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AGREEMENT NO. CE/38/95  
IMPROVEMENT TO KAM TIN ROAD, STAGE 1  
ENVIRONMENTAL IMPACT ASSESSMENT AND  
DRAINAGE IMPACT ASSESSMENT STUDIES

ENVIRONMENTAL IMPACT ASSESSMENT

FINAL REPORT

(VOLUME 1 OF 2)

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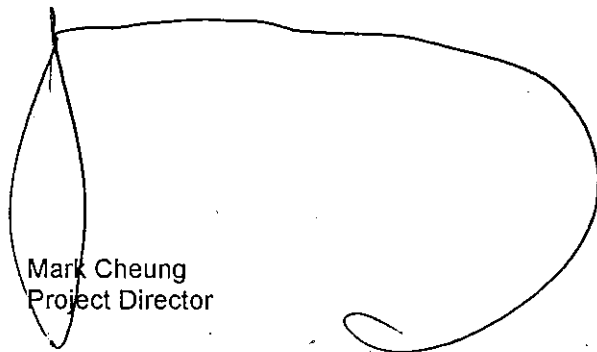
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Dear Sirs,

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Improvement to Kam Tin Road, Stage I  
Environmental Impact Assessment and  
Drainage Impact Assessment Studies  
Environmental Impact Assessment  
Final EIA Report, EM&A Manual and Executive Summary

We enclose one set of the Final EIA Report, EM&A Manual and the Executive Summary for your retention and record.

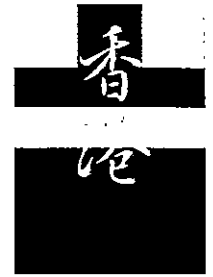
Yours faithfully,  
For and on behalf of  
**Babtie BMT (Hong Kong) Ltd. and  
Ho Tin & Associates Consulting Engineers Ltd.**



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## ENVIRONMENTAL IMPACT ASSESSMENT

FINAL REPORT  
(volume 1 OF 2)

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# Section 1

## Introduction

## SECTION 1 INTRODUCTION

### 1.1 Background

Babtie BMT (HK) Ltd. and Ho Tin & Associates Consulting Engineers Ltd. in association with Enpac Ltd., Urbis Travers Morgan Ltd. and Delcan International Corporation are commissioned by Highways Department/NT Region to carry out the Environmental Impact Assessment and Drainage Impact Assessment Studies for the Improvement to Kam Tin Road, Stage 1.

The current Kam Tin Road is a single 2-lane carriageway linking Castle Peak Road at Au Tau Interchange to Route Twisk. To cater for the future development and increased traffic demand over the North West New Territories Area, there is an urgent need to upgrade the existing Kam Tin Road which is currently approaching its capacity. The situation will be further worsened by the opening of Route 3 (Country Park Section).

The whole improvement project is divided into two stages. Stage 1 starts from Au Tau Roundabout and end at the western end of Kam Tin Bypass. Stage 2 starts from eastern end of the Kam Tin Bypass and end at the Route Twisk Roundabout. In stage 1, the 1.1km long Kam Tin Road section between Au Tau Roundabout and Kam Tin River will be upgraded to a dual 2-lane carriageway road. The location of the Kam Tin Road which will be included in the stage 1 improvement is shown on Figure 1.1.

### 1.2 Scope of EIA Study

A Preliminary Project Feasibility Study (PPFS) for the Project was carried out by HyD in early 1995. As part of the PPFS, an Environmental Review (ER) was conducted by the EPD. The review covered potential air quality, water quality, noise and ecological impacts arising from the construction and operation of the Project.

Given the fairly limited works associated with the Project, impacts related to waste disposal and water quality are unlikely be significant. As such, it was concluded in the ER that these two environmental aspects will not be major issues and no detailed impact assessments on waste disposal and water quality are required.

With regard to the potential effect on air quality brought about by traffic emissions, it is anticipated that the sensitive receivers will unlikely be subject to adverse impact as adequate buffer distances (over 10m) are maintained between the receivers and Kam Tin Road. The ER therefore concluded that no detailed air quality impact assessment is needed.

Site surveys on the environmental conditions of the Project area and review on the proposed engineering works during the conduction of the EIA have concurred the above findings by the ER.

The EIA study, however, should address the potential noise and ecological impacts associated with the implementation of the Project. Also, appropriate contractual clauses and engineering conditions (on air quality, water quality, waste disposal and noise aspects) should be established for incorporation onto the Contract Documents to control deterioration of environmental qualities during the construction phase.

### 1.3 Purpose of Environmental Impact Assessment Study

The purpose of this Environmental Impact Assessment (EIA) Study is to provide information on the nature and extent of environmental impacts arising from the construction and operation of the proposed project and all related activities taking place concurrently.

### 1.4 Objective of Environmental Impact Assessment Study

The objectives of the assessment are as follows:

- i) to describe the proposed project and associated works together with the requirements for carrying out the proposed project;
- ii) to identify and describe the elements of the community and environment likely to be affected by the proposed project, and/or likely to cause adverse impacts upon the proposed project, including both the natural, ecological, landscape and visual and man-made environment;
- iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- iv) to propose the provision of infrastructure or mitigation measures so as to minimise pollution, environmental disturbance and nuisance during construction and operation of the project;
- v) to identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and cumulative effects expected to arise during the construction and operation phases of the project in relation to the sensitive receivers and potential affected uses;
- vi) to identify options and opportunities for landscape works that will help increase the visual quality and amenity value of the site, and help ameliorate the impact, of noise and air pollution resulted from the construction and operation of the project;
- vii) to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the project which are necessary to mitigate these impacts and reduce them to acceptable levels;
- viii) to design and specify the environmental monitoring and audit requirements necessary to ensure the implementation and the effectiveness of the environmental protection



and pollution control measures adopted;

- ix) to investigate the extent of side-effects of proposed mitigation measures that may lead to other forms of impacts;
- x) to identify constraints associated with the mitigation measures recommended in the study; and
- xi) to identify any additional studies, including ecological surveys, necessary to fulfil the objectives to the requirements of this EIA Study.

### 1.5 Study Approach

The study approach is detailed in the relevant section of this report and is broadly outlined as follows:-

- i) Carry out the background studies to identify, collect and analyse existing information relevant to the EIA Study;
- ii) carry out environmental survey including ecological survey, landscape and visual survey, site investigations and baseline monitoring work;
- iii) quantify by use of mathematical models or other predictive methods, the residual and cumulative environmental impacts (distinguishing whether these are transient, long term and/or irreversible) arising from the construction and operation of the project;
- iv) propose practicable, cost effective and enforceable methods, measures and standards to effectively mitigate any significant environmental impacts in the short and long term; and
- v) outline a programme by which the environmental impacts of the project can be assessed, monitored and audited.

## 1.6 Structure of Report

The structure of this report is as follows:-

- Section 1. Introduction  
Provides a general description of the background, scope, purposes, objectives and the study approach.
- Section 2. Kam Tin Road Improvement Stage 1 and Other projects.  
Provides an overview of all the existing and proposed projects in the vicinity of Kam Tin Road Improvement Stage 1.
- Section 3 Noise Impact Assessment  
Identify noise sensitive receivers, present the results of noise impact assessment and recommend the mitigation measure.
- Section 4 Ecological Impact Assessment  
Identify the ecological important areas and presents the results of ecological impact assessment.
- Section 5 Visual and Landscape Impact Assessment  
Present the result of visual and landscape impact assessment and make recommendation to mitigate the identified impacts.
- Section 6 Working Paper on Traffic Study  
Present the result of traffic study for the assessment of environmental impact.
- Section 7 Summary and Recommendations  
Summarise all the findings and recommendations in sections 3, 4 and 5.

**Section 2**

**Kam Tin Road Improvement Stage 1 and  
Other Projects**

## SECTION 2      KAM TIN ROAD IMPROVEMENT STAGE 1 AND OTHER PROJECTS

### 2.1 Introduction

The Kam Tin Road Improvement Stage 1 is part of a project previously known as 109TH titled North West New Territories Development - Improvement to Kam Tin Road. This section provide an overview of the proposed project and other adjacent projects and future developments in the study area which may contribute to environmental impact during the construction and operation of the proposed project.

### 2.2 Kam Tin Road Improvement Stage 1

#### 2.2.1 Project Description

The current Kam Tin Road is a single 2-lane carriageway road with provision of narrow footpath at discrete locations. To cope with the future traffic demand, it will be upgraded to a dual 2-lane carriageway with central reserves, footpaths on both sides and cycle track. The proposed road follow roughly the alignment of the existing Kam Tin Road with widening works on either side of the existing road and is mainly found on earth embankment. The preliminary road layout is shown on Figures 2.1 to 2.4. Besides, a typical road section is shown on Figure 2.5.

As described in the Brief, the Kam Tin Road Improvement Stage 1 includes the following major elements:-

- i) Widening of the 1.1km long Kam Tin Road section between Au Tau Roundabout and Kam Tin River from a single carriageway road to a dual 2-lane carriageway road;
- ii) Provision of pedestrian and cyclist facilities, including 2m wide footpath with 3m wide cycle track on the north side and 3.5m wide footpath on the south side and traffic signal controlled pedestrian crossings. From the junction with the Route 3 (Country Park Section (CPS)) slip roads eastward, the footpath on the south side will be reduced to 2m to tie in with the existing footpath in Kam Tin Town;
- iii) Construction of 24m long lay-bys for buses and general loading/unloading activities at appropriate locations (average 300m apart) and reprovision of existing proper run-ins;
- iv) Provision of associated traffic management works, drainage works and environmental mitigation measures ; and
- v) Necessary modification of the junctions of Kam Tin Road at Au Tau Roundabout, with Route 3 (CPS) slip roads, and the access road leading to an electric substation.

### 2.2.2 Construction Programme

The construction works is programmed to start on Feb. 99 and complete on Aug. 2001. The tentative construction programme is shown on Figure 3.2 and is subject to review and adjustment if necessary.

### 2.2.3 Study Area

The study area is defined in the brief as the area within 300m from the centre line of the proposed Kam Tin Road. The boundaries is outlined on Figure 3.1. The study area may be further extended for ecological impact assessment and landscape and visual impact assessment when necessary.

This portion of Kam Tin Road runs from Au Tau roundabout on the western end to the proposed Kam Tin Bypass on the eastern end outside Kam Tin Shi. This portion of Kam Tin Road mainly runs through scattered low rise residential development/village, commercial/open storage and agricultural small holdings/fish pond. All these features are shown on Figure 5.2.

## 2.3 Kam Tin Bypass

Kam Tin Bypass is a proposed 1.3km long new route running to the north of Kam Tin Town to relieve the traffic condition of the town centre portion of Kam Tin Road. The road is a dual 2-lane standard carriageway constructed on embankments. On the western end, it will link Kam Tin Road Stage 1 Improvement Work.

The construction work is tentatively scheduled to start in early 2000 and end in end 2001.

## 2.4 Route 3 (Country Park Section)

This portion of Route 3 includes the Tai Lam Tunnel and Yuen Long Approach Road and is implemented on a Build Operate and Transfer (BOT) basis under the management of Highways Department. The portion of Route 3 adjacent to the study area is mainly constructed on embankment with a few elevated bridge structures over Slip Roads I & J, access to a WSD pumping station and Kam Tin Road. It is also connected to Kam Tin Road through proposed Slip Roads I & J.

The project is currently implemented and is schedule to complete and open to traffic in July/August 1998.

## 2.5 Main Drainage Channels for Yuen Long and Kam Tin

Since Yuen Long and Kam Tin areas are under frequent and extensive flooding, there are several major drainage works managed by Drainage Services Department in this area. Among these projects, the proposed works which is under PWP item no. 81CD (formerly known as 22CD) and 43CD are close to our study area and have to be considered in our assessment.

The construction of PWP item 43CD is currently in progress and is tentatively scheduled to complete by the mid of 1998. The tentative programme for item 81CD (formerly known as 22CD) is mid 1998 to end 2000.

## 2.6 Western Corridor Railway

The project is under the jurisdiction of Transport Branch, with the assistance of Highways Department. Kowloon-Canton Railway Corporation (KCRC), as the prospective builder and operator of the railway, is carrying out planning and engineering studies on the project.

According to a Railway Development Study managed by the Railway Division of Highways Department, the proposed completion date is year 2001. Since this project is only in the preliminary stage, there is no firm programme on the exact start and finish dates.

The portion of the proposed Western Corridor Railway next to our study area run along the side of the Route 3 (Country Park Section) and is constructed mainly on embankment. Similar to Route 3, it also crosses over Kam Tin Road on elevated structures.

## Section 3

# Noise Impact Assessment

## SECTION 3 NOISE IMPACT ASSESSMENT

### 3.1 INTRODUCTION

#### 3.1.1 Background

The section of Kam Tin Road between Au Tau Roundabout and the proposed Kam Tin Bypass (western end) is to be improved to increase its capacity in order to cater for the increasing traffic demand arising from the rapid development in the North West New Territories, and to relieve the heavy traffic flows on Kam Tin Road upon the planned opening of Route 3 - Country Park Section in 1998 and Kam Tin Bypass in end 2001.

The stretch of Kam Tin Road for which improvement works are proposed is currently a single 2-lane carriageway with narrow footpaths at discrete locations. The proposed improvement works, including widening/modification of road sections, provision of pedestrian/cyclist facilities and lay-bys, and construction of engineering and traffic management works, will upgrade the road to a dual 2-lane carriageway. Figure 3.1 shows the works limit of Improvement to Kam Tin Road, Stage 1 (the Project).

#### 3.1.2 Study Objectives

The purpose of the Study is to provide information on the nature and extent of the potential noise impacts on the environment arising from the construction and operation of the Project and all concurrent activities in the area.

The noise assessment results will be used as the basis for the evaluation of the noise impacts of the proposed road improvement works on both existing and planned communities, as well as for the identification of locations where the acceptable noise level criteria are exceeded and appropriate noise mitigation measures may be required.



## 3.2 PROPOSED ROAD IMPROVEMENT SCHEME

### 3.2.1 Proposed Road Improvement Works

The existing Kam Tin Road is to be improved to provide additional traffic capacity and at the same time to enhance pedestrian safety through provision of wider continuous footpaths.

The Project will upgrade the 1.1 km long Kam Tin Road between Au Tau Roundabout and Kam Tin River from a single carriageway to a dual 2-lane carriageway. The alignment of the upgraded Kam Tin Road in this section will follow approximately the existing alignment of Kam Tin Road.

In addition, a 2 m wide footpath with 3 m wide cycle track on the northern side and 3.5 m wide footpath on the southern side will be provided. There will be a 24 m long lay-bys for buses and general loading/unloading activities at appropriate locations (averaging 300 m apart).

### 3.2.2 Construction Programme

A preliminary construction programme for the road widening works has been scheduled as shown in Table 3.2.1 (also see Figure 3.2):

**Table 3.2.1 Preliminary Construction Programme**

Month	Construction Activity	
	No.	Description
1 - 2	1	Preliminaries, site clearance and mobilisation
3 - 12	2	Excavation
6 - 15	3	Backfilling and subbase
12 - 18	4	Drainage and utilities
12 - 15	5	Kerbing
15 - 19	6	Road paving on widened portion
17 - 20	7	Breaking of existing road surface
20 - 26	8	Drainage and utilities
22 - 26	9	Backfilling and subbase
23 - 27	10	Kerbing
25 - 30	11	Road paving and road sign
28 - 30	12	Footpath

### 3.2.3 Construction Activities

Road works will consist of construction of flexible pavement comprising subbase, roadbase, basecourse and wearing course. Drainage for the carriageway will be provided by a gravity flow drainage system consisting of gullies, manholes, drain pipes, surface channels and possibly subsoil drains. A water main of 1400mm diameter will be laid along Kam Tin Road between Au Tau Pumping Station and the Au Tau Roundabout.

The existing traffic will be maintained during the construction period by adopting an appropriate temporary traffic diversion scheme. The construction will proceed generally in the following sequence : (a) widening of carriageway while maintaining traffic in the existing Kam Tin Road, and (b) reconstruction of the existing Kam Tin Road while diverting the traffic to the widened carriageway.

Equipment requirements for each activity are provided in Table 3.2.2, along with sound power levels (SWLs) for individual and groups of equipment. Equipment SWLs employed for this assessment are based on those contained in Table 3 of the *Technical Memorandum on Noise from Construction Work other than Percussive Piling* and Table 11 of *BS 5228: Part 1: 1984*. No percussive pilings are anticipated for the construction of the Project.

### 3.2.4 Predicted Traffic Flows

A comprehensive survey has been conducted for the prediction of the traffic demand in the design year 2011 in the study area, including sections of Castle Peak Road, Kam Tin Road, Route 3 (Country Park Section) and its slip roads to Kam Tin Road, Kam Tin Bypass, Kam Sheung Road and two local access roads. The results are contained in *Improvement to Kam Tin Road, Stage 1, Environmental Impact Assessment Studies - Working Paper on Traffic Study, January 1996*, which has been accepted by the New Territories Regional Office, Territory Transport Planning Division, and Transport Surveying Division of Transport Department.

Upon reviewing the traffic survey results, CTS-2 data and other similar studies, it was concluded that the daily traffic peak in the study area occurred in the AM period. As such, the predicted traffic flows in the AM peak hours have been adopted in this noise impact assessment.

Projected 2011 AM peak hour traffic flows and vehicle composition for the roads under consideration are given in Table 3.2.3 below.

Table 3.2.2 Typical Equipment Requirements

Construction Activity	Equipment and Quantity		CNP Code	SWL, dB(A)	
				Per piece	Total
Preliminary works and mobilisation	Truck with crane	1	048	112	112
Excavation	Air compressor <sup>(1)</sup>	1	002	100	120
	Driller	1	064	103	
	Backhoe (Excavator)	2	081	112	
	Bulldozer	1	030	115	
	Lorry <sup>(2)</sup>	10	141	112	
	Road roller	1	185	108	
Back filling and subbase	Backhoe (Excavator)	3	081	112	119
	Bulldozer	1	030	115	
	Road roller	1	185	108	
Drainage and utilities	Truck with crane	1	048	112	119
	Dump truck <sup>(2)</sup>	1	067	117	
	Backhoe (Excavator)	1	081	112	
	Vibrator	2	170	113	
	Concrete mixer	1	046	96	
	Road roller	1	185	108	
Kerbing	Concrete mixer	1	046	96	117
	Vibrator	2	170	113	
	Dump truck <sup>(2)</sup>	1	067	117	
Road paving on widened portion	Asphalt truck	4	<sup>(3)</sup>	110	117
	Paver	1	004	109	
	Road roller	1	185	108	
Breaking of existing road surface	Backhoe (Excavator)	2	081	112	118
	Hydraulic breaker	1	024	110	
	Dump truck <sup>(2)</sup>	2	067	117	
Back filling and subbase	Road roller	1	185	108	122
	Dump truck <sup>(2)</sup>	15	067	117	
Kerbing	Concrete mixer	1	046	96	117
	Vibrator	2	170	113	
	Dump truck <sup>(2)</sup>	1	067	117	
Road paving and road sign	Asphalt truck	4	<sup>(3)</sup>	110	118
	Paver	1	004	109	
	Road roller	1	185	108	
	Truck with crane	1	048	112	
Footpath	Concrete mixer	1	046	96	116
	Vibrator	2	170	113	

- Notes: (1) Silenced type air compressor.  
(2) 20% on-time with an adjustment of -7 dB(A) is applied to lorry and dump truck operations.  
(3) SWL based on Table 11 of *BS 5228: Part 1: 1984*.

Table 3.2.3 Predicted 2011 AM Peak Traffic Flows

Road	2-way Flow (veh/hr)	% of Heavy Vehicles <sup>(1)</sup>	Speed (kph)	Surface Material
Kam Tin Road - West of Kam Tin Bypass West Junction	5486	59.1	50	Flexible
Kam Tin Road - East of Kam Tin Bypass West Junction	3013	49.0	50	Flexible
Kam Tin Road - West of Kam Tin Bypass East Junction	464	30.0	50	Flexible
Kam Tin Bypass - East of Kam Tin Bypass West Junction	2479	71.3	70	Pervious Friction Course
Kam Sheung Road	2695	51.8	50	Flexible
Castle Peak Road - Yuen Long	4130	68.0	70	Rigid
Castle Peak Road - Tam Mi	2850	61.0	70	Flexible
Route 3 (Country Park Section)	7030	64.0	100	Pervious Friction Course
Slip road to and from Route 3 (Country Park Section)	800	64.0	50	Pervious Friction Course
Kam Tin Road/Access to Ko Po San Tsuen	83	56.3	50	Flexible
Kam Tin Road/Access to Kam Tin Shi	168	14.0	50	Flexible

Note: (1) All vehicles with an unladen weight exceeding 1525 kg.

Sources: (1) *Improvement to Kam Tin Road, Stage 1, Environmental Impact Assessment Studies Working Paper on Traffic Study, January 1996.*  
 (2) *Route 3 Tai Lam Tunnel & Yuen Long Approach Northern Section, Volume 1, Detailed Environmental Impact Assessment, Final Report, October 1995.*

### 3.3 PROJECT SITE

#### 3.3.1 Existing Noise Environment

The existing noise environment in the vicinity of the Project site is dominated by road traffic on Kam Tin Road, although sensitive developments at the eastern and western ends of the Study Area are also affected by traffic noises generated from Kam Sheung Road and Castle Peak Road respectively.

Background noise surveys in the Study Area had been conducted for recent/concurrent EIA studies for highway projects in Kam Tin area. The monitoring results are summarised in Table 3.3.1 and the locations of the monitoring stations shown in Figure 3.3.

The calculated existing traffic noise levels at stations M1 and M2, based on recent traffic count information (see Table 3.3.2), are 77.3 and 77.6 dB(A) respectively. These predicted levels are consistent with the measured  $L_{10}$  (1 hour) noise levels at the stations. Other calculated existing noise levels at NSRs in the Study Area are given in Table 3.5.3 (see Section 3.5.2 below).

According to the monitoring and calculated results, it is apparent that the existing NSRs along Kam Tin Road are currently suffering from unacceptable traffic noise impacts.

**Table 3.3.1 Background Noise Measurements**

Monitoring Station	Designation	Facade Noise Level, dB(A)		
		Daytime (07:00-19:00)		AM Peak
		$L_{eq}$ (1 hour)	$L_{10}$ (1 hour)	$L_{10}$ (1 hour)
M1	Village House at Ko Po Tsuen	71.2 - 73.3	74.4 - 76.8	76.8
M2	Kam Tin Dragon Kindergarten	71.0 - 77.1	74.0 - 76.5	76.5

- Sources:
- (1) *Route 3 Country Park Section and Ting Kau Bridge, Preliminary Design Stage 2, Country Park Section - Tai Lam Tunnel and Yuen Long Approach Road, Volume 3A, Environmental Assessment - Technical Report.*
  - (2) *Route 3 Country Park Section and Ting Kau Bridge, Preliminary Design Stage 2, Country Park Section - Tai Lam Tunnel and Yuen Long Approach Road, Volume 3B, Environmental Assessment - Appendices.*
  - (3) *Kam Tin Bypass, Design and Construction Consultancy, Environmental Impact Assessment (Draft).*

**Table 3.3.2 Existing AM Peak Traffic Flows**

Road	2-way Flow (veh/hr)	% of Heavy Vehicles	Speed (kph)
Kam Tin Road	1540	32.7	50
Kam Sheung Road	491	40.0	50
Castle Peak Road - Yuen Long	4554	35.6	70
Castle Peak Road - Tam Mi	2938	41.7	70
Kam Tin Road/Access to Ko Po San Tsuen	83	56.3	50
Kam Tin Road/Access to Kam Tin Shi	168	14.0	50

Source: Observed 1995 traffic flows as contained in *Improvement to Kam Tin Road, Stage 1, Environmental Impact Assessment Studies, Working Paper on Traffic Study, January 1996 (See Appendix)*.

### 3.3.2 Existing Noise Sensitive Receivers

Existing noise sensitive receivers in the vicinity of the Project site are likely to be adversely affected by the proposed road works. Site surveys undertaken in November 1995 and January 1996 reveal that existing NSRs in the Study Area are mainly low-rise developments, including village houses, villas, residential blocks, three educational institutions and a church. The identified NSRs are listed below and depicted in Figures 3.4 and 3.5:

- Isolated village houses at Au Tau roundabout.
- School and church adjacent to Castle Peak Road - Yuen Long.
- Village houses at Ko Po San Tsuen.
- Villas at "Kam Fung Terrace".
- Village houses at Ko Po Tsuen.
- Schools and low-rise residential developments at Kam Tin Shi.

The following observations were also made during the recent site visits and these are recorded in Figures 3.4 and 3.5:

- NSRs to the immediate east of Au Tau Roundabout have been removed, and the area becomes a construction site at present.
- Rural developments to the south of Kam Tin Road, between CLP's electric substation and access road leading to Ko Po San Tsuen, are either ruins or being cleared to make way for a construction site.
- Many buildings located wayside of Kam Tin Road are occupied for non-sensitive uses such as godowns, storage yards, car-repairing shops, etc.

- Many village houses are ruins or abandoned, particularly those located between Ha Ko Po Tsuen and Au Tau Roundabout. No noise sensitive use is planned for the land presently occupied by these ruined/removed structures as they fall within the zone of Agriculture, Conservation Area and Undetermined according to Outline Zoning Plan.
- The village house to the immediate south of Au Tau Roundabout is substantially screened from the Project by several industrial buildings and a hill slope, and the noise impact on this house should be negligible.
- Village houses at Ha Ko Po Tsuen and the isolated house for the aged at Ko Po San Tsuen fall within the site limit of Route 3 or Western Corridor Railway, and will be cleared for the constructions before the operation of this project. As such, they are excluded from this assessment.
- Kam Tin Dragon Kindergarten and Kam Tin Mung Yeung Public School have been provided with air-conditioners under the *Noise Abatement Programme in Schools*. Besides, noise impacts at these two educational institutions have been addressed in the *Kam Tin Bypass EIA Report*. As traffic noise arising from this Project would not constitute additional impacts, these two educational institutions are excluded from this assessment.

Representative NSRs have been selected for construction and operational noise impact assessments and these are presented in Table 3.3.3 and Figures 3.4 and 3.5. Regarding construction noise impact assessment, 11 out of 23 representative NSRs have been selected. Furthermore, operational noise impact assessment have been undertaken for all of the identified representative NSRs.

### 3.3.3 Future and Planned Sensitive Uses

Information on future/planned sensitive uses has been obtained from the latest Outline Zoning Plans prepared by the Planning Department, and is presented in Figure 3.6. The area in and around Ko Po Tsuen has been zoned for village development. A representative receptor point east of Ko Po Tsuen and at 20 m away from the edge of the carriageway of the improved Kam Tin Road has been chosen for impact assessment (designated as "P1" in Figure 3.5).

Another area at Kam Tin Shi has also been zoned for residential development (Village Type Development and Residential Group C). A representative receptor point south of Kam Tin Shi and at 65 m away from the edge of the carriageway of the Kam Tin Road has been chosen for impact assessment (designated as "P2" in Figure 3.5).

Table 3.3.3 Representative Noise Sensitive Receivers

NSR	Designation		No. of Storey	No. of Dwellings Represented	Buffer <sup>(1)</sup> Distance (m)	Potential Noise Impact	
	Location	Building Type				Construction	Operational
AT-1	Au Tau Roundabout	Village house	1	1	17	Yes	Yes
CH		Church	2	-	300	No <sup>(2)</sup>	Yes
SCH		School	6	-	300	No <sup>(2)</sup>	Yes
KPST-1	Ko Po San Tsuen	Village house	3	3	102	Yes	Yes
KPST-2		Village house	2	2	94	Yes	Yes
KPST-3		Village house	1	1	105	Yes	Yes
KPST-4		Village house	2	2	115	Yes	Yes
KPT-1	"Kam Fung Terrace"	Villa	3	15	74	Yes	Yes
KPT-2		Villa	3	3	42	Yes	Yes
KPT-3		Villa	3	6	42	Yes <sup>(3)</sup>	Yes
KPT-4	Ko Po Tsuen	Village house	3	6	66	Yes	Yes
KPT-5		Village house	3	6	38	Yes	Yes
KPT-6		Village house	3	3	25	Yes <sup>(4)</sup>	Yes
KPT-7		Village house	3	9	35	Yes	Yes
KPT-8		Village house	3	3	43	Yes	Yes
KPT-9		Village house	3	9	30	Yes	Yes
KPT-10		Village house	3	3	23	Yes <sup>(4)</sup>	Yes
KPT-11		Village house	3	3	32	Yes <sup>(4)</sup>	Yes
KPT-12		Village house	3	3	32	Yes <sup>(4)</sup>	Yes
KPT-13		Village house	2	8	47	Yes	Yes
KTS-1		Village house	3	9	182	Yes	Yes
P1	Adjacent to Ko Po Tsuen	Village Type Development	3 <sup>(5)</sup>	-	20 <sup>(5)</sup>	No	Yes
P2	South of Kam Tin Shi	Residential Group C	3 <sup>(5)</sup>	-	65 <sup>(5)</sup>	No	Yes

- Notes: (1) Distance from sensitive facade to edge of carriageway of the improved Kam Tin Road.
- (2) Construction noise impact is considered negligible due to topographical screening effect and a considerable distance of about 300m.
- (3) The worst construction noise impacted NSR at "Kam Fung Terrace".
- (4) The worst construction noise impacted NSRs at Ko Po Tsuen.
- (5) As no information on future development is available, number of storey and buffer distance have been assumed.



### 3.4 METHODOLOGY

#### 3.4.1 Environmental Standards and Guidelines

##### 3.4.1.1 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* sets a non-statutory daytime noise limit of 75 dB(A)  $L_{eq}(30 \text{ min})$  at the facades of dwellings. It 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 the *Technical Memorandum on Noise from Construction Work other than Percussive Piling* issued under the Noise Control Ordinance (NCO) are not applicable to this Project.

###### (c) Percussive Piling

No percussive piling is anticipated during the construction phase and therefore the criteria stipulated in the *Technical Memorandum on Noise from Percussive Piling* issued under the NCO are not applicable to this Project.

##### 3.4.1.2 Operational Noise

The impact of operational noise has been assessed with reference to the Hong Kong Planning Standards and Guidelines (HKPSG) which stipulates maximum  $L_{10}$  (1 hour) road traffic noise levels of 70 dB(A) for domestic premises and 65 dB(A) for the educational institutions and churches.

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 three conditions (with HKPSG criteria) set down in UK DOT's *Calculation of Road Traffic Noise, HMSO, 1988* (CRTN) have been adopted to test which NSRs may be qualified for indirect technical remedies.

### 3.4.2 Noise Assessment Methodologies

#### 3.4.2.1 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. A 20% on-time with an adjustment of -7 dB(A) has been applied to lorry and dump truck operations, according to Figure 3.4 of *BS 5228: Part 1: 1984*.

Additionally, for the purpose of this EIA, construction noise impact assessment has been undertaken based on the followings:

- Construction of the Project is assumed to be carried out in 250 m segments, and only a single activity is conducted on each segment at any one time.
- 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.
- The highest total sound power level arising from concurrent construction activities conducted at different segments is used.

#### 3.4.2.2 Operational Noise

Road traffic noise levels have been predicted using ENPAC's in-house noise model which is based on the procedures described in the CRTN. The projected worst case morning peak hour traffic flows for the design year 2011 have been employed for the operational noise assessment.

### 3.5 NOISE IMPACT ASSESSMENT

#### 3.5.1 Construction Phase

As illustrated in the construction programme (see Figure 3.2), construction activities will, during a particular period, be undertaken on individual basis or simultaneously. A set of construction noise assessment scenarios has been identified in accordance with the preliminary construction sequence and activities, and is summarised in Table 3.5.1 below. The assessment scenarios describe broadly individual activities and groups of overlapping activities.

As shown in Table 3.5.1, the total SWLs for the identified scenarios vary from 112 to 126 dB(A). It is clear that assessment scenario N is the noisiest operation, and therefore this scenario has been adopted for impact assessment.

**Table 3.5.1 Construction Noise Assessment Scenarios**

Scenario	Activity <sup>(1)</sup>	Total SWL <sup>(2)</sup> dB(A)
A	1	112
B	2	120
C	2,3	123
D	2,3,4,5	125
E	3,4,5	123
F	3,4,5,6	124
G	4,6	121
H	4,6,7	123
I	6,7	121
J	7,8	122
K	8	119
L	8,9	124
M	8,9,10	125
N	8,9,10,11	126
O	10,11	121
P	11,12	120

- Notes: (1) See Table 3.2.1 for activity numbers.  
 (2) A 20% on-time with an adjustment of -7 dB(A) has been applied to lorry and dump truck operations.

A +3 dB(A) facade correction has been added to the predicted noise levels in order to account for the facade effect at each NSR. Also, a negative correction of 10 dB(A) has been applied to NSRs substantially protected by a topographical feature such as building and hill slope.

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.

Construction noise calculation results for scenario N are shown in Table 3.5.2.

With the exception of NSR KTS-1, all the dwellings are likely to be exposed to noise levels above 75 dB(A). The predicted construction noise level at the most affected dwellings (AT-1) exceeds the noise limit by 9 dB(A). Mitigation measures are therefore required to alleviate the construction noise impacts.

Table 3.5.2 Construction Noise Levels for the Worst Case Scenario (Unmitigated)

NSR	Drainage and Utilities		Backfilling and Subbase		Kerbing		Road Paving and Road Sign		Total Noise Level dB(A)
	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	
AT-1	29	84	257	69	568	57	878	54	84
KPST-1	170	68	112	76	305	62	605	54	77
KPST-2	185	68	100	77	278	63	580	58	78
KPST-3	255	65	115	76	215	65	508	56	77
KPST-4	288	64	124	75	198	66	482	59	76
KPT-3	525	59	216	70	55	77	203	67	78
KPT-6	595	58	285	68	39	80	130	71	81
KTP-10	625	57	315	67	31	82	99	73	83
KPT-11	651	47 <sup>(1)</sup>	342	56 <sup>(1)</sup>	42	79	76	75	80
KTP-12	668	47 <sup>(1)</sup>	360	56 <sup>(1)</sup>	65	76	41	81	82
KTS-1	1110	52	810	49 <sup>(1)</sup>	528	58	228	66	67

Notes: (1) A correction of -10 dB(A) has been applied to account for the screening effect of buildings.

### 3.5.2 Operational Phase

The traffic noise levels at the sensitive facades of the chosen NSRs have been calculated using the UK DOT procedures. The traffic flows used in the computer simulation are those presented in Tables 3.2.3 and 3.3.2 previously. Also, noise reductions offered by the barriers and embankments at Route 3 have been taken into account in the noise modelling.

The results of the noise analysis are presented in Table 3.5.3.

Table 3.5.3 shows that current (1995) traffic noise already exceeds the HKPSG maxima at a number of NSRs resided close to (with a buffer distance less than 50 m) and facing Kam Tin Road. These significantly impacted NSRs include the village houses at the front row of Ko Po Tsuen and "Kam Fung Terrace", and the isolated house at Au Tau Roundabout. It is estimated that the current noise levels at 37 number of dwellings exceed the HKPSG criteria.

According to the 2011 modelling results, all of the NSRs except KTS-1 along the Project alignment are subject to severe operational noise impacts. The predicted  $L_{10}$  noise levels are ranging from 70 to 84 dB(A), representing a maximum noise exceedance of 14 dB(A) for village developments. Such adverse impacts are mainly due to: (1) limited source-receiver buffer distances (12 out of the 21 existing representative NSRs are located less than 50 m away from the edge of the carriageway of the improved Kam Tin Road), (2) high 2011 peak hour traffic flow (about 5500 veh/hr), (3) high percentage of heavy vehicles (about 59%), (4) lack of topographical barriers (e.g. hill slopes and large non-sensitive buildings) in the Project area, and (5) other roads effects.

Given that the predicted noise levels at the identified NSRs are well in excess of the HKPSG criteria, appropriate noise mitigation measures should be provided to remedy the adverse noise environment.

Table 3.5.3 Current and 2011 Traffic Noise Levels (Unmitigated)

NSR	Assessment Point (Storey)	mPD Level (m)	Assessment Criterion L <sub>10</sub> dB(A)	Current Noise Level, dB(A)		2011 Noise Level, dB(A)		
				L <sub>10</sub>	Exceedance over Criterion	Improved Kam Tin Road	Other Roads	Overall
AT-1	1	13.5	70	77	7	84	72	84
KPST-1	3	23.1	70	68	-	76	75	79
KPST-2	2	14.3	70	69	-	76	73	78
KPST-3	1	8.5	70	69	-	75	68	75
KPST-4	2	10.8	70	69	-	73	69	74
KPT-1	3	11.2	70	68	-	75	66	75
KPT-2	3	11.2	70	74	4	81	69	81
KPT-3	3	11.2	70	74	4	81	68	81
KPT-4	3	11.2	70	68	-	75	63	75
KPT-5	3	11.7	70	72	2	78	66	78
KPT-6	3	11.7	70	77	7	83	70	83
KPT-7	3	11.7	70	70	-	77	62	77
KPT-8	3	11.7	70	68	-	75	61	75
KPT-9	3	11.7	70	71	1	77	63	78
KPT-10	3	11.7	70	77	7	83	70	83
KPT-11	3	11.9	70	75	5	81	68	82
KPT-12	3	12.8	70	75	5	82	68	82
KPT-13	2	12.8	70	69	-	75	65	76
KTS-1	3	10.4	70	68	-	67	67	70
P1	3	12.7	70	-	-	83	70	84
P2	3	14.1	70	-	-	67	75	75
CH	2	17.4	65	76	11	54	76	76
SCH	6	36.2	65	72	7	47	73	73

### 3.6 NOISE MITIGATION MEASURES

#### 3.6.1 Construction Phase

As discussed in Section 3.5.1, most of the NSRs are likely to be exposed to significant construction noise impacts. Suitable noise mitigation measures should be provided to protect the affected NSRs throughout the construction period.

For mitigation of construction noise at the Project site, the most effective measure is to control noise at source. In the case of PME, this involves either selecting silenced equipment, or reducing transmission of noise using mufflers, silencers, or acoustic enclosures. As the NSRs are low-rise, erecting temporary noise barriers at the site boundary or around the noisy equipment is an effective mitigation options. Table 3.6.1 demonstrates how construction noise could be mitigated at the adversely affected NSRs by installing noise barriers.



Table 3.6.1 Construction Noise Levels for the Worst Case Scenario (Mitigated)

NSR	Drainage and Utilities		Backfilling and Subbase		Kerbing		Road Paving and Road Sign		Total Noise Level dB(A)
	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	Intervening Distance (m)	Noise Level dB(A)	
AT-1	29	74 <sup>(1)</sup>	257	69	568	57	878	54	75
KPST-1	170	68	112	66 <sup>(1)</sup>	305	62	605	54	71
KPST-2	185	68	100	67 <sup>(1)</sup>	278	63	580	58	71
KPST-3	255	65	115	66 <sup>(1)</sup>	215	65	508	56	70
KPST-4	288	64	124	65 <sup>(1)</sup>	198	66	482	59	70
KPT-3	525	59	216	70	55	67 <sup>(1)</sup>	203	67	73
KPT-6	595	58	285	68	39	70 <sup>(1)</sup>	130	71	75
KTP-10	625	57	315	67	31	72 <sup>(1)</sup>	99	63 <sup>(1)</sup>	74
KPT-11	651	47 <sup>(2)</sup>	342	56 <sup>(2)</sup>	42	69 <sup>(1)</sup>	76	65 <sup>(1)</sup>	71
KPT-12	668	47 <sup>(2)</sup>	360	56 <sup>(2)</sup>	65	66 <sup>(1)</sup>	41	71 <sup>(1)</sup>	72
KTS-1	1110	52	810	49 <sup>(2)</sup>	528	58	228	66	67

- Notes: (1) A noise reduction of -10 dB(A) has been allowed for the provision of temporary noise barriers.  
(2) A correction of -10 dB(A) has been applied to account for the screening effect of buildings.  
(3) A noise reduction of -10 dB(A) has been allowed for the provision of temporary noise barriers during examination period only.

In addition to the provision of temporary noise barriers, the following alternative/additional noise reduction measures should be implemented by the Contractor to reduce noise levels from project activities:

- 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 quietest, but may require long 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 or during school examination hours 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.
- The power units of non-electric stationary plant and earth-moving plant may be quietened by vibration isolation and partial or full acoustic enclosures for individual noise-generating components.
- Construction activities shall be planned so that parallel operation of several sets of equipment close to a given receiver is avoided.
- If possible, the numbers of operating items of powered mechanical equipment 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 reducing measures other than noise barriers (e.g. earth embankment) may be used to screen specific receivers. Enclosures for noisy activities such as concrete breaking should be applied where the noise impact is potentially severe.

While it is not feasible to dictate the methods of construction to be employed by the Contractor, noise control requirements can be incorporated in the tender/contract documents, specifying the noise standards to be met and requirements for noise monitoring on the site. Details of environmental monitoring and audit (EM&A) requirements are contained in the EM&A Manual.

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 and school administrations 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, the Government and the Contractor. In addition, residents and school administrations should be provided with a telephone number for the Resident Engineer's office, where they may register complaints concerning excessive noise.

### 3.6.2 Operational Phase

#### 3.6.2.1 Noise Mitigation Options

Traffic noise may be controlled at source, along its path, or at NSR facades. The various options available for mitigating traffic noise have been reviewed, and their suitability for use in this Project are presented below.

##### (a) Control at Source

Controlling traffic noise at its source involves the design of quieter vehicles, traffic management and road surface treatments, all of which result in less noise being generated.

Traffic management measures may be introduced, such as reducing traffic flow or vehicle speed or limiting the use of the road by heavy vehicles. However, such measures for traffic noise reduction would be difficult to be effectively enforced, and would reduce the capacity of the road, thus defeating the purpose of the road improvement works. Hence, these noise mitigation measures would be impractical for this Project.

A pervious macadam paving surface (i.e. friction course surfacing) has high acoustic absorption characteristics that can reduce traffic noise levels by 2.5 dB(A) when compared with impervious or concrete road surface for speed below 75 kph, according to CRTN. In practice, however, the use of pervious macadam paving on low speed roads and roadways subject to start-stop traffic such as Kam Tin Road (with speed limit of 50 kph) is restricted, due to frequent maintenance requirements.

The improved Kam Tin Road will have a number of road junctions, roundabouts, loading and unloading bays, bus bays and pedestrian crossings. Experience with the use of this surfacing materials in Hong Kong indicates that the road surface will require frequent maintenance. The benefits of the reduced traffic noise would be offset by the inconvenience of frequent surfacing repair and replacement operations.

Potential sources of additional traffic noise can be minimised by omitting manhole covers in the carriageway as far as possible during the 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.

**(b) Control along Noise Path**

Controlling traffic noise along its path includes interception by designing the road alignment to incorporate natural or man made topographical barriers or by constructing purpose-built noise screening structures.

Road alignment can be so designed that it incorporates features which will reduce traffic noise at sensitive developments. The road alignment can be altered so that the distance between the carriageway and the affected receiver is increased, thus permitting greater natural attenuation of noise along the path to the receiver.

The alignment of the improved Kam Tin Road is however fixed by the existing road alignment. Additionally, many of the existing developments are situated right at the roadside. It would not be practical or effective to alter the road alignment to control traffic noise in this Project.

Purpose-built noise screening structures can be in the form of roadside barriers, earth bunds, partial enclosures or full enclosures.

Barriers may be provided along the sides of the carriageway. Under normal circumstances, barriers are more effective when provided close to the noise source. Conventional plain barriers are the simplest noise abatement structures to use. This noise screening option requires minimal space requirements and may easily be erected to suite various road conditions. However, the applicability of plain barriers may be fairly limited. Their uses are very often confined to where low-rise buildings are to be protected, or where there is an adequate set back of sensitive receivers. Also, the practical noise reductions normally achieved by noise barriers are about 5 to 10 dB(A) only, although a noise reduction of up to 20 dB(A) can be achieved under desirable conditions.

Alternatively, earth bunds could be provided to screen the noise. In rural areas, earth bunds covered with vegetation provide a less intrusive mitigation option than conventional plain barriers. However, this option generally requires a fairly large land intake. For example, earth bunds of 2 or 3 m height on flat ground would require a minimum land intake of 6 or 9 m respectively. Furthermore, the wide openings required in bunds at junctions and run-ins would render them ineffective and less attractive. To reduce the area of land intake, combinations of earth bunds with short plain barriers on top will be considered at the Design Stage of the Project.

Generally, partial enclosures provide a more effective noise protection to affected receivers than that offered by plain barriers. Subject to the availability of space and compliance with the safety requirements such as sightline distance, they could be built against the edge of road. A properly designed and located partial enclosure could easily achieve a noise reduction of 10 to 15 dB(A).

In terms of acoustical performance, full enclosures can reduce road traffic noise by a substantial amount. However, the improved Kam Tin Road will have a number of road junctions, loading and unloading bays, etc., and therefore the application of full enclosures in this case will not be effective or practical.

(c) **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. Site survey indicates that the existing receivers within the study area do not incorporate any of these measures.

Current practice in noise assessment and mitigation in Hong Kong is that the provision of noise insulation at receivers should only be considered as the last resort should the implementation of all feasible direct technical remedies prove to be impracticable and ineffective. Only those receivers which meet the following three criteria are eligible for consideration of indirect technical remedies by Exco:

- The predicted overall noise level from the new road, together with other traffic noise in the vicinity, must be above the HKPSG criteria of  $L_{10}$  (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 noise level, i.e. the total traffic noise level existing before the commencement of the construction works.
- The contribution to the increase in the noise level from the new road must be at least 1.0 dB(A).

Those qualified receivers that will be affected by increased traffic noise levels following improvement to Kam Tin Road could be protected by the insulation of sensitive facades. This would involve the provision of good quality windows and air conditioning units.

### 3.6.2.2 Noise Mitigation Scenarios

Three noise mitigation scenarios have been identified for evaluation. These mitigation scenarios have been developed based on the considerations of critical factors including noise reduction requirements, source-receiver distances, sightline requirements, fire services installations, highways maintenances, bus-stops provisions and pedestrian facilities. Mitigation Scenario 1 is aimed to protect NSRs at "Kam Fung Terrace", Ko Po Tsuen and the planned NSR to the east of Ko Po Tsuen. Two alternatives, Scenario 1a and Scenario 1b have been considered under Mitigation Scenario 1. Mitigation Scenario 1a uses combinations of 3m, 5m plain barriers and a partial enclosure, while Mitigation Scenario 1b uses combinations of 3m plain barrier and 5.7m high inverted-L barrier. Mitigation Scenarios 2 and 3, on the other hand, are proposed to protect NSRs KPST-1 to 4 at Ko Po San Tsuen and NSR AT-1 at Au Tau respectively. The mitigation scenarios are described in Table 3.6.2 and graphically depicted in Figures 3.7 to 3.9.

In formulating the above mitigation scenarios, a sensitivity analysis has been performed on various forms of the noise mitigation measures, including 3m and 5m high plain barriers, partial enclosure and 5m inverted-L barrier. The underlying principle is that where practical plain barriers up to 5m high are considered to maximize the protection of the NSRs in the Study Area. However, plain barriers higher than 5m are not considered visually and aesthetically acceptable for the rural setting of the Study Area. For more protection, partial enclosures or 5.7m inverted-L barriers are considered more acceptable and more in line with the highway requirements for road clearance. The above combinations are considered appropriate for the protection of the targeted NSRs.

**Table 3.6.2 Noise Mitigation Scenarios**

Mitigation Scenario	Targeted NSR	No. of <sup>(1)</sup> Dwelling Protected	Length of Mitigation Measures (m)			
			3 m Barrier	5m Barrier	Partial Enclosure	5.7 m Inverted-L Barrier
1a	NSRs at "Kam Fung Terrace" and Ko Po Tsuen	27	120	80	280	-
1b	NSRs at "Kam Fung Terrace" and Ko Po Tsuen	27	120	-	-	360
2	NSRs at Ko Po San Tsuen	4	-	250	-	-
3	NSR AT-1	1	-	145	80	-

Note: (1) NSR exposed to Kam Tin Road

Mitigated noise levels at the representative NSRs for each mitigation scenario are shown in Table 3.6.3.

Table 3.6.3 2011 Traffic Noise Levels Under 3 Mitigation Scenarios

NSR	Assessment Point (Storey)	mPD Level (m)	Assessment Criterion L <sub>10</sub> dB(A)	2011 Noise Level, dB(A)			Mitigation Scenario	
				Improved Kam Tin Road	Other Roads	Overall		
AT-1	1	13.5	70	69.8	71.7	73.9	3	
KPST-1	3	23.1	70	68.6	75.4	76.2	2	
KPST-2	2	14.3	70	67.2	73.5 <sup>(1)</sup>	74.4		
KPST-3	1	8.5	70	65.8	68.1	70.1		
KPST-4	2	10.8	70	66.8	68.5	70.7		
KPT-1	3	11.2	70	69.3 (68.9)	65.1 (65.3)	70.7 (70.5)	1a (1b)	
KPT-2	3	11.2	70	68.0 (68.3)	68.3 (68.5) <sup>(1)</sup>	71.2 (71.3)		
KPT-3	3	11.2	70	68.5 (69.1)	68.3 (68.2)	71.4 (71.7)		
KPT-4	3	11.2	70	56.2 (59.4)	63.4 (63.4)	64.2 (64.9)		
KPT-5	3	11.7	70	63.0 (64.6)	65.9 (65.7)	67.7 (68.2)		
KPT-6	3	11.7	70	73.0 (73.0)	69.3 (69.2) <sup>(1)</sup>	74.5 (74.5)		
KPT-7	3	11.7	70	71.3 (71.0)	61.9 (62.2)	71.7 (71.6)		
KPT-8	3	11.7	70	69.5 (69.2)	61.4 (61.7)	70.1 (69.9)		
KPT-9	3	11.7	70	71.2 (71.0)	63.6 (63.7)	71.9 (71.7)		
KPT-10	3	11.7	70	73.4 (73.4)	69.2 (69.1) <sup>(1)</sup>	74.8 (74.8)		
KPT-11	3	11.9	70	68.8 (70.7)	67.4 (66.6)	71.2 (72.1)		
KPT-12	3	12.8	70	71.3 (72.1)	67.9 (67.4)	73.0 (73.3)		
KPT-13	2	12.8	70	67.7 (67.4)	64.3 (63.5)	69.3 (68.9)		
P1	3	12.7	70	69.6 (71.3)	69.1 (68.6)	72.4 (73.2)		
KTS-1	3	10.4	70	67.4	66.6	70.0		-
P2	3	14.1	70	66.9	74.5	75.2		-(2)
CH	2	17.4	65	53.5	75.8	75.9		-(2)
SCH	6	36.2	65	47.1	72.7	72.7	-(2)	

Note: (1) Noise level from "Other Roads" is dominated by Route 3, its noise level contribution is based on that provided in *Route 3 Tai Lam Tunnel & Yuen Long Approach Northern Section, Volume 1, Detailed Environmental Impact Assessment, Final Report, October 1995*.

(2) In view of major noise contributions from other roads outside the project limit, no mitigation scenario is deemed appropriate.

**(a) Kam Fung Terrace and Ko Po Tsuen (Mitigation Scenario 1)**

Mitigation Scenario 1 will provide considerable noise improvement to the NSRs at "Kam Fung Terrace" and Ko Po Tsuen. Scenario 1a and 1b offer comparable noise abatement performance. Despite this, not all the affected receivers will be completely mitigated, particularly those NSRs residing near the run-in junctions due to discontinuation of the noise amelioration structures at these run-in junctions and set back of the mitigation structures to meet the sightline requirements. As such, further mitigation to cater for the residual impacts at NSRs KPT-1, 2, 3, 6, 7, 9 to 12 and P1 are thus required. Also in view of these constraints, it is apparent that full protection is unlikely to be achieved even with the provision of full enclosures.

**(b) Ko Po San Tsuen (Mitigation Scenario 2)**

While Mitigation Scenario 2 will reduce noise generated from the improved Kam Tin Road to below the 70 dB(A) assessment criterion, the overall noise impacts on the village houses at Ko Po San Tsuen remain unacceptable. As shown in Table 3.6.3, the 2011 noise environment will be dominated by traffic noise generated from Route 3 and other roads. In other words, traffic noise from other roads will counteract the noise reduction provided by Mitigation Scenario 2, thus rendering the mitigation provision ineffective and impractical. Furthermore, only 4 dwellings will be benefited from this scheme. Apparently, Mitigation Scenario 2 is not an appropriate measure in terms of acoustic performance and effectiveness, and indirect mitigation should be considered.

**(c) Isolated village house (NSR AT-1) at Au Tau roundabout (Mitigation Scenario 3)**

As Castle Peak Road and Route 3 are the dominant noise sources, even with the substantial noise mitigation structures in Mitigation Scenario 3 (i.e. 145 m long 5 m high barrier and 80 m long partial enclosure), the traffic noise problem at NSR AT-1 still cannot be fully abated. Hence, Mitigation Scenario 3 is not acoustically effective at all. This, coupled with the limited no. of NSR to be benefited (only a single dwelling), suggests that direct mitigation for AT-1 is not a viable approach and consideration should be given to indirect mitigation.

**(d) NSRs outside the Project limit (NSR P2, CH and SCH)**

As shown in Table 3.5.3, the 2011 noise environment at planned NSR P2 near Kam Tin Shi will be dominated by traffic noise generated from the section of Kam Tin Road to the east of the eastern end of the works limit, Kam Sheung Road and/or the future Kam Tin Bypass. Similarly, the noise environment at NSRs CH and SCH will be dominated by traffic noise from Castle Peak Road - Yuen Long. Hence, even with a full enclosure along the improved Kam Tin Road, traffic noise from other roads will counteract the noise reduction provided and thus render any mitigation provisions ineffective and impractical. As such, no mitigation scheme on Kam Tin Road is deemed effective in terms of acoustic performance.



### 3.6.2.3 Recommended Mitigation Scheme

A closer examination of the two alternative mitigation measures, Scenarios 1a and 1b, suggests that Scenario 1b provides comparable noise abatement performance. However, factors such as the area of land intake, safety concerns, sightline requirements, highways requirements for road clearance and visual impacts would make Scenario 1a less practicable. It is therefore clear that Scenario 1b is a more effective and practicable mitigation provision and is thus recommended for abatement of traffic noise. A conceptual design and locations of the 3m high plain barrier and 5.7m high inverted-L barrier are illustrated in Figure 3.10 and 3.11 respectively.

Mitigated noise levels at the representative NSRs under the recommended mitigation scheme 1b are shown in Table 3.6.4.

For the future development at the P1 site, it is considered that all practicable direct mitigation measures have been applied to reduce the potential traffic noise impact. It is recommended that careful consideration should be given to the orientation of the sensitive facades of the first row of future village houses facing Kam Tin Road to alleviate the residual impact. For example, a noise reduction of about 3dB(A) can be achieved if the facade is turned 90° from the road. Furthermore, District Land Office/Yuen Long will ask the future applicants of the first row of the village houses to consider rotating the sensitive facades 90° from Kam Tin Road, Stage 1 in order to reduce the noise impact in meeting the HKPSG criteria.

Traffic noise level at P2 is dominated by roads other than that covered under this project. Thus, mitigation measures would not be provided under this project.

The total capital cost of mitigation scheme 1b (120m in length of 3m high plain barrier and 360m in length of 5.7m high inverted-L barrier) is estimated to be in the range of HK\$13.6 to 19.1 million depending on the choice of construction materials.

Table 3.6.4 2011 Traffic Noise Levels Under Recommended Mitigation Scheme 1b

NSR	Assessment Point (Storey)	mPD Level (m)	Assessment Criterion L <sub>10</sub> dB(A)	2011 Noise Level, dB(A)		
				Improved Kam Tin Road	Other Roads	Overall
AT-1	1	13.5	70	84.0	71.7	84.2
KPST-1	3	23.1	70	75.5	75.4	78.5
KPST-2	2	14.3	70	76.3	73.5 <sup>(1)</sup>	78.1
KPST-3	1	8.5	70	74.5	68.1	75.4
KPST-4	2	10.8	70	73.0	68.5	74.3
KPT-1	3	11.2	70	68.9	65.3	70.5
KPT-2	3	11.2	70	68.3	68.3 <sup>(1)</sup>	71.3
KPT-3	3	11.2	70	69.1	68.2	71.7
KPT-4	3	11.2	70	59.4	63.4	64.9
KPT-5	3	11.7	70	64.6	65.7	68.2
KPT-6	3	11.7	70	73.0	69.2 <sup>(1)</sup>	74.5
KPT-7	3	11.7	70	71.0	62.2	71.6
KPT-8	3	11.7	70	69.2	61.7	69.9
KPT-9	3	11.7	70	71.0	63.7	71.7
KPT-10	3	11.7	70	73.4	69.1 <sup>(1)</sup>	74.8
KPT-11	3	11.9	70	70.7	66.6	72.1
KPT-12	3	12.8	70	72.1	67.4	73.3
KPT-13	2	12.8	70	67.4	63.5	68.9
KTS-1	3	10.4	70	67.4	66.6	70.0
P1	3	12.7	70	71.3	68.6	73.2
P2	3	14.1	70	66.9	74.5	75.2
CH	2	17.4	65	53.5	75.8	75.9
SCH	6	36.2	65	47.1	72.7	72.7

Note: (1) Noise level from other roads is mainly dominated by Route 3, its noise level contribution is based on that provided in *Route 3 Tai Lam Tunnel & Yuen Long Approach Northern Section, Volume 1, Detailed Environmental Impact Assessment, Final Report, October 1995*.

### 3.6.2.4 Residual Impacts and Indirect Mitigation

As discussed in Section 3.6.2.2, a number of representative NSRs should be considered for indirect mitigation, namely NSRs AT-1, KPST-1 to 4, KPT-1,2,3,6,7,9,10,11 and 12.

EPD's eligibility criteria have been applied to test whether NSRs AT-1, KPST-1 to 4, KPT-1,2,3,6,7,9,10,11, and 12 are eligible for consideration of indirect technical remedies through the provision of building insulation and room air conditioners. Results of the eligibility assessment are presented in Table 3.6.5. Because of the high prevailing noise and dominated noise contributions from other roads, only NSRs AT-1, KPST-1 to 4, and KPT-1 and 7 as shaded in Figures 3.11 and 3.12 are eligible for consideration for indirect technical remedies by Exco.

Before the improvement of Kam Tin Road, the noise levels at 37 number of dwellings exceed the HKPSG criteria. Table 3.6.6 summarises the estimated number of dwellings exceeding the HKPSG criteria upon the operation of the improved Kam Tin Road with and without the recommended noise mitigation measures, as well as the estimated number of dwellings eligible for consideration for indirect technical remedies by Exco even with the recommended mitigation measures in place.

**Table 3.6.6 Dwelling Units Exceeding the HKPSG Criteria and Eligible for Consideration for Indirect Technical Remedies**

	Estimated number of dwellings exceeding the HKPSG criteria	Number of dwellings eligible for consideration for Indirect Technical Remedies
Before Improvement to Kam Tin Road (Stage I)	37 <sup>(1)</sup>	not applicable
After Improvement to Kam Tin Road (Stage I) without noise mitigation measures	86 <sup>(1)</sup>	not applicable
After Improvement to Kam Tin Road (Stage I) with recommended noise mitigation measures	63 <sup>(1)</sup>	33 <sup>(2)</sup>

Note: (1) Number of affected dwellings for the planned receivers P1 and P2 have not been included as no information on future development is available.

(2) Approximately 8 nos of dwelling at Ko Po San Tsuen may be provided with indirect technical remedies under the Route 3 Project. The exact numbers and locations of dwellings will be identified in a detailed survey to be undertaken in the Noise Insulation Works Study upon ExCo approval. In case where a dwelling is to be provided with indirect technical remedies under the Route 3 Project, it will not be eligible for indirect technical remedies under this project.

The total capital cost of indirect technical remedies (window insulations and air-conditioners) is estimated to be HK\$935,088.

Table 3.6.5 Eligibility Assessment for Indirect Technical Remedies

NSR	Assessment Point (Storey)	Assessment Criterion L <sub>10</sub> dB(A)	Prevailing Noise Level L <sub>10</sub> dB(A)	2011 L <sub>10</sub> Noise Level, dB(A)			Criterion 1 (5) > (1)	Criterion 2 (5) - (2) ≥ 1.0	Criterion 3 (5) - (4) ≥ 1.0	Indirect Mitigation (Yes/No)
				Improved Kam Tin Road	Other Roads	Overall				
AT-1	1	70	76.5	84.0	71.7	84.2	Yes	Yes	Yes	Yes
KPST-1	3	70	67.6	75.5	75.4	78.5	Yes	Yes	Yes	Yes
KPST-2	2	70	68.9	76.3	73.4	78.1	Yes	Yes	Yes	Yes
KPST-3	1	70	68.8	74.5	68.1	75.4	Yes	Yes	Yes	Yes
KPST-4	2	70	68.6	73.0	68.5	74.3	Yes	Yes	Yes	Yes
KPT-1	3	70	68.3	68.9	65.3	70.5	Yes	Yes	Yes	Yes
KPT-2	3	70	74.2	68.3	68.3	71.3	Yes	No	Yes	No
KPT-3	3	70	74.3	69.1	68.2	71.7	Yes	No	Yes	No
KPT-6	3	70	76.6	73.0	69.2	74.5	Yes	No	Yes	No
KPT-7	3	70	70.2	71.0	62.2	71.6	Yes	Yes	Yes	Yes
KPT-9	3	70	71.0	71.0	63.7	71.7	Yes	No	Yes	No
KPT-10	3	70	77.3	73.4	69.1	74.8	Yes	No	Yes	No
KPT-11	3	70	75.1	70.7	66.6	72.1	Yes	No	Yes	No
KPT-12	3	70	75.1	72.1	67.4	73.3	Yes	No	Yes	No
Column		(1)	(2)	(3)	(4)	(5)				

### 3.7 CUMULATIVE NOISE IMPACTS

#### 3.7.1 Concurrent Projects

Concurrent activities with potential for significant contribution to the noise environment in the Study Area include :

(a) Route 3 (Tai Lam Tunnel & Yuen Long Approach)

The Route 3 (Tai Lam Tunnel & Yuen Long Approach) section extends from Ting Kau Bridge in the south to Kam Tin Road in the north via two slip roads. The project is currently being implemented on a Build Operate Transfer basis contract under the management of the Western Harbour Link & Route 3 (Country Park Section) Office of the Highways Department. The route is under construction and is due to open to traffic in July/August 1998.

(b) Kam Tin Bypass

The proposed Kam Tin Bypass is a dual two carriageway, approximately 1.3 km long to be constructed to the north of Kam Tin. The road will be constructed on an embankment and will connect to the existing Kam Tin Road by an roundabout to the west and east of the Kam Tin urban area. The project is planned for construction in early 2000 and open to traffic in end 2001.

(c) Main Drainage Channels for Yuen Long and Kam Tin

Drainage Services Department is currently implementing a series of major drainage works aimed to alleviate flooding in areas around Kam Tin. The drainage works involve the construction of main drainage channels for Yuen Long and Kam Tin in different phases. Construction programme commenced in 1993 and the target completion date is 2003.

(d) Western Corridor Railway

The proposed Western Corridor Railway project provides a rail link from the border via Yuen Long, Kam Tin, Tsuen Wan and Kwai Chung to west Kowloon. The target completion date is 2001, though the project is still very much at a preliminary planning stage.

### 3.7.2 Cumulative Construction Impact

With the completion of Route 3 by July/August 1998 prior to the commencement of this Project, no cumulative construction impacts are anticipated. While details of the construction programmes for other activities are unavailable to the present study, it is likely that Kam Tin Bypass and Main Drainage Channel projects will have a cumulative noise impact during the present improvement works. However the extent of the impact is uncertain because of the lack of construction programmes for all these works. On the other hand, the potential for cumulative impacts from the Western Corridor Railway project is remote given that the improvement works will have been substantially completed before the commencement of the railway project.

### 3.7.3 Cumulative Operation Impact

Noise impacts arising from the roads other than the improved Kam Tin Road have been taken into considerations in the assessment of the traffic noise impacts and the formulation of recommended noise mitigation measures.

### 3.8 CONCLUSIONS AND RECOMMENDATIONS

#### 3.8.1 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) at most NSR locations and noise control measures will be required to mitigate the impacts.

The most effective measure is to control the sound emissions from the powered mechanical equipment used on site. This involves either selecting silenced equipment, or reducing transmission of noise using mufflers, silencers, or acoustic enclosures. In addition, the installation of temporary noise barriers at the site boundary or around the noisy equipment would be effective in screening the low-rise receivers from the construction noise.

Road traffic noise will be a major environmental issue in the operation phase. Based on the projected traffic figures for 2011, it has been predicted that the traffic noise levels at most existing and planned NSRs will exceed the HKPSG noise criteria. Three noise mitigation scenarios have been identified and evaluated.

While the noise impacts at some NSRs can be significantly mitigated with the proposed direct technical measures, there are 63 number of NSRs where the impacts cannot be mitigated by practical direct mitigation measures. As a last resort, the EPD's eligibility criteria have been applied to determine if these dwellings are eligible for consideration of indirect technical remedies in order to redress the residual impact.

#### 3.8.2 Recommendations

The following recommendations are made :

- inclusion of contract clauses with noise limit criteria to control construction noise from the improvement works.
- provision of Noise Mitigation Scheme 1b to protect the NSRs at Ko Po Tsuen and Kam Fung Terrace in the Study Area.
- consideration for indirect technical measures to redress the residual impact at NSRs shown in Table 3.8.1, subject to Exco approval.
- further study to identify the exact extent of eligible premises and detailed scope of noise insulation works for indirect technical remedies.
- careful considerations should be given to the orientation of the sensitive facades (e.g. turn 90° away from the improved Kam Tin Road) and setback distance to alleviate the residual impact for the future developments in the Study Area.

The recommended direct and indirect mitigation measures are summarised in Table 3.8.1.

**Table 3.8.1 Summary of Recommended Direct and Indirect Mitigation Measures**

Direct Mitigation Measures	120m in length of 3m high plain barrier 360m in length of 5.7m high inverted-L barrier
Indirect Mitigation Measures	Provisions of window insulations and air-conditioners for 33 number of dwellings, represented by NSRs AT-1, KPST-1 to 4*, KPT-1 and KPT-7, subject to Exco approval and Noise Insulation Works Study.

Note\* If these dwellings may be provided with indirect measures under the Route 3 project, they will not be eligible for indirect technical measures under this project.



**Section 4**

**Ecological Impact Assessment**

## SECTION 4 ECOLOGICAL IMPACT ASSESSMENT

### 4.1 Introduction

#### 4.1.1 The Study Area

The study area for the ecological impact assessment on Improvement to Kam Tin Road, Stage 1 (the Project) covers all lands within 300 m from the centre line of the proposed road works. The Project site lies between the Au Tau Roundabout and Kam Tin Shi. The study area is located in Yuen Long Plain, where the Kam Tin River running through.

There is a large number of poultry farms in the catchment of Kam Tin River, and the river is heavily polluted by organic wastes discharged from these farms. There used to be large patches of commercial fish ponds and agricultural fields in the area. However, due to recent changes in land uses in Northwest New Territories, a lot of the lands, especially those adjacent to roads, have been filled and/or turned into open storage or construction sites. While the study area may give an impression of degraded wildlife habitats under immense human influence, intact habitats have, in fact, been identified under closer examination in areas away from the roads.

#### 4.1.2 Aims of Study

The aims of this study are: (a) to describe the physical environmental background and habitat characteristics, (b) to survey the flora and fauna species within the study area, (c) to assess the potential ecological impacts (both direct, indirect and cumulative) arising from the implementation of the Project, and (d) to evaluate the impacts and proposals for any habitat preservation, creation and compensation measures.

#### 4.1.3 Study Methodologies

The site was visited from 15 to 24 January 1996, both during the day and at night. The existing habitats were covered on foot. Higher plants were identified and their presence in various habitats was recorded. Bats were surveyed at dusk and after dark by visual observation and using a high frequency electronic bat detector. Special attention was also paid to signs and tracks of larger mammals. Birds were recorded as they were seen foraging or heard calling within the study area. A population estimate was made when flocks of birds were seen. Visits made at dusk provide useful information on the importance of the site as a roost for some species. Reptiles were surveyed by visual encounter and by searching in potential hiding places. Amphibians were sampled by active searching and acoustic detection at breeding sites. A dip net was also used to sample tadpoles in wetlands.

### 4.2 VEGETATION

Four different habitat types (based on vegetation) have been identified within the study area, namely (a) disturbed area, (b) woodland, (c) freshwater marsh, and (d) fish pond (both in use and abandoned).

Figure 4.1 is a habitat map showing the major wildlife habitats discovered on site.

#### 4.2.1 Disturbed Areas

This habitat type dominates the study area and includes open storage/construction sites, roadside areas and villages. Most of the plant species recorded in this habitat are weed species, which are widely distributed in disturbed areas and many of the species are exotic.

A total of 34 tree species were recorded in this habitat. The trees are mostly scattered at the edges/boundaries of open storage areas and construction sites, along Kam Tin Road, and close to or within villages. The heights of trees range from 3 to 14 m. Most of the trees were planted by people, including fruit trees (e.g. *Dimocarpus longan* and *Psidium guajava*), shading trees (e.g. *Macaranga tanarius* and *Melia azedarach*) and scenic trees (e.g. *Delonix regia*). A few other trees such as *Sapium sebiferum* and *Litsea glutinosa* may have been seeded naturally.

More than 60 species of shrubs and herbs were identified in the disturbed habitat. Most of them are typical to disturbed areas and can usually be found in places with similar environment. The most common herbs identified are *Ageratum conyzoides*, *Amaranthus spp.*, *Bidens pilosa*, *Ipomoea cairica* and *Mikania micranth*. Common grasses recorded include *Eleusine indica*, *Neyraudia reynaudiana* and *Pennisetum spp.* These grasses are cosmopolitan species and can establish themselves in open disturbed areas.

#### 4.2.2 Woodlands

There are two small patches of semi-natural woodlands within the study area. As the woodlands are close to villages and there are many graves inside the habitats, they have been disturbed in various degree. The trees are 6 to 14 m in height. Under-storey growth is not particularly rich and pieces of clear ground are present. More than 20 tree species were identified during the survey, and the woodlands are too small for any tree species to be considered dominant.

Common species recorded in the upper-storey are *Acacia confusa*, *Celtis sinensis*, *Litsea glutinosa*, *Mallotus paniculatus* and *Sapium sebiferum*. In the under-storey, shrubs like *Ligustrum sinensis*, *Psychotria rubra* and *Litsea rotundifolia*, and climbers such as *Ipomoea cairica*, *Ligustrum sinensis* and *Mikania micrantha* are commonly found. The total number of higher plants species recorded in this habitat is 46.

#### 4.2.3 Marshes

Several marshes of various sizes are found scattered in the study area, and most of them are close to disturbed areas (e.g. construction sites and roadside areas). The marshes are almost completely covered by vegetation. Altogether 28 species of higher plants have been recorded in the marshes, most of the plants are exclusive marsh species, and the dominant ones are *Eichhornia crassipes* (water hyacinth), *Rumex maritimus*, *Polygonum hydropiper* and *Mikania micrantha*. Also, *Sapium sebiferum* and *Pennisetum alopecuriodes* can be found at the peripheries of the marshes.

#### 4.2.4 Fish Ponds

Fish ponds, with sizes ranging from 0.03 to 1 hectare, have been identified on both sides of the stretch of Kam Tin Road inside the study boundary. With the exception of *Eichhornia crassipes*, which covers 5 to 70% of the pond area, no higher plants can be found growing inside the ponds. However, species such as *Apluda mutica*, *Mikania micrantha*, *Rumex maritimus*, *Amaranthus spinosa* and *Pennisetum purpureum* have been recorded on the bunds.

None of the plant species identified in the ecological survey are protected in Hong Kong. As most of the study site have been disturbed to some extent, no botanically interesting area can be recognized.

A complete list of the plant species surveyed is contained in Appendix C.

#### 4.3 BIRDS

Birds surveyed on site are listed in Table 4.1 below according to whether they were seen north or south of Kam Tin Road, in an attempt to identify areas with the highest sensitivity. The habitats where the bird species were recorded are wetlands and woodlands in the Study Area (see Figures 4.1 and 4.2).

During the survey days 50 species of birds were recorded. Of the species identified, 28 were resident species and 20 are associated with wetland areas in Hong Kong.

The number of bird species recorded compares favorably even with that surveyed in less disturbed sites in Hong Kong. Although along Kam Tin Road there are many car repairing yards which may cause serious ecological impacts to the immediate environment, areas that are of some local ecological importance, even given their fairly fragmented nature, can be identified behind these yards.

While all wild birds are protected in Hong Kong, the following species should receive particular attention:

- Grey-headed Lapwing
- Intermediate Egret
- Grey Starling
- Imperial Eagle
- Pied Kingfisher
- Swinhoe's Snipe

These species have localized distributions and could be considered rare. The Lapwing is becoming scarce due to the rapid loss of wetland habitats in Hong Kong. The Intermediate Egret, Swinhoe's Snipe and Pied Kingfisher are also associated with wetlands. All other species are fairly widespread and/or common in Hong Kong.

## 4.4 MAMMALS

No signs of large mammals were found during the survey.

Three species of insectivorous bat were recorded. Two species were positively identified by sight and high frequency signature (calls). One species probably belonging to the Family Vespertilionidae was detected but not positively identified.

The location and approximate numbers (from visual sightings) of bats identified are as follows:

*Fish Pond and River Edge habitats (Northwest)*

Japanese Pipistrelle ( <i>Pipistrellus abramus</i> )	5
Noctule Bat ( <i>Nyctalus noctula</i> )	2

*Marsh Habitat (Northeast)*

Japanese Pipistrelle	8 - 12
Noctule Bat	1
Unidentified Spp.	1

*Abandoned Fish Pond Habitat (Southeast)*

Japanese Pipistrelle	4
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The Japanese Pipistrelle has widespread status in Hong Kong and is common in all habitats where there are suitable roosting structures (old buildings, crevices in new buildings, etc.), and foraging areas where insects can be found in abundance.

The status of Noctule Bat in Hong Kong is unknown as few specimens have been recorded. However, recently this species has been discovered at several locations in the New Territories. The Noctule is larger and not as adaptive as the Pipistrelle. This bat species also roosts in buildings.

The bats are probably attracted to the study site to forage on insects. They appeared to be feeding primarily on aquatic emergent Chironomids, which formed small swarm plumes above the wetlands. Loss of these wetlands will result in a loss of feeding grounds for the species of bats observed. In addition, loss of such inundated lowland areas in Hong Kong (due to development) must be having some effect on the local bat fauna since long distance flight for these small mammals is highly energy demanding so they tend to forage close to their day-roost sites.

All bats are protected in Hong Kong under the Wild Animals Protection Ordinance (Ades, 1990)

Table 4.1 List of Bird Species Identified

Common Name	Latin Name	Status
Fish Pond and River Edge Habitats (Northwest)		
Kestrel	<i>Falco tinnunculus</i>	WV
Black-eared Kite (over 35)	<i>Milvus migrans lineatus</i>	R
Imperial Eagle (1)	<i>Aquila heliaca</i>	WV
Black-faced Laughing Thrush	<i>Garrulax perspicillatus</i>	R*
Crested Bulbul	<i>Pycnonotus jocusus</i>	R*
Chinese Bulbul	<i>P. sinensis</i>	R*
Collared Starling	<i>Sturnus nigricollis</i>	R*
Grey Starling (approx. 80)	<i>S. cineraceus</i>	WV
Silky Starling	<i>S. sericeus</i>	WV
Magpie Robin	<i>Copsychus saularis</i>	R*
Tree Sparrow	<i>Passer montanus</i>	R*
Crested Mynah	<i>Acridotheres cristatellus</i>	R*
Spotted Dove	<i>Streptopelia chinensis</i>	R*
Rufous Turtle Dove	<i>S. orientalis</i>	WV
Magpie	<i>Pica pica</i>	R*
Collared Crow	<i>Corvus torquatus</i>	R
Rufous-backed Shrike	<i>Lanius schach</i>	R*
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	R*
Brown Prinia	<i>P. inornata</i>	R*
Dusky Warbler	<i>Phylloscopus fuscatus</i>	WV
Fantail Warbler	<i>Cisticola juncidis</i>	R*
Stonechat	<i>Saxicola torquata</i>	WV
Olive-backed Pipit	<i>Anthus hodgsoni</i>	WV
Masked Bunting	<i>Emberiza spodocephala</i>	WV
Yellow Wagtail	<i>Motacilla flava</i>	WV
Grey Wagtail	<i>M. cinerea</i>	R
White Wagtail	<i>M. alba</i>	WV

Common Name	Latin Name	Status
Common Kingfisher	<i>Alcedo atthis</i>	R*
White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	R
Cormorant	<i>Phalacrocorax carbo</i>	WV
Fantail Snipe	<i>Gallinago gallinago</i>	WV
Chinese Pond Heron	<i>Ardeola bacchus</i>	R*
Night Heron	<i>Nycticorax nycticorax</i>	R
Grey Heron (5)	<i>Ardea cinerea</i>	WV
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	R*
Cattle Egret	<i>Bubulcus ibis</i>	R
Little Egret (over 50)	<i>Egretta garzetta</i>	R
Intermediate Egret (1)	<i>Mesophoyx intermedia</i>	WV
Grey-headed Lapwing (10)	<i>Vanellus cinereus</i>	WV
Green Sandpiper	<i>Tringa ochropus</i>	WV
Wood Sandpiper	<i>T. glareola</i>	WV
Yellow-nib Duck	<i>Anas poecilorhyncha</i>	R
Marsh Habitat (Northeast)		
Swinhoe's Snipe	<i>Gallinago megala</i>	WV
Fantail Snipe (10)		WV
White-vented Mynah	<i>Acridotheres grandis</i>	I
Richard's Pipit	<i>Anthus novaeseelandiae</i>	WV
Pied Kingfisher (1)	<i>Ceryle rudis</i>	R
Rufous Turtle Dove		WV
Barred Owlet	<i>Glaucidium cuculoides</i>	R
Abandoned Fish Pond Habitat (Southeast)		
Little Grebe	<i>Tachybaptus ruficollis</i>	R*
Moorhen	<i>Gallinula chloropus</i>	R*
Common Sandpiper	<i>Actitis hypoleucos</i>	WV
White-eye	<i>Zosterops japonica</i>	R*
Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>	R

Common Name	Latin Name	Status
Crested Mynah		R*
Common Kingfisher		R*
Chinese Pond Heron		R*
Spotted Dove		R*
Rufous Turtle Dove		R*
Woodland Habitat		
Spotted Dove		R*
Rufous Turtle Dove		WV
Crested Bulbul		R*
Chinese Bulbul		R*
Magpie		R*
Collared Starling		R*
Disturbed Habitat		
Tree Sparrow		R*
Spotted Dove		R
Crested Mynah		R
<p>Legends:</p> <ul style="list-style-type: none"> <li>* Species likely to breed on site</li> <li>R Resident )</li> <li>WV Winter visitor ) Keys following Chalmers, 1986</li> <li>I Introduced )</li> </ul> <p>Note: Numbers in brackets indicate no. of birds recorded on site.</p>		



#### 4.5 AMPHIBIANS AND REPTILES

Since the survey was carried out in the cool dry winter when the ectothermic amphibians and reptiles were less active, only two species of reptiles and no amphibians were found. The reptiles recorded were:

Reeves' Smooth Skink (*Scincella reevesi*)

Red-eared Terrapin (*Trachemys scripta elegans*)

The Reeves' Smooth Skink was found hiding under a board on a fish pond bund while the Red-eared Terrapin was seen basking in Kam Tin River. The skink is a common and widespread species in forest edge and agricultural fields. The terrapin is a North American species which is commonly sold as pets in Hong Kong. Released terrapins of this species have been encountered in reservoirs, rivers and fish ponds locally.

The terrestrial habitats in the survey area are fragmented and disturbed to a considerable extent. Similar habitats in the New Territories do not support any rare reptiles and those in the study area are not believed to be different.

Due to the timing of the survey, no amphibians were recorded. Several common lowland species are expected to breed in the freshwater marshes and the fish ponds such as Asian Common Toad (*Bufo melanostictus*) and Gunter's Frog (*Rana guentheri*). However, the three aquatic habitats present are not ideal habitat for amphibians. Kam Tin River is grossly polluted and eutrophic and is not suitable for amphibians to breed. The freshwater marsh has predatory Mosquito Fish (*Gambusia affinis*) and the fish pond has additional omnivorous fish like Tilapia (*Oreochromis mossambicus*). Tadpoles from certain amphibian species are very vulnerable to fish predation. Thus the freshwater marsh and fish pond habitats within the study site are not believed to be important amphibian habitat.

#### 4.6 ECOLOGICALLY IMPORTANT AREAS

Although the study site has been considerably disturbed and is found to be floristically simple, it is clear from this survey that the wetlands within the study site are important habitats for birds and several insectivorous bats. Three ecologically important areas were identified within the study area (see Figure 4.2). The ecological impacts on the three ecologically important areas have been duly covered in the EIA Report on the Main Drainage Channel Projects. Ecological impacts arising from the Project, which are considered indirect and unlikely to be significant, would not be further addressed in this EIA.

## 4.7 IMPACT ASSESSMENT AND MITIGATION MEASURES

### 4.7.1 Direct Impacts and Mitigation

Most of the vegetation, including some large roadside trees, present along Kam Tin Road within the project boundary will be removed due to the road improvement works. However, most of these trees are exotic species and scattered, and the vegetation is patchy and heavily disturbed and they are unlikely important habitat for wildlife. This impact can be mitigated by planting suitable tree species along the widened Kam Tin Road once the Project is finished. Tree species such as *Albizia lebbek*, *Bauhinia blakeana*, *Cassia surattensis*, *Delonix regia* and *Eucalyptus citriodora* are recommended. A comprehensive list of recommended species is presented in Section 5 - Landscape and Visual Impact Assessment.

One small fish pond immediately south of Kam Tin Road (see Figure 4.1) partially lies within the proposed project limit and would be affected as such. As advised by Drainage Service Department (DSD), this fish pond, which is also affected by DSD's 81CD (formerly known as 22CD) project - Main Drainage Channel for Yuen Long and Kam Tin (Stage II, Phase 1), will be temporarily resumed. It will be reinstated and returned to the owner after completion of the works. HyD would take this juncture to complete the roadworks at this area. It is understood that HyD would relocate the proposed refuse collection point (RCP), which encroaches into the fish pond on the present layout, elsewhere and limit the works as far as practicable such that there will be no permanent loss of fish pond arising from this Project, thus totally eliminating the potential ecological impact in respect of fish pond loss.

### 4.7.2 Indirect Impacts and Mitigation

The construction work of the proposed project may pollute the soil and the marshes next to Kam Tin Road, if the Contractor's housing-keeping procedures are not executed properly. Therefore, measures must be taken to prevent water carrying sediment and oil from flowing to surrounding areas outside the works boundary.

In addition, dust arising from the construction works may be blown by wind and cover the foliage of plants. This may eventually choke and kill the plants. As such, measures must also be taken to minimize the emission of dust during construction.

The existence of freshwater marshes depends on the hydrology of the area. Precautions must be taken to make sure that the construction of the proposed project would not alter the hydrology of the area.

Appropriate construction precaution measures such as those recommended in Appendix B shall be implemented to minimize the indirect ecological impacts.

### 4.7.3 Cumulative Impacts and Mitigation

As shown in earlier sections, the most ecologically significant habitats in the study area are wetlands which are important foraging sites for a diverse avifauna to meet their different needs. However, as there will be no permanent loss of fish pond arising from this Project, the cumulative impact of this Project on the overall wetland losses would be negligible.

## 4.8 ECOLOGICAL MONITORING AND AUDIT

It is recommended that the following monitoring and audit program to be carried out during the construction and for 1 year after the implementation of the Project:

- Monitoring the use of Ko Po Tsuen Egretty by egrets and/or herons monthly during the nesting season, in view of its close proximity to the work site.
- Monitoring the success of the landscape planting every six months by the Landscape Contractor.

## 4.9 CONCLUSIONS

An ecological survey has been conducted within the study area in January 1996 to collect information on habitats, vegetation, birds, mammals, amphibians and reptiles for the assessment of the impacts arising from the implementation of the Project. During the survey, no rare or endangered species were discovered within the works boundary. In addition, three ecologically important areas were identified in the study area. However, these areas will unlikely be significantly affected by this road improvement works.

Due to the relatively small scale of the construction works, the highly disturbed roadside environment, as well as the common/widespread fauna and flora present there, no severe direct impacts are anticipated and the impacts can be mitigated. On the other hand, suitable mitigation measures and construction practices such as those illustrated in Appendix B shall be implemented to minimize the indirect impacts (e.g. polluted water and dust emitted from the construction works) on the species and habitats outside the works boundary.

## **Section 5**

# **Visual And Landscape Impact Assessment**

## SECTION 5 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

### 5.1 Introduction

This section of the report describes the effects that the proposed Improvement to Kam Tin Road, Stage 1 would have on the physical features and character of the existing landscape/townscape and its visual impact on local people. The key objective is to identify and assess the potential landscape/townscape and visual impacts of the road widening scheme and to identify the potential for mitigating any adverse impacts that would arise from the scheme.

### 5.2 Legislation

There is no legislation in Hong Kong that relates directly to the assessment of landscape and visual impact of new developments. A degree of control is achieved through the requirement to address visual issues as part of the environmental review and assessment process. The EPD advice note (2/90) relating to the 'Application of the EIA Process to Major Private Sector Projects' identifies visual impact as being an issue of concern to be addressed. In addition, HKPSG, Chapter 10 -Landscape and Conservation, outlines those design criteria that should be considered when planning developments in agricultural and fish farming areas, woodlands, and water storage areas. The chapter also provides guidelines for reducing adverse landscape and visual impacts in rural areas and also for roadside planting in rural and urban areas.

### 5.3 Methodology

For the purposes of this assessment a distinction is drawn between visual impacts and impacts on the landscape:

- visual impact relates to the changes arising from development to individual 'receiver groups' views of the landscape e.g. local residents
- landscape impact relates to the effect upon the physical characteristics or components, which together form a landscape, e.g. the topography, vegetation, watercourses, settlements, transport corridors, etc.

In the assessment, high quality landscape and views are considered to be an environmental resource of the equivalent value as, say, clean air or water.

The assessment of potential visual and landscape impacts has involved the following activities:

- (a) Identification and assessment of the landscape context of Kam Tin Road in terms of the surrounding topography, vegetation cover, land use, cultural identity, landscape character and quality, in order to evaluate objectively any subsequent impacts.
- (b) Identification of the sources of impact that would be generated by the scheme i.e. the elements of the construction works and operational procedures.

- (c) Identification of key landscape impacts, predicted primarily on the basis of the order of change to baseline conditions prevalent at the time of the assessment and are assessed at two levels:
- in terms of the systematic consideration of the impact upon landscape features, and
  - in terms of the overall impacts of the development on the site and its landscape context.
- (d) Landscape impacts are predicted by assessing:
- character and quality of existing landscape
  - nature of predicted impacts
  - degree of change to key features and existing landscape
  - ability of the landscape to accommodate change: and
  - significance of change within local and regional context

The degree of severity of the landscape impacts are categorised into severe, moderate, slight and insignificant impacts

- (e) The area of the study for the assessment of visual impacts is defined by the 'Visual Envelope' or zone of visual influence, i.e. the area from within which views of the development are possible. There may also be off site indirect impacts resulting from the construction, for example by construction traffic movements or the extraction and deposition of materials.
- (f) Identification of the key visual receiver groups within the visual envelope who would be affected by the development. For the purposes of this study the potential visual receivers have been grouped into the following categories:
- Those people who would view the scheme from their home
  - Those people who would view the scheme from their workplace
  - Those people who would view the scheme whilst travelling along public roads or footpaths
- (g) Identification of key visual impacts and assessment of visual impact of the scheme on the identified visual receiver groups. Visual impacts relate to changes in views arising from a development to individual 'receiver groups' views of the landscape e.g. local residents or visitors to the area. The sensitivity of each receiver group is influenced by the immediate context of the viewer and their location relative to the source of visual impact as follows:
- Those who view the scheme from their homes are considered to be most sensitive to any visual intrusion associated with the scheme. This is because the

attractiveness, or otherwise, of the view would have a notable affect on a home owners' general quality of life and acceptability of their home environment.

- Those people who view the scheme from their workplace are considered relatively less sensitive to visual intrusion. This is because they are employed in activities where visual outlook plays a less important role in the perception of the quality of the working environment.
- For those people who view the scheme from public thoroughfares, the degree of visual intrusion experienced depends on the speed of travel and whether views are continuous or only occasional. Generally, the slower the speed of travel and the more continuous the viewing experience then the greater the degree of sensitivity.

(h) Impacts on Visual Amenity are predicted by identifying changes such as:

- value of existing views
- degree of change to existing views
- proximity of receiver
- sensitivity of receiver
- number of receivers in the group
- availability and amenity value of alternative views

The degree of severity of visual impacts are categorised into severe, moderate and insignificant impacts.

(i) Potential landscape and visual impacts (both positive and negative) are considered at the three points in time:

- during construction
- on the opening day
- in year 2011 (10-11 years after operation)

Through the assessment of impacts at these three points in time, distinction will be drawn between temporary, short-term and permanent residual impacts.

(j) Identification of potential mitigation measures and residual impacts.

## 5.4 Description of the Scheme

The scheme proposes the widening of the existing Kam Tin Road between Au Tau Roundabout and the Kam Tin River. At its eastern limit the scheme would link up with the proposed Kam Tin Bypass. It is proposed to widen the existing single 2-lane carriageway road to a dual 2-lane standard with the provision of pedestrian and cyclist facilities, pedestrian crossings and lay-bys. The new road level would be raised on embankment as the scheme is situated in the flood fringe area of the Kam Tin Basin. 3.0 m and 5.7 m noise barriers are required at Ko Po Tsuen to mitigate noise impacts.

The proposed scheme is illustrated on the Landscape and Visual Mitigation Plan, Figure 5.7 and Illustrative Cross-sections, Figure 5.8, Sketch Perspective, Figure 5.9.

## 5.5 Future Planned Developments

The improvement to Kam Tin Road, Stage 1 is programmed to commence in February 1999 and for completion in August 2001. In addition to the Kam Tin Road proposals, there are a number of interrelated infrastructure projects planned in the area which would affect the visual and landscape assessment, these are as follows:

- Route 3 (Country Park Section) - The proposed Route 3 alignment runs eastwards from Fox Hill, at Au Tau. A series of elevated slip roads gradually converge and all join the main route alignment just south of Kam Tin Road. The route continues south-eastwards, crossing over and briefly running parallel to Kam Tin Road on elevated structure. A junction is proposed, via elevated slip roads, between Route 3 and the Kam Tin Road at Ko Po Tsuen. The project is currently under construction and the whole route is due to open to traffic in July/August 1998, before the commencement of the road widening scheme.

A number of buildings are being demolished, or will be in the future, as part of the land clearance work related to Route 3, these include a Home for the Aged, individual residences and St. Joseph's Primary School.

- Kam Tin Bypass - The Kam Tin Bypass is a proposed dual two lane carriageway to be constructed to the north of Kam Tin village. The route would connect to the Kam Tin Road by roundabouts to the west and east of Kam Tin village. An environmental impact assessment is currently underway. The bypass is programmed to open in end 2001.
- Western Corridor Railway - The rail link reserve corridor follows the alignment of Route 3 until it begins to diverge from Route 3, as it crosses Kam Tin Road to the south of Ko Po Tsuen. The rail link would then continue westwards following a more northerly alignment. The alignment of the rail link and its associated station and public transport link are currently at a preliminary planning stage and may change as the route assessment process continues. The construction programme for this project is not yet confirmed but has been tentatively programmed to be completed in 2001.



- River Retraining - A number of drainage rehabilitation projects are planned in the Kam Tin area. Of these, PWP Item 43 CD is in progress and programmed for completion in mid 1998 and PWP Item 81CD (formerly known as 22CD) is due to start at the mid of 1998, for completion in end 2000. Both projects would have an impact on the road widening scheme. It is proposed to substantially widen and deepen the Kam Tin river and provide a straighter, more uniform channel alignment.

The route alignments of the above projects are illustrated in Figure 5.1, Future Development Plan.

These proposed infrastructure projects may create notable landscape and visual impacts both before and during the construction and operation phases of the road widening scheme. The cumulative impact of all the above projects on the landscape and visually sensitive receivers is difficult to predict and would depend on the success of the proposed mitigation measures for each project and the degree of residual impacts. However, it is possible to study the proposed route alignments and any preliminary landscape proposals for the above projects, and to assess the influence they may have on the landscape and visual impact assessment and mitigation proposals for the Kam Tin road widening. Details of this assessment are included in the following sections on landscape and visual impacts.

## 5.6 Landscape Impact Assessment

### 5.6.1 Existing Landscape/Townscape Context

The existing Kam Tin Road commences at the Au Tau Roundabout and continues eastwards along the low lying flood plain of the Shek Kong Valley. The road is bordered to the south by the foothills of the Tai Lam hill range. To the north lies the flat, open floodplain of the Kam Tin River, which flows beneath the road at the western limit of the proposed road widening. The character of the original rural landscape of the study area, comprising scattered village settlements within a landscape pattern of fish ponds and small scale agricultural holdings has been largely lost.

The Landscape/Townscape of the study area has been classified into broadly homogenous character types as described below and shown on the Landscape Assessment Plan, in Figure 5.3. Figures 5.4 and 5.5 illustrate the character of Kam Tin Road and the surrounding landscape around Ko Po Tsuen.

### 5.6.2 Road Corridor

The existing Kam Tin Road is a single 2-lane carriageway road that is heavily trafficked. The road has a rigid, linear alignment, with only one gentle bend, to the east of Ko Po Tsuen. The road includes narrow footpaths alongside either carriageway and safety railings are provided from St. Joseph's Primary School to the Kam Tin River.

The road-side is vegetated with individual mature trees and tree belts, especially between Au Tau Roundabout and the access road to the water pumping station and at Ko Po Tsuen. The

trees provide an attractive landscape setting to sections of the road, which runs through some landscape areas which have little other notable vegetation and also help to soften the boundary fences of properties adjacent to the carriageways.

There are a number of small, Lands Department Environmental Improvement Projects, these are located adjacent to the carriageway footpaths at the electricity sub-station, the water pumping station access road and at the eastern limit of the scheme. These comprise small belts of amenity planting.

### 5.6.3 Low Rise Residential

Ko Po Tsuen, a traditional village, lies adjacent to the existing Kam Tin Road. The village is architecturally undistinguished but the entrance to the village off the Kam Tin Road is bordered by some large mature trees. The trees help to screen views towards the Kam Tin Road and provide an attractive setting for the village. Ha Ko Po Tsuen and Ko Po San Tsuen are set back from the Kam Tin Road. These formerly rural villages, are now surrounded by areas of open storage, open derelict land. A small number of derelict dwellings have been recently demolished, or are awaiting demolition, as part of the initial ground clearance works for Route 3 (Country Parks Section).

### 5.6.4 Industrial/Commercial/Open Storage

Commercial storage areas for containers, cars and earth moving equipment, scrap yards and car and plant hire establishments are dominant elements within the landscape adjacent to the Kam Tin Road, resulting in a poor landscape quality. These land uses contribute heavily to the visual degradation of the area. A number of these areas have recently been cleared, as part of the initial works for Route 3 (Country Parks Section) resulting in large, open areas of derelict land characterised by piles of rubble and other debris.

### 5.6.5 Agricultural Small Holdings/Fish Ponds

The character of the original agricultural landscape has become fragmented and is generally of a poor quality. Most of the fish ponds lying adjacent to the road have been infilled, only one large pond remains close to Kam Tin River. Some areas of derelict farm buildings adjacent to the Kam Tin Road, at Ha Ko Po Tseun, have recently been cleared as part of the Route 3 pre-construction works, resulting in unattractive, rubbish strewn areas of derelict land.

### 5.6.6 River Corridor

The Kam Tin River flows beneath Kam Tin Road at the eastern limit of the scheme. The river embankments are vegetated with grasses, low herbaceous vegetation and a number of mature trees. Although it appears badly polluted, the river corridor is a locally important landscape feature which affords pleasant, open views from the road out to the surrounding hillsides. However, recent drainage improvement work has removed much of the herbaceous vegetation on the banks of the river and when the proposed river retraining works are completed much of

the natural and informal character of the river will be destroyed.

#### 5.6.7 Public Utilities

The China Light and Power Electricity Sub-station and its associated 400kV electricity transmission lines dominate the skyline to the north and south east of the Kam Tin Road. The access road to the Sub-station is bounded by recent tree and shrub planting. The access road off the Kam Tin Road to the Au Tau water pumping station has a straight linear character with no notable existing vegetation..

#### 5.6.8 Natural Hillslopes

The eastern limit of the study area comprises the natural, undeveloped hillslopes of Fox Hill and Ho Hok Shan which provide an attractive natural backdrop to the Kam Tin Road. The lower slopes of Ho Hok Shan, that lie adjacent to the road, comprise a mature Fung Shui wood land with grass and light scrub on the upper slopes. Fox Hill is well covered with a patchy vegetation of grasses, scrubland and tall trees. Access to the hills is limited to infrequently used footpaths.

#### 5.6.9 Burial Grounds/Cultural Artefacts

A number of graves are located on the lower slopes of Ho Hok Shan close to Kam Tin Road. Two small, inscribed stones of local cultural significance are located at the edge of both carriageways in front of Ko Po Tsuen and also adjacent to the road at Ha Ko Po Tsuen.

### 5.6.10 Assessment Results

The overall character of the landscape/townscape is run-down and derelict and, consequently, is of a poor quality. The recent demolition of a number of buildings to the north and south of the road around Ha Ko Po Tsuen has further contributed to the abandoned and derelict nature of the landscape.

Route 3 (Country Parks Section) is to be completed in July/August 1998, before the commencement of the road widening proposal, and will be elevated on embankment or viaduct as it runs close to and crosses the Kam Tin Road. The route will constitute a large scale engineering structure and its construction will dramatically change the predominantly small-scale character of the area. Route 3 is to be aligned through areas of disused land and extensive areas of landscape planting are proposed, in this respect, the route is predicted to have a slight beneficial effect on the landscape character given the run down nature of the existing landscape.

The implementation of the proposed elevated Western Corridor Railway would further alter the character of the area. On its proposed alignment, the railway would remove a number of open storage areas and buildings around Ko Po San Tsuen and disused agricultural land to the north and south of the Kam Tin Road.

Route 3 and the other planned developments will create a totally new character for the area. The future townscape/ landscape character will be dominated by these large scale projects, therefore, given the low quality of much of the remaining landscape it is predicted that the widening scheme would have negligible adverse impacts on the landscape character of the study area during its construction and operational phases. In the longer term some beneficial landscape impacts would be created by the provision of landscaped amenity areas adjacent to the road and footpath/cyclepath.

The approximate location of existing vegetation on and adjacent to the route corridor has been plotted using recent aerial photographs and on-site investigations and is illustrated on Figure 5.2, a recent aerial photograph and Figure 5.3, the Landscape Assessment Plan. It is predicted that the construction of Route 3 will result in the loss of the mature tree belt and some individual mature trees adjoining the road around Ha Ko Po Tsuen.

After the construction of Route 3, the improvements to Kam Tin Road would result in the loss of most of the remaining existing vegetation. Key areas of vegetation loss would comprise a few individual trees scattered along the road, part of the tree belt at Au Tau Roundabout and the three Environmental Improvement Projects, resulting in a low landscape impact. However, the potential loss of the mature trees lining the road at Ko Po Tsuen would result in a high localised landscape impact, due to the mature size and good form of the trees. The Kam Tin Road Improvements may also disturb areas of Route 3 mitigation planting.

The scheme avoids the graves and fung shui woodland at the base of Ho Hok Shan but the cultural artefacts at Ko Po Tsuen and Ha Ko Po Tsuen would be removed by the proposed road alignment, resulting in a high cultural impact.

## 5.7 Visual Impact Assessment

### 5.7.1 Visually Sensitive Receivers and Visual Envelope

The extent of visual influence of the existing Kam Tin Road and visually sensitive receiver groups are shown on the Visual Impact Assessment Plan, Figure 5.3. Other off-site visual impacts caused, for example, by the movement of construction traffic or spoil disposal are not included within the extent of visual influence.

The visual envelope of the existing Kam Tin Road is restricted by the hillslopes surrounding the Au Tau Roundabout and the urban development which borders the road corridor for much of its length. Where areas of land have been recently cleared as part of the Route 3 construction works, the building demolition has opened up temporary views. However, views towards the Kam Tin Road will be restricted in the future by the elevated alignments of Route 3, due for completion in 1998, the future Western Corridor Railway and their associated planting. Generally, the proposed scheme would have a low adverse visual impact and a notable impact on only a few sensitive receivers.

Many of the land uses falling within the visual envelope of the proposed scheme are not considered visually sensitive, such as the China Light and Power Electricity Sub-station and the Au Tau Water Pumping Station ( which have limited external views) and the many vehicular storage areas and scrap yards lining the road would experience negligible visual impacts. The visual impact of any views from motorists on Route 3 and Western Corridor Railway would also be negligible due to the nature of the land use.

### 5.7.2 Visually Sensitive Receivers

The following visually sensitive receivers have been assessed as suffering notable visual impacts during the construction and operational phases of the route:

### 5.7.3 Residents of Ko Po Tsuen

The scheme would result in the loss of three large mature trees at the entrance to the village which act as a screen towards the existing road. The vegetation loss would open up direct, close distance views of the road during its construction and would create more open views towards Route 3, resulting in a high adverse visual impact during the construction. 3.0 m and 5.7 m high noise barriers are proposed along the edge of the footpath in front of Ko Po Tsuen village entrance. The barriers would screen ground level views from Ko Po Tsuen to the road and its increased traffic and Route 3 during the operational phase. However, the barriers themselves would constitute a visual obstruction, resulting overall in a low adverse visual impact during the early operational phase.

#### 5.7.4 Pedestrians and Cyclists on Kam Tin Road

Pedestrians walking along Kam Tin Road would experience high negative impacts during construction as the restricted road corridor would expose pedestrians to continuous close distance views of the works. However, low beneficial impacts are predicted when the road opens. The proposed 2m wide footpaths and 3m cycle track would be a substantial improvement on the existing narrow footpaths. The proposed amenity areas would provide a degree of visual separation between pedestrian/cycle and vehicular traffic. Amenity planting would also filter views towards Route 3 and, in the longer term, the construction and operational phase of the Western Corridor Railway. The proposed noise barriers at Ko Po Tsuen would constitute a visual obstruction, resulting in a localised low adverse visual impact during the early operational phase.

#### 5.7.5 Travellers/Motorists on Kam Tin Road/Route 3/WCR

Motorists on the Kam Tin Road would experience low adverse visual impacts during the construction phase as the restricted nature of the road corridor would expose drivers to continuous, close distance views of the works. On the opening day, the introduction of long sections of noise barriers around Ko Po Tsuen would constitute a visual obstruction, resulting overall in a low adverse impact.

Motorists on the newly completed Route 3 would experience continuous, elevated and ground level views, resulting in low to negligible impacts during construction and negligible impacts during operation phases.. Planting would screen most views to Kam Tin Road in the longer term.

Future passengers on the Western Corridor Railway would experience negligible visual impact during the operational phase of the scheme, planting would screen most views to the road in the longer term.

## 5.8 Mitigation Measures

The following mitigation measures are proposed to help ameliorate assessed impacts as far as possible.

Proposed landscape and visual impact mitigation measures are illustrated in Figure 5.7, Landscape and Visual Mitigation Plan, Illustrative Cross-Sections, Figure 5.8 and Sketch Perspective, Figure 5.9. Figure 5.4 and 5.5 show the general location of the noise barriers at Ko Po Tsuen and Figure 5.10 illustrates a typical treatment for the proposed noise barriers.

Landscape and Visual Impact mitigation measures are divided into two main categories:

1. Temporary measures to reduce the landscape and visual impact of the road during the construction phase
2. Permanent measures to reduce the landscape and visual impact of the operational road, integrate the scheme into the surrounding landscape and additional environmental improvement measures.

### 5.8.1 Temporary Mitigation Measures - During Construction

The following mitigation measures are recommended to reduce landscape and visual impacts during the construction of the scheme:

- Detailed alignment of road to reduce visual impacts and the loss of existing trees and cultural artefacts. Construction work areas should be restricted to a minimum and protective fencing used. Enclose working areas with hoarding next to Ko Po Tseun village to reduce visual impacts. Hoarding should be erected to a safe minimum height.
- Minimise night time working and lighting to reduce visual impacts. Night lighting should be angled directly to the area required to minimise glare to village residents and travellers.

### 5.8.2 Permanent Mitigation Measures - After Construction

The following measures are recommended to successfully integrate the scheme into the surrounding landscape:

- New tree planting is recommended to replace those trees unavoidably lost. The land between the works limit and road corridor would be used for replacement planting.
- Dense tree planting would help to screen views to the road from sensitive receivers. It would also screen views from the road and foot/cycleways to the adjacent open storage areas etc., Route 3 and in the longer term the Western Corridor Railway. Where possible, new planting would tie back into the surrounding existing vegetation and match the mitigation proposed by the future planned infrastructure projects.
- Tree planting would need to be restricted in areas where Route 3 and 400kV electricity pylons oversail the road due to the height restrictions imposed by these structures. The underground drainage reserve would place restrictions on the species of planting proposed over the reserve.
- Fill slopes should have a natural profile of no steeper than 1:2, to provide satisfactory plant establishment and should be integrated with the existing topography and new embankments related to other planned infrastructure projects.
- Raised amenity areas would be 600mm high and clad in natural granite blockwork, to provide an attractive visual and physical separation of pedestrians, cyclists and vehicular traffic. The amenity areas would contain signage and street furniture to reduce obstructions on the footpath and avoid unnecessary visual clutter. Tall planting would be carefully positioned to avoid blocking views towards signage.
- Wide canopied, evergreen trees at a regular spacing would be used to provide shade for pedestrians and cyclists. Understorey shrubs would act as a barrier between the footpath /cycletrack and the road. The amenity planting would provide an attractive edge to the road with species chosen for their flowers, varied foliage, form and colour. Low groundcover would be used at all junctions in order to allow clear sight lines for drivers.
- 3.0 m and 5.7 m high noise barriers with GRC/Paraglass panel walls are proposed along the eastbound carriageway in front of Ko Po Tsuen. Figures 5.4 and 5.5 illustrate existing views of the Kam Tin Road around Ko Po Tsuen where the noise barriers are proposed. The noise barriers should be sensitively designed to help ameliorate their appearance and reduce visual impacts on motorists, cyclists, pedestrians and residents at Ko Po Tsuen. Figures 5.7, 5.8, 5.9 and 5.10 illustrate the location, form and surface treatment of the noise barriers. Variations in colour, texture have been introduced to provide an attractive structure. Visual interest has been created by introducing transparent vision panels along the top edge of the barrier to help reduce the visual height of the structures whilst coloured concrete absorptive panels help to screen views of the traffic from nearby residential properties.



- Of primary importance is the integration of the noise barriers with the adjacent residential landuse and the amelioration of the pedestrian environment. Therefore the appearance of the barriers would be soften using shrub planting in raised planters at the base of the noise barriers. Figures 5.8 and 5.9 illustrate typical treatments.
- Environmental improvements to the paved area in front of Ko Po Tsuen to provide an attractive amenity for residents. These improvements would include new block paving and seating areas. The existing trees and artefact would be retained, where possible, by locally widening the width of the footpath. Existing vegetation would be supplemented with tree and shrub planting in raised planters to screen views to the road, Route 3 and the future construction works for Western Corridor Railway. Figures 5.7, 5.8 and 5.9 illustrate the mitigation and environmental improvement measures for Ko Po Tsuen.
- Street furniture, such as bollards, barriers shelters and litter bins, around bus stops, foot/cycle paths and amenity areas would be carefully selected and chromatically themed, in order to create a distinctive character setting for the road. The detailed design of fences and barriers should be carefully considered. Low timber barriers at the edge of the road corridor would be less visually intrusive than metal railings.
- During the detailed design stage, traffic signs and lighting columns should be located to avoid unnecessary obstruction of the footpath/cycle track. Wherever possible, road signage, lighting, junction boxes etc. should be located in the central reservation.
- Surface materials for the footpaths and cycle track would be chosen to emphasise the difference in scale and activity between these areas and the road. Pedestrians and cyclists should be separated wherever possible by the use of bollards and changes in surface materials.
- Junction points between the road, footpath and cycle track demand careful treatment. Changes in surface material should be introduced at potential conflict points, such as road entrances and bus bays. Bollards should be located to deter vehicles from illegally using the cycle paths.

### 5.8.3 Planting Proposals

Planting would not be proposed in the central reserve for maintenance reasons and the poor growing environment. An adequate number of watering points should be provided within the planting areas to achieve the satisfactory establishment of the plant material. Planting areas should be designed for ease of maintenance and should be fully accessible to maintenance vehicles.

Planting proposals would include the species as listed in Table 5.1.

**Table 5.1 Planting Proposals**

Trees	Palms	Shrubs	Groundcover/ Climbers
Albizia lebbek	Chrysalidocarpus lutescens	Alamanda neriifolia	Aglaia odorata
Bauhinia blakeana	Rhapis humilis	Alpinia Xerumbei	Bougainvillea spectabilis
Cassia surattensis		Bambusa multiplex	Catharanthus roseus
Crateva religiosa		Calliandra haematocephala	Coleus blumei
Delonix regia		Callistemon rigidus	Hymenocallis americana
Erytherina crista-galle		Excoecaria cochinchinensis	Lantana montevidensis
Ficus microcarpa		Gordonia axillaris	Ligustrum sinensis
Machilus chinensis		Hibiscus rosa - sinensis	Nephrolepis exaltata
Melaleuca Meucadendron		Jasminum mesnyl	Pyrostegia Ignea Presl
Musa paradisiaca		Melastoma candidum	Thunbergia erecta
Plumeria rubra		Murraya paniculata	Wedelia trilobata
		Pittosporum tobira	Zebrina pendula
		Rhododendron spp	
		Rhodomyrtus tomentosa	
		Thevetia peruviana	

The road widening provides an opportunity to visually upgrade the immediate road side environment by the provision of generous and well landscaped foot/cycleways. Planting adjacent to the road would also screen views towards and from Route 3 and also the construction works and operational phase of Western Corridor Railway. These environmental improvements would result in an overall beneficial impact on most visual receivers during the operational phase of the scheme.

The character of the area will change dramatically with the completion of Route 3 and later the Western Corridor Railway and the mitigation measures would integrate the road widening proposals into the future character of the surrounding area. Amenity planting areas and dense tree planting are proposed to screen views to the road, traffic and noise barriers from sensitive receivers. Planting would also screen views from the road and foot/cycleways to the proposed Route 3, Western Corridor Railway and Kam Tin Bypass.

### 5.9 Residual Impacts(Year 10)

The adoption of the mitigation measures outlined above would do much to reduce the impact of the scheme to acceptable levels. In time, the road would become fully integrated into its surroundings to provide an attractive, well landscaped transport corridor for pedestrians, cyclists and motorists.

Planting at a wide range of New Territory sites indicates that proposed tree cover would be successfully established within 10 years. In the long term, the proposed planting measures would successfully screen views of the noise barriers and road from pedestrians and cyclists, Ko Po Tsuen and other residential properties around Ha Ko Po Tsuen (if they have not already been cleared or their views blocked by the Western Corridor Railway construction works).

The proposed Route 3, Western Corridor Railway and other future infrastructure projects would all have a major impact on the future landscape of the area. In the long term, the landscape and visual impacts created by the scheme are negligible compared to the potential impacts resulting from the other proposed developments. Mitigation planting between the proposed projects will need to be co-ordinated to create a comprehensive landscape strategy for the area and to minimise damage to the mitigation measures related to the Kam Tin Road widening scheme.

## 5.10 Conclusion

The character of the original rural landscape of the study area has largely been lost. The landscape character of the road corridor is heavily degraded by the presence of open storage sites, large scale developments, such as the water treatment works and overhead power lines. In the future, Route 3, Kam Tin Bypass, Western Corridor Railway and river retraining projects will further alter the rural character of the area. It is predicted, therefore, that the route would have a negligible impact on the landscape character of the study area.

High localised landscape impacts are likely to result from the clearance of mature roadside trees which are characteristic of the area, along certain stretches on both sides of the road. However, the construction of Route 3 is predicted to remove many notable areas of existing vegetation, resulting in an overall low impact on existing vegetation. No burial sites would be affected and the detailed alignment of the scheme would avoid the loss of a small number of inscribed stones adjoining the road.

Severe adverse visual impacts are predicted to be experienced by sensitive receivers in Ko Po Tsuen during construction, medium adverse impacts in the early operational phase and medium beneficial impacts in the longer term once mitigation and environmental improvement measures have become established. Other residential areas would either have views blocked or the property would be demolished by the construction work related to Route 3 and WCR. Pedestrians and cyclists along the route would experience high adverse visual impacts during construction, which would be reduced to low adverse impacts during the early operational phase. In the longer term, mitigation planting would reduce views of the road to an acceptable level. Motorists would experience low adverse visual impacts during construction and early operational stages and low beneficial impacts in the longer term. The appearance of the proposed noise barrier has been carefully considered to reduce its apparent height and provide a visually attractive and well landscaped structure. These measures would reduce the adverse impact of the barrier to a negligible level.

Mitigation proposals aim to provide a comprehensive landscape treatment for the road, which would be a significant environmental improvement for the whole area. Mitigation measures would reduce landscape, cultural and visual impacts to acceptable levels and minimal residual impacts are predicted as a result of the scheme.

**Section 6**

**Working Paper on Traffic Study**

**SECTION 6 WORKING PAPER ON TRAFFIC STUDY****6.1 BACKGROUND**

The section of Kam Tin Road between Au Tau Roundabout and Kam Tin Bypass (western end) is to be upgraded from a single two-lane carriageway to dual two-lane standard. The improvement in road capacity is mainly aimed at catering for the increasing east-west traffic demand from proposed developments in the region and at relieving the predicted heavy traffic flow upon opening of the Route 3 (Country Park Section). The project will also enhance road network operation and safety through the provision of improved junctions with better visibility and vehicle manoeuvrability as well as the introduction of wider footways, pedestrian crossing facilities and bus lay-bys.

As part of the overall planning process, Highways Department commissioned Babbie BMT (Hong Kong) Ltd. and Ho Tin & Associates Consulting Engineers Ltd. to conduct Environmental Impact Assessment (EIA) and Drainage Impact Assessment (DIA) studies.

Delcan International Corporation were appointed as the traffic sub-consultant to carry out a traffic study to provide detailed existing traffic flow and provide forecasts of the study area for the design year of 2011 for use in the EIA.

**6.2 EXISTING TRAFFIC CONDITIONS****6.2.1 Traffic Surveys**

Comprehensive AM and PM peak hour traffic surveys were carried out on 8 December 1995 to record the existing traffic conditions and patterns quantitatively as well as to provide data for analysis of current conditions and forecast of future traffic flows.

The surveyed intersections, including their existing and planned junction types, are summarised in **Table 6.1**. A plan of the surveyed locations is shown on **Figure 6.1**. Traffic movements at the surveyed locations are shown on **Figure 6.2** to **Figure 6.6** while a summary of the traffic counts obtained is presented in **Table 6.10**.

TABLE 6.1 SURVEYED LOCATIONS AND JUNCTION TYPES

Location	Junction Name	Junction Type	
		Existing	Proposed
A	Au Tau Roundabout (Kam Tin Road/Castle Peak Road)	Roundabout	Roundabout
B	Kam Tin Road/Unnamed Access	Priority T-junction	Priority T-junction
C	Kam Tin Road/Access to CLP Electricity Sub-station	Priority T-junction	Priority T-junction
D	Kam Tin Road/Unnamed Access to Recreational Facilities	Priority T-junction	Priority T-junction
E	Kam Tin Road/Access to Ha Ko Po Tsuen	Priority Crossroad	Priority T-junctions
F	Kam Tin Road/Unnamed Access	Priority T-junction	Priority T-junction
G	Kam Tin Road/Access to Ko Po San Tsuen	Priority Crossroad	Priority T-junctions
H	Kam Tin Road/Access to Ko Po Tsuen	Priority T-junction	Priority T-junction
I	Kam Tin Road/Unnamed Access	Priority T-junction	Priority T-junction
J	Kam Tin Road/Unnamed Access (Future Ramp connecting Route 3)	Priority T-junction	Signalled T-junction
K	Kam Tin Road/Access to Kam Tin Shi	Priority T-junction	Priority T-junction
L	Kam Tin Road/Kam Sheung Road (west)	Priority T-junction	Priority T-junction

Note: The proposed junction type is from Highways Department's Drawing Number NH 7121.

The consultant's observed traffic volumes and vehicle composition were compared with available surveyed results from Transport Department and the two sets of data was found to be of similar magnitude. It can therefore be concluded that the observed traffic volumes are reliable for use in this study.

## 6.3 DATA ASSEMBLY

### 6.3.1 Traffic Studies

Traffic data from other studies were used to provide input for the traffic analysis in this study. The major planning assumptions and traffic forecasts in these studies were reviewed to derive the traffic demand for the Kam Tin Road Improvement study area for the design horizon year of 2011.

#### 6.3.1.1 Kam Tin Bypass (KTB)

The draft Environmental Impact Assessment (EIA) report of this study, Agreement No. CE 7/94 completed in September 1995, was reviewed. The study assess the impact against environment resulted from a proposed new route about 1.3 km long on an embankment, running to the north of Kam Tin Town and connecting onto Kam Tin Road to the east and west of the conurbation. Traffic forecasts and proportion of heavy vehicles are provided in the 2011 AM peak hour and are reproduced in **Table 6.2**.

**TABLE 6.2 KTB TRAFFIC FORECASTS IN 2011 AM**

Road Link	2-way flow (vehs/hr)	Percentage of heavy vehicles (%) <sup>*</sup>
Kam Tin Road - East of Shek Kong to Kam Tin Bypass Junction	2,968	61.3%
Kam Sheung Road	2,695	51.8%
Kam Tin Road - West of Shek Kong to Kam Tin Bypass Junction	562	15.1%
Kam Tin Road - East of Kam Sheung Road Junction	464	30.0%
Kam Tin Road - West of Kam Sheung Road Junction	3,013	49.0%
Kam Tin Road - West of Kam Tin Bypass West Junction	5,486	59.1%
Kam Tin Bypass - East of Junction with Access to Tai Kong Po	2,420	71.9%
Kam Tin Bypass - West of Junction with Access to Tai Kong Po	2,444	71.5%
Kam Tin Bypass - West of Junction with Access to Kam Hing Wai	2,479	71.3%

Notes: 1. <sup>\*</sup> Heavy vehicles are all vehicles with an unladen weight exceeding 1,525 kg.  
2. Traffic flows shown are in vehicles/hour.

Source: Extract from Table 5.11 of KTB report.

A more detailed forecast vehicle composition are provided only for the major roads and they are shown in **Table 6.3**. For the access roads, KTB assumed that the light vehicles are evenly distributed while only heavy vehicles are considered.



**TABLE 6.3 KTB FORECAST 2011 AM VEHICLE COMPOSITION**

Road Segment	Percentage of Total Vehicle						
	Private Car	Taxi	Private Bus	PLB	LGV	MGV	HGV
Kam Tin Bypass	25.6%	1.5%	1.4%	0.0%	36.4%	12.3%	22.8%
Kam Sheung Road	40.7%	1.3%	2.3%	3.9%	30.5%	8.4%	12.9%
Kam Tin Road - West of Kam Tin Bypass	32.3%	3.2%	2.0%	6.6%	30.7%	9.0%	16.2%
Kam Tin Road - East of Kam Tin Bypass	24.3%	1.4%	1.2%	11.9%	31.2%	11.1%	18.9%

Source: Extract from Table A3 of KTB report.

### 6.3.1.2 Route 3 - Country Park Section and Ting Kau Bridge (R3-CPS&TKB)

A review was conducted on the Preliminary Design Stage 2 Environmental Assessment report of the R3-CPS&TKB (Country Park Section - Tai Lam Tunnel and Yuen Long Approach Road) Study, Agreement No. CE 27/92 completed in 1993. Relevant year 2011 AM peak hour traffic forecasts in the study area are reproduced in Table 6.4.

**TABLE 6.4 R3-CPS&TKB TRAFFIC FORECASTS IN 2011 AM**

Road Link	Flow (vehs/hr)
Slip road from Kam Tin Road to Route 3	290
Slip road from Route 3 to Kam Tin Road	880
Kam Tin Road (Eastbound)	920
Kam Tin Road (Westbound)	1,820
Castle Peak Road - Yuen Long (Eastbound)	2,100
Castle Peak Road - Yuen Long (Westbound)	3,100
Castle Peak Road - Tam Mi (Northbound)	1,180
Castle Peak Road - Tam Mi (Southbound)	1,280

Source: Extract from Table 18.3 in Volume 3B of the R3-CPS&TKB report.

Traffic flows on Route 3 CPS, its slip roads and connecting roads are based on information from Transport Department, where a conversion factor (from pcus/hour to vehicles/hour) of 1.65 was adopted. The study also assumed a uniform traffic mix on all roads: motorcycles (1%), passenger cars (12%), taxis (7%), light goods vehicles (25%), medium goods vehicles

(44%), heavy goods vehicles (6%), coaches (1%), light buses (1%) and franchised buses (3%). From Figure 15.2 in Volume 3A of the report, again with data provided by Transport Department, it was found that the AM peak hour traffic flow is generally much larger.

### 6.3.1.3 Route 3 - Tai Lam Tunnel & Yuen Long Approach Northern Section (R3-TLT&YLA)

Predicted 2011 AM peak hour traffic data was abstracted from the Traffic Design Report prepared by MVA Asia Limited which was endorsed by Highways Department and Transport Department in June 1995. The Route 3 and local road traffic flows are given in Table 6.5.

**TABLE 6.5 R3-TLT&YLA TRAFFIC FORECASTS IN 2011 AM**

Road	Flow (vehs/hr) and proportion of heavy vehicles			Road	Flow (vehs/hr) and proportion of heavy vehicles		
Route 3 north of Au Tau Interchange	NB	3,260	64%	Kam Tin Road east of Link Roads I & J	EB	800	69%
	SB	2,930	64%		WB	800	69%
Link G	SB	1,480	64%	Link H near Small Traders New Village	NB	3,840	64%
Link H north of Links E and F	NB	1,740	64%		SB	3,440	64%
Route 3 south of Link G and H	NB	1,520	64%	Link Road I	SB	360	64%
	SB	1,450	64%	Link Road J	NB	440	64%
Castle Peak Road (Tam Mi)	NB	1,300	54%	Kam Tin Road west of Link Roads I & J	EB	750	67%
	SB	1,550	61%		WB	800	66%
Link E	SB	2,100	64%	Route 3 south of Links E and F	NB	3,480	64%
Link F	NB	1,960	64%		SB	3,550	64%
Castle Peak Road (Yuen Long) west of Au Tau Bypass	EB	2,140	62%	Castle Peak Road (Yuen Long) east of Au Tau Bypass	EB	1,120	72%
	WB	1,990	68%		WB	1,440	71%
Au Tau Bypass south of Castle Peak Road	NB	2,610	64%	Route 3 south of Links I and J	NB	3,910	64%
	SB	2,610	64%		SB	3,910	64%
Link K	SB	960	67%	Link L	NB	1,360	71%

Source: Extract from Table 4.16 of the R3-TLT&YLA report.

### 6.3.2 Government Sources

Information was extracted from various Government publications and Transport Department was also approached. Relevant data obtained was utilised in conducting this study.

#### 6.3.2.1 Report of the Working Party on Measures to Address Traffic Congestion

In an effort to address traffic congestion in the territory, the Transport Branch published a report in November 1994 in which it recommended that the longer term target growth rate for private vehicles will be 2% per annum.

#### 6.3.2.2 Annual Traffic Census (ATC)

Table 6.6 shows the Annual Average Daily Traffic (AADT) figures extracted from the 1989 to 1994 ATC's published by Transport Department for count stations in the study area.

**TABLE 6.6 AADT FROM 1988 TO 1994 ATC's**

Location	Stn. No.	Annual Average Daily Traffic						
		1988	1989	1990	1991	1992	1993	1994
Castle Peak Rd-Tam Mi & NTCR	5016	23,150	23,880	24,970	25,860	32,210	44,730	48,710
Castle Peak Rd-Yuen Long	5019	45,520	47,810	51,090	53,900	58,420	64,300	66,600
Kam Tin Road	5254	-	16,370	15,660*	16,360*	16,310*	14,890*	12,900
Kam Tin Road	6051	-	-	-	-	23,700	20,120	20,330*
Kam Tin Road	6207	15,840	16,760	15,800	17,740	16,640	14,340	14,920
Kam Sheung Road	6208	7,470	7,860	7,120	7,180	7,260	5,580	7,210
Fan Kam Road	6212	8,170	9,210	8,340	9,280	9,580	8,690	8,940

- Notes: 1. Traffic flows are shown in vehs/day.  
2. \* denotes estimated volume.

Linear regression analysis was applied to the AADT volumes from 1988 to 1994 to obtain an annual growth factor for the projection of 2011 minor road traffic volumes. In deriving the traffic growth factor, only actual measured growth values rather than the estimated figures were used. The resulting average annual growth rate, weighted by traffic volume, for the area was 5%.

Vehicle classification and occupancy on the section of Castle Peak Road - Tam Mi and NTCR were recorded by core station no. 5016. The 1994 ATC weekday peak hour (0800-0900) vehicle composition is presented in Table 6.7.

**TABLE 6.7 1994 ATC VEHICLE CLASSIFICATION FOR COUNT STATION 5016**

Time	Proportion of Total Vehicle										2-way Flow (vehs/hr)	Directional Distribution
	Motor Cycle	Private Car	Taxi	Pass. Van	PLB	LGV	HGV	Non F. Bus	SD	DD		
0800 - 0900 Peak Hour	1.1%	40.6%	5.1%	2.0%	5.1%	12.2%	30.8%	2.4%	0.3%	0.4%	3,690	51.3% N

Note: Pass. Van = Passenger Van, F. Bus = Franchised Bus, SD = Single Deck Franchised Bus and DD = Double Deck Franchised Bus.

In addition, 1994 hourly variation graphs for core stations on Castle Peak Road - Tam Mi and NTCR (5016), Castle Peak Road - Yuen Long (5019), Route Twisk (5014), Tolo Highway (5013) and Screenline T-T have all shown that the AM peak hour flow is most significant.

### 6.3.2.3 CTS-2 Forecasts

Figures from the Second Comprehensive Transport Study (CTS-2) were also reviewed to establish the traffic growth rate in the study area. Zonal trip ends and link flows of the study area, which take into account future developments, between 1996 and 2011 were examined. An averaged annual growth rate was calculated to be less than 3%.

For year 2011, the CTS-2 trip ends, link flows within the study area and along the ATC Screenline T-T were reviewed for different peak periods. Findings also indicated the AM peak hour as critical.

### 6.3.2.4 Transport Department

Various divisions of Transport Department were approached and the following traffic and transport data was obtained:

- Year 1995 classified junction movements counts within the study area.
- Year 2001, 2006 and 2011 AM peak hour traffic forecasts for Route 3 Country Park Section.

## 6.4 FUTURE TRAFFIC PREDICTIONS

### 6.4.1 Study Area Peak Hour

The EIA methodology is to adopt the peak traffic flows as the input, thus identifying the maximum predicted noise levels generated by traffic at the chosen design years. Therefore, it was considered appropriate to predict only the peak period traffic flows.

Upon review of other studies, ATC data, traffic survey results and CTS-2 data, it was concluded that the daily peak in the study area occurs in the AM period. Therefore it was concluded that the AM peak hour should be adopted to provide a traffic demand projection that represents the highest flow period.

### 6.4.2 Forecast Methodology

#### 6.4.2.1 Major Roads

Year 2011 AM peak hour traffic flows for Au Tau Roundabout, Kam Tin Road, slip road to Route 3 CPS, Kam Tin Bypass and Kam Sheung Road were forecasted primarily based on traffic data from other studies mentioned in Section 6.3.1. The decision on which study to adopt was based on a number of criteria; these include study objectives, study area and time of report publication. In this respect, the KTB study traffic data was used for Kam Tin Road, Kam Tin Bypass and Kam Sheung Road; the R3-TLT&YLA study for flows along Castle Peak Road and the slip road to and from Route 3 CPS. The projected 2-way traffic demand, in vehicles per hour, for these links is schematically illustrated on Figure 6.7.

Year 2011 vehicle composition for the major roads was also assumed to be the same as the corresponding studies and is summarised in Table 6.8.

**TABLE 6.8 FORECAST 2011 AM TRAFFIC FLOW AND VEHICLE COMPOSITION FOR MAJOR ROADS**

Major Road Link	2- way flow (vehs/hr)	Percentage of heavy vehicles (%)
Kam Tin Road - West of Kam Tin Bypass West Junction	5,486	59.1%
Kam Tin Road - East of Kam Tin Bypass West Junction	3,013	49.0%
Kam Tin Road - West of Kam Tin Bypass East Junction	464	30.0%
Kam Tin Bypass - East of Kam Tin Bypass West Junction	2,479	71.3%
Kam Sheung Road	2,695	51.8%
Castle Peak Road - Yuen Long	4,130	68.0%
Castle Peak Road - Tam Mi	2,850	61.0%
Slip road to and from Route 3 CPS	800	64.0%

Note: The detailed vehicle composition for Kam Tin Road, Kam Tin Bypass and Kam Sheung Road is shown in Table 6.3.

The adopted traffic prediction given in **Table 6.8** was compared with those obtained through application of an annual growth factor of 5% to the observed counts; and the former was found to be significantly higher in general. The high growth probably arises from the increase in east-west traffic demand from proposed developments in the region and the opening of the Route 3 CPS.

#### 6.4.2.2 Minor Roads

Changes in traffic flows of minor access roads along both sides of Kam Tin Road (junctions B, C, D, E, F, G, H, I and K in Table 6.1) were not available from other studies. To reflect general growth in vehicle usage and to allow for uncertainties in land use changes, it was therefore considered appropriate to adopt an annual growth factor of 5% (as derived in Section 6.3.2.2 from ATC figures) for projection of traffic demand.

It is anticipated that vehicle composition at the minor roads would remain relatively unchanged and the surveyed traffic mix would still apply. The vehicle mix and corresponding traffic movements of the minor roads in the design horizon year of 2011 is shown in **Table 6.9** while the location of the traffic movements are shown on **Figure 6.8** to **Figure 6.12**.

**TABLE 6.9 FORECAST 2011 AM TRAFFIC FLOW AND VEHICLE COMPOSITION FOR MINOR ROADS**

Intersection	Movement	Percentage of Total Vehicle					Total	
		Motor-cycle	Car/Taxi/LGV	PLB/GMB	MGV/HGV	Bus/Coach	Vehs	PCUs
B	B1	0%	0%	0%	0%	0%	0	0
	B2	0%	0%	0%	0%	0%	0	0
C	C1	0%	0%	0%	0%	0%	0	0
	C2	0%	0%	0%	0%	0%	0	0
D	D1	0%	0%	0%	0%	0%	0	0
	D2	0%	0%	0%	0%	0%	0	0
EB	EB1	0%	0%	0%	0%	0%	0	0
	EB2	0%	60%	0%	40%	0%	9	13
EC	EC1	0%	67%	0%	33%	0%	5	7
	EC2	0%	63%	0%	37%	0%	14	20
F	F1	0%	0%	0%	0%	0%	0	0
	F2	0%	0%	0%	0%	0%	0	0
GA	GA1	0%	0%	0%	100%	0%	4	7
	GA2	0%	0%	0%	100%	0%	4	7
GB	GB1	4%	54%	0%	42%	0%	47	61
	GB2	0%	25%	0%	75%	0%	36	58
GC	GC1	0%	100%	0%	0%	0%	2	2
	GC2	0%	0%	0%	0%	0%	0	0
H	H1	0%	100%	0%	0%	0%	4	4
	H2	0%	100%	0%	0%	0%	4	4
I	I1	0%	60%	0%	40%	0%	9	13
	I2	0%	100%	0%	0%	0%	7	7
K	K1	0%	84%	6%	10%	0%	56	61
	K2	0%	87%	5%	6%	2%	112	122

- Notes: 1. LGV - Light Goods Vehicle.  
 2. MGV - Medium Goods Vehicle.  
 3. HGV - Heavy Goods Vehicle.  
 4. Location of traffic movements are shown on Figure 6.8 to Figure 6.12.

## 6.5 CONCLUSIONS

A comprehensive exercise has been conducted in order to predict traffic demand for the design horizon year of 2011 for the study area; including sections of Castle Peak Road, Kam Tin Road, slip road to Route 3 CPS, Kam Tin Bypass and Kam Sheung Road. Latest relevant studies and traffic information has been used to achieve the objective, which have taken into account Government's territorial traffic demand, and planned land use and road infrastructure changes.

Comprehensive AM and PM peak hour traffic surveys were carried out to record the existing traffic conditions and patterns. The surveyed traffic counts is presented in Table 6.10.

Projected year 2011 AM peak hour traffic flows and vehicle composition for Au Tau Roundabout, Kam Tin Road, slip road to Route 3 CPS, Kam Tin Bypass and Kam Sheung Road are given in Table 6.8 and illustrated on Figure 6.7.

Traffic forecasts and vehicle composition of minor roads within the study area for 2011 AM are presented in Table 6.9.



TABLE 6.10 OBSERVED 1995 TRAFFIC FLOW AND VEHICLE COMPOSITION

Intersection	Movement	Peak	Percentage of Total Vehicle					Total	
			Motor-cycle	Car/Taxi/LGV	PLB/GMB	MGV/HGV	Bus/Coach	Vehs	PCUs
A	A1	AM	1%	61%	6%	29%	3%	2,403	3,067
		PM	1%	73%	6%	16%	4%	2,141	2,551
	A2	AM	1%	66%	7%	21%	5%	2,151	2,647
		PM	1%	71%	6%	17%	5%	2,382	2,849
	A3	AM	0%	63%	6%	27%	4%	1,674	1,921
		PM	1%	64%	5%	26%	4%	1,819	2,069
	A4	AM	0%	52%	5%	39%	4%	1,264	1,710
		PM	0%	75%	3%	18%	4%	844	995
	A5	AM	1%	69%	9%	17%	4%	704	846
		PM	0%	75%	9%	11%	5%	528	618
	A6	AM	1%	66%	12%	16%	5%	700	855
		PM	0%	73%	11%	12%	4%	746	875
B	B1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
	B2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
C	C1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	50%	0%	50%	0%	2	3
	C2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	50%	0%	0%	50%	2	3
D	D1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
	D2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
EA	EA1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
	EA2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
EB	EB1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	25%	0%	75%	0%	4	6
	EB2	AM	0%	60%	0%	40%	0%	5	7
		PM	0%	29%	0%	71%	0%	7	11
EC	EC1	AM	0%	67	0%	33%	0%	3	4
		PM	0%	50%	0%	50%	0%	2	3
	EC2	AM	0%	63%	0%	37%	0%	8	11
		PM	0%	0%	0%	100%	0%	3	6
F	F1	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
	F2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	0%	0%	0%	0%	0	0
GA	GA1	AM	0%	0%	0%	100%	0%	2	4
		PM	0%	40%	0%	60%	0%	5	7
	GA2	AM	0%	0%	0%	100%	0%	2	4
		PM	0%	0%	0%	100%	0%	5	9
GB	GB1	AM	4%	54%	0%	42%	0%	26	34

Intersection	Movement	Peak	Percentage of Total Vehicle					Total	
			Motor-cycle	Car/Taxi/LGV	PLB/GMB	MGV/HGV	Bus/Coach	Vehs	PCUs
	GB2	PM	0%	71%	0%	29%	0%	7	9
		AM	0%	25%	0%	75%	0%	20	32
		PM	0%	58%	0%	42%	0%	12	16
GC	GC1	AM	0%	100%	0%	0%	0%	1	1
		PM	0%	0%	0%	0%	0%	0	0
	GC2	AM	0%	0%	0%	0%	0%	0	0
		PM	0%	100%	0%	0%	0%	2	2
H	H1	AM	0%	100%	0%	0%	0%	2	2
		PM	0%	0%	0%	0%	0%	0	0
	H2	AM	0%	100%	0%	0%	0%	2	2
		PM	0%	0%	0%	0%	0%	0	0
I	I1	AM	0%	60%	0%	40%	0%	5	7
		PM	0%	67%	0%	33%	0%	3	4
	I2	AM	0%	100%	0%	0%	0%	4	4
		PM	0%	0%	0%	100%	0%	1	2
J	J1	AM	4%	92%	4%	0%	0%	25	25
		PM	6%	50%	0%	25%	19%	16	21
	J2	AM	0%	88%	0%	12%	0%	8	9
		PM	6%	71%	0%	10%	13%	31	36
K	K1	AM	0%	84%	6%	10%	0%	31	34
		PM	3%	82%	5%	7%	3%	60	65
	K2	AM	0%	87%	5%	6%	2%	62	68
		PM	2%	74%	10%	8%	6%	49	57
L	L1	AM	1%	58%	11%	23%	7%	243	314
		PM	0%	69%	11%	10%	10%	199	245
	L2	AM	1%	60%	10%	21%	8%	248	319
		PM	0%	68%	10%	16%	6%	266	328
M	Eastbound Link Flow	AM	1%	70%	11%	15%	3%	820	980
		PM	2%	65%	11%	17%	3%	790	960
N	Westbound Link Flow	AM	1%	62%	14%	18%	5%	720	900
		PM	2%	71%	7%	17%	3%	1,010	1,190

- Notes: 1. LGV - Light Goods Vehicle.  
 2. MGV - Medium Goods Vehicle.  
 3. HGV - Heavy Goods Vehicle.  
 4. Location of traffic movements are shown on Figure 6.2 to Figure 6.6.

## Section 7

# Summary and Recommendations

## SECTION 7 SUMMARY AND RECOMMENDATIONS

### 7.1 Noise Impact Assessment

Construction of the project would lead to significant noise impacts on the noise sensitive receivers identified in the Study area. The predicted maximum anticipated construction noise levels are above 75 dB(A) at most NSRs locations. To mitigate this impact, it is recommended to control the sound emission from the powered mechanical equipment during the construction work by either using silenced equipment or reducing noise transmission using mufflers, silencers or acoustic enclosures. In addition, the installation of temporary noise barriers at site boundary or around the noisy equipment is another effective means in screening the low-rise receivers from the construction noise. Through the proper implementation of these mitigation measures, construction noise levels at all the affected NSRs can be reduced to or below the 75 dB(A) criterion.

A practical guide that will be designed to assist the Engineer and the Contractor in fulfilling their requirements for environmental review and to ensure the effectiveness of the environmental protection and pollution control measures adopted has been provided in a stand-alone EM&A Manual, that also forms part of this EIA.

During the operational phase of the road, traffic noise levels at most of the existing and planned NSRs will exceed the HKPSG noise criteria based on the projected 2011 traffic figures. To ameliorate the noise impacts, it is recommended to erect 3m high barrier and 5.7m high inverted-L barrier to protect the existing and planned NSRs at Ko Po Tsuen and "Kam Fung Terrace". For NSRs at Ko Po San Tsuen and Au Tau, the provision of noise abatement structures is not effective and thus indirect mitigation measures are recommended for Exco consideration. Altogether it is found that the noise impact to 63 out of 86 number of affected dwellings in this study cannot be duly mitigated by direct technical measures. Among these 63 dwellings, 33 of them are eligible for indirect technical measure based on the EDP's eligibility criteria. For the future developments in the Study Area, careful considerations should be given to the setback distances and orientation of the sensitive facades in order to alleviate the residual impacts.

### 7.2 Ecological Impact Assessment

Due to the relatively small scale of the construction work and the highly disturbed roadside environment, the only direct impact is the removal of some roadside trees of exotic species along the Kam Tin Road within the project boundary. The trees loss can be compensated by planting suitable tree species once the Project is finished. In addition, proper mitigation measures shall be provided to alleviate indirect impact such as polluted water and dust.

### 7.3 Landscape and Visual Impact

The existing character of the landscape/townscape of the study area is run-down and derelict. With the completion of Route 3 by July/August 1998 before the commencement of this project, the landscape character will be slightly improved due to the extensive areas of landscape planting associated with this project. The future landscape character in this study area will be dominated by the Western Corridor Railway and Route 3. Hence, the widening scheme will have negligible adverse impacts on the landscape character both during the construction and operational phases.

Although there are no adverse impacts, potential loss of trees lining the road at Ko Po Tsuen would result in a localized landscape impact. In addition, the cultural artefacts (inscribed stones adjoining the road) at Ko Po Tsuen and Ha Ko Po Tsuen would be removed resulting in a high cultural impact. These localized impacts can be mitigated by replacement planting and detailed alignment of road to avoid the loss of existing trees and cultural artefacts.

Regarding the visual impact, adverse visual impacts are predicted during the construction stage for the Ko Po Tsuen resident, pedestrians and cyclists. During the early operational stage, it is reduced to low adverse visual impacts and is further reduced to acceptable level in the longer term. To mitigate the impact, it is proposed that the construction work shall be restricted to a minimum. Hoarding shall be erected for works area close to Ko Po Tsuen. The appearance of the proposed noise barrier has been carefully considered to reduce its apparent height and provide a visually attractive and well landscaped structure. After construction, new trees shall be planted to replace the loss trees and along the road side.

## Reference

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Kam Tin Bypass, Agreement No. CE 7/94. KTB/200/Issue 1 - Environmental Impact Assessment. September 1995. Binnie Wilbur Harris JV.

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Chalmers, M.L. (1986). Annotated Checklist of the Birds of Hong Kong. Hong Kong Bird Watching Society, Hong Kong.

Improvement to Castle Peak Road from Siu Lam to So Kwun Tan. Agreement No. CE23/93-Noise Impact Assessment. Jun 95. Peter Fraenkel BMT (Asia) Ltd.

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Figure 6.11 Location Plan of Projected Traffic Movements (Sheet 4 of 5)  
Figure 6.12 Location Plan of Projected Traffic Movements (Sheet 5 of 5)

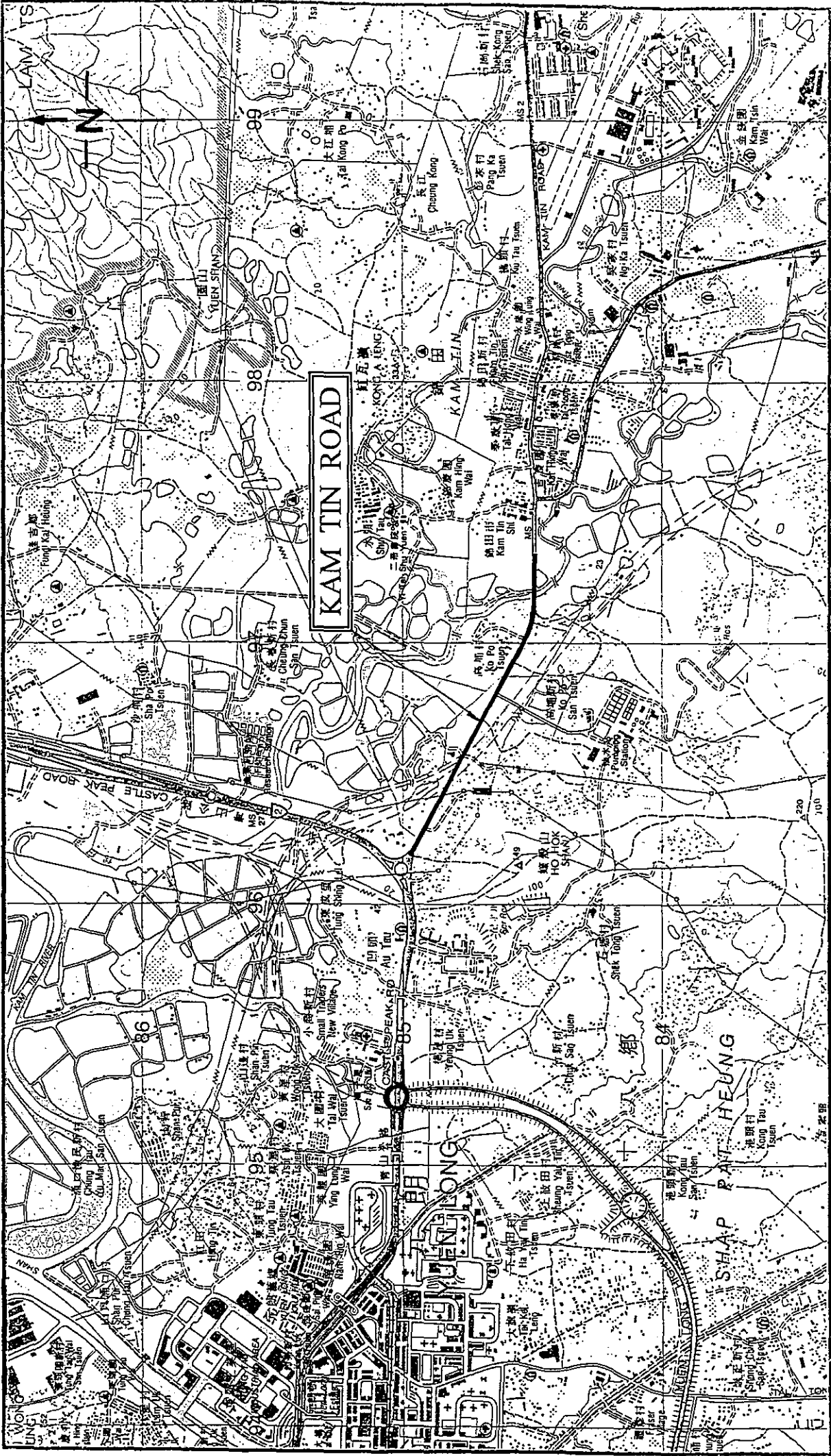
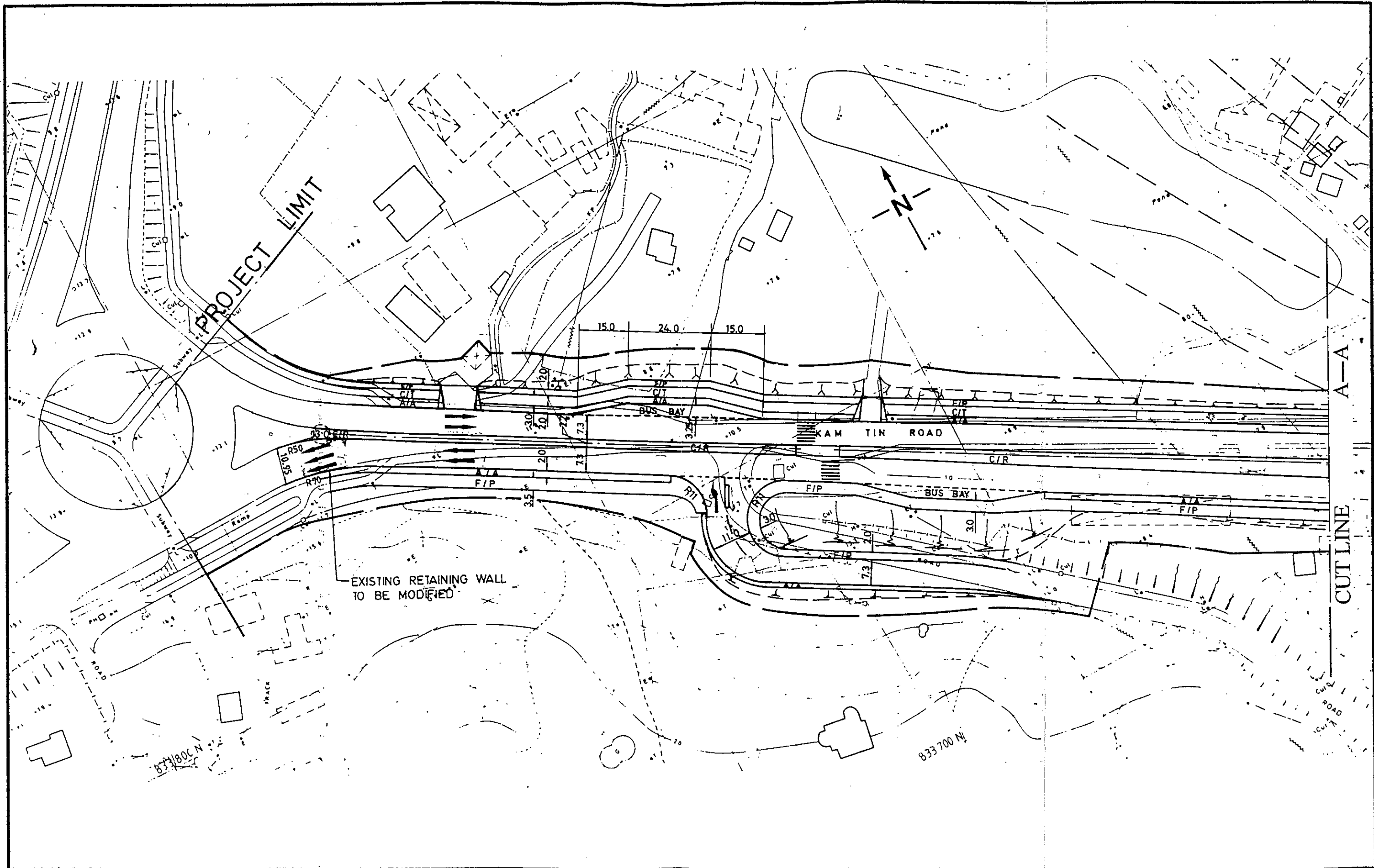


FIGURE 1.1

SITE LOCATION PLAN

BABTIE BMT (HONG KONG) LTD.

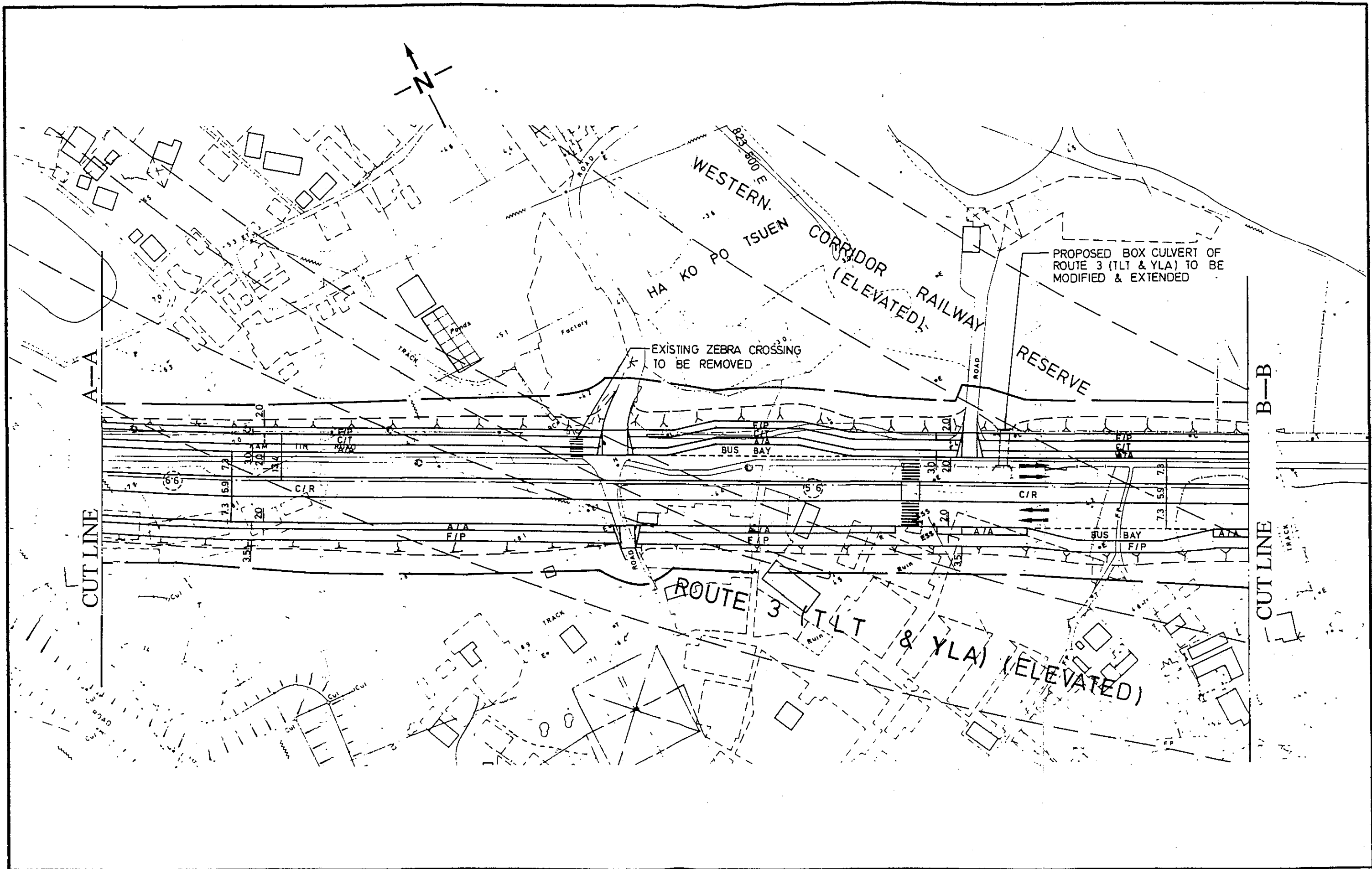
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



PRELIMINARY GENERAL LAYOUT ( SHEET 1 OF 4)

FIGURE 2.1

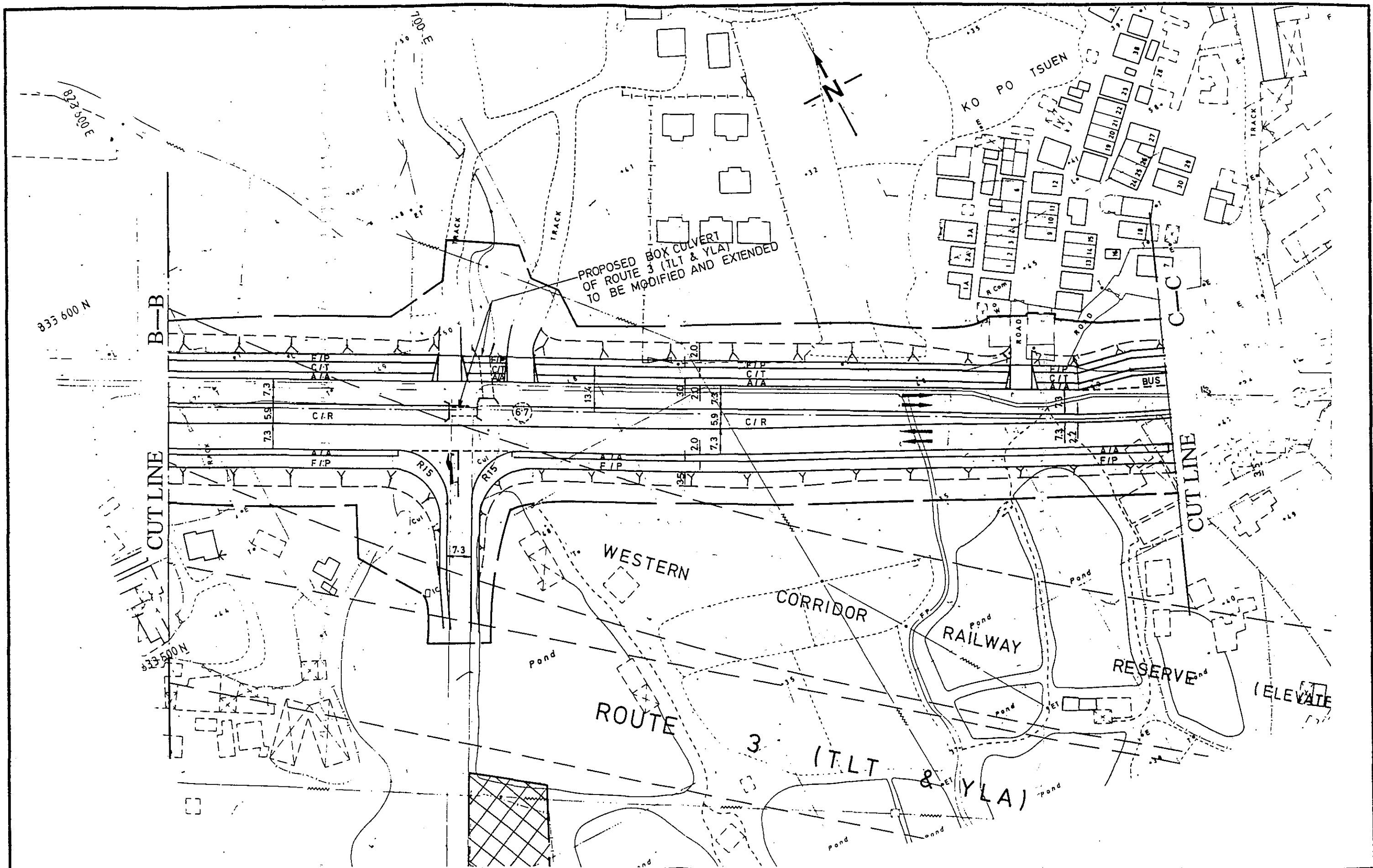
BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



PRELIMINARY GENERAL LAYOUT (SHEET 2 OF 4)

FIGURE 2.2

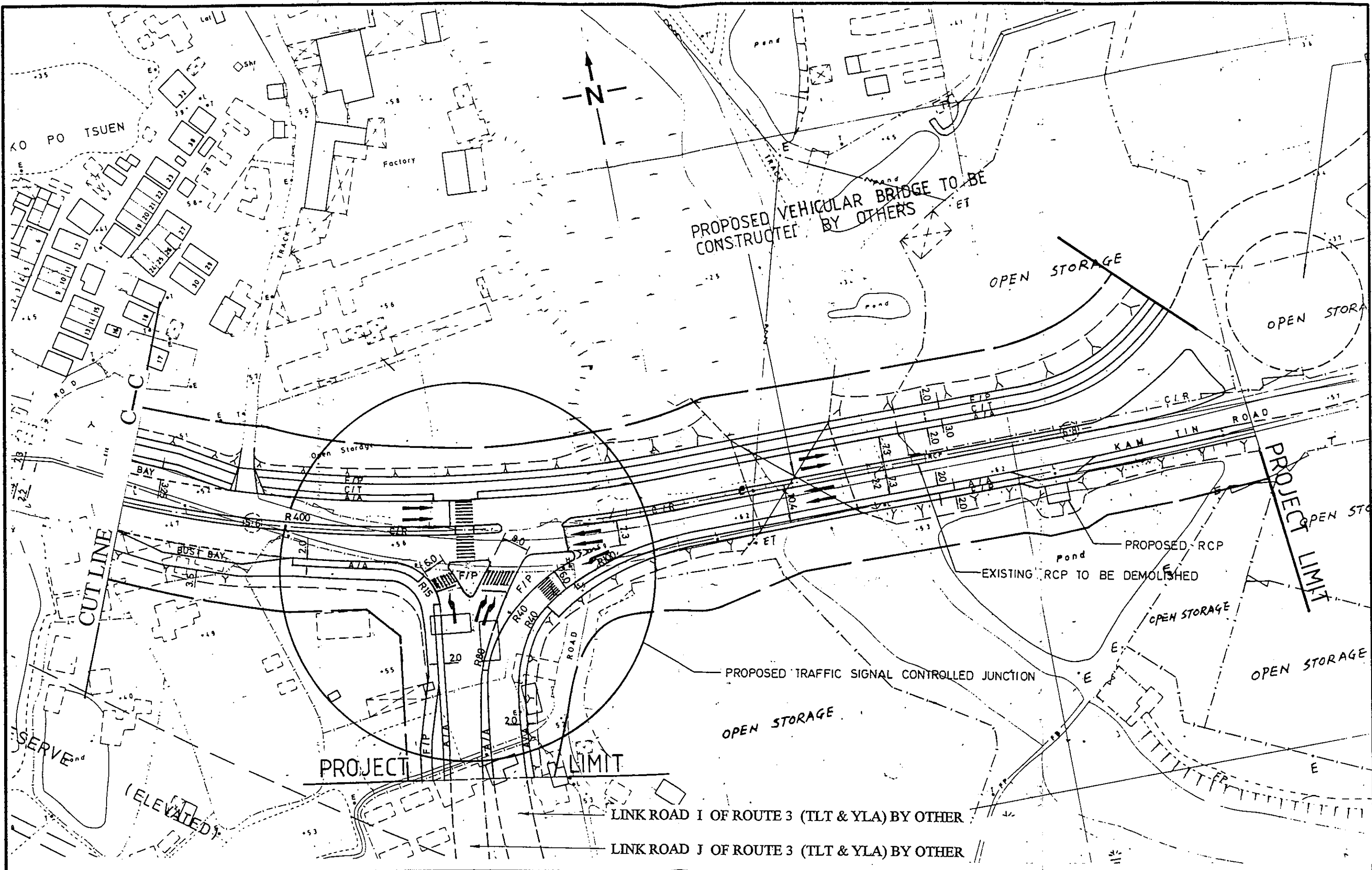
BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



PRELIMINARY GENERAL LAYOUT (SHEET 3 OF 4)

FIGURE 2.3

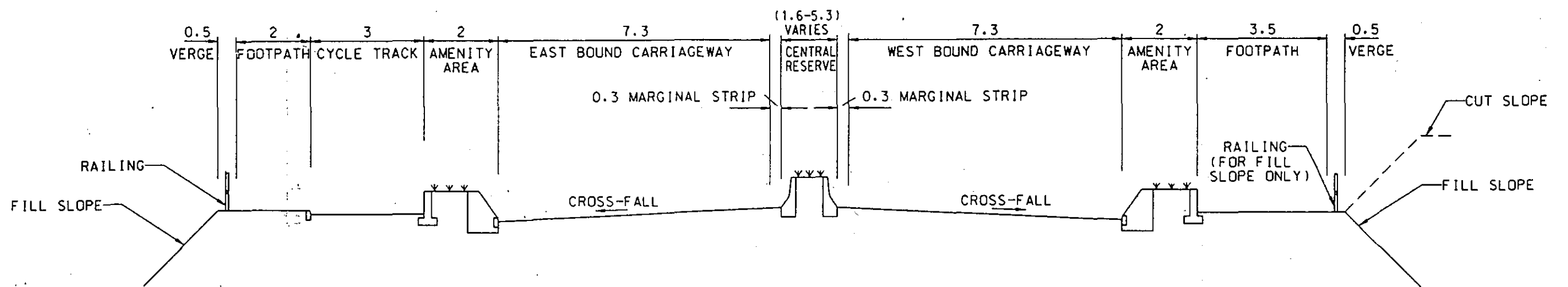
BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



PRELIMINARY GENERAL LAYOUT (SHEET 4 OF 4)

FIGURE 2.4

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



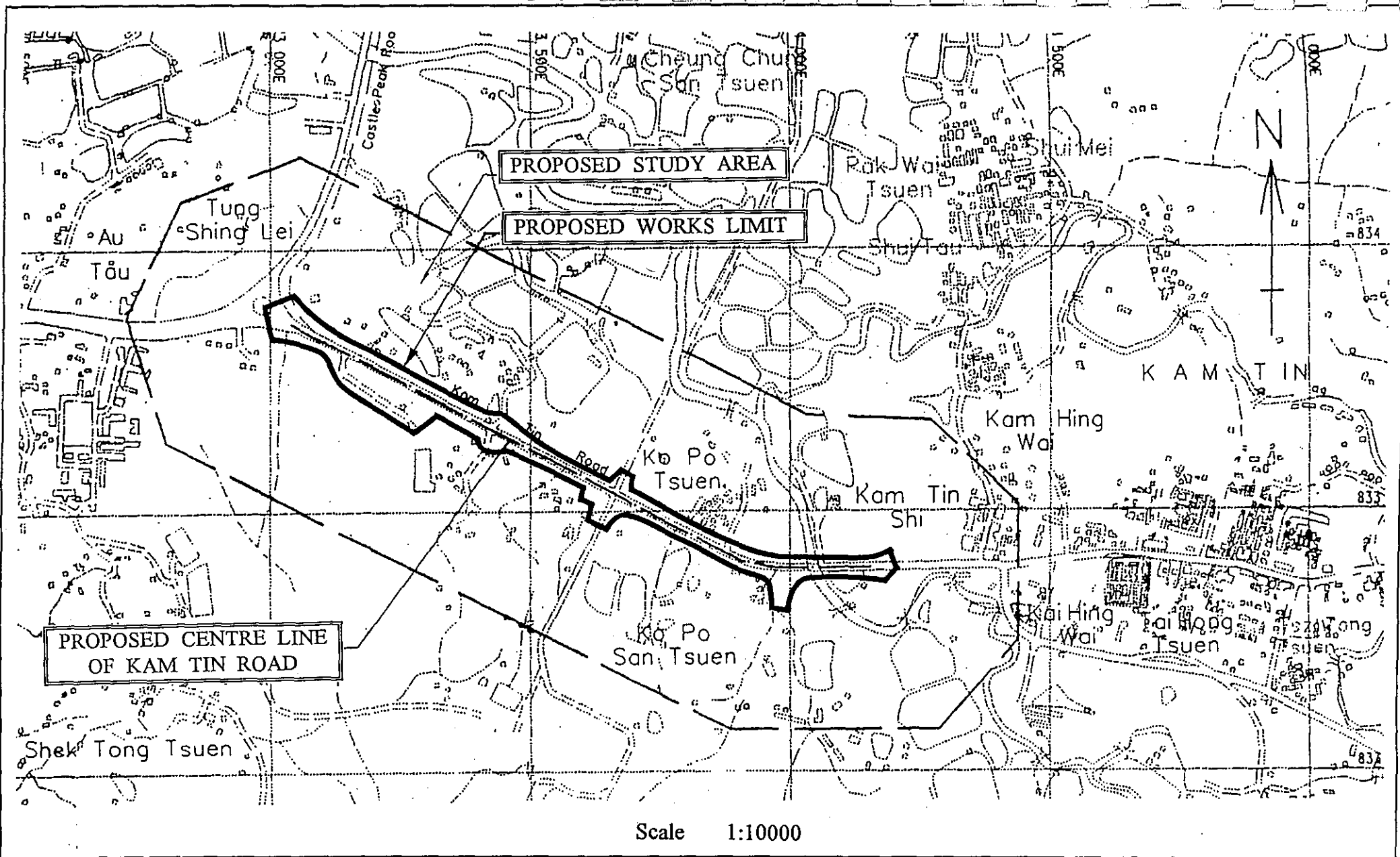
TYPICAL ROAD CROSS - SECTION

SCALE 1:125

FIGURE 2.5

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

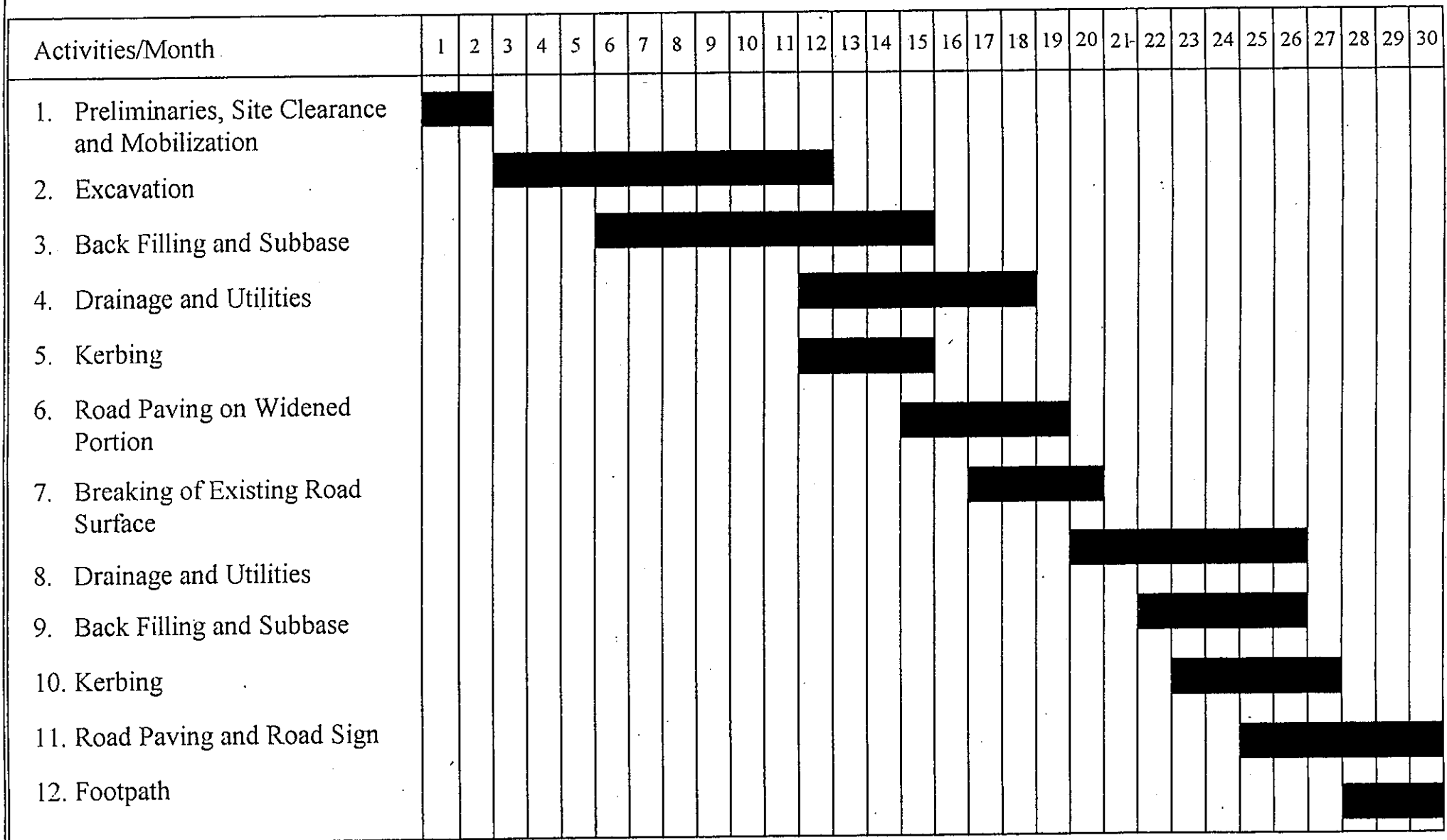




WORKS LIMIT OF PROPOSED ROAD  
IMPROVEMENT WORKS

FIGURE 3.1

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

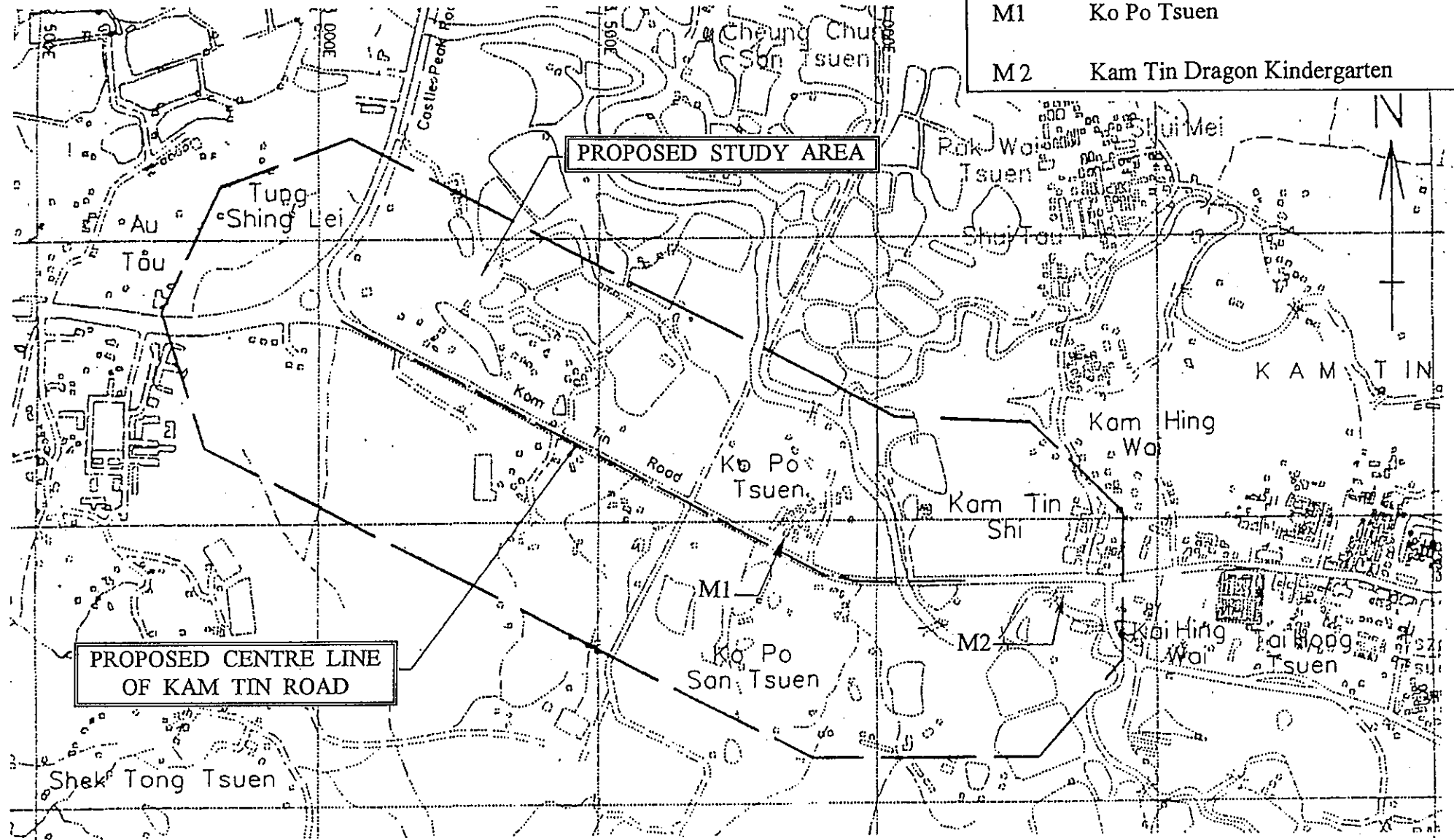


PRELIMINARY CONSTRUCTION PROGRAMME

FIGURE 3.2

BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

M1 Ko Po Tsuen  
 M2 Kam Tin Dragon Kindergarten

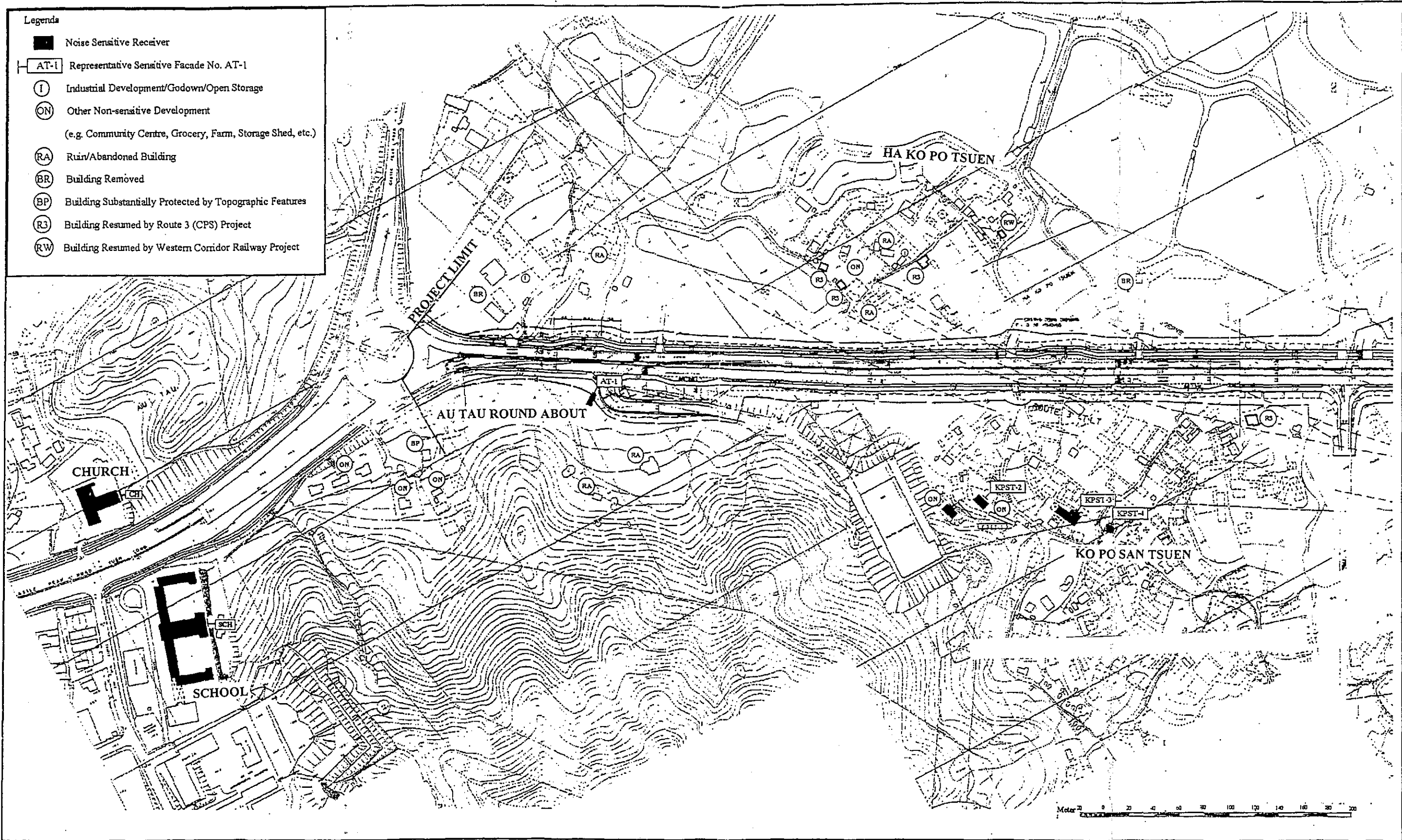


Scale 1:10000

LOCATIONS OF BACKGROUND NOISE MONITORING STATIONS

FIGURE 3.3

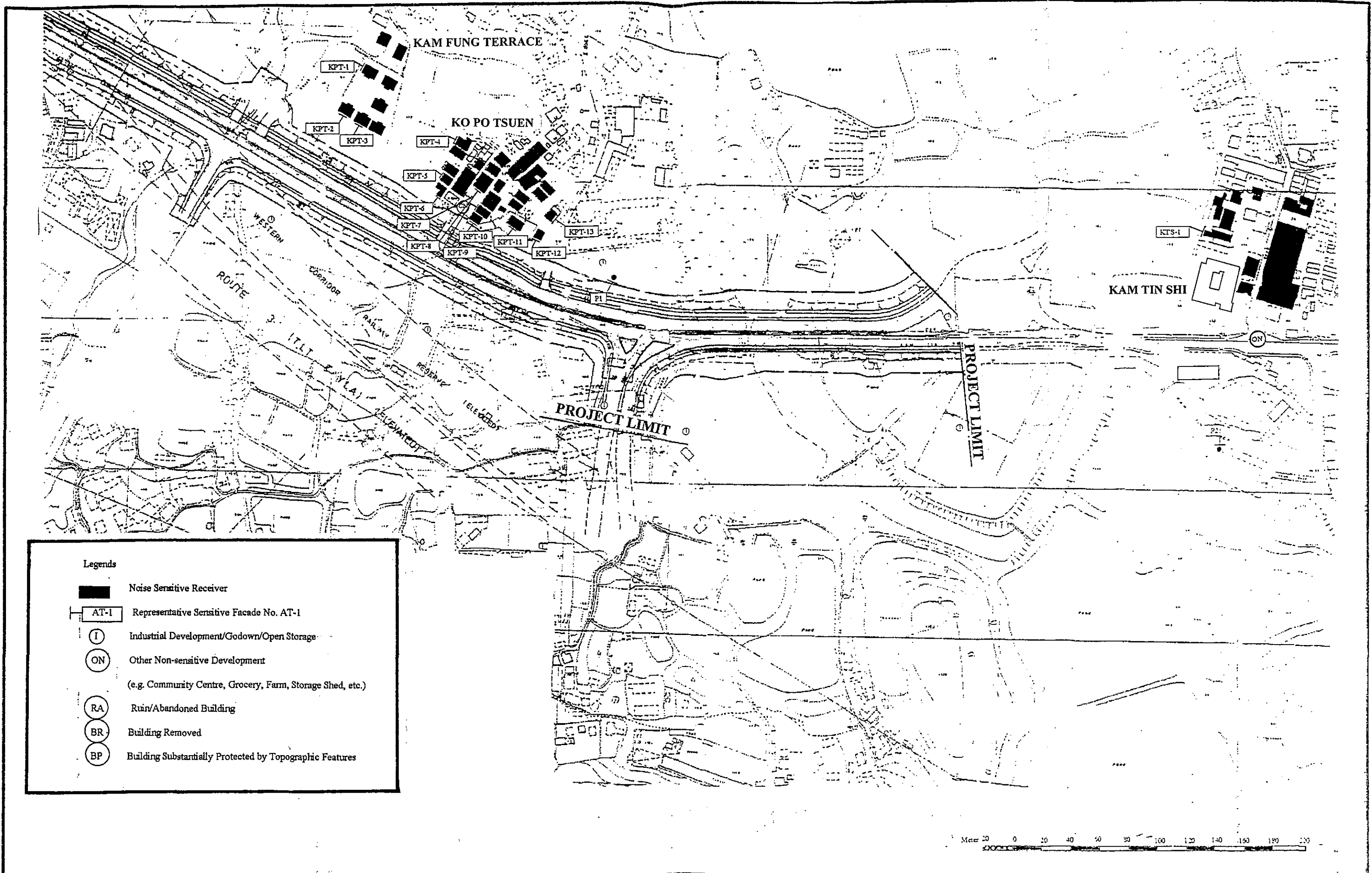
BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



NOISE SENSITIVE RECEIVERS AND REPRESENTATIVE SENSITIVE FACADES (SHEET 1 OF 2)

FIGURE 3.4

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



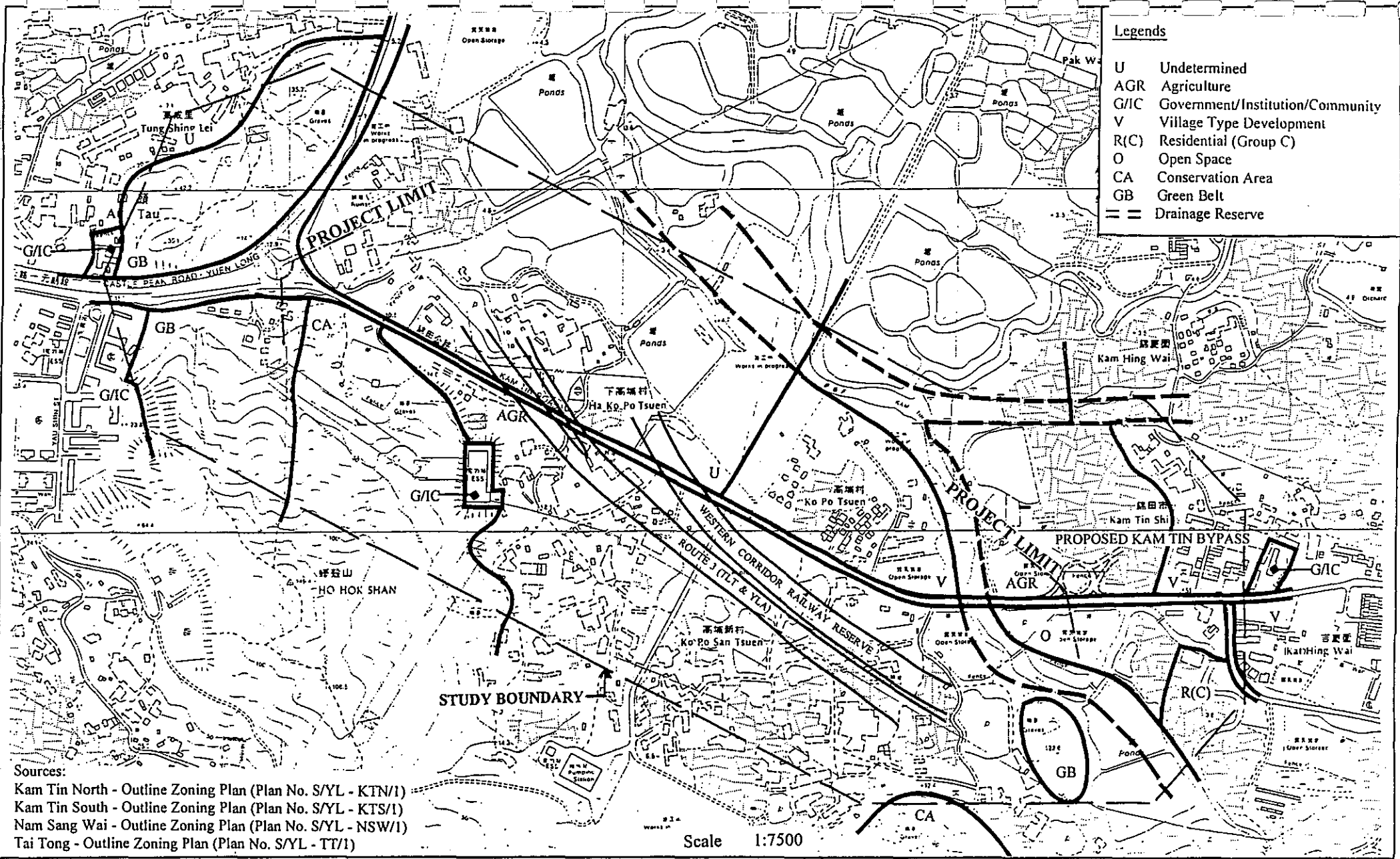
**Legends**

- Noise Sensitive Receiver
- AT-1 Representative Sensitive Facade No. AT-1
- I Industrial Development/Godown/Open Storage
- ON Other Non-sensitive Development  
(e.g. Community Centre, Grocery, Farm, Storage Shed, etc.)
- RA Ruin/Abandoned Building
- BR Building Removed
- BP Building Substantially Protected by Topographic Features

NOISE SENSITIVE RECEIVERS AND  
REPRESENTATIVE SENSITIVE FACADES  
(SHEET 2 OF 2)

FIGURE 3.5

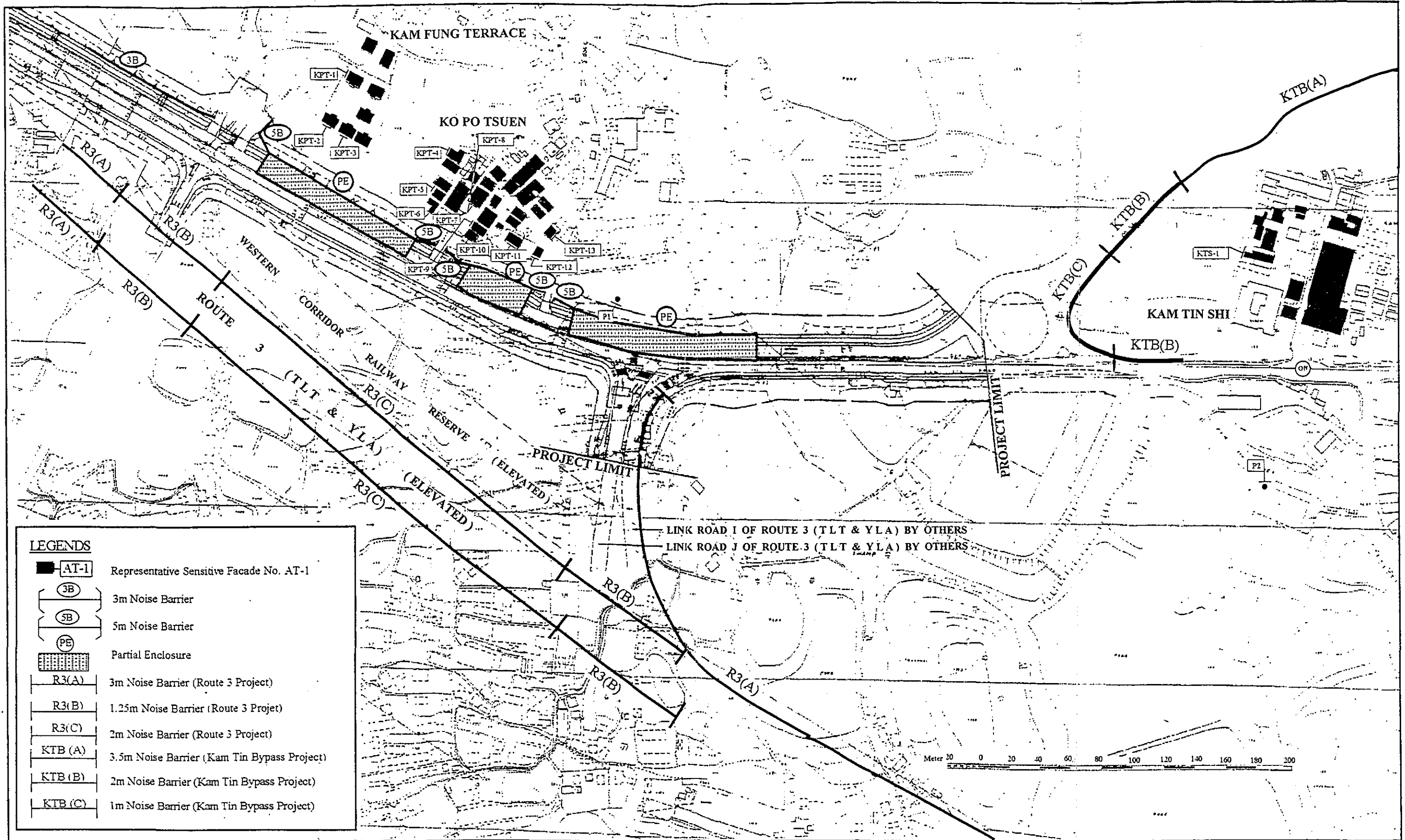
BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



PLANNED LAND USES WITHIN STUDY AREA

FIGURE 3.6

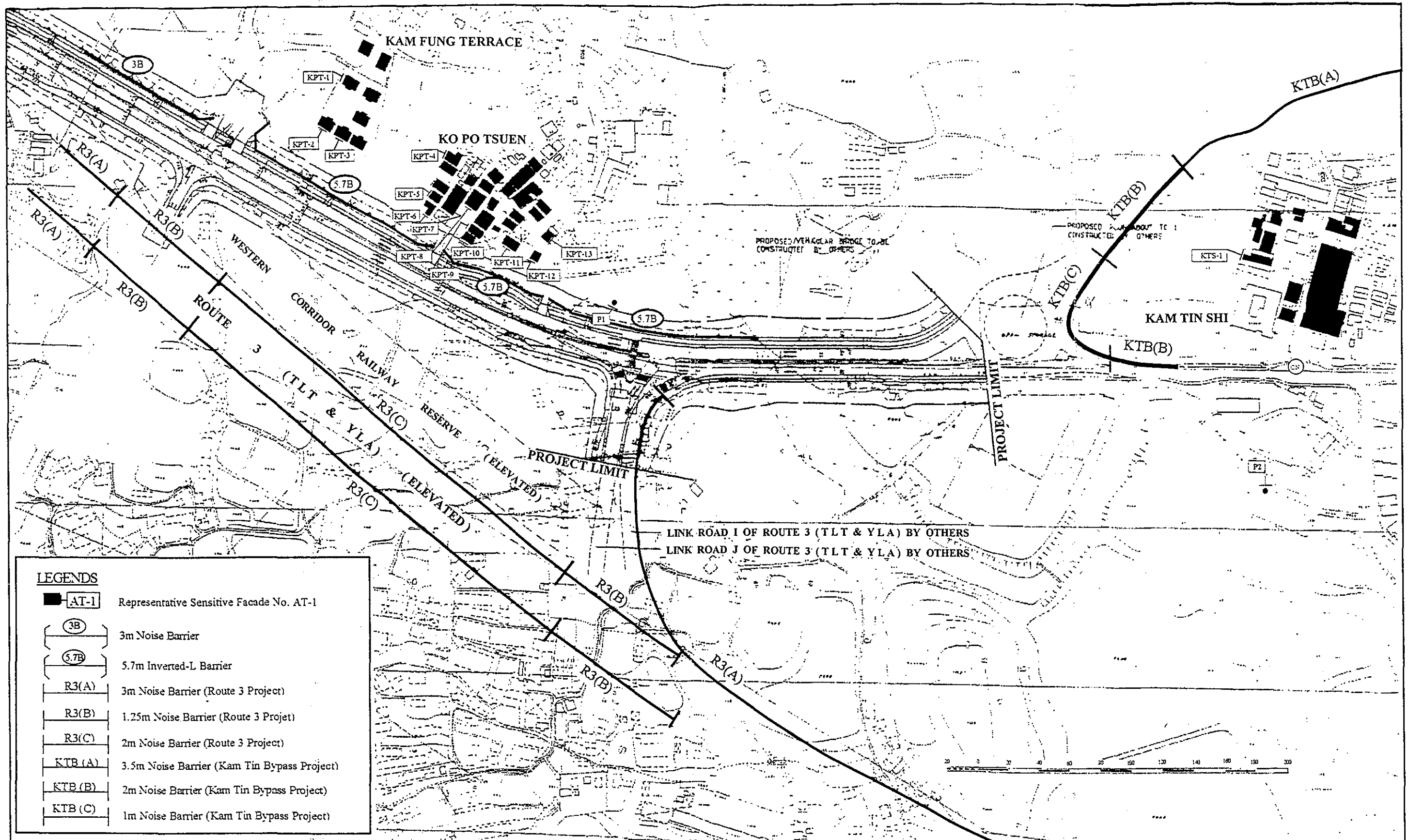
BABTIE BMT (HONG KONG)LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



NOISE MITIGATION SCENARIO 1a

FIGURE 3.7

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

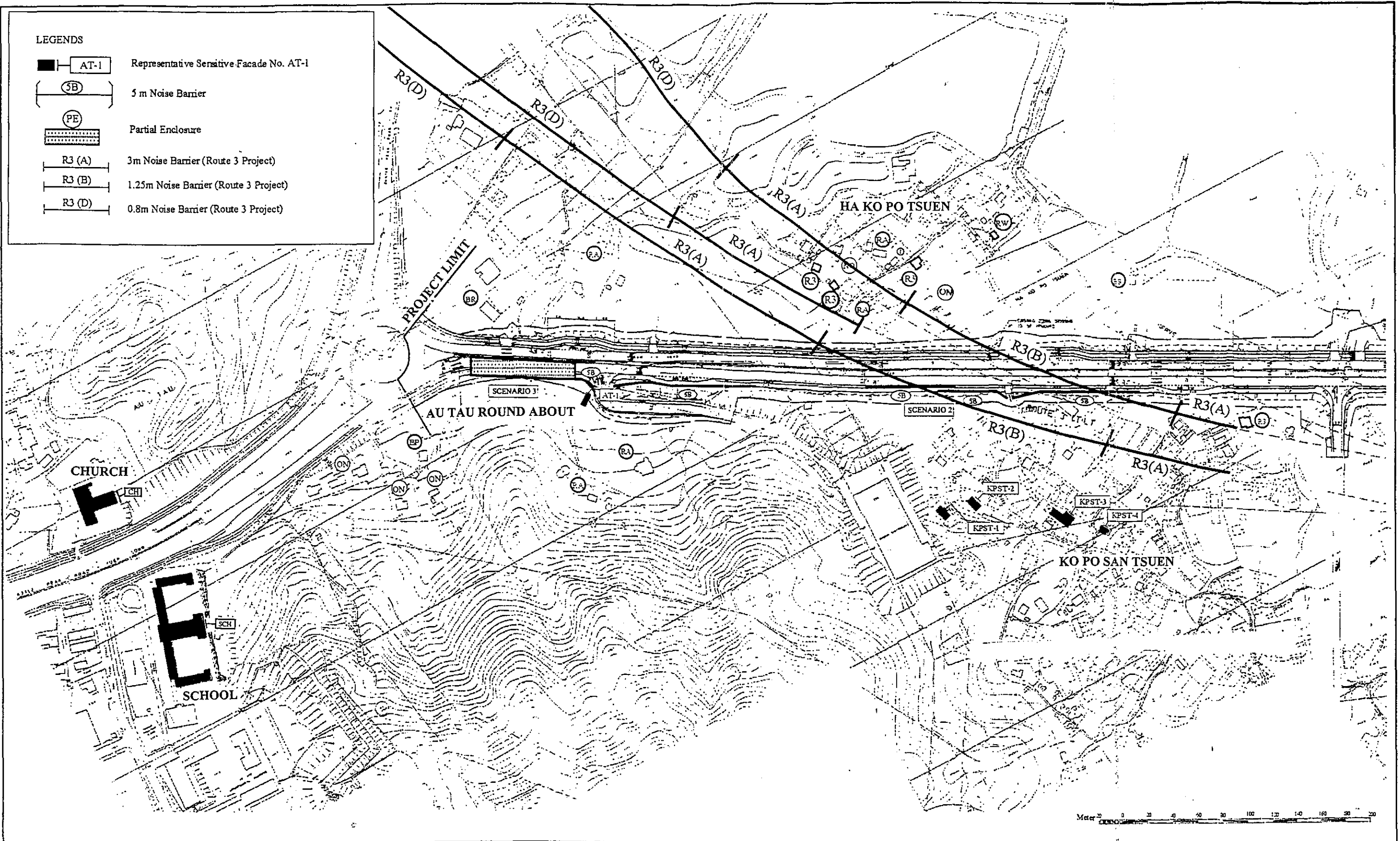


NOISE MITIGATION SCENARIO 1b

FIGURE 3.8

BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

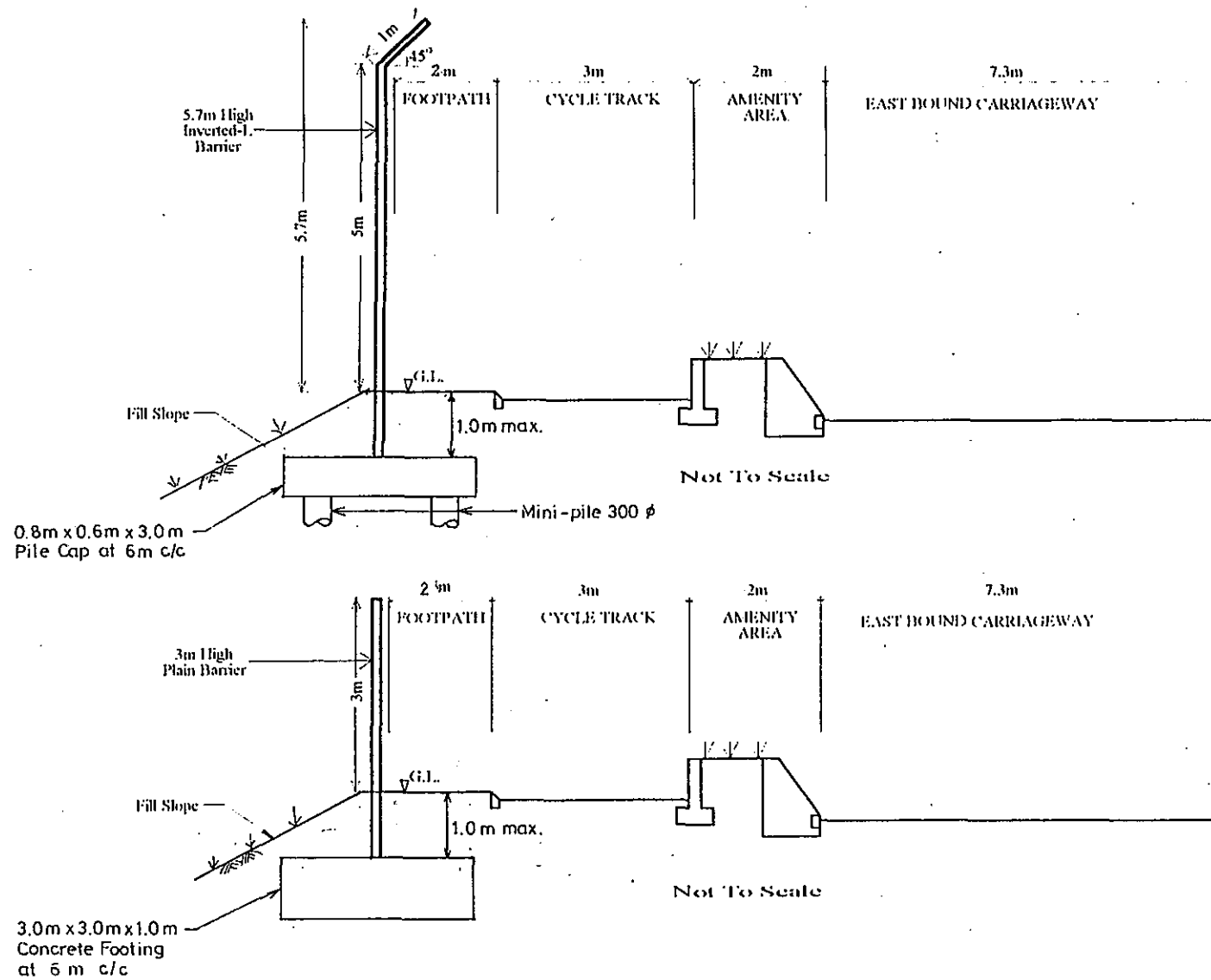




NOISE MITIGATION SCENARIO 2 AND 3

FIGURE 3.9

BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

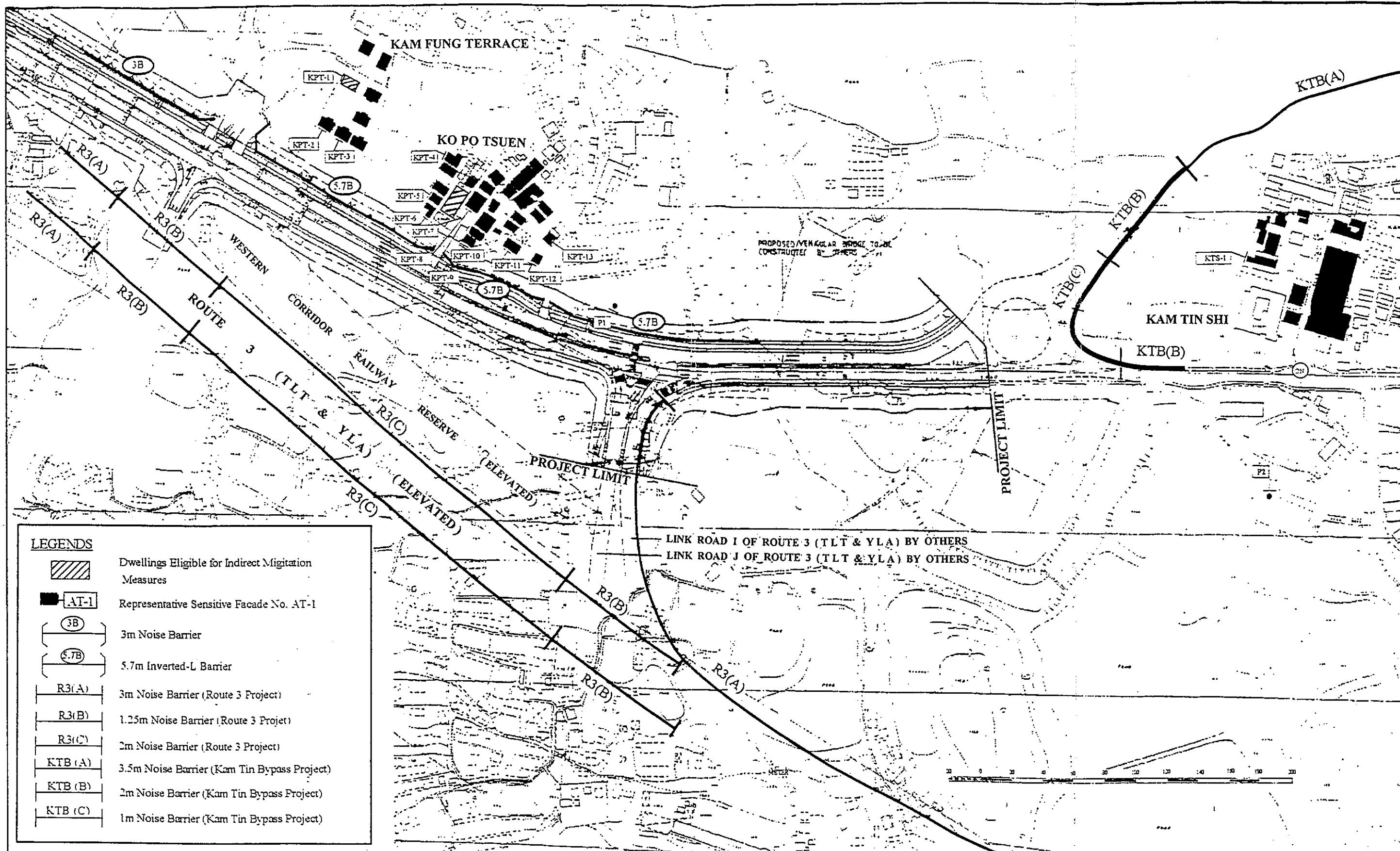












SCALE 1:100

## CONCEPTUAL DESIGN OF NOISE BARRIERS

FIGURE 3.10

BABTIE BMT (HONG KONG)LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

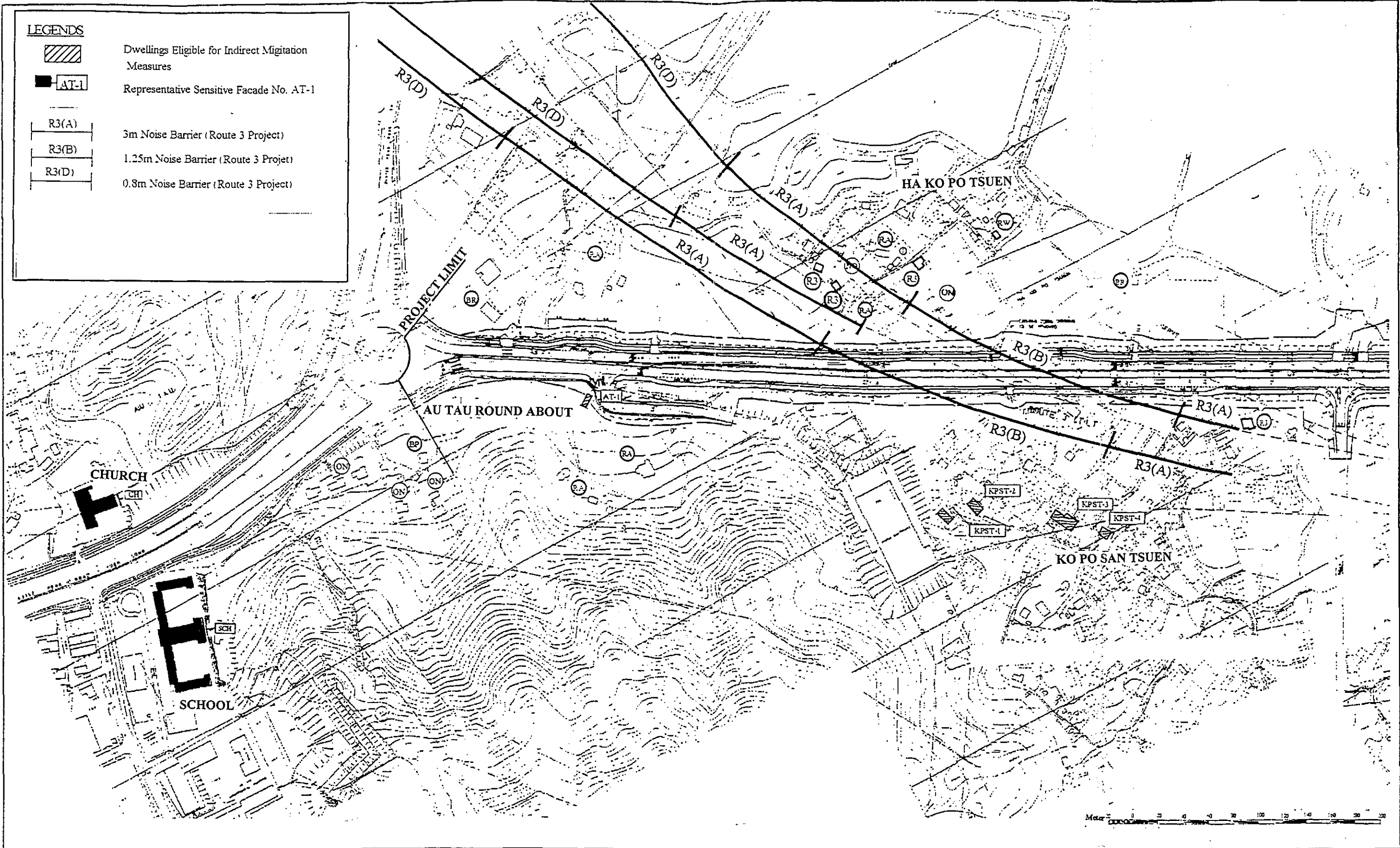


LEGENDS	
	Dwellings Eligible for Indirect Mitigation Measures
	Representative Sensitive Facade No. AT-1
	3m Noise Barrier
	5.7m Inverted-L Barrier
	3m Noise Barrier (Route 3 Project)
	1.25m Noise Barrier (Route 3 Project)
	2m Noise Barrier (Route 3 Project)
	3.5m Noise Barrier (Kam Tin Bypass Project)
	2m Noise Barrier (Kam Tin Bypass Project)
	1m Noise Barrier (Kam Tin Bypass Project)

RECOMMENDED NOISE MITIGATION  
SCHEME 1b

FIGURE 3.11

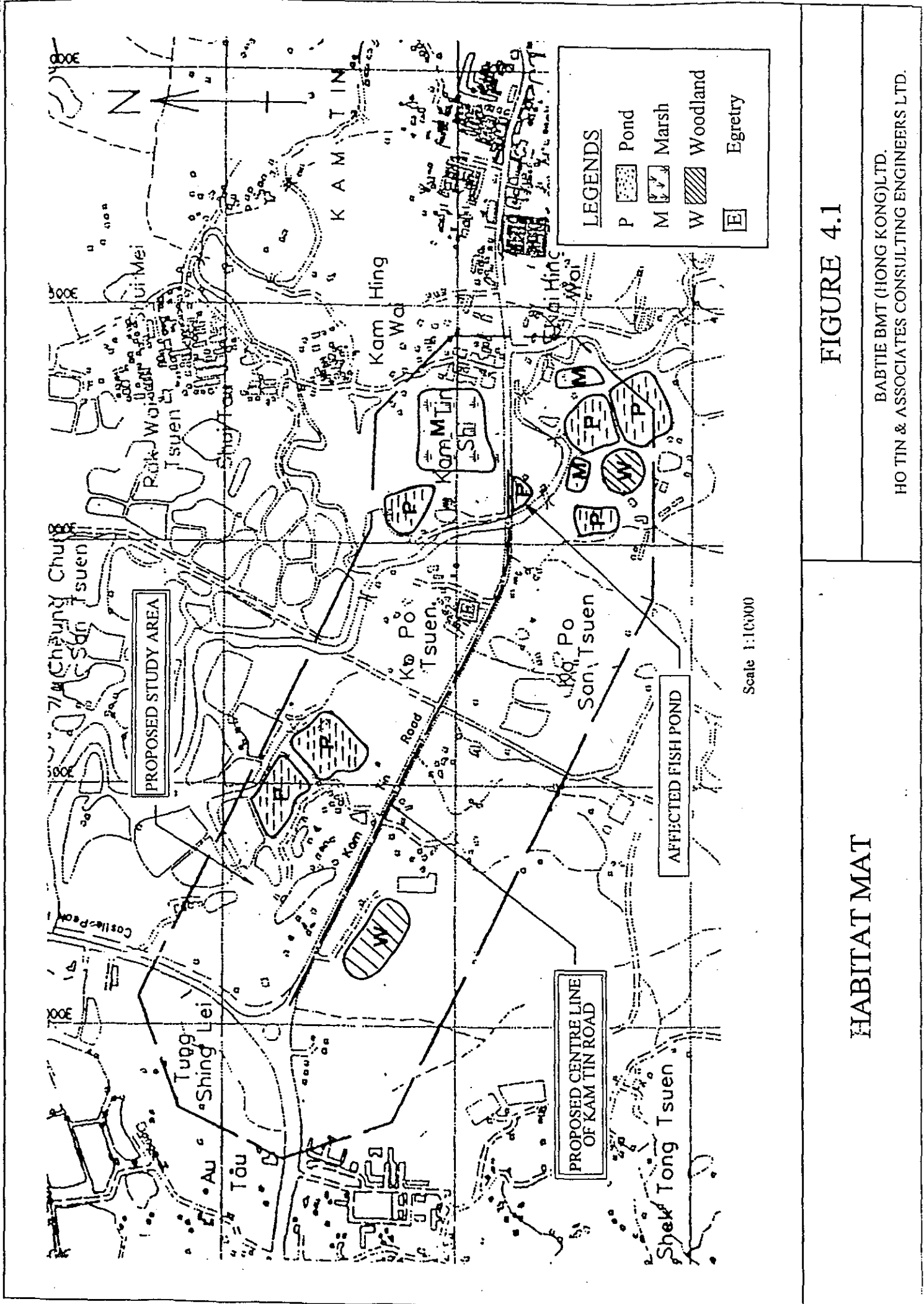
BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



LOCATIONS OF DWELLINGS ELIGIBLE FOR INDIRECT MITIGATION MEASURES

FIGURE 3.12

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

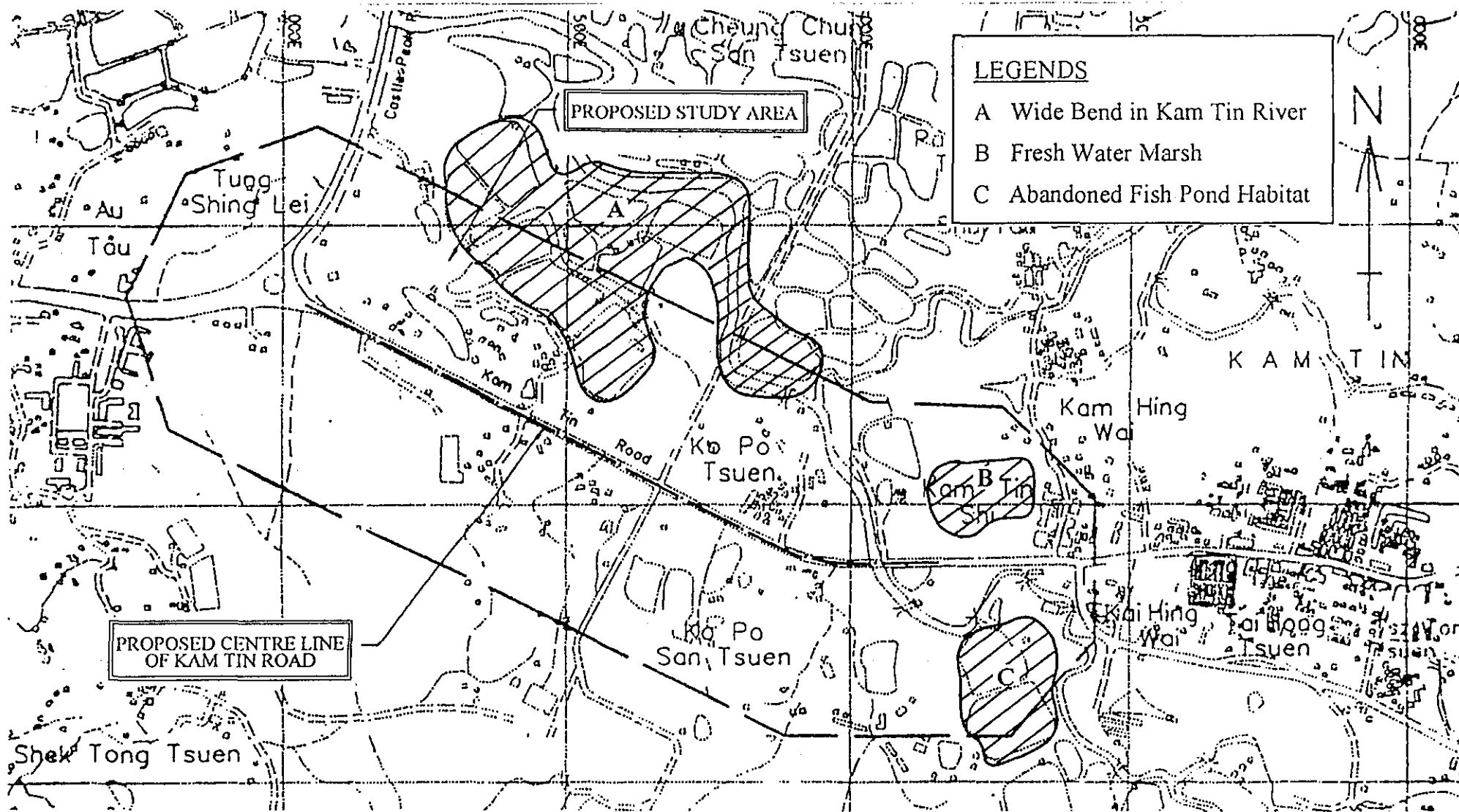


Scale 1:10000

### HABITAT MAT

**FIGURE 4.1**

BABTIE BMT (HONG KONG)LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

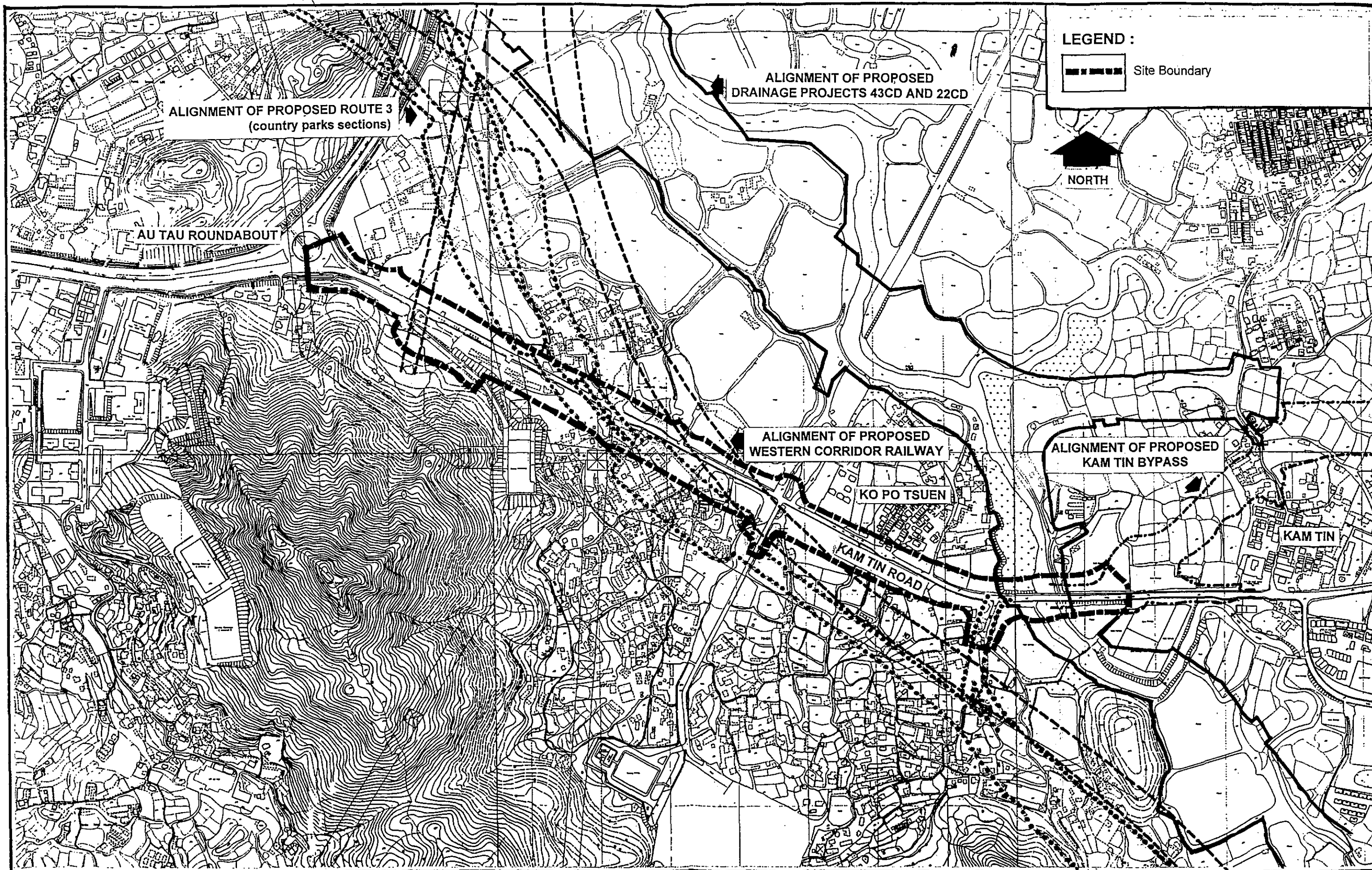


Scale 1:10000

**ECOLOGICALLY IMPORTANT AREAS**

**FIGURE 4.2**

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



FUTURE DEVELOPMENT PLAN

NOT TO SCALE

FIGURE 5.1

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

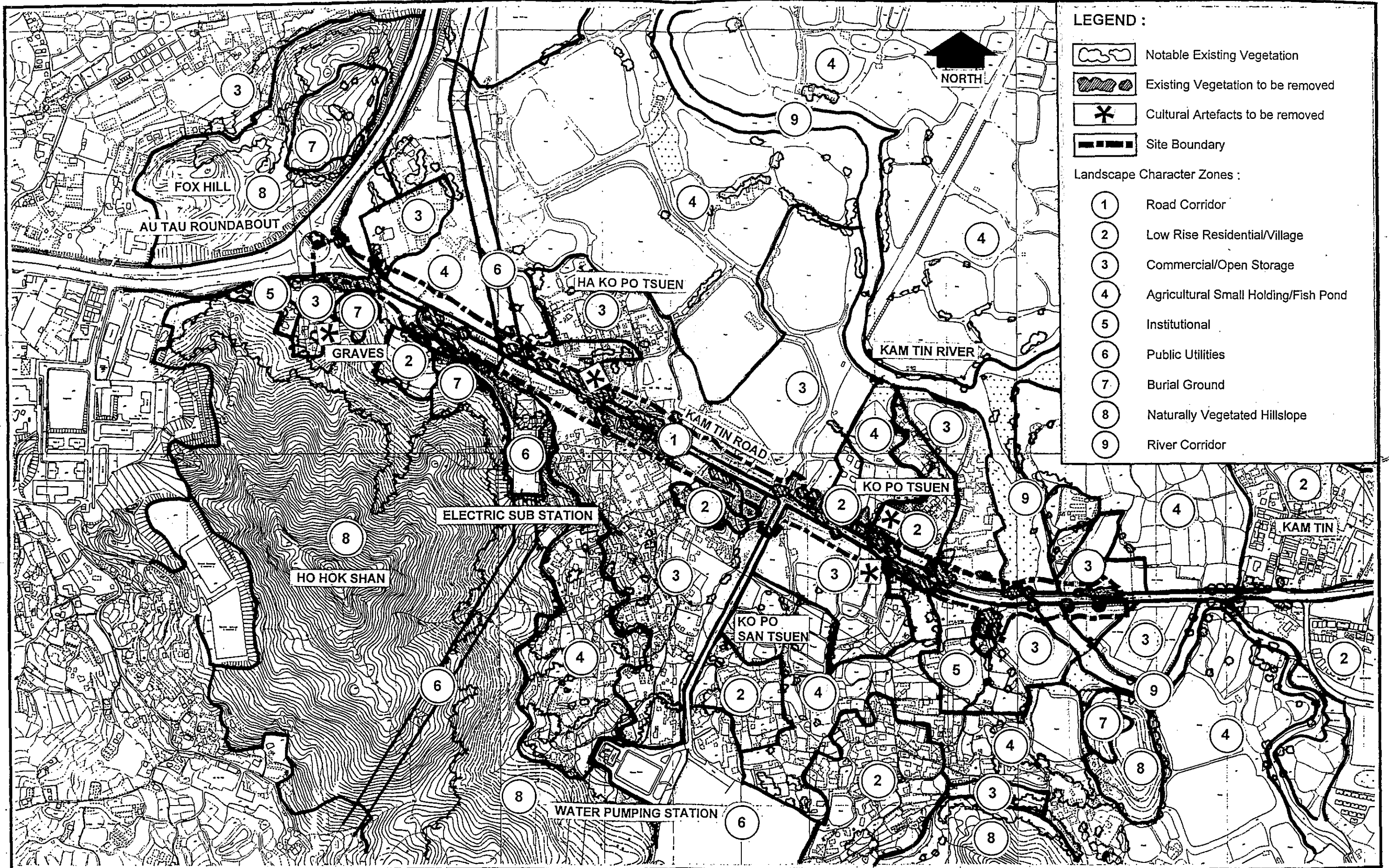


AERIAL PHOTOGRAPH

FIGURE 5.2

BABTIE BMT (HONGKONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.





LANDSCAPE IMPACT ASSESSMENT PLAN

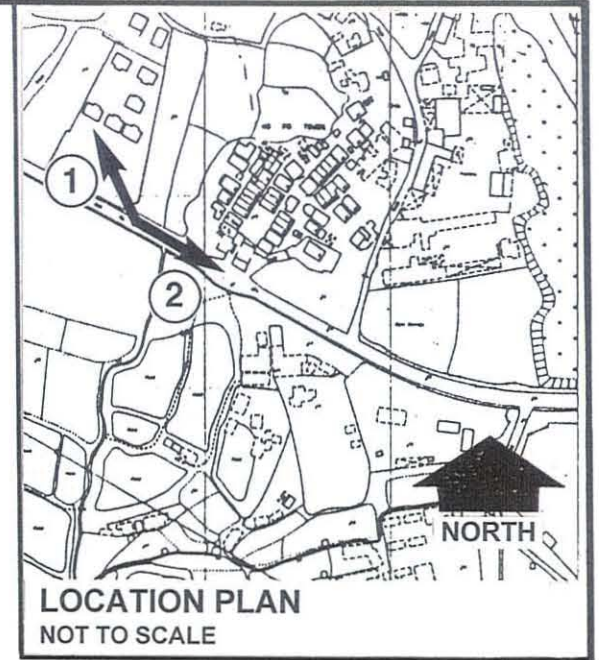
NOT TO SCALE

FIGURE 5.3

BABTIE BMT (HONGKONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



①



②

VIEW OF KAM TIN ROAD AT KO PO TSUEN  
LOOKING SOUTH-EAST

FIGURE 5.4

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



3

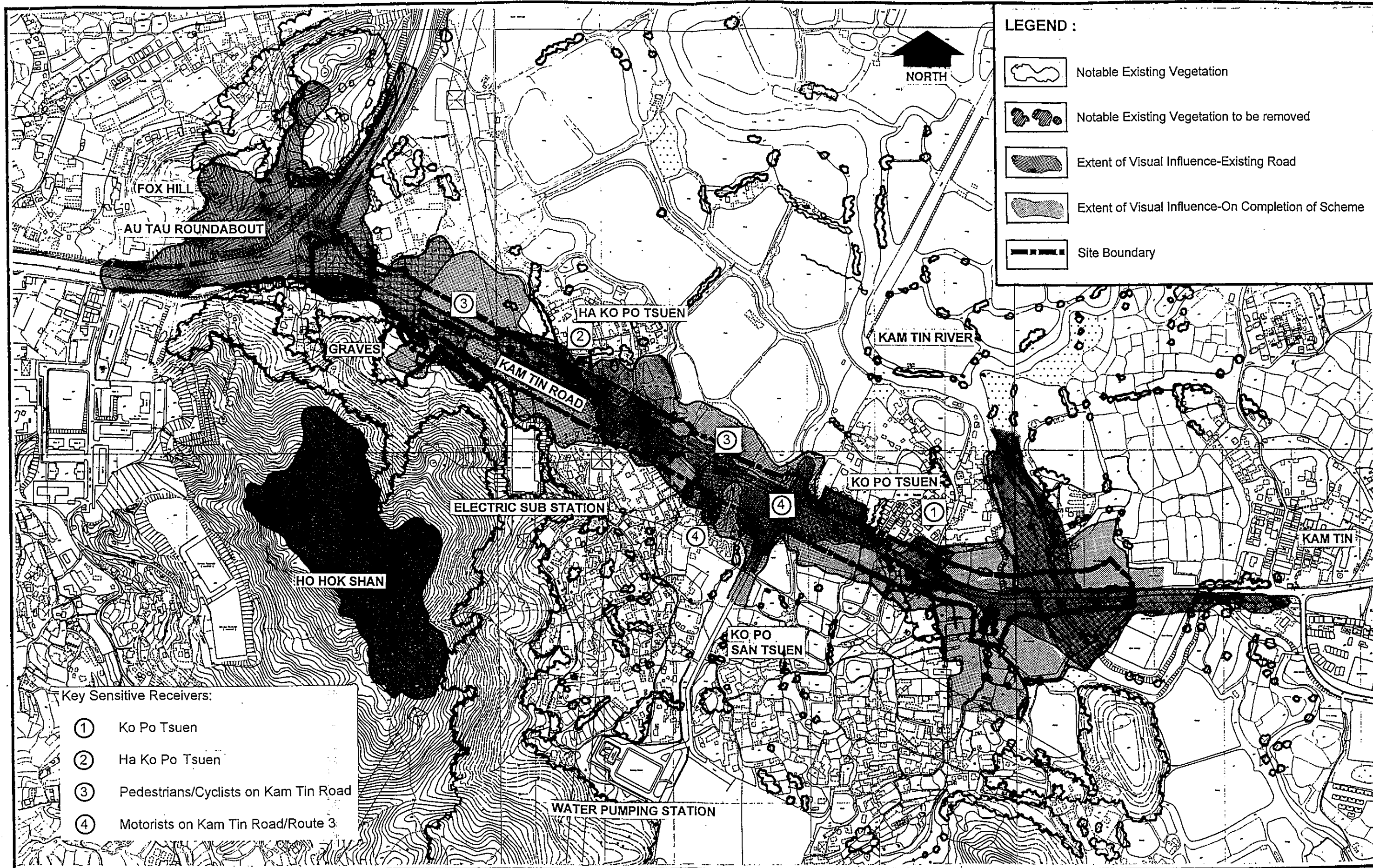


4

VIEW OF KAM TIN ROAD AT KO PO TSUEN  
LOOKING NORTH-WEST

FIGURE 5.5

BABTIE BMT (HONGKONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

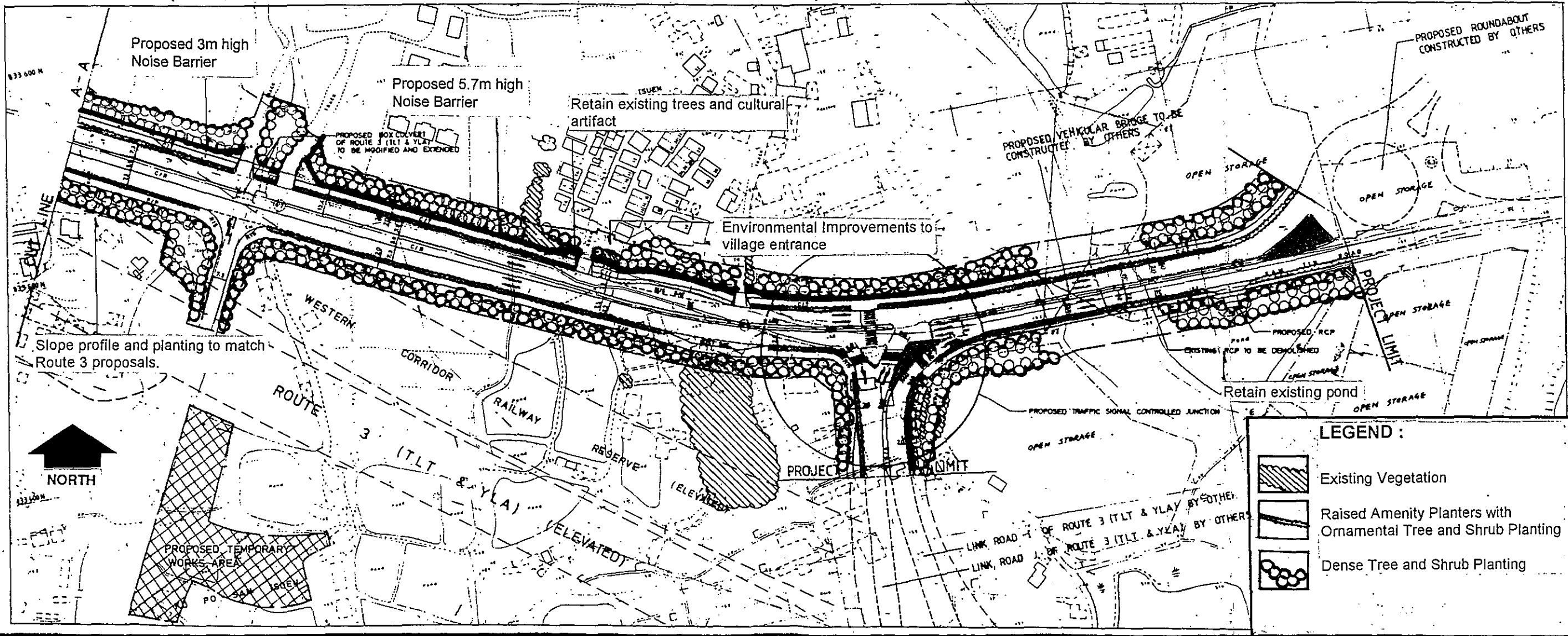
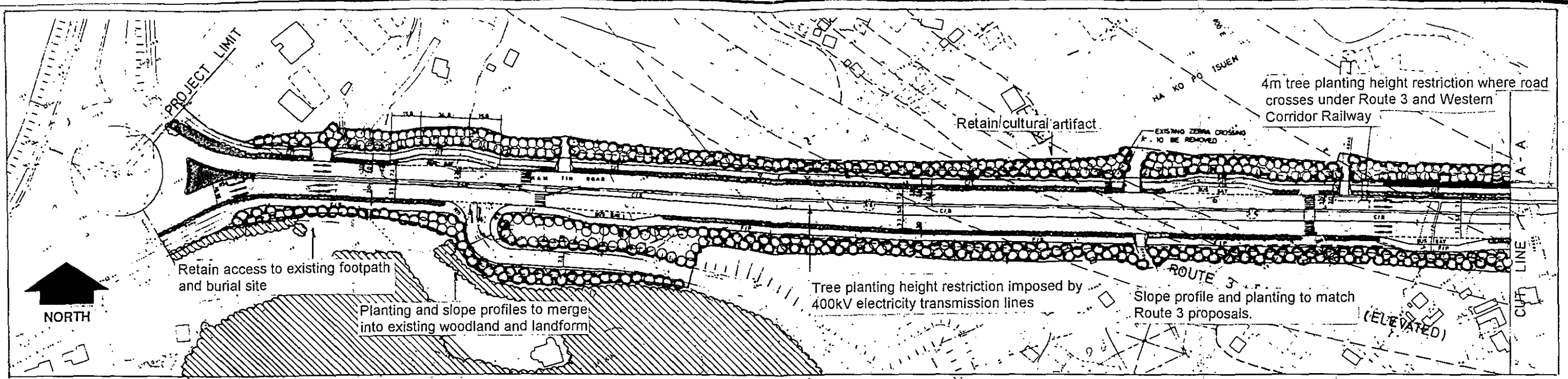


VISUAL IMPACT ASSESSMENT PLAN

NOT TO SCALE

FIGURE 5.6

BABTIEBMT(HONGKONG)LTD.  
HOTIN&ASSOCIATESCONSULTINGENGINEERSLTD.

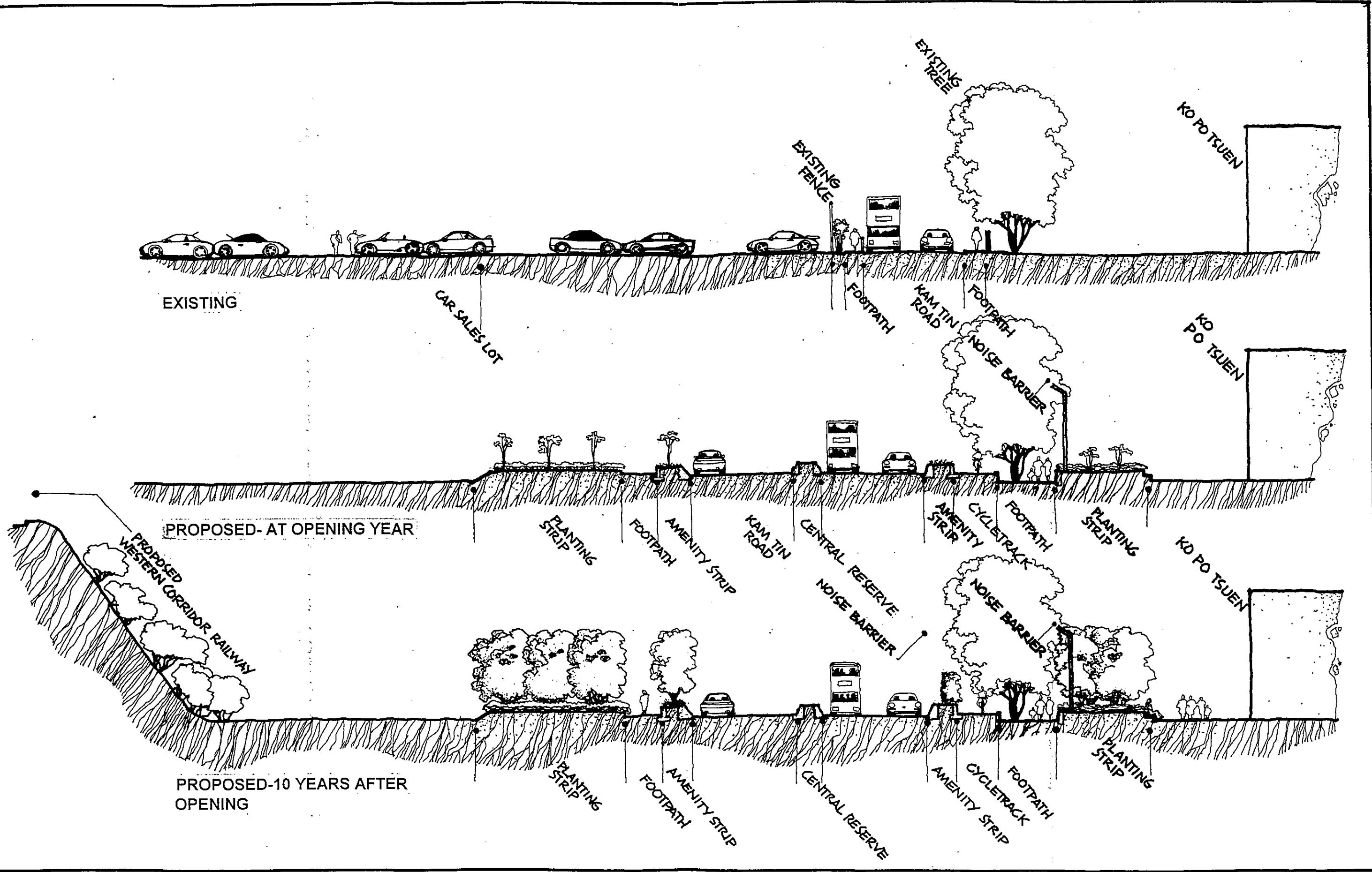


LANDSCAPE AND VISUAL IMPACT MITIGATION PLAN

FIGURE 5.7

SCALE 1:2000

BABTIE BMT (HONG KONG) LTD.  
HOTIN & ASSOCIATES CONSULTING ENGINEERS LTD.

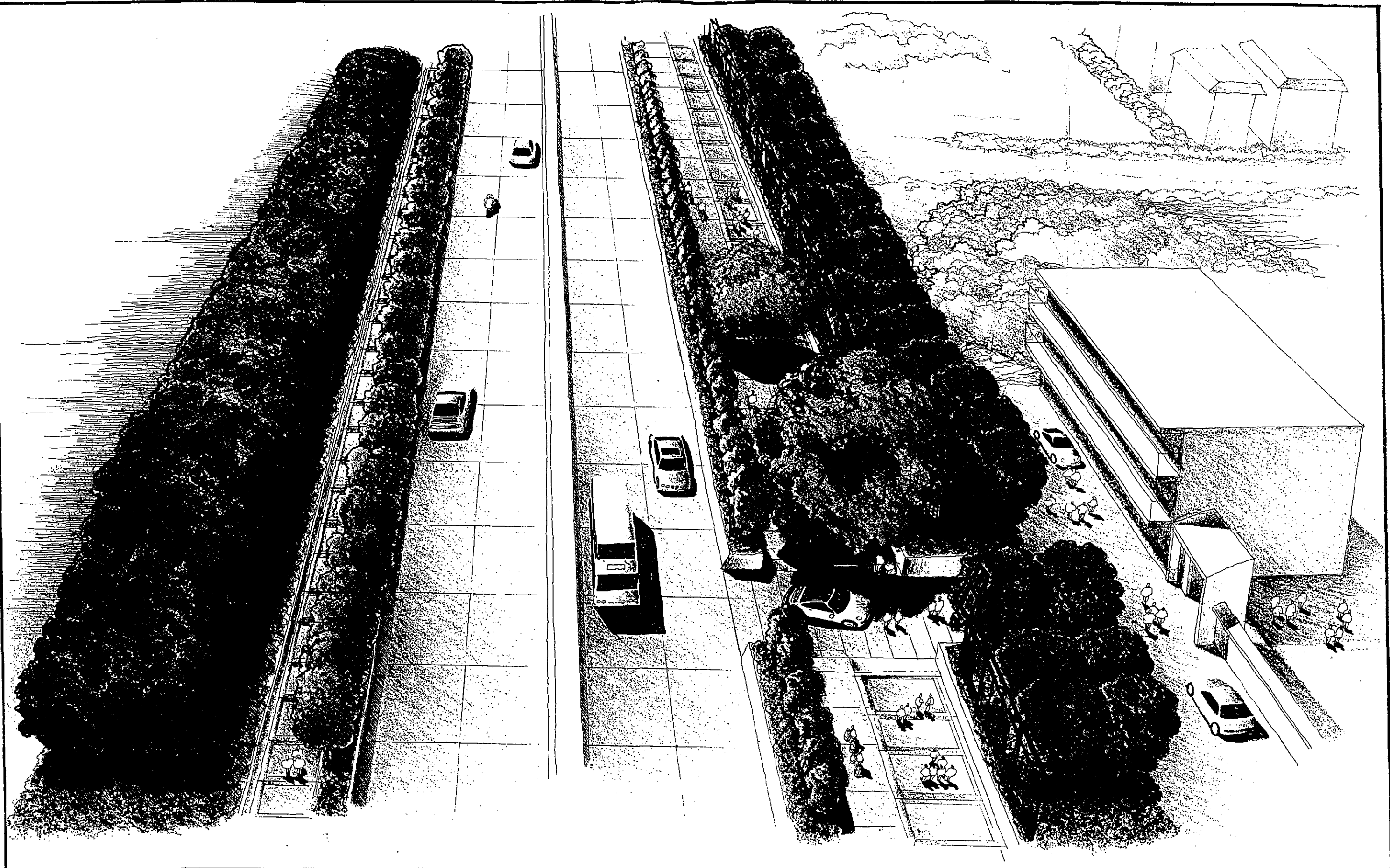


ILLUSTRATIVE CROSS-SECTIONS  
THROUGH KAM TIN ROAD AT KO PO TSUEN

FIGURE 5.8

SCALE 1:250

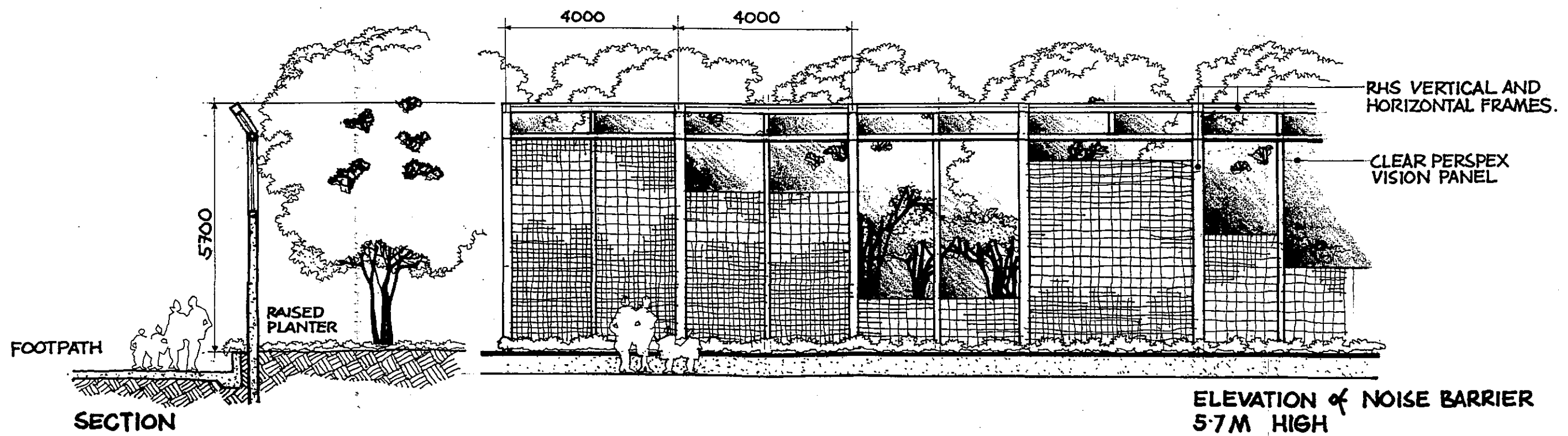
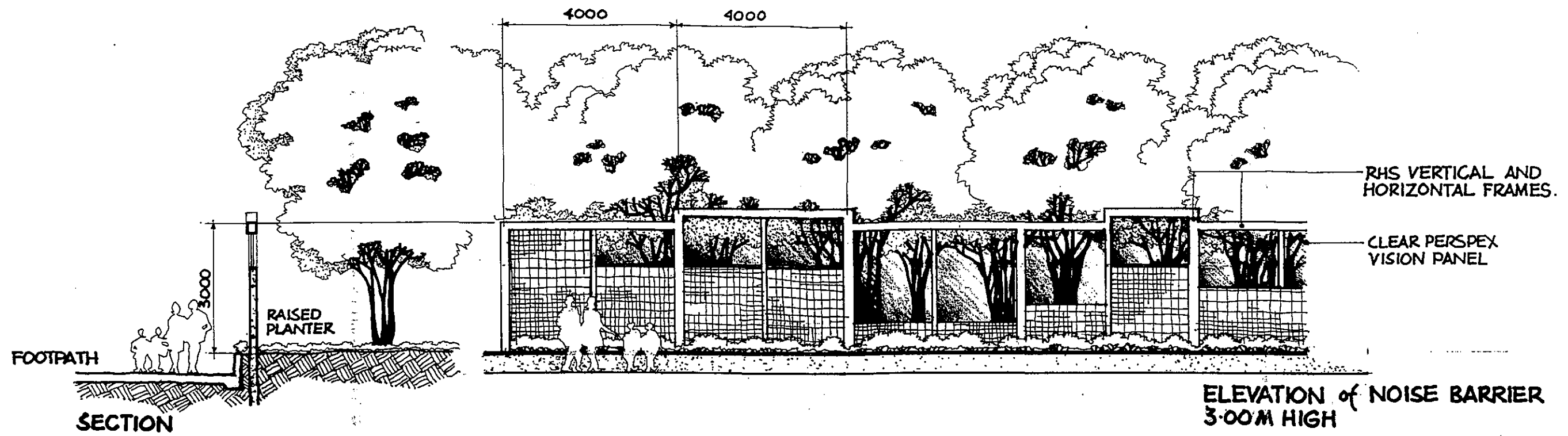
BABTIEBMT (HONGKONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



SKETCH PERSPECTIVE  
AERIAL VIEW OVER KO PO TSUEN  
LOOKING NORTH-WEST

FIGURE 5.9

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



GENERAL ARRANGEMENT OF NOISE BARRIERS

FIGURE 5.10

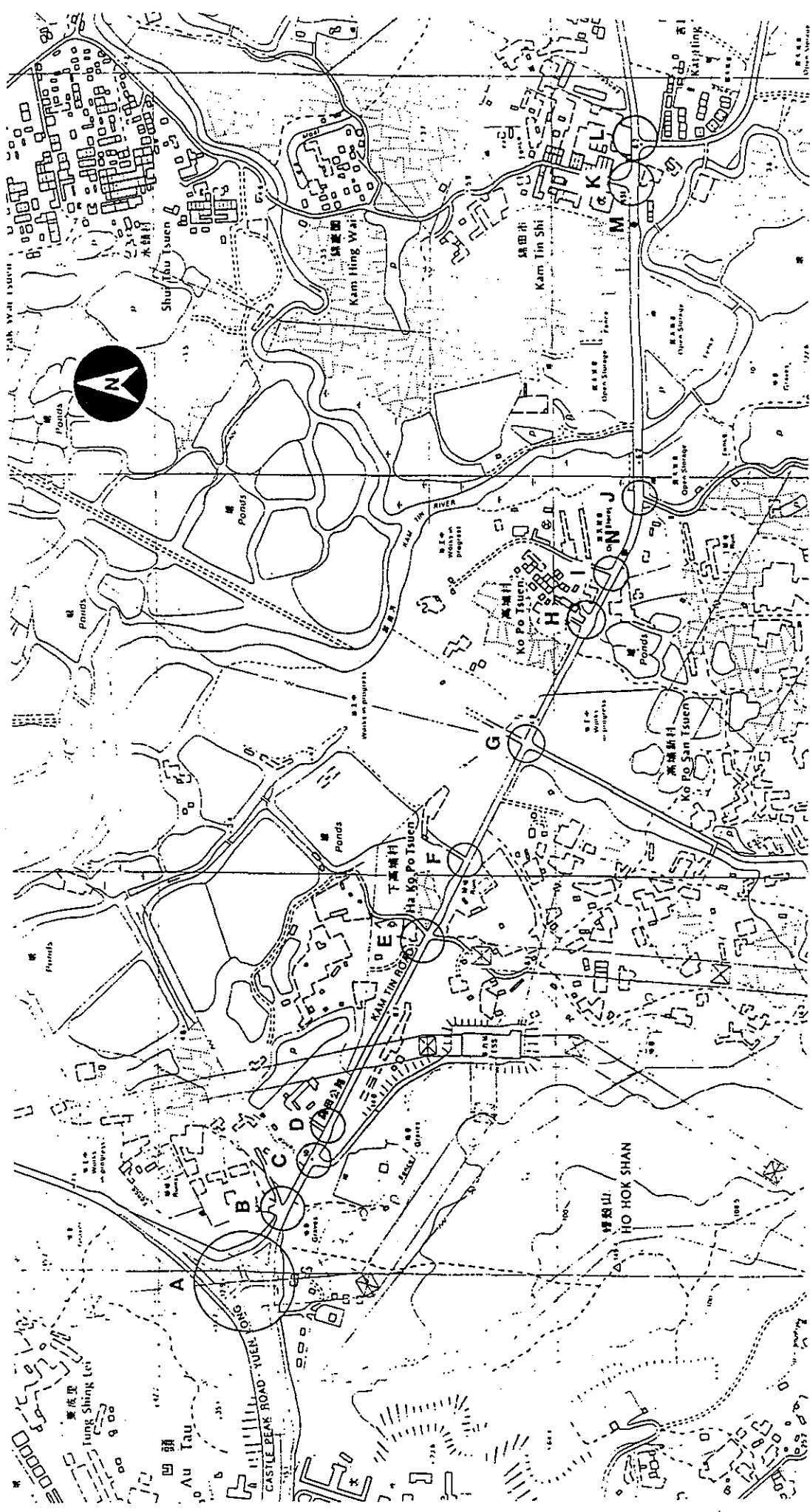
BABTIEBMT (HONGKONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



LOCATION PLAN OF SURVEYED INTERSECTIONS

FIGURE 6.1

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



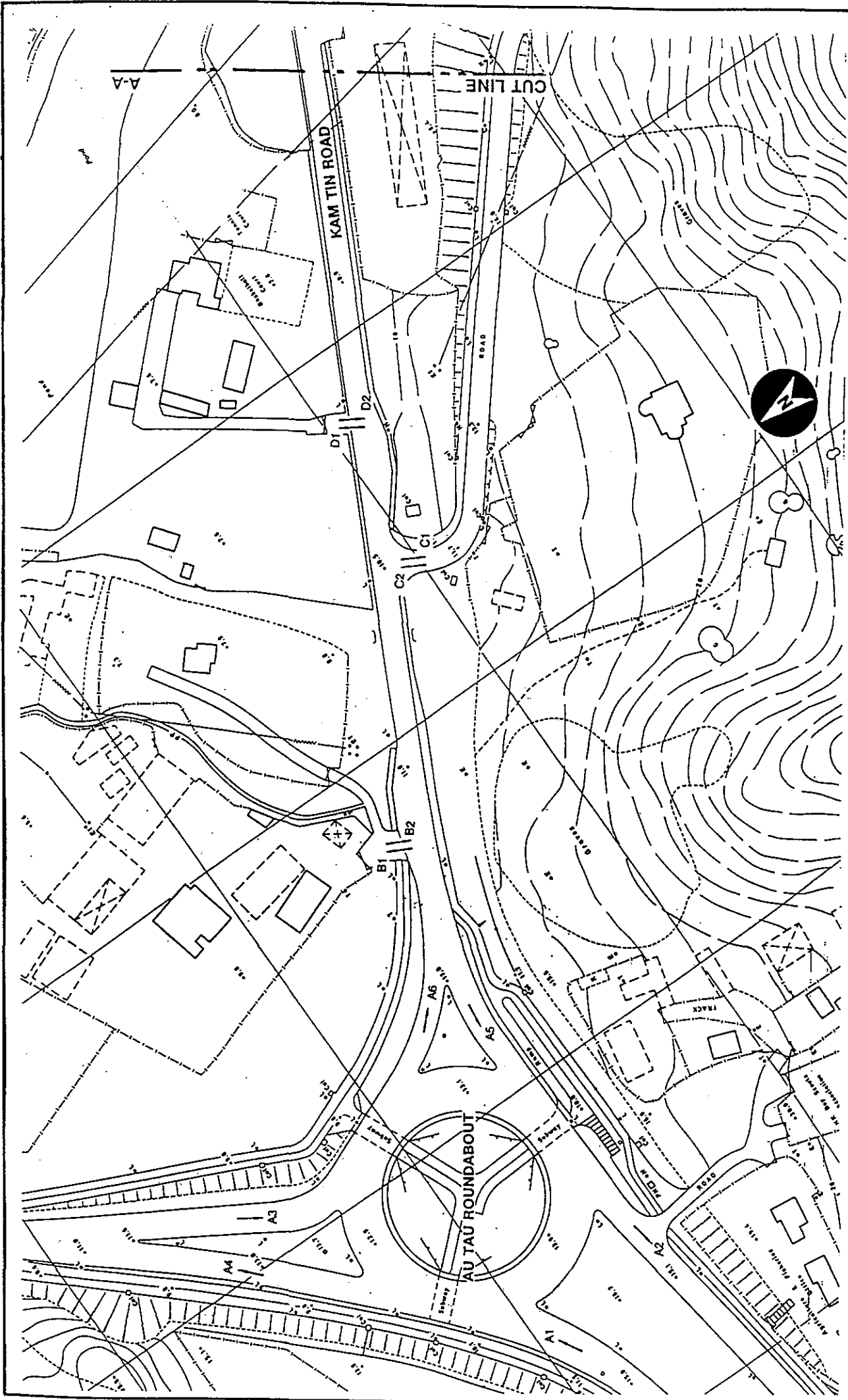
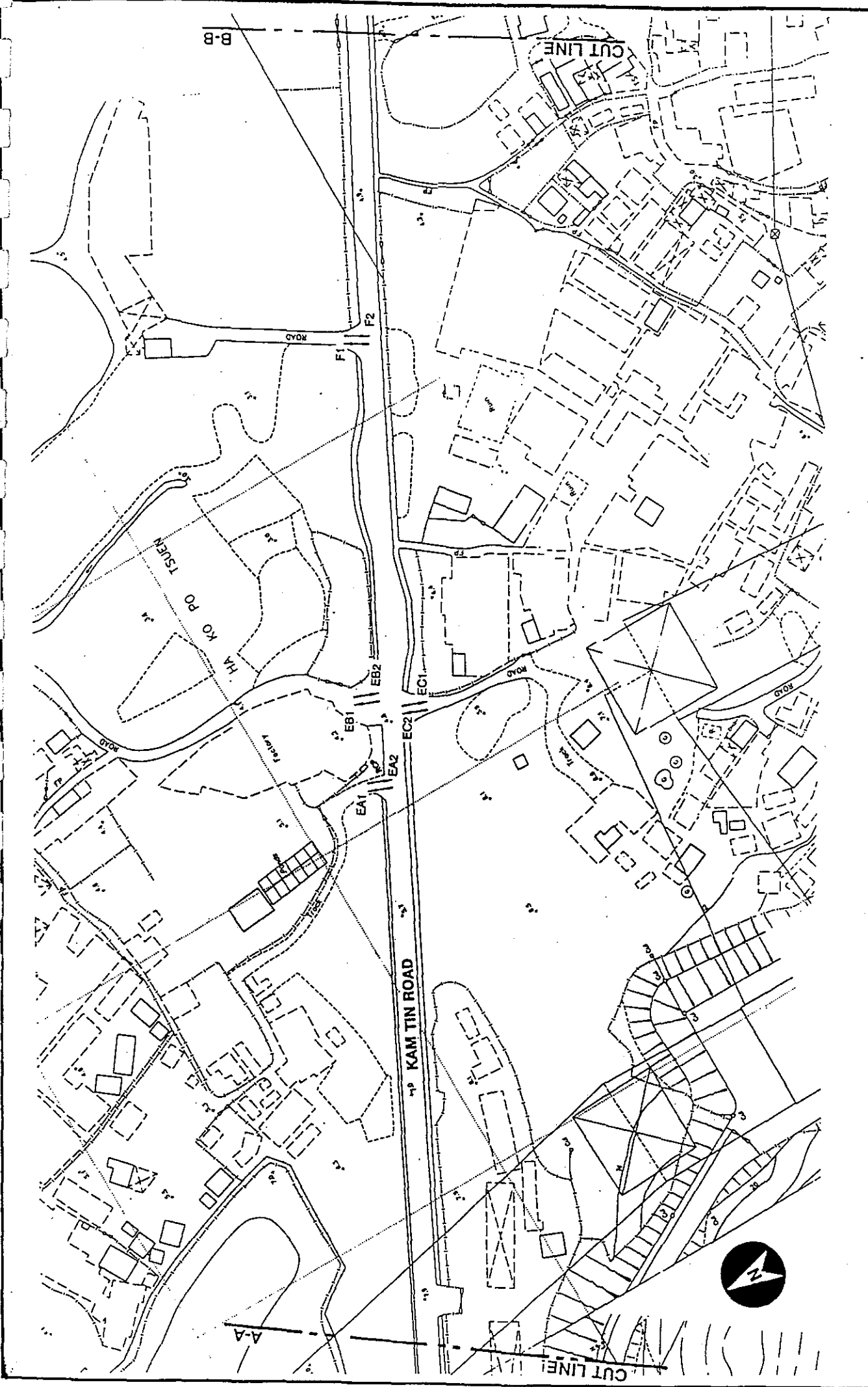


FIGURE 6.2

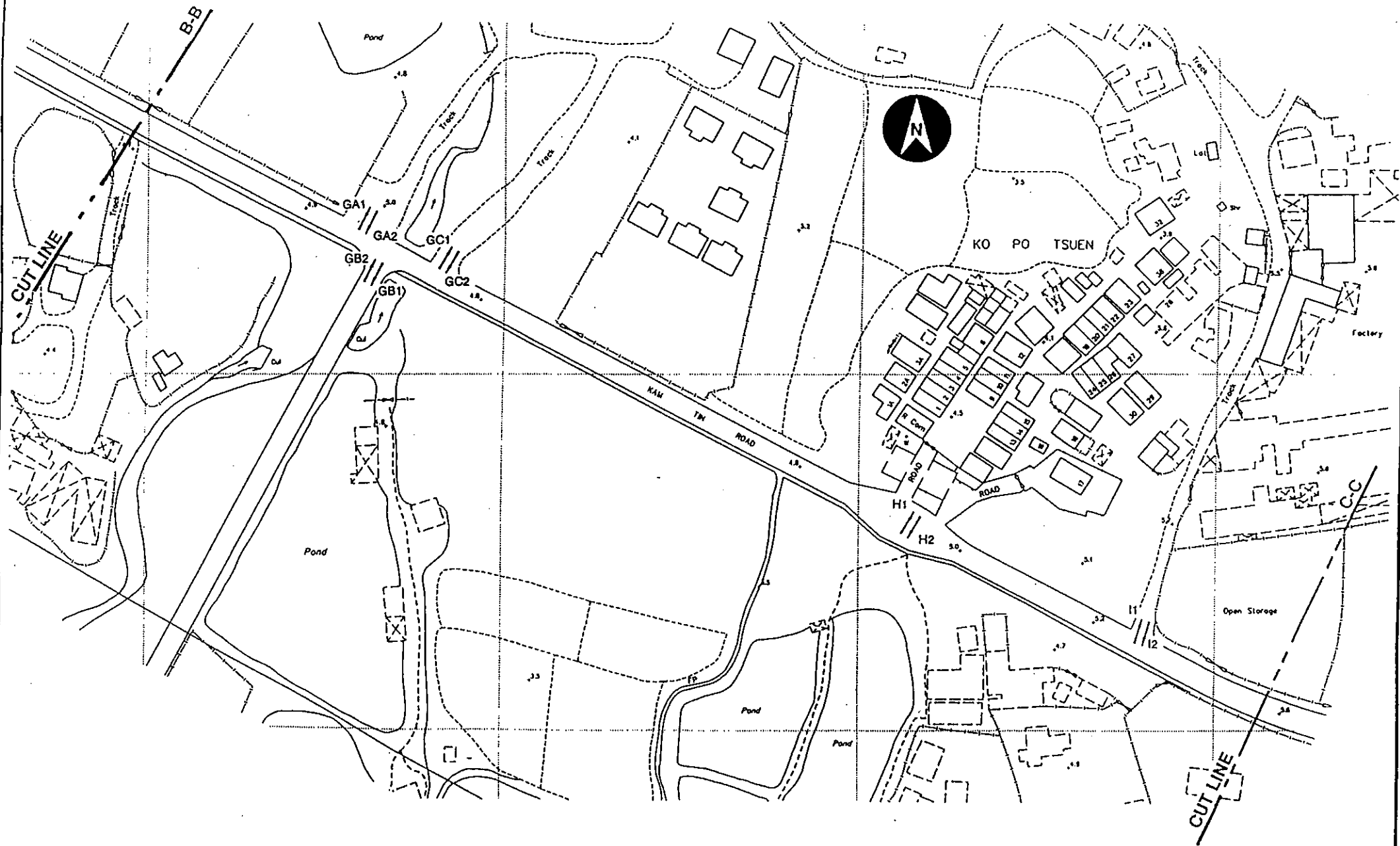
LOCATION PLAN OF SURVEYED TRAFFIC MOVEMENTS  
(SHEET 1 OF 5)



LOCATION PLAN OF SURVEYED TRAFFIC MOVEMENTS  
 (SHEET 2 OF 5)

FIGURE 6.3

BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



LOCATION PLAN OF SURVEYED TRAFFIC MOVEMENTS  
(SHEET 3 OF 5)

FIGURE 6.4

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

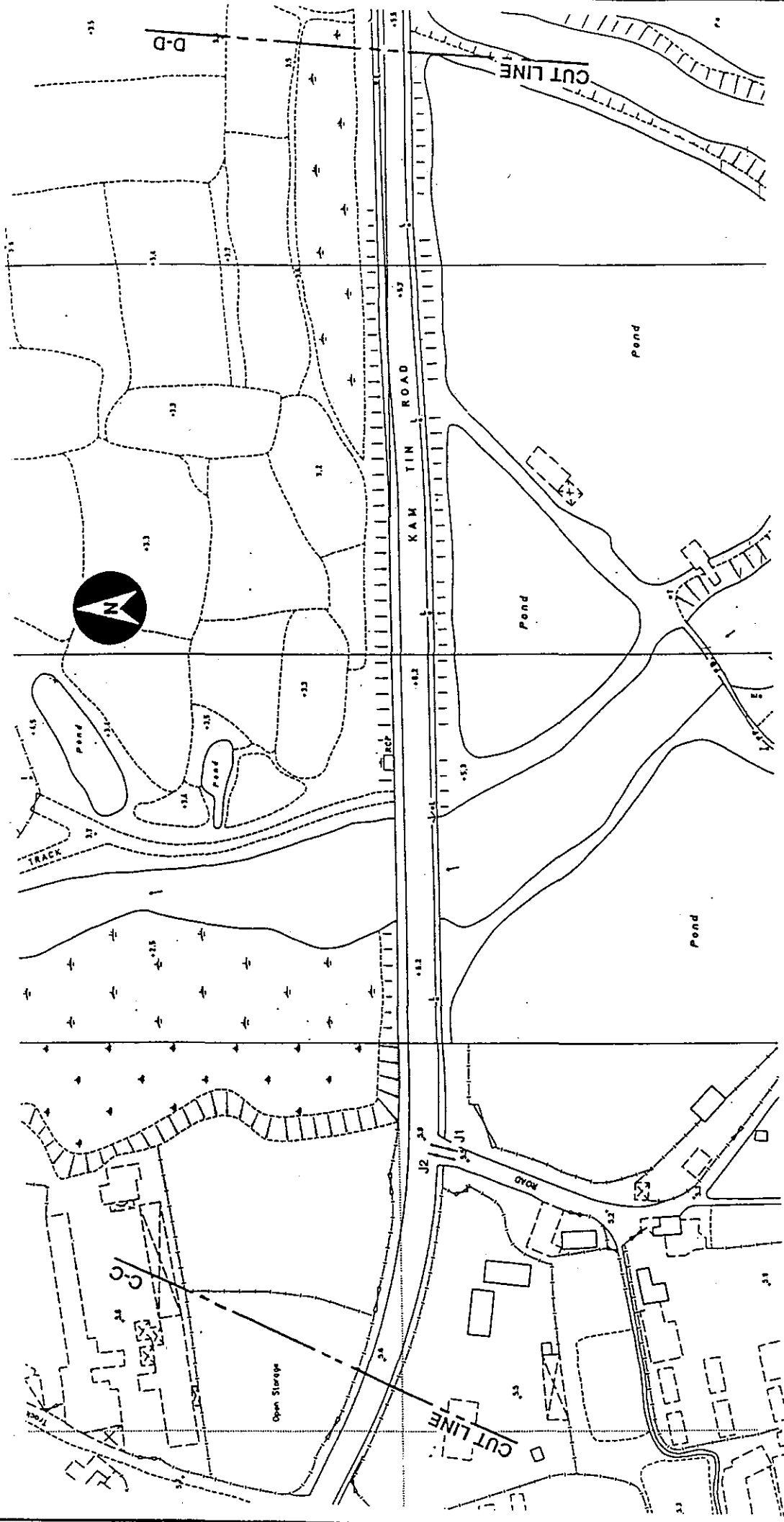


FIGURE 6.5

LOCATION PLAN OF SURVEYED TRAFFIC MOVEMENTS  
(SHEET 4 OF 5)

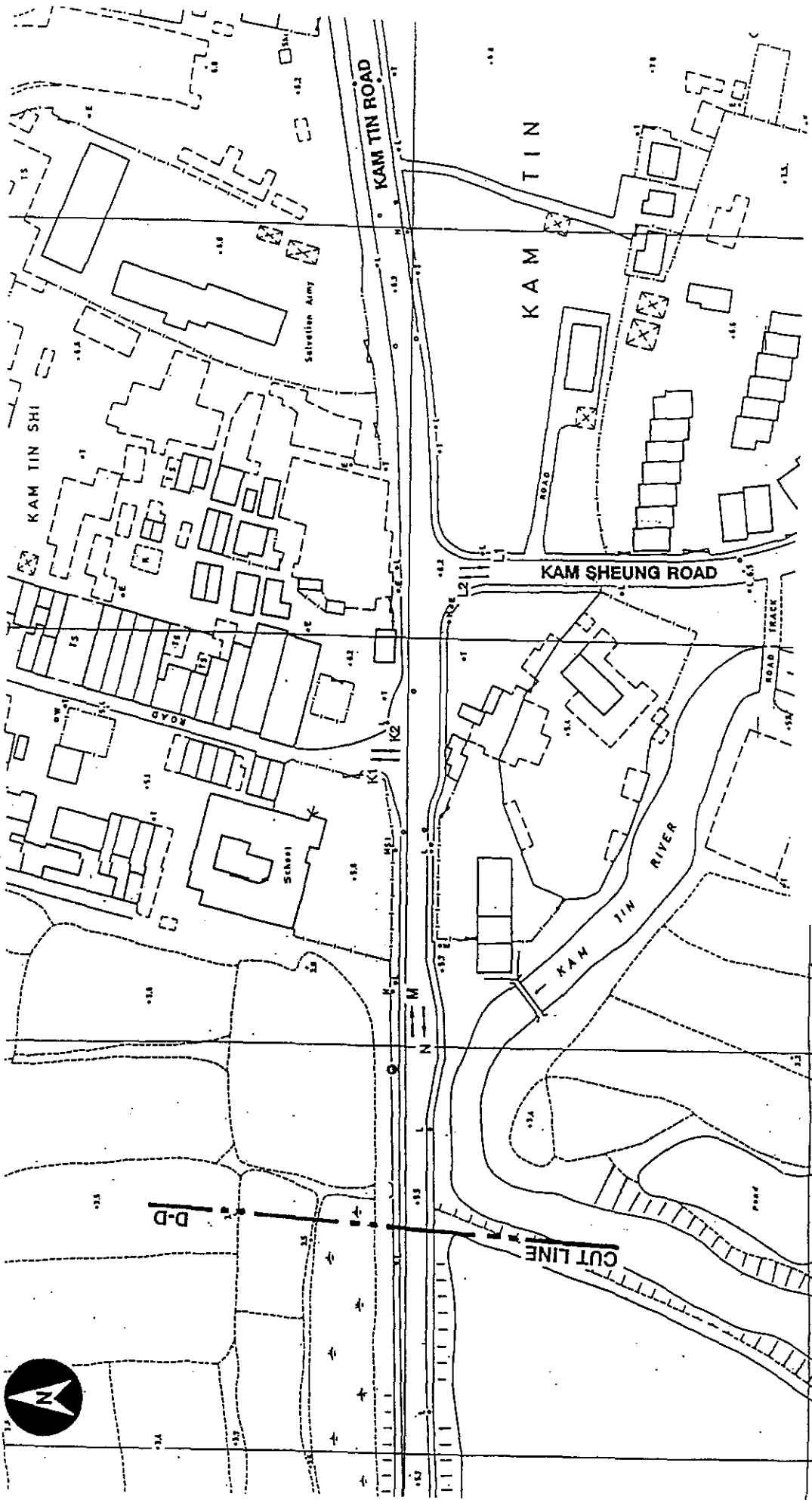
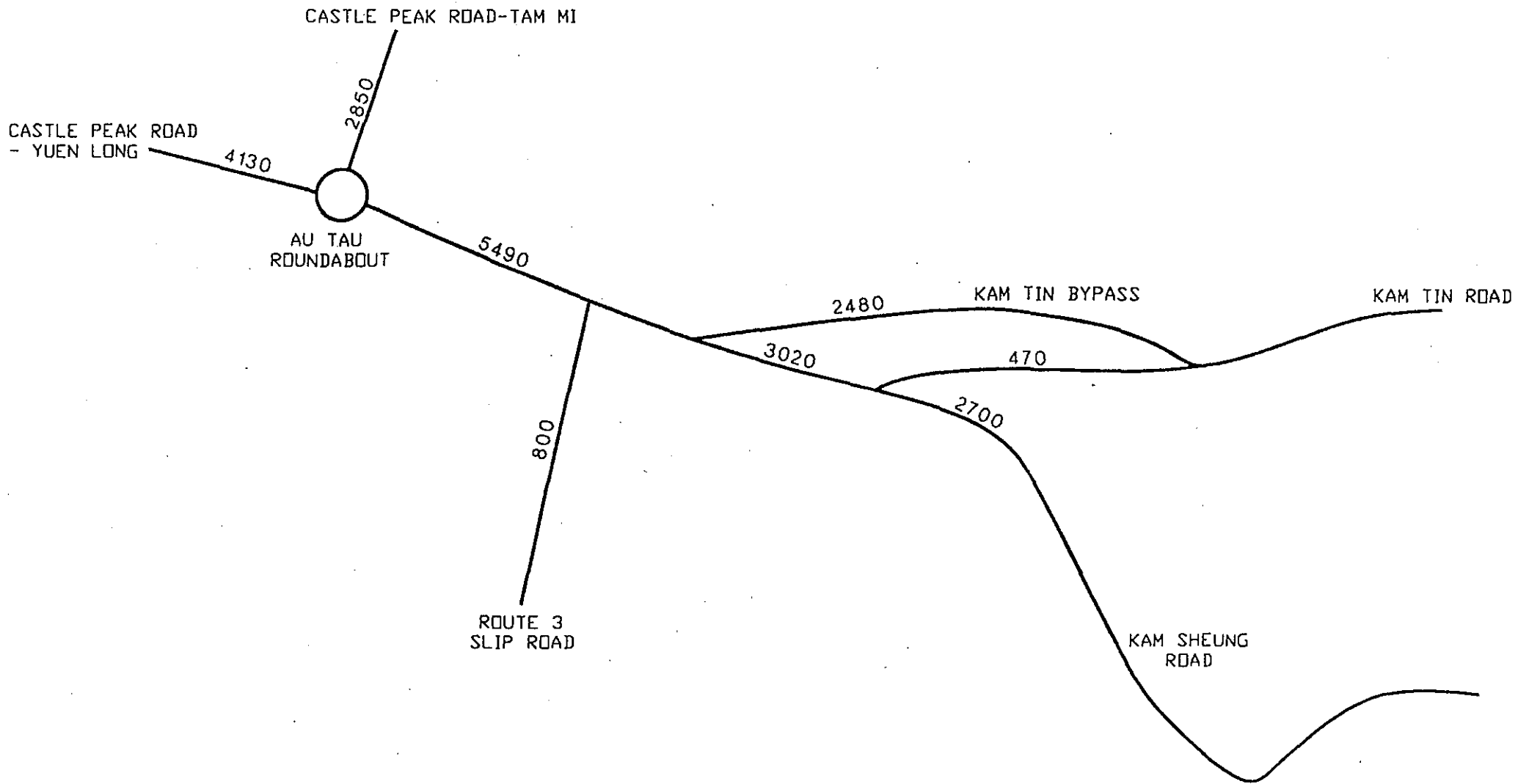


FIGURE 6.6

LOCATION PLAN OF SURVEYED TRAFFIC MOVEMENTS  
(SHEET 5 OF 5)

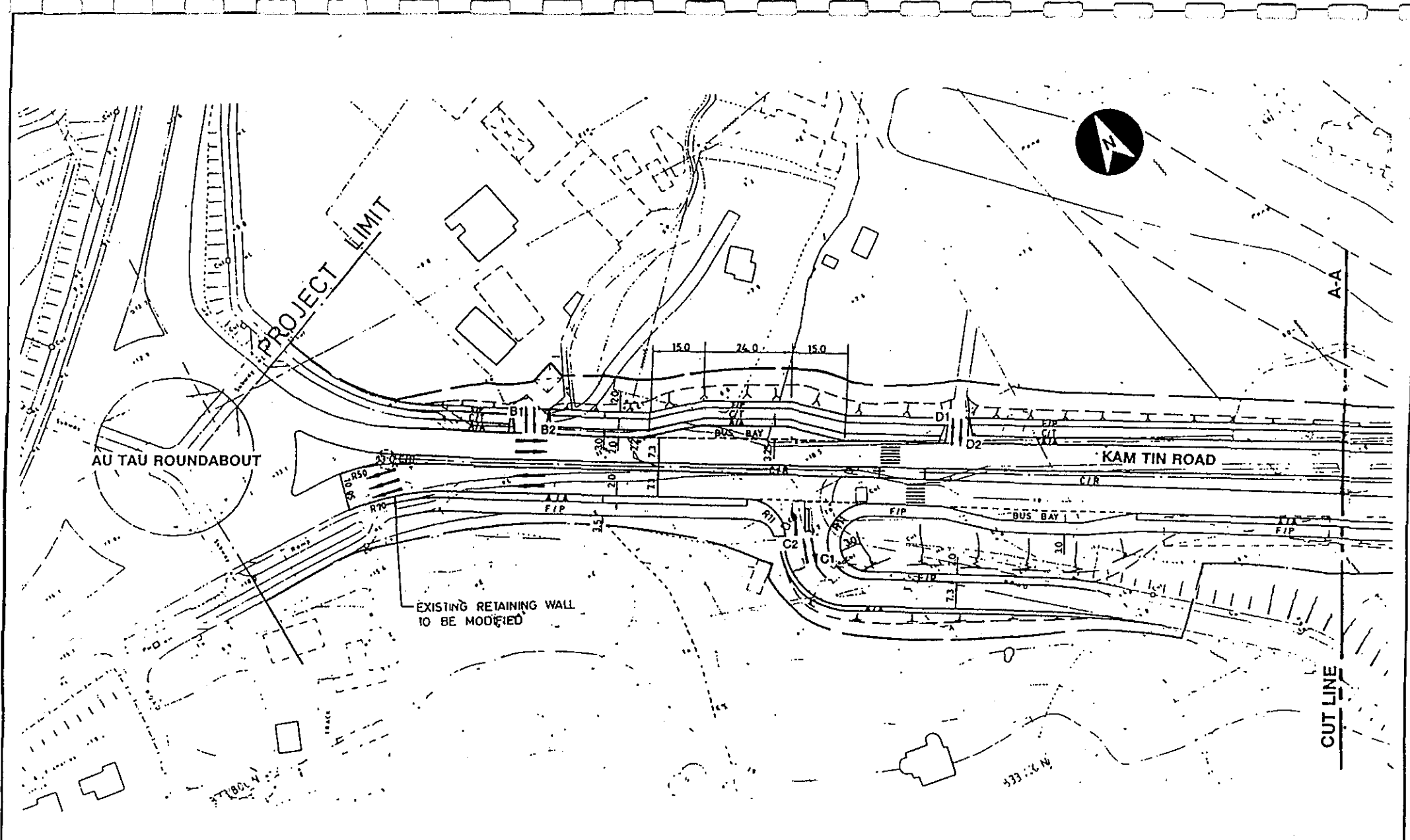


NOTES: 1. TRAFFIC FLOWS IN VEHICLES/HOUR  
 2. FIGURES SHOW TRAFFIC FLOWS TO NEAREST 10.

FORECAST 2011 AM TWO-WAY TRAFFIC FLOW

FIGURE 6.7

BABTIE BMT (HONG KONG) LTD.  
 HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



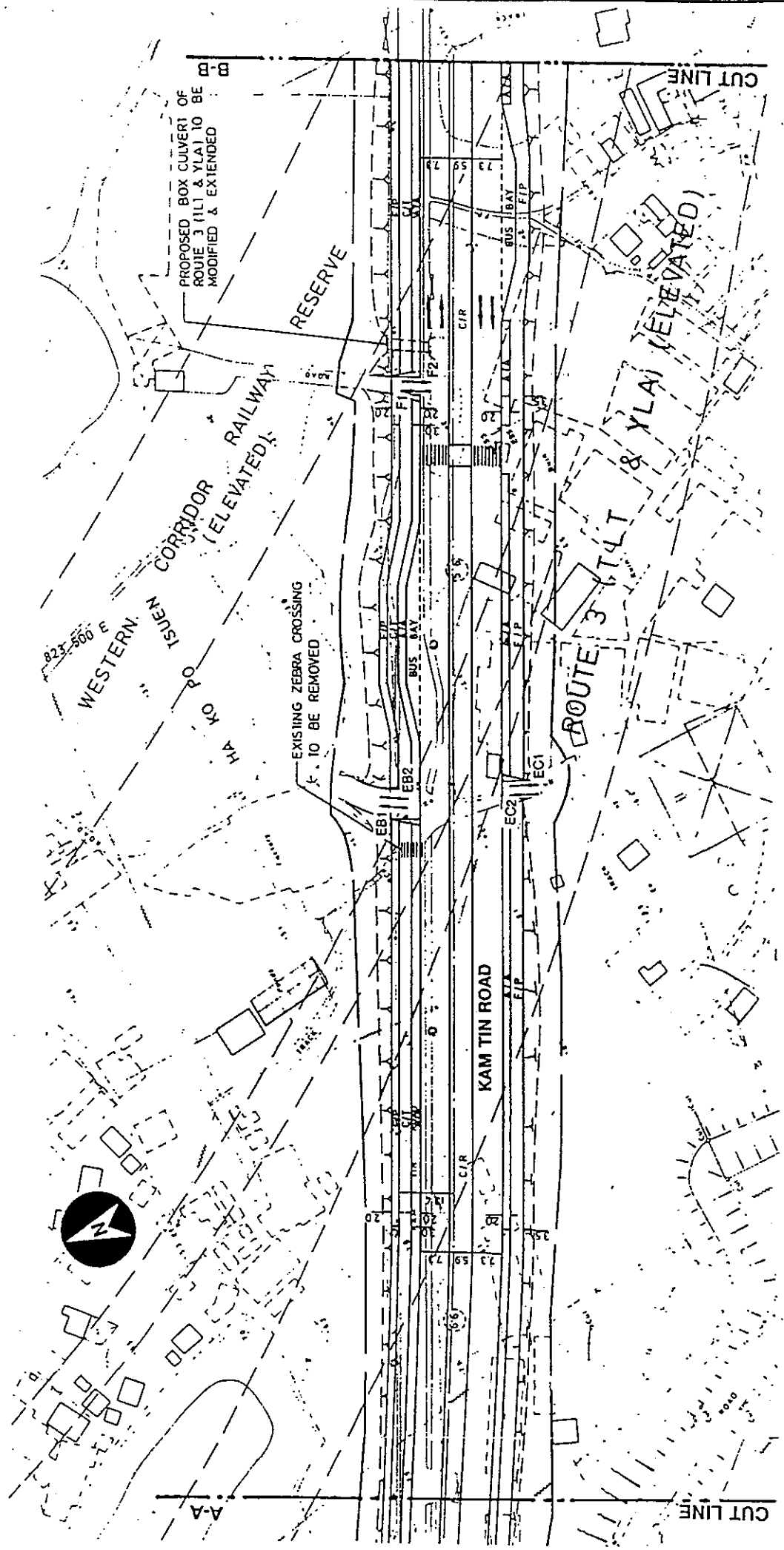
NOTE: EXTRACT FROM HIGHWAYS DEPARTMENT  
DRAWING NO. NH 7121

LOCATION PLAN OF PROJECTED TRAFFIC MOVEMENTS  
(SHEET 1 OF 5)

FIGURE 6.8

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



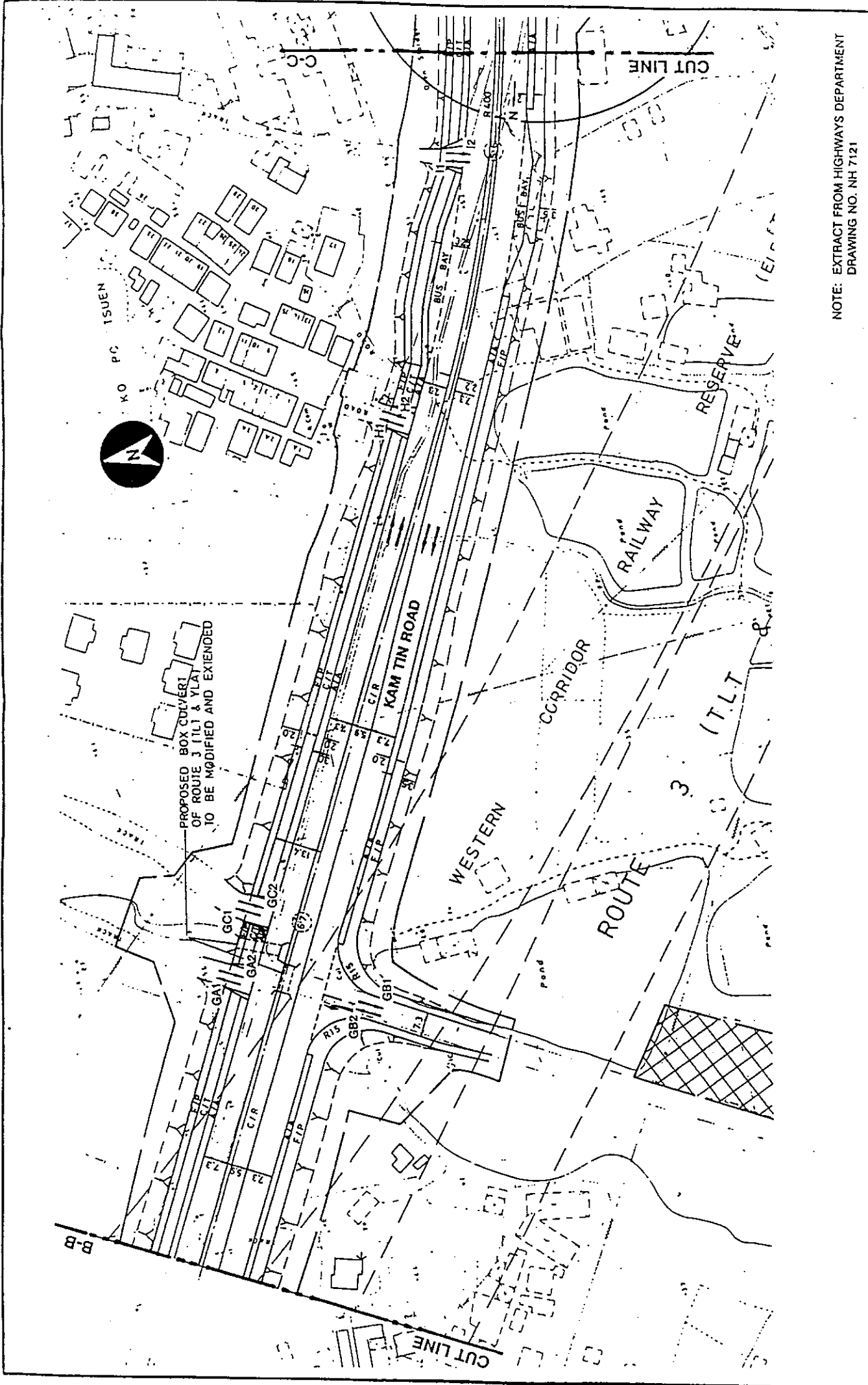


NOTE: EXTRACT FROM HIGHWAYS DEPARTMENT  
DRAWING NO. NH 7121

LOCATION PLAN OF PROJECTED TRAFFIC MOVEMENTS  
(SHEET 2 OF 5)

FIGURE 6.9

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

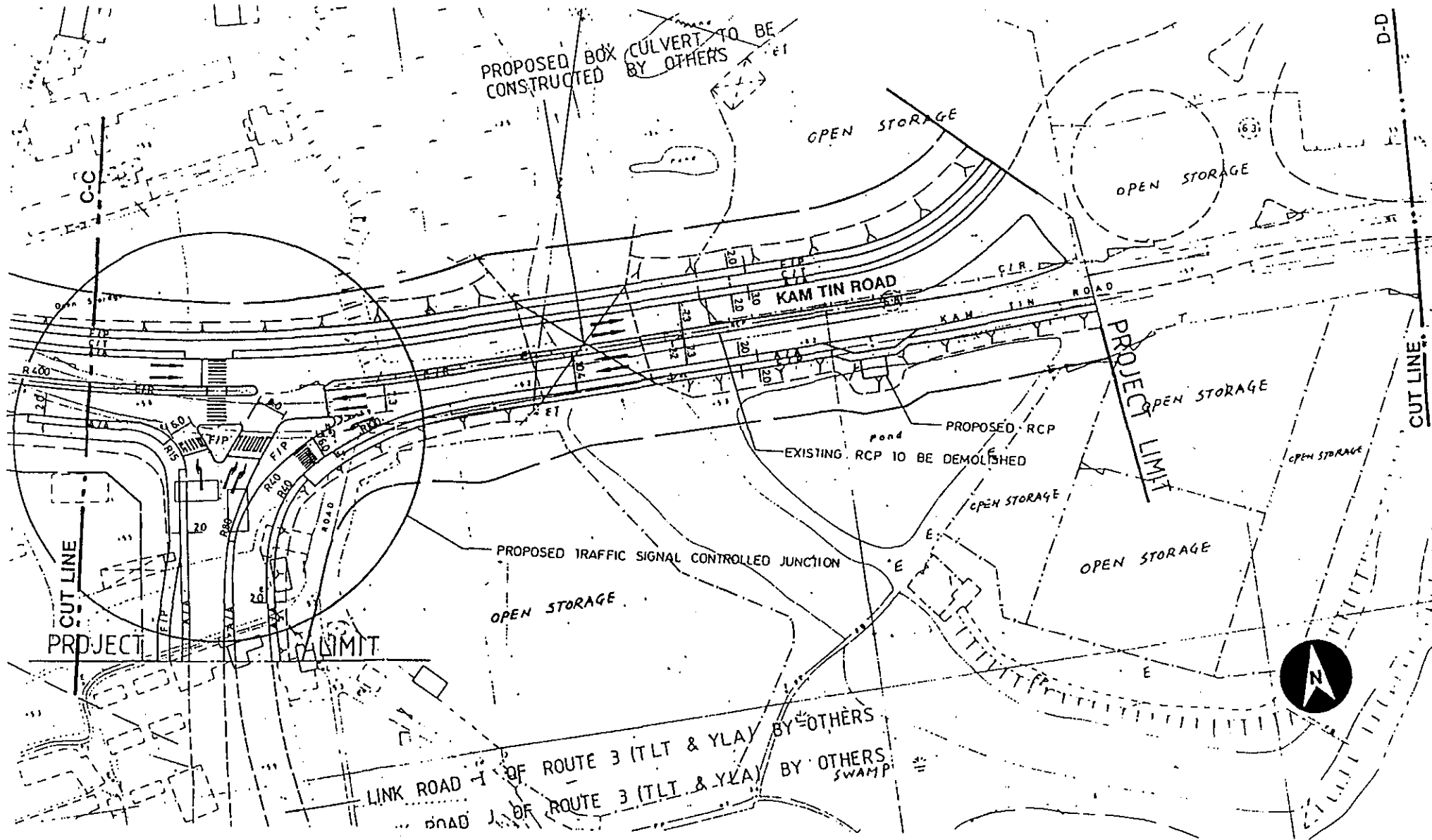


NOTE: EXTRACT FROM HIGHWAYS DEPARTMENT  
DRAWING NO. NH 7121

# FIGURE 6.10

BARTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

## LOCATION PLAN OF PROJECTED TRAFFIC MOVEMENTS (SHEET 3 OF 5)

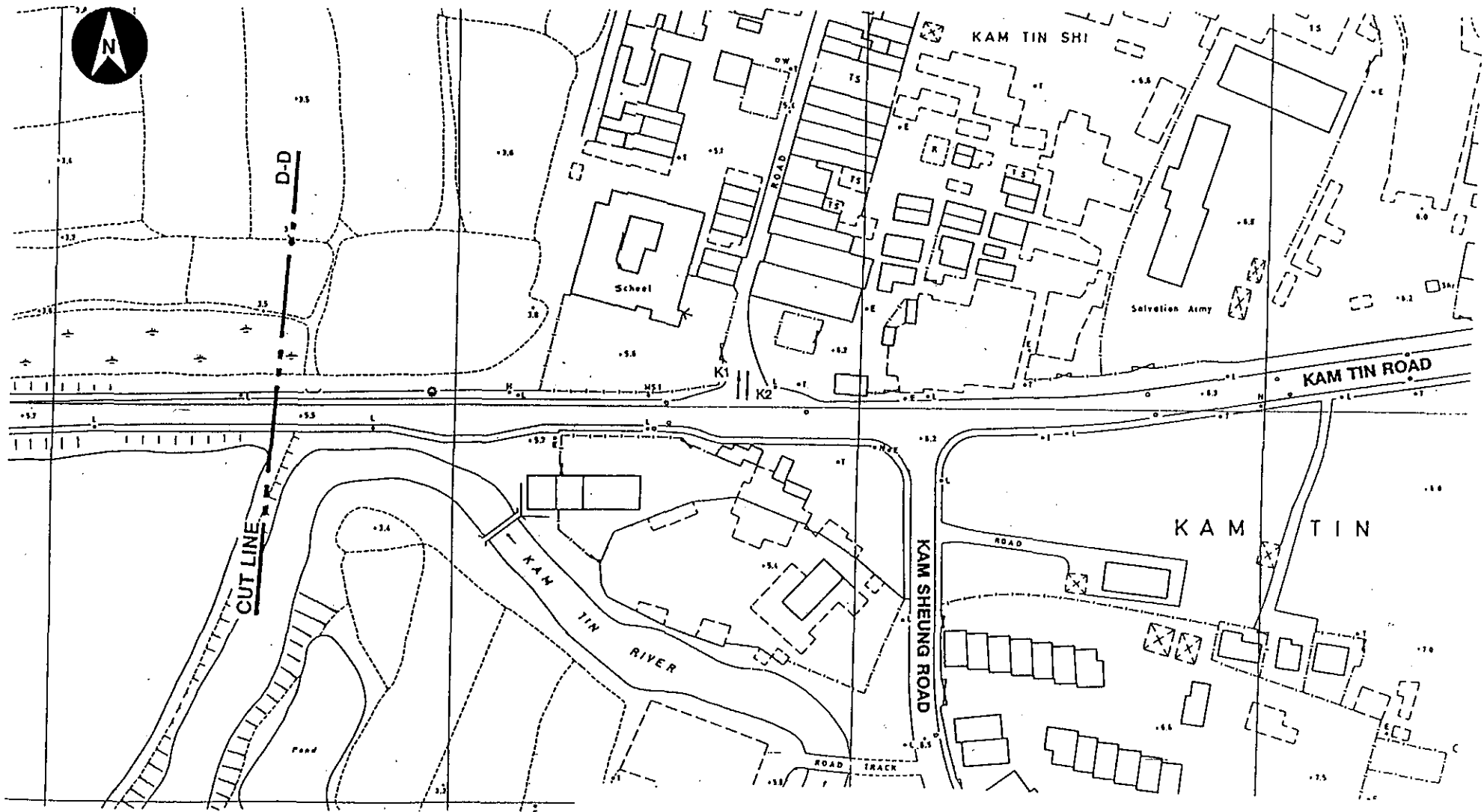


NOTE: EXTRACT FROM HIGHWAYS DEPARTMENT  
DRAWING NO. NH 7121

LOCATION PLAN OF PROJECTED TRAFFIC MOVEMENTS  
(SHEET 4 OF 5)

FIGURE 6.11

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.



LOCATION PLAN OF PROJECTED TRAFFIC MOVEMENTS  
(SHEET 5 OF 5)

FIGURE 6.12

BABTIE BMT (HONG KONG) LTD.  
HO TIN & ASSOCIATES CONSULTING ENGINEERS LTD.

## Appendix A

**COST ESTIMATION OF NOISE BARRIERS**

The unit cost is built up based on the cost estimates in the previous report on noise impact assessment for "Improvement to Castle Peak Road from Siu Lam to So Kwun Tan, Agreement No. CE23/93- Noise Impact Assessment, Jun 95" by Peter Fraenkel BMT (Asia) Ltd. The unit cost is then adjusted from the base year 94 to base year 99 using a 10% inflation rate per year. The estimates are summarised in table A1.

**Table A1 Cost Estimation of Noise Barriers**

Type	Capital Cost		Maintenance Cost	Total
	(Year 94)	(Year 99)		
A1	3030	4,878	3,415	8,293
A2	5670	9,129	6,390	15,519
A3	6990	11,254	7,878	19,132
B1	42,410	68,280	47,796	116,076
B2	13,920	22,411	15,688	38,099
B3	24,495	39,437	27,606	67,043
B4	20,000	32,200	22,540	54,740
C1	64,273	103,480	72,436	175,915
C2	75,010	120,766	84,536	205,302
C3	57,370	92,366	64,656	157,022
C4	73,190	117,836	82,485	200,321
C5	72,230	116,290	81,403	197,694
C6	54,750	88,148	61,704	149,851
D1	-	36,000	25,200	61,200
D2	-	49,400	34,580	83,980
D3	-	45,630	31,941	77,571

Notes : (1) The maintenance cost is calculated based on a 5% capital cost with a 0% discount rate and a operation period of 15 years including the one year maintenance period.

(2) See Table A2 for the descriptions of the noise barriers type A1- D3

**Table A2** Various Types of Noise Barriers

Type	Description
A1	3m high steel post with concrete planks
A2	3m high concrete post with GRC panels
A3	3m high steel post with concrete planks and Dephond Screen Noise Barrier
B1	5m high vertical barrier with concrete planks (portal frame)
B2	5m high vertical barrier with concrete planks (free standing)
B3	5m high vertical barrier with GRC wall and top 2m Paraglass (free standing)
B4	5m high vertical barrier with Insokell (free standing)
C1	Partial enclosure one carriageway (east bound), concrete wall, Paraglass roof (portal frame)
C2	Partial enclosure one carriageway (east bound), GRC wall, Paraglass roof (portal frame)
C3	Partial enclosure one carriageway (east bound), concrete wall, Paraglass roof (cantilever)
C4	Partial enclosure one carriageway (east bound), GRC wall, Paraglass roof (cantilever)
C5	Partial enclosure one carriageway (east bound), Insokell wall and roof (cantilever)
C6	Partial enclosure one carriageway (east bound), GRC wall, Axxis polycarbonate sheet roof (cantilever)
D1	5.7m high inverted-L barrier with concrete planks (free standing)
D2	5.7m high inverted-L barrier with GRC wall and with top 2.7m Paraglass (free standing)
D3	5.7m high inverted-L barrier with Insokell (free standing)

## Appendix B



**RECOMMENDED POLLUTION CONTROL CONDITIONS  
FOR CONSTRUCTION CONTRACTS**

The following are the recommended clauses to be incorporated to the construction contract document to control the construction work.

**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.
- (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.
- (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<sup>3</sup> 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, particularly 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.

## Appendix C

disturbed area

*Dusturbed Habitat*

Acacia confusa	Echinochloa colona	Oxalis repens
Acacia mangium	Elephantopus tomentosa	Panicum maxima
Achyranthes asper	Eleusine indica	Paspalum conjugatum
Ageratum conyzoides	Emilia sonchifolia	Paspalum spp.
Aleurites moluccana	Erechtites valerianefolia	Passiflora foetida
Alocasia macrorrhiza	Erigeron floribundus	Pennisetum alopecuriodes
Amaranthus spinosa	Eucalyptus robusta	Pennisetum purpureum
Amaranthus viridis	Ficus elastica	Phyllanthus emblica
Apluda mutica	Ficus hirta	Polygonum chinensis
Arundinella nepalensis	Ficus hispida	Portulaca oleracea
Arundinella setosa	Ficus microcarpa	Psidium guajava
Bauhinia blakeana	Ficus pumila	Pyrostegia ignea
Berdelia monica	Ficus rumphii	Riccinus communis
Bidens pilosa	Gossampinus malabarica	Rubus reflexus
Blumea laciniata	Hibiscus tiliaceous	Rumex crispus
Carica papaya	Impatiens chinensis	Sapium sebiferum
Cassia fistula	Imperata cylindrica	Scoparia dulcis
Casuarina equisetifolia	Ipomoea cairica	Sesbania cochinchinensis
Celtis philippensis	Lagerstroemia speciosa	Sida acuta
Celtis sinensis	Lantana camara	Sida rhombifolia
Chamaesyce hirta	Leucanea leucocephala	Solanum nigrum
Chloris barbata	Ligustrum sinensis	Solanum torvum
Cinnamomum burmanni	Litchi chinensis	Sonchus oleraceus
Clausena lansium	Litsea glutinosa	Sporobolus fertilis
Cleome spinosa	Lportulaca oleraceae	Stachytarpheta jamariecns
Cocculus orbiculatus	Macaranga tanarius	Sterculia nobilis
Cratoxylum cochinchinensis	Malvastrum coromandelinum	Synedrella nodiflora
Cyperus difformis	Melia azedarach	Trema orientalis
Cyperus rotundus	Mikania micrantha	Triumfetta bartramia
Delonix regia	Mimosa pudica	Urena lobata

disturbed area

Desmodium heterocarpon  
Digitaria spp.  
Dimocarpus longan

Musa paradisiaca  
Neyraudia reynaudiana  
Oxalis corymbosa

Wedelia trilobata

Marsh

*Marsh*

*Apluda mutica*

*Carex* spp.

*Coix lachyme-job*

*Commelina nudiflora*

*Cuscuta* spp.

*Digitaria* spp.

*Echinochloa crus-galli*

*Eichhornia crassipes*

*Erarotis* spp.

*Hygrophila salicifolia*

*Ipomoea reptans*

*Kyllinga monocephala*

*Leptochloa chinensis*

*Ludwigia octovalis*

*Mikania micrantha*

*Oenanthe stoloifolia*

*Oenanthe javanica*

*Paspalum conjugatum*

*Paspalum distichum*

*Pennisetum alopecuriodes*

*Pennisetum purpureum*

*Philydrum lanuginosum*

*Polygonum hydropiper*

*Ranuncula soleratus*

*Reichhornia crassipes*

*Rumex maritimus*

*Sporobolus fertilis*

*Wedelia trilobata*



wood

*Woodland*

Acacia confusa  
Alocasia macrorrhiza  
Breynia fruticosa  
Bridelia monoica  
Cansjera rheedii  
Celtis philippensis  
Celtis sinensis  
Cocculus orbiculatus  
Cratoxylum ligustrum  
Cyclea hypoglauca  
Delonix regia  
Desmos cochinchinensis  
Dianella ensifolia  
Dimocarpus longan  
Euonymus chinensis  
Ficus hispida

Ficus hurta  
Ficus varilosa  
Glochidion eriocarpus  
Gordonia axillaris  
Heterosmilax gaudichaudiana  
Ipomoea carica  
Ligustrum sinensis  
Liriope spicata  
Litchi sinensis  
Litsea cububa  
Litsea glutinosa  
Litsea rotundifolia  
Lygodium japonicum  
Macaranga tanarius  
Mallotus paniculatus  
Melastoma dodecandrum

Melia azedarach  
Mussaenda pubescens  
Paederia scandens  
Pandanus tectorius  
Phyllanthus emblica  
Phyllanthus reticulatus  
Pinus massoniana  
Psychotria rubra  
Rhapiolepis indica  
Sageretia theezans  
Sapium sebiferum  
Smilax china  
Trema orientalis  
Zanthoxylum nitidum

## Appendix D

Item No	Dept. letter ref.	Comment	Response
1	HyD/R&D HRD 14/NT 5 March 1996	<u>Section 3.6.2.1, 4th para., 3rd sentence</u>  replace the phrase ' a service life of up to 3 years' to 'a service life of up to 5 years'.	Noted and text has been amended.

Item No	Dept. letter ref.	Comment	Response
2	HyD/Str (70) in STR 5/30/109 6 March 1996	No comment.	
3	CHE NT HNT 602/YL/29	No comment	

Item No	Dept. letter ref.	Comment	Response
4	HyD MWPMO ( ) in HyD MWPMO 246TH/INT 8 March 1996	2nd paragraph of para 2.3 should read ' The construction work is tentatively scheduled to start on <u>22 March 1998</u> and end at <u>21 March 2000</u> ' according to the updated programme.	Noted and text has been amended.

Item No	Dept. letter ref.	Comment	Response
5	TD/NT ( ) in NR 183/161/PWP- 560TH 11 March 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
6	WSD (79) in WVO/M921/1744/8 5 12 March 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
7	HyD Railway Division (8) in RD 7/1/13 Pt 1 13 March 1996	My comment on the captioned report is to replace the first sentence of para. 2.6 by "The project is under the jurisdiction of Transport Branch, with the assistance of Highways Department. Kowloon-Canton Railway Corporation (KCRC), as the prospective builder and operator of the railway, is carrying out planning and engineering studies on the project".	Noted and text has been amended.



Item No	Dept. letter ref.	Comment	Response
8	HyD CPS (Route 3) (50) in CPS/INT/104 14 March 1996 (Sheet 1 of 5)	<p>a) Section 1.2: As there will be several concurrent projects in the vicinity, please state in the 4th paragraph whether the findings of the Environmental Review (ER) are still valid in respect of <b>cumulative</b> impacts on air quality, waste disposal and water quality based on the latest information available.</p> <p>b) Section 2.2.2 and Figure 3.2, Section 3.2.2: The Route 3 Country Park Section (CPS) project is presently scheduled for completion in July/August 1998. To avoid two independent contractors working on the same site and creating conflicts with each other, it would be advisable to defer the commencement of the construction works in the overlapped works site until late 1998.</p> <p>c) Section 2.2.3 (last sentence) and Figure 5.2: Now that the construction of Route 3 CPS in Kam Tin area has commenced in December 1995, many existing features within the Route 3 CPS works site limit should have been changed and Figure 5.2 may need to be updated.</p> <p>d) Section 2.4: i) "Slip Road J" in the 4th line should preferably be replaced by "Slip Roads I &amp; J".</p>	<p>The findings of the ER are still valid as the air quality, waste disposal and water quality impacts arising from this Project is negligible when compared with those arising from the concurrent projects.</p> <p>The construction programme will be subject to review and adjustment if necessary. The current commencement date is Feb 99 for completion in Aug 01. Corresponding text has been revised.</p> <p>Noted and drawing has been amended.</p> <p>Noted and text has been amended.</p>

Item No	Dept. letter ref.	Comment	Response
8	HyD CPS (Route 3) (50) in CPS/INT/104 14 March 1996 (Sheet 2 of 5)	<p>d) Section 2.4: ii) "Slip Road &amp; J" in the 6th line should be replaced by "Slip Roads I &amp; J".</p> <p>e) Section 2.4 &amp; Section 3.7.1(a): The Route 3 CPS project is currently scheduled for completion and open to traffic in July/August 1998.</p> <p>f) Sections 3.3.2, 3.5.2, 3.6.2.2 &amp; 3.6.2.3, Figure 3.4, Tables 3.3.3, 3.5.2, 3.5.3, 3.6.1, 3.6.3, 3.6.4 &amp; 3.6.5:  It appears that some noise sensitive receivers at Ha Ko Po Tsuen (e.g. HKPT-1 and HKPT-2) and the home for the aged at Ko Po San Tsuen (KPST-5) were located within the works site of Route 3 CPS project and were already cleared in December 1995. The relevant sections, figures and tables may need to be updated based on the latest site conditions.</p> <p>g) Section 3.3.3 &amp; Figure 3.6: To complete the overall picture, it would be useful to include the Route 3 CPS alignment and the proposed Western Corridor Railway in Figure 3.6.</p>	<p>Noted and text has been amended.</p> <p>Noted and text has been amended.</p> <p>All NSRs fall within the work site of Route 3 have been excluded from the noise impact assessment, and the relevant sections, figures and tables have been updated.</p> <p>Noted and the figure have been revised.</p>

Item No	Dept. letter ref.	Comment	Response
8	HyD CPS (Route 3) (50) in CPS/INT/104 14 March 1996 (Sheet 3 of 5)	<p>h) Sections 3.7.2 &amp; 3.8.1 (last paragraph): The construction programme for the Route 3 CPS project can be provided upon request. An assessment of the cumulative construction impact should be made.</p> <p>i) Section 4, Figures 4.1 &amp; 4.2 Some of the information on existing wildlife habitats as shown in Section 4, Figures 4.1 and 4.2 may need to be revised now that the Route 3 CPS project in Kam Tin area commenced in December 1995.</p> <p>j) Section 4.7.1: Please show the location of the small fish pond as mentioned in the 2nd paragraph and check whether this pond is being affected by the Route 3 CPS project.</p> <p>k) Section 4.7.3 (3rd paragraph): Please state whether the three ecologically important areas marked A, B and C may possibly be affected by the Western Corridor Railway.</p>	<p>Noted. Construction programme for Route 3 CPS project has been obtained for cumulative construction impact assessment as required.</p> <p>Noted and figures have been revised to suit the work site of Route 3 CPS project.</p> <p>Location of the fish pond have been shown in Figure 4.1. The fish pond is not affected by the Route 3 CPS project.</p> <p>Ecologically important areas A and C will likely be directly affected by the Western Corridor Railway. However, impact assessment of the Western Corridor Railway on the three ecologically important areas are outside the scope of this study.</p>

Item No	Dept. letter ref.	Comment	Response
8	HyD CPS (Route 3) (50) in CPS/INT/104 14 March 1996 (Sheet 4 of 5)	<p>l) Sections 4.9 &amp; 7.2: It appears that the three ecologically important areas are being or will be affected by several major projects. If so, you are requested to explain how it will be possible to protect/conserves/buffer/join these areas?</p> <p>m) Section 5.5: i) Please delete "The more southern section of" in the 10th line.</p> <p>ii) If the road widening scheme is programme to start in February 1998 (ref. Section 2.2.2), "mid 1998, before" in the 11th &amp; 12th lines should be replaced by "July/August 1998, after".</p> <p>n) Section 5.6 (viii): i) If the road widening scheme is programmed to start in February 1998 (ref. Section 2.2.2), "mid 1998, prior to" in the 1st line of the 3rd paragraph should be replaced by "July/August 1998, after the commencement of".</p> <p>ii) Is "Figure 2" in the 3rd line of the 6th paragraph correct?</p> <p>iii) It is not clear from Figure 5.2 which trees are affected by the Route 3 CPS project as indicated in the last line of the 6th paragraph.</p>	<p>As advised by AFD, the three ecologically important areas fall outside the scope of this study and the proposed mitigation measures have been deleted accordingly.</p> <p>Noted and text deleted</p> <p>Noted and text amended</p> <p>Noted and text amended</p> <p>Text is revised to "Figure 5.2"</p> <p>A clearer copy of Figure 5.2 will be included in the final report.</p>

Item No	Dept. letter ref.	Comment	Response
8	HyD CPS (Route 3) (50) in CPS/INT/104 14 March 1996 (Sheet 5 of 5)	<p>o) Section 6.5.2.2: Some of the monitoring stations (e.g. MS-B, MS-D) may fall within the Route 3 CPS works limit and were already cleared. Please check.</p> <p>p) Section 7.3: If the commencement date of the captioned project is in February 1998 (Ref. Section 2.2.2), "mid 1988 prior to" in the 2nd should be replaced by "July/August 1998 before".</p> <p>q) Reference: Has any reference made to the Route 3 Country Park Section (Tai Lam Tunnel and Yuen Long Approach) Northern Section Detailed Environmental Impact Assessment Final Report issued in October 1995?</p> <p>r) Figure 2.4: Slip Roads I &amp; J should be marked in this figure.</p> <p>s) Appendix A, Section 3.1.3: Please insert "prepared by MVA Asia Limited" after "the Traffic Design Report" in the 1st line.</p>	<p>Noted and monitoring stations fall within the Route 3 CPS works limit have been deleted.</p> <p>Noted and text has been amended.</p> <p>Route 3 Country Park Section (Tai Lam Tunnel and Yuen Long Approach) Northern Section Detailed Environmental Impact Assessment Final Report has been added to Reference.</p> <p>Noted and the figure has been revised.</p> <p>Noted and amended.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 1 of 8)	<p>(i) Please check and correct typographical errors.</p> <p>(ii) Please use the project title "Improvement to Kam Tin Road, Stage I" throughout the report.</p> <p>(iii) <u>Para. 1.6</u> (a) A brief introduction to the review and recommendation of the contractual clauses for the contract of the project shall be given.</p> <p>(b) The traffic forecast study shall form a section of the report.</p> <p>(iv) <u>Para 2.1</u> Some words are missing at the end of 1st sentence.</p> <p>(v) <u>Para. 2.2.2</u> Please note that the construction programme will be subject to review and adjustment if necessary. The current commencement date is Feb 99 for completion in Aug 01. Please take note of this in the assessments.</p>	<p>Checked and amended.</p> <p>Noted and corrected.</p> <p>A introduction is included.</p> <p>Traffic forecast is incorporated to section 6 and other sections are revised accordingly.</p> <p>Noted and text has been amended.</p> <p>Text revised.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 2 of 8)	<p>(vi) <u>Para. 2.4</u> It appears that Slip Road I is also connected to Kam Tin Road.</p> <p>(vii) It seems that only existing NSRs are determined. (re. para. 3.3.2). For the noise impact assessment for operational stage to be meaningful, there shall be a sub-section giving the rationale behind the determination of NSRs at the operational stage giving due regard to the proposed/approved projects in the vicinity in the design year 2011 and beyond. Please check whether the identified NSRs as mentioned in para. 3.3.2 will still exist in 2011 and beyond is required. Your particular attention is drawn to the fact that Route 3 (CPS), Western Corridor Railway and 22CD &amp; 43CD drainage projects are located close to and have interface with the project, some of the identified NSRs which fall within the land requirement plans/resumption plans of these projects may have been resumed and cleared and become non-existent by 2011 and beyond. Some NSRs in HKPT (e.g. HKPT 1-4) and KPST (e.g. KPST-5) may fall into this category. Please therefore check and confirm the status of the NSRs by referring to the relevant information. Apart from government projects, future proposed/approved private developments in the vicinity should also be identified to see if they should be included as NSRs. In this connection please check and consult with DPO/TM &amp; YL if there are any such developments.</p>	<p>Noted and text has been amended.</p> <p>Future and planned sensitive users have been identified in Section 3.3.3. Existing NSRs fall within work sites of the Route 3 (CPS), Western Corridor Railway and 81CD (formerly known as 22CD) &amp; 43CD drainage projects have been excluded from the noise impact assessment.</p> <p>DPO of YL has been consulted to confirm the latest zoning plan. We have received no objection from them regarding our latest plans on hand.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 3 of 8)	<p>Likewise, NSRs for construction noise impact assessment, which may be different from the NSRs for operational phase noise impact assessment, should be identified by taking into account any proposed/approved projects (public and private) in the vicinity.</p> <p>(viii) <u>Para. 3.4.1</u> the criteria adopted from the environmental standards and guidelines are an important issue which would affect the results of the noise impact assessment. I notice that most NSRs are currently experiencing traffic noise in excess of the "acceptable criteria". To reduce the operational traffic noise, which is the combined noise due to prevailing traffic noise and the noise generated by increased traffic after road improvement, to the "acceptable level" would require this project to mitigate additional noise not being caused by the project itself. Please therefore check and seek comments from EPD whether it is acceptable under such standards and guidelines to have the noise reduced to the prevailing level or the criteria level whichever is higher and hence reduce the obviously out-of-proportion mitigation cost to a level which is commensurate with the roadworks cost.</p>	<p>NSRs for construction and operational noise impact assessment have been differentiated in Table 3.3.3.</p> <p>As advised by EPD, "acceptable criteria" stipulated in HKPSG should be followed.</p>



Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 4 of 8)	<p>(ix) <u>Para. 3.6.1</u> It is noted that no mitigation proposal is mentioned for construction phase although noise calculations for mitigated case are carried out and shown in Table 3.6.1. Please give a brief proposal in line with the assumptions made in the calculations and with an assessment carried out with regard to the feasibility and cost implication of such temporary mitigation measures shall be given.</p> <p>(x) <u>P.28, 2nd last para.</u> It seems that NSRs will be about 1-3 storey high. Does it mean plain barriers are suitable in this case?</p> <p>(xi) <u>Para. 3.6.2.2</u> (a) As stated in the last para. on p.28, the earth bund option will require huge land intake, is the 3m high barrier on earth bund feasible in view of land required? In this connection, please provide sketches showing the cross-sections of the proposed noise barriers shall be provided.</p> <p>(b) A preliminary design for the proposed noise barriers should be given.</p>	<p>Various potential construction noise mitigation measures have been provided as indicated in para. 2 and 3 of Section 3.6.1. As the selection of the appropriate mitigation measures is largely subject to the work method and programme adopted by the Contractor, it is not appropriate to specify a particular mitigation option in this EIA study.</p> <p>Plain barriers could be generally effective in protecting low-rise receivers if the noise exceedance is less than 10 dB(A). Since the predicted noise levels at the NSRs exceed the noise criterion by over 10 dB(A), provision of noise barrier will unlikely fully protect the NSRs.</p> <p>Land intake revised to 5m and 7m for 2m and 3m height earth bund based on 1 : 2 slope and 1m berm. In the final report, 3m high noise barrier and 5.7m high inverted L barrier is most feasible and the typical sections will be included in the final report.</p> <p>Noted and conceptual design of noise mitigation measures has been provided.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 5 of 8)	<p>(c) Please clarify if indirect technical remedies are recommended (re. 3rd para., p. 30).</p> <p>(d) A detailed build-up of the unit cost of noise barriers, giving the date of the price level, should be provided. The assumptions in ascertaining the maintenance cost should also be given.</p> <p>(xii) <u>Para. 3.6.2.3</u> Do you recommend indirect technical remedies for AT-1, KPT-7 and KPT-9.</p> <p>(xiii) <u>Para. 4.7.1</u> Please clarify what role this project can play in maintaining the unfilled fish pond for wildlife conservation which is located outside the project limit.</p> <p>(xiv) <u>Para. 4.9</u> Similar to comment (xiii) above but regarding the 3 ecological important areas.</p>	<p>Indirect technical remedies are recommended for those NSRs meeting three eligibility criteria as stated in Section 3.6.2.1 - <i>Control at NSRs</i> on page 29. Refer to Appendix A</p> <p>Noted and has been clarified.</p> <p>As advised by DSD, the fish pond will be returned to the owner, therefore the pond will not be maintained for wildlife conservation.</p> <p>As advised by AFD, the three ecologically important areas fall outside the scope of this study area and the proposed mitigation measures have been deleted accordingly.</p>

Item No.	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 6 of 8)	<p>(xv) <u>Para. 5.5</u> (a) Is the old person dwelling the same as the home for the aged (i.e. KPST-5) as mentioned in the section on Noise Impact Assessment? Please clarify.</p> <p>(b) Include the alignments of 22CD and 43CD in Figure 5.1.</p> <p>(xvi) <u>Para. 5.6 (iv)</u> (a) Clarification is required on whether the buildings in Ha Ko Po Tsuen will be cleared by Route 3.</p> <p>(xvii) <u>2nd last para., p. 55</u> Recent air photographs shall be helpful if they are included in the report to show the existing landscape/visual environment.</p> <p>(xviii) <u>Para. 5.7</u> It is noted that the proposed noise barriers will have medium negative visual impact. Could you propose any mitigation measures for this impact?</p>	<p>The text has been amended to read "Home for the Aged"</p> <p>Noted and drawing amended.</p> <p>A number of the buildings in Ha Ko Po Tsuen will be cleared as stated in Para. 5.6(ii)</p> <p>Noted, recent air photograph will be included in the report.</p> <p>Noted, more detailed mitigation measures have been proposed.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 7 of 8)	<p>(xix) <u>Para 5.8</u> Please explanation why the fill slope should not be steeper than 2:1.</p> <p>(xx) Landscape and visual impact assessment should be included in this EM&amp;A Manual.</p> <p>(xxi) <u>Para. 6.4.2</u> Please clarify if the Independent Environmental Auditor is a consultant employed by the government. If so, please provide the recommended consultancy brief for employing such an auditor.</p> <p>(xxii) <u>Para. 6.5.3</u> Please check and confirm whether, within the project limit, there is any fish pond affected by this project and consider its implications to the requirements of monitoring and auditing for fish ponds and carrying out water quality monitoring.</p>	<p>The steepness of the slope has a major effect on plant establishment. Planting would require more intensive maintenance on slope greater than 2 : 1. Noted and text amended.</p> <p>It is recommended that the Independent Environmental Auditor to be employed by the government. Consultancy brief for employing such an auditor has been provided.</p> <p>As the fish pond (the only fish pond identified within the project limit) will be returned to the owner once completion of works. As such, no monitoring and auditing for fish ponds and water quality are required, and relevant text has been amended accordingly. Also, the possible relocation of the RCP has been adopted in the EIA report as a ecological mitigation option.</p>

Item No	Dept. letter ref.	Comment	Response
9	HyD NT ( ) in HNT 54/42 A III 14 March 1996 (Sheet 8 of 8)	<p>(xxiii) <u>Para. 6.6.3</u> See comment (xxii) above.</p> <p>(xxiv) <u>Table 6.7.1</u> Some words are missing in the 1st &amp; 3rd rows in the 2nd column.</p> <p>(xxv) <u>Para. 7</u> (a) The proposed noise mitigation measures should be mentioned.</p> <p>(b) A para. on EM&amp;A Manual should be given.</p>	<p>See response to comment <u>Para. 6.5.3</u> above.</p> <p>Noted and text has been amended.</p> <p>Noted and the recommended noise mitigation measures have been added.</p> <p>Noted and text has been amended.</p>

Item No	Dept. letter ref.	Comment	Response
10	HyD NT ( ) in HNT 54/42 A III 19 March 1996	<p>(i) <u>Para. 3.6.2.2</u> I note that there is only one option proposed for the noise mitigation measure which consists of concrete post with GRC/Paraglass panel walls. Please investigate if there are other options in terms of different structural forms and/or construction materials shall be investigated and compared for the cost-effectiveness of various options.</p> <p>(ii) <u>Para. 5.6, 5.7 &amp; 5.8</u> Since noise barriers are recommended as a noise mitigation measure, please assess the landscape and visual impacts of the various options of noise barriers as mentioned in para. 3.6.2.2 and propose their mitigation measures. Please provide details regarding the followings:</p> <p>(a) a general arrangement drawing of the noise barriers with elevations of all parts that will be exposed to view;</p> <p>(b) perspective or axonometric views illustrating the form, texture and colour treatment of the proposed noise barriers; and</p> <p>(c) comprehensive photographs of the site where noise barriers are proposed to be built.</p>	<p>Noted and other options have been evaluated and included in the EIA report.</p> <p>Noted, text and illustration have been included to provide a more detailed landscape and visual impact assessment of the barriers and appropriate mitigation measures.</p>
11	DSD MN ( ) in MN 7/4/15 19 March 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
12	WB (15) in WB(W) 1878/560/TH 21 March 1996 (Sheet 1 of 2)	<p>1. First, even before commencement of construction of Kam Tin Road improvement, the embankments and bridges for Route 3 - CPS will have been completed. These embankments will form noise barriers and there will be some noise barriers on top of the embankments. It is not stated whether or not the assessment has been made allowance for the barrier effect of these Route 3 embankments, but I suspect not.</p> <p>2. It is certainly apparent that the recommended noise mitigation measures shown on Figures 3.7 and 3.8 have ignored the Route 3 embankment. Most of the noise barriers shown on Figure 3.7 will not be required because the Route 3 embankment will provide the noise barrier.</p> <p>3. I understand that structures HKPT1 and HKPT2 and KPST-5 have been or will be demolished to build Route 3. HKPT-4 may be demolished for construction of the Western Corridor Railway. Can the cost of the barriers to protect the few remaining building of Ha Ko Po Tsuen and Ko Po San Tsuen still be justified?</p>	<p>Noise barrier effect of the Route 3 embankments have been taken into account in the noise modelling for operational noise impact assessment.</p> <p>Extent of the provision of noise barriers has been reviewed by taking into account of the Route 3 embankments. Revised mitigation measures have been illustrated in the relevant figures.</p> <p>NSRs at Ha Ko Po Tsuen and Ko Po San Tsuen that fall within the work limit of Route 3 and Western Corridor Railway have been excluded from the noise impact assessment. The effectiveness of the noise mitigation measures for the remaining NSRs at Ko Po San Tsuen has been reviewed and included in the report.</p>

Item No	Dept. letter ref.	Comment	Response
12	WB (15) in WB(W) 1878/560/TH 21 March 1996 (Sheet 2 of 2)	<p>4. Loss of wetlands (Section 4.7) is currently an emotive issue that has delayed other projects. This project only marginally affects one fish pond. If the loss of, and impact upon this fishpond can be eliminated, there would be significant benefit to the project and the ecology. This can be achieved by minor design changes-</p> <ul style="list-style-type: none"> <li>i. relocated the new RCP away from the fish pond;</li> <li>ii. locally remove the roadside amenity strip; and</li> <li>iii. replace the embankment with a retaining wall with landscape planting between the retaining wall and the edge of the pond.</li> </ul> <p>5. The loss of cultural relics (first sentence on page 56 and first bullet on page 58) may result in objections and delays. These should be retained if at all possible by local re-design of the scheme to avoid objections and delays.</p> <p>6. I cannot entirely agree with the first bullet point under "Permanent Mitigation Measures - After Construction" on page 58. If there is "leftover land between the works limit and road corridor" that is not government land and is not required as part of the permanent works, then the works limit should be adjusted to exclude it. Resumption costs are high and the expenditure would be difficult to justify if the land is only used for tree planting. Additionally, Lands Department have inadequate staff resources to resume the land. The less land we resume, the more chance there is of acquiring the land as programmed.</p>	<p>Highways Department will liase with RSD of the possibility of relocating the RCP to reduce the loss of wetlands.</p> <p>Noted, see bullet point no. 1, p.58 under the heading "Temporary Mitigation Measures-".</p> <p>Noted, all proposed planting areas will be part of the permanent works. The text has been amended accordingly.</p>



Item No	Dept. letter ref.	Comment	Response
13	CP (96) in CP/T/TMB 216/608 Pt. 17	No comment.	

Item No	Dept. letter ref.	Comment	Response
14	YLDO (7) in YL131361 IV 1 April	No comment.	

Item No	Dept. letter ref.	Comment	Response
15	DPO TM&YL ( ) in PDYL 2/8/26 1 April 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
16	DSO YL (24) in BLD 372/NGS/87 2 April 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
17	FSD (25) in FSD 18/7596/85 III 3 April 1996	Please be informed that I have no objection in principle to the captioned Report. However, as both temporary and permanent noise barriers are proposed to be erected within the project area to mitigate the noise impact, I would like to draw your attention to this regard that those noise barriers should under no circumstance cause any obstruction to the EVA to nearby villages/buildings and the fire hydrants installed along the area so that Fire Services operational duties would not be impeded in case of emergency.	Layout of the proposed noise barriers have been planned to avoid obstructing any access to the villages/villas. Blockage of fire hydrants can be avoided by careful detailed design of the noise barriers during the detailed design stage.

Item No	Dept. letter ref.	Comment	Response
18	DLO YL (8) in L/M (5) to DLOYL 217/YRN/60A 9 April 1996	Please note that the commencement date of the construction works of the Kam Tin Road Improvement Stage 1 Project will be subject to review and adjustment.	The commencement date is Feb'99 and end at Aug 01 and is subject to review and adjustment.

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 1 of 10)	<p>The EIA study should focus on investigating how the proposed road improvement works will affect the existing environment and recommend suitable measures to mitigate adverse impacts identified. The findings and recommendations of the study must be directly related to the project itself. All recommendations must be cost effective and practicable for the project proponent to implement. Moreover, there should not be any open ended recommendations.</p> <p>The proposed road improvement works will be carried out along the existing road corridor which has already and is still subject to a high degree of disturbance. As concluded in Section 4.9 of the Report, no severe direct impacts are anticipated and the impacts can be mitigated. The loss of 2,250m<sup>2</sup> fish pond (may be further reduced to 680m<sup>2</sup>) due to the project should not be considered in the same context as the much larger scale fish pond losses due to other projects near the Deep Bay Buffer Zones. The effect of this project to the overall fish pond loss would be minimal. Therefore, the cumulative impact of this project would seem to have been overstated.</p>	<p>Noted.</p> <p>Agreed and the relevant text about the cumulative impact of this project on the fish pond loss has been revised.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 2 of 10)	<p>Furthermore, it is not clear from the Report which fish pond will be affected but can be avoided. Would it be possible to avoid touching the pond at all? It is recommended in Section 4.7.1 that a portion of the pond to be affected be retained for wildlife management. No management plan has been proposed. However, without knowing its location, it would not be possible for the readers to assess whether the portion of fish pond to be retained is suitable for fish farming or for wildlife management. Such recommendation will not be implementable. The most practicable solution seems to return the pond to fish farmer for fish farming.</p> <p>No details have been provided regarding the "management strategy for the remaining wetlands in the Kam Tin/Au Tau" mentioned in Section 4.7.1. It is not clear about its objectives nor the arrangement for formulating such strategy. The subject matter may be outside the scope of the existing EIA study, otherwise the consultants should provide details of such strategy if it is related to the implementation of the project.</p> <p>The recommended ecological monitoring and audit programme seems to be excessive. As most ecological impacts are indirect ones resulting from water and air pollution, adequate monitoring on water and air qualities will serve the purpose. Unless the relationship between the changes in ecological parameters being monitored with the works of the project can be established, the monitoring programme would not be meaningful.</p>	<p>Noted. Location of fish pond has been indicated in Figure 4.1. As advised by DSD, the fish pond will be returned to the owner once completion of works and therefore the proposed mitigation measures have been deleted accordingly.</p> <p>Noted. The subject matter is outside the scope of this study and the relevant text has been deleted accordingly.</p> <p>Noted and EM&amp;A programme for ecology has been amended.</p>



Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 3 of 10)	<p>It should also be noted that some agricultural land under active cultivation might be affected by the project. Measures should be taken to avoid causing adverse impacts on the local agriculture both during and after the construction period. Agricultural infra-structures affected by the project should be re-provisioned.</p> <p>Specific comments on EIA report</p> <p>Page 38, Section 4.2 Para. last The rationale for only recording higher plants should be provided.</p> <p>Page 39, Para. last "Find ponds" in line 1 should be "Fish ponds".</p> <p>Page 40, Section 4.3 Para. first There is no legislation on rare plants. The sentence should be suitably amended.</p> <p>Page 40, Section 4.3 Para. first The habitats of the birds were not shown in Table 4.1. Please clarify and indicate the source of information.</p>	<p>No active cultivation has been recorded during ecological survey.</p> <p>In the detailed design stage, considerations could be given to the road alignment and location of the drainage works in order that adverse impacts on the local agriculture could be avoided as much as possible.</p> <p>Noted and text has been amended.</p> <p>Noted and has been corrected.</p> <p>Noted and text has been amended.</p> <p>Noted and the habitats of the birds have been indicated in Figures 4.1 and 4.2.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 4 of 10)	<p>Page 40, Para. list of species should receive attention The numbers (only that of Grey Starling and Grey-headed Lapwing were given in Table 4.1) and activities (feeding, roosting, fly over, etc.) of the six species of birds mentioned in the study site were not provided. It would be difficult to establish the relationship between these species and the habitats of the study site. Hence the ecological importance of the habitats could not be assessed in the study.</p> <p>Page 40, Section 4.4 Para. last As only scattered fish ponds are recorded within the study site which are subject to high disturbance, Javan Mongoose should not be expected to be present within the study site.</p> <p>Page 41, Para. second last The field data were not shown to substantiate the statement on the cumulative effect on bats.</p> <p>Page 45, Section 4.5 Para. fourth Tilapia is herbivorous and not carnivorous as stated.</p>	<p>Noted and clarifications have been made in Table 4.1.</p> <p>Noted and the relevant text has been deleted.</p> <p>Noted and text has been amended.</p> <p>It is clarified that Tilapia is omnivorous (Man and Hodgkiss, 1981).</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 5 of 10)	<p>Page 45, Section 4.6 Para. first Please clarify whether or not the sites mentioned in the two studies quoted (Diskin and Pearse 1994 &amp; Carey 1995) are within the study area of this project. Preferably these sites should also be shown in Fig. 4.2 to indicate the relationship between these sites and the three ecological important areas identified by this study.</p> <p>It is not substantiated how the local (<u>territory wide</u>) avian fauna will be <u>detrimentally</u> affected. The ecological significance of the three areas seems being overstated.</p> <p>Page 46, Para. first It is not clear what actions are to be adopted by the project proponent "to preserve the remaining areas". If it was meant to recommend preserving abandoned fish ponds, there was no simple practicable way to ascertain the ponds would continue to be "abandoned".</p>	<p>The sites mentioned in the two studies quoted (Diskin and Pearse 1994 &amp; Carey 1995) should include ecologically important area A identified in this study. As advised by DSD, however, the ecological impacts on the three ecologically important areas have been duly studied by the EIA Report on the Channel Projects, therefore the relevant text has been deleted to avoid duplicate effort and confusion.</p> <p>Relevant text has been deleted.</p> <p>Ecological impacts on the three ecologically important areas have been duly studied by the EIA Report on the Channel Projects, therefore the relevant text has been deleted accordingly.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 6 of 10)	<p>Page 46, Section 4.7.1 Para. first It should be noted that various factors (e.g. availability of stock in the market, robustness, resistances to pollution, etc.) should be considered in selecting tree species for planting. Only those able to survive in the rather hostile roadside conditions should be used. The requirements of the recommendations of the landscape and visual impact assessment (Section 5.8) should also be taken into consideration. A preliminary list should be provided for the project proponent to consider.</p> <p>The reference quoted (Corelitt 1992) is not an appropriate reference for selecting trees for planting. The last sentence should be deleted.</p> <p>Page 46, Para. second The location of the small fish pond should be shown in a plan. Would it be possible for the works to completely avoid this pond?</p> <p>The ecological value of this small pond is not substantiated by field findings. Were there records showing the birds from the nearby egrettries feed on this pond being recorded? If yes, how much did these birds depend on the pond for survival?</p>	<p>Noted. A preliminary list of the recommended tree species has been provided by taking into account of various factors. For detail, refer section 5.7.</p> <p>Noted and the last sentence has been deleted.</p> <p>The location of the fish pond has been indicated in Figure 4.1. As advised by HyD, it would be impossible for the works to completely avoid this pond based on the present project limit. The possible relocation of the RCP has been adopted in the EIA report as a ecological mitigation option.</p> <p>As advised by DSD, fish pond will be returned to the owner once completion of works, the relevant text has been deleted accordingly.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 7 of 10)	<p>Page 46, Para. third Why the retained portion of the pond should not be handed back to fish farmer? Who will manage the retained portion of the pond for wildlife conservation? It is doubtful how much ecological value can be gained by managing such a small area of pond after the road works. Without a proper management plan and an appropriate management agent, the recommendation is impracticable.</p> <p>It has not been substantiated that there is a need to compensate for the loss of a small area of fish pond.</p> <p>Page 46, Para. four What is the "management strategy for the remaining wetlands in the Kam Tin/Au Tau"? Who is going to work out such study? The paragraph falls outside the scope of the EIA study and should be deleted.</p> <p>Page 47, Section 4.7.2 Para. third The Drainage Impact Assessment of this project should take into consideration the concern on altering hydrology of the area. Please clarify whether this has been done or not.</p>	<p>As advised by DSD, fish pond will be returned to the owner once completion of works, the proposed mitigation measures have been deleted accordingly.</p> <p>Noted and text has been deleted.</p> <p>See response to Page 46, Para. third.</p> <p>Noted. the necessary precautions are contained in Section 10 and 11 in the DIA report.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 8 of 10)	<p>Page 47, Section 4.7.3 Para. first It should be noted that the contribution of this project on the total wetland loss is minimal and insignificant. It should also be noted that the fish pond to be affected is outside the Deep Bay Buffer Zone and its ecological value cannot be compared with those in the Ramsar Site.</p> <p>Page 47, Para. last two These two paragraphs discussed issues that were not directly relevant to this project and fall outside the scope of this project. They should be deleted.</p> <p>Page 48, Section 4.8 Para. first first 2 bullet points - It has not been justified why the birds should be monitored. How could the monitoring results be related to impacts caused by the works of this project?</p> <p>third bullet points - Landscape planting will be maintained by the landscape contractor initially and then by RSD. The need for monitoring should be justified.</p> <p>fourth bullet point - Agreement from EPD is needed on the need for water quality monitoring.</p>	<p>Noted and text has been revised accordingly.</p> <p>Noted and text has been deleted.</p> <p>Considering that the egret location is close to the work site, monitoring the use of Ko Po Tsuen Egret during the nesting season is necessary. Second bullet point has been deleted.</p> <p>Noted. Monitoring of the landscape planting will be undertaken by the landscape contractor, and the relevant text has been amended.</p> <p>Noted.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 9 of 10)	<p>Page 48, Section 4.9 Para. last This paragraph falls outside the scope of this EIA study and should be deleted.</p> <p>Page 64, Section 6.3.2.1 Table 6.3.1 Filling of the fish pond should be avoided as far as practicable.</p> <p>The proposal of managing the fish pond for wildlife conservation is impracticable and should be deleted. (Please refer to comments on Section 4.7.1 above).</p> <p>Page 65, Section 6.3.2.2 Table 6.3.2 Please delete the part on ecology as such measures would be impossible for the project proponent to implement and they would fall outside the scope of this study. (Please refer to comments on Sections 4.7.1 and 4.7.3 above).</p> <p>Page 70-71, Section 6.5.3 Please refer to comments on Section 4.8 above.</p>	<p>Noted and text has been deleted.</p> <p>Noted.</p> <p>Noted and text has been deleted.</p> <p>Noted and text has been deleted.</p> <p>Noted and refer to responses to Section 4.8 above.</p>

Item No	Dept. letter ref.	Comment	Response
19	AFD (69) in AF DVL 14/44 15 April 1996 (Sheet 10 of 10)	<p>Page 72, Section 6.6.3 Please refer to comments on Section 4.8 above.</p> <p>Page 78, Section 7.2 Para. four Please delete the last sentence as it is outside the cope of the project and not implementable by the project proponent.</p>	<p>Noted and refer to responses to Section 4.8 above.</p> <p>Noted and text has been deleted.</p>



Item No	Dept. letter ref.	Comment	Response
20	HyD SLA HYDT 12/7/20 17 April 1996	No comment.	

Item No	Dept. letter ref.	Comment	Response
21	DSD DP ( ) in DP/12/YL/4 19 April 1996 (Sheet 1 of 3)	<p>5. <u>General</u></p> <p>(a) From the "Reference" section, it is noted that the EIA Report for the Main Drainage Channels in the area has not been considered in the drafting of this EIA. This is very undesirable since the areas, in particular the "ecologically important areas" as shown in Fig 4.2 have already been included in the said EIA study which is now in its final report drafting stage. That EIA Report is now being prepared by ERM - Hong Kong Ltd. for TDD.</p> <p>(b) Based on the scope of the study (Para. 1.2 refers), air quality is also included. However, it appears from the Report that air quality (or Dust) has not been mentioned in details accordingly.</p> <p>(c) Similarly for water quality and waste disposal, what are the precautions to avoid the sediments during construction being washed into the streams or the channels together with the run-off.</p> <p>6. <u>Para 2.5:</u></p> <p>Works for item 22CD has been scheduled for commencement in mid 1988 and completion in end 2000. 60CD is scheduled for completion in Sept 98.</p>	<p>TDD has been contacted for the release of this report, but they said that the final report is still under preparation and is unable to give us any copy even for the draft report because much changes have been made.</p> <p>Detailed air quality impact assessment is outside the scope of this EIA. Dust suppression measures during construction phase have been recommended in Appendix B.</p> <p>The precautions to avoid the sediments during construction washed into the streams or the channels together with the run-off have been presented in Appendix B.</p> <p>Noted and text has been amended.</p>

Item No	Dept. letter ref.	Comment	Response
21	DSD DP ( ) in DP/12/YL/4 19 April 1996 (Sheet 2 of 3)	<p>7. <u>Para. 4.7.1</u></p> <p>The fish pond will be temporarily resumed by the Channel Project (22CD - Phase 1). Upon completion of the works, the pond will be returned to the owner. This has been discussed and agreed at an inter-departmental meeting on 16.4.96 among HyD (Kam Tin Road, Stage 1; Kam Tin Bypass, Route 3), DLO/YL, DSO/YL and DSD (Main Drainage Channel Works).</p> <p>8. <u>Para. 4.7.3</u></p> <p>Most of the areas marked A, B and C in Fig 4.2 will become parts of the drainage channels under the channel projects. Hence, the ecological impacts have been duly studied by the respective EIA Report.</p> <p>9. <u>Para. 4.8</u></p> <p>(a) What are the baseline figures for such a monitoring proposal?</p> <p>(b) Should an unacceptable deviation be found from the monitoring, how can a conclusion be made to identify that which project in the area should be responsible?</p>	<p>Noted and relevant text has been amended.</p> <p>Noted. Also as advised by AFD, the three ecologically important areas fall outside the scope of this study.</p> <p>As the extent of ecological monitoring programme is revised, the original text is no longer valid and has been amended accordingly.</p> <p>Please refer to response to comment (a) of Para. 4.8 above.</p>

Item No	Dept. letter ref.	Comment	Response
21	DSD DP ( ) in DP/12/YL/4 19 April 1996 (Sheet 3 of 3)	<p>10. <u>Para. 6.5.3, 6.6.3</u></p> <p>(a) "Section 3" should read as "Section 4".</p> <p>(b) It appears that the survey information included in Section 4 is not sufficient to act as a baseline for ecological monitoring. Besides, with the ongoing large scale site formation of Route 3, the ecological situation in the area before the road construction in Feb. 98 will definitely be different from this "baseline" survey which was carried out in January 96.</p> <p>(c) What are the Trigger/Action/Target levels for the ecological monitoring?</p> <p>(d) In fact, it may be argued that with the comprehensive monitoring on Water, Noise and Air (Dust), the ecological monitoring might not be necessary. Of course, this should be subject to the detailed study by the Consultants.</p> <p>11. <u>Para. 7.2</u></p> <p>It appears that 'Water' and 'Dust' are not mentioned in details in the Report.</p>	<p>Noted and has been corrected.</p> <p>Please refer to response to comment (a) of Para. 4.8 above.</p> <p>Please refer to response to comment (a) of Para. 4.8 above.</p> <p>Please refer to response to comment (a) of Para. 4.8 above.</p> <p>See responses to 5. <u>General</u> (b) and (c) above.</p>

Item No	Dept. letter ref.	Comment	Response
22	EPD Annex (1) to EP2/N6/23 19 April 1996 (Sheet 1 of 5)	<p>(a) The project have been selected by ACE-EIA Subcommittee for submission/presentation. The project would normally by presented at ACE 2 months after the completion of the report and the Executive Summary. I will keep you informed of any further development in due course.</p> <p>(b) The consultants are reminded to check with relevant authorities to ensure that the NSRs selected for the noise modelling would not be resumed for other projects, such as Route 3 and WCR.</p> <p>(c) Please find attached Appendix A listing our detailed comments on Chapter 3 - Noise Impact Assessment.</p> <p>(d) Regarding Chapter 6 - EM&amp;A, it should be a stand-alone document and comply with the <u>relevant sections</u> of the following guidelines attached herewith:</p> <ul style="list-style-type: none"> <li>- Appendix B "Engineer's Guidelines For Implementation of EM&amp;A Programmes";</li> <li>- Appendix C "A Selection from the EM&amp;A Protocols, including the "Standard Air, Water and Noise Monitoring Requirements" and the "Typical Event and Action Plan for Air, Water and Noise Monitoring during Construction".</li> </ul>	<p>Noted.</p> <p>Noted and comments from HyD and Secretary for Works on the NSRs have been incorporated.</p> <p>Noted.</p> <p>Noted and guidelines as per Appendices B and C have been incorporated.</p>

Item No	Dept. letter ref.	Comment	Response
22	EPD Annex (1) to EP2/N6/23 19 April 1996 (Sheet 2 of 5)	<p>(e) Plan D and/or HyD(Landscape Section) should be consulted regarding Chapter 5 - Visual and Landscape Assessment.</p> <p>Appendix A - Comments on Chapter 3 of the Draft EIA Report</p> <p>(a) Please state the classification/nature of the improved road, i.e. whether it would be a local distributor, a district distributor or trunk road etc.?</p> <p>(b) Section 3.3.3 and Table 3.3.3 - the report is required to provide a schedule and plans to identify all <u>existing and planned</u> NSRs to be potentially affected by the project. The locations shall be clearly documented. We have noticed some structures (as marked up on the attached drawing) which may be noise sensitive within the Study Area. Would the consultants please advise what these structures are. If they are noise sensitive, they should be included in the noise assessment.</p> <p>(c) For easy reference, the road surface material of each road section should be shown on Table 3.2.3 as well.</p> <p>(d) Section 3.6.2.1 - Please note that the use of pervious road surface can only reduce the traffic noise level by 2.5 dB when compared with impervious or concrete road surface for speed below 75km/h according to the CRTN.</p>	<p>EIA was passed to SLA HyD and DPO for comment</p> <p>Noted and has been clarified.</p> <p>Noted. The NSRs identified adjacent to Castle Peak Road - Yuen Long are church and school which are noise sensitive uses. However, as they are completely screened by topographical features, it is anticipated that the traffic noise impact on these NSRs will be negligible. For those remaining structures, they are either industrial premises or ruined/removed and thus excluded from the noise assessment. The above have been clarified in the final report accordingly.</p> <p>Noted and road surface material has been added to the table.</p> <p>Noted and text has been amended.</p>

Item No	Dept. letter ref.	Comment	Response
22	EPD Annex (1) to EP2/N6/23 19 April 1996 (Sheet 3 of 5)	<p>(e) Table 3.5.3, Table 3.6.4 and Table 3.6.5 - Would the consultants please confirm whether they have strictly follow the CRTN methodology in the noise modelling in calculating the noise levels for the eastbound and westbound traffic separately where the central reserve is more than 5m or where the heights of the outer edges of the two carriageways differ by more than 1m?</p> <p>(f) Table 3.5.3 and Table 3.6.4 - Please show the predicted noise levels at each NSR due to the improved Kam Tin Road and other roads separately as well as showing the overall noise levels. This will enable the readers to identify where is the major contribution.</p> <p>(g) Section 3.6.2.1 - The first of the three "eligible criteria" for indirect technical remedies should be amended to read;</p> <p>"...traffic noise in the vicinity, <u>must be above</u> the HKPSG criteria..."</p> <p>(h) Section 3.6.2 - On the mitigation measures for the operational traffic noise impact, we are puzzled by the need of partial enclosures. Please note that the NSRs in the area are predominately low-rise, making simple plain barrier effective. The consultant is required to justify the need of the partial enclosures.</p>	<p>The CRTN methodology in calculating the noise levels for the eastbound and westbound traffic separately has been followed in the noise modelling.</p> <p>Noted. Contributions of Kam Tin Road and other roads to the overall noise levels at each NSR have been added to tables.</p> <p>Noted and text has been amended.</p> <p>According to the predicted noise levels, plain barrier will unlikely be sufficient to fully protect the NSRs. However, the provisions of noise barriers and partial enclosures have been reviewed in the final report.</p>

Item No	Dept. letter ref.	Comment	Response
22	EPD Annex (1) to EP2/N6/23 19 April 1996 (Sheet 4 of 5)	<p>(i) The improved road would be provided with a central reserve. We suggest the consultant exploring the feasibility and effectiveness of erecting noise barrier along the central reserve. We believe it would help to reduce the overall height of the roadside noise barrier. Further optimization of the direct technical remedies is required. For example, why only 3m and 5m high barrier, but not other heights?</p> <p>(j) The consultants are reminded to take into account the noise reflection due to multiple barriers along the side of the road. Where necessary, the use of absorptive barriers would reduce this undesirable effect.</p> <p>(k) The practicability of any proposed mitigation measures needs to be demonstrated, taking into account, the fire fighting aspect, sighting problem at run-ins/junctions, bus stops, underground services, visual impact, etc.</p> <p>(l) The cost effectiveness of the final recommended mitigation scheme needs to be justified. The cost of the recommended <u>indirect technical remedy package</u> to redress the residual impact would need to be assessed and shown in the report also.</p> <p>(m) Table 3.6.5 - The quoted Prevailing Noise Level for KPT-7 is inconsistent with that on Table 3.6.4. Also, the noise levels on this table need to be presented to the first decimal place in order to compare with the 2nd and 3rd "eligible criteria".</p>	<p>Erection of noise barrier along the central reserve will cause significant safety concern and has not been recommended to be provided.</p> <p>Effectiveness of noise barriers of other heights (e.g. 6m) has been tested.</p> <p>Noted.</p> <p>Constraints such as fire fighting aspect and sighting problem at run-ins have been taken into account when developing the mitigation measures.</p> <p>More detailed cost comparison of various mitigation options including indirect technical remedy package has been provided.</p> <p>Noted and has been checked and revised.</p>



Item No	Dept. letter ref.	Comment	Response
22	EPD Annex (1) to EP2/N6/23 19 April 1996 (Sheet 5 of 5)	<p>(n) Table 3.6.5 - the 2011 noise levels from other roads at KPT-6 &amp; KPT-10 are 2 dB above the noise levels from Route 3 (re. Route 3 CPS Northern Section EIA Report). Please explain and clarify the difference. Are there other roads contributing to the noise levels.</p> <p>(o) Section 3.6.2 - The Consultant is required to identify ALL the NSRs affected by the potential traffic noise impact. The following information should be provided in the report:</p> <ul style="list-style-type: none"> <li>i. No. of dwellings, schools and other NSRs exceeding the HKPSG criteria upon operation of the improved Kam Tin Road without noise mitigation measures.</li> <li>ii. No. of dwellings, schools and other NSRs exceeding the HKPSG criteria upon operation of the improved Kam Tin Road with the recommended noise mitigation measures.</li> <li>iii. No. of dwellings eligible for consideration for indirect technical remedies even with the recommended noise mitigation measures in place.</li> </ul> <p>(p) Section 3.8 - For planned developments or committed landuses which would still be affected even with the recommended direct technical remedies in place, the consultants should make recommendations in how these developments should be designed for information of the relevant parties.</p>	<p>Noted and has been checked and revised.</p> <p>Noted and a summary has been provided.</p> <p>Noted and text has been added.</p>

Item No	Dept. letter ref.	Comment	Response
23	CED f(35) in GCP 1/10/407 XI 22 April 1996	No comments	

Item No	Dept. letter ref.	Comment	Response
24	TDD ( ) in NTN RU 2/10/6 25 April 1996 (Sheet 1 of 2)	<p>1) Section 2.5 and 5.5  Programme for 22CD is from early 98 (start) to late 00 (complete).</p> <p>2) Section 4.2, 1st para, 3rd line - define what is meant by "higher plants".  Section 4.2, 3rd para, 2nd line - "weedy" should read "weed" species.</p> <p>3) Section 4.7.1 pp.46, 4th paragraph, last line - delete "in" before "concerned".</p> <p>4) Section 4.7.2, 2nd line - "housing keeping" should read house-keeping.</p> <p>5) Section 4.7.3 3rd para. Will the areas (wet land) A, B and C be affected by the captioned project "Improvement to Kam Tin Road, Stage 1". If yes, suggest to add "this project and" before "other projects".</p> <p>6) Section 4.9 pp.48, 1st paragraph, last line - please define "rarer" in this context, as at the beginning of sentences states that there are no rare species.</p>	<p>Noted and text has been amended with reference to DSD DP's comment.</p> <p>Noted and text has been amended.</p> <p>Noted and has been corrected.</p> <p>Noted and has been corrected.</p> <p>Noted and has been corrected.</p> <p>As advised by AFD, the three ecologically important areas fall outside the scope of this study and the relevant text has been deleted.</p> <p>See response to comment 5) above. The last sentence of the first para. of Section 4.9 has been amended accordingly.</p>

Item No	Dept. letter ref.	Comment	Response
24	TDD ( ) in NTN RU 2/10/6 25 April 1996 (Sheet 2 of 2)	7) Section 5, item 5.10 1st paragraph, last line - It is doubtful "that the route would have no impact" as stated. Minimal impact would be more realistic.  8) Section 6.3.1.1, Ecology. How about the possible impacts to the area (wetland) A, B and C which are of significant ecological value as identified in the Report.	Noted and text has been amended.  See response to comment 5) above. Ecological impacts on the wetland areas (A, B and C) have not been assessed in this EIA study.

Item No	Dept. letter ref.	Comment	Response
25	RSD (36) in RSD 1/HQ 752/94(9) 26 April 1996	<ol style="list-style-type: none"> <li>1) It is noted that planting would not be proposed in the central reserve for maintenance reasons and the poor growing environment. (Page 59 of draft EIA report). I am also aware of planting, but I am of the opinion that adequate water points at appropriate locations scattering over the planting areas with shrubs and ground covers are one of our prerequisite conditions if we are to consider taking over the subsequent horticultural maintenance thereof.</li> <li>2) Other general conditions for taking over horticultural maintenance include accessibility to site and manoeuvrability on site. To be specific, the amenity/planting areas should be accessible by vehicles, not steeper than 30° in gradient and wider than 1m in width.</li> <li>3) Please let us have the detailed landscape design for comment in due course.</li> </ol>	<p>Noted and text amended to include mention of water point provision.</p> <p>Noted and text amended to include maintenance accessibility requirements.</p> <p>Noted, full landscape proposals will be provided at the detailed design stage.</p>

Item No	Dept. letter ref.	Comment	Response
26	KCRC WRMS-000091 1 May 1996	We have no major comment on the EIA Report except a suggestion that the Ko Po Tsuen egretty mentioned on page 71 and 72 be specified on figures, such as figures 4.1 and/or 4.2.	Noted and location of Ko Po Tsuen egretty has been indicated in Figure 4.1.

Item No	Dept. letter ref.	Comment	Response
27	HyD MWPMO HyD MWPMO 246 TH/INT 3 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
28	TDD ( ) in NTN RU 2/10/6 III 4 July 1996	<p>Main Report</p> <p>1) Section 4.7.3, 5th line - delete "In view of ..... Deep Bay Buffer Zones." (As you have not quantified the impacts in your report, it remains uncertain as regards the significance of the impacts due to the other projects)</p> <p>2) Section 4.8, 1st para, 6th line - delete " and the ecological..... well covered in the Main Drainage Channel Projects."  (In fact, the EIA study previously completed for Main Drainage Channel Projects has made no assessment regarding the impacts due to your project "Improvement to Kam Tin Road, Stage I")</p> <p>Environmental Monitoring and Audit Manual</p> <p>3) Section 3.1.2.2, 1st line - delete "when compared with that..... in the area"  (By making the comparison between your project and other development projects, your report strongly implied that other projects have caused serious adverse effects in the study area with regard to the loss of wetlands. However, such implication is unfair to other projects since you have provided no substantial evidence.)</p>	<p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p>



Item No	Dept. letter ref.	Comment	Response
29	DLO YL (11) in L/M(5) to DLOYL 217/YRN/60A 4 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
30	DLM/YL/RSD (76) in S/F(1) in RSD 3/YL 752/88 9 July 1996	<p>1) The 2), 3) and 4) appeared in the 'Comment' column should be 1), 2) and 3) respectively.</p> <p>2) Some words are found omitted in the first paragraph of the 'Comment' column. The whole paragraph should read as follows :</p> <p>“It is noted that planting would not be proposed in the central reserve for maintenance reasons and the poor growing environment. (Page 59 of draft EIA report). I am also aware of low maintenance mitigation proposals to be adopted on landscape planting, but I am of the opinion that adequate water points at appropriate locations scattering over the planting areas with shrubs and ground covers are one of our prerequisite conditions if we are to consider taking over the subsequent horticultural maintenance thereof.”</p>	<p>Noted and amended.</p> <p>Noted.</p>

Item No	Dept. letter ref.	Comment	Response
31	AFD (80) in AF DVL 14/44 10 July 1996	Main Report No comment.  EM&A Manual Regarding the EM&A Manual it appears that Section 3.1.2.2 is not consistent with the findings of the EIA study and the recommendation has not been discussed in the EIA Report. This paragraph should be suitably amended to be in line with Section 4.7.3 of the EIA Final Report.	Noted and amended.

Item No	Dept. letter ref.	Comment	Response
32	DPO TM&YL PDYL 2/8/26 13 July 1996	<p>Point 4.7.1 para. 2</p> <p>The affected fish pond as shown in Figure 4.1 falls within "Open Space" zone on the draft Kam Tin South Outline Zoning Plan No. S/YL-KTS/1 and the use of it as a refuse collection point (RCP) will require planning permission from the Town Planning Board. However, our record reveals that no planning permission have been granted to the aforementioned site for the use of RCP.</p>	<p>The RCP will be relocated to other part of the project area and HyD will further liase with DPO TM&amp;YL.</p>

Item No	Dept. letter ref.	Comment	Response
33	DLO YL (14) in L/M(5) to DLOYL 217 /YRN/60 (A) 13 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
34	HyD/RD (2) in RD 7/1/13 Pt 2 15 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
35	HyD/NT ( ) in HNT 54/42 A V 15 July 1996 (sheet 1 of 3)	<p>i) Section 5.8.2 2nd and 3rd lines of the 7th bullet point: "Figures 5.3 and 6.4" should read "Figures 5.4 and 5.5"</p> <p>ii) Section 3.2.2 Please revise the construction period to 30 months to match with the construction programme mentioned in section 2.2.2. Figure 3.2 should also be revised accordingly.</p> <p>It appears that an activity for drainage and utilities should also be required in the second half of the programme.</p> <p>iii) Section 3.6.2.3 &amp; 7.1 Please note that Kam Tin Dragon Kindergarten has been air-conditioned (para. 5.114 of Kam Tin Bypass EIA report refers) while Kam Tin Mung Yeung Public School has been provided with air conditioners under NAMISP, a programme to provide noise abatement measures to schools affected by excessive noise. (para. 5.109 of Kam Tin Bypass EIA report refers).</p> <p>iv) Section 4.7.1 HyD would relocate the concerned RCP elsewhere and avoid encroaching into the fish pond as far as possible during the detailed design stage. Therefore, it seems that the area of the fish pond loss could be reduced to minimal.</p>	<p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p>

Item No	Dept. letter ref.	Comment	Response
35	HyD/NT ( ) in HNT 54/42 A V 15 July 1996 (sheet 2 of 3)	<p>(v) EM&amp;A Manual</p> <p>(a) Section 1.2.2.2 Please refer to comment (ii) above.</p> <p>(b) Section 3.1 Please enclose a drawing showing the locations of NSRs.</p> <p>(c) Section 4.2 The recommendation requiring the Client Department, HyD, to employ an Independent Environmental Auditor would virtually require HyD to engage into a consultancy agreement with an environmental consultant. This would have severe resources (staff, cost and time) implications to HyD in the selection and administration of the consultancy. As such I suggest that the Independent Environmental Auditor be employed by the Contractor to reduce administration efforts input by HyD. To effect this amendment, please delete the 2nd bullet point in section 4.2.1, add the same to section 4.2.5 and delete the last para. in section 4.2.4.</p> <p>Please state the required qualifications of the Independent Environmental Auditor and the Environmental Sub-contractor.</p>	<p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p> <p>Noted and amended.</p>



Item No.	Dept. letter ref.	Comment	Response
35	HyD/NT ( ) in HNT 54/42 A V 15 July 1996 (sheet 3 of 3)	(d) Section 6.3 & 6.4 It is preferable that the period of post-project/operation monitoring and audit be shortened to 1 year to match with the maintenance period of the roadworks. If there is a genuine need for 2-year post-project/operation monitoring and audit, it seems that this responsibility should be taken up by the maintenance parties after the expiry of maintenance period.	Noted and amended.

Item No	Dept. letter ref.	Comment	Response
36	CED GCP 1/10/407 XII 16 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
37	KCRC WRGV-000391 17 July 1996	The location of the Ko Po Tsuen egretty has not been added to Fig 4.1 as stated in the response to comment.	Figure amended.

Item No	Dept. letter ref.	Comment	Response
38	RSD (18) in RSD 1/HQ 752/94(9)III 26 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
39	DP DSD ( ) in DP/12/YL/4 30 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
40	CPS(R3) HyD ( ) in CPS/HNT/104 30 July 1996	No comment	

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 1 of 9)	<p>(I) Response to comments</p> <p>(1) Item 22, EPD's numbering Appendix A (b) Section 3.3.3 and Table 3.3.3 - please see below comments (II)(1)</p> <p>(2) Item 22 EPD's numbering Appendix A (d), S.3.6.2.1 - please see below comments (II)(4)</p> <p>(3) Item 22 EPD's numbering Appendix A (i) - the effectiveness and constraints of noise barriers other than 3m and 5m height are still not mentioned in the revising report.</p> <p>(4) Item 22 EPD's numbering Appendix A (j) - please indicate clearly whether the correction factor of multiple barriers reflection is included in the noise model.</p> <p>(5) Item 22 EPD's numbering Appendix A (l) - please see below comments (II)(5)</p> <p>(6) Item 22 EPD's numbering Appendix A (p), Section 3.8 - please see below comment (II)(11)</p>	<p>See responses to comment (II)(1) below</p> <p>See responses to comment (II)(4) below</p> <p>Barriers below 3m high are not effective in identified NSRs. Barriers above 5m high are effective but are increasingly expensive because of structural strengthening to withstand high wind loads in Hong Kong. Furthermore, they are generally visually intrusive. As an alternative, we have examined the effectiveness of a 5.7m high inverted-L barrier, in lieu of 6m high plain barrier.</p> <p>Noted and text will be added to clarify.</p> <p>See response to comment (II)(5) below.</p> <p>See response to comment (II)(11) below.</p>

Item No.	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 2 of 9)	<p>(II) Revised EIA Report</p> <p>(1) Section 3.3.2 Existing Noise Sensitive Receivers :</p> <p>(a) Page 15, last bullet point - You are reminded that the ruined/removed structures should not be neglected in the assessment. They should be included in the assessment if they will be developed into noise sensitive uses in the future. Therefore, please review and confirm the future uses of these structures in respect of the Outline Zoning Plan or other relevant information (i.e. from DPO/TM&amp;YL, or DLO/YL, etc.).</p> <p>(b) Page 16, 1st and 2nd bullet point - Section views should be provided to illustrate the NSRs which are protected by topographic features for our reference.</p> <p>(c) Page 16, 2nd bullet point - Words such as “likely” should be avoided in describing the findings of the study.</p> <p>(d) Page 16, 3rd bullet point - Regarding the NSRs which are within the site limits of Route 3 and WCR, please state whether the NSRs will be removed before the operation of this road project.</p>	<p>No sensitive use is planned for the land presently occupied by these ruined/removed structures as they fall within the zone of Agriculture, Conservation Area and Undetermined according to Outline Zoning Plan. The report will be amended to reflect this.</p> <p>Based on the survey map and subsequent verification during site visit, the village house to the immediate south of Au Tau Roundabout, and the church and school located at western end of the Study Area are substantially screened from the project by topographical features. We consider that section views are not necessary to be presented in the Report.</p> <p>Noted and the word “likely” has been deleted.</p> <p>These NSRs will be cleared for the construction of Route 3 and WCR before the operation of this project. The text has been amended</p>



Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 3 of 9)	<p>(2) S.3.6.2.1 (a) Control at Source, Page 28 last paragraph, 2nd sentence : It should be noted that the stated restriction only limits to the present available mixed pervious macadam paving material in Hong Kong. EPD and HyD are still studying a kind of paving material to suit the low speed road. Therefore, the comments in this section are premature and should be revised.</p> <p>(3) S.3.6.2.1(b) Control along Noise Path (a) Page 29 last paragraph - Apart from only applying earth bunds on flat ground, please also consider the combination of earth bunds and barrier walls which will reduce the area of land intake.</p> <p>(b) Page 30 1st para. last sentence and 2nd para. last sentence - Noise enclosures (both partial and full), depending on the design, will not necessarily be visually intrusive. Thus, we do not agree that this project should avoid the use of both full and partial enclosures. It should be noted that direct mitigation measures including noise enclosures should be applied whenever practicable to alleviate the noise impacts. These sentences should be revised as appropriate.</p>	<p>Noted and text amended.</p> <p>The text has been amended to take effect that earth bunds or combinations of earth bund with short plain barriers on top are considered, subject to detailed design at the Design Stage of the Project.</p> <p>The last sentence of the first paragraph was deleted. In fact, the effectiveness of the partial enclosure has been examined and found unsatisfactory in the Report. Besides, the improved Kam Tin Road will have a number of road junctions, loading and unloading bays, etc., full enclosures will not be effective or practical.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 4 of 9)	<p>(4) S.3.6.2.2 (a) Mitigation Options, Page 31, 2nd para : Please note Potential that window insulation is not confined to "double glazing". Please revise the wording as necessary.</p> <p>(5) Pages 31 to 33 S.3.6.2.2 (b) and (c) Costs of noise Sensitive Structures We have reservation on the evaluation of direct mitigation measures to be based on the cost comparison. It should be noted that the present policy is to implement direct mitigation measures whenever practicable. However, we have no objection to qualitative comments on the cost of various types of direct mitigation measures for reference. Please consider deleting section 3.6.2.2 (b), section 3.6.2.2 (c), Table 3.6.2 and Table 3.6.3.</p> <p>(6) Page 34 para. 1 section 3.6.2.2 (d) Noise Mitigation Proposals (a) Typo error : The 4th sentence should be amended as "..... at Ko Po San Tsuen and NSR AT-1 at Au Tau respectively.</p>	<p>Noted and "acoustical insulation" was used instead of "double glazing"</p> <p>As per EPD's letter Annex (1) to EP/2/N6/23 dated 19 April 96, the cost effectiveness of the mitigation schemes and indirect technical remedies package would need to be assessed and shown in the report. Furthermore, cost comparison has been presented for reference purpose, but not as the major reason to substantiate the practicability and effectiveness of mitigation options. As such, Section 3.6.2.2 (b), Section 3.6.2.2 (c), Table 3.6.2 and Table 3.6.3 could be retained.</p> <p>Noted and amended.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 5 of 9)	<p>(b) In order to avoid confusion, I suggest the consultants presenting the noise mitigation schemes in two separate sections for Ko Po Tsuen and Ha Ko Po Tsuen. The study should identify all practicable and effective mitigation measures for individual section under the constraints of the local context. Specific reasons for not adopting any mitigation measures should also be given.</p> <p>(c) As per the above comment (II)(5), the cost comparison should be deleted.</p> <p>(7) Page 34 para 3.4 figure 3.10 Noise Mitigation Proposals Please seek agreement in-principle from ACABAS (and/or SLA/HyD) on the proposed barrier design.</p> <p>(8) Page 34 para. 5 section 3.6.2.2 (d) Noise Mitigation Proposals (a) Please review the noise mitigation measures recommended from EIA study of Route 3 as well as Kam Tin Bypass. The details of recommended mitigation measures in previous EIA studies should be presented together with the mitigation measures of this project in the form of tables and drawings for easy reference. Please also confirm whether all mitigation measures recommended in Route 3 are incorporated in the noise model of this study.</p>	<p>The text, in our view, is clear enough and therefore we see no need for separate sections for Ko Po Tsuen and Ha Ko Po Tsuen. The effectiveness of the proposed mitigation measures should not be viewed in isolation, as the two groups of NSRs are within 300m of each other. Besides, the constraints of the local context have been taken into considerations in the identification of practicable and effective mitigation measures.</p> <p>As per our response to comment (II)(5) above, the cost comparison could be retained.</p> <p>Noted and agreement from ACABAS will be sought.</p> <p>The details of the recommended mitigation measures in EIA studies of Route 3 and Kam Tin Bypass are illustrated in figures 3.7 to 3.9. The revised report has stated that noise reductions offered by the barriers and embankments at Route 3 has been taken into account in the noise modelling.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 6 of 9)	<p>(b) Furthermore, EIA of Route 3 recommended 1m barriers on Kam Tin Road to be considered in this project. Therefore, the 1m noise barriers should be reviewed in this NIA study.</p> <p>(9) Page 36 of table 3.6.4 Noise Mitigation Scheme As per the above comment (II)(5), the cost comparison in the table may not be appropriate.</p> <p>(10) Page 37 Table 3.6.5 2011 Traffic Noise Levels (Mitigated) The traffic noise levels of the planned NSRs P2 should be incorporated in this table. It should be noted that the proposed direct mitigation measures should also take into account the planned NSRs since noise mitigation at source will be the most effective approach.</p>	<p>With reference to the Report, the noise abatement effect is not satisfactory with the provision of 3m or even 5m barriers. In the light of high traffic flows, the effectiveness of the 1m barriers on Kam Tin Road is dubious.</p> <p>As per our response to comment (II)(5) above, the cost comparison could be retained.</p> <p>As stated in the last paragraph of Section 3.6.2.2 (d), the 2011 noise environment for those NSR P2 will be mainly dominated by traffic noise from other nearby roads other than the improved Kam Tin Road. It has been concluded that no mitigation scheme is deemed appropriate in terms of acoustic performance. As such, the noise level of planned NSR P2 has not been incorporated in this table.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 7 of 9)	<p>(11) Page 38 section 3.6.2.3 Residual Impacts and Indirect Mitigation</p> <p>(a) It is noteworthy that turning the facade 90° would not ensure the angle of view from a 1m facade to be 90°. Furthermore, only recommending the angle of view for the planned noise receivers are not sufficient for the development guidelines. Mitigation measures such as set back distance should also be considered as well . The proposed development restriction should be agreed with DPO/TM&amp;YL, DLO/YL and relevant departments. In order to avoid confusion, the discussion of the direct mitigation measures on the planned NSRs (i.e. the development guidelines) should be moved to section 3.6.2.2.</p> <p>(b) The consultants should review the recommended indirect mitigation measures from other projects such as Route 3. In case the indirect mitigation measures are provided by other projects, the NSRs may not be eligible for noise insulation ex-gratia in this project.</p> <p>(15) Page 39 Table 3.6.6 Eligibility Assessment for indirect Technical Remedies Typo error : "&gt;" for criteria 2 and 3 should be "&gt;=".</p>	<p>Mitigation measure such as setback distance added. Besides, the discussion of the direct mitigation measures on the planned NSRs are moved to Section 3.6.2.2 (d).</p> <p>Noted.</p> <p>Noted and corrected.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 8 of 9)	<p>(16) Page 40 Table 3.6.7</p> <p>(a) Please confirm whether the estimated number of dwellings cover all NSRs. It is noteworthy that classification of a dwelling should be in line with its ownership. In case a three-storey building includes three different owners, the number of dwellings should be 3 instead of 1. In addition to existing dwellings in the village zone, please also estimate the total dwellings when are to be accommodated in the future. Regarding the planned area, please further define the estimated dwellings in the area.</p> <p>(b) Maintenance cost and operating cost may not be appropriate to be incorporated in the report. Furthermore, a new section should be incorporated to present the costs of recommended direct and indirect mitigation measures.</p> <p>(17) Page 42 section 3.8 conclusions and recommendations</p> <p>(a) In view of the above comments, the Conclusion and Recommendation should be revised in according to the above comments.</p> <p>(b) Furthermore, the recommended direct and indirect mitigation measures should be presented in the form of Table in this section for easy reference.</p>	<p>As no information is available on the ownership of each dwelling, one dwelling per building has been assumed. Besides, it is quite impossible to estimate the number of dwellings in the future without any information on future development.</p> <p>Maintenance cost and operating cost are deleted. Besides, a summary showing the costs of recommended direct and indirect mitigation measures are added.</p> <p>Noted.</p> <p>Noted and a table added.</p>

Item No	Dept. letter ref.	Comment	Response
41	EPD Annex (1) to EP 2/N6/23 Pt. II 13 August 1996 (sheet 9 of 9)	<p>(18) Figure 3.8- Noise Mitigation Measures ( Mitigation Scheme 1b) The NSR south of Kam Tin Shi should read "P2" instead of "P1".</p> <p>(19) Page 40, S3.6.2.3 and Page 84, S.7.1 For NSRs KTS-2 and 3 (Kam Tin Mung Yeung Public School and Kam Tin Dragon Kindergarten), please refer to Kam Tin Bypass EIA (S.5.109 and S.5.114) for updated information.</p> <p>(20) Page 53, S.4.7.1 Further to para (iv) of HyD's letter dated 15.7.96, please clarify the area of fish pond loss due to this project on the understanding that the RCP will be relocated elsewhere.</p>	<p>Noted and corrected.</p> <p>Noted.</p> <p>As advised by Highways Department, the loss of wetland area will be minimised as far as possible. The area of fish pond loss will be available in the Design Stage of the Project.</p>

Item No	Dept. letter ref.	Comment	Response
42	EPD Ann(1) EP2/N6/23 14 October 1996 (sheet 1 of 2)	<p>(1) (I)(3) - The direct noise mitigation measures should be optimised. Please also demonstrate the optimisation process and provide justifications in the report. While the cost factor cannot be ruled out completely from optimization process, the justifications for adopting or not adopting a particular type direct measures should base on engineering/acoustic reasons. Furthermore, it is crucial that practicality of any recommended direct measures must be agreed with Highways Department.</p> <p>(2) (II)(1)(b) - The section views are necessary to illustrate how the noise sensitive receivers are screened from the proposed road.</p> <p>(3) (II)(5) - Please delete the quantitative cost analysis and comparison of the different noise mitigation schemes from the report. However, it may describe qualitatively the cost considerations undertaken in determining the final mitigation scheme.</p> <p>(4) (II)(6)(b) - We do not agree with your response on this point. Please reconsider our previous comment.</p> <p>(5) (II)(6)(c) - Please refer to our comments in (3) above.</p>	<p>The text has been revised to justify the optimum height of the recommended noise barriers.</p> <p>Instead of a section plan to illustrate the topographical screening effects, a school and a church near Au Tau roundabout have been included in the noise calculation.</p> <p>Noted. The quantitative cost analysis and comparison of the different noise mitigation schemes have been deleted from the report.</p> <p>Noted and text has been presented in separate sections.</p> <p>See our response to comment (3) above.</p>



Item No	Dept. letter ref.	Comment	Response
42	EPD Ann(1) EP2/N6/23 14 October 1996 (sheet 2 of 2)	<p>(6) (II)(7) - In principal approval from ACABAS on the recommended mitigation scheme must be sought as soon as practicable, preferably before the endorsement of the EIA Final Report. I understand that Highways/N.T. Region will follow-up this point as necessary.</p> <p>(7) (II)(9) - Please refer to our comments in (3) above.</p> <p>(8) (II)(10) - The argument as stated in your response should be supported by noise predictions. It is therefore essential that the noise levels for P2 are shown on Table 3.6.5.</p> <p>(9) (II)(16)(a) - The assumption of one dwelling per building is probably not valid for most buildings taller than 1 storey. Please consider surveying the existing NSRs within the study area so as to come up with a more accurate estimate of the number of dwellings affected. For planned noise sensitive landuse zoning, please check with Planning Department on the planned population/no. of dwelling for each zone.</p> <p>(10) Furthermore, for NSRs located in Kam Tin Shi (i.e.KTS-1,2 and 3), please refer to the EIA for Kam Tin Bypass and check whether the predictions are consistent. Please also take into account the mitigation measures recommended in the Kam Tin Bypass project.</p>	<p>Noted and approval from ACABAS on the recommended noise mitigation scheme will be sought before the endorsement of the EIA Final Report.</p> <p>See our response to comment (3) above.</p> <p>Noted and the noise level for P2 has been included.</p> <p>Noted. Three dwellings per building (3-storey) have been assumed in estimating the number of dwellings affected and eligible for indirect technical remedies.</p> <p>Taking into account mitigation measures recommended in the Kam Tin Bypass project, the noise predictions for KTS-1 have been reviewed and revised accordingly.</p>

Item No	Dept. letter ref.	Comment	Response
43	EPD Annex (1) to EP2/N6/23 Pt. III 17 October 1996	2nd para of S.4.7.1 (i) "81 CD project" at line 3 should read "81CD (formerly known as 22 CD) project".  (ii) "no permanent loss of fish pond area" at the second last line should read "no permanent loss of fish pond arising from this project".	Noted and Amended.  Noted and Amended.

Item No	Dept. letter ref.	Comment	Response
44	EPD Annex (1) to EP2/N6/23 Pt. III 18 October 1996	<p data-bbox="551 300 1330 488">HyD has recently confirmed that Kam Tin Road Stage I is classified as Rural Type (A) which is equivalent to Primary Distributor used in Urban Road Type. Please refer to HyD's memo dated 14.10.96 which was addressed to us and copied to you for information.</p> <p data-bbox="551 533 1330 644">However, it is noted that the draft EIA report has referred the above road as "Local Distributor" (e.g. 3rd para of S.1.1, 1st para of S.2.2.1 and 2nd para of S.3.1.1).</p>	<p data-bbox="1370 300 1644 331">Noted and Amended.</p> <p data-bbox="1370 533 1644 564">Noted and Amended.</p>

Item No	Dept. letter ref.	Comment	Response
45	EPD Annex (1) to EP2/N6/23 Pt. III 22 October 1996	As HyD has confirmed that there will be no permanent fish pond loss arising from the project (please see HyD letter dated 17.10.96 regarding the amendment to the 2nd para of S.4.7.1), S.4.7.3 (Cumulative Impacts and Mitigation) regarding wetland loss should be amended accordingly.	Noted and Amended.

Item No	Dept. letter ref.	Comment	Response
46	AFD (19) in AF DVL 14/44 II 31 October 1996	<p>It has been reported recently that the Ko Po Tsuen Egrettry has been abandoned during the breeding season this year. As such, I suggest to amend the proposed monitoring programme for Ko Po Tsuen Egrettry as stated in the first bullet points in Section 5.3.2 and 6.3 of the EM&amp;A Manual as follow :</p> <p><u>“ Monitoring and auditing the use of Ko Po Tsuen Egrettry and/or other active egrettries adjacent to the works areas along the road corridor by egrets and herons monthly during the nesting season, in view of its proximity to the works site.”</u></p>	Noted and Amended.

