

**THE GOVERNMENT OF
THE HONG KONG SPECIAL ADMINISTRATIVE REGION
HIGHWAYS DEPARTMENT
MAJOR WORKS PROJECT MANAGEMENT OFFICE**

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

FINAL EM&A MANUAL

March 2000



in association with

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

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Issue and Revision Record

Rev	Date	Originator	Checked By	Approved By	Description
A	July 99	A Watker-Zeris	H T Cheng	K W Lee	Draft
B	Jan 00	A Watker-Zeris	H T Cheng	K W Lee	Draft Final
C	Mar 00	MCL	H T Cheng	K W Lee	Final

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1. INTRODUCTION

1.1 Purpose of the Manual

The purpose of this Environmental Monitoring and Audit (EM&A) Manual, hereafter referred to as the Manual, is to guide the setup of an EM&A programme to ensure compliance with the Environmental Impact Assessment (EIA) study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action. This Manual outlines the monitoring and audit programme to be undertaken for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling. It aims to provide systematic procedures for monitoring, auditing and minimising of the environmental impacts associated with Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling.

Hong Kong environmental regulations for air and water quality, noise and waste, the Hong Kong Planning Standards and Guidelines, and recommendations in the EIA Report on Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling have served as environmental standards and guidelines in the preparation of this Manual.

This Manual contains the following:

- a) responsibilities of the Contractor, the Engineer or Engineer's Representative (ER) Independent Checker (Environmental) and Environmental Team (ET) with respect to the environmental monitoring and audit requirements during the course of the project;
- b) information on project organisation and programming of construction activities for the project;
- c) the hypotheses of potential impacts, the basis for and description of the broad approach underlying the environmental monitoring and audit programme;
- d) requirements with respect to the construction schedule and the necessary environmental monitoring and audit programme to track the varying environmental impacts;
- e) the specific questions and testable hypotheses that the monitoring programme is designed to answer;
- f) details of the methodologies to be adopted, including all field, laboratory and analytical procedures, and details on quality assurance and quality control programme;
- g) the rationale on which the environmental monitoring data will be evaluated and interpreted and the details of the statistical procedures that will be used to interpret the data;
- h) definition of Action and Limit levels (AL Levels);
- i) establishment of Event and Action Plans;
- j) requirements for reviewing pollution sources and working procedures required in the event of non-compliance of the environmental criteria and complaints;
- k) requirements for presentation of environmental monitoring and audit data and appropriate reporting procedures; and

- l) requirements for review of EIA predictions and effectiveness of the environmental monitoring and audit programme.

For the purpose of this Manual, the "Engineer" shall refer to the Engineer as defined in the Contract and the Engineer's Representative (ER), in cases where the Engineer's powers have been delegated to the ER, in accordance with the Contract. The ET leader, who shall be responsible for and in charge of the ET, shall refer to the person delegated the role of executing the environmental monitoring and audit requirements.

1.2 Background

The Highways Department (Major Works Project Management Office) has commissioned Mott Connell Ltd in association with Enviros Hong Kong Ltd, MVA Hong Kong Ltd, ACL Asia Ltd and ERM Hong Kong Ltd to undertake the Investigation and Preliminary Design Assignment for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling under the Agreement No. CE 73/98. The scope of the Assignment includes an environmental impact assessment arising from the construction and operation of the road widening project.

The project site and boundary is shown in *Figure 1.1*.

The objectives of the EIA Study are as follows:

- i. to describe the Project and associated works together with the requirements and environmental benefits 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 and man-made environment and the associated environmental constraints;
- iii. to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- iv. to identify and quantify any potential losses or damage to flora, fauna and natural habitats;
- v. to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- vi. to propose the provision of infrastructure or mitigation measures to minimize pollution, environmental disturbance and nuisance during construction, operation of the project;
- vii. to identify existing landscape and visual quality in the study area for the purpose of evaluating the landscape and visual impact of the proposed Project;
- viii. to investigate the feasibility, effectiveness and implications of the proposed mitigation measures;
- ix. to identify, predict and evaluate residual (ie after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction and

operation phases of the Project in relation to the sensitive receivers and potential affected uses;

- x. 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 residual environmental impacts and cumulative effects and reduce them to acceptable levels;
- xi. 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; and
- xii. to identify any additional studies necessary to implement the mitigation measures or monitoring and proposals recommended in the EIA report.

1.3 Environmental Monitoring and Audit Requirements

In this Section, a summary of the EIA findings is presented, and the requirements and scope of the EM&A are discussed below. Details of the recommended mitigation measures as implementation schedule are described in *Annex A*.

Air Quality

The construction work will inevitably lead to dust emissions, mainly from blasting, concrete batching, excavation, truck haulage and material handling. It is predicted that the dust generated will exceed the hourly and daily criteria of $500 \mu\text{gm}^{-3}$ and $260 \mu\text{gm}^{-3}$ respectively at the some ASRs. Dust control measures were recommended to be incorporated in the Contract Specification of the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling to minimise dust nuisance arising from the works.

Noise

Monitoring is required to ensure compliance with the Environmental Impact Assessment Ordinance (EIAO) in providing feedback to the Contractors for the management of their operations. It was recommended that noise monitoring be carried out as part of the EM&A programme during the construction period of the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling.

Water Quality

It has been recommended that water quality monitoring be carried out to ensure protection of marine waters when construction works over water such as river training works and demolition and reconstruction of bridges are carried out.

Waste Management

It has been recommended that auditing of each waste stream shall be carried out periodically by the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling Contractor to determine if wastes are being managed in accordance with approved procedures and the site waste management plan. The audits shall look at all aspects of waste management including waste generation, storage, recycling, treatment, transport, and disposal. An appropriate audit programme would be to undertake a first audit at the commencement of the construction works, and then to audit quarterly thereafter.

Ecology

The mitigation measures shall be included into contract clauses for the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling. The implementation of the measures shall be checked as part of the environmental monitoring and audit procedures during the construction period.

Cultural Heritage

Clauses will need to be included in the contract document to specify that construction works in the proximity of Wu Yiu kiln and Yuen Chau Tsai is carried out as unobtrusively as possible to avoid any damage to and discourage visitors to the site.

Archaeological monitoring works will also be required during construction in areas defined by AMO and as shown in Figures 10.1 and 10.2 which are included in Annex B.

Sensitive Receivers

Representative air and noise sensitive receivers, as defined in the Technical Memorandum on Environmental Impact Assessment have been identified in the EIA Assessment Report using, inter alia, the information sources given in *Table 1.1* and are listed in *Tables 1.2-1.9*. Both the existing and planned receivers are included in the list. The locations of these sensitive receivers are shown in *Figure 1.2*.

Table 1.1 List of Outline Zoning Plans and Outline Development Plans Referenced

Outline Zoning Plan No.	Date
Kau Lung Hang – Outline Zoning Plan S/NE-KLH/1	24th June 1994
Draft Kau Lung Hang - Outline Zoning Plan S/NE-KLH/2	6th August 1999
Proposed Amendment on the Draft Kau Lung Hang – Outline Zoning Plan S/NE-KLH/1	12th September 1997
Fanling / Sheung Shui – Outline Zoning Plan S/FSS/7	27th February 1998
Fanling / Sheung Shui – Outline Zoning Plan S/FSS/8	2nd July 1999
Tai Po – Outline Zoning Plan S/TP/9	27th January 1998
Proposed Amendment on the Tai Po – Outline Zoning Plan S/TP/7	21st November 1997
Proposed Amendment on the Tai Po – Outline Zoning Plan S/TP/9	13th November 1998
Tai Po – Outline Zoning Plan S/TP/10	23 rd March 1999
Draft Tai Po – Outline Zoning Plan S/TP/11	20th August 1999
Outline Development Plan No.	Date
Tai Po New Town Outline Development Plan D/TP/A (Provisional)	20th March 1990
Fanling / Sheung Shui Outline Development Plan D/FSS/A (Provisional)	20th March 1990

The 42 representative ASRs selected for the traffic related air quality impact assessment modelling are detailed in *Tables 1.2 through 1.5* below.

Table 1.2 Selected Air Sensitive Receivers (ASRs) Between Pak Wo Road and Hong Lok Yuen Road

Selected SR#	Name	Land Use ^A
SR1	Avon Park	R
SR2	Fanling Government Secondary School	Ed
SR3	Dawning Views	R
SR4	Fanling Centre (1)	R
SR7	Southwest Tong Hang	R
SR9	Wo Hop Shek (2)	R
SR11	Kiu Tau	R
SR17B	Tai Hang (3)	R
SR20	Hong Lok Yuen 2	R
SR22	Wai Tau Tsuen 1	R
SR75	Wong Kong Shan	R
SR77	Yuen Leng 2	R

Notes:

^A : Residential uses (R); Educational uses (Ed)

Table 1.3 Selected Air Sensitive Receivers (ASRs) Between Hong Lok Yuen Road and Tai Po Tai Wo Road

Selected SR#	Name	Land Use ^B
SR23	Wai Tau Tsuen 2	R
SR25	Kau Liu Ha 2	R
SR28	Northwest Shek Kwu Lung	R
SR29	Parc Versailles	R

Notes:

^B : Residential uses (R)

Table 1.4 Selected Air Sensitive Receivers (ASRs) Between Tai Po Tai Wo Road and Tat Wan Road

Selected SR#	Name	Land Use ^C
SR31	Shek Kwu Lung 2	R
SR33	Shek Kwu Lung 4	R
SR34	Pun Chun Yuen	R
SR35	Buddhist Tai Kwong Middle School	Ed
SR36	Ma Wo 1	R
SR55	Dynasty View 1	R
SR56	Monastery at Ma Wo	T
SR78	Dynasty View 3	R

Notes:

^C : Residential uses (R); Educational uses (Ed); Temple/Place of Worship (T)

Table 1.5 Selected Air Sensitive Receivers (ASRs) Between Tat Wan Road and Island House Interchange

Selected SR#	Name	Land Use ^D
SR39	The Paragon	R
SR43	Wan Tau Tong Estate - Wan Lam House 2	R
SR45	HK Teacher's Association Secondary School	Ed
SR47	Wang Fuk Court – Wang Cheong Hse 1	R
SR54	Riverrain Bayside	R
SR57	King Nga Court – King Yuet House 1	R
SR61	Tak Nga Court 2	R
SR62	Ha Wun Yiu	R
SR64	Shan Tong New Village 1	R
SR66	P.L.K. Tin Ka Ping Primary School	Ed
SR68	Island House Park – Bicycle Track	Rec
SR69	Island House Park – Garden	Rec
SR70	Kwong Fuk Estate - Kwong Lai House	R
SR71	Tai Po Waterfront Park	Rec
SR72	Tai Po Waterfront Park	Rec
SR73	Island House Conservation Studies Centre	O
SR74	Yuen Chau Tsai - Tennis Court	Rec
SR100	KCRC Staff Quarter at Tai Po Kau	R

Notes:

^D : Residential uses (R); Educational uses (Ed); Recreational uses (Rec); Office (O)

Table 1.6 Selected Noise Sensitive Receivers (NSRs) Between Pak Wo Road and Hong Lok Yuen Road

Selected SR#	Name	Land Use ^A
SR1	Avon Park	R
SR2	Fanling Government Secondary School	Ed
SR3	Dawning Views	R
SR7	Southwest Tong Hang	R
SR8	Wo Hop Shek 1	R
SR9	Wo Hop Shek 2	R
SR10	Kau Lung Hang	R
SR11	Kiu Tau	R
SR86	Tong Hang	R
SR12	Nam Wa Po 1	R
SR84	Nam Wa Po 2	R
SR85	Nam Wa Po 3	R
SR13	West Tai Wo	R
SR14	Tai Wo 1	R
SR87	Tai Wo 2	R
SR17	Tai Hang 1	R
SR17A	Tai Hang 2	R
SR17B	Tai Hang 3	R
SR81	Tai Hang 4	R
SR82N	Tai Hang 5	R
SR19	Hong Lok Yuen 1	R
SR20	Hong Lok Yuen 2	R
SR21	Hong Lok Yuen 3	R
SR22	Wai Tau Tsuen 1	R
SR80	Wai Tau Tsuen 3	R
SR88	Wai Tau Tsuen 4	R
SR89	Wai Tau Tsuen 5	R
SR90	Wai Tau Tsuen 6	R

Selected SR#	Name	Land Use ^A
SR75	Wong Kong Shan	R
SR76	Yuen Leng 1	R
SR77	Yuen Leng 2	R
SR83	Yuen Leng 3	R
SR96#	Village Zone near Wai Tau Tsuen	R
SR97#	Village Zone at Tai Wo 1	R
SR98#	Village Zone at Tai Wo 2	R

Notes:

^A : Residential uses (R); Educational uses (Ed); Temple/Place of Worship (T)

* : NSRs during construction phase only. (Will be demolished during the operational phase)

: Planned NSR

Table 1.7 Selected Noise Sensitive Receivers (NSRs) Between Hong Lok Yuen Road and Tai Po Tai Wo Road

Selected SR#	Name	Land Use ^B
SR23	Wai Tau Tsuen 2	R
SR24	Kau Liu Ha 1	R
SR25	Kau Liu Ha 2	R
SR26	Tai Po Garden	R
SR27	Mui Shu Hang	R
SR28	Northwest Shek Kwu Lung	R
SR29	Parc Versailles	R

Notes:

^B : Residential uses (R)

Table 1.8 Selected Noise Sensitive Receivers (NSRs) Between Tai Po Tai Wo Road and Tat Wan Road

Selected SR#	Name	Land Use ^C
SR30A	Shek Kwu Lung 1	R
SR30B	Shek Kwu Lung	R
SR30C	Shek Kwu Lung	R
SR31	Shek Kwu Lung 2	R
SR33	Shek Kwu Lung 4	R
SR34	Pun Chun Yuen	R
SR35	Buddhist Tai Kwong Middle School	Ed
SR36	Ma Wo 1	R
SR38	Dynasty View 2	R
SR55	Dynasty View 1	R
SR56	Monastery at Ma Wo	T
SR78	Dynasty View 3	R
SR91#	New Residential (B) Zone near To Yuen Tung 1	R
SR92#	New Residential (B) Zone near To Yuen Tung 2	R
SR95B#	Tai Po Normal School Memorial School	Ed

Notes:

^C : Residential uses (R); Educational uses (Ed); Temple/Place of Worship (T)

: Planned SR

Table 1.9 Selected Noise Sensitive Receivers (NSRs) Between Tat Wan Road and Island House Interchange

Selected SR#	Name	Land Use ^D
SR39	The Paragon	R
SR40	Grand Palisades	R
SR41	Wong Shiu Chi Middle School	Ed
SR42	Wan Tau Tong Estate - Wan Lam House 1	R
SR43	Wan Tau Tong Estate - Wan Lam House 2	R
SR44	Wan Tau Tong Estate - Wan Loi House	R
SR45	HK Teacher's Association Secondary School	Ed
SR46	Uptown Plaza	R
SR47	Wang Fuk Court – Wang Cheong House 1	R
SR48	Wang Fuk Court – Wang Cheong House 2	R
SR49	Wang Fuk Court – Wang Cheong House 3	R
SR50	Wang Fuk Court – Wang Tat House	R
SR51	Wang Fuk Court – Wang Shing House	R
SR52	Ha Wong Yi Au 1	R
SR53	Ha Wong Yi Au 2	R
SR54	Riverrain Bayside	R
SR57	King Nga Court – King Yuet House 1	R
SR58	King Nga Court – King Yuet House 2	R
SR59N	King Nga Court – King Yan House	R
SR60	Tak Nga Court 1	R
SR61	Tak Nga Court 2	R
SR62	Ha Wun Yiu	R
SR63	Lai Chi Shan	R
SR64	Shan Tong New Village 1	R
SR65	Shan Tong New Village 2	R
SR66	P.L.K. Tin Ka Ping Primary School	Ed
SR67	Redland Garden	R
SR70	Kwong Fuk Estate - Kwong Lai House	R
SR73	Island House Conservation Studies Centre	O
SR79	Care Village	R
SR93	S.K.H. Mok Sau Tsang Secondary School	Ed
SR94	Choi Hin to Primary School	Ed
SR99#	Ha Wong Yi Au 3	R
SR100	KCRC Staff Quarter at Tai Po Kau	R

Notes:

^D : Residential uses (R); Educational uses (Ed); Recreational uses (Rec); Office (O)

: Planned SR

For the purpose of this EM&A, only the existing receivers are considered as sensitive receivers.

Water Quality Sensitive Receivers

Water quality sensitive receivers have been identified as stream courses in the Ma Wat River, Tai Po River and Lam Tsuen River catchments, Wo Hop Shek tributary and Tolo Harbour.

1.4 Project Organisation

The project organisation and lines of communication with respect to environmental protection works is shown in *Figure 1.3*.

The Environmental Team (ET) shall not be in any way an associated body of the Contractor. The ET leader shall have relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Engineer's Representative (ER) and the Environmental Protection Department (EPD).

Appropriate staff shall be included in the ET, under the supervision of the ET Leader, to fulfil the EM&A duties of the ET Leader specified in this manual. Basically, the duties comprise the following:

- a) To monitor the various environmental parameters as required in EIA study final report;
- b) To investigate and audit the Contractors' equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise;
- c) To audit and prepare audit reports on the environmental monitoring data and the site environmental conditions; and
- d) To report on the environmental monitoring and audit results to the Contractor, the ER, and the EPD or its delegate.

Appropriate resources shall also be allocated under the Contractor and the ER to fulfil their duties specified in this manual.

The Independent Checker (Environmental), IC(E), shall be an independent person or company with a minimum of 7 years EIA experience and proven track record in EM&A similar to the scope proposed in this Manual.

1.5 Construction Programme

A preliminary project programme is shown in *Figure 1.4*

Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling will be constructed in two packages, and the construction works are expected between 2002 and 2005.

The major construction activities for the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling are excavation, demolition and reconstruction of bridges, erection of noise barriers road widening and paving/finishing.

It is expected that construction works will generally be carried out 12 hours a day (07:00 - 19:00 hrs).

Table 1.10 presents the cut and fill balance for the materials generated from the construction of the Project.

Table 1.10 Cut and Fill Balance for Construction

Activity	Material Type	Likely time of arising	Estimated total volumes generated
<i>Construction Phase</i>			
Ground preparatory works	Site clearance	Jun 02 – Jul 02 ^{Sections i, ii, iii} Feb 03 – May 03 ^{Section iv}	Coverage 12.64 Ha
	Demolition materials	May 03 – Oct 03 ^{Section i} Nov 03 – May 04 ^{Section iv} Aug 04 - Mar 05 ^{Section I} Oct 04 – Feb 05 ^{Section iii} Oct 04 – Mar 05 ^{Section iv} Apr 05 – Mar 05 ^{Section ii}	4000m ³
Earthworks	Excavated materials	Feb 02 - Apr 03 ^{Section i} Nov 02 – Dec 03 ^{Section ii} Oct 02 – Jun 03 ^{Section iii} Feb 03 – Jan 05 ^{Section iv} May 03 – Dec 03 ^{Section iv}	24,500m ³
General works	Construction waste	Throughout construction period	5,000m ³
	Chemical waste	Throughout construction period	450 litre/month
	Bentonite slurries	Upon completion of construction works	Dependent upon site practices
	General refuse (generated by site staff)	Throughout construction period	3852 kg/week (assumes max of 600 staff and a 6 day week)
<i>Operational Phase</i>			
Maintenance works	Construction Wastes	Intermittent	Dependent upon extent of works.

2. AIR QUALITY

2.1 Introduction

In this section, the methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during the construction stage of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling are explained. Dust is expected to be the key pollutant during construction of the Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling.

The impact of fugitive dust on ambient air pollution depends on the quantity, as well as the drift potential of the dust particles injected into the atmosphere. Large dust particles will settle out near the source and particles that are 30 - 100 µm in diameter are likely to settle within a distance of 100 m from the source depending on atmospheric turbulence. The main dust impact will arise from the fine particles of a diameter less than 30 µm, measured as TSP, dispersed over great distance from the sources. TSP levels shall, therefore, be monitored to evaluate the dust impact during the construction. The objectives of TSP monitoring shall be:

- to identify the extent of construction dust impacts on sensitive receiver;
- to determine the effectiveness of mitigation measures to control dust from construction activities;
- to recommend further mitigation measures if found to be necessary; and
- to comply with AL Levels for air quality as defined in this Manual.

2.2 Air Quality Parameters

Monitoring and audit of the TSP levels shall be carried out by the ET to ensure that any deteriorating air quality could be readily be detected and timely actions taken to rectify the situation.

1-hour and 24-hour TSP levels shall be measured to indicate the impacts of construction dust on air quality. The TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B. Upon approval of the ER, 1-hour TSP levels can be measured by direct reading methods which are capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. shall be recorded down in details. A sample data sheet is shown in *Annex A*.

2.3 Monitoring Equipment

High volume sampler (HVS) in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:

- a) m^3/min (20-60 SCFM) adjustable flow range;
- b) equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- c) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- d) capable of providing a minimum exposed area of 406 cm^2 (63 in^2);
- e) flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- f) equipped with a shelter to protect the filter and sampler;
- g) incorporated with an electronic mass flow rate controller or other equivalent devices;
- h) equipped with a flow recorder for continuous monitoring;
- i) provided with a peaked roof inlet;
- j) incorporated with a manometer;
- k) able to hold and seal the filter paper to the sampler housing at horizontal position;
- l) easy to change the filter; and capable of operating continuously for 24-hr period.

The ET Leader is responsible for provision of the monitoring equipment. He shall ensure that sufficient number of HVSs with an appropriate calibration kit are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc. shall be clearly labelled.

Initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at bi-monthly intervals. The transfer standard shall be traceable to the internationally recognised primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by the concerned parties such as the IC(E). All the data shall be converted into standard temperature and pressure condition.

The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded down in the data sheet as mentioned in *Annex A*.

If the ET Leader proposes to use a direct reading dust meter to measure 1-hr TSP levels, he shall submit sufficient information to the IC(E) to prove that the instrument is capable of achieving a comparable result as that the HVS and may be used for the 1-hr sampling. The instrument shall also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

In exceptional situations, the ET Leader may propose alternative methods to obtain representative wind data upon approval from the ER and agreement from IC(E).

2.4 Laboratory Measurement / Analysis

A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments, to handle the dust samples collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory shall be HOKLAS accredited or other internationally accredited laboratory.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be approved by the ER in consultation with the IC(E). Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IC(E). IC(E) shall conduct regular audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

Filter paper of size 8"x 10" shall be labelled before sampling. It shall be a clean filter paper with no pin holes, and shall be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper is then returned to the laboratory for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

All the collected samples shall be kept in a good condition for 6 months before disposal.

2.5 Monitoring Locations

The dust monitoring locations are summarised in *Table 2.1*. The status and locations of dust sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER and agreement from the IC(E).

Table 2.1 Dust Monitoring Stations

Location	Monitoring Station	Description
Kiu Tau	AM1 (SR11)	Residential
Fanling Government Secondary School	AM2 (SR2)	School
Dynasty View	AM3 (SR55)	Residential
Shan Tong New Village 1	AM4 (SR64)	Residential
Riverrain Bayside	AM5 (SR54)	Residential
Parc Versailles	AM6 (SR29)	Residential

When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:

- a) at the site boundary or such locations close to the major dust emission source;
- b) close to the sensitive receptors; and
- c) take into account the prevailing meteorological conditions.

The ET Leader shall agree with the ER in consultation with the IC(E) the position of the HVS for installation of the monitoring equipment. When positioning the samplers, the following points shall be noted:

- a) a horizontal platform with appropriate support to secure the samplers against gusty wind shall be provided;
- b) no two samplers shall be placed less than 2 meter apart;
- c) the distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- d) a minimum of 2 metres of separation from walls, parapets and penthouses is required for rooftop samplers;
- e) a minimum of 2 metre separation from any supporting structure, measured horizontally is required;
- f) no furnace or incinerator flue is nearby;
- g) airflow around the sampler is unrestricted;
- h) the sampler is more than 20 metres from the dripline;
- i) any wire fence and gate, to protect the sampler, shall not cause any obstruction during monitoring;
- j) permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- k) a secured supply of electricity is needed to operate the samplers.

2.6 Baseline Monitoring

The ET Leader shall carry out baseline monitoring at all of the designated monitoring locations for at least 14 consecutive days prior to the commissioning of the construction works to obtain daily 24-hr TSP samples. 1-hr sampling shall also be done at least 3 times per day while the highest dust impact is expected. Before commencing the baseline monitoring, the ET leader shall inform the IC(E) of the baseline monitoring programme such that the IC(E) can conduct on-site audit to ensure accuracy of the baseline monitoring results.

During the baseline monitoring, there shall not be any construction or dust generation activities in the vicinity of the monitoring stations.

In case the baseline monitoring cannot be carried out at the designated monitoring locations during the baseline monitoring period, the ET Leader shall carry out the monitoring at alternative locations which can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be approved by the ER and agreed with the IC(E).

In exceptional case, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IC(E) and EPD to agree on an appropriate set of data to be used as a baseline reference and submit to ER for approval.

Ambient conditions may vary seasonally and shall be reviewed at three monthly intervals. If the ET Leader considers that the ambient conditions have been changed and a repeat of the baseline monitoring is required to be carried out for obtaining the updated baseline levels, the monitoring shall be at times when the contractor's activities are not generating dust, at least in the proximity of the monitoring stations. Should change in ambient conditions be determined, the baseline levels and, in turn, the air quality criteria, shall be revised. The revised baseline levels and air quality criteria shall be agreed with the IC(E) and EPD.

2.7 Impact Monitoring

The ET Leader shall carry out impact monitoring during the course of the Works. For regular impact monitoring, the sampling frequency of at least once in every six-days, shall be strictly observed at all the monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days shall be undertaken when the highest dust impact occurs. Before commencing the baseline monitoring, the ET leader shall inform the IC(E) of the impact monitoring programme such that the IC(E) can conduct on-site audit to ensure accuracy of the impact monitoring results.

The specific time to start and stop the 24-hr TSP monitoring shall be clearly defined for each location and be strictly followed by the operator.

In case of non-compliance with the air quality criteria, more frequent monitoring exercise, as specified in the Action Plan in *Section 2.8*, shall be conducted within 24 hours after the result is obtained. This additional monitoring shall be continued until the excessive dust emission or the deterioration in air quality is rectified.

2.8 Event and Action Plan for Air Quality

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET Leader shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. *Table 2.2* shows the air quality criteria, namely Action and Limit (AL) Levels to be used. Should non-compliance of the air quality criteria occurs, actions in accordance with the Action Plan in *Table 2.3* shall be carried out.

Table 2.2 Action and Limit Levels for Air Quality

Parameters	Action	Limit ($\mu\text{g}/\text{m}^3$)
24 Hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$, Action level = (Baseline level * 1.3 + Limit level)/2; For baseline level $> 200 \mu\text{g}/\text{m}^3$, Action level = Limit Level	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = (Baseline level *1.3 + Limit level)/2 For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit Level	500

2.9 Dust Mitigation Measures

The EIA report has recommended dust control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

The dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* shall be incorporated in the Contract Specification and implemented to reduce dust impact to within the acceptable dust criteria of $500\mu\text{g}/\text{m}^3$ arising from the works. Typical control measures are:

- where breaking of rock/concrete is required, watering shall be implemented to suppress dust generation, water spray shall be used during the handling of excavated material at the site and at active cuts, tunnel construction works, excavation and fill sites where dust is likely to be created;
- the heights from which excavated materials are dropped shall be controlled to a minimum practical height to limit fugitive dust generation from unloading;
- all dusty materials shall be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;
- any stockpiles of aggregate or spoil shall be covered and water applied;
- vehicle travel on haul road shall reduced the speed to 20 kph,
- every vehicle shall be washed to remove any dusty materials from its body and wheels before leaving a construction site;
- the load on the vehicles shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and

Table 2.3 Event/Action Plan for Air Quality

EVENT	ACTION			
	ET Leader	IC(E)	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Inform IC(E) and ER 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET 2. Check Contractor's working method 	<ol style="list-style-type: none"> 1. Notify Contractor 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source 2. Inform IC(E) and ER 3. Repeat measurements to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with IC(E) and Contractor on remedial actions required 6. If exceedance continues, arrange meeting with IC(E) and ER 7. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervisor implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Submit proposals for remedial actions to IC(E) within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

EVENT	ACTION			
	ET Leader	IC(E)	ER	CONTRACTOR
LIMIT LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source 2. Inform ER and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 	<ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET 2. Check Contractor's working method 3. Discuss with ET and Contractor on possible remedial measures 4. Advise the ER on the effectiveness of the proposed remedial measures 5. Supervisor implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2.Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IC(E), ER, Contractor and EPD 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Arrange meeting with IC(E) and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. In consultation with the IC(E), agree with the Contractor on the remedial measures to be implemented 4. Ensure remedial measures properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

- the working area of any excavation shall be sprayed with water before, during and immediately after the operation so as to maintain the entire surface wet.

According to the EPD's *Best Practicable Means Requirements for Cement Works (Concrete Batching Plant)*, the following mitigation measures are required for concrete batching plant:

- the loading, unloading, handling, transfer or storage of cement, pulverised fuel ash or other equally dusty materials shall be carried in a enclosed system;
- all dust-laden air or waste gas generated by the process operations shall be properly extracted and vented to fabric filtering system;
- cement, pulverised fuel ash or other equally dusty materials shall be stored in storage silo fitted with audible high level alarms to warn of over-filling. The high-level alarm indicators shall be interlocked with the material filling line;
- vents of all silos and weighing scale shall be fitted with fabric filtering system; and
- seating of pressure relief valves of all silos shall be checked, and the valves reseated if necessary, before each delivery.

If the above measures are not sufficient to restore the air quality to acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to ER for approval, and implement the mitigation measures.

3. NOISE

3.1 Introduction

As the noise sensitive receivers (NSR)s working area will be subjected to daytime, and possibly restricted-hour construction noise, a noise monitoring programme shall be developed by the ER to include daytime and restricted-hour (if necessary) noise measurement at the sensitive receivers. The programme shall be carried out by the ET to ensure that the noise level of construction works complies with the criteria of the Noise Control Ordinance (NCO) and other adopted noise criteria.

3.2 Noise Parameters

The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}) $L_{eq(30 \text{ min})}$ shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, $L_{eq(5 \text{ min})}$ shall be employed for comparison with the NCO criteria.

As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference. A sample data record sheet is shown in *Annex A* for reference.

3.3 Monitoring Equipment

As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level metres in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level metre shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agree to within 1.0 dB (A).

Noise measurements shall not be made in the presence of fog, rain, wind with a steady speed exceeding 5 ms^{-1} or wind with gusts exceeding 10 ms^{-1} . The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

The ET Leader is responsible for the provision and maintenance of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

3.4 Monitoring Locations

The noise monitoring locations are summarised in *Table 3.1*. The status and locations of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from ER, and agreement from the IC(E) and EPD of the proposal.

Table 3.1 Noise Monitoring Stations

Location	Monitoring Station	Description
Between Pak Wo Road and Hong Lok Yuen Road <ul style="list-style-type: none"> • Kui Tau • West Tai Wo • Fanling Government School 	M1 (SR 11) M2 (SR 13) M3 (SR 2)	Residential Residential School
Hong Lok Yuen Road to Tai Po Tai Wo Road <ul style="list-style-type: none"> • Tai Po Garden • Dynasty View 	M4 (SR 26) M5 (SR 55)	Residential Residential
Tai Po Tai Wo Road and Tat Wan Road <ul style="list-style-type: none"> • Wong Shui Chi Middle School • HK Teachers Association Secondary School 	M6 (SR 41) M7 (SR 45)	School School
Tat Wan Road and Island House Interchange <ul style="list-style-type: none"> • Grand Palisades • PLK Tin Ka Ping Primary School • River Rain Bayside 	M8 (SR 40) M9 (SR 66) M10 (SR 54)	Residential School Residential

When alternative monitoring locations are proposed, the monitoring locations shall be chosen based on the following criteria:

- a) at locations close to the major site activities which are likely to have noise impacts;
- b) close to the noise sensitive receivers (N.B. For the purposes of this section, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing art centre shall be considered as a noise sensitive receiver); and
- c) for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.

The monitoring station shall normally be at a point 1m from the exterior of the sensitive receivers building facade and be at a position 1.2m above the ground. If there is a problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3dB(A) shall be made to the free field measurements. The ET Leader shall agree with the IC(E) on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

3.5 Baseline Monitoring

The ET Leader shall carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring shall be carried out daily for a period of at least two weeks. A schedule on the baseline monitoring shall be submitted to the ER for approval before the monitoring starts.

There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. Baseline monitoring measurements shall be evenly spread throughout the assessment period to be conducted at the same frequency and duration throughout all periods of the day for which works are anticipated to be constructed (eg. daytime, evening and nighttime).

In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with EPD to agree on an appropriate set of data to be used as a baseline reference and submit to the ER for approval.

3.6 Impact Monitoring

Noise monitoring shall be carried out, by the ET Leader, at all the designated monitoring station. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a per week basis when noise generating activities are underway:

- a) one set of measurements between 0700-1900 hours on normal weekdays;
- b) one set of measurements between 1900-2300 hours;
- c) one set of measurements between 2300-0700 hours of next day; and
- d) one set of measurements between 0700-1900 hours on holidays.

General construction work carrying out during restricted hours is controlled by CNP system under the NCO.

For the measurements (b), (c) and (d) above, one set of measurements shall at least include 3 consecutive $L_{eq(5 \text{ min})}$ results.

School exists near the construction activity, such as the Wong Shiu Chi Middle School and HK Teachers Association Secondary School, noise monitoring shall be carried out during the school examination periods. The ET Leader shall liaise with the school's personnel and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

In case of non-compliance with the construction noise criteria, more frequent monitoring as specified in the Action Plan in *Section 3.7* shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

3.7 Event and Action Plan for Noise

The AL Levels for construction noise are defined in *Table 3.2*. Should non-compliance of the criteria occurs, action in accordance with the Action Plan in *Table 3.3*, shall be carried out.

Table 3.2 Action and Limit Levels for Construction Noise

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)
0700-2300 hrs on holidays; and 1900-2300 hrs on all other days		60/65/70** dB(A)
2300-0700 hrs of next day		45/50/55** dB(A)

* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

** To be selected based on Area Sensitivity Rating.

Table 3.3 Event/Action Plan for Construction Noise

EVENT	ACTION			
	ET Leader	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IC(E) and Contractor 2. Carry out investigation 3. Report the results of investigation to the IC(E) and Contractor 4. Discuss with the Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IC(E) 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify IC(E), ER, EPD and Contractor 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IC(E), ER and EPD the causes & actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analysed noise problem 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IC(E) within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

3.8 Noise Mitigation Measures

The EIA Report has recommended construction noise control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

Noise emissions from construction sites can be minimised through good site practice and selecting quiet plant. These methods are discussed in the following paragraphs.

Good Site Practice

Good site practice and noise management can considerably reduce the impact of construction site activities on nearby NSRs. The following package of measures shall be followed during each phase of construction:

- only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction works;
- machines and plant that may be in intermittent use shall be shut down between work periods or shall be throttled down to a minimum;
- plant known to emit noise strongly in one direction, shall, where possible, be orientated to direct noise away from nearby NSRs;
- mobile plant shall be sited as far away from NSRs as possible; and
- material stockpiles and other structures shall be effectively utilised, where practicable, to screen noise from on-site construction activities.

Selecting Quieter Plant and Working Methods

The Contractor may be able to obtain particular models of plant that are quieter than standard types given in the GW-TM. The benefits achievable for each of the measures proposed will depend on the details of the Contractors' chosen methods of working, and it is considered too restrictive to specify items of plant that a Contractor has to use during construction activities. It is therefore both preferable and practical to specify an overall plant noise performance specification to apply to the total SWL of all plant on the site, so that the Contractor is allowed some flexibility to select plant to suit his needs.

Use of Temporary and Movable Noise Barriers

Movable barriers could be very effective in providing noise screening from a particular plant. It is anticipated that a 3m high movable noise barrier with a skid footing and a small cantilevered upper portion can be located within a few metres of plant. It is estimated that movable noise barrier of this type, if carefully located, can produce at least 10 dB(A) screening for stationary plant and 5 dB(A) for mobile plant.

Reducing the Number of Plant Operating On-site Close to NSRs.

It shall be noted that various types of silenced equipment can be found in Hong Kong. However, the EPD, when processing a CNP application, will apply the noise levels contained in the relevant statutory TM, unless the noise emission of a particular piece of equipment can be validated by certificate or demonstration.

If the above measures are not sufficient to restore the construction noise quality to an acceptable levels upon the advice of ET Leader, the Contractor shall liaise with the ET Leader on some other mitigation measures, propose to ER for approval, and carry out the mitigation measures.

4. WATER QUALITY

4.1 Introduction

It has been recommended that monitoring water quality impacts shall included in the impact monitoring and audit programme. The purpose of the impact monitoring of water quality is to determine any deterioration of the water quality when construction works are being carried out. Water quality sensitive receivers are illustrated in Figure 4.1.

4.2 Water Quality Parameters

Monitoring of turbidity in NTU, dissolved oxygen (DO) in mg/l and suspended solids (SS) in mg/l shall be carried out by the ET to ensure that any deteriorating water quality is readily detected and timely action may be taken to rectify the situation. The former two parameters are measured in-situ while the latter one is determined in an approved laboratory.

In association with the water quality parameters, some relevant data shall also be measured, such as monitoring location/position, time, water depth, water temperature, salinity, DO saturation, weather conditions, tidal stage, and any special phenomena and work underway at the construction site etc.

4.3 Monitoring Equipment

Dissolved oxygen and temperature measuring equipment

- (a) The instrument should be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and use a DC power source. It should be capable of measuring:-
 - a dissolved oxygen level in the range of 0-20 mg/l and 0-200% saturation
 - a temperature of 0-45 degree Celsius.
- (b) It should have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables should be available for replacement where necessary. (e.g. YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).
- (c) Should salinity compensation not be built-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

The instrument should be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment should use a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU (e.g. Hach model 2100P or an approved similar instrument).

Suspended Solids

- (a) A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and can be effectively sealed with latex cups at both ends. The sampler should have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (e.g. Kahlsico Water Sampler or an approved similar instrument).
- (b) Water samples for suspended solids measurement should be collected in high density polythene bottles, packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory as soon as possible after collection.

Water Depth Detector

A portable, battery-operated echo sounder should be used for the determination of water depth at each designated monitoring station. This unit can either be handheld or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

Salinity

A portable salinometer capable of measuring salinity in the range of 0-40 part per thousand (ppt) shall be provided for measuring salinity of the water at each monitoring location.

Position Fixing

A hand-held type digital Differential Global Positioning System (GPS) with way point bearing indication and Radio Technical Commission for Maritime (RTCM) Type 16 error message screen pop-up facilities (for real-time auto-display of error messages and DGPS corrections from the Hong Kong Hydrographic Office) or other equivalent instrument of similar accuracy shall be provided and used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Calibration of In-Situ Instruments

All in-situ monitoring instruments shall be checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring. Responses of sensors and electrodes should be checked with certified standard solutions before each use. Wet bulb calibration for a DO meter shall be carried out before measurement at each monitoring location.

For the on site calibration of field equipment, the BS 1427:1993, "Guide to Field and on-site test methods for the analysis of waters" should be observed.

Sufficient stocks of spare parts should be maintained for replacements when necessary. Backup monitoring equipment shall also be made available so that monitoring can proceed uninterrupted even when some equipment some equipment is under maintenance, calibration, etc.

Equipment list and testing methods for water quality baseline monitoring are as follows:

- (a) Water depth (on board)

- Measured by portable echo sounder (Seafarer 901).
- (b) Temperature (in-situ)
Measured by using the temperature probe of the Dissolved Oxygen meter (Model YSI 58).
- (c) Dissolved oxygen (in-situ)
A submersible D.O. probe (YSI 5739) equipped with a stirrer (YSI 5795A) lowered to the appropriate depth, the D.O. content being measured in-situ.
- (d) Turbidity (in-situ)
Water from the appropriate depth taken by a water sampler (model Kahlsico 135WB 153) and the turbidity measured by a turbidimeter (Model HACH 2100P)
- (e) Suspended Solids (laboratory)
Method used was in accordance with APHA led 2540D.
- (f) pH (laboratory)
Measured by pH meter (Hanna - HI 9024).(APHA 17th ed. 4500 - H⁺)

The locations of the water sampling will be determined by Global Positioning Equipment - ENSIGN GPS Trimble Navigation System or similar approved.

4.4 Monitoring Locations

Monitoring shall be undertaken at two monitoring stations (refer to Figure 4.2 for location of proposed monitoring locations) when working over water and one control station at the site. The locations which are shown in Figure 4.2 for illustrative purposes shall be agreed with EPD before undertaking any work over water.

The status and locations of water quality sensitive receivers may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from the IC(E) and DEP.

When alternative monitoring locations are proposed, they should be chosen based on the following criteria:

- (a) at locations close to and preferably at the boundary of the major site activities as indicated in the EIA final report, which are likely to have water quality impacts
- (b) close to the sensitive receptors which are directly or likely to be affected
- (c) for monitoring locations located in the vicinity of the sensitive receptors, care should be taken to cause minimal disturbance during monitoring
- (d) two or more control stations which shall be at locations representative of the project site in its undisturbed condition. Control stations should be located, as far as is practicable, both upstream and down stream of the works area.

Control stations are necessary to compare the water quality from potentially impacted sites with the ambient water quality. Control stations shall be located within the same body of water as the impact monitoring stations but should be outside the area of influence of the works and, as far as practicable, not affected by any other works.

Measurements shall be taken at mid-depth. The ET Leader shall seek approval from the ICE(E) and DEP on all the monitoring stations.

4.5 Baseline Monitoring

Baseline conditions for river water quality shall be established and agreed with DEP prior to the commencement of works. The purposes of the baseline monitoring are to establish ambient conditions prior to the commencement of the works and to demonstrate the suitability of the proposed impact, control and reference monitoring stations. The baseline conditions shall normally be established by measuring the water quality parameters specified in *Section 4.1*. The measurements shall be taken at all designated monitoring stations including control stations, 3 days per week for at least four weeks prior to the commencement of river training works.

There shall not be any construction activities over water in the vicinity of the stations during the baseline monitoring.

In exceptional case when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall seek approval from the IC(E) and DEP on an appropriate set of data to be used as baseline reference.

Baseline monitoring schedule shall be faxed to EPD 1 week prior to the commencement of baseline monitoring. The interval between 2 sets of monitoring shall not be less than 36 hours.

4.6 Impact Monitoring

During the course of the river training works, monitoring shall be undertaken on three occasions per week. The interval between two sets of monitoring shall not be less than 36 hours except where there are exceedances of Action and/or Limit levels, in which case the monitoring frequency will be increased.

Upon completion of all river training work, a post project monitoring exercise on river water quality shall be carried out for four weeks in the same manner as the impact monitoring.

Proposed water quality monitoring schedule shall be faxed to EPD on or before the first day of the monitoring month, EPD shall be notified immediately of any change in schedule by fax.

4.7 Event and Action Plan for Water Quality

The water quality criteria, namely Action and Limit levels are shown in *Table 4.1*. Should the monitoring results of the water quality parameters at any designated monitoring stations indicate that the water quality criteria are exceeded, the actions in accordance with the Action Plan in *Table 4.2* shall be carried out.

This project has a duration of greater than 12 months and, therefore quarterly assessment of impacts of the construction activities on water quality at the project site shall be undertaken and reported in a quarterly report. The difference between the quarterly mean and 1.3 times of the ambient mean, which is defined as 30% increase of the baseline and/or EPD data, of the related parameters shall be compared using appropriate statistical procedures. If the analytical results demonstrate quarterly mean is significantly higher than the 1.3 times of ambient mean ($P < 0.05$), appropriate mitigation measures shall be proposed in the quarterly report.

Table 4.1 Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg/l (Surface, Middle & Bottom)	5%-ile of baseline data	4 mg/l or 40% saturation at 15 degree celcius
SS in mg/l (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's SS at the same tide of the same day	99%-ile of baseline, or 130% of upstream control station's SS at the same tide of the same day and specific sensitive receiver water quality requirements
Turbidity (Tby) in NTU (depth-averaged)	95%-ile of baseline data or 120% of upstream control station's Tby at the same tide of the same day	99%-ile of baseline or 130% of upstream control station's Tby

Notes:

- For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- For SS and Tby, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.

Table 4.2 Event and Action Plan for Water Quality

Action Level	ET Leader	IC(E)	ER	Contractor
1. Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in-situ measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), Contractor & ER; 4. Check monitoring data, all plant, equipment & contractor's working methods; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET & Contractor's working methods; 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify, Contractor 	<ol style="list-style-type: none"> 1. Inform the ER & confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Amend working methods if appropriate.
2. Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), Contractor, ER & EPD; 4. Check monitoring data, all plant, equipment & Contractor's working methods; 5. Discuss mitigation measures with IC(E), ER & Contractor; 6. Ensure mitigation measures are implemented; 7. Increase monitoring to daily until no exceedance of Action level. 	<ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET & Contractor's working method; 2. Discuss with ET & Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor & advise the ER accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IC(E) on the proposed mitigation measures; 2. Ensure mitigation measures properly implemented; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the Engineer & confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant & equipment & consider changes of working methods; 4. Submit proposal of mitigation measures to ER within 3 working days of notification & discuss with ET, IC(E) & ER; 5. Implement the agreed mitigation measures.
1. Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), contractor, ER & EPD; 4. Check monitoring data, all plant, equipment & contractor's working methods; 5. Discuss mitigation measures with IC(E), Contractor & ER. 	<ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET & Contractor's working method; 2. Discuss with ET & Contractor on the possible mitigation measures; 3. Review the proposed mitigation measures submitted by Contractor & advise the ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Discuss with IC(E), ET & Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods. 	<ol style="list-style-type: none"> 1. Inform the ER & confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant & equipment & consider changes of working methods; 4. Submit proposal of mitigation measures to ER within 3 working days of notification & discuss with ET, IC(E) & ER.

Action Level	ET Leader	IC(E)	ER	Contractor
<p>2. Limit level being exceeded by two or more consecutive sampling days</p>	<ol style="list-style-type: none"> 1. Repeat measurement on the next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IC(E), Contractor, ER & EPD; 4. Check monitoring data, all plant, equipment & Contractor's working methods; 5. Discuss mitigation measures within IC(E), Contractor & ER; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days. 	<ol style="list-style-type: none"> 1. Checking monitoring data submitted by ET & Contractor's working method; 2. Discuss with ET & Contractor on potential remedial actions; 3. Review Contractor's mitigation measures whenever necessary to assure their effectiveness & advise the ER accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IC(E), ET & Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Consider & instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposal of mitigation measures to ER within 3 working days of notification & discuss with ET, IC(E) & ER; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

4.8 Mitigation Measures

The EIA report has recommended water quality control and mitigation measures. The Contractor shall be responsible for the design and implementation of these measures.

- All waste water generated on the Site shall be collected, removed from Site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance.
- The Contractor shall construct, maintain, remove and reinstate, as necessary, temporary drainage works and take all other precautions necessary for the avoidance of damage by flooding and silt washed down from the Works. He shall also provide adequate precautions to ensure that no spoil or debris of any kind is allowed to be pushed, washed down, fall or be deposited on land or on the seabed adjacent to the site.
- Around any material storage, batching plants or other facilities where spillage may occur, a bund with a capacity of 110% will be provided.
- The Contractor shall not permit any sewage, waste water or other effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land or allow any solid waste to be deposited anywhere within the Site or onto any adjoining land and shall have all such materials removed from the Site.
- The Contractor shall be responsible for temporary drainage, 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.
- Any proposed temporary diversions to stream courses or nullahs 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 when the temporary diversion is no longer required.
- The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit to be discharged into any public sewer, storm-water drain, channel, stream-course or sea, any effluent or foul or contaminated water or cooling water without the prior consent of the relevant Authority 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.
- If any office, site canteen or toilet facilities is erected, foul water effluent shall, subject to clause as stated in the last paragraph above, be directed to a foul sewer or to a sewage treatment facilities either directly or indirectly by means of pumping.
- The Contractor shall at all times ensure that all existing stream courses and drains within, and adjacent to the Site are kept safe and free from any debris and any excavated materials arising from the Works. The Contractor shall ensure that chemicals and concrete agitator washings are not deposited in watercourses.
- All Contractor's Equipment shall be designed and maintained to minimise the risk of silt and other contaminants being released into the water column or deposited in other than designated locations.

5. WASTE MANAGEMENT

5.1 Introduction

The Contractor is responsible for waste control within the construction site, removal of waste material produced by the site and the implementation of any mitigation measures to minimise waste or redress problems arising from site waste. The waste material may include any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material flowing from the site into any storm sewer, sanitary sewer, or any waste matter or refuse deposited anywhere within the site or onto any adjoining land.

When handling the waste material, the following measures shall be undertaken:

The proposed re-use, recycling, storage, collection, transport and disposal methods for various wastes which are recommended to avoid or minimise potential adverse impacts are detailed below. Specifically, it is recommended that during the construction phase, the Contractor incorporate the recommendations into an on-site waste management plan.

The Contractor shall also pay attention to the Waste Disposal Ordinance and its subsidiary regulations, the Dumping at Sea Ordinance, the Public Health and Municipal Services Ordinance and the Water Pollution Control Ordinance, and carry out the appropriate waste management work. The relevant license/permit, such as the effluent discharge license, the chemical waste producer registration, etc. shall be obtained. The Contractor shall refer to the relevant booklets issued by EPD when applying for the license/permit.

During the site inspections and the document review procedures as mentioned in *Sections 5.1 and 5.2* of this manual, the ET Leader shall pay special attention to the issues relating to waste management, and check whether the Contractor has followed the relevant contract specifications and the procedures specified under the laws of Hong Kong.

5.2 Waste Mitigation Measures

This section sets out recycling, storage, transportation and disposal measures which are recommended to avoid or minimise potential adverse impacts associated with waste arising from the construction of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling. The contractor shall incorporate these recommendations into a comprehensive on-site waste management plan. Such a management plan shall incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.

Waste Management Hierarchy

The various waste management options can be categorised in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in the longer term. Hence, the hierarchy is as follows:

- avoidance and minimisation, ie not generating waste through changing or improving practices and design;
- reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- recovery and recycling, thus avoiding disposal (although reprocessing may be required);
and

- treatment and disposal, according to relevant laws, guidelines and good practice.

The Contractor shall consult the EPD on the final disposal of wastes.

This hierarchy shall be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs. Waste reduction measures shall be introduced at the design stage and carried through the construction activities, wherever possible, by careful purchasing control, reuse of formworks and good site management. By reducing or eliminating over-ordering of construction materials, waste is avoided and costs are reduced both in terms of purchasing of raw materials and in disposing of wastes.

Training and instruction of construction staff shall be given at the site to increase awareness and draw attention to waste management issues and the need to minimise waste generation. The training requirement shall be included in the site waste management plan.

Storage, Collection and Transport of Waste

Permitted waste hauliers shall be used to collect and transport wastes to the appropriate disposal points. The following measures to minimise adverse impacts shall be instigated:

- handle and store wastes in a manner which ensures that they are held securely without loss or leakage, thereby minimising the potential for pollution;
- use waste hauliers authorised or licensed to collect specific category of waste;
- remove wastes in a timely manner;
- maintain and clean waste storage areas regularly;
- minimise windblown litter and dust during transportation by either covering trucks or transporting wastes in enclosed containers;
- obtain the necessary waste disposal permits from the appropriate authorities, if they are required, in accordance with the *Waste Disposal Ordinance (Cap 354)*, *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354)*, the *Crown Land Ordinance (Cap 28)*;
- Dispose of waste at licensed waste disposal facilities;
- Develop procedures such as a ticketing system to facilitate tracking of loads, particularly for chemical waste, and to ensure that illegal disposal of wastes does not occur; and
- maintain records of the quantities of wastes generated, recycled and disposed.

Surplus Excavated Material

The excavated material may have to be temporarily stockpiled on-site for subsequent re-use. Control measures shall be taken at the stockpiling area to prevent the generation of dust and pollution of stormwater channels. Key control measures are highlight below:

Dust:

- wetting the surface of the stockpiled soil with water to keep the surface wet especially during the dry season;
- covering the stockpiled soil with sheets; and
- enclosure of the stockpiling area.

Water Quality:

- separating surface water drainage system for the stockpiling area;
- installation of silt traps for the surface water drainage system; and
- covering stockpiled material with tarpaulin during heavy rainstorm.

C&D Waste

In order to minimise waste arising and to keep environmental impacts within acceptable levels, the environmental control measures described below shall be adopted.

Careful design, planning and good site management can minimise over-ordering and generation of waste materials such as concrete, mortars and cement grouts. The design of formwork shall maximise the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing shall be considered to increase the potential for reuse.

The Contractor shall recycle the C&D material on-site. Proper segregation of wastes on site will increase the feasibility of certain components of the waste stream by the recycling contractors. For example, concrete and masonry can be used as general fill and steel reinforcement bar can be used by scrap steel mills. Different areas of the worksite shall be designated for such segregation and storage wherever site conditions permit.

The handling and disposal of bentonite slurries shall be undertaken in accordance with ProPECC PN 1/94 on construction site drainage.

Construction and demolition wastes currently comprise approximately 35% of waste inputs to landfills. To maximise landfill life, Government policy discourages the disposal of C&D wastes with more than 30% inert material (by weight) at landfill. Inert C&D material are directed to reclamation areas, where they have the added benefit of offsetting the need for removal of materials from borrow areas for reclamation purposes.

Government has established a charging scheme for the disposal of waste to landfill. When it is implemented, this will provide additional incentive to reduce the volume of waste generated and to ensure proper segregation of wastes to allow free disposal of inert material to public filling areas.

Chemical Waste

It should be stressed that the Contractor should be registered as a Chemical Waste producer if chemical wastes are generated.

Chemical waste that is produced, as defined by *Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation*, shall be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes* as follows.

Containers used for the storage of chemical wastes shall:

- be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- have a capacity of less than 450 litres unless the specifications have been approved by the EPD; and
- display a label in English and Chinese in accordance with instructions prescribed in *Schedule 2 of the Regulations*.

The storage area for chemical wastes shall:

- be clearly labelled and used solely for the storage of chemical waste;
- be enclosed on at least 3 sides;
- have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- have adequate ventilation;
- be covered to prevent rainfall entering (water collected within the bund must be tested and disposed as chemical waste if necessary); and
- be arranged so that incompatible materials are adequately separated.

Disposal of chemical waste shall:

- be via a licensed waste collector; and
- be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers; or
- be to a reuser of the waste, under approval from the EPD.

The Centre for Environmental Technology operates a Waste Exchange Scheme which can assist in finding receivers or buyers for the small quantity of chemical waste to be generated from the project.

General Refuse

General refuse shall be stored in enclosed bins or compaction units separate from C&D and chemical wastes. A reputable waste collector shall be employed by the contractor to remove

general refuse from the site, separately from C&D and chemical wastes, on a daily or every second day basis to minimise odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law.

General refuse is generated largely by food service activities on site, so reusable rather than disposable dishware shall be used if feasible. Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated or easily accessible, so separate labelled bins for their deposit shall be provided if feasible.

Office wastes can be reduced through recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme shall be considered if one is available.

6. ECOLOGY

6.1 Introduction

The engineering Contractor is responsible for the implementation of all mitigation measures as listed in Section 6.2 to minimise ecological impacts from site activities. The implementation of these measures shall be checked by the ET as part of the environmental audit, details of which are presented in the following Section 7.

6.2 Mitigation Measures

The ET shall be responsible for checking (auditing) the correct implementation of the following mitigation measures (and good site practices) by the Contractor prior to and during the works.

- erection of fences along the boundary of construction sites before the commencement of works to prevent tipping, vehicle movements, and encroachment of personnel into adjacent wooded areas, particularly fung-shui woodlands and where the rare/protected plant species are located;
- selection of haul routes, storage and works areas etc. so as to minimize habitat/vegetation disturbance;
- regular checking to ensure that the work site boundaries are not exceeded and that no damage occurs to surrounding areas;
- prohibition and prevention of open fires within the work site boundary during construction and provision of temporary fire fighting equipment in the work area during construction; and
- check the effectiveness of on-site compensation planting to address loss of fung-shui woodlands and secondary woodlands due to road construction.

6.3 Non-compliance Action Plan

If during the audit the ET notes that significant vegetation damage has occurred as a consequence of non-compliance of any of the above measures, the ER shall be informed immediately verbally and in writing.

Should any supplementary works such as additional vegetation planting or tree surgery be undertaken as a consequence of non-compliance, the ET shall also be responsible for checking the effectiveness of these measures.

7. SITE ENVIRONMENTAL AUDIT

7.1 Site Inspections

Site Inspections provide a direct means to trigger and enforce the specified environmental protection and pollution control measures. They shall be undertaken routinely by the ET Leader to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. With well defined pollution control and mitigation specifications and a well established site inspection, deficiency and action reporting system, the site inspection is one of the most effective tools to enforce the environmental protection requirements on the construction site.

The ET Leader is responsible for formulation of the environmental site inspection, deficiency and action reporting system, and for carrying out the site inspection works. He shall submit a proposal on the site inspection, deficiency and action reporting procedures within 21 days of the construction contract commencement to the Contractor for agreement and to the ER for approval.

Regular site inspections shall be carried out at least once per week. The areas of inspection shall not be limited to the pollution control and mitigation measures within the site; it shall also review the environmental situation outside the site area which is likely to be affected, directly or indirectly, by the site activities. The ET Leader shall make reference to the following information in conducting the inspection:

- a) the EIA recommendations on environmental protection and pollution control mitigation measures;
- b) works progress and programme;
- c) individual works methodology proposals (which shall include proposal on associated pollution control measures);
- d) the contract specifications on environmental protection;
- e) the relevant environmental protection and pollution control laws; and
- f) previous site inspection results.

The Contractor shall update the ET Leader with all relevant information of the construction contract for him to carry out the site inspections. The inspection results and its associated recommendations on improvements to the environmental protection and pollution control works shall be submitted to the IC(E) and the Contractor within 24 hours, for reference and for taking immediate action. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, deficiency and action reporting system formulated by the ET Leader to report on any remedial measures subsequent to the site inspections.

Ad hoc site inspections shall also be carried out if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the investigation work, as specified in the Action Plan for environmental monitoring and audit.

7.2 Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in Hong Kong which the construction activities shall comply with.

In order that the works are in compliance with the contractual requirements, all the works method statements submitted by the Contractor to the ER for approval shall also be sent to the ET Leader for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that the any foreseeable potential for violating the laws can be prevented.

The Contractor shall regularly copy relevant documents to the ET Leader so that the checking work can be carried out. The document shall at least include the updated Work Progress Reports, the updated Works Programme, the application letters for different license/permits under the environmental protection laws, and all the valid license/permit. The site diary shall also be available for the ET Leader's inspection upon his request.

After reviewing the document, the ET Leader shall advise the ER and the Contractor of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the ET Leader's review concludes that the current status on license/permit application and any environmental protection and pollution control preparation works may not cope with the works programme or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he shall advise the Contractor and the ER accordingly.

Upon receipt of the advice, the Contractor shall undertake immediate action to remedy the situation. The ER shall follow up to ensure that appropriate action has been taken by the Contractor in order that the environmental protection and pollution control requirements are fulfilled.

7.3 Environmental Complaints

Complaints shall be referred to the ET Leader for carrying out complaint investigation procedures. The ET Leader shall undertake the following procedures upon receipt of complaint:

- a) log complaint and date of receipt onto the complaint database and inform the IC(E) immediately;
- b) investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- c) if a complaint is valid and due to works, identify mitigation measures;
- d) if mitigation measures are required, advise the Contractor accordingly;
- e) review the Contractor's response on the identified mitigation measures, and the updated situation;

- f) if the complaint is transferred from EPD, submit interim report to EPD on status of the complaint investigation and follow-up action within the time frame assigned by EPD;
- g) undertake additional monitoring and audit to verify the situation if necessary, and review that any valid reason for complaint does not recur;
- h) report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complaint is EPD, the results shall be reported within the time frame assigned by EPD); and
- i) record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

During the complaint investigation work, the Contractor and ER shall cooperate with the ET Leader in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor shall promptly carry out the mitigation. The ER shall ensure that the measures have been carried out by the Contractor.

A flow chart of the complaint response procedures is shown in *Figure 7.1*.

8. REPORTING

8.1 General

The reporting guidelines referred to in this section are based upon a paper based system, however, the same information can be provided by an electronic medium upon agreeing the format with the ER and EPD. All the monitoring data (baseline and impact) shall also be submitted in diskettes in a format shown in *Annex A*.

8.2 Baseline Monitoring Report

The ET Leader shall prepare and submit a Baseline Environmental Monitoring Report within 10 working days of completion of the baseline monitoring. Copies of the Baseline Environmental Monitoring Report shall be submitted to all parties; the Contractor, the IC(E), the ER and the EPD. The format and content of the report, and the representation of the baseline monitoring data shall be in a format to the satisfaction of EPD and include, but not be limited to the following:

- a) up to half a page executive summary;
- b) brief project background information;
- c) drawings showing locations of the baseline monitoring stations;
- d) monitoring results (in both hard and diskette copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations (and depth);
 - monitoring date, time, frequency and duration;
 - QA/QC results and detection limits;
- e) details on influencing factors, including
 - major activities, if any, being carried out on the site during the period;
 - weather conditions during the period;
 - other factors which might affect the results.
- f) determination of the AL Levels for each monitoring parameter and statistical analysis of the baseline data; the analysis shall conclude if there is any significant difference between control and impact stations for the parameters monitored, and the following information shall be recorded:
 - graphical plots of monitored parameters in the month annotated against;
 - the major activities being carried out on site during the period;
- g) revisions for inclusion in the EM&A Manual; and
- h) comments and conclusions.

8.3 EM&A Reports

The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET Leader. The EM&A report shall be prepared, endorsed by IC(E) and submitted within 10 working days of the end of each reporting month, with the first report due in the month after construction commences. Before submission of the first EM&A report, the ET Leader shall liaise with the parties on the exact number of copies and format of the monthly reports in both hard copy and electronic medium requirement. The ET Leader shall review the number and location of monitoring stations and parameters to monitor every 6 months or on as needed basis in order to cater for the changes in surrounding environment and nature of works in progress.

First Monthly EM&A Report

The First Monthly EM&A Report shall include at least the following :

- (a) 1-2 pages executive summary;
 - Breaches of AL levels;
 - Complaints Log;
 - Notifications of any summons and successful prosecutions;
 - Reporting Changes;
 - Future key issues.
- (b) Basic Project Information
 - Project organisations including key personnel contact names and telephone numbers;
 - Programme
 - Management structure; and
 - Works undertaken during the month;
- (c) Environmental Status
 - Work undertaken during the month with illustrations (such as location of works daily dredging/filling rates percentage fines in the fill material used);and
 - Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations.
- (d) Summary of EM&A requirements
 - All monitoring parameters;
 - AL Levels;
 - Event-Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA Report;
 - Environmental requirements in contract documents;

(e) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA Report, summarised in the updated implementation schedule (in *Annex A*);

(f) Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology
- Name of laboratory and types of equipment used and calibration details
- Parameters monitored
- Monitoring locations (and depth)
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period; and
- Any other factors which might affect the monitoring results;
- QA/QC results and detection limits

(g) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

- Record of all noncompliance (exceedances) of the environmental quality performance limits (AL Levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
- Description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;

(h) Others

- An account of the future key issues as reviewed from the works programme and work method statements; and
- Advice on the solid and liquid waste management status.

Subsequent Monthly EM&A Reports

The subsequent Monthly EM&A Reports shall include the following :

(a) Executive Summary (1-2 pages)

- Breaches of AL levels
- Complaint Log
- Notifications of any summons and successful prosecutions;
- Future key issues

(b) Environmental Status

- Works undertaken during the month with illustrations including key personnel contact names and telephone number; and
- Drawing showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations

(c) Implementation Status

Advice on the implementation status of environmental protection and pollution control/mitigation measures including measures for ecological and visual impacts, as recommended in the EIA Report, summarised in the updated implementation schedule (see *Annex A*).

(d) Monitoring Results

To provide monitoring results (in both hard and diskette copies) together with the following information:

- Monitoring methodology
- Name of laboratory and types of equipment used and calibration details
- Parameters monitored
- Monitoring locations (and depth);
- Monitoring date, time, frequency, and duration;
- Weather conditions during the period; and
- Any other factors which might affect the monitoring results;
- QA/QC results and detection limits

(e) Report on Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

- Record of all noncompliance (exceedances) of the environmental quality performance limits (AL Levels);
- Record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
- Record of all notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;

- Review of the reasons for and the implications of non-compliance, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - a description of the actions taken in the event of noncompliance and deficiency reporting and any follow-up procedures related to earlier noncompliance;
- (f) Others
- An account of the future key issues as reviewed from the works programme and work method statements; and
 - Advice on the solid and liquid waste management status.
- (g) Appendix
- AL levels
 - Graphical plots of trends of monitored parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - i) major activities being carried out on site during the period;
 - ii) weather conditions during the period; and
 - iii) any other factors which might affect the monitoring results
 - Monitoring schedule for the present and next reporting period
 - Cumulative statistics on complaints, notifications of summons and successful prosecutions
 - Outstanding issues and deficiencies

Quarterly EM&A Summary Reports

The Quarterly EM&A Summary Report which shall generally be around 5 pages (including about 3 of text and tables and 2 of figures) shall contain at least the following information.

- a) up to half a page executive summary;
- b) basic project information including a synopsis of the project organisation, programme, contacts of key management, and a synopsis of work undertaken during the quarter;
- c) a brief summary of EM&A requirements including:
 - monitoring parameters;
 - environmental quality performance limits (AL Levels); and
 - environmental mitigation measures, as recommended in the EIA Report;
- d) advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA study report, summarised in the updated implementation schedule;

- e) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- f) graphical plots of the trends of monitored parameters over the past 4 months (the last month of the previous quarter and the present quarter) for representative monitoring stations annotated against;
 - the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results;
- g) advice on the solid and liquid waste management status;
- h) a summary of noncompliance (exceedances) of the environmental quality performance limits (AL Levels);
- i) an quarterly assessment of constructional impacts on water quality at the project site including but not limited to comparison of the difference between the quarterly mean and 1.3 times of the ambientment which is defined as 30% increase of the baseline data or EPD data of the related parameters by using appropriate statistical procedures. Suggestion of appropriate mitigation measures if the quarterly assessment analytical results demonstrate that the quarterly mean is significantly higher than the liaison water quality times of the ambient mean ($p < 0.05$);
- j) a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
- k) a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
- l) a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
- m) comments (e.g. effectiveness and efficiency of the mitigation measures), recommendations (e.g. any improvement in the EM&A programme) and conclusions for the quarter; and
- n) proponents' contacts and any hotline telephone number for the public to make enquiries.

Annual/Final EM&A Review Reports

The Annual/Final EM&A Report shall contain at least the following information:

- a) Executive Summary (1-2 pages);
- b) drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations;
- c) basic project information including a synopsis of the project organization contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
- d) a brief summary of EM&A requirements including:

- (i) environmental mitigation measures, as recommended in the project EIA Report;
 - (ii) environmental impact hypotheses tested;
 - (iii) AL Levels;
 - (iv) all monitoring parameters
 - (v) Event-Action Plans;
- e) a summary of the implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA study report summarized in the updated implementation schedule;
- f) graphical plots and the statistical analysis of the trends of monitored parameters over the course of the project, including the post project monitoring (for the past twelve months for annual report) for all monitoring stations against:
- the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results
- g) a summary of noncompliance (exceedances) of the environmental quality performance limits (AL Levels);
- h) a review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- i) a description of the actions taken in the event of non-compliance;
- j) a summary record of all complaints received (written or verbal) for each media liaison and consultation undertaken, action and follow-up procedures taken;
- k) a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection pollution control legislations locations and nature of the breaches, investigation, follow-up actions taken and results;
- l) a review of the validity of EIA Report predictions and identification of shortcomings in EIA Report recommendations; and
- m) a review of the effectiveness and efficiency of the mitigation measures;
- n) a review of success of the EM&A programme to cost effectively identify deterioration and to initiate prompt effective mitigatory action when necessary.

8.4 Data Keeping

The site document such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, the document shall be well kept by the ET Leader and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. The monitoring data shall also be recorded in magnetic media form, and the software copy can be available upon request. The water quality data software format shall be agreed with EPD. All the documents and data shall be kept for at least one year after completion of the construction contract.

8.5 Interim Notifications of Environmental Quality Limit Exceedances

With reference to Event/Action Plans in *Tables 2.3* and *3.3*, when the environmental quality limits are exceeded, the ET Leader shall immediately notify the ER and EPD, as appropriate. The notification shall be followed up with advice to EPD on the results of the investigation, proposed action and success of the action taken, with any necessary follow-up proposals. A sample template for the interim notifications is shown in *Annex A*.

9. OPERATION PHASE EM&A

9.1 Introduction

Operational noise is required for EM&A during operational phase. The methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit are discussed as follows.

9.2 Operational Phase Noise Monitoring

Noise monitoring during the operational phase of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling shall be carried out at NSRs which are located along Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling and in the vicinity of the recommended direct technical remedies. The purpose of this monitoring is to verify the traffic noise prediction and effectiveness of the proposed noise mitigation measures. Highways Department shall be responsible for the operational phase monitoring. A qualified noise monitoring contractor or laboratory shall be employed to carry out the proposed monitoring.

9.2.1 Noise Parameter

The operational phase noise monitoring shall focus on traffic noise. Noise level shall be measured in terms of L_{10} for the a.m. and p.m. peak traffic flow on normal weekdays once Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling is fully operational. In order to capture the actual peak hour traffic, noise monitoring is recommended to be conducted for a period of 1.5 hour.

9.2.2 Monitoring Equipment

Monitoring equipment to be used shall be the same as that specified in *Section 3.3*. That is, sound level meters in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications shall be used for carrying out the traffic noise monitoring. Calibration procedures and other measurement conditions shall also be in the same as stated in *Section 3.3*.

9.2.3 Monitoring Locations

The noise monitoring locations is recommended to be at NSRs which are located along Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling and are in the vicinity of the recommended direct technical remedies. The noise monitoring locations are summarised in *Table 9.1*. However, the exact locations where the noise monitoring shall be conducted shall be confirmed after the completion of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling and in agreement with the EPD.

Table 9.1 Noise Monitoring Stations during Operational Phase

Location	Monitoring Station	Description
King Nga Court, King Yuet House 2	(SR 58)	Residential
Hong Lok Yuen 2, 2/F	(SR 20)	Residential
The Paragon	(SR 39)	Residential

9.2.4 Baseline Monitoring

Baseline monitoring should be carried out daily for a period of at least two weeks at agreed locations.

9.2.5 Impact Monitoring

Traffic noise monitoring shall be carried out at the proposed monitoring stations (subject to approval by EPD) when Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling is fully operational. It is recommended that two sets of traffic noise monitoring data should be obtained during the first year of the operation of Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling. The following is a guide on the traffic noise monitoring for each station when Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling is operational:

- one set of measurements at the morning traffic peak hour on normal weekdays (exact timing to be confirmed with Transport Department and agreed with EPD); and
- one set of measurements at the evening traffic peak hour on normal weekdays (exact timing to be confirmed with Transport Department and agreed with EPD).

During the traffic noise monitoring, traffic counts (vehicles per hour, % of heavy vehicles and mean speed for north-bound and south-bound respectively) should also be conducted so as to ensure the traffic noise of the peak periods are covered.

The measured noise levels should be compared with the noise modelling result obtained with the counted traffic data. The discrepancy, if any, shall be reported to EPD.

ANNEX A

**IMPLEMENTATION SCHEDULE AND
PROFORMA FOR CONSTRUCTION PHASE
EM&A PROGRAMME**

A. SCHEDULE OF RECOMMENDED MITIGATION MEASURES

A.1 Introduction

Schedules of all mitigation measures recommended in the EIA Report are given within Tables A.1 to A.6 for each environmental aspect.

Table A.1 Air Quality – Schedule of Recommended Mitigation Measures

Impact	Mitigation Measures	Timing	Responsibility
Air Quality during construction	Restricting heights from which materials are dropped, as far as practicable to minimise the fugitive dust arising from unloading/loading.	During construction	Contractor
	All stockpiles of excavated materials or spoil of more than 50m ³ shall be enclosed, covered or dampened during dry or windy conditions.	During construction	Contractor
	Effective water sprays shall be used to control potential dust emission sources such as unpaved haul roads and active construction areas.	During construction	Contractor
	All spraying of materials and surfaces shall avoid excessive water usage.	During construction	Contractor
	Vehicles that have the potential to create dust while transporting materials shall be covered, with the cover properly secured and extended over the edges of the side and tail boards.	During construction	Contractor
	Materials shall be dampened, if necessary, before transportation.	During construction	Contractor
	Travelling speeds shall be controlled to reduce traffic induced dust dispersion and re-suspension within the site from the operating haul trucks.	During construction	Contractor
	Vehicle washing facilities shall be provided to minimise the quantity of material deposited on public roads.	During construction	Contractor
Air Quality during Operation	Not required	N/A	N/A

Table A.2 Noise – Schedule of Recommended Mitigation Measures

Impact	Mitigation Measures	Timing	Responsibility
Noise during construction	Use of silenced plant or plant equipped with mufflers or dampers in substitute of ordinary plant.	During construction	Contractor
	Reduce the number of equipment and their percentage on-time.	During construction	Contractor
	3.5 m and 5.5 m high temporary noise barrier at culvert construction work area (Fig 5.6.1).	During construction	Contractor
	3 m high temporary noise barrier along the northern edge of Bridge 12 at ground level (Fig 5.6.2).	During construction	Contractor
	2 m high temporary noise barrier along the northern edge of Bridge 12 at bridge level (Fig 5.6.2).	During construction	Contractor
	2.5 m high temporary noise barrier along Tai Wo Service Road West (Fig 5.6.3).	During construction	Contractor
	3.5 m high temporary noise barrier along Tai Wo Service Road West near Wai Tau Tsuen (Fig 5.6.3).	During construction	Contractor
	3.5 m high temporary noise barrier along Tai Wo Service Road West near Tai Hang (Fig 5.6.3).	During construction	Contractor
	7 m high temporary noise barrier along Tai Wo Service Road West near Tai Wo Footbridge work area (Fig 5.6.4).	During construction	Contractor
7 m high temporary noise barrier near Kiu Tau Footbridge work area (Fig 5.6.4).	During construction	Contractor	
2.5 m high temporary noise barrier near river diversion work area (Fig 5.6.5).	During construction	Contractor	
Noise during operation	Noise barriers of varying heights as shown on Drawings 551/R/9002 to 9016.	During design	Designer to implement in the engineering design
	Low noise reducing surfacing along both the widened and reconstructed sections of the works	During design	Designer to implement in the engineering design

Table A.3 Water Quality – Schedule of Recommended Mitigation Measures

Impact	Mitigation	Timing	Responsibility
Water quality during construction	Demolition and reconstruction of bridges <ul style="list-style-type: none"> • Prevent off-site migration through use of sheet piles. • Minimise duration of works as far as practical. • All sewer and drainage connections should be sealed to prevent debris, soil, sand etc, from entering public sewers/drains. • Site surface runoff should be settled to remove sand/silt before it is discharged into the existing storm drains. 	During construction	Contractor
	River training works <ul style="list-style-type: none"> • Inspection and testing of water quality in the nullah on the Tai Po River and in the Ma Wat River immediately downstream of culvert N490, between the rubber dam and the water intake channel. 	During construction	Contractor
	Road Widening Works and Earthworks <ul style="list-style-type: none"> • Wastewater generated from any concrete batching washdown of equipment or similar activities should be discharged into foul sewers, after the removal of settleable solids, and pH adjustment as necessary. All sewage discharges from the study area should meet the TM standards and approval from EPD through the licensing process is required. • Sand traps, oil interceptors and other pollution prevention installations should be provided, properly cleaned and maintained. • Runoff from exposed working areas, unfinished slopes and from unlined temporary channels should be directed to stilling basins and/or silt traps before discharging to the drainage outfalls. • Regular inspections of stilling basins and/or silt traps is required to ensure that sediment is not conveyed into the existing drainage system. • Open stockpiles should be covered with a tarpaulin cover. • During the wet season, any exposed top soils should be covered with a tarpaulin, shotcreted or hydroseeded. • Sand and silt from wash-water from vehicle washing should be settled out before discharging into storm drains. • Fuels should be stored in bunded areas such that spillage can be easily collected. 	During construction	Contractor

Impact	Mitigation	Timing	Responsibility
Water Quality during operation	Contaminants present in the run off during normal operation will by their chemical nature be strongly absorbed onto the particulate phase. The use of silt or sand traps, preferably built into the road drainage system will control both the suspended solids in the run off and the contaminants absorbed onto them. These traps should be maintained regularly and frequently cleaned to prevent the accumulation of solids with the resultant reduction in retention time and thus efficiency.	During design	Designer to implement in the engineering design

Table A.4 Waste – Schedule of Recommended Mitigation Measures

Impact	Mitigation	Timing	Responsibility
Waste management during construction	<p>General Waste</p> <ul style="list-style-type: none"> • Transport of wastes off site as soon as possible. • Maintenance of accurate waste records. • Minimisation of waste generation for disposal (via reduction/recycling/re-use). • No on-site burning will be permitted. • Use of re-useable metal hoardings/signboards. 	During construction	Contractor
	<p>Vegetation from site clearance</p> <ul style="list-style-type: none"> • Segregation of materials to facilitate disposal. • Mulching to reduce bulk and where possible review opportunities for the possible beneficial use within landscaping areas. 	During construction	Contractor
	<p>Demolition Wastes</p> <ul style="list-style-type: none"> • Segregation of materials to facilitate disposal. • Appropriate stockpile management. 	During construction	Contractor
	<p>Excavated Materials</p> <ul style="list-style-type: none"> • Segregation of materials to facilitate disposal / reuse. • Appropriate stockpile management. • Re-use of excavated material on or off site (where possible). • Special handling and disposal procedures in the event that contaminated materials are excavated. 	During construction	Contractor
	<p>Construction Wastes</p> <ul style="list-style-type: none"> • Segregation of materials to facilitate recycling/reuse (within designated area in appropriate containers/stockpiles). • Appropriate stockpile management. • Planning to reduce over ordering and waste generation. • Recycling and re-use of materials where possible (e.g. metal, wood from formwork) • For material which cannot be re-used/recycled, collection should be carried out by an approved waste contractor for landfill disposal. 	During construction	Contractor
	<p>Bentonite Slurries</p> <ul style="list-style-type: none"> • Bentonite slurries should be reused as far as possible. • Disposal in accordance with Practice Note For Professional Persons ProPECC PN 1/94. 	During construction	Contractor

Table A.5 Ecology – Schedule of Recommended Mitigation Measures

Impact	Mitigation Measures	Timing	Responsibility
Ecology during construction	<p>Accurate Delineation of Works Area</p> <ul style="list-style-type: none"> • Boundaries of proposed works areas shall be clearly identified and separated from external areas by a physical barrier to prevent encroachment of adjacent habitats. • Individual trees which fall within the works areas but which work plans show do not require removal are to be retained and fenced off to maximise protection. 	During construction	Contractor
	<p>Vegetation Clearance</p> <ul style="list-style-type: none"> • No fires shall be lit within the works area for the purpose of burning cleared vegetation. • The Contractor shall give consideration to mulching the cleared vegetation for recycling within the works area / adjacent land. 	During construction	Contractor
	<p>Dust generation</p> <p>There are a number of measures which shall be taken as specified in the Air Pollution Control (Construction Dust) Regulation on ‘ Dust Control Requirements, including the following key measures to be applied during construction:</p> <ul style="list-style-type: none"> • vehicle washing facilities to be provided at every discernible or designated vehicle exit point; • all temporary site access roads shall be sprayed with water to suppress dust as necessary; • all dusty materials should be sprayed with water immediately prior to any handling; and • all debris should be covered entirely by impervious sheeting or stored in a sheltered debris collection area. 	During construction	Contractor
	<p>Surface Run-off</p> <p>In general, mitigation measures shall be in accordance with ProPECC PN1/94 on ‘ Construction Site Drainage’. Key measures include:</p> <ul style="list-style-type: none"> • Bund and cover stock piles to avoid run-off; • Channel any run-off through a system of oil, grease and sediment / silt traps and re-use water on site where ever practical; • All vehicle maintenance to be undertaken within a bunded area; and • Maximise vegetation retention on-site to maximise absorption (minimise transport). 	During construction	Contractor

Impact	Mitigation Measures	Timing	Responsibility
Ecological impact during operation phase	Compensatory ecological planting <ul style="list-style-type: none"> • To be conducted over approx. 15 hectares, including native and exotic species. • Specific planting details as in Section 8.4 and Section 9 of the EIA. 	During construction and operation	Contractor (during construction); LCSD/AFCD* (during operation)

Note: * The division of vegetation planting and maintenance responsibilities shall follow the guidelines stipulated in Works Branch Technical Circular (WBTC) 24/94.

Table A.6 Landscape and Visual Impact – Schedule of Recommended Mitigation Measures

Impact	Mitigation Measures	Timing	Responsibility
Landscape & Visual during construction	<p>Preservation of Existing Vegetation</p> <ul style="list-style-type: none"> • Trees identified for retention within the project limit would be protected during the works. • The tree transplanting and planting works shall be implemented by approved Landscape Contractors 	During construction	Contractor
	<p>Temporary Works Areas</p> <ul style="list-style-type: none"> • Where feasible the works areas would be screened using hoarding and existing vegetation would be retained where possible to reduce the landscape and visual impacts arising from the construction activity. The landscape of these works areas would be restored following the completion of the construction phase. 	During construction	Contractor
	<p>Hoarding</p> <ul style="list-style-type: none"> • A hoarding would be erected where practicable in the most visually sensitive locations to screen the temporary construction works from the local VSR's, 	During construction	Contractor
	<p>Top Soils</p> <ul style="list-style-type: none"> • The works will result in disturbance to extensive areas of topsoil. Topsoil worthy of retention should be stockpiled for use following completion of the civil engineering works. It should either be temporarily vegetated with hydroseeded grass or turned over on a regular basis. 	During construction	Contractor
	<p>Protection of Important Landscape Features</p> <ul style="list-style-type: none"> • Important features such as temples, Island House and kilns within the study area, although remote from the proposed works retained and adequately protected. 	During construction	Contractor
Landscape during operation	<p>Footpath and Cycleway</p> <ul style="list-style-type: none"> • Two lengths of footpath / cycleway embankment would be reinstated between the reprovisioned footbridge at Nam Wah Po and the existing interchange Wo Hop Shek. Tree planting along the line of the reprovisioned footpath would provide shade for pedestrians. 	During Operation	Designer to implement during engineering design

Impact	Mitigation Measures	Timing	Responsibility
Landscape during operation	<p>Compensatory Planting</p> <ul style="list-style-type: none"> • The loss of existing vegetation would be a primary source of both the landscape and visual impacts. The road widening would be facilitated through the construction of extensions to the embankment and would have a soft finish. • The embankments and cuttings would be planted with a mix of tree and shrub planting. Identifying a corridor separate from the utility corridors that impede landscape works. • Tree and shrub screen planting including roadside and amenity planting. In certain locations, woodland planting would be appropriate with the species mix reflecting those affected with the eventual long-term objective of creating native woodland. • Create a fast vegetative cover to ensure soil stability and quick visual effect for planting of disturbed areas. The long-term aim would be to allow native species to become dominant. • Use of ornamental species in urban locations such as areas adjacent to residential development or on urban sections of the highway. • Use of low growing shrub planting in the central reserve of the highway where the forward visibility splays allow. Robust plant species would be used which have a low maintenance requirement. 	During Operation	Designer to implement during engineering design
Visual Impact during operation	<p>Engineering Structures</p> <ul style="list-style-type: none"> • The structures should aim to “touch” the ground as lightly as possible in order to minimise disturbance to the existing landscape and vegetation below the structures. Landform and vegetation in areas disturbed by construction works will be reinstated to blend with the existing landscape patterns; • Maintenance access roads shall be sensitively designed to minimise visual intrusion and physical disruption of the existing landscape. • Lighting along the roadside should be designed to avoid excessive light spillage raising the levels of ambient light levels in the local areas and in views from the VSR's. • New structures should aim to match those existing along Tolo Highway for visual compatibility. • Drainage should where possible be concealed in the structure. • Vegetation to be proposed below viaducts where light levels allow. • The advice of ACABAS should be incorporated into the detailed design. 	During Operation	Designer to implement during engineering design

Table A.7 Cultural Heritage Impact – Schedule of Recommended Mitigation Measures

Impact	Mitigation Measures	Timing	Responsibility
Archaeological Impact during construction	Archaeological Monitoring works shall be carried out in areas defined in Figures 10.1 & 10.2 Specification clauses to be included in the construction contract to ensure that construction works in the proximity to Wun Yiu kiln and Yuen Chau Tsai is carried out as unobstructively as possible to avoid any damage and discourage visitors to the site.	During construction During design	Contractor/Resident Site Staff Designer to implement during engineering design

Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

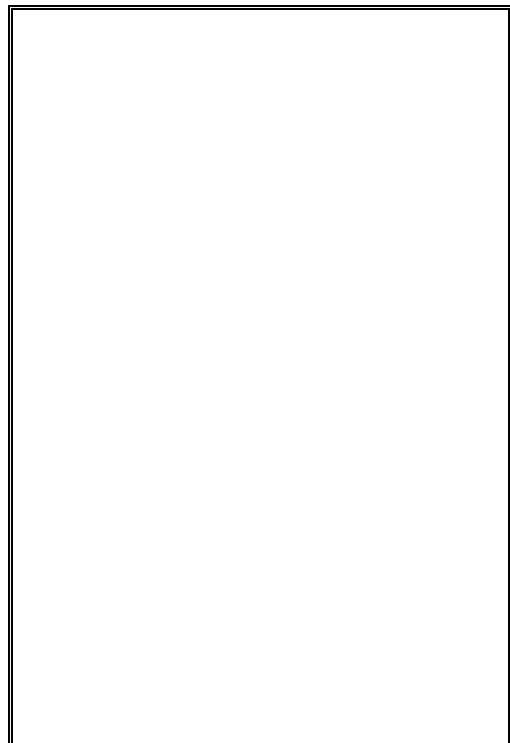
Location Plan

Prepared by:

Designation:

Signature:

Date:



Data Sheet for TSP Monitoring

Monitoring Location			
Details of Location			
Sampler Identification			
Date & Time of Sampling			
Elapsed-time	Start (min.)		
Meter Reading	Stop (min.)		
Total Sampling Time (min.)			
Weather Conditions			
Site Conditions			
Initial Flow Rate, Qsi	Pi	(mmHg)	
	Ti	(°C)	
	Hi	(in.)	
	Qsi	(Std. m ³)	
Final Flow Rate, Qsf	Pf	(mmHg)	
	Tf	(°C)	
	Hf	(in.)	
	Qsf	(Std. m ³)	
Average Flow Rate (Std. m ³)			
Total Volume (Std. m ³)			
Filter Identification No.			
Initial Wt. of Filter (g)			
Final Wt. of Filter (g)			
Measured TSP Level (ug/m ³)			

Name & Designation

Signature

Date

Field Operator :

Laboratory Staff:

Checked by:

Noise Monitoring Field Record Sheet

Monitoring Location			
Description of Location			
Date of Monitoring			
Measurement Start Time (hh:mm)			
Measurement Time Length (min.)			
Noise Meter Model / Identification			
Calibrator Model / Identification			
Measurement Results	L ₉₀	(dB(A))	
	L ₁₀	(dB(A))	
	Leq	(dB(A))	
Major Construction Noise Source (s) During Monitoring			
Other Noise Source(s) During Monitoring			
Remarks			

Name & Designation

Signature

Date

Recorded by :

Checked by:

Water Quality Monitoring Data Record Sheet

Location				
Date				
Start Time (hh:mm)				
Weather				
Sea Conditions				
Tidal Mode				
Water Depth (m)				
Monitoring Depth		Surface	Middle	Bottom
Salinity				
Temperature				
DO Saturation				
DO				
Turbidity				
SS Sample Identification				
SS	(mg/l)			
	<100m from location			
	>100m from location			
Other Observations				

Name & Designation

Signature

Date

Recorded by :

Checked by:

Note: The SS results are to be filled up once they are available from the laboratory

ANNEX B

**PROFORMA FOR ARCHAEOLOGICAL
MONITORING WORKS**

**Guidelines for the Archaeological Monitoring of Engineering
Works for Widening of Tolo Highway/Fanling Highway between Island House
Interchange and Fanling**

1. Introduction

Monitoring is a form of mitigation which is required when engineering works impact on areas that have been assessed as having archaeological potential and where conventional testing methods are not possible due to inaccessibility, for examples, concrete coverage and housing settlement . The range of archaeological resources that require monitoring include both historical and prehistoric material and features.

The monitoring process entails the observation of the engineering works by qualified archaeologists in order to identify any archaeological material or features that revealed during the excavation phase of the works schedule. Upon identification of such material or features, the archaeologists will require immediate access to the excavation area for recording of the material/features *in-situ* location, artefact retrieval and sample collection.

These guidelines serve for two basic purposes, firstly, that the archaeological resources are adequately recorded and recovered and secondly, that appropriate measures are taken on site to create a minimum of delays to the engineering schedule.

2. Monitoring Personnel

Monitoring should be undertaken by a qualified archaeologist, whose must apply for a licence under the Antiquities and Monuments Ordinance (Cap. 53) from the Authority before the monitoring works commence.

3. Areas to be Monitored

The areas which required archaeological monitoring is defined in the Drawing Nos. 551/R/9007 and 551/R/9008 forwarded to you under my memo dated 3-3-2000 with reference (56) in LCS AM 81/3/5.

4. Scale of Monitoring / Sampling Procedures

An appropriate sampling procedure must be developed by the field archaeologist and approved by AMO. Sampling should be set not be less than 2.5% in order to ensure a meaningful representation.

5. Site Access

Archaeologists should be allowed reasonable access to relevant areas of groundworks, so that deposits can be examined and recorded. Trenches may require temporary shoring and groundworks might need to be temporarily re-scheduled, to provide a safe environment for such works. Provision should be made, at the earliest stage of development programming, for specified blocks of time to be available for unrestricted archaeological access to areas of groundworks.

6. Monitoring and Retrieval Methodology

Table 1 are the various categories of archaeological material and features that are most likely to occur in local contexts. Also listed are the recommended type and degree of recording and retrieval required for each category.

7. Recording Forms for Monitoring

A set of forms for the recording of any archaeological material identified during the monitoring process must be approved by the AMO. They should include the following:

- registers to record finds, special finds, contexts, photographs, drawings, levels and samples
- context description forms
- a daily record form designed to specifically for archaeological monitoring. This form must locate clearly the area of works monitored, the nature and extent of the works, summaries of the days findings and cross references to all register numbers used that day.
- a set of AMO's recording forms is attached at Annex for your easy reference.

8. Safety Requirements

Archaeologists and staff employed in monitoring must follow the safety procedures enforced by the contractors on site.

9. Monitoring Report

The procedures and results of the monitoring programme should be presented in report form, following standards set by the AMO for reports on other types of archaeological fieldwork. This includes details of the overall programme, methodology, sampling strategy, implementation, findings and interpretation. All data, material and records forming the site archive must be submitted to the AMO upon completion of the project.

Categories of Archaeological Material	Retrieval Procedures
<p style="text-align: center;">Human Burial</p> <ul style="list-style-type: none"> - Skeletal remains - Items associated with Human Burial, i.e. grave goods 	<p style="text-align: center;">Full Recording and Recovery of Human Remains and Associated Features</p> <ul style="list-style-type: none"> - Complete recording by photography, drawing, written description - Full Measurement of burial and surrounding matrix. - Retrieval of human remains and associated materials. - Retrieval of surrounding soil for further analysis.
<p style="text-align: center;">Intact Features</p> <ul style="list-style-type: none"> - Structural/architectural remains. - Undisturbed contexts, e.g. heath, midden, habitation area, assemblages of artefacts and/ or environmental material. 	<p style="text-align: center;">Limited Recording and Recovery of Archaeological Features</p> <ul style="list-style-type: none"> - Recording and measurement of salient features by photography, drawing and written description - Retrieval of all archaeological material. - Retrieval of samples from the surrounding matrix.
<p style="text-align: center;">Intact Artefacts</p> <ul style="list-style-type: none"> - Complete objects, e.g. pottery, metal objects, stone or bone tools. The objects are complete but isolated and are not part of assemblage or feature 	<p style="text-align: center;">Recovery of Artefacts</p> <ul style="list-style-type: none"> - Recovery of Objects. - Sampling of surrounding matrix.
<p style="text-align: center;">Isolated Material</p> <ul style="list-style-type: none"> - Sherds, non-human bone, artefact fragments (metal, pottery, glass). There are no complete objects, the material is isolated and fragmentary in nature. 	<p style="text-align: center;">Recovery of Artefact Fragments/ Archaeological Material</p> <ul style="list-style-type: none"> - Recovery of material, e.g. artefact fragments, environmental material and sampling of surrounding matrix.
<p style="text-align: center;">Deposits with Archaeological Potential</p> <ul style="list-style-type: none"> - Soil deposits which exhibit characteristics associated with archaeological remains in Hong Kong 	<p style="text-align: center;">Sampling of Deposit</p> <ul style="list-style-type: none"> - Collection of soil samples from deposits displaying archaeological potential.

Table 1. Categories of archaeological finds and recommended action.

香港古物古蹟辦事處考古組
 Archaeology Division
 Antiquities & Monuments Office
 Hong Kong

錄像登記表
 Video-tape Register

頁碼 Sheet No. :
 遺址名稱 Site Name:
 遺址代號 Site Code :

錄影帶型號 (Tape Type) : _____ 帶長 (Span) : _____ 分鐘 min.(s) 錄影帶編號 (Tape No.) : _____
 開始日期 (Date Started) : _____ 結束日期 (Date Finished) : _____

讀數 Count	日期 Date	探方編號 Site Grid Ref.	遺存單元編號 Context No.	內容 Subject	攝錄者 Recorded by
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32.					

遺址名稱 Site Name	遺址代號 Site Code	編號 Sheet No.
相機 Camera	膠卷種類 Roll	感光度 ASA/DIN
始拍日期 Date Started	終拍日期 Date Finished	沖晒日期 Date Processed

內容 Subject	遺存單元編號 Context No.	取景方向 View From	日期 Date	時間 Time	光圈/快門 Exposure	鏡頭 Lens	拍攝者 By
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02							
1							
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田野攝影登記表
Field Photography Record

香港古物古蹟辦事處考古組
Archaeology Division
Antiquities & Monuments Office
Hong Kong

探力編號 Site CRM Ref.

遺存單元記錄表 CONTEXT RECORDING

堆積 DEPOSIT	打破面 CUT
1. 粘硬度 Compaction	1. 平面形狀 Shape in plan
2. 土色 Colour	2. 轉角形狀 Corners
3. 土質/含礫粒大小 (10%以上) Composition / Particle size (over 10%)	3. 面積/深度 Dimensions/Depth
4. 包含物 (10%以下) 少/中/多 Inclusions (under 10%) Occa / mod / freq	4. 近頂部斷面形狀 Break of slope-top
5. 厚度/範圍 Thickness & extent	5. 邊形 Sides
6. 其他 Other comments	6. 近底部斷面形狀 Break of slope-base
7. 發掘方法與天氣 Method & conditions	7. 底部形狀 Base
	8. 方向 Orientation
	9. 傾斜軸 Inclination of axis
	10. 是否被打破 Truncated (if known)
	11. 填土編號 Fill nos
	背面繪草圖 Draw profile overleaf =>

層序關係 Stratigraphic matrix

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
本遺存單元 This context					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

解釋 Your interpretation:

討論 Your discussion:

接背面 =>

本遺存單元相當於 Context same as:

平面圖號 Plan no:	遺址參考資料 Site book ref:	簽名及日期 Initials & Date:
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其他圖號(如剖面圖等) Other drawings: S/E	相關層序 Matrix location:	覆核人及日期 Checked by & Date:
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卡片號 Card no:

背頁的水準測量 Levels on reverse

計算和轉移至平面圖後請 √:

最高 Highest	<input type="checkbox"/>	最低 Lowest	<input type="checkbox"/>
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遺物 Finds (√)

無 None	陶 P	瓷 C	石 S	骨/貝 B/Shell	金屬 M	其他 Other
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

環境樣本 Environmental samples:

樣本編號及種類 Sample no. & type:	遺物標本件號 Finds sample (BM) no:
出土物標號: 現場 <input type="checkbox"/> 遺址外 <input type="checkbox"/>	金屬標測: 原位置 <input type="checkbox"/> 現場 <input type="checkbox"/> 遺址外 <input type="checkbox"/>

覆核意見 Checked interpretation:

接背面 =

估計年代 Provisional period	分組/分期 Group	簽名及日期 Initials & Date
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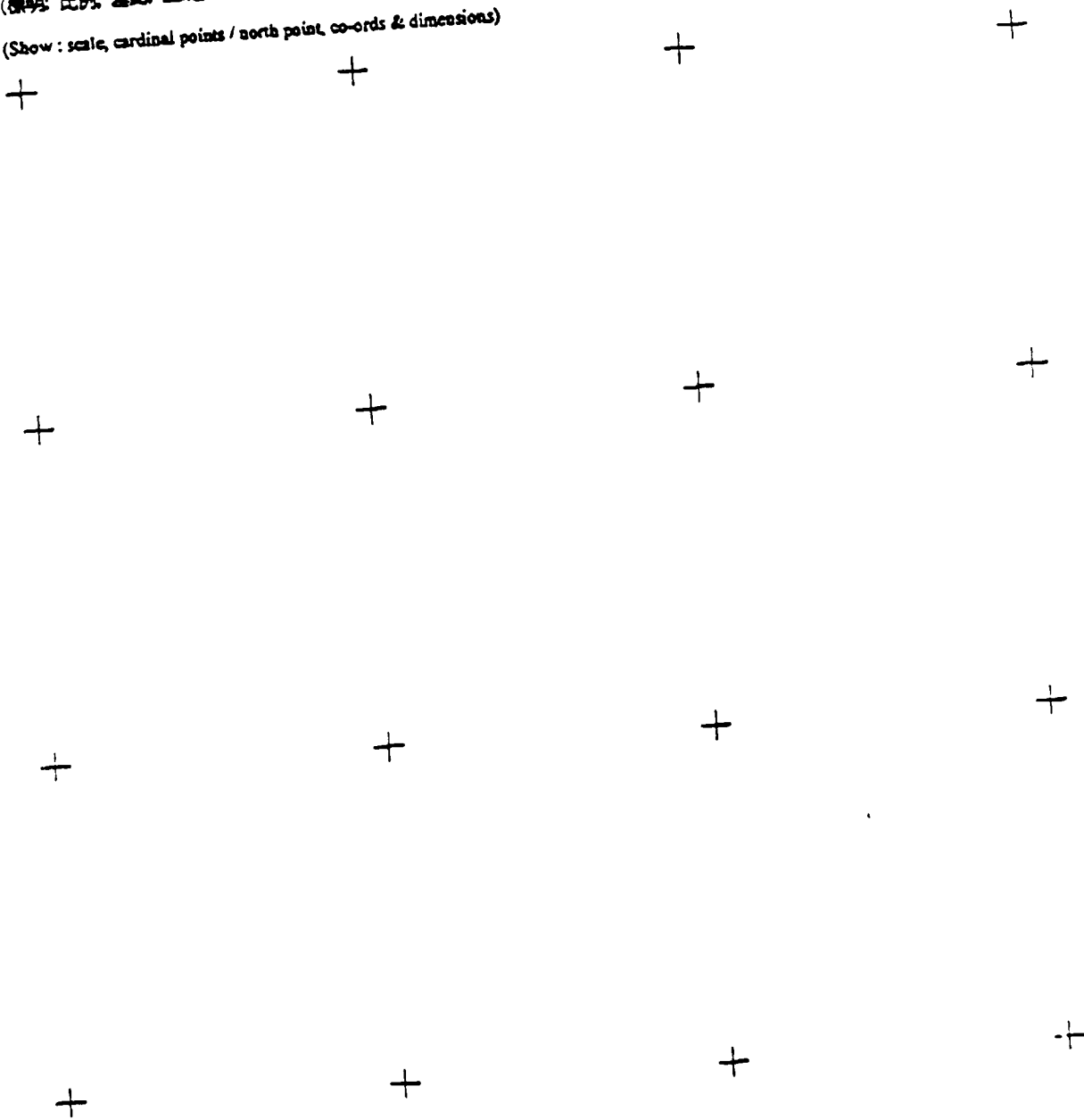
香港古物古蹟辦事處考古組
 ARCHAEOLOGY SECTION
 ANTIQUITIES & MONUMENTS OFFICES
 HONG KONG

	第一站 (1st TBM)	BM.	Nos:	(2nd TBM)	BS:	Nos:
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No	前視 FS	實際高程 Reduced	No	前視 FS	實際高程 Reduced	No	前視 FS	實際高程 Reduced
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2			12			22		
3			13			23		
4			14			24		
5			15			25		
6			16			26		
7			17			27		
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9			19			29		
10			20			30		

請記錄在平面圖 Now transfer to plan
 請測繪草圖 Draw sketch profile / plan

(標明: 比例, 基點, 正北, 經度, 方向, 位置等)
 (Show: scale, cardinal points / north point, co-ords & dimensions)



ANNEX C1

**COMMENTS AND RESPONSES ON
DRAFT EM&A MANUAL**

**Comments and Responses on
Investigation Assignment for
Widening of Tolo Highway/Fanling Highway
between Island House Interchange and Fanling**

Draft Environmental Monitoring and Audit Manual

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**Comments and Responses on
Investigation Assignment for
Widening of Tolo Highway/Fanling Highway
between Island House Interchange and Fanling**

Draft Environmental Monitoring and Audit Manual

Comments	Responses
<p>Item 1 : Chief Highway Engineer/NT East Ref. () in HNT 703/TP/148 Dated 3 August 1999</p>	Noted.
<p>I refer to your letter dated 30.7.99 and have no comments on the Manual from highways point of view.</p>	
<p>Item 2: Assistant Commissioner for Transport/NT Transport Department Ref. () in NR 183/161/720TH Dated 4 August 1999</p>	We have contacted the centre and they have advised us that their office has not been provided with air conditioning facilities.
<p>I refer to your letter dated 30.7.99 and have no comments from traffic point of views. However I notice that in tables 1.5 and 1.9 the Island House Conservation Studies Centre (Office use) has been selected as a Selected ASR and NSR. It seems that the office has already been provided with air conditioning facilities. You may wish to review the need of this NSR.</p>	
<p>Item 3 : District Officer (North), North District Office, Ref. (4) in DON 67/239/97 V Dated 10 August 1999</p>	Noted.
<p>Thank you for your letter of 30 July 1999. Please note that this office has no comment on the above manual.</p>	
<p>Thank you for your kind attention.</p>	
<p>Item 4 : Director of Agriculture & Fisheries, Agriculture & Fisheries Department Ref: (46) in AF EA 007/98 Dated 10 August 1999</p>	Noted.
<p>Thank you for your letter of 30 July 1999 enclosing a copy of Draft EM&A Manual for the captioned project.</p>	
<p>The findings of the EIA Study of the captioned project should form the basis of this EM&A Manual. However, the EIA report has yet to be finalized and there are still some outstanding issues regarding ecological impact assessment to be addressed as indicated in my letter of 6 August 1999 (ref. (43) in AF EA 007/98). As such, we would reserve our comments on the EM&A Manual until the ecological impact assessment of the EIA Study is substantially completed.</p>	

**Comments and Responses on
Investigation Assignment for
Widening of Tolo Highway/Fanling Highway
between Island House Interchange and Fanling**

Draft Environmental Monitoring and Audit Manual

Comments	Responses
<p>Item 5 : Project Manager/NT North Territory Development Department Ref: () in NTN 4/5/44 Dated 11 August 1999</p>	
<p>I refer to your above-referenced letter dated 30.7.1999.</p>	
<p>Please be advised that a landscape section should be included in the EM&A Manual to address the issues in relation to landscaping works.</p>	<p>It is not normally a requirement for landscape and visual mitigation measures to be included in the EM&A. Mitigation proposals will be addressed in the Investigation Report.</p>
<p>Item 6 : Senior Landscape Architect 2/Landscape Unit, Highways Department Ref: () in HYDT/12/7/75 Dated 19 August 1999</p>	
<p>I refer to your letter and the attached captioned report layout dated 30 July 1999. My comments are as follows:</p>	
<p>1. Landscape aspect shall be included as one of the sections in the EM&A manual.</p>	<p>Please refer to response to item 5 above.</p>
<p>2. Section 1.3, landscape aspect should be included as part of this section.</p>	<p>Please refer to response to item 5 above.</p>
<p>3. Tentative Implementation Programme, as commented previously, most sections of the landscape works will be completed out of the planting season, which shall be avoided.</p>	<p>Programme will be updated accordingly.</p>
<p>4. Annex A Table A.5, protection of existing trees within the site should be provided and monitored during construction.</p>	<p>Text will be revised accordingly.</p>
<p>5. Section 6.2, last sentence, "feng-shui woodlands and secondary woodlands are to be <u>lost</u> due to road construction". Please amend.</p>	<p>Sentence will be revised accordingly.</p>
<p>Item 7 : District Planning Officer/Shia Tin, Tai Po & North Planning Department Ref: (5) in PD/SN 4/5/3 VI Dated 20 August 1999</p>	
<p>I refer to your letter of 15.7.1999 enclosing the environmental monitoring and audit manual.</p>	

**Comments and Responses on
 Investigation Assignment for
 Widening of Tolo Highway/Fanling Highway
 between Island House Interchange and Fanling**

Draft Environmental Monitoring and Audit Manual

Comments	Responses
<p>2. It is noted that some of Outline Zoning Plans (OZPs) on Table 1.1 are out-dated. The followings are the updated versions of the OZPs:</p> <p>(i) Draft Kau Lung Hang OZP No. S/NE-KLH/2 gazetted on 6.8.1999;</p> <p>(ii) Approved Fanling/Sheung Shui OZP No. S/FSS/8 gazetted on 2.7.1999; and</p> <p>(iii) Draft Tai Po OZP No. S/TP/11 gazetted on 20.8.1999.</p>	<p>The updated versions of the OZPs will be reviewed and references updated accordingly.</p>
<p>3. Please note that a site of about 0.64 ha in Ma Wo has been rezoned from "Green Belt" to "Residential (Group B)1" on the draft Tai Po OZP No. S/TP/11 for residential development. As the site is located adjacent to Tolo Highway, it is suggested that this site should also be included in Table 1.8 - selected noise sensitive receivers between Tai Po Tai Wo Road and Tat Wan Road. A location plan of the site is attached for reference.</p>	<p>This will be reviewed and addressed accordingly.</p>
<p>Item 8 : Environmental Protection Officer Environmental Protection Department Ref: () in EP2/N5/23 Dated 29 November 1999</p> <p>I refer to your letter dated 30.7.99 & 15.10.99 enclosing a copy of the EM&A Manual and advance copy of the draft EIA report (Sections 1, 6 to 9) respectively for the captioned project.</p>	
<p><u>Water Quality</u></p> <p>(i) The implementation schedule outlined in Table A.3 of the EM&A Manual is unacceptable to us as there are no details given related to what type of measures are proposed or will be implemented to mitigate the potential WQ impacts identified in the EIA. All site-specific measures must be clearly spelled out in the implementation schedule as this will form part of the Environmental Permit in the later stage of the EIAO process. Please revise the implementation schedule in accordance with Section 6 of Annex 20 of the EIAO-TM.</p>	<p>Agreed. These modifications have been made.</p>

**Comments and Responses on
Investigation Assignment for
Widening of Tolo Highway/Fanling Highway
between Island House Interchange and Fanling**

Draft Environmental Monitoring and Audit Manual

Comments	Responses
<u>Waste Management</u>	
(ii) Section 5.1 Introduction, second last paragraph (pg.5-1) stated "the contractor shall also pay attention to the Waste Disposal Ordinance". We suggest adding the words "and its subsidiary regulations" after the word "Ordinance". Please also refer to our comment (iv) above.	Noted, the amendment has been made.
(iii) Section 5.1 Introduction, last paragraph (pg.5-1) stated "during the site inspections and the document review procedures as mentioned in Sections 6.1 and 6.2 of this manual....." However, Sections 6.1 and 6.2 are related to ecology.	Agreed. The correction has been made.
(iv) Section 5.2 Waste Mitigation Measures, C&D Waste, second last paragraph (pg.5-3), the "20% inert material (by volume)" should read "30% inert material (by weight)".	Agreed, this correction has been made.
(v) Section 5.2 Waste Mitigation Measures, Chemical Waste (pg.5-4), contractor should be registered as a chemical waste producer if chemical waste is produced.	Agreed, this clarification has been included in the report.
(vi) In Table A-4 (pg.A-3), the row of demolition wastes, segregation of materials is required so as to facilitate reuse and recycling. Disposal should be the last resort.	Agreed, this has been clarified in the table.
(v) In Table A-4 (pg.A-4), the row of chemical wastes, please add "the chemical wastes should be collected by licensed chemical waste collector".	Agreed, this has been included in the table.

ANNEX C2

**COMMENTS AND RESPONSES ON
DRAFT FINAL EM&A MANUAL**

**Comments and Responses on
Draft Final Environmental Monitoring and Audit Manual**

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**Comments and Responses on
 Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p>Item 1 : Assistant Commissioner for Transport/NT Transport Department Ref: () in NR 183/161/PWP720TH Dated 17 January 2000</p> <p>I refer to your letter of 12 January 2000 and have no comment from traffic point of views on the draft Final Environmental Monitoring and Audit Manual.</p>	<p>Noted.</p>
<p>Item 2 : Chief Engineer/Major Works 2-1 Major Works Project Management Office Highways Department Ref: () in HMW2 720TH/7/10/1 Dated 21 January 2000</p> <p>I refer to the draft EM&A Manual submitted on 12.1.2000 and have the following comments:</p>	
<p>(a) Please provide plans showing the locations of all environmentally sensitive receivers proposed to be monitored under the EM&A works.</p>	<p>These shall be included in the revised EM&A Manual.</p>
<p>(b) Page 1-4 - Would you please liaise with AMO regarding the provision of mitigation measures in protecting the concerned archeological sites during construction stage.</p>	<p>Information provided by AMO has been included in the Manual accordingly.</p>
<p>(c) Page 1-8 - Wo Hop Shek tributary has been identified as one of the water quality sensitive receivers for assessment according to Section 6.3 of the draft final EIA report. Please include this sensitive receiver in the Section.</p>	<p>This has been included accordingly.</p>
<p>(d) Section 1.5 - It is noted that three construction packages were proposed for implementing the above road widening works. However, as indicated in Section 16.8.5 of the draft final report for the Project, the optimum number of works contracts for the Project has not yet been determined. Please clarify and address the issue in the reports. For the fourth paragraph, would you please advise the working period as well as the duration of working hours.</p>	<p>This should read two construction packages. Text has been revised accordingly.</p>
<p>(e) Table 1.10 - I note that two widening options are currently considered at Ch. 2820 and Ch. 3120. Please advise the final recommendation and update the volumes of excavated materials accordingly.</p>	<p>The table has been updated accordingly.</p>

**Comments and Responses on
 Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
(f) Table 3.1 - It is noted in the draft final EIA report that although the predicted noise levels at SR41 and SR45 exceeded relevant standards during certain construction periods, they would not be impacted by the residual construction noise as they had been provided with noise insulation works. Would you please advise the purpose of including these two SRs as monitoring stations and what mitigation measures would be taken when the construction noise exceeds the Limit Level.	These two SR's have been replaced after a further review of the Final EIA was undertaken.
(g) Section 3.6 - You highlighted that noise monitoring works should be carried out at So Kwun Wat Government School as it will be close to the construction activities. However, I note that the school has not been included as one of the noise sensitive receivers for NIA. Please explain.	Topographical error. This has been corrected accordingly.
(h) Section 4.4 "Water Quality" - It seems that the text had not been updated to suit the requirements of the above Project. Some EM&A requirement with respect to marine construction works appeared in various parts of the Section and such marine activities have never been addressed in the draft final EIA report. Please clarify.	The text has been corrected accordingly.
(i) Section 5 "Waste Management" - Some construction practice guidelines have been included in the Section. Would you please define the associated monitoring and audit requirements during construction and operational phases for ensuring minimization of waste generation and proper waste disposal.	There are no specific monitoring and audit requirements except the routine site audit/checking by the ET to confirm that the guidelines suggested are achieved.
(j) Page 5-3 - It is mentioned that it may be possible to find alternatives to reduce or even avoid the generation of chemical waste. Would you please clearly state in the Manual on how these targets can be achieved.	This point has been clarified in the text.
(k) Section 6 "Ecology" - The Section is considered too brief for comments. Would you please advise the monitoring requirements and actions plans during the construction phase to ensure the effectiveness of the proposed mitigation measures. Your attention is drawn to the EM&A requirement in Section 5.5 of EIA TM.	We note your comment. Accordingly we have discussed the need for monitoring with our specialist ecologists and confirm that there is no specific ecological monitoring required.
(l) Section 9.1 - The details with respect to the monitoring and auditing of air quality during operational phase is missing. Please provide the information.	There is no air quality monitoring proposed for the operational phase.

**Comments and Responses on
 Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p>(m) Section 9.2 - Please advise on what basis or which procedures that you recommended HyD should be responsible for the operational monitoring.</p> <p>(n) As regards the comments on tables A.5 and A.6, would you please refer to comments (ll) and (mm) in my previous letter of 17.1.2000.</p> <p>Item 3 : Senior Landscape Architect 2/Landscape Unit, Highways Department Ref: () in HYDT/12/7/75 Dated 26 January 2000</p> <p>I refer to your letter and the captioned report submitted dated 12 January 2000. My comments are as follows:</p> <p>1. <u>Tentative Implementation Programme</u>, some of the construction activities, e.g. construct noise barriers, will be implemented within the landscape planting period. Sufficient measures and arrangement shall be taken to avoid the possible disturbance of the construction activities to the planting works on the same site.</p> <p>2. <u>Table A.3</u>, please amend that the "Mitigation Measures (Air Quality)" shall be revised as "Mitigation Measures (Water Quality)".</p> <p>3. <u>Table A.5 Mitigation Measures (Ecology)</u>, I presume "Boundaries beyond the proposed works areas ... with <u>hoarding</u> to prevent..." Please revise.</p> <p>4. <u>Table A.5 Mitigation Measures (Ecology)</u>, regarding the Creation of new resting areas for Ardeidae bird species, please ensure that further confirmation from AFCD, Marine Department and related authority should be sought.</p> <p>5. <u>Table A.5, Operation Phase</u>. Please note that the compensatory tree planting will be commissioned within the construction period. And the maintenance agent shall be identified as refer to Table A.6.</p>	<p>This should have referred to Environmental Protection Department. The text has been revised accordingly.</p> <p>Noted.</p> <p>Noted. The text has amended accordingly.</p> <p>Noted.</p> <p>Noted.</p> <p>Noted.</p>

**Comments and Responses on
Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p>6. Annex B Item 5, I do not agree that it is not normal for the landscape and visual mitigation measures to be included as part of the EM&A. During the course of the construction, a monitoring system should be undertaken to ensure the construction activities will not disturb the retained vegetation and avoid illegal felling of trees. Landscape professionals shall be included as members of the Environmental Team. Another important aim of EM&A is to monitor the effectiveness of the mitigation measures. In the operation stage, the landscape and visual mitigation measures shall also require close monitoring to ensure the landscape and visual mitigation measures are successful and effective as assessed in the EIA report.</p>	<p>Landscape and visual mitigation measures has already been included in the EM&A Manual.</p>
<p>7. Please also refer to my previous comment on the draft Final EIA Report dated 28 December 1999 and 3 January 2000 respectively, and also the Final Report dated 28 January 2000.</p>	<p>Noted.</p>
<p>Item 4 : District Officer (North) Ref: (7) in DON 67/239/97 VIII Dated 27 January 2000</p>	
<p>Thank you for your letter of 12 January 2000. Please note that our office has no comment on the above manual.</p>	<p>Noted.</p>
<p>Thank you for your kind attention.</p>	
<p>Item 5 : Chief Highway Engineer / NT East, Highways Department Ref: () in HNT 703/TP/148 Dated 28 January 2000</p>	
<p>I refer to the captioned report attached to your letter dated 12.1.2000 and have no comments from the highways point of view.</p>	<p>Noted.</p>
<p>Item 6 : District Planning Officer/Sha Tin, Tai Po & North Ref: () in PD/SN 4/513 (X) Dated 28 January 2000</p>	
<p>Thank you for your letters listed below:</p> <p>KWL/HTC/TL/rw/T551/06.18/L1099 - [Land Report (North)] KWL/HTC/TL/rw/T551/06.18/L1100 - [Land Report (Tai Po)] KWL/HTC/TL/rw/T551/06.17/L1064 - [DFEM&A Manual] KWL/HTC/TL/rw/T551/06.20/L1043 - [DFR]</p>	

**Comments and Responses on
Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p>I have the following comments on the remaining reports listed in the caption.</p> <p>Item 7 : Director of Agriculture, Fisheries and Conservation Ref: (14) in AF EA 007/98 Pt. 2 Dated 1 February 2000</p> <p>I refer to your letter dated 12 January 2000 enclosing the captioned report.</p> <p>We have expressed vide our previous letter (ref. (46) in AF EA 007/EA dated 10 August 1999 that the findings of the EIA Study of the captioned project should form the basis of this EM&A Manual. Noting that the EIA Report has yet to be finalised, we consider that it is premature at this stage to finalize the draft EM&A Manual before the completion of the EIA Report. As such, we would reserve our right to further comment on the EIA Report.</p> <p>Nevertheless, we would like to comment on the following points in the EM&A Manual:-</p> <p><u>1. p. 4-1, Section 4.1</u> It appeared that project would not involve any marine construction works or the construction of a Toll Plaza. Therefore, "The purpose of when marine construction works are carried out for the Toll Plaza" is irrelevant.</p> <p><u>2. p. 6-1, Section 6.2</u> i. Please specify in the text who should be responsible for monitoring the non-compliance of implementation of mitigation measures. ii. As no ecological monitoring was recommended in this section, please confirm with justifications whether an ecological monitoring programme is deemed necessary. iii. Please revise "important plant species" as "on-site vegetation" in paragraph 1 as no such species has been identified in the EIA. iv. Please delete "and where the rare/protected plant species are located" in the 2nd bullet point as no such species have been identified in the EIA. v. As fung shui woodland and secondary woodland have been confirmed to be affected by the captioned project, please revise the 6th bullet point to read "on-site planting should be provided to address loss of feng-shui woodlands and secondary woodlands due to road construction".</p>	<p>Noted.</p> <p>Noted.</p> <p>The text has been revised accordingly.</p> <p>The ET leader will be responsible for inspection of construction activities.</p> <p>It is considered that there is no specific ecological monitoring programme required. Rather checks as to contractor compliance with mitigation measures will be made by the ET during the site audit. The text has been revised accordingly.</p> <p>The text has been revised accordingly.</p> <p>The text has been revised accordingly.</p>

**Comments and Responses on
Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p><u>3. Annex A</u> Regarding the mitigation measure <i>Creation of new resting areas for Ardeidae bird species</i> in p. A-6, Table A.5, as the EIA Report did not identify any adverse impacts to the avifauna, including egrets, the deployment of concrete blocks in the coastal areas of Tolo Harbour for avifauna species to rest on is not justified.</p> <p>Item 8 : Project Manager/NT North Ref: (28) in NTN 4/5/44 Pt. 7 Dated 2 February 2000</p> <p>I refer to your above referenced letter dated 12 January 2000 and your response to our previous comment (Annex B, page 2 of the EM&A Manual refers).</p> <p>I do not agree with your response as I understand that, in recent EM&A Manuals for other projects, they normally include landscape mitigation measures to ensure that the measures would be implemented in a timely and effective manner.</p> <p>Item 9 : Executive Secretary, Antiquities and Monuments Office Ref: (47) in LCSD AM 81/3/5 (III) Dated 2 February 2000</p> <p>Thank you for your letter dated 12 January 2000 and the attached draft Final EM&A Manual. Our comments on the draft Final EM&A Manual are as follows:</p> <p><u>1.3 Environmental Monitoring and Audit Requirements</u> • <i>Cultural Heritage</i> Please revise this section as follows:</p> <p>A Cultural Heritage Impact Assessment has been undertaken by the Antiquities and Monuments Office for HyD. On the basis of the information provided by the AMO, Wun Yiu Kiln, Yuen Chau Tsai (Island House), Mui Shu Hang south, West of Lam Kam roundabout, Wai Tau, Kiu Tau, Tai Hang to Nam Wa Po (southern end) and Wai Tau to Tai Hang should be monitored during the construction. The monitoring work should be conducted by a qualified archaeologist who should apply for a licence from the Antiquities Authority beforehand, which is a statutory requirement stated in sections 12 and 13 in the Antiquities and Monuments Ordinance (Cap. 53). After the completion of the monitoring, the archaeologist is required to submit a full report to AMO to explain the finding of the monitoring work.</p>	<p>The table has been revised accordingly.</p> <p>Landscape mitigation measures have already been included in the Manual.</p> <p>The text has been revised in line with the information and guidelines provided in your memo of 10 March 2000 ref (60) in LCS AM 81/3/5 to CE/MW 2-3, HyD.</p>

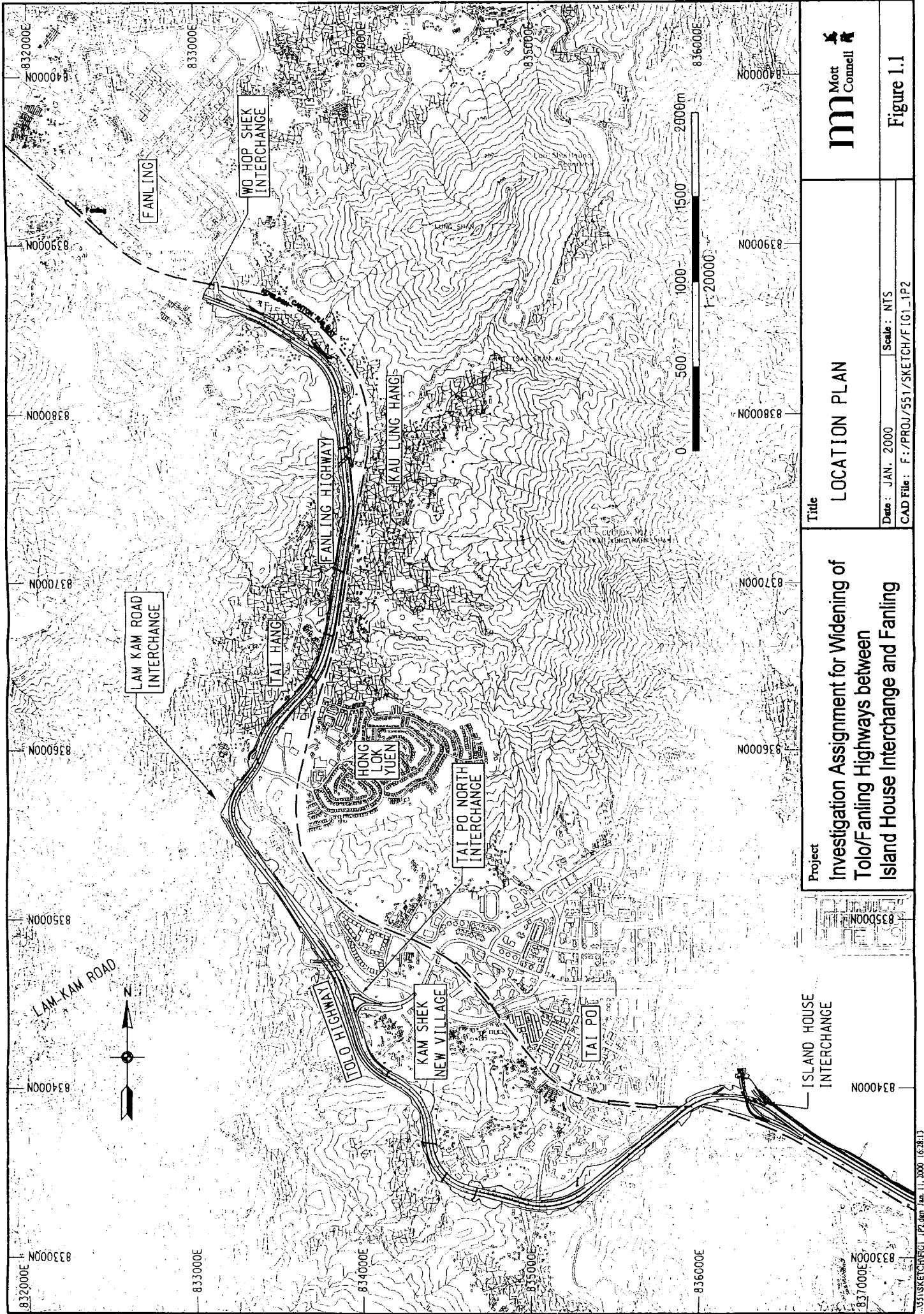
**Comments and Responses on
 Draft Final Environmental Monitoring and Audit Manual**

Comments	Responses
<p>For Wun Yiu and Yuen Chau Tsai, the clause "construction works in the proximity is carried out as unobtrusively as possible to avoid any damage to the site and discouragement of visitors to the site" should be included in the construction contract.</p> <p>Item 10 : District Officer (Tai Po) Ref: (36) in TP 4/59/177/97 (6) Dated 3 February 2000</p> <p>Thank you for your letter dated 31 January 2000.</p> <p>I have no comment on the above manual.</p> <p>Item 11 : Chief Highway Engineer/NT East Highways Department Ref: () in HNT 703/TP/148 Dated 8 February 2000</p> <p>I refer to the captioned report attached to your letter dated 28.1.2000 and have further comments as follows:-</p> <p>(a) <u>Section 9.2, last third line</u> Please clarify that HyD is responsible for noise operational phase monitoring within one year after the road opening only.</p> <p>(b) <u>Table A.6</u> LCSD, instead of HyD shall be the Management Department of roadside planting (within HyD Reserve). Moreover, EPD, instead of HyD, shall be the Management Department of Noise Barriers.</p> <p>Item 12 : Environmental Protection Officer Director of Environmental Protection Ref: () in EP2/N5/23 Dated 15 February 2000</p> <p>I refer to your letter dated 12.1.2000 enclosing the revised EM&A Manual for our comment.</p> <p>Please note my following comments:-</p> <p>(i) <u>Section 1.1 - Purpose of the Manual</u> I noticed that IC(E) will be included in this project. As such, please revise section 1.1 to mention the provision of IC(E) and highlight his role and responsibility.</p> <p>(ii) <u>Section 1.3 - Environmental Monitoring and Audit Requirements</u> a) Please revise the paragraph under sub-heading <i>Noise</i> to indicate that operation phase noise monitoring will be included in the EM&A programme.</p>	<p>Noted with thanks.</p> <p>The text has been clarified accordingly.</p> <p>Noted.</p> <p>Noted. The text has been revised accordingly.</p> <p>Agreed. The text has been revised accordingly.</p>

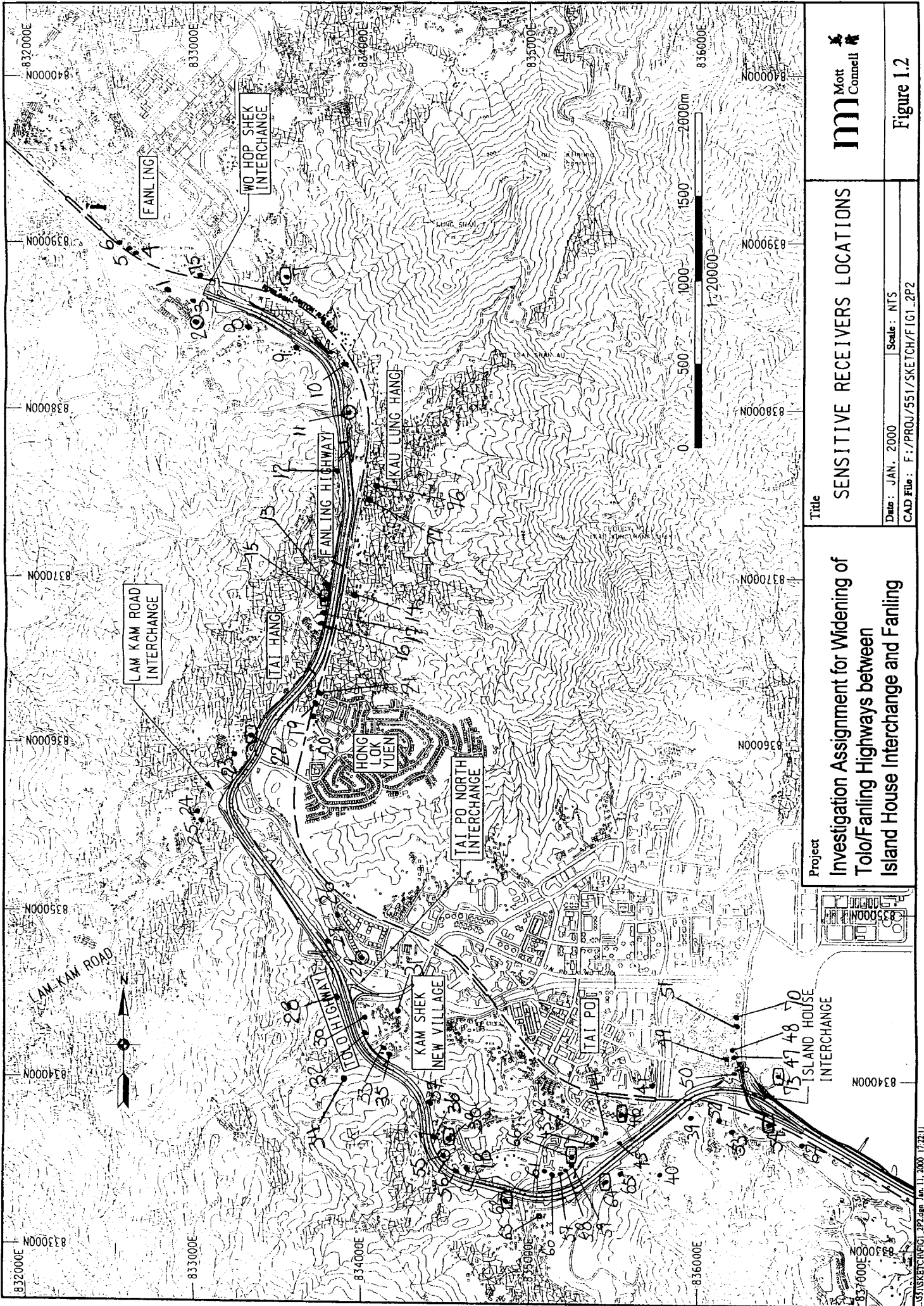
**Comments and Responses on
 Draft Final Environmental Monitoring and Audit Manual**


Comments	Responses
<p>b) Please amend the sentence under sub-heading <i>Water Quality</i> to indicate that the monitoring is carried out to ensure protection of stream courses as well as marine waters.</p>	<p>Agreed. The text has been revised accordingly.</p>
<p>(iii) <u>Section 1.4 - Project Organisation</u> Please specify the duties of the IC(E).</p>	
<p>(iv) <u>Section 1.5, Table 1.10 - Cut and Fill Balance for Construction</u> The estimated total volumes of wastes indicated in Table 1.10 does not correspond to those figures contained in Table 7.4 of the draft final EIA report. Please clarify and amend accordingly.</p>	<p>The table has been revised accordingly.</p>
<p>(v) <u>Section 2.5, Table 2.1 - Dust Monitoring Stations</u> I noticed that no ASRs between Hong Lok Yuen Road and Tai Po Tai Wo Road were selected as the dust monitoring stations. Please clarify or else a representative dust monitoring station should be included along that section.</p>	<p>An additional station has been included (SR29).</p>
<p>(vi) <u>Section 3.4, Table 3.1 - Noise Monitoring Stations</u> I noticed that no NSRs between Tai Po Tai Wo Road and Tat Wan Road were selected as the noise monitoring stations. Please clarify or else a representative noise monitoring station should be included along that section. Also, there is no "SR15" as indicated in the draft final EIA report. I do not think Tai Hang 1 is an appropriate location for noise monitoring as it will be demolished after commencement of the road widening works (as indicated in the Table 5.3 of the draft final EIA report). Please propose an alternate location.</p>	<p>This section has been amended to reflect these comments.</p>
<p>(vii) <u>Section 4.1 - Water Quality Monitoring Introduction</u> Please clarify the second sentence as I am not aware of any marine construction works to be carried out for the Toll Plaza for this project.</p>	<p>This was a typographical error. The text has been revised accordingly.</p>
<p>(viii) <u>Section 4.4 - Water Quality Monitoring Locations</u> You should identify in this Manual the appropriate for impact monitoring and indicate in a drawing the tentative sites/locations for carrying out the water quality monitoring work.</p>	<p>Noted. A new figure has been included which shows tentative water quality monitoring locations.</p>
<p>(ix) <u>Annex A - Schedule of Recommended Mitigation Measures</u> As the EIA report has yet to be finalised, I shall provide you the comments on the schedule pending the finalisation of the report.</p>	<p>Noted.</p>

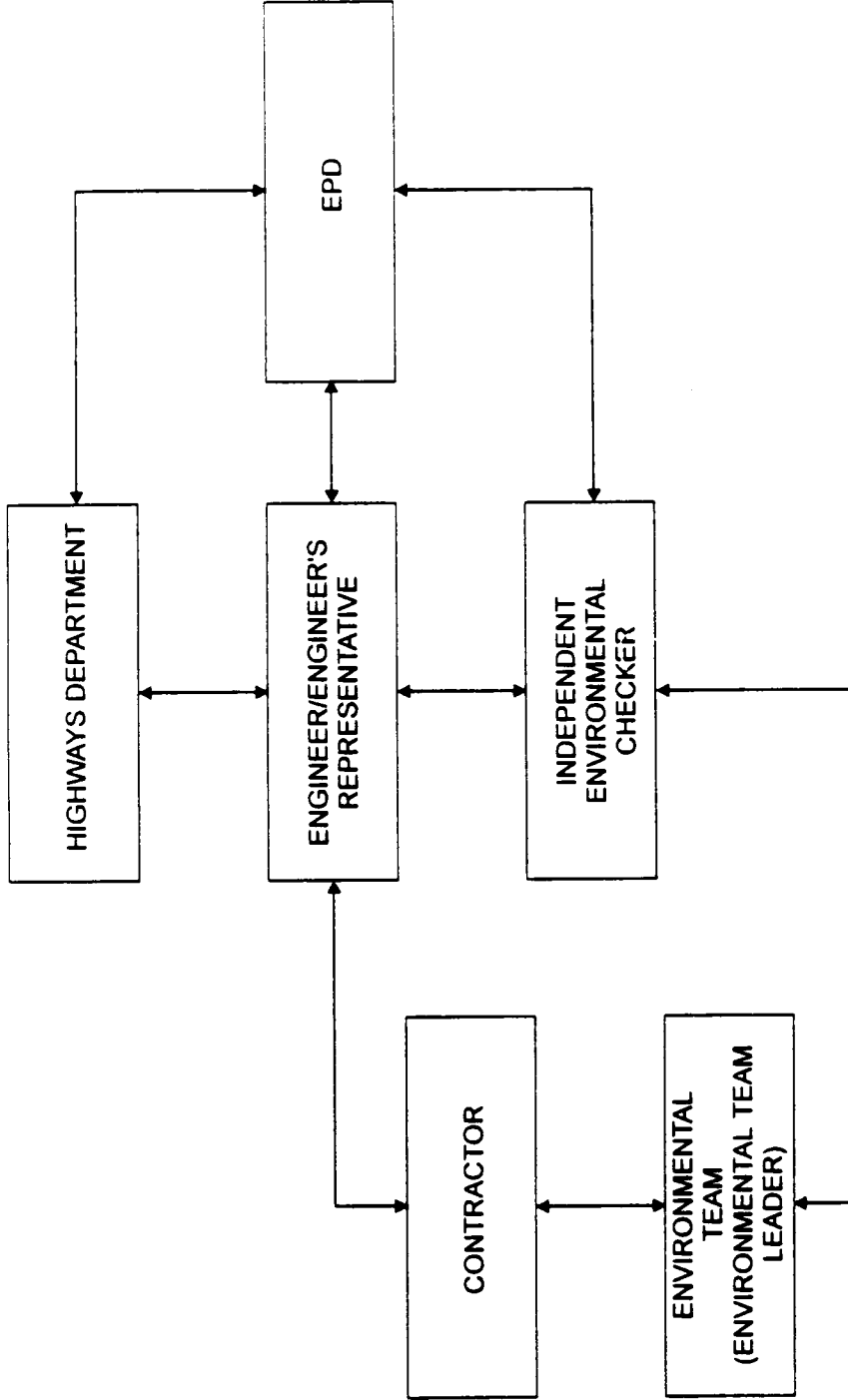
FIGURES



Project Investigation Assignment for Widening of Tolo/Fanning Highways between Island House Interchange and Fanning	Title LOCATION PLAN		
		Date: JAN. 2000 CAD File: F:\PROJ\551\SKETCH\FIG1_IP2	Scale: NTS Figure 1.1



Project Investigation Assignment for Widening of Tolo/Fanling Highways between Island House Interchange and Fanling	Title SENSITIVE RECEIVERS LOCATIONS		 Mott MacDonald
	Date : JAN., 2000	Scale : NTS	
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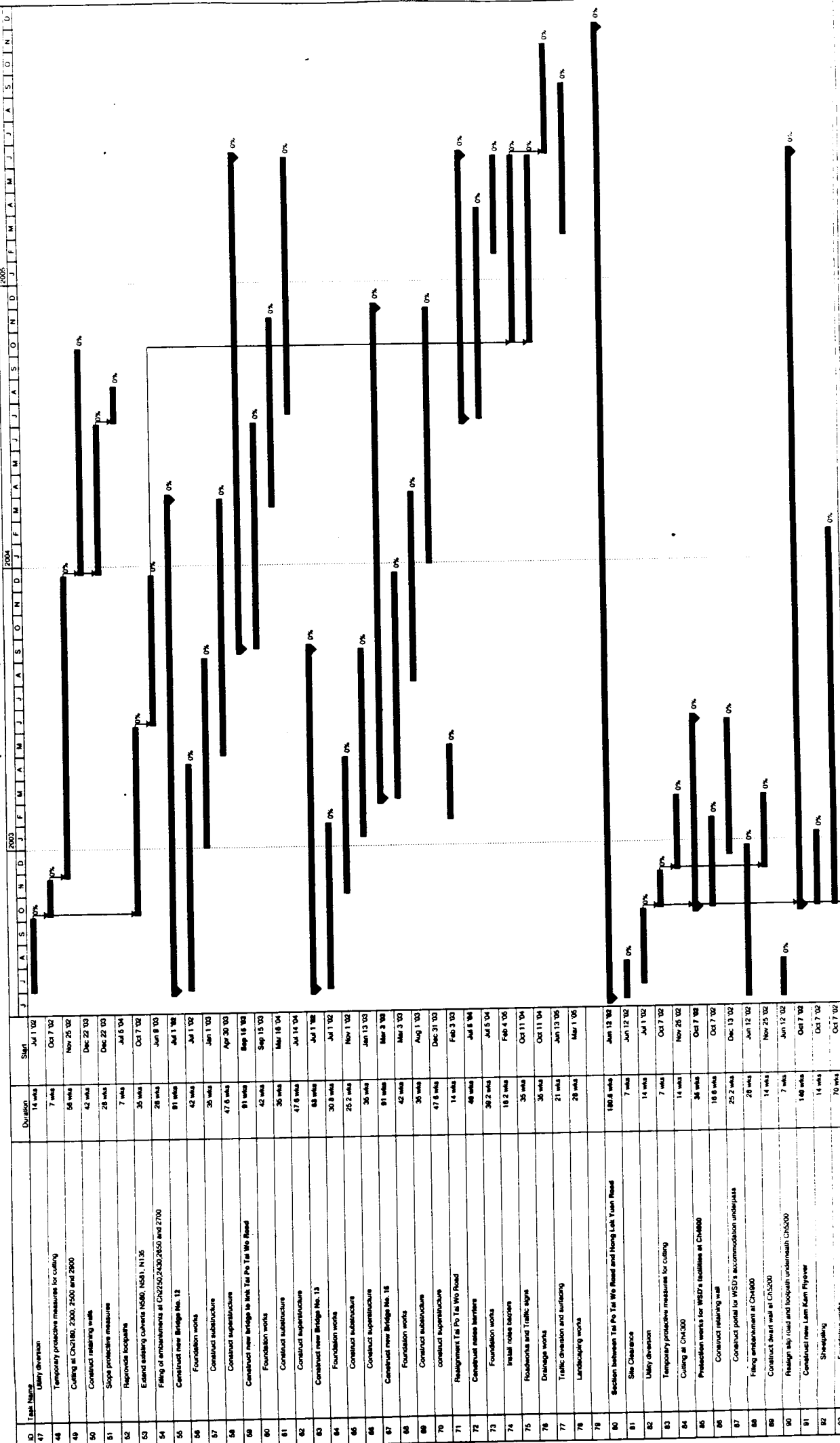


Project Investigation Assignment for Widening of Tolo/Fanling Highways between Island House Interchange and Fanling		Title Project Organisation and Lines of Communication			
		Date JULY 1999	Scale N.T.S		
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Figure 1.3

Agreement No. CE 7398
Investigation Assignment for widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

Tentative Implementation Programme



Project Control Date: Jan 12 '05

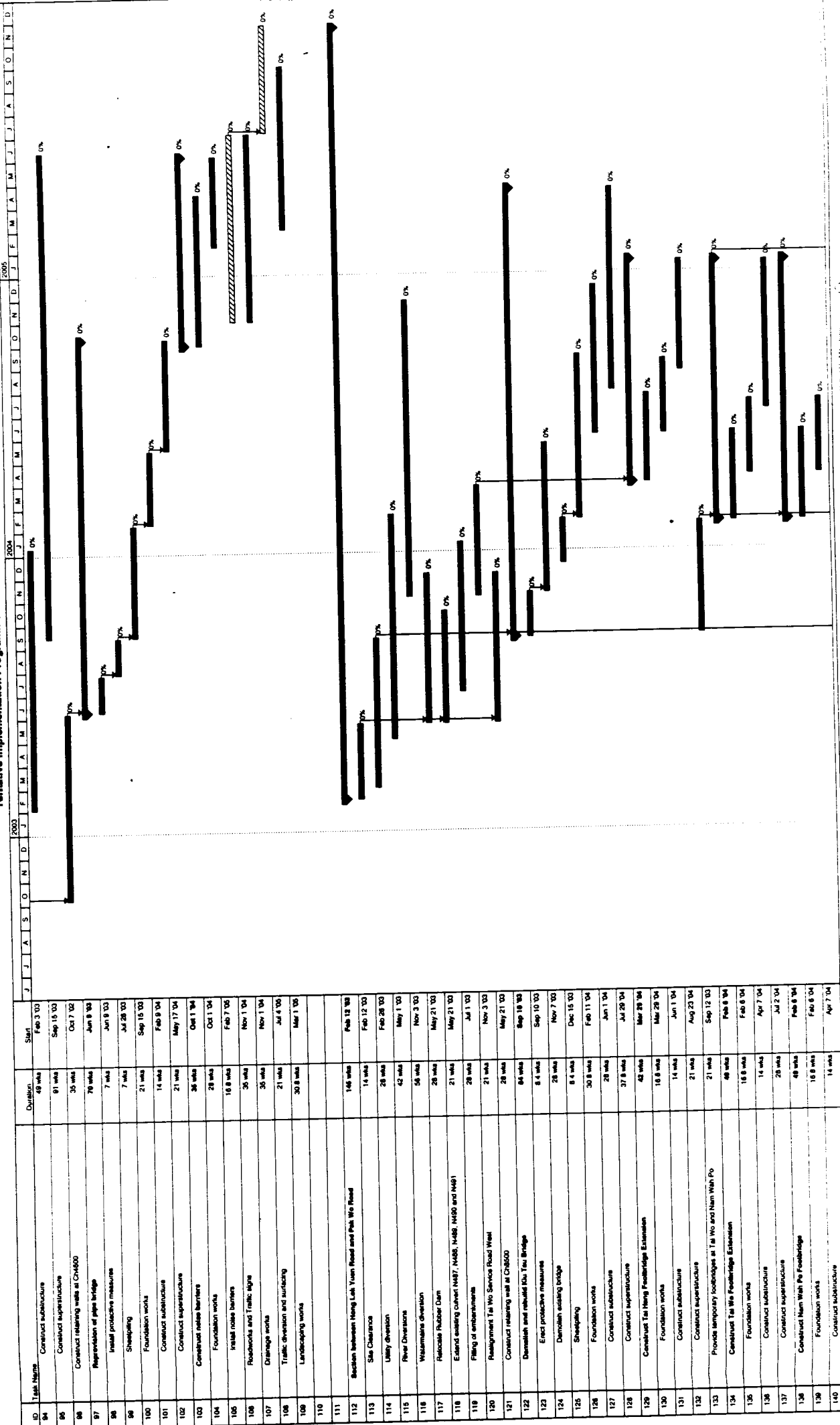
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- Critical
- Critical Span
- Critical Progress
- Task
- Baseline Measure
- Measure
- Summary Progress
- Summary
- Halted Up Critical
- Halted Up Critical Span
- Halted Up Critical Progress
- Halted Up Task
- Halted Up Task Progress
- Halted Up Baseline Measure
- Halted Up Baseline Progress
- Halted Up Baseline Summary
- Final Up Measure
- Final Up Task
- Final Up Summary

Page 2

Agreement No. CE 73/98
Investigation Assignment for widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

Tentative Implementation Programme

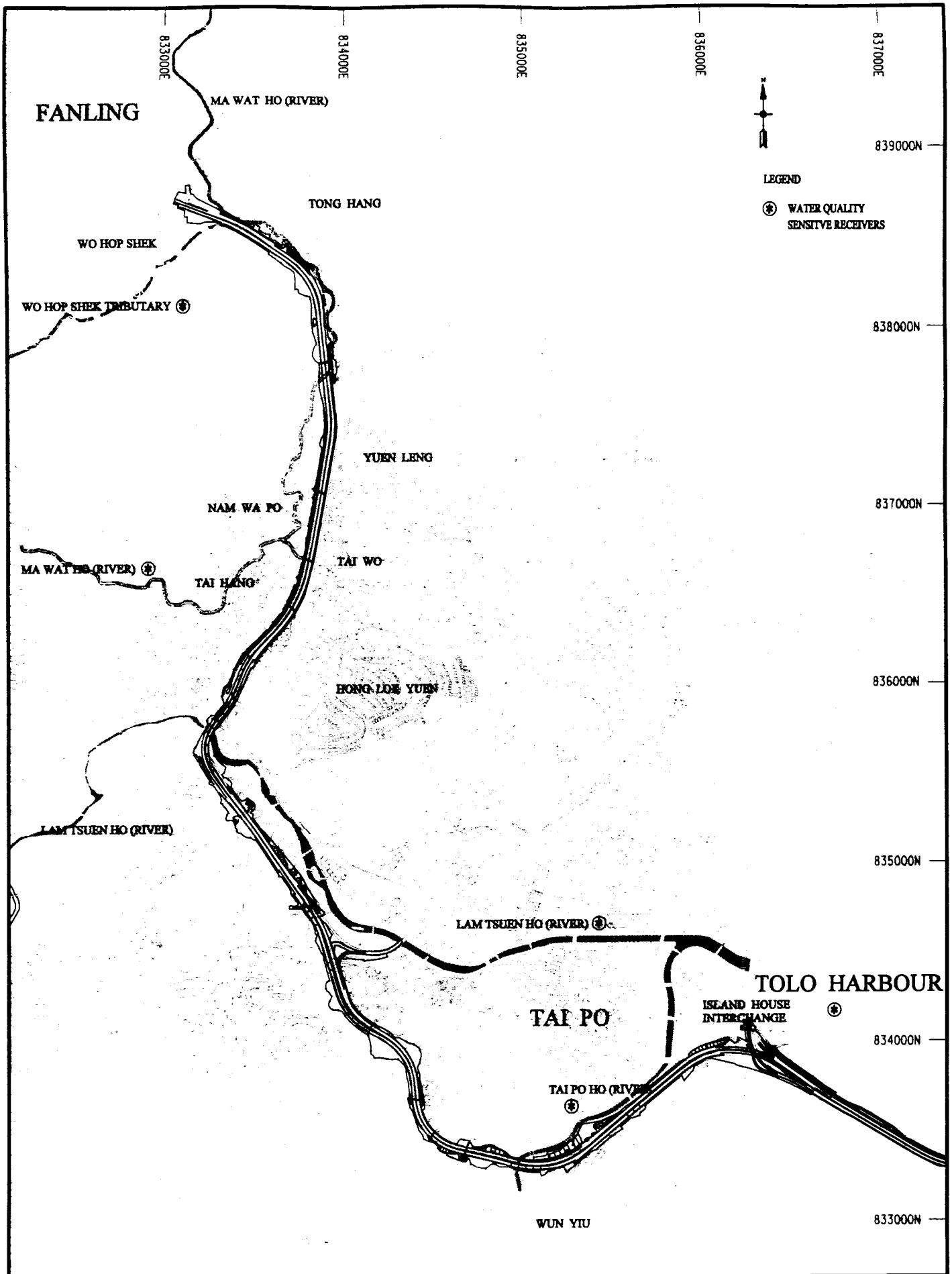


ID	Task Name	Start	Duration
94	Construct substructure	Feb 3 '03	49 wks
95	Construct superstructure	Sep 15 '03	91 wks
96	Construct retaining walls at CH400	Oct 7 '02	35 wks
97	Reparation of pipe bridge	Jun 9 '03	70 wks
98	Install protective measures	Jun 9 '03	7 wks
99	Shoring	Jul 28 '03	7 wks
100	Foundation works	Sep 15 '03	21 wks
101	Construct substructure	Feb 9 '04	14 wks
102	Construct superstructure	May 17 '04	21 wks
103	Construct noise barriers	Oct 1 '04	36 wks
104	Foundation works	Oct 1 '04	28 wks
105	Install noise barriers	Feb 7 '05	10.8 wks
106	Roadworks and traffic signs	Nov 1 '04	36 wks
107	Drainage works	Nov 1 '04	36 wks
108	Traffic diversion and surfacing	Jul 4 '05	21 wks
109	Landscaping works	Mar 1 '05	30.8 wks
110			
111			
112	Section between Hong Lok Yuan Road and Pak Wo Road	Feb 12 '03	146 wks
113	Site Clearance	Feb 12 '03	14 wks
114	Utility diversion	Feb 26 '03	28 wks
115	River Diversion	May 1 '03	42 wks
116	Watermain diversion	Nov 3 '03	54 wks
117	Hazardous Rubber Dam	May 21 '03	28 wks
118	Extend existing culvert (M487, M488, M489, M490 and M491)	May 21 '03	21 wks
119	Filling of embankments	Jul 1 '03	28 wks
120	Realignment Tai Wo Service Road West	Nov 3 '03	21 wks
121	Construct retaining wall at CH500	May 21 '03	28 wks
122	Demolish and rebuild Ma Tau Bridge	Sep 19 '03	84 wks
123	Erect protective measures	Sep 10 '03	8.4 wks
124	Demolish existing bridge	Nov 7 '03	28 wks
125	Shoring	Dec 15 '03	8.4 wks
126	Foundation works	Feb 11 '04	30.8 wks
127	Construct substructure	Jun 1 '04	28 wks
128	Construct superstructure	Jul 29 '04	37.8 wks
129	Construct Tai Wo Footbridge Extension	Mar 29 '04	42 wks
130	Foundation works	Mar 29 '04	18.6 wks
131	Construct substructure	Jun 1 '04	14 wks
132	Construct superstructure	Aug 23 '04	21 wks
133	Provide temporary loadbridges at Tai Wo and Nam Wan Po	Sep 12 '03	21 wks
134	Construct Tai Wo Footbridge Extension	Feb 6 '04	48 wks
135	Foundation works	Feb 6 '04	18.6 wks
136	Construct substructure	Apr 7 '04	14 wks
137	Construct superstructure	Jul 2 '04	28 wks
138	Construct Nam Wan Po Footbridge	Feb 6 '04	48 wks
139	Foundation works	Feb 6 '04	18.6 wks
140	Construct substructure	Apr 7 '04	14 wks

Project Control
Date: Jan 12 '05

Legend:

- Critical
- Critical Split
- Critical Progress
- Task
- Task Progress
- Task Split
- Baseline
- Baseline Split
- Baseline Measure
- Measure
- Summary Progress
- Summary
- Held Up Critical
- Held Up Critical Split
- Held Up Critical Progress
- Held Up Critical Task
- Held Up Split
- Held Up Split Progress
- Held Up Split Task
- Held Up Baseline
- Held Up Baseline Measure
- Held Up Measure
- Held Up Summary
- Held Up Measure
- Held Up Task
- Held Up Progress
- Held Up Summary



Project

Investigation Assignment for Widening of Tolo/Fanling Highways between Island House Interchange and Fanling

Title

Water Quality Sensitive Receivers



Date

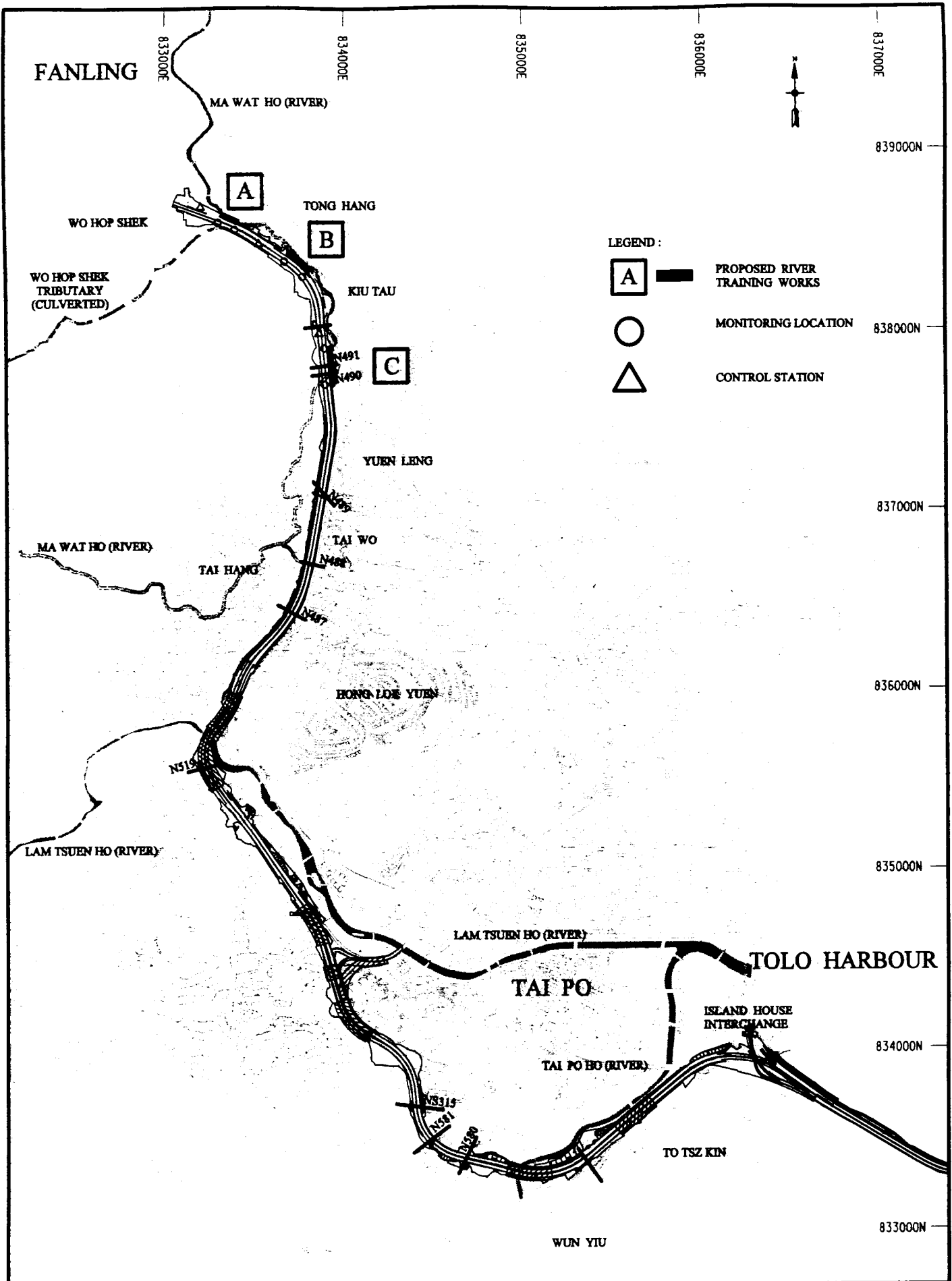
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Figure 4.1

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Project

Investigation Assignment for Widening of Tolo/Fanling Highways between Island House Interchange and Fanling

Title

Proposed Monitoring Locations During River Training Works

Date

MAR. 2000

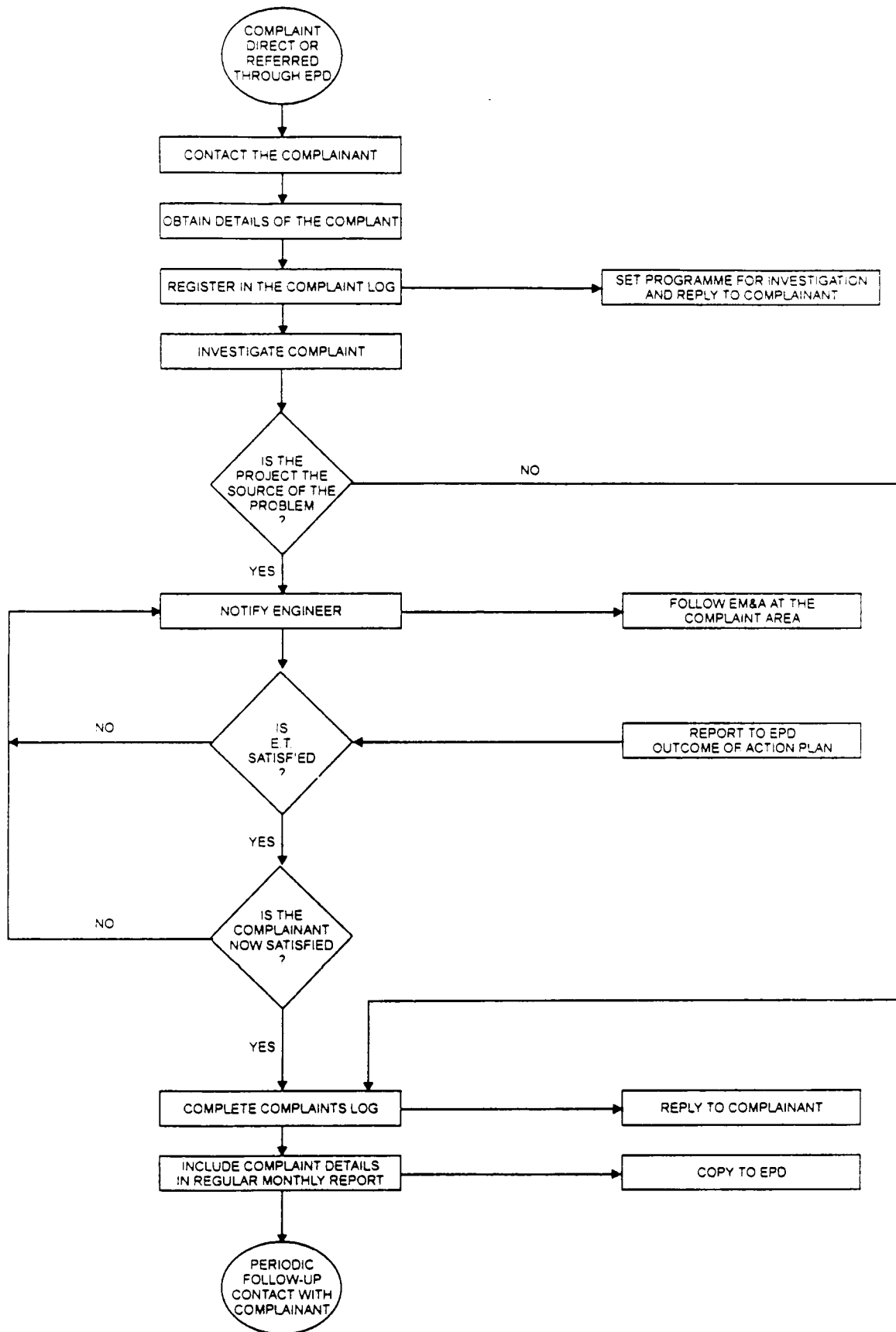
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Figure 4.2

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Project
Investigation Assignment for Widening of Tolo/Fanling Highways between Island House Interchange and Fanling

Title
Complaint Response Procedures



Date
 JULY 1999

Scale
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Figure 7.1

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