Maunsell

Contract No. HY/2003/04

Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Environmental Monitoring and Audit Manual

[May 2004]

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Gammon Skanska Limited

Maunsell

Contract No. HY/2003/04

Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Environmental Monitoring and Audit Manual

[May 2004]

Reviewed by (PM):	Checked by:	Approved by: (Environmental Team Leader)
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The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and MEMCL accepts no responsibility for its use by others.

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Attn.: Mr. Y. T. Tang

Dear Sir,

Contract No. HY/2003/04
Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam
- Environmental Monitoring and Audit Manual (Revision 0)

Further to our review of the EM&A Manual (Rev. 0), we are pleased to verify the report i satisfactory subject to the amendment of the "Table of Contents" to include the Landscape an Visual section in the report.

Should you require further information, please do not hesitate to contact us.

Assuring you of our best attention at all times.

Yours faithfully,
for and on behalf of
MATERIALAB CONSULTANTS LIMITED

Joseph Poon
Independent Environmental Checker

JP/cy

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1. INTRODUCTION

Background

1.1 Gammon Skanska Limited (the Contractor) was commissioned by the Highways Department (HyD) to carry out Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam (the Project) under Contract No. HY/2003/04. Maunsell Environmental Management Consultants Limited (MEMCL) was employed by the Contractor as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project.

1.2 According to Part 8 Clause 8.2.2 of the Employer's Requirement, a specific Environmental Monitoring and Audit Manual was prepared on behalf of the Contractor to satisfy this Condition.

Proposed Construction Activities and Project Programme

1.3 Construction of Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam forms part of the Government's plan to improve the traffic capacity of Castle Peak Road to cope with the traffic demand generated from the population growth in the Northwest New Territories. The improved Castle Peak Road can also act as a relief route for Tuen Mun Road. The Project involves:

- Widening of a 1.1 km of Castle Peak Road between Ka Loon Tsuen to Tai Lam Kok on its seaward side from a single carriageway to a dual 2-lane carriageway;
- Construction of a new dual 2-lane viaduct approximately 0.8 km long from Tai Lam Kok to Siu Lam with low noise road surfacing;
- Provision of a 3.0m wide footpath on both sides of the road between Ka loon Tsuen and Tai Lam Kok;
- Provision of a 1.5 m wide amenity strip on the proposed seaward side footpath between Ka Loon Tsuen and Tai Lam Kok;
- Reconstruction of the pavement of Castle Peak Road between Tai Lam Kok and Siu Lam;
- Construction of about 1.1 km of seawall between Ka Loon Tsuen and Tai Lam Kok and reclamation of about 0.8 hectare of land at Tai Lam Kok for the road widening;
- Reprovision of existing legal run-ins and appropriate modifications to junction affected by this road improvement scheme; and
- Associated slope works, natural terrain hazard study and the associated hazard mitigation measures, roads and drainage works, traffic aids, street furniture and public lighting, utilities works, environmental mitigation measures, landscape and other ancillary works.

1.4 The layout of the work site is shown in Figure 1.1.

1.5 The construction activities were scheduled to commence in March 2004. The project programme is provided in Appendix A.

Purpose of the Manual

1.6 The purpose of this EM&A Manual is to provide information, guidance and instruction to

personnel with environmental duties and those responsible for undertaking environmental monitoring and auditing work during the construction and operation phase of the Project. It provides systematic procedures for the monitoring and auditing of potential environmental impacts that may arise from the works.

1.7 This EM&A Manual details the EM&A programme for the construction and operation of the Project. The EM&A programme provides the means by which feed-back on the project's compliance with the recommended mitigation measures and the environmental monitoring programme are provided to the Contractor, Supervising Officer's Representative (SOR), HyD and Environmental Protection Department (EPD).

1.8 This EM&A Manual provides a description of the organisational arrangements required for the EM&A programme, stipulation of the scope of monitoring (e.g. air quality, noise and water quality etc.), the parameters to be measured (e.g. 1-hour and 24-hour Total Suspended Particulates, $L_{Aeq30min}$ and Suspended Solids etc.), the frequency of monitoring and actions to be taken in the event of exceedances of the environmental quality performance criteria. This EM&A Manual also outlines guidelines for construction phase site inspections as a means of identifying and resolving problems, and the associated reporting requirements. Moreover, this EM&A Manual makes recommendations on mechanisms for ensuring that the mitigation measures which have been recommended for the design stage are fully and effectively implemented.

1.9 This EM&A Manual is an updated version of the EM&A Manual as provided in the Project's EIA final report.

1.10 The EM&A Manual is a dynamic document that will be reviewed and updated (as necessary) during later stages of the Project.

Objectives of the EM&A Programme

1.11 Construction impacts resulting from the implementation of the Project have been assessed in the EIA report. The Report also specifies the mitigation measures that need to be implemented to ensure compliance with the required environmental criteria. These mitigation measures and their implementation requirements, are presented in the Environmental Mitigation Implementation Schedule contained in Appendix B of this EM&A Manual. In order to ensure that these mitigation measures are fully and effectively implemented, the EIA report recommends that EM&A should be undertaken for air quality, noise, water quality, waste and terrestrial and marine ecology issues.

1.12 This Manual provides specific details of the EM&A requirements that have been recommended for the Project to ensure compliance with the mitigation measures specified in the EIA report.

1.13 The main objectives of the EM&A programme are:

- To provide a database against which any short or long term environmental impacts of the project can be determined;
- To provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;

- To monitor the environmental performance of the Project and effectiveness of the mitigation measures;
- To verify the environmental impacts predicted in the EIA Study;
- To determine project compliance with regulatory requirements, standards and government policies;
- To take remedial action if unexpected problems or unacceptable impacts arise; and
- To provide data against which environmental audits may be undertaken.

Scope of the EM&A Programme

1.14 The scope of the EM&A programme is to:

- establish baseline air quality, noise and water quality levels at designated locations and review these baseline levels every six months;
- implement impact monitoring and inspection programmes for air quality, noise and water quality;
- implement inspection and audit requirements for waste management, ecology and landscape and visual issues;
- liaise with, and provide environmental advice (as requested or when otherwise necessary) to construction site staff on the comprehension and consequences of the environmental monitoring data and exceedances;
- identify and resolve environmental issues and other functions as they may arise from the works;
- check and quantify the Contractor's overall environmental performance, the implementation of Event and Action Plans (EAPs), and remedial actions taken to mitigate adverse environmental impacts as they may arise from the works;
- conduct monthly reviews of monitored impact data as the basis for assessing compliance with the defined criteria and to ensure that necessary mitigation measures are identified and implemented, and to undertake additional ad hoc monitoring and auditing as required by special circumstances;
- evaluate and interpret all environmental monitoring data to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards, and to verify the environmental impacts predicted in the EIA final report;
- manage and liaise with other individuals or parties concerning other environmental issues deemed to be relevant to the construction process;
- conduct regular site inspections to assess:
  - the level of the Contractor's general environmental awareness,
  - the Contractor's implementation of the conditions in the Environmental Permit and the recommendations in the EIA report;
  - the Contractor's performance as measured by the EM&A programme;
  - the need for specific mitigation measures to be implemented or the continued usage of those previously agreed; and
  - to advise the site staff of any identified potential environmental issues; and
- submit monthly EM&A reports which summarise project monitoring and auditing data, with full interpretation illustrating the acceptability or otherwise of any environmental impacts and identification or assessment of the implementation status of agreed mitigation measures.

Structure of the EM&A Manual

1.15 Following this introductory section, the remainder of the Manual is set out as follows:

- Section 2 outlines the various parties involved in the EM&A process, and presents the organisational structure of the responsible parties for implementing the EM&A programme and their key responsibilities;
- Section 3 sets out the EM&A general requirements;
- Section 4 details the methodology and criteria, monitoring equipment and locations, requirements for baseline and impact monitoring for air quality, compliance assessment and Event and Action Plan (EAP) for air quality;
- Section 5 details the methodology and criteria, monitoring equipment and locations, requirements for baseline and impact monitoring, compliance assessment and Event and Action Plan (EAP) for noise;
- Section 6 details the methodology and criteria, monitoring equipment and locations, requirements for baseline, impact and post-project monitoring, compliance assessment and Event and Action Plan (EAP) for water quality;
- Section 7 details the audit procedures with regard to waste management issues;
- Section 8 details the audit procedures with regard to ecology issues;
- Section 9 details the audit procedures with regard to landscape and visual issues;
- Section 10 describes the scope and frequency of site auditing; and
- Section 11 details the EM&A reporting requirements.

2. EM&A ORGANISATION

2.1 The roles and responsibilities of the various parties involved in the construction phase EM&A process are outlined below. The organisation and lines of communication with respect to environmental management for the Project are shown in Figure 2.1.

2.2 The duties and responsibilities of respective parties are as follows:

Contractor

2.3 The Contractor should report to the Supervising Officer's Representative (SOR). The duties and responsibilities of the Contractor are:

- Work within the scope of the construction contract and other contract documents;
- Participate in the site inspections undertaken by the Environmental Team (ET) and the Independent Environmental Checker (IEC) as required and implement the corrective actions instructed by the SOR;
- Take responsibility and strictly adhere to the guidelines of the EM&A programme and complementary protocols developed by their staff;
- Report all findings of site inspections to the SOR.

Environmental Team (ET)

2.4 The ET should report to the Contractor. The designated ET is Maunsell Environmental Management Consultants Limited (MEMCL), an independent environmental consultant employed by Gammon Skanska Limited (GSL). The ET's responsibilities include:

- Designate an ET Leader to fulfil Condition 2.1 of the Environmental Permit EP-171/2003/A and Further Environmental Permit FEP-01/171/2004. The ET Leader will certify or verify any environmental submissions as required by the EP-171/2003/A and FEP-01/171/2004;
- Provide specialist advice on all environmental issues to the Contractor;
- Monitor the various environmental parameters as required by the EM&A Manual;
- Conduct regular site inspections and investigate and inspect the Contractor's equipment and work methodologies with respect to pollution control and environmental mitigation, and to anticipate environmental issues that may require mitigation before the problem arises;
- Review the programme of works, in order to anticipate any potential environmental impacts before they arise;
- Review and comment on the construction method statements provided by the Contractor;
- Audit the environmental monitoring data and report the status of the general site environmental conditions and of the implementation of mitigation measures resulting from site inspections;
- Report the EM&A results and the wider environmental issues and conditions to the Contractor and SOR;
- Prepare EM&A reports as required in the EM&A Manual and
- Follow the procedures stipulated in the agreed Event and Action Plans in the event of exceedance, non-compliance or complaint;

Supervising Officer's Representative (SOR)

2.5 The SOR is responsible for overseeing the construction works and for ensuring that they are undertaken by the Contractor in accordance with the specification and contractual requirements. The duties and responsibilities of the SOR are:

- Monitor the Contractor's compliance with contract specifications, including the effective implementation and operation of environmental mitigation measures and other aspects of the EM&A programme;
- Instruct the Contractor to follow the agreed protocols or those in the Contract Specifications in the event of exceedances or complaints;
- Comply with the agreed Event and Action Plans in the event of any exceedance; and
- Liaise with the IEC and assist as necessary in the implementation of the EM&A program.

Independent Environmental Checker (IEC)

2.6 The IEC would independently audit the environmental performance of the works. The duties and responsibilities of the IEC are:

- Monitor the implementation of the EM&A programme and the overall level of environmental performance being achieved;
- Arrange and conduct regular "independent" site inspections of the works;
- Provide specialist advice to the SOR and HyD on environmental matters;
- Ensure the impact monitoring is conducted at the correct locations at the frequency identified in the EM&A Manual;
- Check that the mitigation measures are effectively implemented;
- Review and verify the monitoring data and environmental submissions provided by the ET of the Contractor.

3. EM&A GENERAL REQUIREMENTS

Introduction

3.1 In this Section, the general requirements of the EM&A programme for the Project are presented with reference to the relevant findings from the EIA final report and requirements stipulated in the Permit that have formed the basis of the scope and content of the programme.

Methodology and Criteria

3.2 The environmental issues, which were identified during the EIA process and are associated with the construction phase of the Project would be addressed through the monitoring and controls specified in this EM&A Manual and in the construction contract.

3.3 During the construction phase air quality, noise, water quality, waste arising, ecology and landscape and visual issues would be subject to EM&A, with environmental monitoring being undertaken for air quality, noise and water quality as specified under Condition 4.2 of the Environmental Permit.

3.4 During the operation phase, noise issue would be subject to EM&A, with noise monitoring being undertaken as specified under Condition 6.2 of the Environmental Permit.

3.5 The monitoring of the effectiveness of the mitigation measures would be achieved through the environmental monitoring programme as well as through site inspections. The inspections would include within their scope, mechanisms to review and assess the Contractor's environmental performance, ensuring that the recommended mitigation measures have been properly implemented, and that the timely resolution of received complaints are managed and controlled in a manner consistent with the recommendations of the EIA final report.

Environmental Monitoring

3.6 The environmental monitoring works throughout the Project period would be carried out in accordance with this EM&A manual and reported by the ET. Monitoring works would comprise of quantitative assessment of air quality, noise and water quality impact. Monitoring would be conducted at the chosen representative sensitive receivers in the vicinity of the work site.

Action and Limit Levels

3.7 Action and Limit (AL) levels are defined levels of impact recorded by the environmental monitoring activities which represent levels at which a prescribed response is required. These Levels are quantitatively defined later in the relevant sections of this manual and described in principle below:

- Action Level: beyond which there is a clear indication of a deteriorating ambient environment for which appropriate remedial actions are likely to be necessary to prevent

environmental quality from falling outside the Limit Levels, which would be unacceptable; and

- Limit Levels: statutory and/or agreed contract limits stipulated in the relevant pollution control ordinances, Hong Kong Planning Standard Guidelines or Environmental Quality Objectives established by the EPD. If these are exceeded, works should not proceed without appropriate remedial action, including a critical review of plant and working methods.

Event and Action Plans

3.8 The purpose of the Event and Action Plans (EAPs) is to provide, in association with the monitoring and audit activities, procedures for ensuring that if any significant environmental incident (either accidental or through inadequate implementation of mitigation measures on the part of the Contractor) does occur, the cause would be quickly identified and remediated, and the risk of a similar event recurring is reduced. This also applies to the exceedances of AL criteria identified in the EM&A programme.

Site Inspections

3.9 In addition to monitoring air quality, noise and water quality levels as a means of assessing the ongoing performance of the Contractor, the ET would undertake regular site inspections and audits of on-site practices and procedures. The primary objective of the inspection and audit programme would be to assess the effectiveness of the environmental controls established by the Contractor and the implementation of the environmental mitigation measures recommended in the EIA final report.

3.10 Whilst the audit and inspection programme would undoubtedly complement the monitoring activity with regard to the effectiveness of dust suppression, noise attenuation and water quality control, the criteria against which the audits should be undertaken should be derived from the clauses within the Contract Documents which seek to enforce the recommendations of the EIA final report.

3.11 The findings of site inspections and audits should be made known to the Contractor at the time of the inspection to enable the rapid resolution of identified non-compliances. Non-compliances, and the corrective actions undertaken, would also be reported in the monthly EM&A reports.

Enquiries, Complaints and Requests for Information

3.12 Enquiries, complaints and requests for information could be expected from a wide range of individuals and organisations including members of the public, government departments, the press and community groups.

3.13 All enquiries concerning the environmental effects of the construction works, irrespective of how they are received, would be directed to the SOR and copied to HyD. Procedures for investigation and handling complaints would follow the procedures set out in Section 10.

3.14 In all cases the complainant would be notified of the findings, and audit procedures would be put in place to minimise the change of reoccurrence of the problem.

Reporting

3.15 During the construction phase, baseline, monthly, quarterly and final EM&A summary reports would be prepared and certified by the ET Leader and verified by the IEC. These reports would be submitted to the SOR, Highways Department and EPD. The monthly reports would be prepared and submitted to EPD within 2 weeks from the end of each reporting month.

3.16 During the operation phase, a report to record the monitoring details and results, including the comparison between the measured noise levels and the predicted levels in the EIA report would be prepared. This report would be submitted to the IEC, SOR, HyD and EPD within one month after completion of monitoring.

Cessation of EM&A

3.17 The ET would continue to carry out construction phase environmental monitoring and site inspections until the completion of the construction works. The construction phase EM&A programme, or any part of it, would be terminated upon approval from the SOR, IEC, HyD and EPD.

3.18 The ET would carry out operation phase noise monitoring within the first year of the road opening.

4. AIR QUALITY

Introduction

4.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of air quality impacts during construction of the Project are presented.

4.2 The objectives of the monitoring for Total Suspended Particulates (TSP) are:

- To identify the extent of construction dust impacts on sensitive receivers;
- To determine the effectiveness of mitigation measures to control dust generation from construction activities;
- To audit the compliance of the Contractor with regard to dust control, contract conditions and the relevant dust impact criteria;
- To recommend further mitigation measures if found to be necessary; and

Methodology and Criteria

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

4.4 The criteria against which air quality (measured as TSP) monitoring would be assessed are:

- The 24-hour TSP Hong Kong Air Quality Objective of 260 $\mu g\ m^{-3}$; and
- The 1-hour TSP EIAO assessment criterion of 500 $\mu g\ m^{-3}$.

4.5 These levels are not to be exceeded at the Air Sensitive Receivers (ASRs).

4.6 1-hour and 24-hour TSP levels would be measured to indicate the impacts of construction dust. The TSP levels would be measured by following the standard method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.

4.7 24-hour TSP levels would be measured by drawing air through a high volume sampler (HVS) fitted with a conditioned, pre-weighed filter paper, at a controlled rate. After sampling for 24 hours, the filter paper with retained particles should be collected and returned to the laboratory for drying in a desiccator followed by accurate weighing. 24-hour TSP levels would be calculated from the ratio of the mass of particulates retained on the filter paper to the total volume of air sampled. The analysis process normally takes about two days to complete.

4.8 1-hour TSP levels would be measured by direct reading dust meter.

4.9 All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of sampler, identification and weight of the filter paper, and other special phenomena and work progress of the concerned site etc. would be recorded in detail. A sample data record sheet is shown in Appendix C.

Monitoring Equipment

4.10 HVS in compliance with the following specifications would be used for carrying out 24-hour TSP monitoring:

- 0.6 - 1.7 m^3 per minute (20 - 60 standard cubic feet per minute) adjustable flow range;
- equipped with a timing/ control device with ± 5 minutes accuracy for 24 hours operation;
- installed with elapsed-time meter with ± 2 minutes accuracy for 24 hours operation;
- capable of providing a minimum exposed area of 406 cm^2 (63 in^2);
- flow control accuracy: ± 2.5% deviation over 24-hour sampling period;
- incorporated with an electronic mass flow rate controller or other equivalent devices;
- equipped with a flow recorder for continuous monitoring;
- provided with a peaked roof inlet;
- incorporated with a manometer;
- able to hold and seal the filter paper to the sampler housing at horizontal position;
- easy to change the filter; and
- capable of operating continuously for a 24-hour period.

4.11 The ET would be responsible for the provision of the monitoring equipment. The ET would ensure that sufficient number of HVSs with appropriate calibration kit is available for carrying out the baseline, regular impact monitoring and ad-hoc monitoring. The HVSs should be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals, in accordance with requirements stated in the manufacturers operating manual and as described below. All the equipment, calibration kit, filter papers, etc, would be clearly labelled.

4.12 The flow rate of each HVS with mass flow controller would be calibrated using an orifice calibrator. Initial calibration of the dust monitoring equipment would be conducted upon installation and prior to commissioning. Five-point calibration would be carried out every two months.

4.13 The flow-rate of the sampler before and after the sampling exercise with the filter in position would be verified to be constant and be recorded on the data sheet as shown in Appendix C.

4.14 Direct reading dust meter capable of achieving a comparable result as that of the HVS would be used for 1-hour TSP sampling.

4.15 Wind monitoring equipment would be provided and set up at conspicuous locations for logging wind speed and wind direction near the dust monitoring stations. The equipment installation location would be proposed by the ET and agreed with the SOR in consultation with the IEC. For installation and operation of the wind monitoring equipment, the wind sensors would be installed on masts at an elevated level 10m above the ground so that they are clear of obstructions or turbulence caused by buildings. The wind data would be captured by a data logger and downloaded for analysis at least once a month. The wind data monitoring equipment would be calibrated at least once every six months and wind direction would be divided into 16 sectors of 22.5 degrees. The ET may propose alternative methods to obtain representative wind data upon approval from the IEC and SOR, and agreed with EPD.

Laboratory Measurement/Analysis

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

4.17 If a site laboratory or a non-HOKLAS accredited laboratory is used, the laboratory equipment should be approved by the SOR in consultation with the IEC. Measurement performed by the laboratory should be demonstrated to the satisfaction of the SOR and the IEC. The ET would conduct regular audits to determine the accuracy of the measurement results. The ET should provide the SOR with one copy of the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

4.18 Filter paper of size 8"x10" would be labelled before sampling. It would be a clean filter paper with no pin holes, and would be conditioned in a humidity controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

4.19 After sampling, the filter paper loaded with dust would 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 would be regularly calibrated against a traceable standard.

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

Monitoring Locations

4.21 Two air quality monitoring stations have been identified. The locations of the monitoring stations are presented in Table 4.1 and depicted in Figure 4.1.

Table 4.1 Locations of Air Quality Monitoring Stations

ASR No.	Identity/Description
AM1	Correctional Services Department Married Staff Quarters
AM2	Temple

4.22 The status and locations of dust sensitive receivers may change after issuing this manual. If such cases exist, the ET would propose updated monitoring locations and seek approval from the SOR and agreement from the IEC.

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

- At the site boundary or such locations close to the major dust emission source;
- Close to the sensitive receptors; and
- Take into account the prevailing meteorological conditions.

4.24 Prior to the commencement of the EM&A programme, the proposed air quality monitoring stations would be discussed and agreed with the IEC, SOR and EPD. When positioning the samplers, the following points would be noted:

- a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
- no two sampler shall be placed less than 2 m apart;
- 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;
- a minimum of 2 m separation from walls, parapets and penthouses is required for rooftops samplers;
- a minimum of 2 m separation from any supporting structure, measures horizontally is required;
- no furnace or incinerator flue is nearby;
- airflow around the sampler is unrestricted;
- the sampler is more than 20 m from the dripline;
- any wire fence and gate to protect the sampler, shall not cause any obstruction during monitoring;
- permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- a secured supply of electricity is needed to operate the samplers.

Baseline Monitoring

4.25 Baseline monitoring would be carried out to determine the ambient 24-hour and 1-hour TSP levels at the monitoring stations prior to the commencement of the construction works. Baseline monitoring would be carried out for a period of at least two weeks with the 24-hour and three 1-hour measurements taken daily at each monitoring station. General meteorological conditions and notes regarding any significant adjacent dust producing sources would also be recorded throughout the baseline monitoring period. Before commencing the baseline monitoring, the ET would inform the IEC of the baseline monitoring programme such that the IEC could conduct on-site audit to ensure accuracy of the baseline monitoring results.

4.26 Baseline monitoring schedule would be submitted to the Contractor, IEC and EPD for information and the SOR for approval prior to commencement of the baseline monitoring.

4.27 During the baseline monitoring, there should not be any construction or dust generating activities in the vicinity of the monitoring stations.

4.28 In case the baseline monitoring could not be carried out at the designated monitoring locations during the baseline monitoring period, the ET should carry out the monitoring at alternative locations which could effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations should be approved by the SOR and agreed with the IEC.

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

4.30 The baseline monitoring would provide data for the determination of the appropriate Action Levels with the Limit Levels set against statutory or otherwise agreed limits.

4.31 Baseline checking of ambient dust levels would be carried out every three months at each monitoring station, when no dusty works activities are in operation. If the ET considers that significant changes in the ambient conditions have arisen, a repeat of the baseline monitoring might be carried out to update the baseline levels and air quality criteria, after consultation and agreement with the SOR, IEC, HyD and EPD.

Impact Monitoring

4.32 The monthly schedule of the compliance and impact monitoring programme would be drawn up by the ET prior to the commencement of the scheduled construction period and 3 months impact monitoring schedule would be provided in the monthly EM&A reports. For regular impact monitoring, a sampling frequency of at least once in every six days would be observed at all monitoring stations for 24-hour TSP monitoring. For 1-hour TSP monitoring, the sampling frequency of at least three times in every six days would be undertaken when the highest dust impacts are likely to occur. Before commencing the impact monitoring, the ET would inform the IEC of the impact monitoring programme such that the IEC could conduct on-site audit to ensure the accuracy of the impact monitoring results.

4.33 The specific time to start and stop the 24-hour TSP monitoring would be clearly defined for each location and would be followed by the ET.

Compliance Assessment

4.34 Action and Limit (AL) Levels provide an appropriate framework for the interpretation of monitoring results. The air quality monitoring data would be checked against the agreed AL Levels as listed in Table 4.2.

Table 4.2 Derivation of Action and Limit Levels for Air Quality

Parameter	Action Level	Limit Level
24 hour TSP Level in $\mu g/m^3$	• For baseline level $\leq$200 $\mu g/m^3$, Action level = (Baseline level*1.3 + Limit level)/2 • For baseline level >200 $\mu g/m^3$, Action level = Limit level	260
1 hour TSP Level in $\mu g/m^3$	• For baseline level $\leq$384 $\mu g/m^3$, Action level = (Baseline level*1.3 + Limit level)/2 • For baseline level >384 $\mu g/m^3$, Action level = Limit level	500

Event and Action Plan

4.35 The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET would compare the impact monitoring results with the air quality criteria established for 24-hour TSP and 1-hour TSP. In case where exceedance of these criteria occurs, the ET, Contractor, SOR and IEC would strictly observe the relevant actions of the EAP shown in Table 4.3.

Table 4.3 Event and Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the cause of exceedance and propose remedial measures; 2. Inform IEC and SOR; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily, if ET assessment indicates that exceedance is due to contractor's construction works.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source, investigate the cause of exceedance and propose remedial measures; 2. Inform IEC and SOR; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency to daily, if ET assessment indicates that exceedance is due to contractor's construction works; 5. Discuss with IEC and Contractor on remedial actions required; 6. If exceedance continues, arrange meeting with IEC and SOR; 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the SOR on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the cause of exceedance and propose remedial measures; 2. Inform IEC, SOR and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily, if ET assessment indicates that exceedance is due to contractor's construction works; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, SOR and EPD informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the SOR on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify Contractor, IEC, SOR and EPD; 2. Identify source, investigate the cause of exceedance and propose remedial measures; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily, if ET assessment indicates that exceedance is due to contractor's construction works; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and SOR to discuss the	1. Discuss amongst SOR, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consultation with the IEC, 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	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within three 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 SOR until

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
	remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, SOR and EPD informed of the results; 8. If exceedance stops, cease additional monitoring.		instruct the Contractor to stop that portion of work until the exceedance is abated.	the exceedance is abated.

Mitigation Measures

4.36 The EIA report has recommended air quality control and mitigation measures during the construction phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of exceedances or complaints, the ET and Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

5. NOISE

Introduction

5.1 In this section, the requirements, methodology, equipment, monitoring locations, criteria and protocols for the monitoring and audit of noise impacts during construction of the Project are presented.

Methodology and Criteria

5.2 Noise level measurements would be carried out using the methodology set out in Sub-section 3 of the Annex - General Calibration and Measurement Procedures, as stated in *the Technical Memorandum on Noise from Construction Work other than Percussive Piling* (GW-TM).

5.3 The construction noise levels would be measured in terms of A-weighted equivalent continuous sound pressure level (L_{Aeq}) measured in decibels dB(A). L_{eq}(30min) would be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, L_{eq}(5min) would be employed for comparison with the NCO criteria. The two statistical sound levels L_{10} and L_{90}; the levels exceeded for 10 and 90 percent of the time respectively, would also be recorded during the monitoring for reference. A sample data record sheet is shown in Appendix C for reference.

Monitoring Equipment

5.4 The ET would be responsible for providing and maintaining a sufficient number of sound level meters to conduct the necessary baseline monitoring, regular impact monitoring and ad hoc monitoring at the agreed monitoring locations.

5.5 Sound level meters and calibrators would comply with the International Electrotechnical Commission Publication 651 : 1979 (Type 1) and 804 : 1985 (Type 1) specification as referred to in the GW-TM. The sound level meters would be supplied and used with the manufacturers recommended wind shield and with a tripod.

5.6 The calibration of the sound level meters would be carried out in accordance with the manufacturer's requirements. The sound level meters, including the calibrators, would be verified by HOKLAS laboratory once per year to ensure that they perform to the same level of accuracy as stated in the manufacturers specifications. Calibrated hand-held anemometers capable of measuring the wind speed in meter per second shall also be supplied for the measurement of wind speeds during noise monitoring periods. The anemometers would be used and calibrated in accordance with the manufacturers recommendations.

5.7 Sound level meters would be calibrated using a portable calibrator before and after each measurement. The calibration levels would be noted with the measurement results and where the difference between the calibration levels is greater than 1.0 dB(A) the measurement would be repeated.

5.8 The ET would ensure the equipment be maintained in a good working order in accordance with

the manufacturer's recommendations with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring programme.

5.9 Noise measurements would 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 would be checked with the hand-held anemometers.

Monitoring Locations

5.10 Based on the noise sensitive receivers identified and stated in the EIA report, representative noise monitoring locations have been determined in the vicinity of the works associated with the construction of the Project. Their locations are listed in Table 5.1 and depicted in Figure 5.1. Prior to the commencement of the EM&A Programme, the proposed noise monitoring locations would be discussed and agreed with the SOR, IEC and the EPD.

Table 5.1 Locations of Construction Noise Monitoring Stations

NSR No.	Identity/Description
NMC1	Correctional Services Department Married Staff Quarters
NMC2	Seamen's Training Centre
NMC3	Customs & Excise Training School

5.11 The status and locations of noise sensitive receivers may change after issuing this manual. If such cases exist, the ET would propose updated monitoring locations and seek approval from SOR and agreement from the IEC and EPD of the proposal.

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

- At locations close to the major site activities which are likely to have noise impacts;
- Close to the noise sensitive receivers; and
- For monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring.

5.13 The monitoring station would normally be at a point 1 m from the exterior of the noise sensitive receiver building facade and at a height of approximately 1.2 m above ground or at the height that has the least obstructed view of the construction activity in relation to the receiver. If there is a problem with access to the normal monitoring position, an alternative position would be chosen, and a correction to the measurements would be made. For reference, a correction of +3 dB(A) would be made to the free field measurements. The ET would agree with the IEC and EPD on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring would be carried out at the same positions.

Baseline Monitoring

5.14 The ET would carry out baseline noise monitoring prior to the commencement of the construction works. The baseline monitoring would be carried out daily for a period of at least

two weeks.

5.15 Baseline monitoring schedule would be submitted to the Contractor, IEC and EPD for information and the SOR for approval prior to commencement of the baseline monitoring.

5.16 There should not be any construction activities in the vicinity of the stations during the baseline monitoring. Any non-project related construction activities in the vicinity of the stations during the baseline monitoring would be noted and the source and location recorded.

5.17 Checking for changes in the baseline noise levels throughout the construction of the Project would be carried out by taking "sample" noise measurements every three months, when no noisy construction activities are in progress. If significant changes that can be validated are observed to have arisen, the baseline may be adjusted accordingly after consultation and agreement with the SOR, IEC, HyD and EPD.

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

Impact Monitoring

5.19 Noise monitoring would be carried out at all the designated monitoring stations. The monitoring frequency would 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:

- One set of measurements between 0700-1900 hours on normal weekdays;
- Measurement(s) between 1900-2300 hours (if there is construction work during the restricted hours, the frequency and scope of monitoring would be determined by the CNP application and the Noise Control Authority);
- Measurement(s) between 2300-0700 hours (if there is construction work during the restricted hours, the frequency and scope of monitoring would be determined by the CNP application and the Noise Control Authority); and
- Measurement(s) between 0700-1900 hours on public holidays including Sundays (if there is construction work during the restricted hours, the frequency and scope of monitoring would be determined by the CNP application and the Noise Control Authority).

5.20 Construction work carrying out during restricted hours is controlled by CNP system under the NCO. The Contractor would obtain a CNP prior to any construction work during restricted hours.

Compliance Assessment

5.21 Action and Limit (A/L) Levels provide an appropriate framework for the interpretation of monitoring results. Interpretation of monitoring results is undertaken through checking them against the Action and Limit (A/L) Levels defined in Table 5.2.

Table 5.2 Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)(1)
0700 – 2300 hours on public holidays including Sundays and 1900 – 2300 hours on all days		60/65/70 dB(A)(2)
2300 – 0700 hours on all day		45/50/55dB(A)(2)

(1) Acceptable Noise Levels for Area Sensitivity Rating of A/B/C. Reduce to 70dB(A) for schools and 65dB(A) during school examination periods.
(2) Acceptable Noise Levels for Area Sensitivity Rating of A/B/C respectively.

5.22 To account for cases where ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Level prior to commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise level and the identified construction noise Limit Level, might be defined upon agreement with the EPD. This amended level would, therefore, be greater than 75 dB(A) and would represent the maximum acceptable noise level at a specific monitoring station.

5.23 For compliance checking, after taking into account any adjustments agreed with EPD, comparison with either the Limit or the Maximum Acceptable Impact Level would represent the governing criteria for noise impact assessment during the Project EM&A.

Event and Action Plan (EAP)

5.24 The ET would compare the impact monitoring results with the noise criteria as defined in Table 5.2. In cases where exceedance of these criteria occurs, the ET, IEC, SOR and Contractor would strictly observe the relevant actions of the EAP shown in Table 5.3.

Table 5.3 Event and Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
Action Level	1. Notify Contractor and IEC; 2. Carry out investigation; 3. Report the results of investigation to the IEC and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness, if ET assessment indicates that exceedance is due to contractor's construction work.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the SOR accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Notify Contractor, IEC, SOR and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency, if ET assessment indicates that exceedance is due to contractor's construction work; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, SOR and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, SOR and EPD informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst SOR, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly; 3. Supervise the implementation of remedial measures.	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 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.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC 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 SOR until the exceedance is abated.

Mitigation Measures

5.25 The EIA report has recommended noise control and mitigation measures during the construction phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of exceedances or complaints, the Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

Operation Monitoring

Introduction

5.26 As the noise sensitive receivers close to the improved section of Castle Peak Road would be exposed to traffic noise during the operational phase, a noise monitoring programme was developed to include noise measurements at NSRs during the peak traffic hour. The programme would be carried out by the ET to ensure that the traffic noise levels are comparable to those predicted in the EIA final report under the full provision of the mitigation measures recommended.

Methodology and Criteria

5.27 The traffic noise level would be measured twice within the first year of the road opening. Measurements would be made in terms of the A-weighted L_{10} over 3 half hour periods during the peak traffic hour. A sample data record sheet is shown in Appendix C for reference.

Monitoring Equipment

5.28 The ET would be responsible for providing and maintaining a sufficient number of sound level meters to conduct the necessary operation monitoring at the agreed monitoring locations.

5.29 Sound level meters and calibrators would comply with the International Electrotechnical Commission Publication 651 : 1979 (Type 1) and 804 : 1985 (Type 1) specification as referred to in the GW-TM. The sound level meters would be supplied and used with the manufacturers recommended wind shield and with a tripod.

5.30 The calibration of the sound level meters would be carried out in accordance with the manufacturer's requirements. The sound level meters, including the calibrators, would be verified by the manufacturers once every two years to ensure that they perform to the same level of accuracy as stated in the manufacturers specifications. Calibrated hand-held anemometers capable of measuring the wind speed in meter per second shall also be supplied for the measurement of wind speeds during noise monitoring periods. The anemometers would be used and calibrated in accordance with the manufacturers recommendations.

5.31 Sound level meters would be calibrated using a portable calibrator before and after each measurement. The calibration levels would be noted with the measurement results and where the difference between the calibration levels is greater than 1.0 dB(A) the measurement would be repeated.

5.32 The ET would ensure the equipment be maintained in a good working order in accordance with the manufacturer's recommendations with sufficient spare equipment available in the event of

breakdown to maintain the planned monitoring programme.

5.33 Noise measurements would 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 would be checked with the hand-held anemometers.

Monitoring Locations

5.34 Based on the noise sensitive receivers identified and stated in the EIA report, representative noise monitoring locations have been determined in the vicinity of the works associated with the operation of the Project. Their locations are listed in Table 5.4 and depicted in Figure 5.2.

5.35 The monitoring locations were selected according to the following criteria:

- The monitoring locations were so chosen that noise from Castle Peak Road would dominate;
- One high floor and one medium floor monitoring points would be chosen at each location as far as practicable; and
- Selected monitoring locations would enable monitoring to be done twice within one year after implementation of the mitigation measures during operation.

5.36 Prior to the commencement of the operation monitoring, the proposed noise monitoring locations would be discussed and agreed with the SOR, IEC and the EPD. When alternative monitoring locations are proposed, the monitoring locations would be chosen based on the following criteria:

- Alternative location should be similarly exposed to potential noise impacts;
- Close to the noise sensitive receivers;
- For monitoring locations located in the vicinity of the sensitive receivers, care should be taken to cause minimal disturbance to the occupants during monitoring; and
- Operational noise monitoring should be carried out at a distance of 1m from the openable window and 1.2m above the floor level of the noise sensitive receivers identified in Table 5.4

Table 5.4 Locations of Operation Noise Monitoring Stations

NSR No.	Identity/Description
NMO1	Block H of Correctional Services Department Married Staff Quarters
NMO2	Siu Lam Hospital
NMO3	Seamen's Training Centre
NMO4	Block J of Correctional Services Department Married Staff Quarters

Baseline Monitoring

5.37 No baseline operation noise monitoring is required.

Impact Monitoring

5.38 Noise monitoring would be carried out at all designated traffic noise monitoring stations. The following is an initial guide on the traffic noise monitoring requirements during the operation phase:

- One set of measurements at the morning traffic peak hour on normal weekdays (exact timing to be confirmed and agreed with Transport Department and EPD);
- One set of measurements at the evening traffic peak hour on normal weekdays (exact timing to be confirmed and agreed with Transport Department and EPD);
- A concurrent census of traffic flow and percentage heavy vehicle would be conducted for the road and the existing road network in the vicinity of each monitoring point;
- Average vehicle speed estimated; and
- The two sets of monitoring data would be obtained within the first year of operation.

5.39 Measured noise levels would be compared with predicted noise levels by applying appropriate conversion corrections to allow for the traffic conditions at the time of measurement.

Compliance Assessment

5.40 Action and Limit (A/L) Levels provide an appropriate framework for the interpretation of monitoring results. Interpretation of monitoring results is undertaken through checking them against the Action and Limit (A/L) Levels defined in Table 5.5.

Table 5.5 Action and Limit Levels for Operation Noise

Sensitive Receiver	Action Level
Village houses/Other residential development	L_{10} equal to or higher than 70 dB(A)
Schools/Educational establishments	L_{10} equal to or higher than 65 dB(A)

Event and Action Plan (EAP)

5.41 The ET would compare the monitoring results with the noise criteria as defined in Table 5.5. In cases where exceedance of these criteria occurs, the Highways Department and Contractor would strictly observe the relevant actions of the EAP shown in Table 5.6.

Table 5.6 Event and Action Plan for Operation Noise

EVENT	ACTION	
	Contractor	HyD
Action Level being exceeded in any of the monitoring stations	• Notify HyD; • Provide details of traffic flow and other monitoring condition to EPD.	• Liaise with EPD to investigate noise mitigation proposals; • Implement noise mitigation proposals if required.

6. WATER QUALITY

Introduction

6.1 In this section, the requirements, methodology, equipment, monitoring locations and mitigation measures for the monitoring and audit of water quality impacts during construction of the Project are presented.

Methodology and Criteria

6.2 Marine water quality monitoring would be carried out by the ET to ensure that any deteriorating water quality is readily detected and that timely action is taken to rectify the situation. The appropriate water quality mitigation measures are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual.

6.3 The objectives of the water quality monitoring programme are as follows:

- to determine the effectiveness of the operational controls and mitigation measures employed, and the need for supplementary mitigation measures; and
- to check compliance with relevant WQOs;

6.4 Parameters to be measured in-situ are:

- Dissolved oxygen (DO) (% saturation);
- Dissolved oxygen (DO) (in mg L^{-1});
- Turbidity (NTU);
- Salinity (ppt);
- Water temperature (^{o}C); and
- Water depth (m).

6.5 Parameters to be measured in the laboratory are:

- Suspended solids (mg L^{-1});

6.6 In addition to the water quality parameters, other relevant data would also be recorded, including monitoring location/position, time, weather conditions, sea conditions (where appropriate), tidal stage (where appropriate), any special phenomena and work activities at the construction site.

6.7 A sample data record sheet is shown in Appendix C.

Monitoring Equipment

Dissolved Oxygen and Temperature Measuring Equipment

6.8 The instrument would be a portable, weatherproof dissolved oxygen measuring instrument complete with a cable, sensor and use a DC power source. The equipment would be capable of measuring:

- A DO level in the range of 0-20mg/l and 0-200% saturation; and
- A temperature of 0-45 degree Celsius

6.9 It would have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables would be available for replacement where necessary. (e.g. YSI 52/58/59 Dissolved Oxygen meter, YSI 6820 CE-C-M-Y or an approved similar instrument).

6.10 Should salinity compensation not be built-in in the DO equipment, in-situ salinity would be measured to calibrate the DO equipment prior to each DO measurement.

Turbidity Measurement Instrument

6.11 The instrument would be a portable, weatherproof turbidity-measuring instrument complete with comprehensive operation manual. The equipment would use a DC power source. It would have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU (e.g. Hach 2100 Turbidimeter, YSI 6820 CE-C-M-Y or an approved similar instrument).

Water Sampling Equipment

6.12 A water sampler comprises a transparent PVC cylinder, with a capacity of not less than 2 litres, and could be effectively sealed with latex cups at both ends would be used. The sampler would 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 (Kahlsico Water Sampler or an approved similar instrument).

6.13 Water samples for suspended solids measurement would 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

6.14 A portable, battery-operated echo sounder (Seafarer 700 or an approved similar instrument) would be used for the determination of water depth at each designated monitoring station. This unit would 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

6.15 A portable salinometer capable of measuring salinity in the range of 0-40 mg/l would be provided for measuring salinity of the water at each monitoring location (YSI 30 Salinity meter, YSI 6820 CE-C-M-Y or an approved similar instrument).

Positioning Device

6.16 A digital Global Positioning System (GPS) would be used during monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Testing Protocols

6.17 All in-situ monitoring instruments would 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. Wet bulb calibration for the DO meter would be carried out at least once per monitoring day.

6.18 For the on-site wet-bulb calibration of field equipment, the BS 127: 1993, *Guide to Field and On-Site Test Methods for the Analysis of Waters* would be observed.

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

Laboratory Measurement/Analysis

6.20 Analysis of suspended solids would be carried out in a HOKLAS or other international accredited laboratory. Water samples of about 1L would be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work would start within 24 hours after collection of the water samples. The SS analyses would follow the standard methods according to Table 6.1 and as described in *APHA Standard Methods for the Examination of Water and Wastewater*, 19th Edition, unless otherwise specified.

Table 6.1 Analytical Method to be Applied to Marine Water Samples

Determinant	Standard Method	Detection Limit
Suspended solids	APHA 2540D	1 mg/L

6.21 If in-house or non-standard methods are proposed, details of the method verification should, if required, be submitted EPD. In any circumstances, the sample testing would have comprehensive quality assurance and quality control programmes. The laboratory would be prepared to demonstrate the quality control programmes to EPD or their representative if and when required.

6.22 Additional duplicate samples may be required by EPD for inter laboratory calibration. Remaining samples after analysis would be kept by the laboratory for 3 months in case repeat analysis is required. If in-house or non-standard methods are proposed, details of the method verification may also be required to submit to EPD. In any circumstance, the sample testing would have comprehensive quality assurance and quality control programmes. The laboratory would prepare to demonstrate the programmes to EPD or his representatives when requested.

Monitoring Locations

6.23 The water quality monitoring stations during construction of the Project are depicted in Figure 6.1. Three Impact Stations (M) have been chosen on the basis of their proximity to the marine works and thus the greatest potential for water quality impacts, as detailed in Table 6.2.

Table 6.2 Locations of Water Quality Impact Stations

Station	Easting	Northing
M1	819 649	824 284
M2	820 315	823 874
M3	820 838	823 800

6.24 As detailed in Table 6.3, two Control Stations (C) have been chosen to facilitate comparison of

water quality of M stations with ambient water quality.

Table 6.3 Locations of Water Quality Control Stations

Station	Easting	Northing
C1	819 051	824 772
C2	821 736	823 874

6.25 Prior to the commencement of the EM&A programme, the ET would seek approval of the proposed water quality monitoring stations from the SOR, IEC and EPD.

6.26 The status and locations of water quality sensitive receivers and the marine activities site may change after issuing this manual. If such cases exist, the ET would propose updated monitoring locations and seek approval from the IEC, SOR and EPD.

6.27 When alternative monitoring locations are proposed, they would be chosen taking into regard the following criteria:

- at locations close to and preferably at the boundary of the mixing zone of the major site activities as indicated in the EIA final report, which were likely to have water quality impacts;
- close to the sensitive receptors which were directly or likely to be affected;
- for monitoring locations located in the vicinity of the sensitive receivers, care would be taken to cause minimal disturbance during monitoring;
- two or more control stations which would be at locations representative of the project site in its undisturbed condition. Control stations would be located outside the area of influence of the works and, as far as practicable, not affected by any other works.

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

6.29 All measurements would be carried out at three water depths, namely, 1 m below water surface, mid-water depth, and 1 m above sea bed as appropriate. If the water depth is less than 6 m, the mid-depth measurement is omitted. If the depth is less than 3 m, only the mid-depth measurement needs to the taken.

Baseline Monitoring

6.30 The purpose of the baseline monitoring is to establish ambient conditions prior to the commencement of marine construction works and to demonstrate the suitability of the proposed impact and control stations. The measurements would be taken at all designated Control and Impact stations, 3-days per week, at mid-flood and mid-ebb tides, for at least 4 consecutive weeks prior to the commencement of marine construction works.

6.31 Two consecutive measurements of DO concentration (mgL^{-1}), DO saturation (%) and turbidity (NTU) would be taken in-situ according to the stated sampling method. Where the difference in value between the first and second measurement of DO or turbidity parameters is more than

25% of the value of the first reading, the reading would be discarded and further readings would be taken. Water samples for SS (mgL^{-1}) measurements would be collected at the same depths. As for the in-situ measurements, duplicates would be taken at Control and Impact Stations.

6.32 In addition to the above in-situ measurements, water temperature and salinity would be determined at all Control and Impact stations at the same depths, as specified above.

6.33 Note that in addition to the water depth, monitoring location/position, time, weather conditions, sea conditions(where appropriate), tidal stage (where appropriate), and any special phenomena would be recorded.

6.34 The baseline monitoring campaign would be executed prior to commencement of marine construction works.

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

6.36 Baseline monitoring schedule should be faxed to EPD one week prior to the commencement of baseline monitoring. The interval between two sets of monitoring would not be less than 36 hours.

Impact Monitoring

6.37 During the course of the marine works, impact monitoring would be undertaken at all Control and Impact stations three working days per week, at mid-ebb and mid-flood tides, with sampling /measurement at the designated monitoring stations. The interval between two sets of monitoring would not be less than 36 hours. Monitoring frequency would be maintained as far as practicable.

6.38 Two consecutive measurements of DO concentration (mgL^{-1}), DO saturation (%) and turbidity (NTU) would be taken in-situ according to the stated sampling method. Where the difference in value between the first and second measurement of DO or turbidity parameters is more than 25% of the value of the first reading, the reading would be discarded and further readings would be taken. Water samples for SS (mgL^{-1}) measurements would be collected at the same depths. As for the in-situ measurements, duplicates would be taken at Control and Impact Stations.

6.39 In addition to the above in-situ measurements, water temperature and salinity would be determined at all Control and Impact stations at the same depths, as specified above.

6.40 For evaluating water quality, the values obtained would be assessed against specified WQOs criteria. Note that in addition to the water depth, monitoring location/position, time, weather conditions, sea conditions(where appropriate), tidal stage (where appropriate), and any special phenomena and work activities underway at the marine construction work site would be recorded.

6.41 Proposed water quality monitoring schedule would be provided to the Contractor, IEC, SOR and EPD on or before the first day of the monitoring month. The Contractor, IEC, SOR and EPD would be notified immediately for any changes in schedule.

Post-project Monitoring

6.42 Upon completion of all marine construction activities, a post project water quality monitoring exercise would be carried out for four weeks, in the same manner as the impact monitoring during construction phase of the Project.

Compliance Assessment

6.43 Water quality monitoring results would be checked against the agreed Action and Limit Levels as shown in Table 6.4.

Table 6.4 Derivation of Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg/L (Surface, Middle & Bottom)	Surface and Middle 5 percentile of baseline data Bottom 5 percentile of baseline data	Surface and Middle 4 mg/L or 1 percentile of baseline data Bottom 2 mg/L or 1 percentile of baseline data
SS in mg/L (depth-averaged)	95 percentile of baseline data and 120% of upstream control station's SS at the same tide of the same day	99 percentile of baseline data and 130% of upstream control station's SS at the same tide of the same day
Turbidity in NTU (depth-averaged)	95 percentile of baseline data and 120% of upstream control station's Turbidity at the same tide of the same day	99 percentile of baseline data and 130% of upstream control station's Turbidity at the same tide of the same day

Notes:
1. "depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.
2. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
3. For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
4. 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.

Event and Action Plan (EAP)

6.44 Should the monitoring results of water quality parameters at any designated monitoring stations indicate that the water quality criteria have been exceeded, the actions in accordance with the Event and Action Plan in Table 6.5 would be carried out.

Table 6.5 Event and Action Plan for Water Quality

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
Action level being exceeded by one sampling day	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Repeat measurement on next day of exceedance, if ET assessment indicates that exceedance is due to contractor's construction work.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented.	1. Inform the SOR and confirm notification of exceedance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and SOR; 6. Implement the agreed mitigation measures.
Action level being exceeded by more than one consecutive sampling days	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance, if ET assessment indicates that exceedance is due to contractor's construction work.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the SOR and confirm notification of exceedance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; Consider changes of working methods; 4. Discuss with ET and IEC and propose mitigation measures to IEC and SOR within three working days; 5. Implement the agreed mitigation measures.

EVENT	ACTION			
	ET	IEC	SOR	CONTRACTOR
Limit level being exceeded by one sampling day	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level, if ET assessment indicates that exceedance is due to contractor's construction work.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and 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. Assess the effectiveness of the implemented mitigation measures.	1. Inform the SOR and confirm notification of exceedance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and SOR within three working days; 6. Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	1. Repeat *in situ* measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days, if ET assessment indicates that exceedance is due to contractor's construction work.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the SOR accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and 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. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit level.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and SOR within three working days; 6. Implement the agreed mitigation measures; 7. As directed by the SOR, to slow down or to stop all or part of the marine work or construction activities.

Mitigation Measures

6.45 The EIA report has recommended water quality mitigation measures during the construction phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of exceedances or complaints, the ET and Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

7. WASTE MANAGEMENT

Introduction

7.1 This section sets out the handling, recycling, storage, transportation and disposal measures which are recommended to avoid or minimise potential adverse impacts associated with waste arising from the construction of the Project.

Waste Management Plan

7.2 In accordance with Special Conditions of Contract Section 47, the Contractor would prepare and submit a Waste Management Plan to the SOR and HyD for approval within 21 days from acceptance of Tender.

7.3 The Plan would describe the arrangements for avoidance, reuse, recover and recycling storage, collection and disposal of different categories of waste which would be generated from the construction activities. The Plan would incorporate site specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials and disposal locations of different categories of waste.

7.4 The Waste Management Plan would be regularly reviewed and updated as appropriate, throughout the course of the construction works to ensure that it remains current with the latest detailed information and works practices.

7.5 All the measures in the approved Waste Management Plan would be fully implemented throughout the construction phase of the Project.

Audit Requirements

7.6 In order to ensure that the Contractor have implemented the recommendations of the EIA final report, the ET would conduct routine weekly site inspections which include waste management issues. The audits would look at all aspects of waste management including waste generation, storage, recycling, transport and disposal.

7.7 The aim of the weekly site inspection would include, but are not limited to, the following:

- ensure that the wastes arising from works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner and comply with the relevant requirements under the Waste Disposal Ordinance (WDO) and its regulations;
- ensure that the Contractor properly implement the appropriate environmental protection and waste pollution control mitigation measures, as outlined the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual to minimise and control the potential for waste impacts;
- ensure the effective implementation of the Contractor's EM&A Manual and Waste Management Plan; and
- encourage the reuse and recycling of materials.

Methodology and Criteria

7.8 The Contractor would ensure that the necessary waste disposal permits or licences are obtained from appropriate authorities in accordance with the various Ordinances. In addition to the ET weekly site inspection, the Contractor would designate a member of staff as being responsible for inspecting and auditing the on-site waste management practices on a monthly basis, with reference to the relevant legislation and guidelines as well as the recommendations given in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual, and defined below:

7.9 General Legislation for Waste Management

- Waste Disposal Ordinance (Cap 354);
- Waste Disposal (Chemical Waste) (General) Regulation (Cap 354);
- Land (Miscellaneous Provisions) Ordinance (Cap 28);
- Public Health and Municipal Services Ordinance (Cap 132) - Public Cleansing and Prevention of Nuisances (Urban Council) and (Regional Council) By-laws;
- Dumping at Sea Ordinance (1995).
- the storage, handling and disposal of chemical waste should be audited with reference to the requirements of the Code of Practice on the Package, Labelling and Storage of Chemical Wastes published by the EPD.

7.10 Other Relevant Guidelines

- *Waste Reduction Framework Plan, 1998 to 2007,* Planning, Environment and Lands Bureau, Government Secretariat, 5 November 1998.
- *Waste Disposal Plan for Hong Kong* (1989), Planning, Environment and Lands Branch Government Secretariat.
- *Environmental Guidelines for Planning in Hong Kong.* Hong Kong Planning Standards and Guidelines (1990).
- *New Disposal Arrangements for Construction Waste.* EPD and CED (1992)
- *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.* EPD(1992).
- *Environment, Transport and Works Bureau Technical Circular (Works) No.15/2003*, Waste Management on Construction Sites; Environment, Transport and Works Bureau, HK SAR Government.
- *Works Branch Technical Circular No. 12/2000,* Fill Management; Works Bureau, HK SAR Government.
- *Environment, Transport and Works Bureau Technical Circular (Works) No 34/2002*, Management of Dredged/Excavated Sediment; Environment, Transport and Works Bureau, HK SAR Government.
- *Works Branch Technical Circular, 32/92*, The Use of Tropical Hard Wood on Construction Site; Works Branch, Hong Kong Government.
- *Works Branch Technical Circular No. 2/93, Public Dumps*, Works Branch, Hong Kong Government.
- *Works Branch Technical Circular No. 16/96*, Wet Soil in Public Dumps, Works Branch, Hong Kong Government.
- *Works Bureau Technical Circular No. 4/98 and No.4/98A*, Use of Public Fill in

Reclamation and Earth Filling Projects; Works Bureau, HK SAR Government.

- *Environment, Transport and Works Bureau Technical Circular (Works) No 33/2002*, Management of Construction and Demolition Material Including Rock; Environment, Transport and Works Bureau, HK SAR Government.
- *Works Bureau Technical Circular No 6/2002 and 6/2002A*, Enhanced Specification for Site Cleanliness and Tidiness, Works Bureau, HK SAR Government.
- *Environment, Transport and Works Bureau Technical Circular (Works) No 21/2002*, Trip-ticket System for Disposal of Construction and Demolition Material; Environment, Transport and Works Bureau, HK SAR Government.
- *Works Bureau Technical Circular No 25/99, 25/99A and 25/99C*, Incorporation of Information on Construction and Demolition Material Management in Public Works Sub-committee Papers; Works Bureau, HK SAR Government.
- *A Guide to the Registration of Chemical Waste Producers.*
- *A Guide to the Chemical Waste Control Scheme.*

Mitigation Measures

7.11 The EIA report has recommended waste management mitigation measures during the construction phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of complaints, the ET and Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

8. ECOLOGY

Terrestrial Ecology

Introduction

8.1 Whilst the EIA final report did not recommend any specific EM&A requirements for terrestrial ecology resources, a number of mitigation measures were specified for implementation to minimize the potential impacts during the construction of the Project.

Auditing Requirements

8.2 In order to ensure that terrestrial ecology resources are adequately protected, it would be necessary to undertake audits to ensure the effective implementation of the recommended mitigation measures. Section 11 of this EM&A Manual sets out the requirements of the auditing programme.

8.3 The audit programme would evaluate the effectiveness and stability of the mitigation measures rather than simply verifying their implementation.

Mitigation Measures

8.4 The EIA final report has recommended terrestrial ecology mitigation measures during the construction phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of complaints, the ET and Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

Marine Ecology

8.5 The constraints on dredging and filling operations defined in Section 6 and Appendix B would act as appropriate mitigation measures to control environmental impacts to marine ecology resources to acceptable levels. If marine ecology impacts due to construction activities arise, it would be monitored through impacts to water quality. As impact on marine water was predicted to be limited, no specific monitoring and audit on marine ecology is envisaged.

Fisheries

8.6 Fishery impacts have been avoided by minimising the reclamation area and scale of dredging. Since no insurmountable fisheries impacts have been identified, mitigation measures are not necessary. Monitoring and audit programme designed to detect and mitigate any unacceptable impacts to water quality and marine ecology would also serve to protect fishery resources. As impact on marine water was predicted to be limited, no specific monitoring and audit on fisheries is envisaged.

9. LANDSCAPE AND VISUAL

Introduction

9.1 Whilst the EIA final report did not recommend any specific EM&A requirements for landscape and visual resources, a number of mitigation measures were specified for implementation to minimize the potential impacts during the construction and operation of the Project.

Auditing Requirements

9.2 In order to ensure that landscape and visual resources are adequately protected, it would be necessary to undertake audits to ensure the effective implementation of the recommended mitigation measures. Section 10 of this EM&A Manual sets out the requirements of the auditing programme.

9.3 The audit programme would evaluate the effectiveness and stability of the mitigation measures rather than simply verifying their implementation.

Mitigation Measures

9.4 The EIA final report has recommended landscape and visual mitigation measures during the construction and operation phase of the Project. These are outlined in the Environmental Mitigation Implementation Schedule in Appendix B of this EM&A Manual. In the event of complaints, the ET and Contractor would be responsible for reviewing the effectiveness of these measures and for proposing, designing and implementing alternative measures as appropriate.

10. ENVIRONMENTAL AUDITING

Site Inspections

10.1 Site inspections provide a direct means to track and ensure the enforcement of specified environmental protection and pollution control measures. The inspections would be undertaken routinely by the ET to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. Additionally, the ET would be responsible for defining the scope of the inspections, detailing any deficiencies that are identified, and reporting any necessary action or mitigation measures that are implemented as a result of the inspection.

10.2 Site inspections would be carried out at least once per week. The areas of inspection would include the general environmental conditions in the vicinity of the site and the pollution control and mitigation measures within the site; it would also review the environmental conditions outside the site area which are likely to be affected, directly or indirectly, by site activities. The ET would make reference to the following information in conducting the inspections:

- the EIA and EM&A recommendations on environmental protection and pollution control mitigation measures;
- ongoing results of the EM&A programme;
- works progress and programme;
- individual works method statements which shall include proposals on associated pollution control measures;
- the contract specifications on environmental protection;
- the relevant environmental protection and pollution control laws; and
- previous site inspection results undertaken.

10.3 The inspection results and their associated recommendations on improvements to the environmental protection and pollution control works would be submitted to the Contractor, as appropriate, within one working day, for reference and for taking immediate action. They would also be presented, along with the remedial actions taken, in the monthly EM&A report. The Contractor would follow the procedures and time-frames stipulated in the environmental site inspection for the implementation of mitigation proposal. An action reporting system would be formulated and implemented to report on any remedial measures implemented subsequent to the site inspections.

10.4 Ad hoc site inspections would also be carried out by the ET if significant environmental problems are identified. Inspections may also be required subsequent to receipt of an environmental complaint, or as part of the associated investigation work.

Compliance with Legal and Contractual Requirements

10.5 There are contractual environmental protection and pollution control requirements, which the Contractor would comply with, in addition to Hong Kong's environmental protection and pollution control laws.

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

10.7 The Contractor would also make available for inspection relevant documents to the ET so that the checking and auditing process can be carried out. The relevant documents are expected to include the updated work progress reports, the updated works programme, the application letters for different licences/permits under the environmental protection laws, and all the valid licences/permit. The site diary would also be available, upon request, to the ET during his site inspection.

10.8 After reviewing the documentation, the ET would advise 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's review concludes that the current status on licence/permit application and any environmental protection and pollution control preparation works is incompatible with the works programme or may result in a potential violation of environmental protection and pollution control requirements by the works in due course, he would also advise the Contractor accordingly.

10.9 Upon receipt of the advice, the Contractor would undertake immediate action to remedy the situation. The SOR would 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.

Environmental Complaint

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

a. log complaint and date of receipt onto the complaint database and inform the IEC immediately;

b. investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;

c. identify mitigation measures in consultation with the IEC if a complaint is valid and due to works;

d. advise the Contractor if mitigation measures are required;

e. review the Contractor's response to identified mitigation measures, and the updated situation;

f. if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;

g. undertake additional monitoring and audit to verify the situation if necessary, and review

that circumstances leading to the complaint do not recur;

h. report investigation results and subsequent actions to complainant (if the source of complaint is EPD or if the source of complaint is identified through EPD, the results shall be reported within the timeframe assigned by the EPD); and

i. record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

10.11 During the complaint investigation work, the Contractor and the SOR should cooperate with the ET in providing all necessary information and assistance for completion of the investigation. If mitigation measures (in consultation with the IEC) are required following the investigation, the Contractor should promptly carryout the measures. The SOR should ensure that the measures have been carried out by the Contractor.

10.12 A flow chart of the complaint response procedures is shown in Figure 9.1 and a sample complaint log is shown in Appendix D.

11. REPORTING

General

11.1 Reports can be provided in an electronic medium upon agreeing the format with the SOR and EPD. This would enable a transition from a paper / historic and reactive approach to an electronic / real time proactive approach.

11.2 Types of reports that the ET would prepare and submit include baseline monitoring report, monthly EM&A report, quarterly EM&A summary report and final EM&A review report.

Electronic Reporting of EM&A Information

11.3 In accordance with Condition 7.1 of the Environmental Permit and Further Environmental Permit (EP and FEP) and to facilitate public inspection of the Baseline Monitoring Report and monthly EM&A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports would be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by EPD and would be submitted at the same time as the hardcopies. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these Reports would be included at the beginning of the document. Hyperlinks to all figures, drawings and tables in these Reports would be provided in the main text from where the respective references are made. All graphics in these Reports would be in interlaced GIF format unless otherwise agreed by EPD. The content of the electronic copies of these reports must be the same as the hard copies.

11.4 In accordance with Condition 7.2 of the EP and FEP, all environmental monitoring data would be made available to the public via a dedicated Internet Website in the shortest possible time and in any event no later than 2 weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with EPD.

11.5 In accordance with Condition 7.3 of the EP and FEP, the Internet Website would enable user-friendly public access to the environmental monitoring data, project information and the EP. The Internet Website would have features capable of:

a. Providing access to all environmental monitoring data of this Project collected since the commencement of construction;
b. Providing access to all finalized submissions as required under this Permit;
c. Searching by date;
d. Searching by types of monitoring data (air quality, noise and water quality); and
e. Hyperlinks to relevant monitoring data after searching;

Or otherwise as agreed by EPD.

Baseline Monitoring Report

11.6 The ET Leader would prepare and submit a Baseline Monitoring Report to the Contractor, IEC, SOR and EPD. The baseline monitoring report would be submitted to EPD at least 2 weeks before commencement of construction of the Project. The submission would be certified by the

ET Leader and verified by the IEC. The ET Leader would liase with the relevant parties on the exact number of copies they require.

11.7 The baseline monitoring report would include at least 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. an updated construction programme;
e. 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; and
   - quality assurance (QA) / quality control (QC) results and detection limits;
f. details on influencing factors, including:
   - major activities, if any, being carried out on the site during the period;
   - weather conditions during the period; and
   - other factors which might affect results;
g. determination of the Action and Limit Levels (AL levels) for each monitoring parameter and statistical analysis of the baseline data, the analysis would conclude if there is any significant difference between control and impact stations for the parameters monitored;
h. revisions for inclusion in the EM&A Manual; and
i. comments and conclusions.

EM&A Reports

11.8 The results and findings of all EM&A work required in the Manual would be recorded in the monthly EM&A reports prepared by the ET Leader. In accordance with Condition 4.5 of the EP and FEP, the EM&A reports would be prepared and certified by the ET Leader and verified by the IEC and submitted to EPD within 2 weeks after the end of each reporting month, with the first report due in the month after construction commences. A maximum of 4 copies of each monthly EM&A report would be submitted to each of the four parties: the Contractor, the IEC, the SOR and the EPD. The ET Leader would 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 would review the number and location of monitoring stations and parameters to monitor every 6 months or on an as need basis in order to cater for the changes in surrounding environment and nature of works in progress.

First Monthly EM&A Report

11.9 The first monthly EM&A report would include at least the following:

a. executive summary (1-2 pages):
   - breaches of Action and Limit levels;
   - complaint log;
   - notifications of any summons and successful prosecutions;

- reporting changes; and
- future key issues.

b. basic project information:
- project organisation including key personnel contact names and telephone numbers;
- construction programme;
- management structure, and
- works undertaken during the month;

c. environmental status:
- works undertaken during the month with illustrations (such as location of works, daily dredging rate, etc); and
- drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations);

d. a brief summary of EM&A requirements including:
- all monitoring parameters;
- environmental quality performance limits (Action and Limit levels);
- Event and Action Plans;
- environmental mitigation measures, as recommended in the project EIA final report; and
- 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 final report, summarised in the updated implementation schedule;

f. monitoring results (in tabulated form 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;
- graphical plots of the monitored parameters in the month annotated against:
  - the major activities being carried out on site during the period
  - weather conditions that may affect the results; and
  - any other factors which might affect the monitoring results
- any other factors which might affect the monitoring results; and
- quality assurance (QA) / quality control (QC) results and detection limits;

g. report on non-compliance, complaints, notifications of summons and successful prosecutions:
- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit 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 notification of summons and successful prosecutions for breaches of 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 non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance;

h. others
- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status; and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

Subsequent Monthly EM&A Reports

11.10 The subsequent monthly EM&A reports would include at least the following:

a. executive summary (1 - 2 pages):
- breaches of Action and Limit levels;
- complaints log;
- notifications of any summons and successful prosecutions;
- reporting changes; and
- future key issues.

b. environmental status:
- construction programme;
- works undertaken during the month with illustrations including key personnel contact names and telephone numbers; 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, as recommended in the project EIA final report, summarised in the updated implementation schedule;

d. monitoring results (in tabulated form 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;
- graphical plots of the monitored parameters in the month annotated against;
  - the major activities being carried out on site during the period;
  - weather conditions that may affect the results; and

    - any other factors which might affect the monitoring results;
  - any other factors which might affect the monitoring results; and
  - quality assurance (QA) / quality control (QC) results and detection limits.

e. report on non-compliance, complaints, and notifications of summons and successful prosecutions:
  - record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit 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 notification of summons and successful prosecutions for breaches of 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 non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.

f. others
  - an account of the future key issues as reviewed from the works programme and work method statements;
  - advice on the solid and liquid waste management status; and
  - comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for example, any improvement in the EM&A programme) and conclusions.

g. appendix
  - Action and Limit 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:
    - major activities being carried out on site during the period;
    - weather conditions during the period; and
    - any other factors that 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

11.11 A quarterly EM&A summary report of around five pages would be produced and would contain at least the following information. Apart from these, the first quarterly EM&A summary report would also confirm that the monitoring work is proving effective and that it is generating data with the necessary statistical power to categorically identify or confirm the absence of impact attributable to the works.

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 works undertaken during the quarter;
c. a brief summary of EM&A requirements including:
   - monitoring parameters;
   - environmental quality performance limits (Action and Limit levels);
   - environmental mitigation measures, as recommended in the project EIA final report;
d. advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA final 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 four 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 non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
i. a brief review of the reasons for and the implications of non-compliance, including a review of pollution sources and working procedures;
j. a quarterly assessment of construction impacts on suspended solids at the project site;
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 summarised record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
m. 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;
n. comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and the performance of the environmental management system, that is, of the overall EM&A programme); recommendations (for example, any improvement in the EM&A programme) and conclusions for the quarter; and
o. proponents' contacts and any hotline telephone number for the public to make enquiries.

Final EM&A Review Report

11.12 The termination of construction phase EM&A programme would be determined on the following basis:

- Completion of construction activities and insignificant environmental impacts of the remaining outstanding construction works;
- Trends analysis to demonstrate the narrow down of monitoring exceedances due to construction activities and the return of ambient environmental conditions in comparison with baseline data; and
- No environmental complaint and prosecution involved.

11.13 The proposed termination would only be implemented after the proposal has been endorsed by

the IEC, the SOR and the HyD followed by final approval from the EPD.

11.14 The final EM&A review report would include at least the following:

a. an executive summary;
b. basic project information including a synopsis of the project organisation, contacts of key management, and a synopsis of work undertaken during the entire construction period;
c. a brief summary of EM&A requirements including:
   - monitoring parameters;
   - environmental quality performance limits (Action and Limit levels); and
   - environmental mitigation measures, as recommended in the project EIA final report;
d. advice on the implementation status of environmental protection and pollution control/mitigation measures, as recommended in the project EIA final report, summarised in the updated implementation status proformas;
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 construction period for representative monitoring stations annotated against:
   - the major activities being carried out on-site during the period;
   - weather conditions during the period;
   - any other factors which might affect the monitoring results; and
   - the return of ambient environmental conditions in comparison with baseline data
g. compare and contrast the EM&A data with the EIA predictions and annotate with explanation for any discrepancies;
h. provide clear-cut decisions on the environmental acceptability of the project with reference to the specific impact hypothesis;
i. advice on the solid and liquid waste management status;
j. a summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
k. a brief review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures;
l. a summary description of the actions taken in the event of non-compliance and any follow-up procedures related to earlier non-compliance;
m. a summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up procedures taken;
n. review monitoring methodology adopted and with the benefit of hindsight, comment on its effectiveness (including cost effectiveness);
o. a summary record of notifications of summons and successful prosecutions for breaches of the current environmental protection/pollution control legislations, locations and nature of breaches, investigation, follow-up actions taken and results;
p. review the practicality and effectiveness of the EIA process and EM&A programme (for examples, a review of the effectiveness and efficiency of the mitigation measures), recommend any improvement in the EM&A programme; and
q. a conclusion to state the return of ambient and/or the predicted scenario as per EIA findings.

Data Keeping

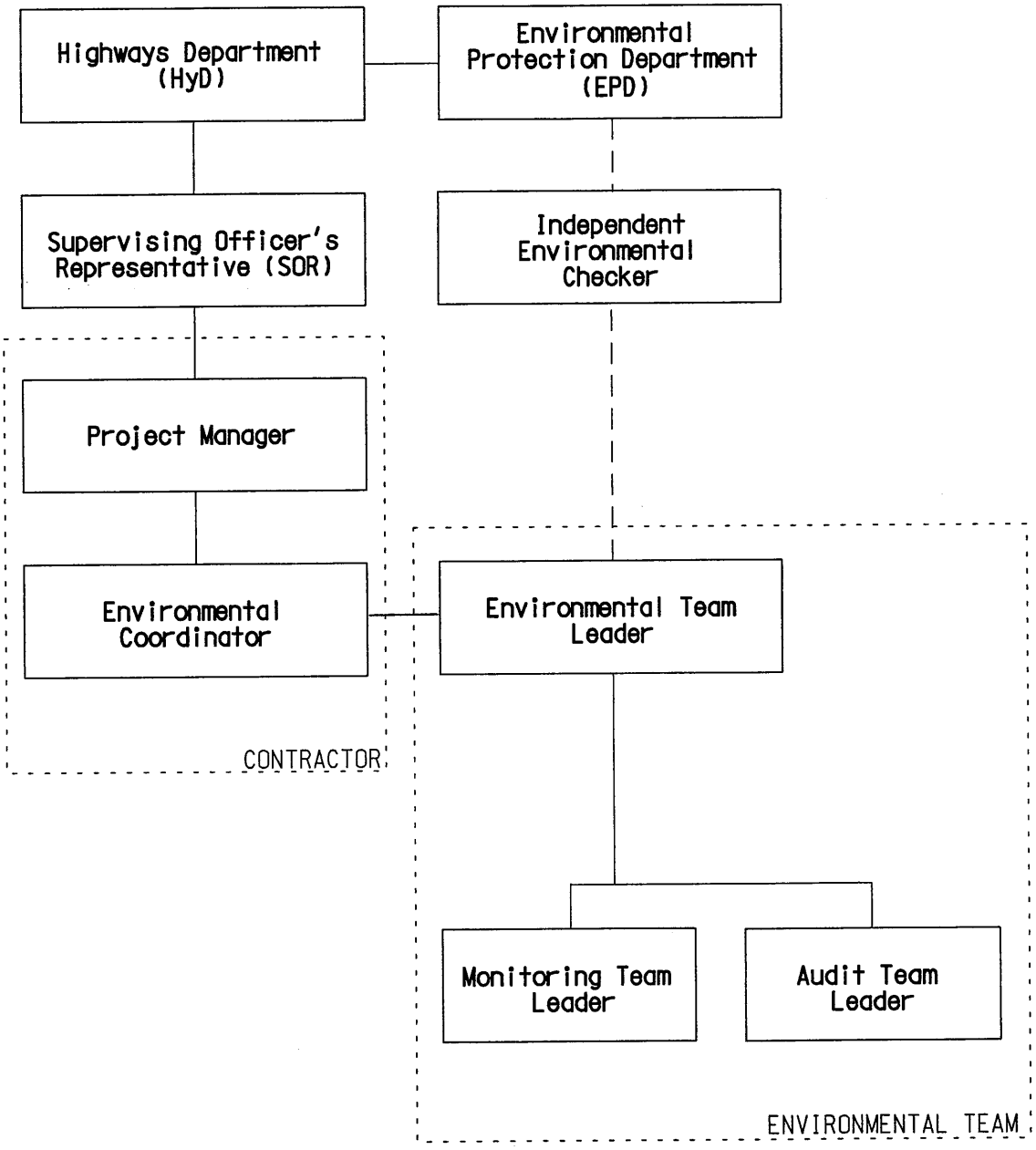
11.15 Documentation such as the monitoring field records, laboratory analysis records, site inspection forms, etc. are not required to be included in the monthly EM&A reports for submission. However, such documents would be well kept by the ET, as appropriate, and would be available for inspection upon request. All relevant information would be clearly and systematically recorded in the documents. Monitoring data would be recorded in magnetic media form, and the soft copy would be available upon request. All documents and data would be kept for at least one year following completion of the construction contract.

Interim Notification of Environmental Quality Limit Exceedances

11.16 With reference to the Event and Action Plan, when the environmental quality performance limits are exceeded, the ET Leader would immediately notify the IEC, SOR and EPD, as appropriate. The notification would be followed up with advice to IEC, the SOR and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notifications is presented in Appendix E.

FIGURES

Project Organization for Environmental Management



Legend:

——— Direct Communication

— — — Liaison

Maunsell ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD. 茂盛環境管理顧問有限公司	CONTRACT NO. HY/2003/04 IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - ENVIRONMENTAL MONITORING AND AUDIT PROJECT ORGANIZATION FOR ENVIRONMENTAL MANAGEMENT	SCALE 比例 N.T.S. JOB No. 項目編號 S01104	DATE 日期 MAR 2004 DRAWING No. 圖號 2.1

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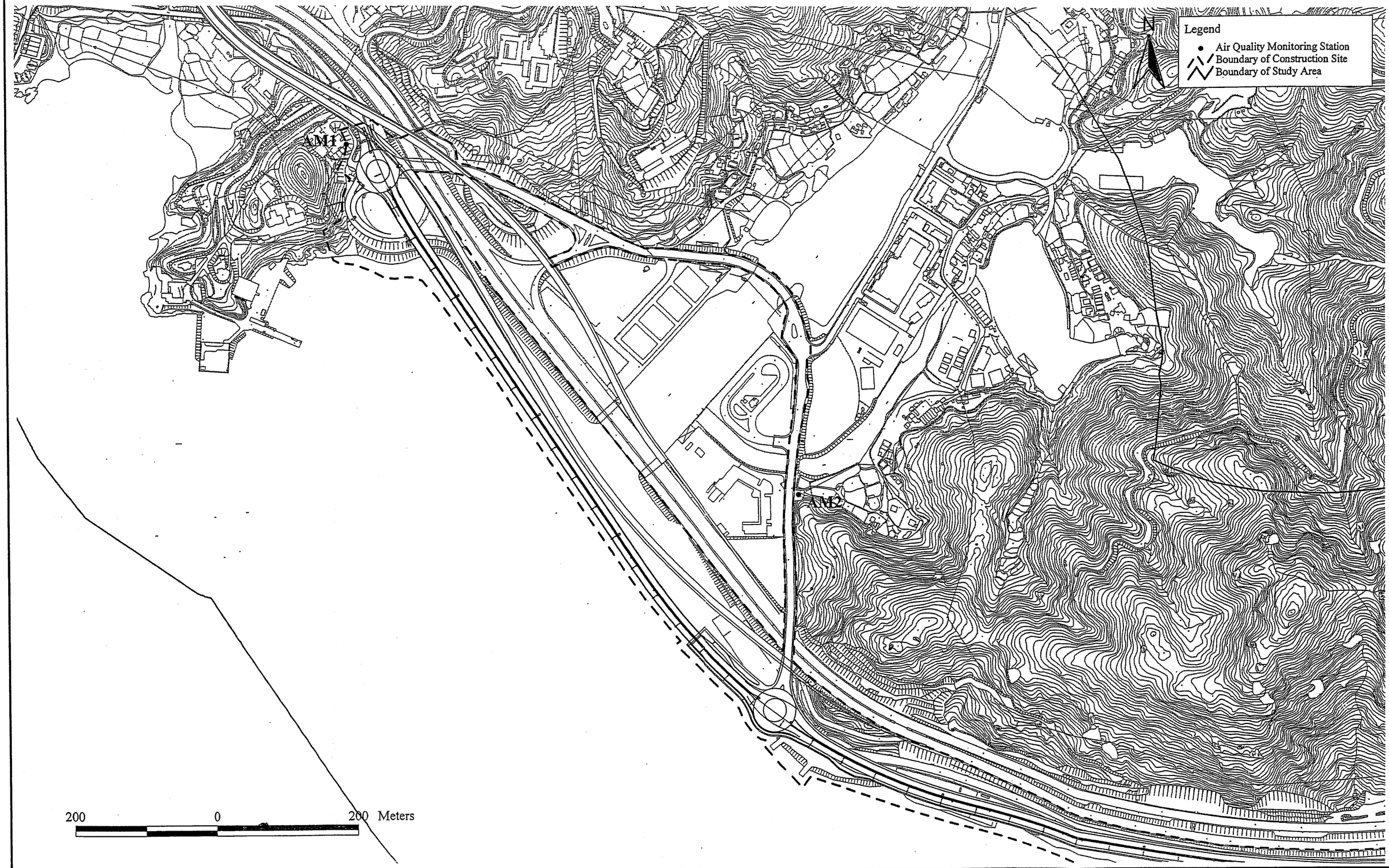

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CONTRACT NO. HY/2003/04 - IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - ENVIRONMENTAL MONITORING AND AUDIT

LOCATIONS OF AIR QUALITY MONITORING STATIONS

SCALE 比例	AS SHOWN
DATE 日期	MAR 2004
JOB No. 項目編號	S01104
DRAWING No. 圖號	4.1

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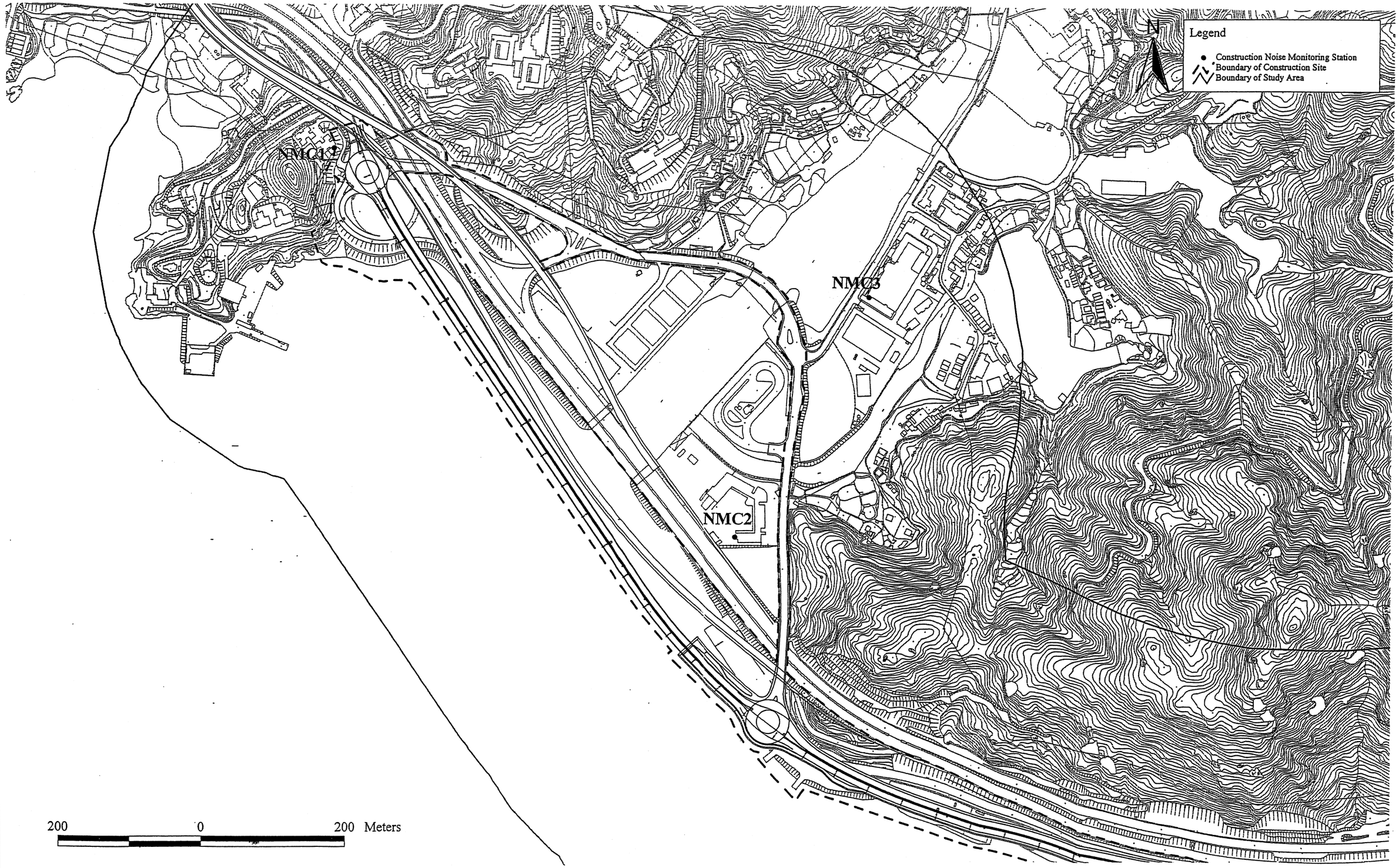

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CONTRACT NO. HY/2003/04 - IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - ENVIRONMENTAL MONITORING AND AUDIT

LOCATIONS OF CONSTRUCTION NOISE MONITORING STATIONS

SCALE 比例	AS SHOWN
DATE 日期	MAR 2004
JOB No. 項目編號	S01104
DRAWING No. 圖號	5.1

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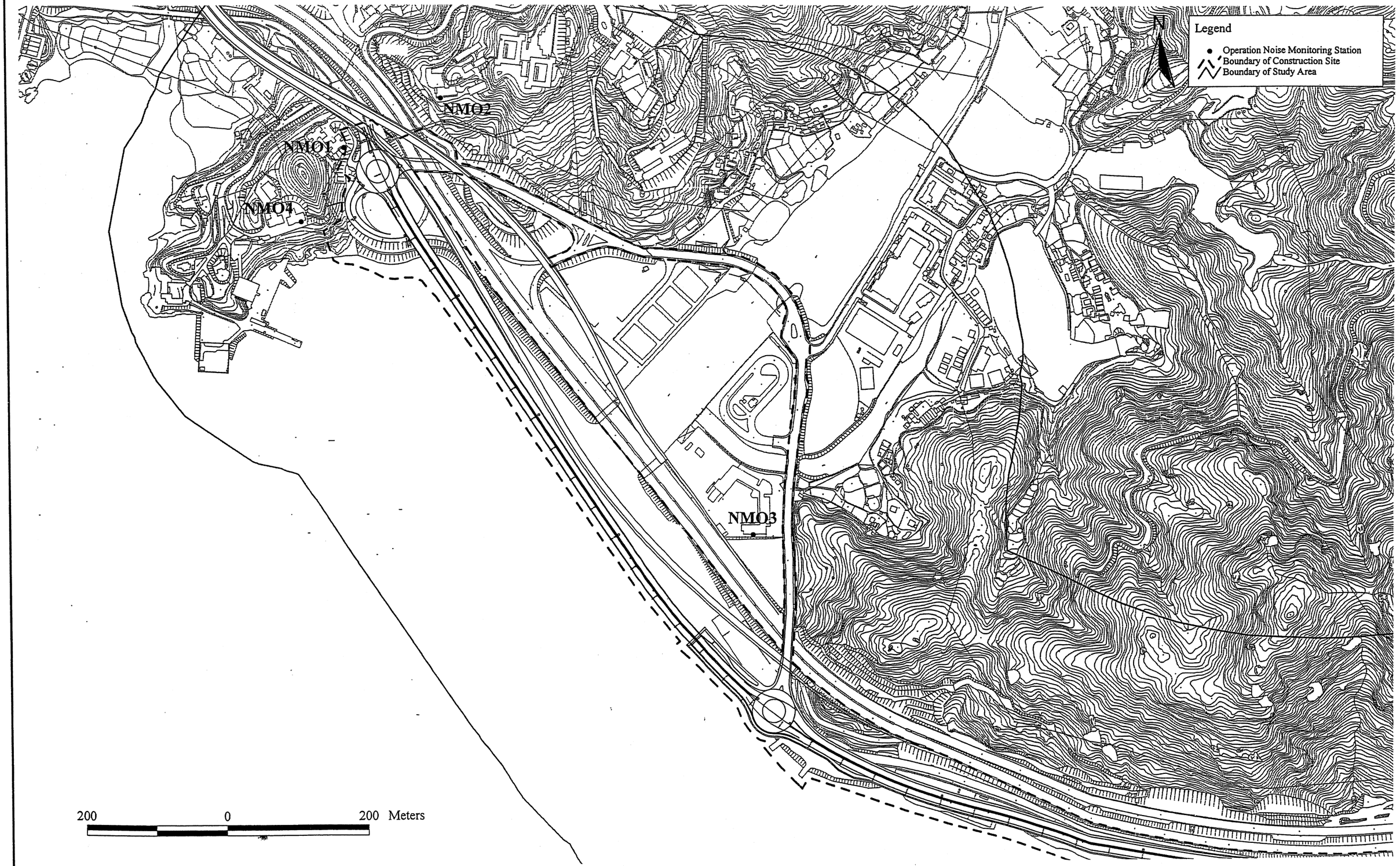

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CONTRACT NO. HY/2003/04 - IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - ENVIRONMENTAL MONITORING AND AUDIT

LOCATIONS OF OPERATION NOISE MONITORING STATIONS

SCALE 比例	AS SHOWN
DATE 日期	MAR 2004
JOB No. 項目編號	S01104
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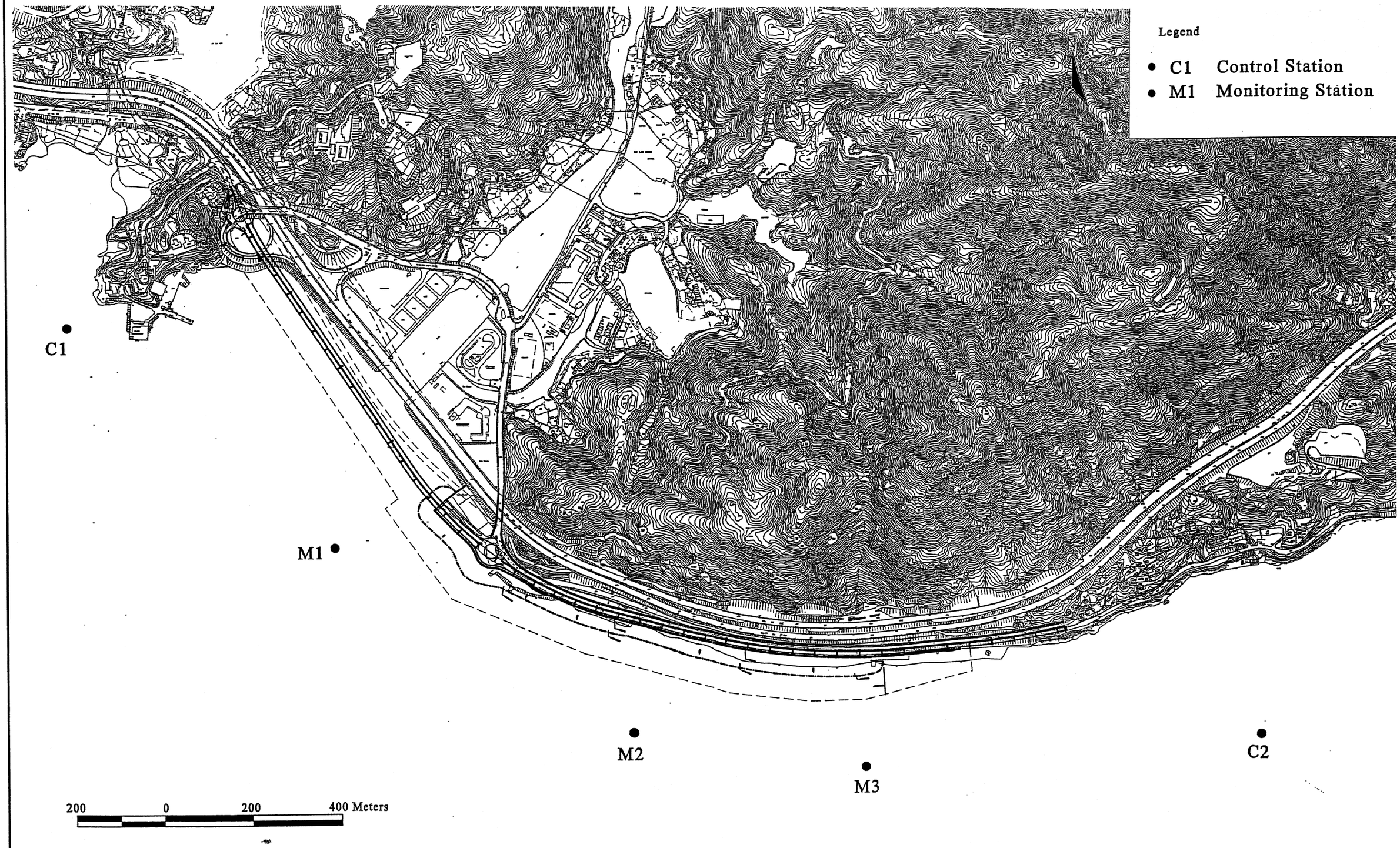

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CONTRACT NO. HY/2003/04 - IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM - ENVIRONMENTAL MONITORING AND AUDIT

LOCATIONS OF WATER QUALITY MONITORING STATIONS

SCALE 比例	AS SHOWN	DATE 日期	MAR 2004
JOB No. 項目編號	S01104	DRAWING No. 圖號	6.1

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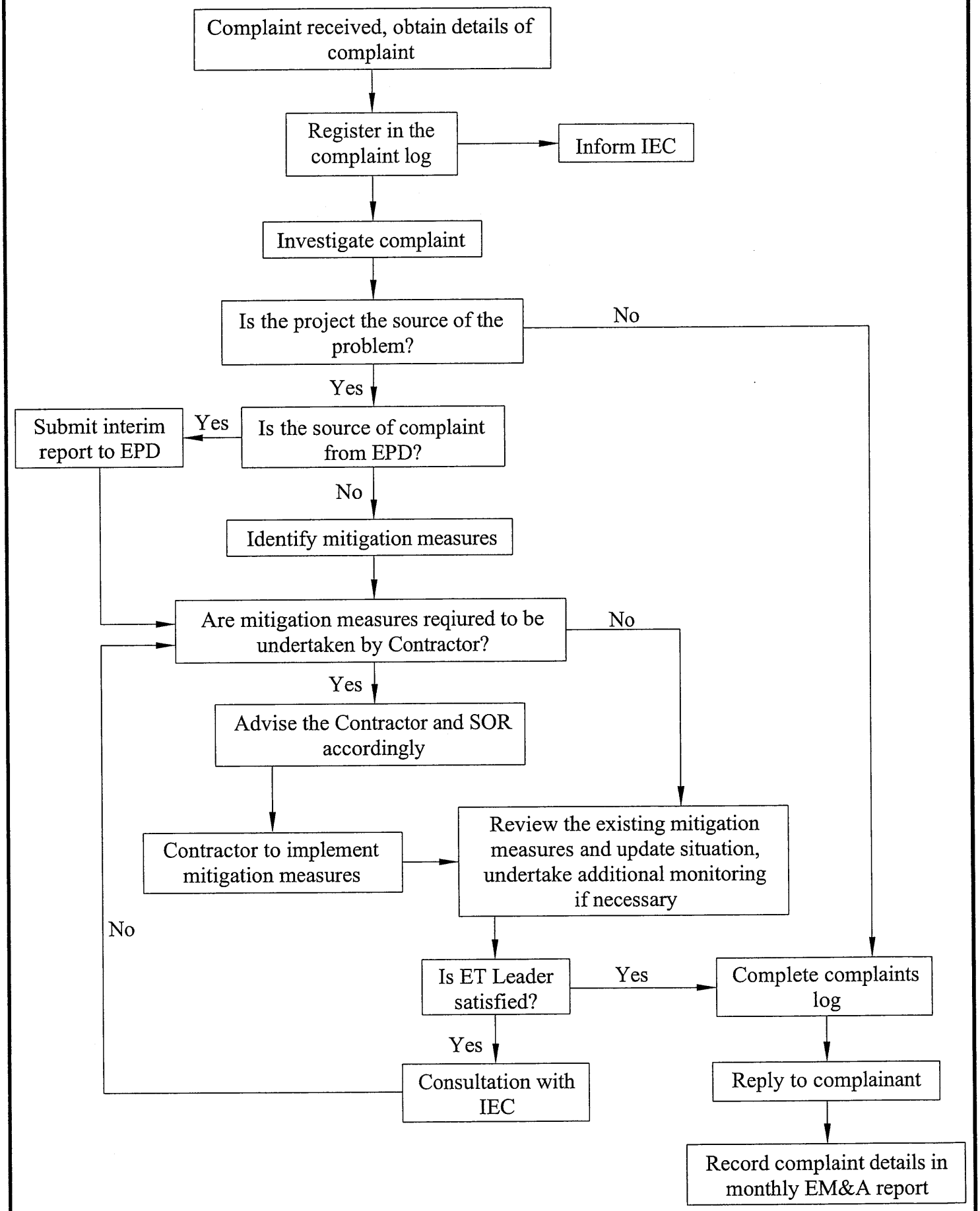

Maunsell ENVIRONMENTAL MANAGEMENT CONSULTANTS LTD. 茂盛環境管理顧問有限公司	CONTRACT NO. HY/2003/04 IMPROVEMENT TO CASTLE PEAK ROAD BETWEEN KA LOON TSUEN AND SIU LAM – ENVRIONMENTAL MONITORING AND AUDIT **COMPLAINT RESPONSE PROCEDURE**	SCALE 比例 N.T.S. JOB No. 項目編號 S01104	DATE 日期 MAR 2004 DRAWING No. 圖號 9.1

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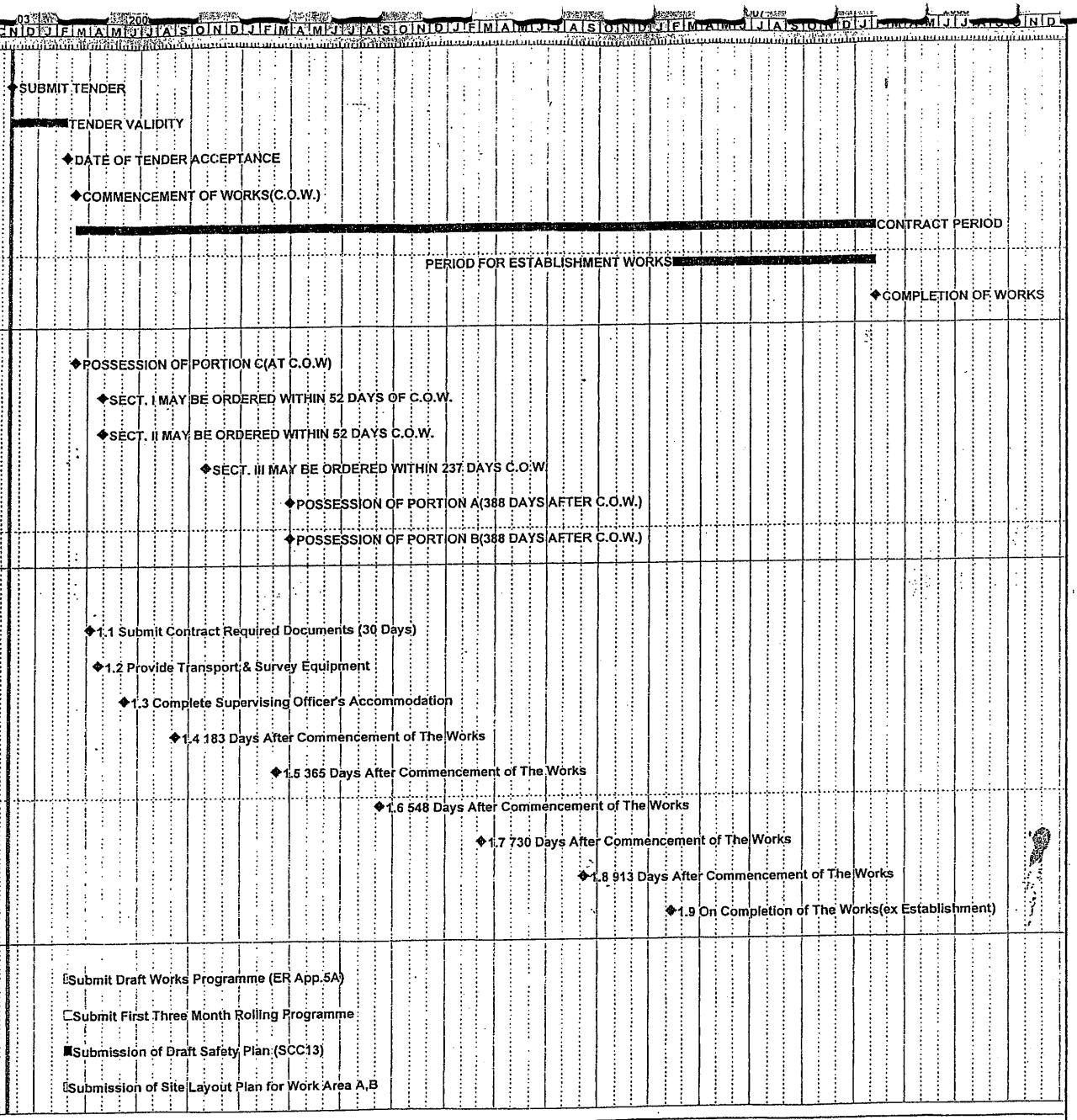
APPENDIX A
PROJECT PROGRAMME

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CONTRACT KEY DATE				
CKD000	SUBMIT TENDER	0	14NOV03	
CKD005	TENDER VALIDITY	101	14NOV03	22FEB04
CKD010	DATE OF TENDER ACCEPTANCE	0	23FEB04	
CKD020	COMMENCEMENT OF WORKS(C.O.W.)	0	08MAR04	
CKD030	CONTRACT PERIOD	1,433	08MAR04	08FEB08
CKD040	PERIOD FOR ESTABLISHMENT WORKS	365	09FEB07	08FEB08
CKD120	COMPLETION OF WORKS	0		08FEB08*
COMMENCEMENT OF WORKS/POSSESSION OF SITE				
CKDPS060	POSSESSION OF PORTION C(AT C.O.W)	0	10MAR04	
CKDPS010	SECT. I MAY BE ORDERED WITHIN 52 DAYS OF C.O.W.	0	29APR04	
CKDPS020	SECT. II MAY BE ORDERED WITHIN 52 DAYS C.O.W.	0	29APR04	
CKDPS030	SECT. III MAY BE ORDERED WITHIN 237 DAYS C.O.W.	0	31OCT04	
CKDPS040	POSSESSION OF PORTION A(388 DAYS AFTER C.O.W.)	0	31MAR05	
CKDPS050	POSSESSION OF PORTION B(388 DAYS AFTER C.O.W.)	0	31MAR05	
COST CENTRE 1 PRELIMINARIES,GENERAL REQUIREMENTS				
MILESTONES				
CC1MS0010	1.1 Submit Contract Required Documents (30 Days)	0		06APR04
CC1MS0020	1.2 Provide Transport & Survey Equipment	0		21APR04
CC1MS0030	1.3 Complete Supervising Officer's Accommodation	0		08JUN04
CC1MS0040	1.4 183 Days After Commencement of The Works	0		06SEP04
CC1MS0050	1.5 365 Days After Commencement of The Works	0		07MAR05
CC1MS0060	1.6 548 Days After Commencement of The Works	0		06SEP05
CC1MS0070	1.7 730 Days After Commencement of The Works	0		07MAR06
CC1MS0080	1.8 913 Days After Commencement of The Works	0		06SEP06
CC1MS0090	1.9 On Completion of The Works(ex Establishment)	0		08FEB07
GENERAL REQUIREMENT				
PG010	Submit Draft Works Programme (ER App.5A)	7	23FEB04	29FEB04
PG015	Submit First Three Month Rolling Programme	14	23FEB04	07MAR04
PG110	Submission of Draft Safety Plan (SCC13)	14	23FEB04	07MAR04
PG160	Submission of Site Layout Plan for Work Area A,B	6	23FEB04	28FEB04



Start Date 14NOV03
Finish Date 08FEB08
Run Date 12MAR04 08:45

Early Bar
Progress Bar
Critical Activity

SCHEME 1

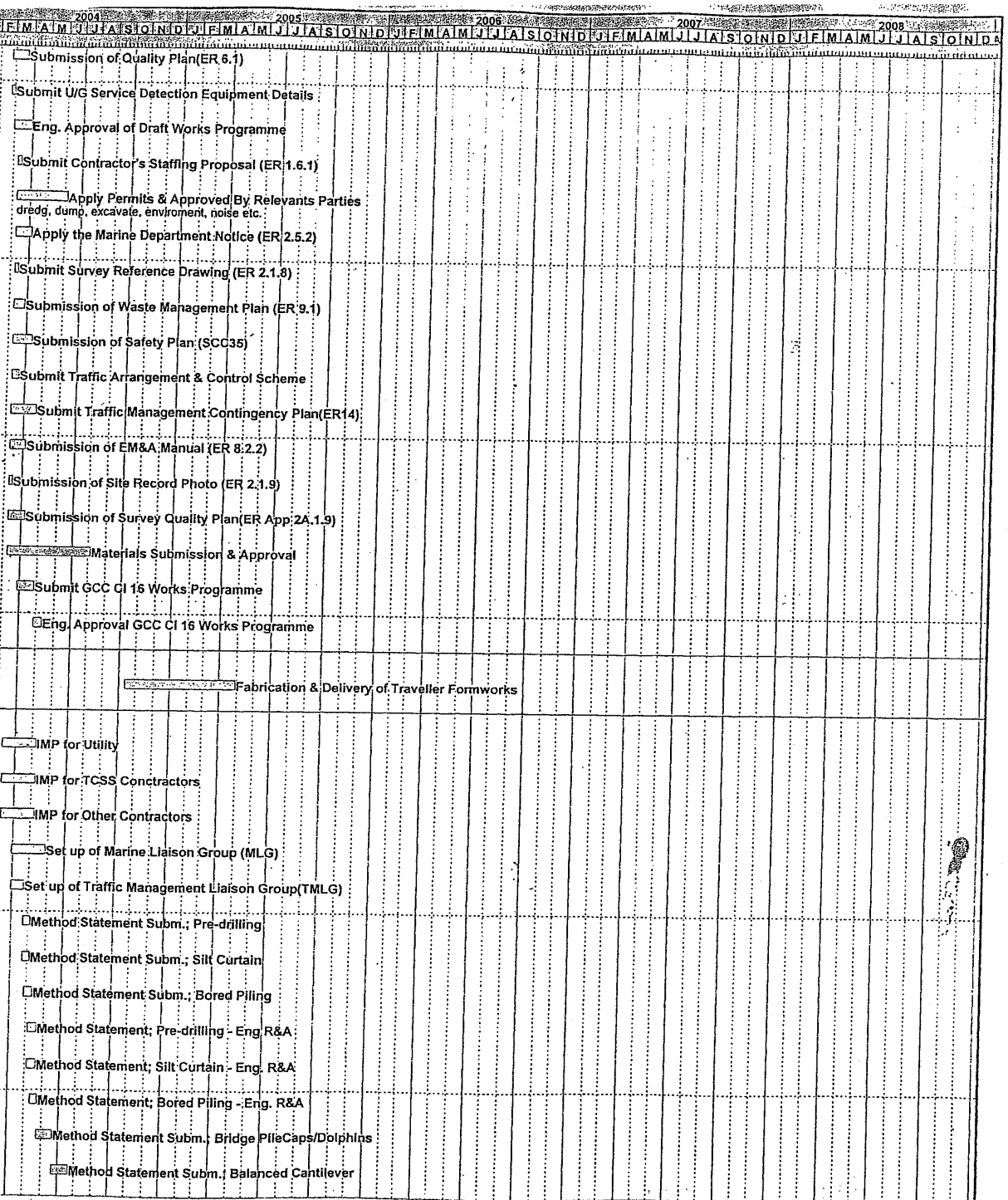
Sheet 1 of 19

CONTRACT No. HY/2003/04
DESIGN & BUILD OF
IMPROVEMENT TO CASTLE PEAK ROAD
BETWEEN KA LOON TSUEN & SIU LAM

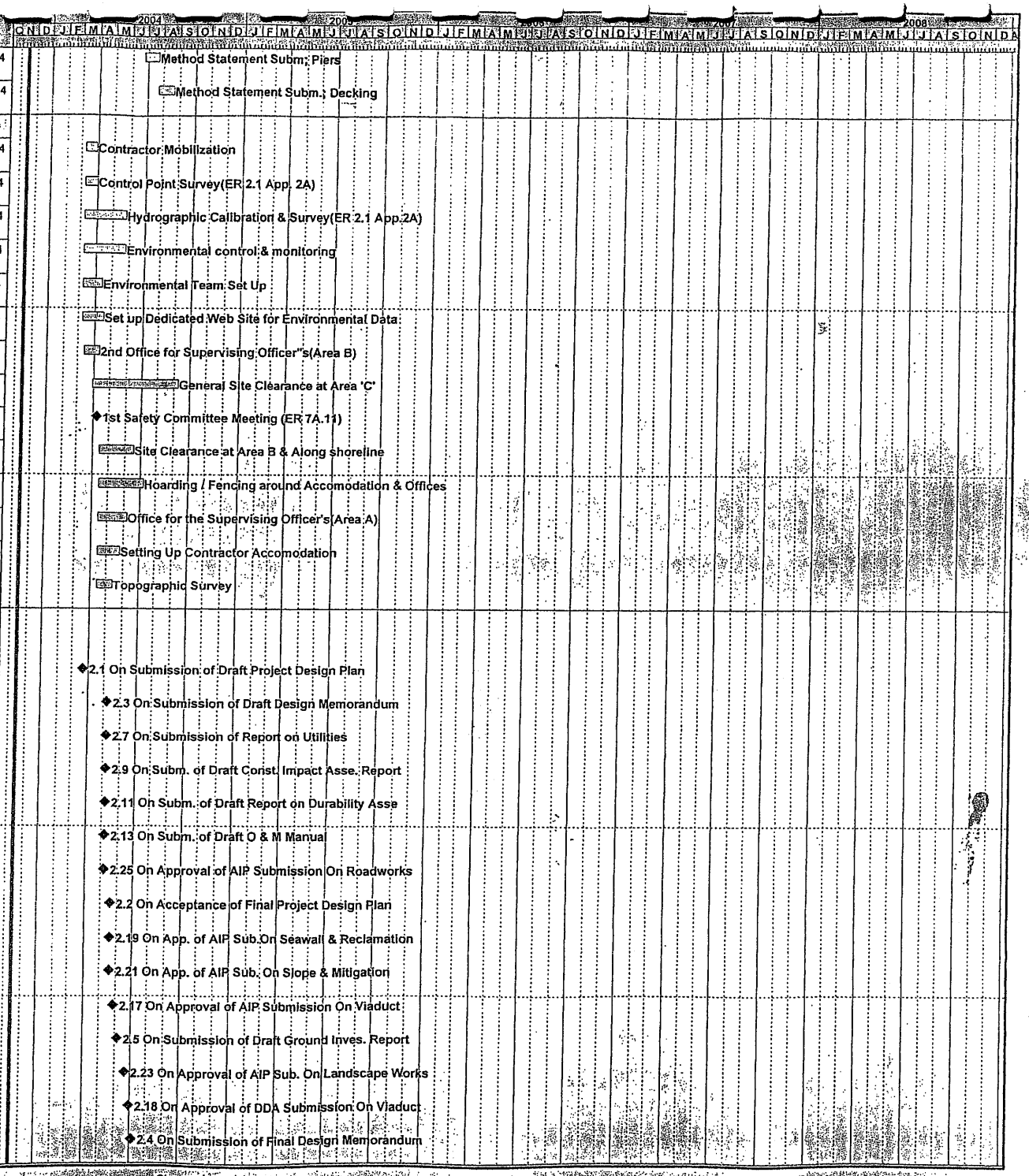
Tender Programme			
Date	Revision	Checked	Approved
08MAR04	DRAFT ISSUE, SCHEME 1		

?Primavera Systems, Inc.

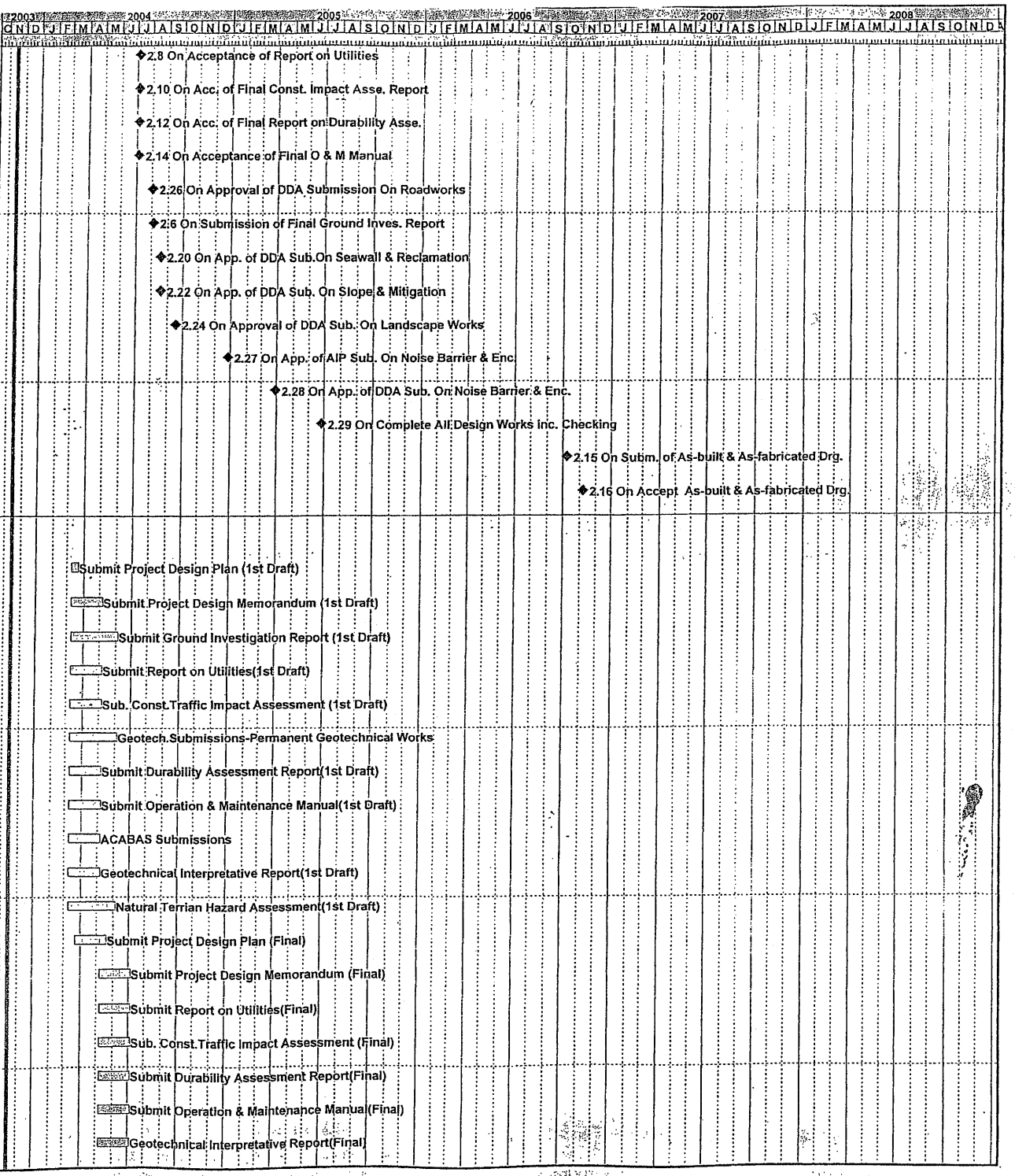
ID	Activity Description	Orig Dur	Early Start	Early Finish
PG190	Submission of Quality Plan(ER 6.1)	28	23FEB04	21MAR04
PG200	Submit U/G Service Detection Equipment Details	7	23FEB04	29FEB04
PG020	Eng. Approval of Draft Works Programme	30	01MAR04	30MAR04
PG050	Submit Contractor's Staffing Proposal (ER 1.6.1)	7	08MAR04	14MAR04
PG070	Apply Permits & Approved By Relevants Parties	90	08MAR04	05JUN04
PG080	Apply the Marine Department Notice (ER 2.5.2)	28	08MAR04	04APR04
PG090	Submit Survey Reference Drawing (ER 2.1.8)	7	08MAR04	14MAR04
PG100	Submission of Waste Management Plan (ER 9.1)	21	08MAR04	28MAR04
PG112	Submission of Safety Plan (SCC35)	35	08MAR04	11APR04
PG120	Submit Traffic Arrangement & Control Scheme	14	08MAR04	21MAR04
PG130	Submit Traffic Management Contingency Plan(ER14)	45	08MAR04	21APR04
PG140	Submission of EM&A Manual (ER 8.2.2)	28	08MAR04	04APR04
PG170	Submission of Site Record Photo (ER 2.1.9)	7	08MAR04	14MAR04
PG180	Submission of Survey Quality Plan(ER App 2A.1.9)	30	08MAR04	06APR04
PR000	Materials Submission & Approval	150	08MAR04	04AUG04
PG025	Submit GCC Cl 16 Works Programme	30	28MAR04	26APR04
PG030	Eng. Approval GCC Cl 16 Works Programme	14	27APR04	10MAY04
MANUFACTURING & DELIVERY				
PR100	Fabrication & Delivery of Traveller Formworks	150	12OCT04	28APR05
METHODS,COORDINATION & INTERFACE MANAGEMENT				
CO020	IMP for Utility	60	08MAR04	06MAY04
CO030	IMP for TCSS Conctractors	60	08MAR04	06MAY04
CO040	IMP for Other Contractors	60	08MAR04	06MAY04
CO090	Set up of Marine Liaison Group (MLG)	60	30MAR04	28MAY04
CO100	Set up of Traffic Management Liaison Group(TMLG)	24	30MAR04	22APR04
MT010	Method Statement Subm.; Pre-drilling	14	22APR04	05MAY04
MT020	Method Statement Subm.; Silt Curtain	14	22APR04	05MAY04
MT030	Method Statement Subm.; Bored Piling	14	27APR04	10MAY04
MT012	Method Statement; Pre-drilling - Eng R&A	14	06MAY04	19MAY04
MT022	Method Statement; Silt Curtain - Eng. R&A	14	06MAY04	19MAY04
MT032	Method Statement; Bored Piling - Eng. R&A	14	11MAY04	24MAY04
MT100	Method Statement Subm.; Bridge PileCaps/Dolphins	28	25MAY04	21JUN04
MT080	Method Statement Subm.; Balanced Cantilever	28	22JUN04	19JUL04



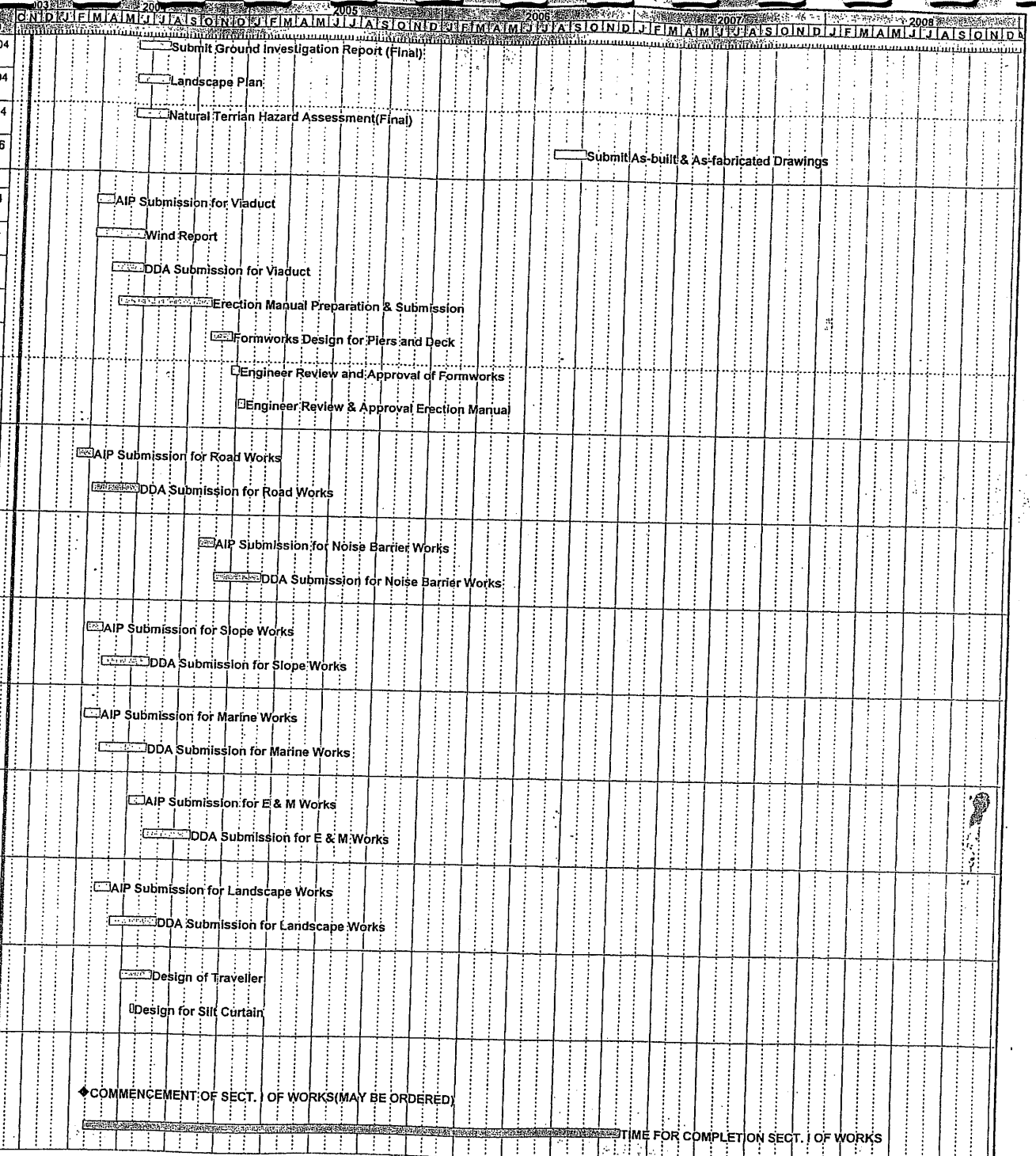
Act ID	Description	Dur	Early Start	Early Finish
MT070	Method Statement Subm; Piers	28	26JUN04	23JUL04
MT110	Method Statement Subm.; Decking	28	24JUL04	20AUG04
SITE WORKS				
PSW010	Contractor Mobilization	19	08MAR04	29MAR04
PSW060	Control Point Survey(ER 2.1 App. 2A)	21	08MAR04	01APR04
PSW090	Hydrographic Calibration & Survey(ER 2.1 App.2A)	60	08MAR04	25MAY04
PSW100	Environmental control & monitoring	60	08MAR04	25MAY04
PSW160	Environmental Team Set Up	30	08MAR04	12APR04
PSW220	Set up Dedicated Web Site for Environmental Data	42	08MAR04	18APR04
PSW120	2nd Office for Supervising Officer"s(Area B)	25	12MAR04	10APR04
PSW030	General Site Clearance at Area 'C'	120	31MAR04	09SEP04
PSW130	1st Safety Committee Meeting (ER 7A.11)	0		06APR04
PSW170	Site Clearance at Area B & Along shoreline	48	13APR04	17JUN04
PSW020	Hoarding / Fencing around Accomodation & Offices	60	14APR04	07JUL04
PSW040	Office for the Supervising Officer's(Area A)	40	14APR04	08JUN04
PSW050	Setting Up Contractor Accomodation	30	14APR04	26MAY04
PSW080	Topographic Survey	21	14APR04	13MAY04
COST CENTRE 2 DESIGN OF PERMANENT WORKS				
MILESTONES				
CC2MS0010	2.1 On Submission of Draft Project Design Plan	0		21MAR04
CC2MS0030	2.3 On Submission of Draft Design Memorandum	0		06MAY04
CC2MS0070	2.7 On Submission of Report on Utilities	0		06MAY04
CC2MS0090	2.9 On Subm. of Draft Const. Impact Asse. Report	0		06MAY04
CC2MS110	2.11 On Subm. of Draft Report on Durability Asse	0		06MAY04
CC2MS130	2.13 On Subm. of Draft O & M Manual	0		06MAY04
CC2MS250	2.25 On Approval of AIP Submission On Roadworks	0		06MAY04
CC2MS0020	2.2 On Acceptance of Final Project Design Plan	0		20MAY04
CC2MS190	2.19 On App. of AIP Sub.On Seawall & Reclamation	0		20MAY04
CC2MS210	2.21 On App. of AIP Sub. On Slope & Mitigation	0		20MAY04
CC2MS170	2.17 On Approval of AIP Submission On Viaduct	0		27MAY04
CC2MS0050	2.5 On Submission of Draft Ground Inves. Report	0		05JUN04
CC2MS230	2.23 On Approval of AIP Sub. On Landscape Works	0		19JUN04
CC2MS180	2.18 On Approval of DDA Submission On Viaduct	0		28JUN04
CC2MS0040	2.4 On Submission of Final Design Memorandum	0		05JUL04



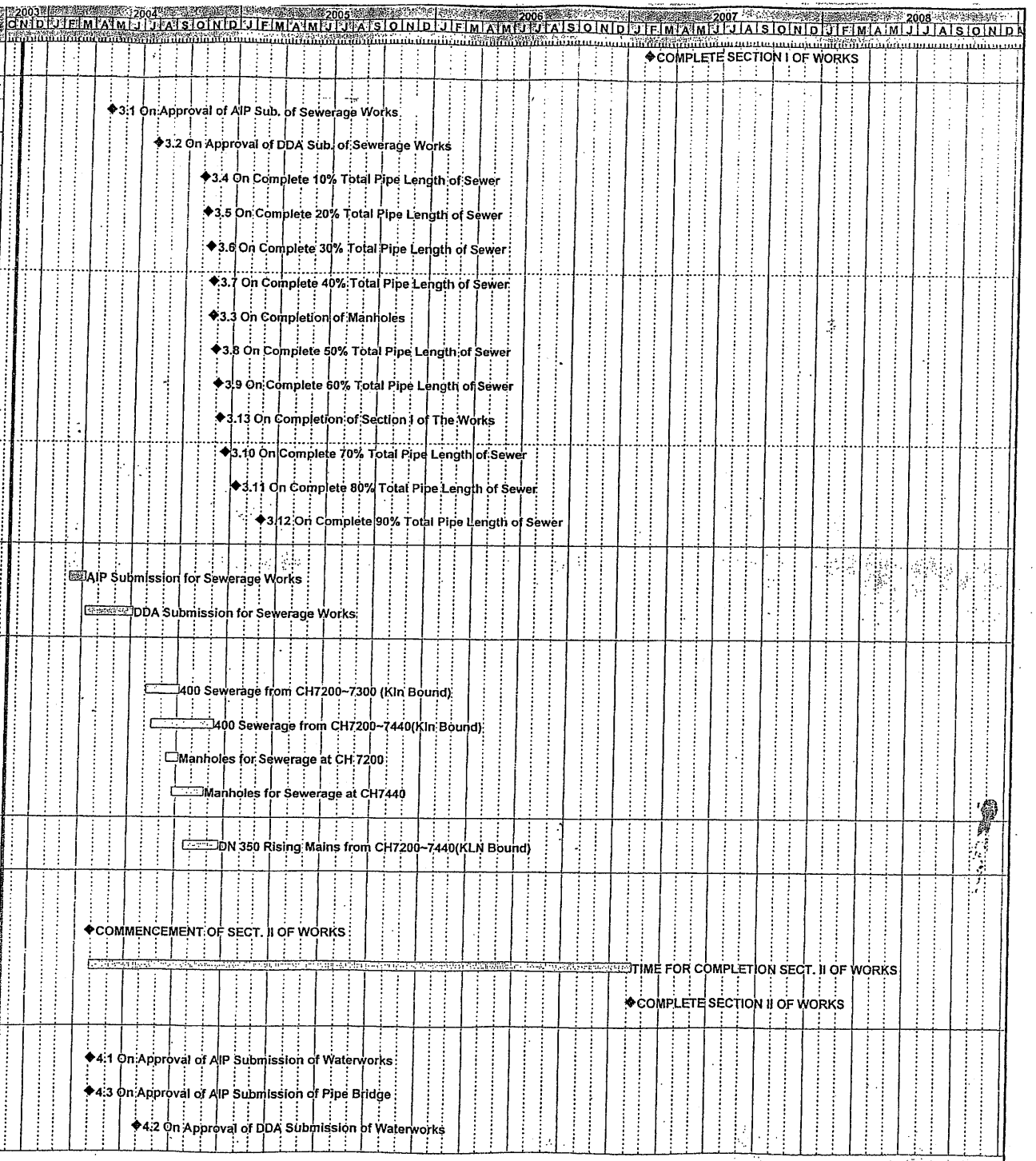
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CC2MS0080	2.8 On Acceptance of Report on Utilities	0		05JUL04
CC2MS0100	2.10 On Acc. of Final Const. Impact Asse. Report	0		05JUL04
CC2MS120	2.12 On Acc. of Final Report on Durability Asse.	0		05JUL04
CC2MS140	2.14 On Acceptance of Final O & M Manual	0		05JUL04
CC2MS260	2.26 On Approval of DDA Submission On Roadworks	0		02AUG04
CC2MS0060	2.6 On Submission of Final Ground Inves. Report	0		04AUG04
CC2MS200	2.20 On App. of DDA Sub.On Seawall & Reclamation	0		18AUG04
CC2MS220	2.22 On App. of DDA Sub. On Slope & Mitigation	0		18AUG04
CC2MS240	2.24 On Approval of DDA Sub. On Landscape Works	0		17SEP04
CC2MS270	2.27 On App. of AIP Sub. On Noise Barrier & Enc.	0		27DEC04
CC2MS280	2.28 On App. of DDA Sub. On Noise Barrier & Enc.	0		27MAR05
CC2MS290	2.29 On Complete All Design Works Inc. Checking	0		25JUN05
CC2MS150	2.15 On Subm. of As-built & As-fabricated Drg.	0		08OCT06
CC2MS160	2.16 On Accept As-built & As-fabricated Drg.	0		07NOV06
DESIGN WORKS				
SUBMISSION SCHEDULE				
CC2DSS010	Submit Project Design Plan (1st Draft)	14	08MAR04	21MAR04
CC2DSS030	Submit Project Design Memorandum (1st Draft)	60	08MAR04	06MAY04
CC2DSS050	Submit Ground Investigation Report (1st Draft)	90	08MAR04	05JUN04
CC2DSS070	Submit Report on Utilities(1st Draft)	60	08MAR04	06MAY04
CC2DSS090	Sub. Const.Traffic Impact Assessment (1st Draft)	60	08MAR04	06MAY04
CC2DSS110	Geotech.Submissions-Permanent Geotechnical Works	90	08MAR04	05JUN04
CC2DSS120	Submit Durability Assessment Report(1st Draft)	60	08MAR04	06MAY04
CC2DSS140	Submit Operation & Maintenance Manual(1st Draft)	60	08MAR04	06MAY04
CC2DSS170	ACABAS Submissions	60	08MAR04	06MAY04
CC2DSS190	Geotechnical Interpretative Report(1st Draft)	60	08MAR04	06MAY04
CC2DSS210	Natural Terrian Hazard Assessment(1st Draft)	90	08MAR04	05JUN04
CC2DSS020	Submit Project Design Plan (Final)	60	22MAR04	20MAY04
CC2DSS040	Submit Project Design Memorandum (Final)	60	07MAY04	05JUL04
CC2DSS080	Submit Report on Utilities(Final)	60	07MAY04	05JUL04
CC2DSS100	Sub. Const.Traffic Impact Assessment (Final)	60	07MAY04	05JUL04
CC2DSS130	Submit Durability Assessment Report(Final)	60	07MAY04	05JUL04
CC2DSS150	Submit Operation & Maintenance Manual(Final)	60	07MAY04	05JUL04
CC2DSS200	Geotechnical Interpretative Report(Final)	60	07MAY04	05JUL04



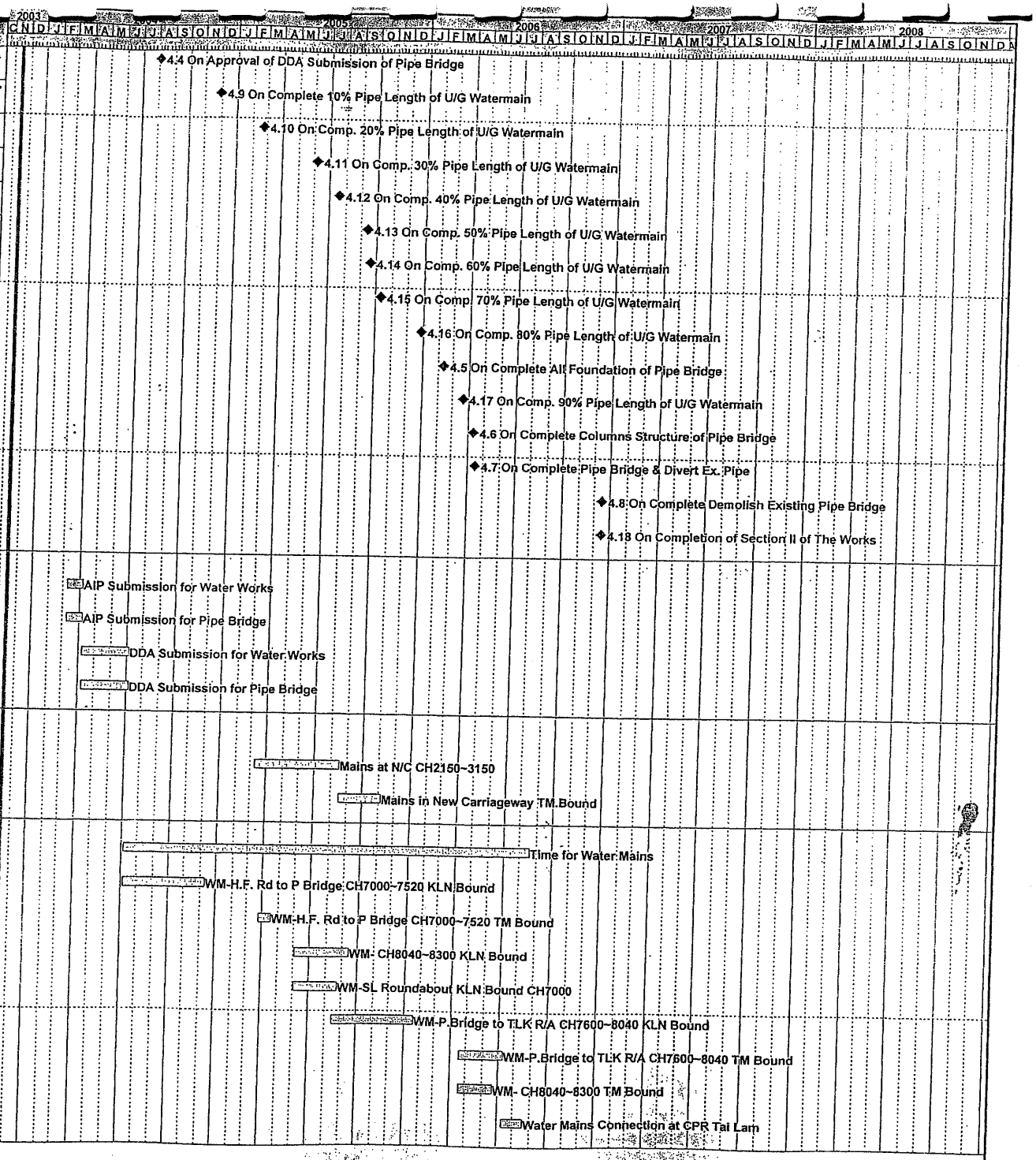
ID	Activity Description	Orig Dur	Early Start	Early Finish
CC2DSS060	Submit Ground Investigation Report (Final)	60	06JUN04	04AUG04
CC2DSS180	Landscape Plan	60	06JUN04	04AUG04
CC2DSS220	Natural Terrian Hazard Assessment(Final)	60	06JUN04	04AUG04
CC2DSS160	Submit As-built & As-fabricated Drawings	60	10AUG06	08OCT06
VIADUCT				
DCS100	AIP Submission for Viaduct	30	31MAR04	29APR04
DCS160	Wind Report	90	31MAR04	28JUN04
DCS110	DDA Submission for Viaduct	60	30APR04	28JUN04
DCS120	Erection Manual Preparation & Submission	180	15MAY04	10NOV04
DCS180	Formworks Design for Piers and Deck	40	11NOV04	20DEC04
DCS190	Engineer Review and Approval of Formworks	14	21DEC04	03JAN05
DCS130	Engineer Review & Approval Erection Manual	14	04JAN05	17JAN05
ROADWORKS				
CC2RD010	AIP Submission for Road Works	30	08MAR04	06APR04
CC2RD020	DDA Submission for Road Works	90	07APR04	05JUL04
NOISE BARRIER/ENCLOUSER				
CC2NBD010	AIP Submission for Noise Barrier Works	30	31OCT04	29NOV04
CC2NBD020	DDA Submission for Noise Barrier Works	90	30NOV04	27FEB05
SLOPEWORKS				
CC2SD010	AIP Submission for Slope Works	30	07APR04	06MAY04
CC2SD020	DDA Submission for Slope Works	90	07MAY04	04AUG04
MARINE WORKS				
CC2MWD010	AIP Submission for Marine Works	30	07APR04	06MAY04
CC2MWD020	DDA Submission for Marine Works	90	07MAY04	04AUG04
E & M WORKS				
CC2EMD010	AIP Submission for E & M Works	30	06JUL04	04AUG04
CC2EMD020	DDA Submission for E & M Works	90	05AUG04	02NOV04
LANDSCAPE WORKS				
CC2LWD010	AIP Submission for Landscape Works	30	07MAY04	05JUN04
CC2LWD020	DDA Submission for Landscape Works	90	06JUN04	03SEP04
GENERAL				
DS160	Design of Traveller	60	29JUN04	27AUG04
DS180	Design for Silt Curtain	7	21JUL04	27JUL04
COST CENTRE 3-SECTION I SEWERAGE WORK(S.T.E)				
KEY DATE				
CC3KD010	COMMENCEMENT OF SECT. I OF WORKS(MAY BE ORDERED)	0	29APR04	
CC3KD020	TIME FOR COMPLETION SECT. I OF WORKS	1,016	29APR04	08FEB07



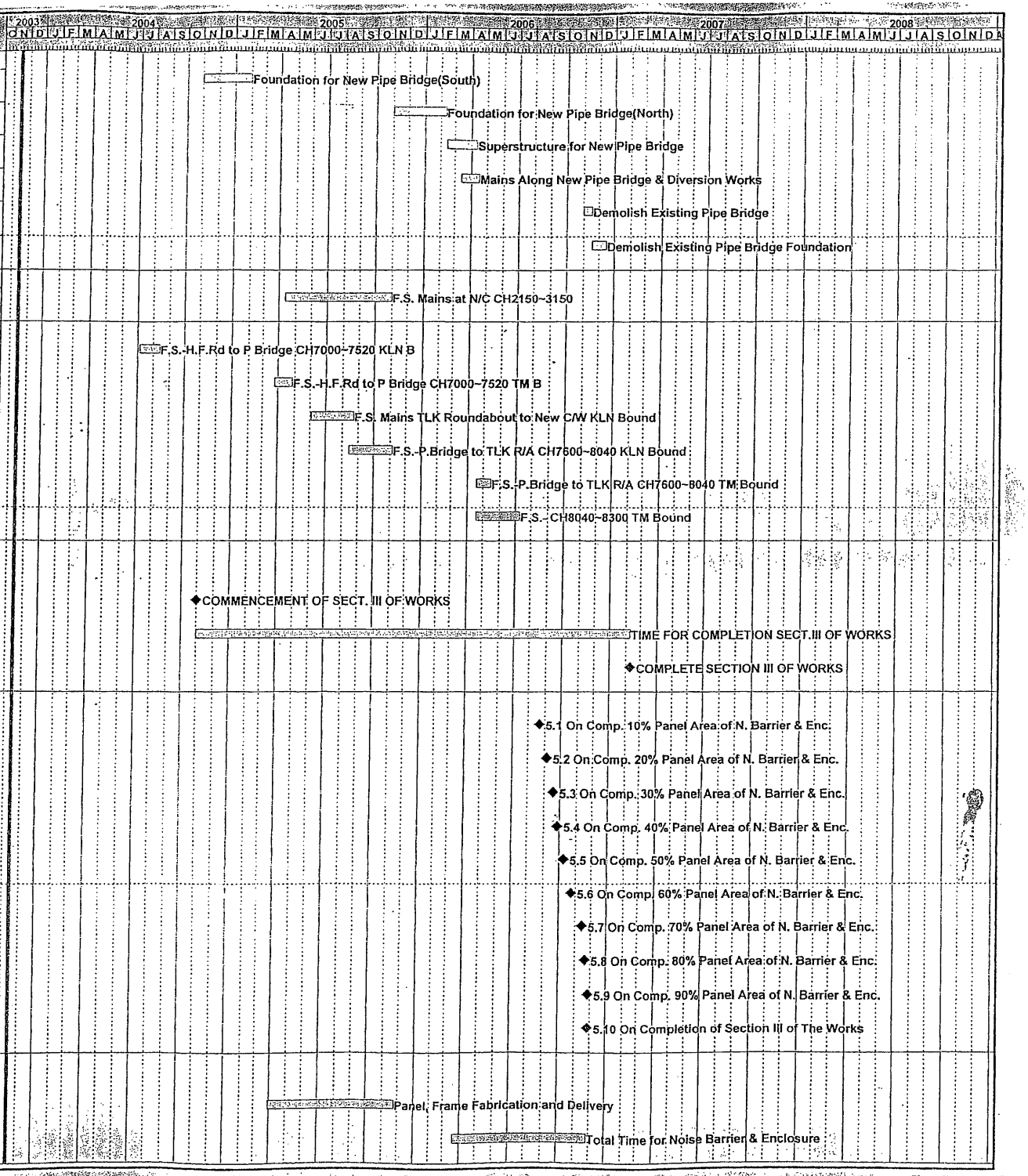
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CC3KD030	COMPLETE SECTION I OF WORKS	0		08FEB07
MILESTONES				
CC3MS010	3.1 On Approval of AIP Sub. of Sewerage Works	0		04MAY04
CC3MS020	3.2 On Approval of DDA Sub. of Sewerage Works	0		02AUG04
CC3MS040	3.4 On Complete 10% Total Pipe Length of Sewer	0		01NOV04*
CC3MS050	3.5 On Complete 20% Total Pipe Length of Sewer	0		08NOV04*
CC3MS060	3.6 On Complete 30% Total Pipe Length of Sewer	0		15NOV04*
CC3MS070	3.7 On Complete 40% Total Pipe Length of Sewer	0		22NOV04*
CC3MS030	3.3 On Completion of Manholes	0		23NOV04
CC3MS080	3.8 On Complete 50% Total Pipe Length of Sewer	0		29NOV04*
CC3MS090	3.9 On Complete 60% Total Pipe Length of Sewer	0		06DEC04*
CC3MS130	3.13 On Completion of Section I of The Works	0		10DEC04
CC3MS100	3.10 On Complete 70% Total Pipe Length of Sewer	0		20DEC04*
CC3MS110	3.11 On Complete 80% Total Pipe Length of Sewer	0		10JAN05*
CC3MS120	3.12 On Complete 90% Total Pipe Length of Sewer	0		28FEB05*
DESIGN WORKS				
CC3SDW010	AIP Submission for Sewerage Works	30	08MAR04	06APR04
CC3SDW020	DDA Submission for Sewerage Works	90	07APR04	05JUL04
SITE WORKS				
SEWERAGE IN RESURFACING/RECONSTRUCTION C/W				
CC3SS015	400 Sewerage from CH7200~7300 (Kln Bound)	45	03AUG04	05OCT04
CC3SS030	400 Sewerage from CH7200~7440(Kln Bound)	90	13AUG04	10DEC04
CC3SS020	Manholes for Sewerage at CH 7200	15	11SEP04	05OCT04
CC3SS040	Manholes for Sewerage at CH7440	45	24SEP04	23NOV04
RISING MAINS IN RESURFACING/RECONSTRUCTION C/W				
CC3SRM020	DN 350 Rising Mains from CH7200~7440(KLN Bound)	55	19OCT04	23DEC04
COST CENTRE 4-SECTION II WATERWORK(S.T.E)				
KEY DATE				
CC4KD010	COMMENCEMENT OF SECT. II OF WORKS	0	29APR04	
CC4KD020	TIME FOR COMPLETION SECT. II OF WORKS	1,016	29APR04	08FEB07
CC4KD030	COMPLETE SECTION II OF WORKS	0		08FEB07
MILESTONES				
CC4MS010	4.1 On Approval of AIP Submission of Waterworks	0		04MAY04
CC4MS030	4.3 On Approval of AIP Submission of Pipe Bridge	0		04MAY04
CC4MS020	4.2 On Approval of DDA Submission of Waterworks	0		02AUG04



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CC4MS040	4.4 On Approval of DDA Submission of Pipe Bridge	0		02AUG04
CC4MS090	4.9 On Complete 10% Pipe Length of U/G Watermain	0		29NOV04*
CC4MS100	4.10 On Comp. 20% Pipe Length of U/G Watermain	0		21FEB05*
CC4MS110	4.11 On Comp. 30% Pipe Length of U/G Watermain	0		06JUN05*
CC4MS120	4.12 On Comp. 40% Pipe Length of U/G Watermain	0		18JUL05*
CC4MS130	4.13 On Comp. 50% Pipe Length of U/G Watermain	0		12SEP05*
CC4MS140	4.14 On Comp. 60% Pipe Length of U/G Watermain	0		19SEP05*
CC4MS150	4.15 On Comp. 70% Pipe Length of U/G Watermain	0		10OCT05*
CC4MS160	4.16 On Comp. 80% Pipe Length of U/G Watermain	0		28DEC05*
CC4MS050	4.5 On Complete All Foundation of Pipe Bridge	0		11FEB06
CC4MS170	4.17 On Comp. 90% Pipe Length of U/G Watermain	0		20MAR06*
CC4MS060	4.6 On Complete Columns Structure of Pipe Bridge	0		10APR06
CC4MS070	4.7 On Complete Pipe Bridge & Divert Ex. Pipe	0		14APR06
CC4MS080	4.8 On Complete Demolish Existing Pipe Bridge	0		16DEC06
CC4MS180	4.18 On Completion of Section II of The Works	0		16DEC06
DESIGN WORKS				
CC4WDW010	AIP Submission for Water Works	30	08MAR04	06APR04
CC4WDW030	AIP Submission for Pipe Bridge	30	08MAR04	06APR04
CC4WDW020	DDA Submission for Water Works	90	07APR04	05JUL04
CC4WDW040	DDA Submission for Pipe Bridge	90	07APR04	05JUL04
SITE WORKS				
WATER MAINS IN PROPOSED CARRIAGEWAY				
CC4WPC010	Mains at N/C CH2150~3150	120	09MAR05	15AUG05
CC4WPC030	Mains in New Carriageway TM.Bound	60	17AUG05	05NOV05
WATER MAINS IN EX. CASTLE PEAK ROAD				
CC11SWM000	Time for Water Mains	573*	05JUL04	18AUG06
CC11SWM010	WM-H.F. Rd to P Bridge CH7000~7520 KLN Bound	120	06JUL04	10DEC04
CC11SWM040	WM-H.F. Rd to P Bridge CH7000~7520 TM Bound	15	25MAR05	15APR05
CC11SWM070	WM- CH8040~8300 KLN Bound	75	03JUN05	12SEP05
CC11SWM090	WM-SL Roundabout KLN Bound CH7000	60	03JUN05	22AUG05
CC11SWM050	WM-P.Bridge to TLK R/A CH7600~8040 KLN Bound	120	15AUG05	18JAN06
CC11SWM060	WM-P.Bridge to TLK R/A CH7600~8040 TM Bound	60	19APR06	10JUL06
CC11SWM080	WM- CH8040~8300 TM Bound	45	19APR06	19JUN06
CC4WRC090	Water Mains Connection at CPR Tai Lam	30	11JUL06	18AUG06



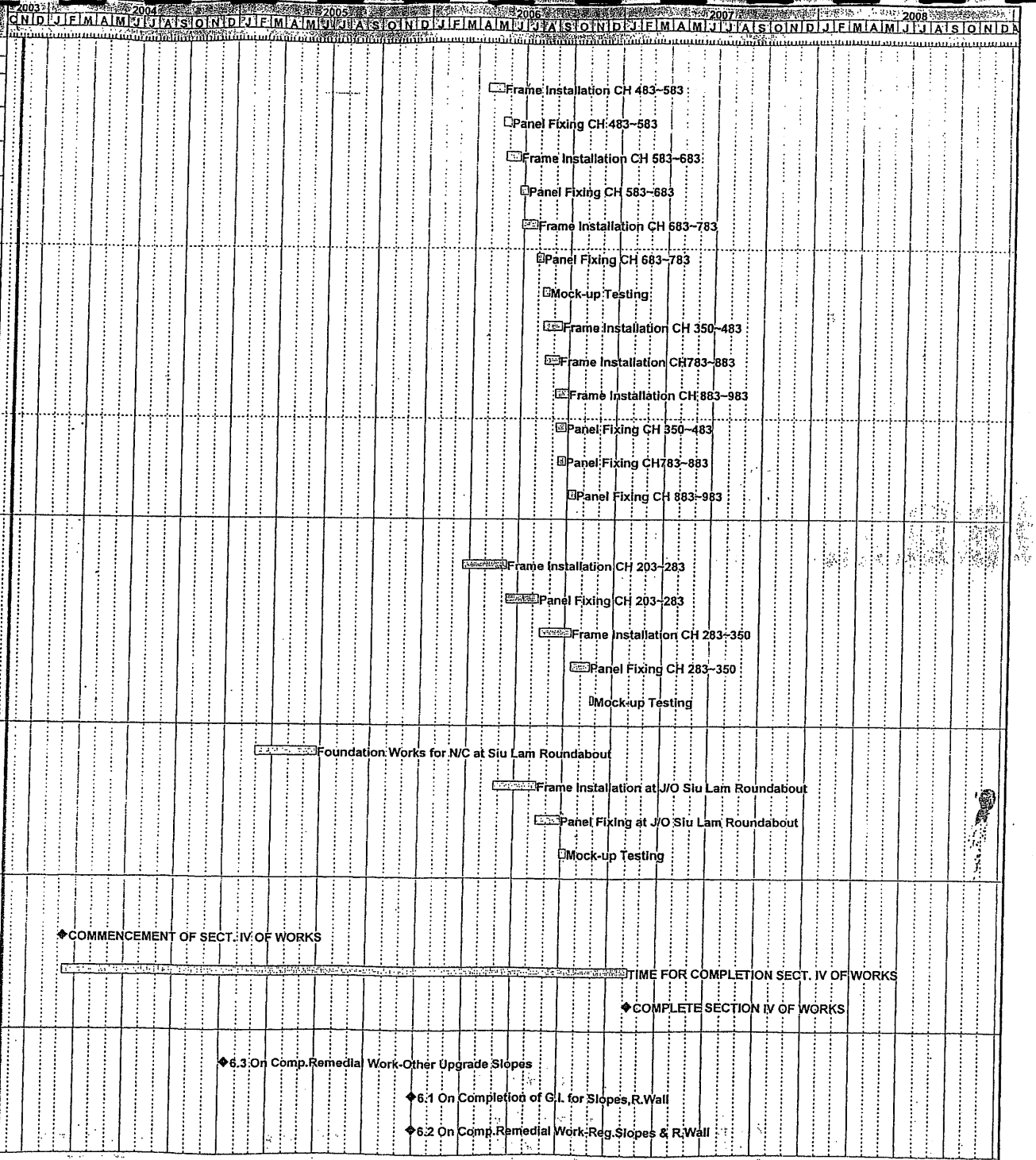
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
PIPE BRIDGE AT TAI LAM CHUNG NULLAH				
CC4WRCB010	Foundation for New Pipe Bridge(South)	75	01NOV04*	31JAN05
CC4WRCB060	Foundation for New Pipe Bridge(North)	75	01NOV05*	11FEB06
CC4WRCB020	Superstructure for New Pipe Bridge	45	13FEB06	10APR06
CC4WRCB030	Mains Along New Pipe Bridge & Diversion Works	25	13MAR06	14APR06
CC4WRCB040	Demolish Existing Pipe Bridge	15	01NOV06*	17NOV06
CC4WRCB050	Demolish Existing Pipe Bridge Foundation	25	18NOV06	16DEC06
FIRE SERVICES MAINS IN PROPOSED NEW CARRIAGEWAY				
CC4WFSN010	F.S. Mains at N/C CH2150~3150	150	12APR05	31OCT05
FIRE SERVICES MAINS IN EX. CASTLE PEAK ROAD				
CC4WFS030	F.S.-H.F.Rd to P Bridge CH7000~7520 KLN B	30	06JUL04	12AUG04
CC4WFS020	F.S.-H.F.Rd to P Bridge CH7000~7520 TM B	25	25MAR05	27APR05
CC4WFS070	F.S. Mains TLK Roundabout to New C/W KLN Bound	60	03JUN05	22AUG05
CC4WFS010	F.S.-P.Bridge to TLK R/A CH7600~8040 KLN Bound	60	15AUG05	04NOV05
CC4WFS040	F.S.-P.Bridge to TLK R/A CH7600~8040 TM Bound	20	19APR06	15MAY06
CC4WFS060	F.S.- CH8040~8300 TM Bound	60	19APR06	10JUL06
C.CENTRE 5-SEC.III N.BARRIES & ENCLOSURES(S.T.E)				
KEY DATE				
CC5KD010	COMMENCEMENT OF SECT. III OF WORKS	0	31OCT04	
CC5KD020	TIME FOR COMPLETION SECT.III OF WORKS	831	31OCT04	08FEB07
CC5KD030	COMPLETE SECTION III OF WORKS	0		08FEB07
MILESTONES				
CC5MS010	5.1 On Comp. 10% Panel Area of N. Barrier & Enc.	0		21AUG06*
CC5MS020	5.2 On Comp. 20% Panel Area of N. Barrier & Enc.	0		04SEP06*
CC5MS030	5.3 On Comp. 30% Panel Area of N. Barrier & Enc.	0		18SEP06*
CC5MS040	5.4 On Comp. 40% Panel Area of N. Barrier & Enc.	0		25SEP06*
CC5MS050	5.5 On Comp. 50% Panel Area of N. Barrier & Enc.	0		09OCT06*
CC5MS060	5.6 On Comp. 60% Panel Area of N. Barrier & Enc.	0		23OCT06*
CC5MS070	5.7 On Comp. 70% Panel Area of N. Barrier & Enc.	0		13NOV06*
CC5MS080	5.8 On Comp. 80% Panel Area of N. Barrier & Enc.	0		20NOV06*
CC5MS090	5.9 On Comp. 90% Panel Area of N. Barrier & Enc.	0		27NOV06*
CC5MS100	5.10 On Completion of Section III of The Works	0		27NOV06
SITE WORKS				
OFF SITE FABRICATION				
CC5BS010	Panel, Frame Fabrication and Delivery	180	28MAR05	24NOV05
CC5BS020	Total Time for Noise Barrier & Enclosure	253*	20MAR06	27NOV06



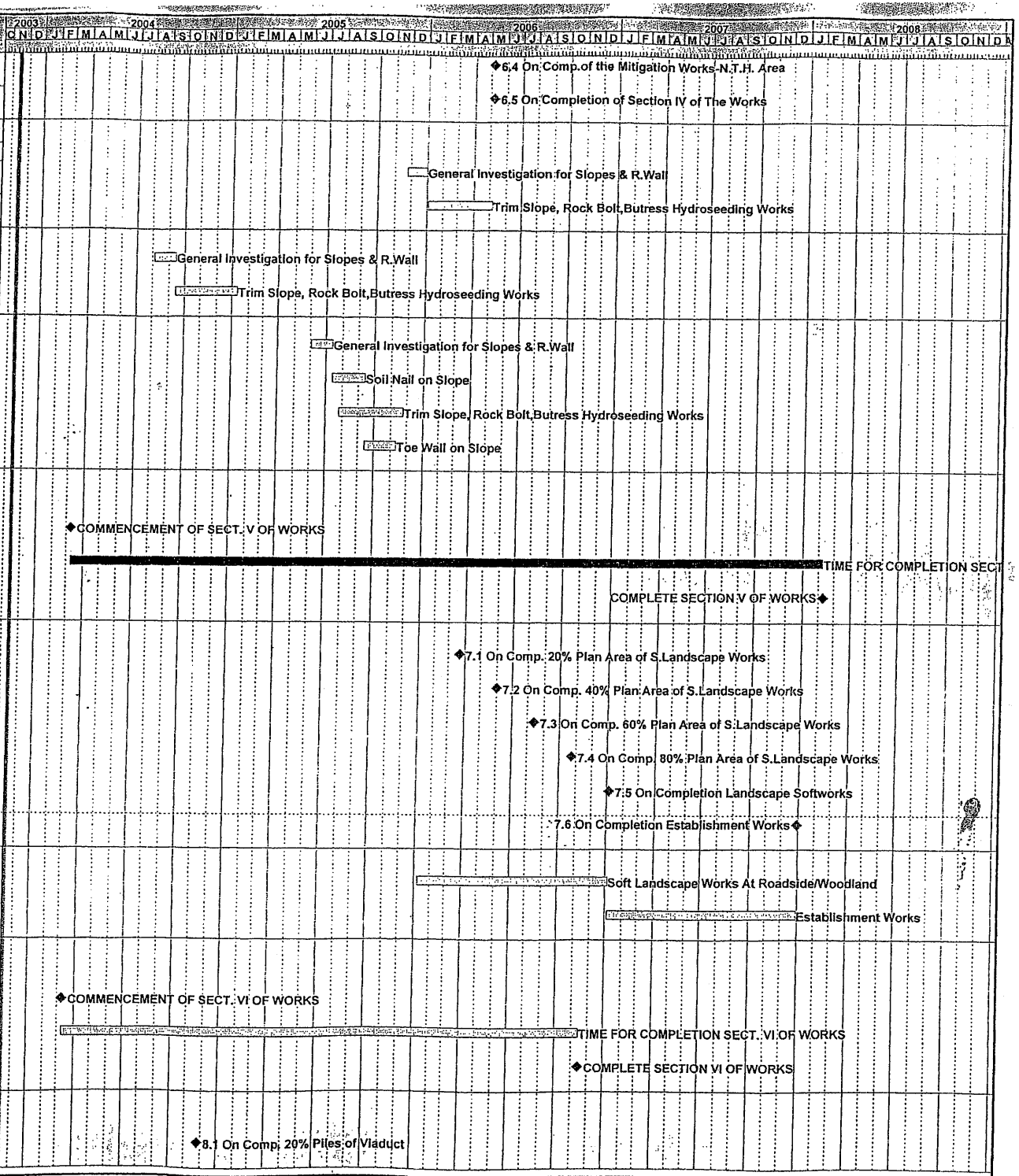
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
NOISE BARRIERS				
ON VIADUCT				
CC5NBF020	Frame Installation CH 483~583	20	21APR06	18MAY06
CC5NBP030	Panel Fixing CH 483~583	10	19MAY06	02JUN06
CC5NBF030	Frame Installation CH 583~683	20	26MAY06	21JUN06
CC5NBP040	Panel Fixing CH 583~683	10	22JUN06	06JUL06
CC5NBF040	Frame Installation CH 683~783	20	28JUN06	25JUL06
CC5NBP050	Panel Fixing CH 683~783	10	26JUL06	08AUG06
CC5NBP080	Mock-up Testing	10	09AUG06	21AUG06
CC5NBF010	Frame Installation CH 350~483	28	10AUG06	15SEP06
CC5NBF050	Frame Installation CH783~883	20	15AUG06	11SEP06
CC5NBF060	Frame Installation CH 883~983	20	06SEP06	30SEP06
CC5NBP020	Panel Fixing CH 350~483	14	08SEP06	26SEP06
CC5NBP060	Panel Fixing CH783~883	10	12SEP06	25SEP06
CC5NBP070	Panel Fixing CH 883~983	10	04OCT06	17OCT06
NOISE ENCLOSURES				
ON VIADUCT				
CC5NEF010	Frame Installation CH 203~283	60	20MAR06	09JUN06
CC5NEP010	Panel Fixing CH 203~283	45	10JUN06	09AUG06
CC5NEF020	Frame Installation CH 283~350	45	12AUG06	13OCT06
CC5NEP020	Panel Fixing CH 283~350	28	14OCT06	18NOV06
CC5NEPT30	Mock-up Testing	7	20NOV06	27NOV06
ON GROUND				
CC5NEG010	Foundation Works for N/C at Siu Lam Roundabout	90	28FEB05	24JUN05
CC5NEG030	Frame Installation at J/O Siu Lam Roundabout	60	24MAY06	11AUG06
CC5NEG040	Panel Fixing at J/O Siu Lam Roundabout	35	12AUG06	28SEP06
CC5NET040	Mock-up Testing	7	29SEP06	10OCT06

C.CENTRE 6-SEC.IV SLOPE UPGRADING & MITIGATION

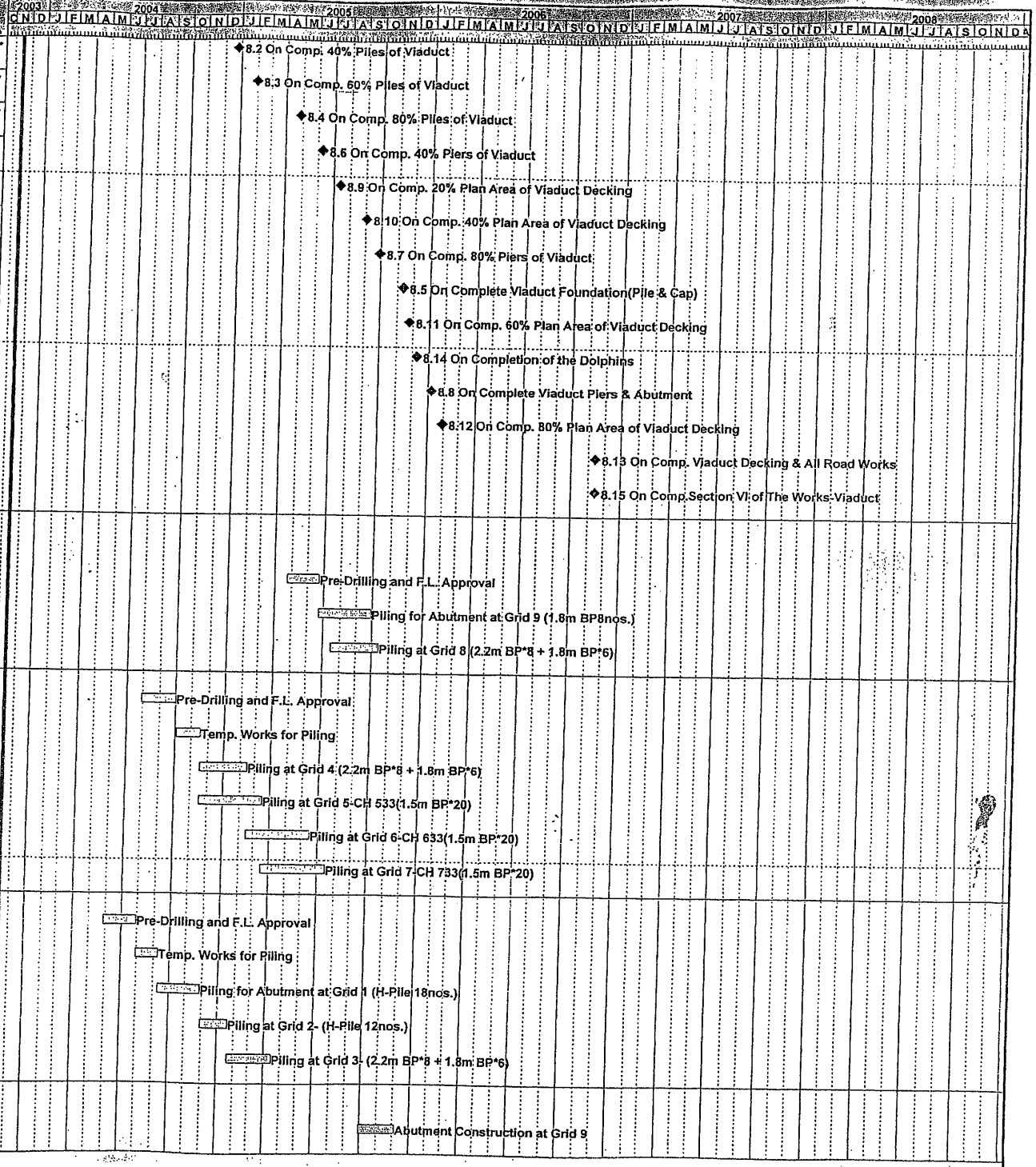
KEY DATE				
CC6KD010	COMMENCEMENT OF SECT. IV OF WORKS	0	08MAR04	
CC6KD020	TIME FOR COMPLETION SECT. IV OF WORKS	1,068	08MAR04	08FEB07
CC6KD030	COMPLETE SECTION IV OF WORKS	0		08FEB07
MILESTONES				
CC6MS030	6.3 On Comp.Remedial Work-Other Upgrade Slopes	0		11JAN05
CC6MS010	6.1 On Completion of G.I. for Slopes,R.Wall	0		31DEC05
CC6MS020	6.2 On Comp.Remedial Work-Reg.Slopes & R.Wall	0		31DEC05



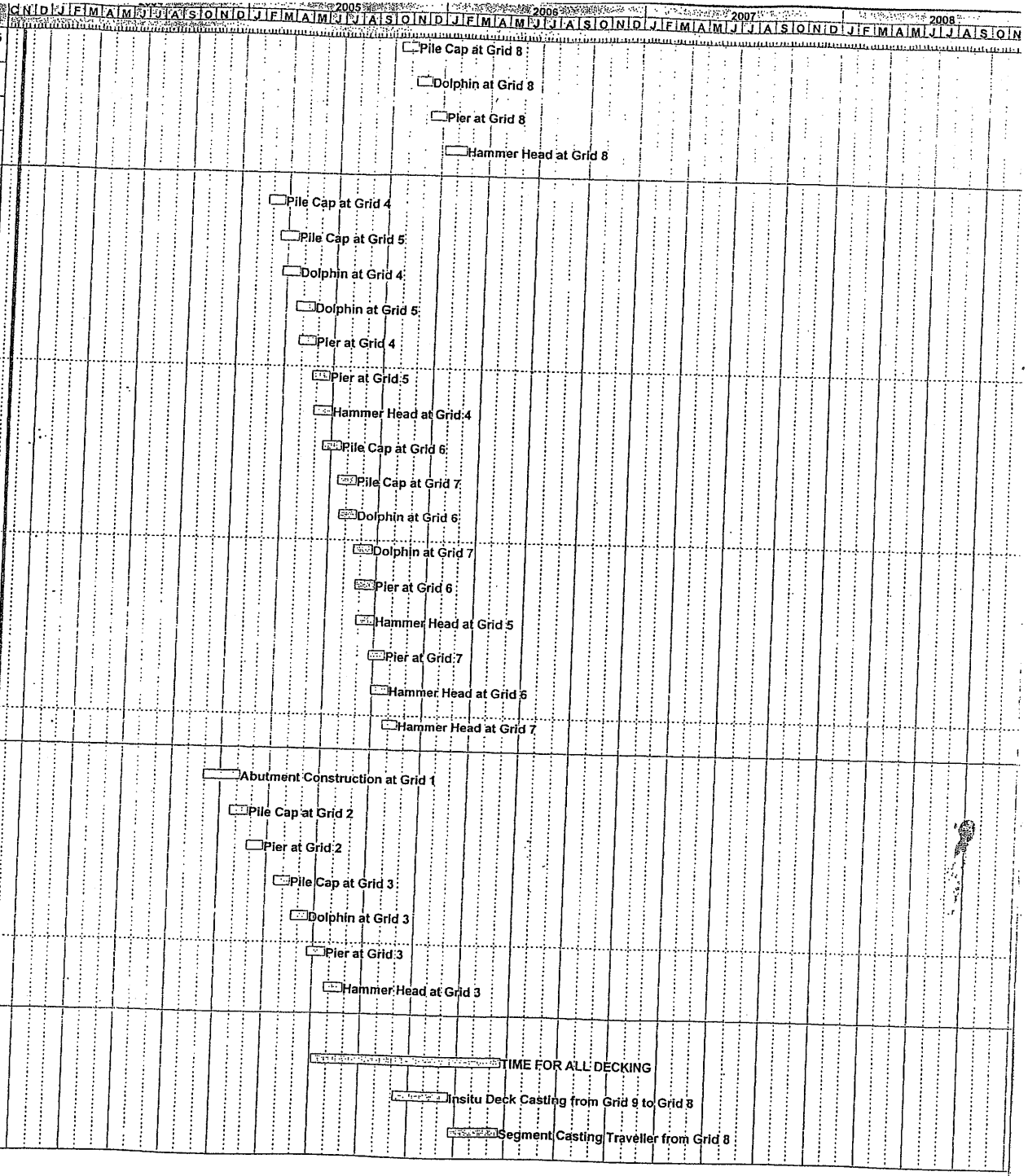
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CC6MS040	6.4 On Comp.of the Mitigation Works-N.T.H. Area	0		06MAY06
CC6MS050	6.5 On Completion of Section IV of The Works	0		06MAY06
SITE WORKS				
SIU LAM INTERCHANGE STUDY AREA				
CC6SSI010	General Investigation for Slopes & R.Wall	30	24NOV05	31DEC05
CC6SSI020	Trim Slope, Rock Bolt,Butress Hydroseeding Works	90	03JAN06	06MAY06
SIU LAM LINK ROAD STUDY AREA				
CC6SSL010	General Investigation for Slopes & R.Wall	30	05AUG04	13SEP04
CC6SSL020	Trim Slope, Rock Bolt,Butress Hydroseeding Works	90	14SEP04	11JAN05
TAI LAM KOK DISTRIBUTOR STUDY AREA				
CC6SSK010	General Investigation for Slopes & R.Wall	30	03JUN05	13JUL05
CC6SSK020	Soil Nail on Slope	45	14JUL05	12SEP05
CC6SSK030	Trim Slope, Rock Bolt,Butress Hydroseeding Works	90	27JUL05	23NOV05
CC6SSK040	Toe Wall on Slope	45	13SEP05	11NOV05
C.CENTRE 7-SEC.V LANDSCAPE & ESTABLISHMENT WORKS				
KEY DATE				
CC7KD010	COMMENCEMENT OF SECT. V OF WORKS	0	08MAR04	
CC7KD020	TIME FOR COMPLETION SECT. V OF WORKS	1,433	08MAR04	08FEB08
CC7KD030	COMPLETE SECTION V OF WORKS	0		08FEB08
MILESTONES				
CC7MS010	7.1 On Comp. 20% Plan Area of S.Landscape Works	0	22MAR06	
CC7MS020	7.2 On Comp. 40% Plan Area of S.Landscape Works	0	02JUN06	
CC7MS030	7.3 On Comp. 60% Plan Area of S.Landscape Works	0	13AUG06	
CC7MS040	7.4 On Comp. 80% Plan Area of S.Landscape Works	0	24OCT06	
CC7MS050	7.5 On Completion Landscape Softworks	0		03JAN07
CC7MS060	7.6 On Completion Establishment Works	0		29DEC07
SITE WORKS				
CC7SW010	Soft Landscape Works At Roadside/Woodland	360	09JAN06	03JAN07
CC7SW020	Establishment Works	360	04JAN07	29DEC07
C.CENTRE 8,9,10-SEC.VI VIADUCT & NEW ROAD				
KEY DATE				
CC810KD010	COMMENCEMENT OF SECT. VI OF WORKS	0	08MAR04	
CC810KD020	TIME FOR COMPLETION SECT. VI OF WORKS	982	08MAR04	14NOV06
CC810KD030	COMPLETE SECTION VI OF WORKS	0		14NOV06
COST CENTRE 8 - VIADUCT				
MILESTONES				
CC8MS010	8.1 On Comp. 20% Piles of Viaduct	0		24NOV04*



Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CC8MS020	8.2 On Comp. 40% Piles of Viaduct	0		25DEC04*
CC8MS030	8.3 On Comp. 60% Piles of Viaduct	0		31JAN05*
CC8MS040	8.4 On Comp. 80% Piles of Viaduct	0		27APR05*
CC8MS060	8.6 On Comp. 40% Piers of Viaduct	0		08JUN05*
CC8MS090	8.9 On Comp. 20% Plan Area of Viaduct Decking	0		13JUL05*
CC8MS100	8.10 On Comp. 40% Plan Area of Viaduct Decking	0		02SEP05*
CC8MS070	8.7 On Comp. 80% Piers of Viaduct	0		27SEP05*
CC8MS050	8.5 On Complete Viaduct Foundation(Pile & Cap)	0		10NOV05
CC8MS110	8.11 On Comp. 60% Plan Area of Viaduct Decking	0		23NOV05*
CC8MS140	8.14 On Completion of the Dolphins	0		09DEC05
CC8MS080	8.8 On Complete Viaduct Piers & Abutment	0		06JAN06
CC8MS120	8.12 On Comp. 80% Plan Area of Viaduct Decking	0		28JAN06*
CC8MS130	8.13 On Comp. Viaduct Decking & All Road Works	0		14NOV06
CC8MS150	8.15 On Comp.Section VI of The Works-Viaduct	0		14NOV06
SITE WORKS				
VIADUCT FOUNDATION(inc. Dolphin)				
SOUTH SECTION - CH 833~933				
CC8SVFS010	Pre-Drilling and F.L. Approval	45	23APR05	22JUN05
CC8SVFS050	Piling for Abutment at Grid 9 (1.8m BP8nos.)	70	23JUN05	27SEP05
CC8SVFS030	Piling at Grid 8 (2.2m BP*8 + 1.8m BP*6)	90	15JUL05	12OCT05
LONG SPAN SECTION - CH 333~833				
CC8SVFL010	Pre-Drilling and F.L. Approval	45	29JUL04	30SEP04
CC8SVFL020	Temp. Works for Piling	35	04OCT04	16NOV04
CC8SVFL030	Piling at Grid 4 (2.2m BP*8 + 1.8m BP*6)	90	17NOV04	14FEB05
CC8SVFL040	Piling at Grid 5-CH 533(1.5m BP*20)	120	17NOV04	16MAR05
CC8SVFL050	Piling at Grid 6-CH 633(1.5m BP*20)	120	15FEB05	14JUN05
CC8SVFL060	Piling at Grid 7-CH 733(1.5m BP*20)	120	17MAR05	14JUL05
NORTH SECTION - CH 203~333				
CC8SVFN010	Pre-Drilling and F.L. Approval	45	29MAY04	28JUL04
CC8SVFN020	Temp. Works for Piling	30	29JUL04	08SEP04
CC8SVFN050	Piling for Abutment at Grid 1 (H-Pile 18nos.)	60	09SEP04	27NOV04
CC8SVFN030	Piling at Grid 2- (H-Pile 12nos.)	40	29NOV04	18JAN05
CC8SVFN040	Piling at Grid 3- (2.2m BP*8 + 1.8m BP*6)	85	19JAN05	13APR05
VIADUCT CAPS,PIERS,ABUTMENTS & DOLPHINS				
SOUTH SECTION - CH 833~933				
CC8SVCSU10	Abutment Construction at Grid 9	55	28SEP05	05DEC05



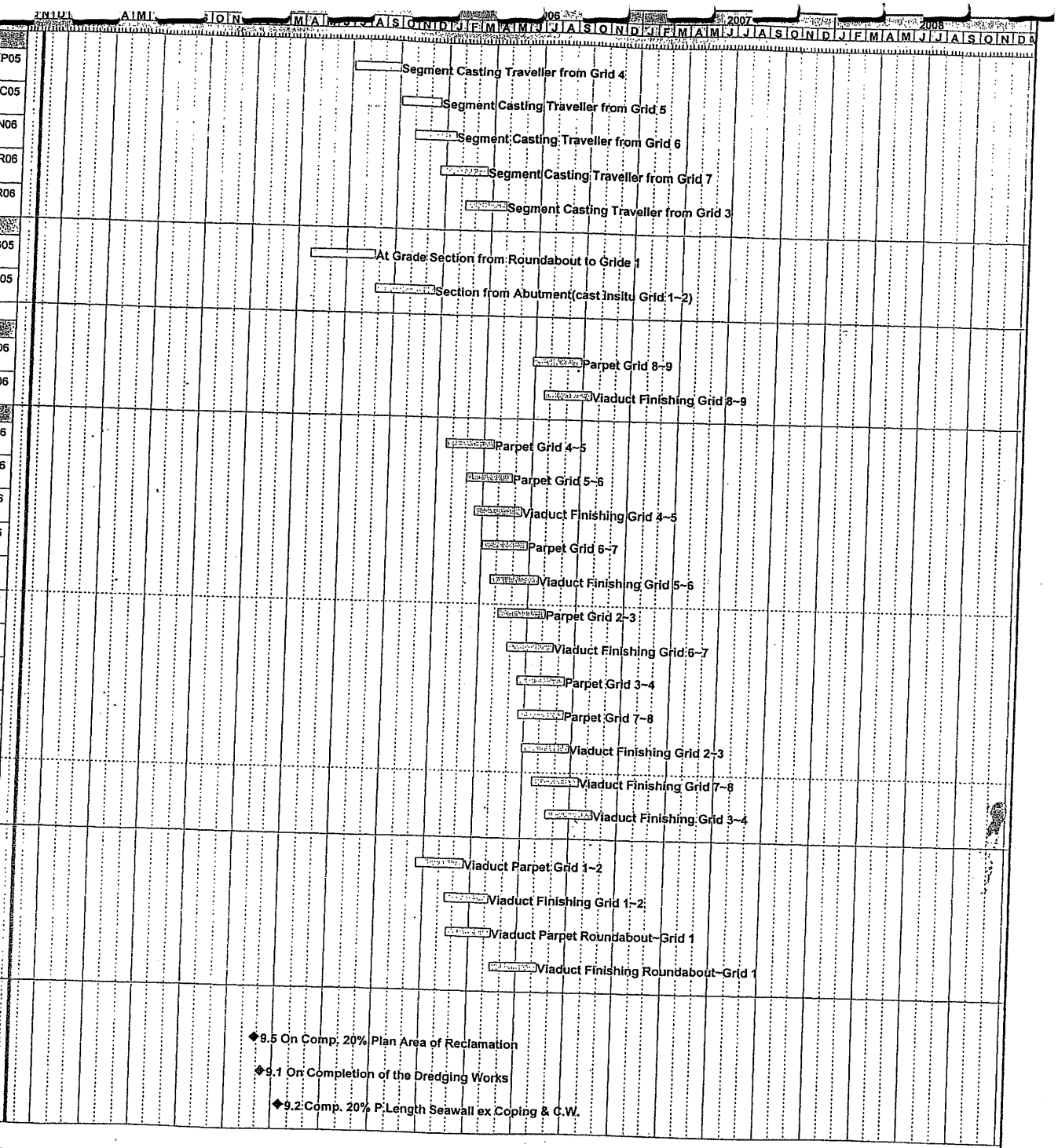
ID	Description	Dur.	Start	Finish
CC8SVCSC10	Pile Cap at Grid 8	25	13OCT05	10NOV05
CC8SVCSP10	Dolphin at Grid 8	25	11NOV05	09DEC05
CC8SVCSE10	Pier at Grid 8	20	10DEC05	06JAN06
CC8SVCSH10	Hammer Head at Grid 8	25	07JAN06	16FEB06
LONG SPAN SECTION - CH 333~833				
CC8SVCLC10	Pile Cap at Grid 4	25	21FEB05	21MAR05
CC8SVCLC20	Pile Cap at Grid 5	25	17MAR05	19APR05
CC8SVCLP10	Dolphin at Grid 4	25	22MAR05	23APR05
CC8SVCLP20	Dolphin at Grid 5	25	20APR05	23MAY05
CC8SVCLE10	Pier at Grid 4	25	25APR05	27MAY05
CC8SVCLE20	Pier at Grid 5	25	24MAY05	24JUN05
CC8SVCLR01	Hammer Head at Grid 4	25	28MAY05	29JUN05
CC8SVCLC30	Pile Cap at Grid 6	25	15JUN05	19JUL05
CC8SVCLC40	Pile Cap at Grid 7	25	15JUL05	17AUG05
CC8SVCLP30	Dolphin at Grid 6	25	20JUL05	20AUG05
CC8SVCLP40	Dolphin at Grid 7	25	18AUG05	21SEP05
CC8SVCLE30	Pier at Grid 6	25	22AUG05	26SEP05
CC8SVCLR11	Hammer Head at Grid 5	25	26AUG05	29SEP05
CC8SVCLE40	Pier at Grid 7	20	22SEP05	20OCT05
CC8SVCLR21	Hammer Head at Grid 6	25	27SEP05	29OCT05
CC8SVCLR31	Hammer Head at Grid 7	25	21OCT05	18NOV05
NORTH SECTION - CH 203~333				
CC8SVCNU40	Abutment Construction at Grid 1	55	29NOV04	04FEB05
CC8SVCNC10	Pile Cap at Grid 2	20	19JAN05	22FEB05
CC8SVCNE10	Pier at Grid 2	25	23FEB05	23MAR05
CC8SVCNC30	Pile Cap at Grid 3	25	14APR05	14MAY05
CC8SVCNP10	Dolphin at Grid 3	25	18MAY05	18JUN05
CC8SVCNE20	Pier at Grid 3	25	20JUN05	22JUL05
CC8SVCNR10	Hammer Head at Grid 3	25	23JUL05	25AUG05
VIADUCT DECKING(BALANCED CANTILEVER/CAST INSITU)				
SOUTH SECTION - CH 833~933				
CC8SVDS00	TIME FOR ALL DECKING	351*	04JUL05	19JUN06
CC8SVDS030	Insitu Deck Casting from Grid 9 to Grid 8	75	06DEC05	18MAR06
CC8SVDS020	Segment Casting Traveller from Grid 8	65	22MAR06	19JUN06



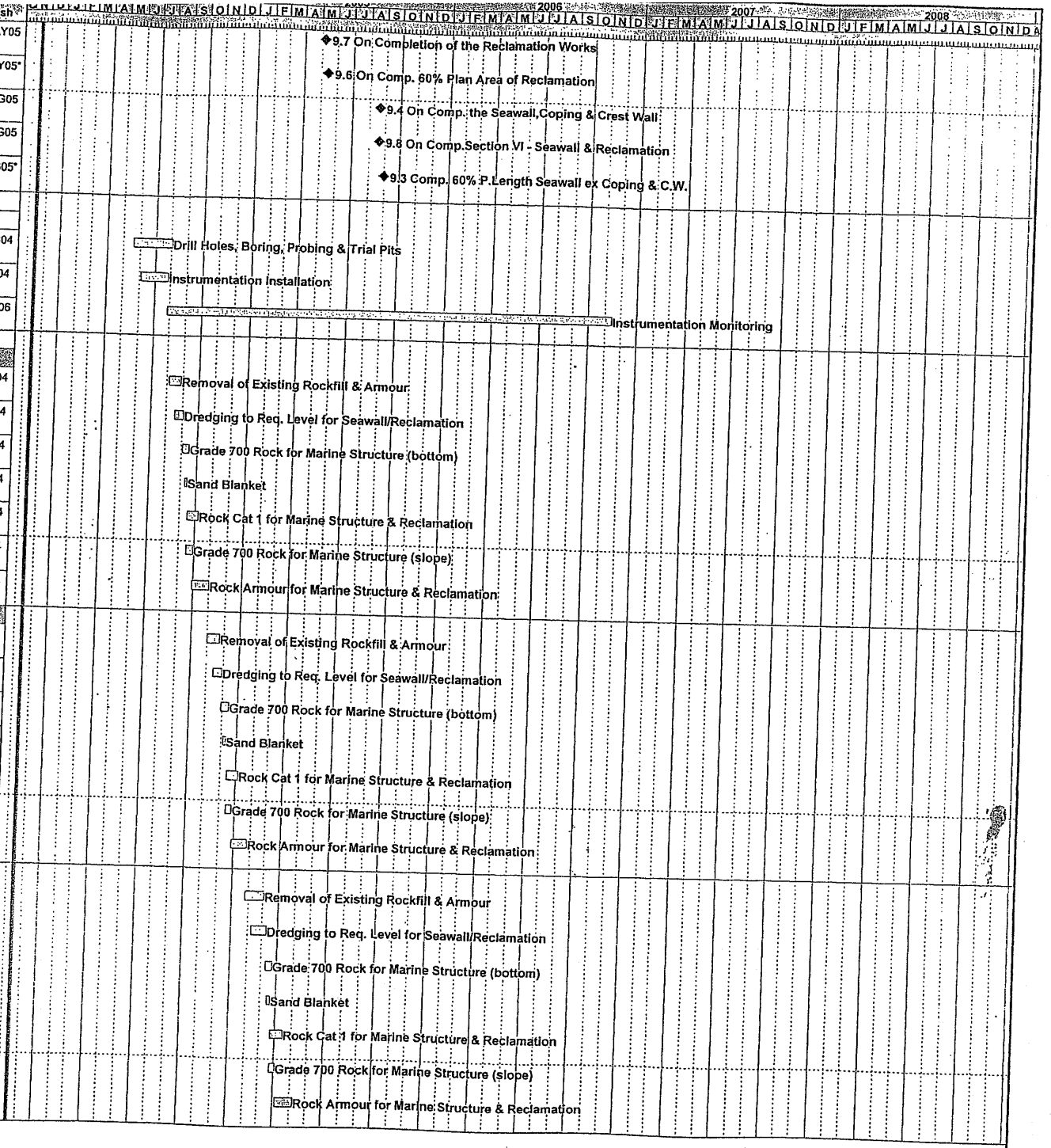
LONG SPAN SECTION CH333-833				
CC8SVDL030	Segment Casting Traveller from Grid 4	65	04JUL05	28SEP05
CC8SVDL040	Segment Casting Traveller from Grid 5	65	04OCT05	19DEC05
CC8SVDL050	Segment Casting Traveller from Grid 6	65	31OCT05	18JAN06
CC8SVDL060	Segment Casting Traveller from Grid 7	65	21DEC05	21MAR06
CC8SVDL020	Segment Casting Traveller from Grid 3	65	08FEB06	28APR06
NORTH SECTION CH 0-333				
CC8SVDN020	At Grade Section from Roundabout to Gride 1	90	23APR05	22AUG05
CC8SVDN030	Section from Abutment(cast insitu Grid 1~2)	90	24AUG05	16DEC05
VIADUCT PARPET & FINISHING				
SOUTH SECTION CH833-933				
CC8SVPSA10	Parpet Grid 8~9	65	28JUN06	25SEP06
CC8SVPSF10	Viaduct Finishing Grid 8~9	65	20JUL06	17OCT06
LONG SPAN SECTION CH333-833				
CC8SVPLA30	Parpet Grid 4~5	65	19JAN06	20APR06
CC8SVPLA40	Parpet Grid 5~6	65	01MAR06	25MAY06
CC8SVPLF30	Viaduct Finishing Grid 4~5	65	18MAR06	14JUN06
CC8SVPLA50	Parpet Grid 6~7	65	03APR06	27JUN06
CC8SVPLF40	Viaduct Finishing Grid 5~6	65	21APR06	19JUL06
CC8SVPLA10	Parpet Grid 2~3	65	08MAY06	03AUG06
CC8SVPLF50	Viaduct Finishing Grid 6~7	65	26MAY06	21AUG06
CC8SVPLA20	Parpet Grid 3~4	65	17JUN06	12SEP06
CC8SVPLA60	Parpet Grid 7~8	65	20JUN06	14SEP06
CC8SVPLF10	Viaduct Finishing Grid 2~3	65	29JUN06	26SEP06
CC8SVPLF60	Viaduct Finishing Grid 7~8	65	21JUL06	18OCT06
CC8SVPLF20	Viaduct Finishing Grid 3~4	65	18AUG06	14NOV06
NORTH SECTION CH 0-333				
CC8SVPNA20	Viaduct Parpet Grid 1~2	65	17DEC05	18MAR06
CC8SVPNF20	Viaduct Finishing Grid 1~2	65	13FEB06	06MAY06
CC8SVPNA10	Viaduct Parpet Roundabout~Grid 1	65	18FEB06	12MAY06
CC8SVPNF10	Viaduct Finishing Roundabout~Grid 1	65	13MAY06	09AUG06

COST CENTRE 9 - RECLAMATION & SEAWALL

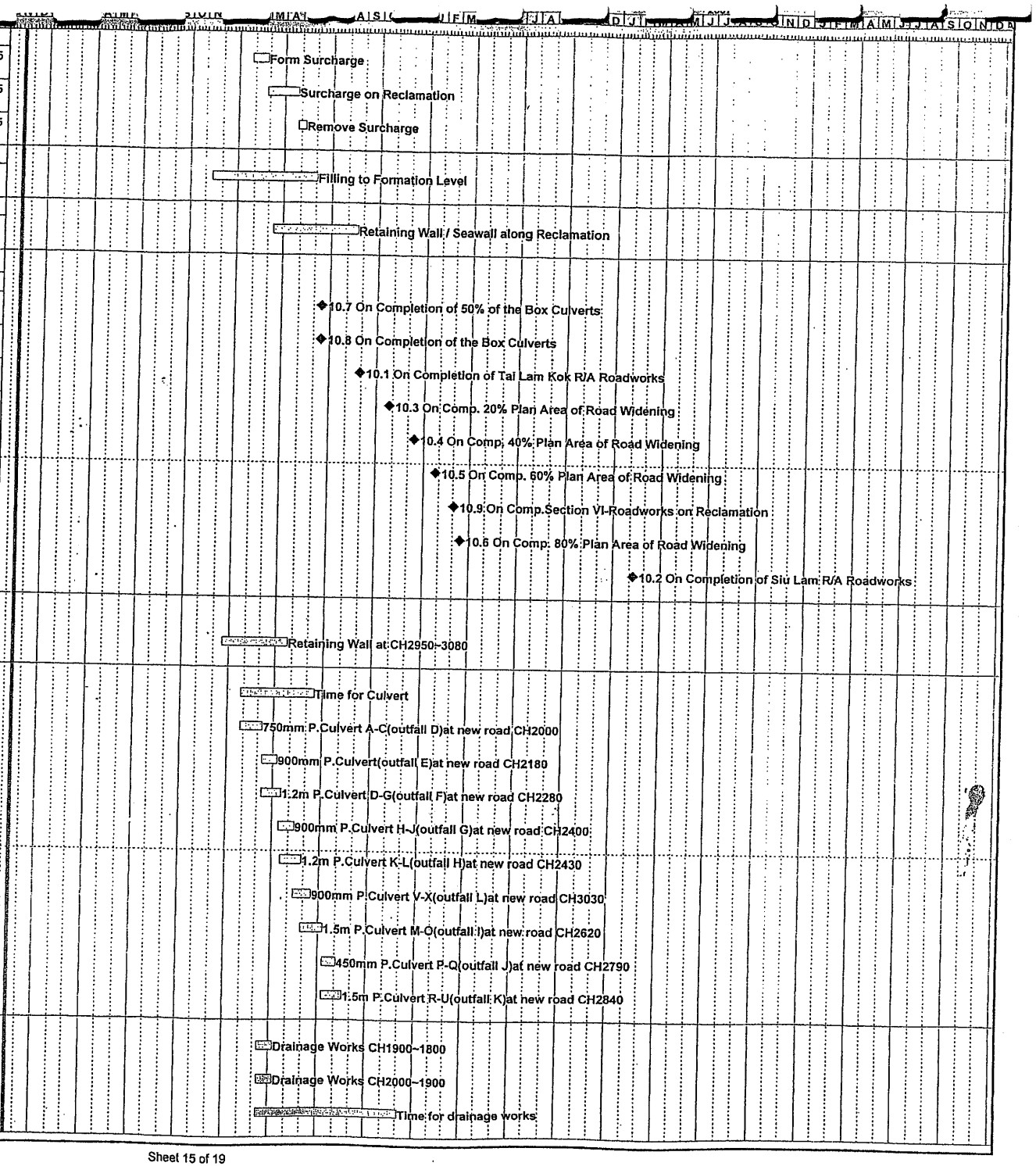
MILESTONES				
CC9MS050	9.5 On Comp. 20% Plan Area of Reclamation	0		25FEB05*
CC9MS010	9.1 On Completion of the Dredging Works	0		08MAR05
CC9MS020	9.2 Comp. 20% P.Length Seawall ex Coping & C.W.	0		13APR05*



	Description	Dur	Start	Finish
CC9MS070	9.7 On Completion of the Reclamation Works	0		07MAY05
CC9MS060	9.6 On Comp. 60% Plan Area of Reclamation	0		13MAY05*
CC9MS040	9.4 On Comp. the Seawall,Coping & Crest Wall	0		19AUG05
CC9MS080	9.8 On Comp.Section VI - Seawall & Reclamation	0		19AUG05
CC9MS030	9.3 Comp. 60% P.Length Seawall ex Coping & C.W.	0		30AUG05*
SITE WORKS				
GROUND INVESTIGATION WORKS				
CC9SGI020	Drill Holes, Boring, Probing & Trial Pits	60	21MAY04	02AUG04
CC9SGI030	Instrumentation Installation	45	03JUN04	27JUL04
CC9SGI050	Instrumentation Monitoring	840	28JUL04	14NOV06
MARINE WORKS(Sea Wall Construction)				
ZONE 1 - CH 900 TO CH 1250				
CC9SM190	Removal of Existing Rockfill & Armour	20	05AUG04	27AUG04
CC9SM200	Dredging to Req. Level for Seawall/Reclamation	15	17AUG04	02SEP04
CC9SM210	Grade 700 Rock for Marine Structure (bottom)	12	03SEP04	16SEP04
CC9SM260	Sand Blanket	5	09SEP04	14SEP04
CC9SM220	Rock Cat 1 for Marine Structure & Reclamation	15	17SEP04	06OCT04
CC9SM250	Grade 700 Rock for Marine Structure (slope)	10	17SEP04	28SEP04
CC9SM230	Rock Armour for Marine Structure & Reclamation	25	30SEP04	30OCT04
ZONE 2 CH 1250 - CH 1640				
CC9SM270	Removal of Existing Rockfill & Armour	20	01NOV04	23NOV04
CC9SM280	Dredging to Req. Level for Seawall/Reclamation	15	12NOV04	29NOV04
CC9SM290	Grade 700 Rock for Marine Structure (bottom)	12	30NOV04	13DEC04
CC9SM330	Sand Blanket	5	06DEC04	10DEC04
CC9SM300	Rock Cat 1 for Marine Structure & Reclamation	15	14DEC04	03JAN05
CC9SM320	Grade 700 Rock for Marine Structure (slope)	10	14DEC04	24DEC04
CC9SM310	Rock Armour for Marine Structure & Reclamation	25	28DEC04	26JAN05
ZONE 3 CH 1510 - END OF SEA WALL				
CC9SM340	Removal of Existing Rockfill & Armour	20	27JAN05	02MAR05
CC9SM350	Dredging to Req. Level for Seawall/Reclamation	15	08FEB05	08MAR05
CC9SM360	Grade 700 Rock for Marine Structure (bottom)	12	09MAR05	22MAR05
CC9SM400	Sand Blanket	5	15MAR05	19MAR05
CC9SM370	Rock Cat 1 for Marine Structure & Reclamation	15	23MAR05	13APR05
CC9SM390	Grade 700 Rock for Marine Structure (slope)	10	23MAR05	02APR05
CC9SM380	Rock Armour for Marine Structure & Reclamation	25	04APR05	07MAY05



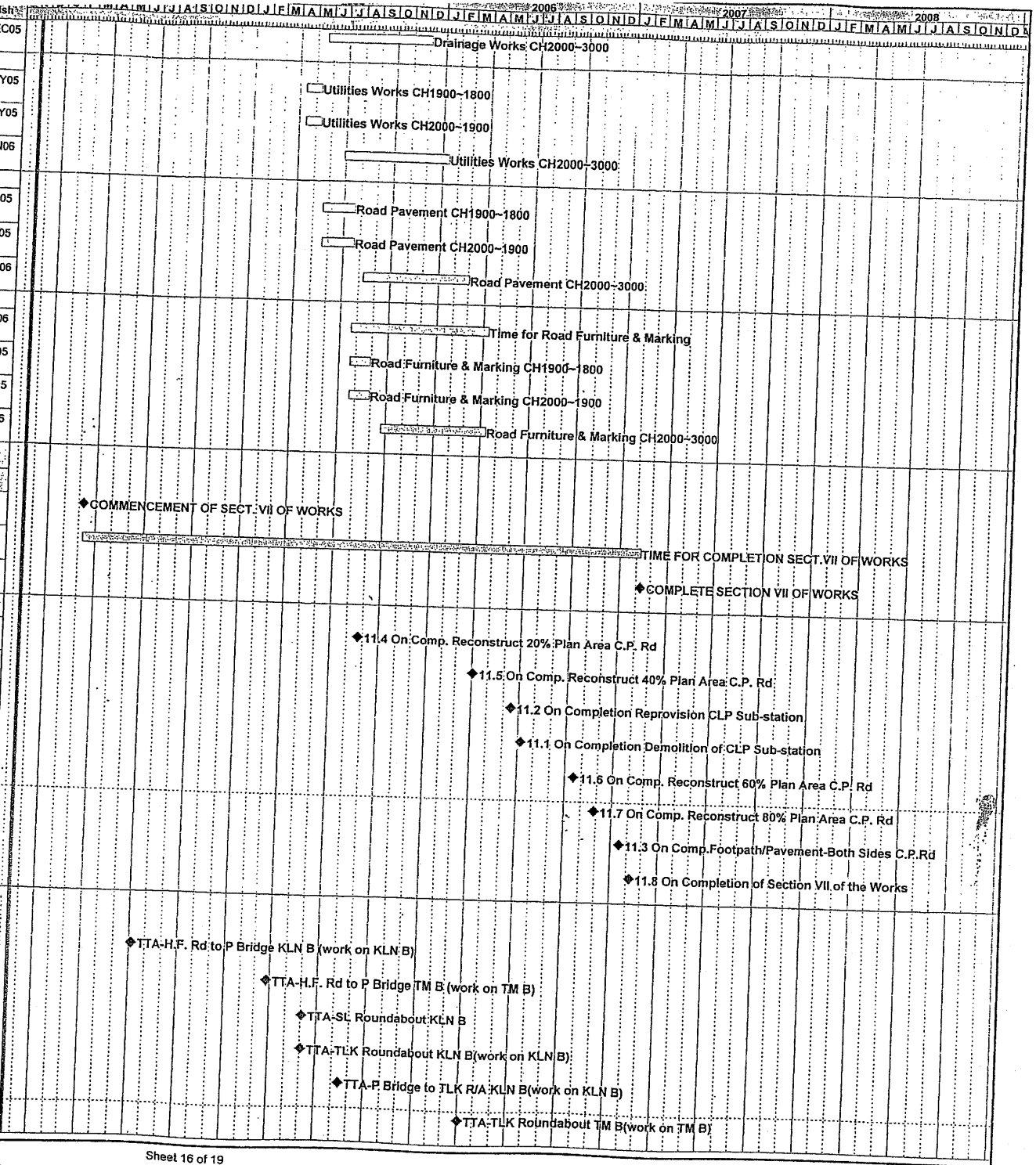
		Dur		
GEOTECHNICAL WORKS				
CC9SG010	Form Surcharge	15	27JAN05	24FEB05
CC9SG020	Surcharge on Reclamation	60	25FEB05	25APR05
CC9SG030	Remove Surcharge	15	26APR05	10MAY05
EARTH WORKS > +2.5mPD				
CC9SE0010	Filling to Formation Level	150	13NOV04	02JUN05
SEA WALL/RETAINING WALL				
CC9SRW010	Retaining Wall / Seawall along Reclamation	120	12MAR05	19AUG05
COST CENTRE 10 - ROAD WIDENING				
MILESTONES				
CC10MS070	10.7 On Completion of 50% of the Box Culverts	0		15JUN05
CC10MS080	10.8 On Completion of the Box Culverts	0		15JUN05
CC10MS010	10.1 On Completion of Tai Lam Kok R/A Roadworks	0		29AUG05
CC10MS030	10.3 On Comp. 20% Plan Area of Road Widening	0		24OCT05*
CC10MS040	10.4 On Comp. 40% Plan Area of Road Widening	0		12DEC05*
CC10MS050	10.5 On Comp. 60% Plan Area of Road Widening	0		23JAN06*
CC10MS090	10.9 On Comp.Section VI-Roadworks on Reclamation	0		01MAR06
CC10MS060	10.6 On Comp. 80% Plan Area of Road Widening	0		13MAR06*
CC10MS020	10.2 On Completion of Siu Lam R/A Roadworks	0		07FEB07
SITE WORKS				
RETAINING WALL				
CC10SRW010	Retaining Wall at CH2950~3080	90	18DEC04	22APR05
BOX/PIPE CULVERTS				
CC10SPC010	Time for Culvert	100*	27JAN05	15JUN05
CC10SPC130	750mm P.Culvert A-C(outfall D)at new road CH2000	25	27JAN05	08MAR05
CC10SPC140	900mm P.Culvert(outfall E)at new road CH2180	25	09MAR05	07APR05
CC10SPC150	1.2m P.Culvert D-G(outfall F)at new road CH2280	30	09MAR05	16APR05
CC10SPC160	900mm P.Culvert H-J(outfall G)at new road CH2400	25	12APR05	12MAY05
CC10SPC170	1.2m P.Culvert K-L(outfall H)at new road CH2430	30	18APR05	26MAY05
CC10SPC210	900mm P.Culvert V-X(outfall L)at new road CH3030	25	13MAY05	15JUN05
CC10SPC180	1.5m P.Culvert M-O(outfall I)at new road CH2620	30	27MAY05	07JUL05
CC10SPC190	450mm P.Culvert P-Q(outfall J)at new road CH2790	20	08JUL05	03AUG05
CC10SPC200	1.5m P.Culvert R-U(outfall K)at new road CH2840	30	08JUL05	15AUG05
DRAINAGE WORKS				
CC10SD190	Drainage Works CH1900~1800	25	09MAR05	07APR05
CC10SD200	Drainage Works CH2000~1900	25	09MAR05	07APR05
CC10SD220	Time for drainage works	272*	09MAR05	05DEC05



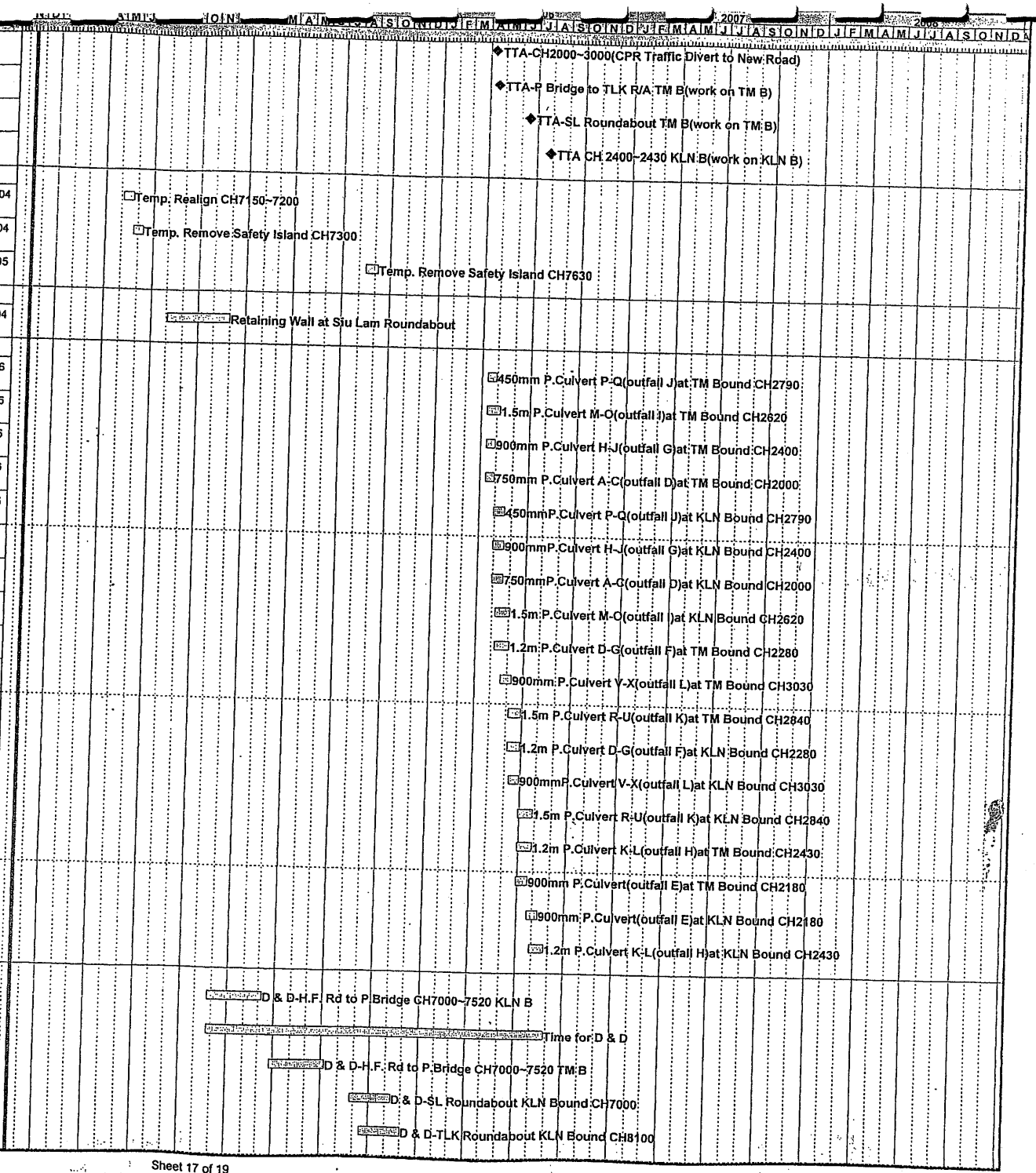
			Start	Finish
CC10SD210	Drainage Works CH2000~3000	150	21MAY05	05DEC05
UTILITIES WORKS				
CC10SU190	Utilities Works CH1900~1800	25	12APR05	12MAY05
CC10SU200	Utilities Works CH2000~1900	25	12APR05	12MAY05
CC10SU210	Utilities Works CH2000~3000	150	29JUN05	13JAN06
ROAD PAVEMENT/FOOTPATH				
CC10SRP190	Road Pavement CH1900~1800	45	21MAY05	20JUL05
CC10SRP200	Road Pavement CH2000~1900	45	21MAY05	20JUL05
CC10SRP210	Road Pavement CH2000~3000	150	10AUG05	01MAR06
ROAD FURNITURE & MARKING				
CC10SRF010	Time for Road Furniture & Marking	195*	21JUL05	10APR06
CC10SRF190	Road Furniture & Marking CH1900~1800	30	21JUL05	29AUG05
CC10SRF200	Road Furniture & Marking CH2000~1900	30	21JUL05	29AUG05
CC10SRF210	Road Furniture & Marking CH2000~3000	150	21SEP05	10APR06

C.CENTRE 11-SEC.VII RECONSTRUCT CASTLE PEAK ROAD

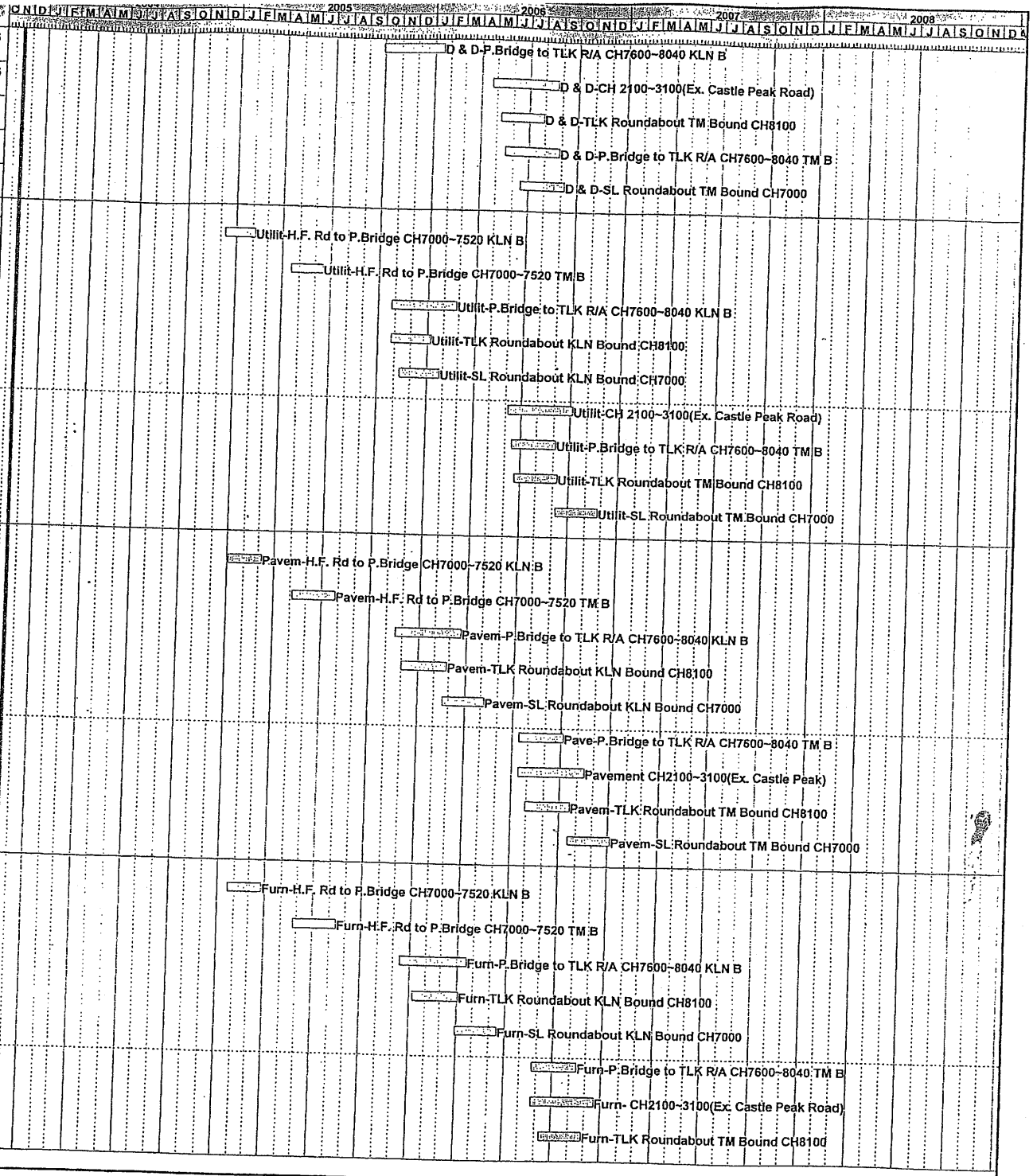
KEY DATE				
CC11KD010	COMMENCEMENT OF SECT. VII OF WORKS	0	08MAR04	
CC11KD020	TIME FOR COMPLETION SECT.VII OF WORKS	1,068	08MAR04	08FEB07
CC11KD030	COMPLETE SECTION VII OF WORKS	0		08FEB07
MILESTONES				
CC11MS040	11.4 On Comp. Reconstruct 20% Plan Area C.P. Rd	0		22AUG05*
CC11MS050	11.5 On Comp. Reconstruct 40% Plan Area C.P. Rd	0		03APR06*
CC11MS020	11.2 On Completion Reprovision CLP Sub-station	0		15JUN06
CC11MS010	11.1 On Completion Demolition of CLP Sub-station	0		07JUL06
CC11MS060	11.6 On Comp. Reconstruct 60% Plan Area C.P. Rd	0		16OCT06*
CC11MS070	11.7 On Comp. Reconstruct 80% Plan Area C.P. Rd	0		27NOV06*
CC11MS030	11.3 On Comp.Footpath/Pavement-Both Sides C.P.Rd	0		16JAN07*
CC11MS100	11.8 On Completion of Section VII of the Works	0		07FEB07
SITEWORKS				
TEMPORARY TRAFFIC ARRANGEMENT				
CC11TTA010	TTA-H.F. Rd to P Bridge KLN B (work on KLN B)	0	06JUL04	
CC11TTA020	TTA-H.F. Rd to P Bridge TM B (work on TM B)	0	25MAR05	
CC11TTA070	TTA-SL Roundabout KLN B	0	03JUN05	
CC11TTA090	TTA-TLK Roundabout KLN B(work on KLN B)	0	03JUN05	
CC11TTA050	TTA-P Bridge to TLK R/A KLN B(work on KLN B)	0	15AUG05	
CC11TTA100	TTA-TLK Roundabout TM B(work on TM B)	0	04APR06	



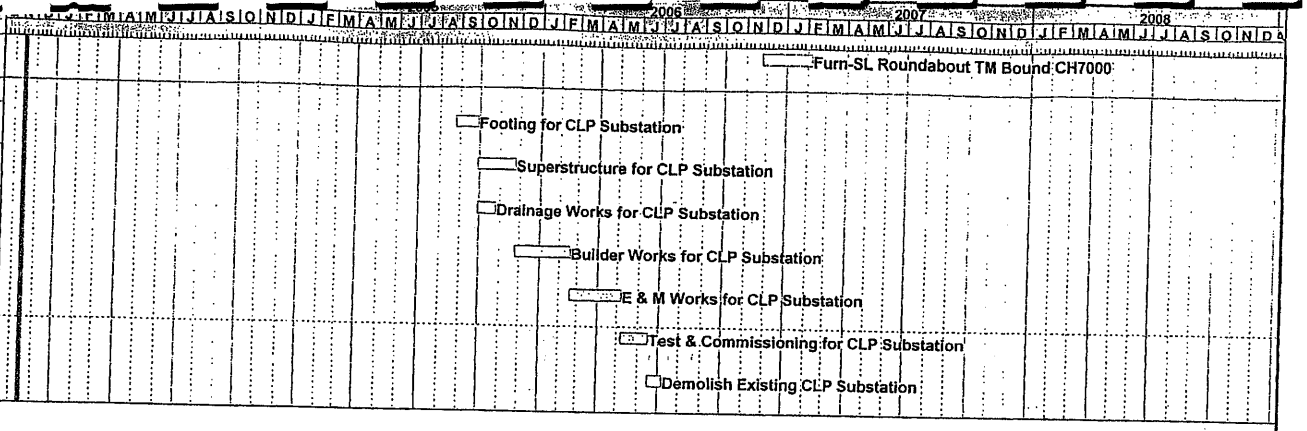
		Dur		
CC11TTA050	TTA-CH2000~3000(CPR Traffic Divert to New Road)	0	11APR06	
CC11TTA060	TTA-P Bridge to TLK R/A TM B(work on TM B)	0	19APR06	
CC11TTA080	TTA-SL Roundabout TM B(work on TM B)	0	17JUN06	
CC11TTA190	TTA CH 2400~2430 KLN B(work on KLN B)	0	27JUL06	
TEMPORARY WORKS				
CC11TTAT10	Temp. Realign CH7150~7200	15	05MAY04	24MAY04
CC11TTAT20	Temp. Remove Safety Island CH7300	15	25MAY04	11JUN04
CC11TTAT30	Temp. Remove Safety Island CH7630	15	15AUG05	05SEP05
RETAINING WALL				
CC11SRW010	Retaining Wall at Siu Lam Roundabout	90	03AUG04	30NOV04
BOX/PIPE CULVERT				
CC11SPC035	450mm P.Culvert P-Q(outfall J)at TM Bound CH2790	15	11APR06	27APR06
CC11SPC045	1.5m P.Culvert M-O(outfall I)at TM Bound CH2620	20	11APR06	06MAY06
CC11SPC065	900mm P.Culvert H-J(outfall G)at TM Bound CH2400	15	11APR06	27APR06
CC11SPC095	750mm P.Culvert A-C(outfall D)at TM Bound CH2000	15	11APR06	27APR06
CC11SPC030	450mmP.Culvert P-Q(outfall J)at KLN Bound CH2790	15	28APR06	19MAY06
CC11SPC060	900mmP.Culvert H-J(outfall G)at KLN Bound CH2400	15	28APR06	19MAY06
CC11SPC090	750mmP.Culvert A-C(outfall D)at KLN Bound CH2000	15	28APR06	19MAY06
CC11SPC040	1.5m P.Culvert M-O(outfall I)at KLN Bound CH2620	20	08MAY06	03JUN06
CC11SPC075	1.2m P.Culvert D-G(outfall F)at TM Bound CH2280	20	08MAY06	03JUN06
CC11SPC015	900mm P.Culvert V-X(outfall L)at TM Bound CH3030	15	20MAY06	09JUN06
CC11SPC025	1.5m P.Culvert R-U(outfall K)at TM Bound CH2840	20	05JUN06	28JUN06
CC11SPC070	1.2m P.Culvert D-G(outfall F)at KLN Bound CH2280	20	05JUN06	28JUN06
CC11SPC010	900mmP.Culvert V-X(outfall L)at KLN Bound CH3030	15	10JUN06	28JUN06
CC11SPC020	1.5m P.Culvert R-U(outfall K)at KLN Bound CH2840	20	29JUN06	26JUL06
CC11SPC055	1.2m P.Culvert K-L(outfall H)at TM Bound CH2430	20	29JUN06	26JUL06
CC11SPC085	900mm P.Culvert(outfall E)at TM Bound CH2180	15	29JUN06	20JUL06
CC11SPC080	900mm P.Culvert(outfall E)at KLN Bound CH2180	15	21JUL06	09AUG06
CC11SPC050	1.2m P.Culvert K-L(outfall H)at KLN Bound CH2430	20	27JUL06	22AUG06
DRAINAGE & DUCT WORKS				
CC11SDW010	D & D-H.F. Rd to P.Bridge CH7000~7520 KLN B	75	24NOV04	07MAR05
CC11SDW020	Time for D & D	641*	24NOV04	26AUG06
CC11SDW015	D & D-H.F. Rd to P.Bridge CH7000~7520 TM B	75	25MAR05	06JUL05
CC11SDW060	D & D-SL Roundabout KLN Bound CH7000	60	24AUG05	11NOV05
CC11SDW080	D & D-TLK Roundabout KLN Bound CH8100	60	13SEP05	29NOV05



	Description	Dur	Start	Finish
CC11SDW040	D & D-P.Bridge to TLK R/A CH7600~8040 KLN B	90	27SEP05	18JAN06
CC11SDW100	D & D-CH 2100~3100(Ex. Castle Peak Road)	90	22APR06	22AUG06
CC11SDW090	D & D-TLK Roundabout TM Bound CH8100	60	10MAY06	28JUL06
CC11SDW050	D & D-P.Bridge to TLK R/A CH7600~8040 TM B	75	18MAY06	26AUG06
CC11SDW070	D & D-SL Roundabout TM Bound CH7000	60	17JUN06	06SEP06
UTILITIES WORKS				
CC11SUW010	Utilit-H.F. Rd to P.Bridge CH7000~7520 KLN B	45	11DEC04	05FEB05
CC11SUW020	Utilit-H.F. Rd to P.Bridge CH7000~7520 TM B	45	16APR05	14JUN05
CC11SUW050	Utilit-P.Bridge to TLK R/A CH7600~8040 KLN B	90	26OCT05	23FEB06
CC11SUW090	Utilit-TLK Roundabout KLN Bound CH8100	60	26OCT05	07JAN06
CC11SUW070	Utilit-SL Roundabout KLN Bound CH7000	60	12NOV05	25JAN06
CC11SUW110	Utilit-CH 2100~3100(Ex. Castle Peak Road)	90	05JUN06	04OCT06
CC11SUW060	Utilit-P.Bridge to TLK R/A CH7600~8040 TM B	60	15JUN06	05SEP06
CC11SUW100	Utilit-TLK Roundabout TM Bound CH8100	60	20JUN06	08SEP06
CC11SUW080	Utilit-SL Roundabout TM Bound CH7000	60	07SEP06	24NOV06
ROAD PAVEMENT/FOOTPATH				
CC11SRP010	Pavem-H.F. Rd to P.Bridge CH7000~7520 KLN B	45	03JAN05	07MAR05
CC11SRP020	Pavem-H.F. Rd to P.Bridge CH7000~7520 TM B	60	06MAY05	25JUL05
CC11SRP050	Pavem-P.Bridge to TLK R/A CH7600~8040 KLN B	90	19NOV05	20MAR06
CC11SRP090	Pavem-TLK Roundabout KLN Bound CH8100	60	30NOV05	23FEB06
CC11SRP070	Pavem-SL Roundabout KLN Bound CH7000	60	18FEB06	06MAY06
CC11SRP060	Pave-P.Bridge to TLK R/A CH7600~8040 TM B	60	14JUL06	04OCT06
CC11SRP110	Pavement CH2100~3100(Ex. Castle Peak)	90	14JUL06	13NOV06
CC11SRP100	Pavem-TLK Roundabout TM Bound CH8100	60	29JUL06	20OCT06
CC11SRP080	Pavem-SL Roundabout TM Bound CH7000	60	19OCT06	03JAN07
ROAD FURNITURE				
CC11RF010	Furn-H.F. Rd to P.Bridge CH7000~7520 KLN B	45	20JAN05	24MAR05
CC11RF020	Furn-H.F. Rd to P.Bridge CH7000~7520 TM B	60	26MAY05	13AUG05
CC11RF050	Furn-P.Bridge to TLK R/A CH7600~8040 KLN B	90	14DEC05	18APR06
CC11RF090	Furn-TLK Roundabout KLN Bound CH8100	60	09JAN06	03APR06
CC11RF070	Furn-SL Roundabout KLN Bound CH7000	60	29MAR06	15JUN06
CC11RF060	Furn-P.Bridge to TLK R/A CH7600~8040 TM B	60	24AUG06	13NOV06
CC11RF110	Furn- CH2100~3100(Ex. Castle Peak Road)	90	24AUG06	18DEC06
CC11RF100	Furn-TLK Roundabout TM Bound CH8100	60	09SEP06	27NOV06



		Dur.	Start	Finish
CC11RF080	Furn-SL Roundabout TM Bound CH7000	60	25NOV06	07FEB07
CLP SUBSTATION				
CC11CLP010	Footing for CLP Substation	25	24AUG05	27SEP05
CC11CLP020	Superstructure for CLP Substation	45	28SEP05	23NOV05
CC11CLP030	Drainage Works for CLP Substation	20	28SEP05	25OCT05
CC11CLP040	Builder Works for CLP Substation	60	24NOV05	17FEB06
CC11CLP050	E & M Works for CLP Substation	60	18FEB06	06MAY06
CC11CLP060	Test & Commissioning for CLP Substation	30	08MAY06	15JUN06
CC11CLP070	Demolish Existing CLP Substation	15	17JUN06	07JUL06



APPENDIX B
ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE (EMIS)

Appendix B – Environmental Mitigation Implementation Schedule

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
Air Quality Mitigation Measures					
General Measures					
Site clearance and demolition of existing structure					
The working area for the uprooting of trees, shrubs, or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures should be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation	To maintain the entire surface wet	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from site clearance) that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition	To minimize dust emission	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Excavation and earth moving					
The working area of any excavation or earth moving operation should be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation	To maintain the entire surface wet	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Excavation or earthworks should be completed as quickly as practicable and exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabilizer immediately after the last construction activity	To minimize dust emission	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Use of vehicle					
Any vehicle with an open load carrying area used for moving materials which have the potential to create dust shall have properly fitted side and tail boards. Materials having the potential to create dust shall not be loaded from a level higher than the side and tail boards, and shall be covered by a clean	To ensure that the dusty materials do not leak from the vehicle	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300 mm over the edges of the side and tail boards. The materials shall also be dampened if necessary before transportation					
Access road					
Every main haul roads with movement of vehicles exceeds 4 vehicles in any 30 minutes or as directed by the Supervising Officer shall be paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; and sprayed with water or a dust suppression chemical	To maintain the entire road surface wet	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit should be kept clear of dusty materials	To minimize dust emissions	The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Site boundary and entrance					
Wheel washing facilities including a high-pressure jet shall be installed at every discernible or designated exit points and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly.	To minimize dust emissions	Vehicle exit points	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
The area where wheel washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores	To minimize dust being raised	Area where vehicle washing takes place and the section of the road between the washing facilities and the exit point	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Where a portion of the Site boundary adjoins a road, street, service and or other area accessible to the public, hoarding of not less than 2.4m from ground level should be provided along the entire length of that portion of the Site boundary except for	To minimize dust being raised	Site boundary	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
site entrance or exit					TM on EIAO
Stockpiling of dusty materials					
Stockpiles of sand and aggregate greater than 20m^3 shall be enclosed on three sides, with walls extending above the pile and 2 metres beyond the front of the pile; and all stockpiles shall be covered by a clean tarpaulin or sprayed with a dust suppression chemical	To maintain the entire surface wet	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Specific Measure					
Water lorries shall be provided to water the site.	To minimize fugitive dust emission	Construction site	Contractor	Construction stage	ER Part 14 Clause 29.17(16)
Twice daily watering of the construction site where construction activities are conducted.	To suppress dust generated	Construction site	Contractor	Construction stage	APCO (Cap.311); Air Pollution Control (Construction Dust) Regulation TM on EIAO
Noise Mitigation Measures					
General Measures					
Good Site Practice					
Use of quiet construction equipment and/or employ the quietest practicable working methods when carrying out demolition works, and/or road opening works during restricted hours.	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO;
All plant and equipment used on site should be properly maintained in good operating condition	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Noisy construction activities shall be effectively sound reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
Intermittent noisy activities should be scheduled to minimize exposure of nearby NSRs to high levels of construction noise	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Noisy equipment and activities shall be sited as far from sensitive receivers as practical	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Use of hydraulic concrete crusher whenever applicable	To reduce noise impacts	Construction site	Contractor	Construction stage	ER Part 14 Clause 29.15(14)
Using Temporary and Movable Noise Barriers					
Movable barriers of 3 to 5m height with a small cantilevered upper portion and skid footing can be located within a few metres of stationary plant and within about 5m or more of mobile equipment such as an excavator and mobile crane etc., such that the line of sight to the NSR is blocked by the barriers	To reduce noise impacts	Stationary plants on construction sites	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Purpose-built noise barriers or screens constructed of appropriate material (minimum superficial density of 15 kg/m^2) located close to operating PME shall be provided, in order to reduce the noise impact to the surrounding sensitive uses. Certain types of PME, such as generators and compressors, can be completely screened by portable barriers giving a total noise reduction of 10 dB(A) or more	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
Using Noise Screening Structures or Purpose-built Noise Barriers along the Site Boundary					
Site buildings such as office and stores can be grouped together to form a substantial barrier separating site operations and nearby noise sensitive premises	To reduce noise impacts	Site buildings	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Stacks of certain materials such as bricks, aggregate, timber or top soil can be strategically placed to form a barrier	To reduce noise impacts	Construction site	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
For adverse cases, purpose-built noise barriers or screens could be placed along the site boundary	To reduce noise impacts	Site boundary	Contractor	Construction stage	NCO (Cap.400); EIAO (cap.499); TM on EIAO; PP-TM; GW-TM; DA-TM
Specific Measures					
Use of movable noise barrier for the following construction activities: • construction of viaduct from Tai Lam Kok to Siu Lam including piling, pile cap, bridge piers and abutment, casting of bridge beams and lifting of bridge beams • construction works at Siu Lam Interchange including relocation of CLP power sub-station, bored pile wall construction, road embankment, realignment of access road, roundabout modification, road pavement, utilities, footpath and road furniture	To reduce noise impacts	Work sites of the viaduct from Tai Lam Kok to Siu Lam and Siu Lam Interchange	Contractor	Construction stage	
Restriction on the usage of operating PME for the following construction activities during the examination period of the schools:	To reduce noise impacts	Work sites of the road reconstruction from Tai Lam Kok to	Contractor	Construction stage	

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
• Road reconstruction from Tai Lam Kok to Siu Lam: road construction (excavation of existing pavement, road pavement, footpath and road furniture), utilities, fill slopes recompaction, cut slopes stabilization (soil nailing to cut slopes). • Reclamation at Tai Lam Kok: dredging and sand filling.		Siu Lam and reclamation at Tai Lam Kok			
Rescheduling of the following concurrent construction activities so as to avoid simultaneous operating during the examination period of the schools: Seamen's Training Centre • Piling works for viaduct from Tai Lam Kok to Siu Lam and dredging works at Tai Lam Kok • Piling works for viaduct from Tai Lam Kok to Siu Lam and seawall construction at Tai Lam Kok • Pile cap, bridge pier & abutment and filling works at Tai Lam Kok • Fill slope recompaction and soil nailing to cut slopes (cut slopes stabilization) for road reconstruction from Tai Lam Kok to Siu Lam Customs & Excise Training School • Fill slopes recompaction and soil nailing to cut slopes (cut slopes stabilization) along the existing Castle Peak Road from Tai Lam Kok to Siu Lam	To reduce noise impacts	Work sites of the road reconstruction from Tai Lam Kok to Siu Lam and viaduct construction from Tai Lam Kok to Siu Lam	Contractor	Construction stage	
Low noise road surfacing, using polymer modified friction course material or otherwise as agreed with EPD, on viaduct should be fully implemented.	To mitigate traffic noise impact	Construction site	Contractor	Construction stage	Condition 3.5 of EP-171/2003/A
Water Quality Mitigation Measures					
Sediment Dredging					
Dredging should be undertaken using closed grab dredgers with a maximum total production rate of 3,000 m^3 day^{-1}	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Deployment of silt curtain around the immediate dredging area while dredging works are in progress	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Filling should commence only after the completion of seawall construction and should be undertaken behind the seawalls	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
Mechanical grabs should be designed and maintained to avoid spillage and seal tightly while being lifted	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
All hopper barges and dredgers should be fitted with tight fitting seals to their bottom openings to prevent leakage of material	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Loading of barges and hoppers should be controlled to prevent splashing of dredged material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation	To avoid water pollution	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Construction Site Runoff and Drainage					
Before commencing any site formation work, all sewer and drainage connections shall be sealed to prevent debris, soil, sand etc. from entering public sewers/drains	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Provision of perimeter channels to intercept storm-runoff from outside the site. These shall be constructed in advance of site formation works and earthworks	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Temporary ditches such as channels, earth bunds or sand bag barriers shall be included to facilitate runoff discharge into the stormwater drain, via a sand/silt basin/trap	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Works programmes shall be designed to minimise works areas at any one time, thus minimising exposed soil areas and reducing the potential for increased siltation and runoff	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Sand/silt removal facilities such as sand traps, silt traps and sediment basins shall be provided to remove the sand/silt particles from run-off. These facilities shall be properly and regularly cleaned and maintained. These facilities shall be	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
carefully planned to ensure that they would be installed at appropriate locations to capture all surface water generated on site					
Careful programming of the works to minimise excavation works during the rainy season	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Temporary access roads shall be protected by crushed gravel and exposed slope surfaces shall be protected when rainstorms are likely	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Open stockpiles of construction materials on-site shall be covered with tarpaulin or similar fabric during rainstorms to prevent erosion	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
General Construction Activities					
Debris and rubbish generated on-site should be collected, handled and disposed of properly to avoid entering the nearby coastal waters and stormwater drains	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
All fuel tanks and store areas shall be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Open drainage channels and culverts near the works areas should be covered to block the entrance of large debris and refuse	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Sewage from Workforce					
Portable toilets shall be provided by the Contractors, where necessary, to handle sewage from the workforce	To avoid water pollution	Construction site	Contractor	Construction stage	ProPECC PN 1/94
Road Drainage					
The silt traps should be regularly cleaned and maintained in good working condition	To avoid water pollution	Road drainage system	Highways Department	Operation stage	ProPECC PN 5/93
Waste Management Mitigation Measures					
Handling and Disposal of Dredged Materials					
In accordance with the WBTC No. 34/2002, the seriously contaminated material must be dredged and transported with great care. Mitigation measures, including the use of closed-grab dredgers, shall be incorporated	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 34/2002

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
The dredged contaminated sediment must be effectively isolated from the environment upon final disposal and shall be disposed of at the East Sha Chau Contaminated Mud Pits	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 34/2002
During transportation and disposal of the dredged marine sediments, bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material. Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 34/2002
During transportation and disposal of the dredged marine sediments, monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by the Director of Environmental Protection	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 34/2002
Good Site Practices and Waste Reduction Measures					
Use waste haulier authorized or licensed to collect specific category of waste	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
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 Land (Miscellaneous Provision) Ordinance (Cap 28)*	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Nomination of an approved personnel, such as a site manager, to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Training of site personnel in proper waste management and chemical handling procedures	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Provision of sufficient waste disposal points and regular collection for disposal	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Appropriate measures to minimise windblown litter and dust	To ensure the wastes	Construction site	Contractor	Construction stage	WDO (Cap.54)

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
during transportation of waste by either covering trucks or by transporting wastes in enclosed containers	are adequately managed				
Separation of chemical wastes for special handling and appropriate treatment at the CWTF	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites)	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
In order to monitor the disposal of C&D and solid wastes at public filling facilities and landfills, and control fly-tipping, a trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team. One may make reference to WBTC No. 5/99 for details	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
A Waste Management Plan (WMP) should be prepared and this WMP should be submitted to the SOR for approval. One may make reference to WBTC No. 15/2003 for details	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WDO (Cap.54)
Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
To encourage collection of aluminium cans by individual collectors, separate labelled bins shall be provided to segregate this waste from other general refuse generated by the work force	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
Any unused chemicals or those with remaining functional capacity shall be recycled	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
Use of reusable non-timber formwork to reduce the amount of C&D material	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
Prior to disposal of C&D waste, it is recommended that wood, steel and other metals shall be separated for re-use and / or	To ensure the wastes are adequately	Construction site	Contractor	Construction stage	WBTC No. 4/98

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
recycling to minimise the quantity of waste to be disposed of to landfill	managed				
Proper storage and site practices to minimise the potential for damage or contamination of construction materials	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	WBTC No. 4/98
Construction and Demolition (C&D) Waste					
Careful design, planning and good site management can minimize over-ordering and generation of waste materials such as concrete, mortar and cement grouts. The design of formwork should maximize the use of standard wooden panels so that high reuse levels can be achieved. Alternatives such as steel formwork or plastic facing should be considered to increase the potential for reuse	To minimize over-ordering and generation of waste materials, and to increase the potential for reuse	Construction site	Contractor	Construction stage	TM on EIAO; WDO; Land (Miscellaneous Provision) Ordinance (Cap.28); Public Health and Municipal Services Ordinance (Cap.132); HKPSG; New Disposal Arrangements for Construction Waste; Various WBTC
The contractor should use as much of the C&D material as possible on-site. Proper segregation of waste types on site will increase the feasibility of certain components of the waste stream by recycling contractors	To increase the feasibility of certain components of the waste stream by recycling companies	Construction site	Contractor	Construction stage	TM on EIAO; WDO; Land (Miscellaneous Provision) Ordinance (Cap.28); Public Health and Municipal Services Ordinance (Cap.132); HKPSG; New Disposal Arrangements for Construction Waste;

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
					Various WBTC
Inert C&D material (public fill) 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, or to an approved public filling area (PFA)	To handle waste properly	Construction site	Contractor	Construction stage	TM on EIAO; WDO; Land (Miscellaneous Provision) Ordinance (Cap.28); Public Health and Municipal Services Ordinance (Cap.132); HKPSG; New Disposal Arrangements for Construction Waste; Various WBTC
Chemical Wastes					
After use, chemical wastes should be handled according to the Code of Practice on the Packaging, Labeling and Storage of Chemical Wastes. Spent chemicals should be stored and collected by an approved operator for disposal at the Chemical Waste Treatment Facility or other licensed facility in accordance with the Chemical Waste (General) Regulation	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging Labelling and Storage of Chemical Wastes
Containers used for the storage of chemical waste should: • Be suitable for the substance they are holding, resistant to corrosion, maintained in 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	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging Labelling and Storage of Chemical Wastes
The storage area for chemical waste should: • Be clearly labeled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides;	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
• 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 disposal as chemical waste if necessary); and Be arranged so that incompatible materials are adequately separated.					the Packaging Labelling and Storage of Chemical Wastes
Disposal of chemical waste should: • Be via a licensed waste collector. • Be a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which offers a chemical waste collection service and can supply the necessary storage containers; or be a reuser of the waste, under approval from the EPD. Be a reuser of the waste, under approval from the EPD	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	Waste Disposal (Chemical Waste) (General) Regulation; Code of Practice on the Packaging Labelling and Storage of Chemical Wastes
General Refuse					
General refuse should be stored in enclosed bins or compaction units separate from C&D and chemical wastes. A reputable waste collector should 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 minimize odour, pest and litter impacts	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	PHMSO; Air Pollution Control (Open Burning) Regulation
Office waste can be reduced through recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered if one is available	To ensure the wastes are adequately managed	Construction site	Contractor	Construction stage	PHMSO; Air Pollution Control (Open Burning) Regulation
Ecology Mitigation Measures					
On-site planting should be provided if there are loss of vegetation due to construction activities	To restore vegetation	Construction site	Contractor	Construction stage	
Erect fences where practical along the boundary of	To protect vegetation	Construction site	Contractor	Construction stage	

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
construction sites					
Check the work site boundaries regularly	To protect vegetation	Construction site	Contractor	Construction stage	
Prohibit and prevent open fires within the site boundary and provide temporary fire fighting equipment	To protect vegetation	Construction site	Contractor	Construction stage	
Reinstate temporary work sites / disturbed areas to its original condition immediately after completion of the construction	To restore vegetation	Construction site	Contractor	Construction stage	
Landscape and Visual Mitigation Measures					
Construction programming and management					
The construction programme for the Project should be reduced to the shortest possible period, particularly in those locations where severe or high landscape and visual impacts are expected	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Keeping the periphery of the works areas at street level clean and tidy and attractive and convenient for pedestrians	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Use of colourful hoarding with interesting motifs	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Advanced planting and erosion control works					
Advance planting of trees and landscape areas	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Temporary hydroseeding of stockpiled topsoil to minimise erosion and improve the visual appearance	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Maintenance and Management of planting during operation	To ensure landscape and visual amenities are properly managed	Construction site	LCSD	Operation stage	WBTC 18/94 LU/GN001
Maximisation of amenity planting in road corridor					
Opportunities to incorporate significant amenity areas along the alignment should be maximised to provide visual relief in an otherwise congested traffic environment. Efforts to remove the footpath from the immediate road edge are to be incorporated whenever possible	To ensure landscape and visual amenities are properly managed	Construction site	HyD	Design stage	

Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to Address	Location of Measure	Who to Implement the Measure?	When to Implement the Measure?	What Requirements or Standards for the Measure to Achieve?
Substantial planting of amenity areas	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Maintenance of planting during operation	To ensure landscape and visual amenities are properly managed	Construction site	LCSD	Operation stage	WBTC 18/94 LU/GN001
Design, materials and finishes of engineering structures					
The quality of the design of all engineering structures, which will include viaducts, parapets, piers, slip roads, noise barriers, noise enclosures and drainage systems. Attention should be given to design modern and attractive structures	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Design stage	ACABAS Submission HyD Standards
High quality finishes to structural elements	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Maintenance and management during operation	To ensure landscape and visual amenities are properly managed	Construction site	HyD	Operation stage	
Maximisation of woodland planting on disturbed land					
Compensatory planting	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	WBTC 25/93
Maintenance and Management of planting during operation	To ensure landscape and visual amenities are properly managed	Construction site	LCSD	Operation stage	WBTC 18/94 LU/GN/001
Urban area under-viaduct hard and soft landscape works					
Where viaducts result in sterilised space under viaducts, extensive hard and soft landscape works should be provided to enhance and restore the function of the land, including creepers and climbers on retaining walls and supporting columns	To ensure landscape and visual amenities are properly managed	Construction site	Contractor	Construction stage	
Maintenance and management of during operation	To ensure landscape and visual amenities are properly managed	Construction site	ASD/LCSD/HyD	Operation stage	WBTC 18/94 LU/GN/001

APPENDIX C
SAMPLE DATA RECORD SHEET FOR AIR QUALITY, NOISE AND WATER QUALITY MONITORING

S01104

Maunsell Environmental Management Consultants Ltd.

MEMCL

1-Hour TSP Dust Monitoring - Data Record Sheet

Project Name: HY/2003/04 Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Equipment: Sibata LD-1 & LD-3 Dust Monitor

Monitoring Location		AM1			AM2		
Details of Location		CSD Marries Staff Quarters (Block H)			Tin Hu Temple		
Equipment Number		A-005-05a / A-005-07a / A005-08a A-005-09a / A-005-10a / A005-11a			A-005-05a / A-005-07a / A005-08a A-005-09a / A-005-10a / A005-11a		
Date of Monitoring		/ /			/ /		
Time of Monitoring							
Weather Condition		Sunny / Fine / Cloudy / Rainy			Sunny / Fine / Cloudy / Rainy		
No. of Measurement Set		1st hour	2nd hour	3rd hour	1st hour	2nd hour	3rd hour
Monitoring Results	Count Value						
	* Mass Concentration (mg/m³)						
Action & Limit Level (μg/m³)							
Site Condition		☐ Normal Operation ☐ Breaker/Excavator/Backhoe ☐ Traffic Emission ☐ Dust from other activities ☐ Others:_____			☐ Normal Operation ☐ Breaker/Excavator/Backhoe ☐ Traffic Emission ☐ Dust from other activities ☐ Others:_____		
Remarks							

Note * : Mass Concentration = K Factor x (Count Value / 60mins)

Equipment Number	A-005-05a	A-005-07a	A-005-08a	A-005-09a	A-005-10a	A-005-11a
K Factor	0.0033	0.0018	0.0018	0.0018	0.0015	0.0014

	Name	Signature	Date
Recorded By			
Checked By			

S01104

Maunsell Environmental Management Consultants Ltd.

MEMCL

24-Hour TSP Dust Monitoring - Data Record Sheet

Project Name: HY/2003/04 Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Equipment: Tisch TE-5170 & GMW-2310 TSP MFC Hi-Vol Sampler

The conditioning and weighing of filters were in accordance with USEPA Standard Method 40 CFR Part 50 Appendix B

		AM1	AM2
Monitoring Location		AM1	AM2
Details of Location		CSD Married Staff Quarters (Block H)	Tin Hu Temple
Equipment No.			
Pump Serial Number			
Date of Sampling		/ /	/ /
Time of Sampling (hh:mm)		09:00	09:00
Weather Condition		Sunny / Fine / Cloudy / Rainy	Sunny / Fine / Cloudy / Rainy
Elapsed-time Meter Reading	Initial		
	Final		
Total Sampling Time (hours)			
Initial Flow Rate (m^3/min.)			
Final Flow Rate (m^3/min.)			
Average Flow Rate (m^3/min)			
Total Sampling Volume (m^3)			
Filter Identification Number			
Initial Weight of Filter (g)			
Final Weight of Filter (g)			
Weight of Particulate (g)			
Particulate Concentration ($\mu g/m^3$)			
Action & Limit Level ($\mu g/m^3$)			
Site Condition		☐ Normal Operation ☐ Breaker/Excavator/Back-hoe ☐ Traffic Emission ☐ Dust from other activities ☐ Others:_____	☐ Normal Operation ☐ Breaker/Excavator/Back-hoe ☐ Traffic Emission ☐ Dust from other activities ☐ Others:_____
Remarks			

	Name	Signature	Date
Filter Placed By:			
Filter Collected By:			
Checked By:			

Maunsell Environmental Management Consultants Ltd.

Noise Monitoring - Data Record Sheet

Project Name: Contract No. HY/2003/04 Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Calibrator	Kit No. (Equipment No.)
B&K 4231 Calibrator (94.0dB at 1KHz)	**A**: (N-004-01)
B&K 4231 Calibrator (94.0dB at 1KHz)	**B**: (N-004-02)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**C**: (N-004-06)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**D**: (N-004-08)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**E**: (N-004-09)

Sound Level Meter	Kit No. (Equipment No.)		
B&K 2236C	**1**: (N-002-03a)		
B&K 2238	**2**: (N-002-04a)		
Rion NL-14	**3**: (N-004-01a)	**4**: (N-004-03a)	**5**: (N-004-06a)
	6: (N-004-10a)	**7**: (N-004-12a)	
Rion NL-31	**8**: (N-007-02a)	**9**: (N-007-03a)	
Rion NL-18	**10**: (N-008-01a)		

Monitoring Location		NMC1	NMC2	NMC3
Details of Location		CSD Married Staff Quarters - Block H	Maritime Services Training Institute	Customs & Excise Training School
Kit No. of Sound Level Meter		1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10
Date of Monitoring		/ /	/ /	/ /
Weather Condition		Sunny / Fine / Cloudy	Sunny / Fine / Cloudy	Sunny / Fine / Cloudy
Measurement Start Time (hh:mm)				
Measurement Time Length (min)		30min / 3 X 5min	30min / 3 X 5min	30min / 3 X 5min
Type of Measurement*		Facade / Free-Field	Facade / Free-Field	Facade / Free-Field
Measurement results	**L_{90} (dB(A))**			
	L_{10} (dB(A))			
	L_{eq} (dB(A))			
Calibration	**Kit No. of Calibrator**	A / B / C / D / E	A / B / C / D / E	A / B / C / D / E
	Before (dB(A))			
	After (dB(A))			
Major Construction Noise Source(s) During Measurement		Excavator/Backhoe ☐ Bulldozer ☐	Excavator/Backhoe ☐ Bulldozer ☐	Excavator/Backhoe ☐ Bulldozer ☐
		Dump Truck / Lorry ☐ Roller ☐	Dump Truck / Lorry ☐ Roller ☐	Dump Truck / Lorry ☐ Roller ☐
		Others, pls specify	Others, pls specify	Others, pls specify
Other Noise Source(s) During Measurement		Road Traffic Noise ☐ Air Traffic Noise ☐	Road Traffic Noise ☐ Air Traffic Noise ☐	Road Traffic Noise ☐ Air Traffic Noise ☐
		Construction Noise From Other Sites (e.g. Piling) Pls specify:	Construction Noise From Other Sites (e.g. Piling) Pls specify:	Construction Noise From Other Sites (e.g. Piling) Pls specify:
		Village Activities or Animal Noise (e.g. Dog Barking) Pls specify:	Village Activities or Animal Noise (e.g. Dog Barking) Pls specify:	Village Activities or Animal Noise (e.g. Dog Barking) Pls specify:
Remarks				

Note* : 3dB(A) correction was added for Free-Field Measurement

	Name	Signature	Date
Recorded By			
Checked By			

Maunsell Environmental Management Consultants Ltd.

Operation Noise Monitoring - Data Record Sheet

Project Name: Contract No. HY/2003/04 Improvement to Castle Peak Road between Ka Loon Tsuen and Siu Lam

Calibrator	Kit No. (Equipment No.)
B&K 4231 Calibrator (94.0dB at 1KHz)	**A**: (N-004-01)
B&K 4231 Calibrator (94.0dB at 1KHz)	**B**: (N-004-02)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**C**: (N-004-06)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**D**: (N-004-08)
Rion NC-73 Calibrator (94.0dB at 1KHz)	**E**: (N-004-09)

Sound Level Meter	Kit No. (Equipment No.)		
B&K 2236C	**1**: (N-002-03a)		
B&K 2238	**2**: (N-002-04a)		
Rion NL-14	**3**: (N-004-01a)	**4**: (N-004-03a)	**5**: (N-004-06a)
	6: (N-004-10a)	**7**: (N-004-12a)	
Rion NL-31	**8**: (N-007-02a)	**9**: (N-007-03a)	
Rion NL-18	**10**: (N-008-01a)		

Monitoring Location		NMO1	NMO2	NMO3	NMO4
Details of Location		CSD Married Staff Quarters - Block H	Siu Lam Hospital	Maritime Services Training Institute	CSD Married Staff Quarters - Block J
Kit No. of Sound Level Meter		1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10	1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9 / 10
Date of Monitoring		/ /	/ /	/ /	/ /
Weather Condition		Sunny / Fine / Cloudy	Sunny / Fine / Cloudy	Sunny / Fine / Cloudy	Sunny / Fine / Cloudy
Measurement Start Time (hh:mm)					
Measurement Time Length (min)					
Type of Measurement*		Facade / Free-Field	Facade / Free-Field	Facade / Free-Field	Facade / Free-Field
Measurement results	L_{90} (dB(A))				
	L_{10} (dB(A))				
	L_{eq} (dB(A))				
Calibration	Kit No. of Calibrator	A / B / C / D / E	A / B / C / D / E	A / B / C / D / E	A / B / C / D / E
	Before (dB(A))				
	After (dB(A))				
Hourly Traffic Flow during Monitoring					
% HGVs of Hourly Traffic					
Estimated Average Vehicle Speed (Kph)					
Mitigation Measures in Place					
Other Noise Source(s) During Monitoring					
Remarks					

Note* : 3dB(A) correction was added for Free-Field Measurement

	Name	Signature	Date
Recorded By			
Checked By			

Contract No. HY/2003/04 MEMCL
Improvement to Castle Peak Road Between Ka Loon Tsuen and Siu Lam

Water Quality Monitoring
Data Record Sheet

Date of Monitoring: _____ Tide Condition: _____Mid-Flood / Mid-Ebb_____

Weather: ___Sunny / Fine / Cloudy / Rainy____ Vessel No: _____

Sea Condition: ___Calm / Moderate / Rough__

Equipment	Model	Equipment No.	Remarks
YSI 6820 Multi-Parameter	6820	☐ W026.21 ☐ W026.25 ☐ W026.22 ☐ W026.26 ☐ W026.23 ☐ W026.27 ☐ W026.24 ☐ W026.28	
YSI 650-MDS Handheld Display	650-MDS	☐ W028.01 ☐ W028.05 ☐ W028.09 ☐ W028.02 ☐ W028.06 ☐ W028.10 ☐ W028.03 ☐ W028.07 ☐ W028.11 ☐ W028.04 ☐ W028.08 ☐ W028.12	

Location	Login I.D.	Sampling Start Time	Water Depth (m)	Sampling Depth		Appearance of Water	Observations		Coordinate	Remark
C1				S	1.0	Clear ☐☐☐ Turbid	☐ Dredging ☐ Dumping ☐ Reclamation ☐ Dead fishes	☐ Plume ☐ Scum ☐ Rubbish ☐ not observed	☐ 22°22.273 114°00.559 or	
				M		Clear ☐☐☐ Turbid				
				B		Clear ☐☐☐ Turbid				
M1				S	1.0	Clear ☐☐☐ Turbid	☐ Dredging ☐ Dumping ☐ Reclamation ☐ Dead fishes	☐ Plume ☐ Scum ☐ Rubbish ☐ not observed	☐ 22°21.140 114°01.192 or	
				M		Clear ☐☐☐ Turbid				
				B		Clear ☐☐☐ Turbid				
M2				S	1.0	Clear ☐☐☐ Turbid	☐ Dredging ☐ Dumping ☐ Reclamation ☐ Dead fishes	☐ Plume ☐ Scum ☐ Rubbish ☐ not observed	☐ 22°21.117 114°01.375 or	
				M		Clear ☐☐☐ Turbid				
				B		Clear ☐☐☐ Turbid				
M3				S	1.0	Clear ☐☐☐ Turbid	☐ Dredging ☐ Dumping ☐ Reclamation ☐ Dead fishes	☐ Plume ☐ Scum ☐ Rubbish ☐ not observed	☐ 22°21.432 114°00.350 or	
				M		Clear ☐☐☐ Turbid				
				B		Clear ☐☐☐ Turbid				
C2				S	1.0	Clear ☐☐☐ Turbid	☐ Dredging ☐ Dumping ☐ Reclamation ☐ Dead fishes	☐ Plume ☐ Scum ☐ Rubbish ☐ not observed	☐ 22°21.143 114°02.089 or	
				M		Clear ☐☐☐ Turbid				
				B		Clear ☐☐☐ Turbid				

Note: If water depth is 3m-6m, omit the mid-depth measurement. If water depth is less than 3m, only 1m below water surface is required.
Volume of sample collected for SS testing: 2. Liters (Duplicate sample)

Any dumping barge nearby ? Y / N If yes, mark location on map on reverse side and indicate whether working or not.

Name of barge: _____ (Please numbers and shows the number on the map).

Any visible discoloration of the water ? Y / N If yes, please mark on map with remarks on appearance.

Any red tide ? Y /N If yes, please mark on map with remarks on appearance.

Remark : _____

Conducted by : _____ Checked by : _____

Date : _____ Date : _____

Project No. S01104

APPENDIX D
COMPLAINT LOG

Appendix D – Complaint Log

Log Ref.	Location	Received Date	Details of Complaint	Investigation/Mitigation Action	Status

APPENDIX E
INTERIM NOTIFICATION OF EXCEEDANCE

Report No.
Monitoring Date

Monitoring Parameter

Location Action Level (AL) Limit Level (LL)

Sensitive Receiver	Monitoring time	Measured value	Level Exceeded

ET Leader Signature & Date: _____