

PROJECT NO.: TCS/00280/05

ISSUE No.: 1

DRAINAGE SERVICES DEPARTMENT (DSD)
CONTRACT NO. DC/2004/08



PENG CHAU SEWAGE TREATMENT WORKS UPGRADE

ENVIRONMENTAL MONITORING AND AUDIT (EM&A)
MONTHLY EM&A REPORT
APRIL 2006

PREPARED FOR

Acciona-ATAL Joint Venture (AAJV)

Quality Index

Date	Reference No.	Prepared by	Certified By
6 May 2006	TCS/00280/05/600/R0124	Ben Tam (Project Supervisor)  P.P.	Cliff Lam (Project ET Leader) 

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BMT Asia Pacific Limited

13 May 2008
Our Ref: 8281/0227

By Post/mail

CDM International Inc.,
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Hong Kong

For the attention of Mr. Alfred Cheung/Mr. Stephen Ng

Dear Sirs,

RE: EM&A MONTHLY REPORT - APRIL 2008
Contract No. DC/2004/08 Upgrading of Peng Chau Sewage Treatment Works

With reference to the final version of the EM&A monthly report for April 2008 provided by ET on 13th May 2008 (ET's ref.: TCS/00280/06/00/R0124 Issue 1), we have no critical comments on the mentioned report.

Thank you for your kind attention and should you require any further information, please do not hesitate to contact the undersigned at 2241 9807.

Yours sincerely

Anthony Wong
Project Independent Environmental Checker
HBR/anw

cc:
Nesco-AIAT JV - Mr. William Chan/Mr. Mingo Li (by fax, email)
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Project: Upgrading of Peng Chau STW/DC/04/08/001



TABLE OF CONTENTS

1.0	Introduction	1
2.0	Project Organisation and Construction Progress	2
3.0	Summary of Monitoring Requirements	3
4.0	Impact Monitoring Methodology	5
5.0	Impact Monitoring Results	9
6.0	Waste Management	11
7.0	Site Inspection	12
8.0	Environmental Complaint and Non-Compliance	12
9.0	Implementation Status Of Mitigation Measures	13
10.0	Impact Forecast	14
11.0	Conclusions	15

List of Tables

Table 2-1	Major Construction Activities in this Reporting Month
Table 2-2	Summary of Valid Environmental Approval Documents
Table 3-1	Summary of EM&A Requirements
Table 3-2	Action and Limit Levels for Air Quality
Table 3-3	Action and Limit Levels for Noise
Table 3-4	Action and Limit Levels for Marine Water Quality
Table 4-1	Locations of Air Quality and Noise Monitoring Stations
Table 4-2	Locations of Marine Water Monitoring Stations
Table 4-3	Monitoring Equipment Used in EM&A Program
Table 4-4	Analytical Methods Applied to Marine Water Quality Samples
Table 5-1	Summary of 24-Hr and 1-Hr TSP Monitoring Results
Table 5-2	Summary of Noise Monitoring Results
Table 5-3	Summary of Exceedances for Marine Water Monitoring Results
Table 6-1	Summary of Quantities for Waste Disposal
Table 6-2	Summary of Quantities for Recycling Materials
Table 8-1	Statistical Summary of Environmental Complaints

List of Appendices

Appendix A	Project Site Layout
Appendix B	Environmental Organisation Structure
Appendix C	Locations of Monitoring Stations
Appendix D	Equipment Calibration Certificates
Appendix E	Impact Monitoring Schedule
Appendix F	Graphical Plots of Air Quality and Noise Monitoring Results
Appendix G	Meteorological Data
Appendix H	Marine Water Quality Results
Appendix I	Graphical Plots of Marine Water Quality
Appendix J	Three-Month Rolling Program

Executive Summary

Acciona-ATAL Joint Venture (AAJV) has been awarded the DSD Contract DC/2004/08 (Project) for the Peng Chau Sewage Treatment Works Upgrade in May 2005. The Project requires an Environmental Monitoring & Audit (EM&A) program to be implemented by an Environmental Team (ET) throughout the contract period in compliance with the requirements as stated in the project Environmental Permit (EP-203/2004) and the Project EM&A manual.

Action-United Environmental Services and Consulting (AUES) has been commissioned by AAJV to be an independent environmental team (ET) to implement the EM&A program in compliance with the EP and the project EM&A Manual.

This report presents the results of the project EM&A program for the reporting month **April 2006** during the period from 26 March to 25 April 2006.

EM&A Activities in this Reporting Month

A summary of the monitoring activities in this reporting month is listed below:

- 1-Hr TSP Monitoring 18 Events
- 24-Hr TSP Monitoring 6 Events
- Noise Monitoring 6 Events
- Water Quality Monitoring 12 Monitoring Days
- Site Inspection Audit 5 Times

Air Quality

No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting month.

Construction Noise

No exceedance in construction noise measurements was recorded and no noise complaint was received in this reporting month.

Water Quality

There were 8 limit and 15 action level exceedances in Ammonia recorded in this reporting month. The limit level exceedances were recorded on 3 & 6 April 2006 at W1 & W2 during ebb tide & flood tide. For the action level exceedances, nine exceedances were recorded during ebb tide on 8, 10, 12, 20, 22 and 24 April 2006; and six exceedances were recorded during flood tide on 29 Mar, 8 and 22 April 2006 at W1 & W2.

According to the site construction dairy was provided by contractor, there was no marine work carried out on those dates. The ammonia levels measured at the control stations at C1 & C2 were also high in values. The ET therefore considered that the exceedances were not due to the project.

Summary of Monitoring Exceedances

A summary of monitoring exceedances for air, noise and water quality monitoring is presented below:

Env. Quality	Parameters	Compliance %	Investigation & Corrective Actions
Air Quality	1-hour TSP	100	Not Required for 100% Compliance
	24-hour TSP	100	Not Required for 100% Compliance
Noise	Leq (30min) Daytime	100	Not Required for 100% Compliance
Water Quality	Suspended Solids	100	Not Required for 100% Compliance
	Turbidity	100	Not Required for 100% Compliance
	Dissolved Oxygen	100	Not Required for 100% Compliance
	Ammonia	100	Not Required for Non Project-Related Exceedances
	TIN	100	Not Required for 100% Compliance

Environmental Complaints

No environmental complaint was received in this reporting month.

Environmental Summon

No environmental summon was received in this reporting month.

Future Key Issues

The potential environmental impact for this project generally include air quality, noise, water quality and construction waste. The contractor is to properly implement the required environmental mitigation measures as per the Implementation Schedule in the EM&A manual to ensure no significant adverse environmental impact arises from the construction works.

AAJV has been demonstrating sound environmental performance in running this project and has been awarded "The Best Construction Site Housekeeping Award" for the year of 2005.

1.0 INTRODUCTION

- 1.01 Acciona-ATAL Joint Venture (AAJV) has been awarded the DSD Contract DC/2004/08 (Project) for the upgrading of Peng Chau Sewage Treatment Works in May 2005. The Project requires an Environmental Monitoring & Audit (EM&A) program to be implemented by an Environmental Team (ET) throughout the contract period in compliance with the requirements as stated in the project Environmental Permit (EP-203/2004) and the project EM&A manual. The location of the project site is presented in **Appendix A**.
- 1.02 The works to be executed under the Project mainly comprise the following:
- Upgrade and reconstruct the existing Peng Chau Sewage Treatment Works (STW);
 - Construct an emergency overflow, storm tanks and submarine outfall;
 - Provide de-odourization facilities and associated sludge treatment facilities, and extend inlet pumping mains and construct an equalization tank;
 - Demolish the existing treatment facilities;
 - Construct sludge drying bed; and
 - Construct remaining works.
- 1.03 Action-United Environmental Services and Consulting (AUES) has been commissioned by AAJV to be the independent environmental team (ET) for implementation of the EM&A program in accordance with the requirements as set out in the EP and the project EM&A manual.
- 1.04 This report presents the results of the project EM&A program for the reporting month **April 2006** during the period from 26 March to 25 April 2006.

Report Structure

- 1.05 The EM&A report is structured into the following sections:

Section 1	Introduction
Section 2	Project Organization and Construction Progress
Section 3	Summary of Monitoring Requirements
Section 4	Monitoring Methodology
Section 5	Monitoring Results
Section 6	Waste Management
Section 7	Site Inspection
Section 8	Environmental Complaint and Non-Compliance
Section 9	Implementation Status of Mitigation Measures
Section 10	Impact Forecast and Monitoring Schedule
Section 11	Conclusions

2.0 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 Project Organization and Management Structure

The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in **Appendix B**.

2.2 Construction Progress

A summary of the major construction activities undertaken in this reporting month is shown in **Table 2-1**.

Table 2-1 Major Construction Activities in this Reporting Month

Location	Description of Construction Activities
Portion P	• Temporary diversion of existing DN150 twin pipes
Portion Q	Nil
Portion R	<ul style="list-style-type: none"> • Excavating for the footing of NSTC and deliver excavated material to PCTF; • Erecting formwork, bar fixing for the roof of ESC; • Concreting for the wall and roof of ESC; • Erecting formwork and bar fixing for NSTC; • Concreting of the base slab of NSTC; • Sheetpile installation for construction of chlorine tank; and • Filling Grade 200 rock fill for the NSTC foundation.
Area A	NA
Area B	• Reinforcement bar bending for NSTC and ESC
Area C	Nil

2.3 Summary of Environmental Submissions

A summary of the relevant permits, licences, and/or notifications on environmental protection for this Project in this reporting month is presented in **Table 2-2**.

Table 2-2 Status of Environmental Licenses and Permits

Item	Item Description	Permit Status
1	Environmental Permit No.: EP-203/2004	Issued at 30, Nov 2004
2	Air Pollution Control (Construction Dust)	Notified EPD on 17-Jun-05
3	Water Pollution Control (Discharge licence) EP890/W2/XE005	Valid to 30-Sep-10
4	Chemical Waste Producer Registration WPN: 5213-976-N2449-01	Registration on 3-Jun-05
5	Exemption for site concrete batching plant licence	Issued at 21, Oct 2005
6	Exemption Account for Disposal of Construction Waste (Account Number : 5000577)	Valid until 27-Sep-08
7	Construction Noise Permit (No. GW-RS0038-06)	Valid (2-Feb-06 to 1-Aug-06)

AAJV has been demonstrating sound environmental performance in running this project and has been awarded "The Best Construction Site Housekeeping Award" for the year of 2005.

3.0 SUMMARY OF IMPACT MONITORING REQUIREMENTS

- 3.01 Environmental monitoring and audit requirements are set out in the project EM&A manual. Air, marine water and construction noise have been identified to be the key environmental issues during the impact phase of the project.
- 3.02 A summary of the EM&A requirements for air quality, marine water quality and construction noise monitoring are shown in **Table 3-1**. The designated locations of the air quality, noise and marine water monitoring stations are shown in **Appendix C**.

Table 3-1 Summary of EM&A Requirements

Environmental Aspect	Monitoring Parameters
Air Quality	1-Hr TSP
	24-Hr TSP
Construction Noise	Leq 30min during normal working hours
	Supplementary L10 and L90 for reference.
Marine Water Quality	<ul style="list-style-type: none"> • Dissolved Oxygen (DO); • Temperature; • Turbidity; • pH; • Salinity; • Suspended Solids (SS); • Ammonia Nitrogen; and • Total Inorganic Nitrogen.

- 3.03 Air monitoring is carried out once every six days for 24-Hr TSP and 3 times every six days for 1-Hr TSP at one designated monitoring station.
- 3.04 Noise monitoring is conducted once every six days at one designated monitoring station. Measurements of Leq 30min shall be taken between 0700 and 1900 with supplementary L10 and L90 data collected.
- 3.05 Marine water monitoring is carried out 3 times every week at 4 designated monitoring stations (2 Control stations and 2 Impact stations) in the course of marine work.
- 3.06 The Impact monitoring program shall be conducted throughout the construction of the Project.
- 3.07 A summary of the Action/Limit (A/L) Levels for air quality, marine water quality and construction noise is shown in **Tables 3-2, 3-3 and 3-4**.

Table 3-2 Action and Limit Levels for Air Quality

Monitoring Location	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-Hr TSP	24-Hr TSP	1-Hr TSP	24-Hr TSP
AN1	346	163	500	260

Table 3-3 Action and Limit Levels for Construction Noise

Parameter	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hrs on normal weekdays	When one or more documented complaints are received	75 dB(A)

Table 3-4 Action and Limit Levels for Marine Water Quality

Parameter		Action	Limit
DO mg/L	Surface & Mid-depth	4.1	3.9
	Bottom	3.3	2.0
Turbidity, NTU		6.2 or 120% of upstream control station's SS at the same tide of the same day.	7.5 or 130% of upstream control station's SS at the same tide of the same day.
SS, mg/L		17.6 or 120% of upstream control station's SS at the same tide of the same day.	20.2 or 130% of upstream control station's SS at the same tide of the same day.
NH3-N, mg/L		0.16	0.22
TIN, mg/L		0.91	0.94
E.Coli, cfu/100mL		374	610

- 3.08 An Event Action Plan for air, noise and water quality has been implemented for this project. Details of the Event Action Plan are presented in the First Impact EM&A report.

4.0 IMPACT MONITORING METHDOLOGY

MONITORING LOCATIONS

- 4.01 There is one designated air and noise monitoring location and four (4) designated water monitoring stations. Their locations are shown in **Tables 4-1 and 4-2** and geographically in **Appendix C**.
- 4.02 Owing to the residents' refusal of providing access to the designated air and noise locations, an alternative air and noise monitoring station was proposed and was approved by EPD (Ref: (2) EP2/N9/F/93 IV) on 14 July 2005. The approved alternative air and noise station is located at the abutment (Portion P) within the site boundary next to the sensitive receiver Sea Crest Villa.

Table 4-1 Location of Air Quality and Noise Monitoring Station

Station ID	Description
AN1	Abutment at Portion P next to Sea Crest Villa

Table 4-2 Locations of Water Quality Monitoring Stations

Station	Description	Easting	Northing
W1	Predicted Dredging Non-Impact Zone	821279.0	816452.1
W2	Live Coral Area	821573.2	816769.7
C1	Control Station	821919.0	817155.0
C2	Control Station	821443.2	816257.4

- 4.03 The installation of a wind monitoring station at the sensitive receivers or site offices was confirmed impractical. Use of meteorological data provided by the Peng Chau Station of the Hong Kong Observatory (HKO) has been adopted in this project since September 2005.

MONITORING FREQUENCY AND PERIOD

1-Hr TSP Monitoring

- 4.04 All 1-Hr TSP monitoring was conducted at the EPD-approved alternative station three times every 6 days during the monitoring period from 26 March to 25 April 2006. A total of 18 monitoring events were carried out in this reporting month.

24-Hr TSP Monitoring

- 4.05 All 24-Hr TSP monitoring was conducted at the EPD-approved alternative station once every six days during the monitoring period from 26 March to 25 April 2006. A total of 6 monitoring events were carried out in this reporting month.

Noise Monitoring

- 4.06 Impact noise monitoring was undertaken at the EPD-approved alternative station weekly monitoring period from 26 March to 25 April 2006. A total of 6 monitoring events were carried out in this reporting month.

Marine Water Quality Monitoring

4.07 The marine water quality monitoring was undertaken at the designated stations 3 days a week from 26 March to 25 April 2006, at mid ebb and mid flood tides. A total of 12 monitoring days were undertaken in this reporting month.

MONITORING EQUIPMENT

4.08 The monitoring equipment used by the ET in the EM&A program is presented in the following table:

Table 4-3 Monitoring Equipment Used in EM&A Program

Parameters	Monitoring Equipment	
Marine Quality	Dissolved Oxygen	YSI 85
	Temperature	YSI 85
	Turbidity	HACH 2100P
Air Quality	1-Hr TSP	Sibata LD-3
	24-Hr TSP	Tisch High Volume Sampler 515N
Noise	Leq30	B&K Type 2238
	On-site Calibration	B&K Type 4231

24-Hr TSP Monitoring

4.09 24-Hr TSP monitoring was carried out by a High volume sampler (HVS) in compliance with the project EM&A Manual. The HVS employed complied with the PS specifications including.

- Power supply of 220v/50 hz for 24-hour continuous operation;
- 0.6-1.7 m³/min (20-60 SCFM) adjustable flow rate;
- A 7-day mechanical timer for 24-hour operation;
- An elapsed time indicator with ± 2 minutes accuracy for 24-Hr operation;
- Minimum exposed area of 63 in²;
- Flow control accuracy of $\pm 2.5\%$ deviation over 24-Hr operation;
- An anodized aluminum shelter to protect the filter and sampler;
- A motor speed-voltage control to control mass flow rate with accuracy of $\pm 2.5\%$ deviation over 24-hr sampling period;
- Provision of a flow recorder for continuous monitoring;
- Provision of a peaked roof inlet;
- Incorporation with a manometer; and
- An 8"x10" stainless steel filter holder to hold, seal and easy to change the filter paper.

4.10 The filter papers used in 24-Hr TSP monitoring were of size 8"x10" and provided by a local HOKLAS-accredited laboratory, ALS Techichem Pty (HK) Limited (HOKLAS No. 66). The filters papers after measurements were returned to the laboratory for the required treatment and analysis.

1-Hr TSP Monitoring

4.11 Measurements of 1-Hr TSP monitoring were taken by a Sibata LD-3 Laser Dust Meter that is a portable and battery-operated laser photometer capable of performing real time 1-Hr TSP measurements. A comparison test with HVS was carried out prior to baseline monitoring in compliance with the EM&A requirements and a conversion factor for direct reading of the dust meter has been established.

WIND DATA MONITORING

- 4.12 The installation of a wind monitoring station at the sensitive receivers or site offices was confirmed impractical. The meteorological data for this project has been provided by the Hong Kong Observatory (HKO) Peng Chau Station upon IEC & EPD approval.

Noise Monitoring

- 4.13 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (Leq) measured in decibels (dB). Supplementary statistical results such as L₁₀ and L₉₀ were also obtained for reference.
- 4.14 Hand-held sound level meters (B&K Model 2238) and associated acoustical calibrators in compliance with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) and 804:1985 (Type 1) specification were used for taking the baseline noise measurements.
- 4.15 Windshield was fitted in all measurements. All noise measurements were made with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq).
- 4.16 No noise measurement was made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s.

Marine Water Quality Monitoring

- 4.17 The marine water quality monitoring was carried out in compliance with the project EM&A requirements. Monitored parameters include Dissolved Oxygen (DO), Temperature, Turbidity, Salinity, pH, Suspended Solids (SS) and Total Inorganic Nitrogen (TIN).
- 4.18 DO, temperature, turbidity, pH and salinity were measured in-situ whereas SS and TIN were determined in a HOKLAS accredited laboratory.
- 4.19 Marine water quality monitoring was conducted during mid-ebb and mid-flood at specified depths in compliance with the project EM&A Manual. Duplicate in-situ measurements were taken and duplicate samples were collected in accordance with HOKLAS requirements for QA/QC purposes.

LABORATORY MEASUREMENT/ANALYSIS

- 4.20 Analyses of SS, TIN and ammonia nitrogen were carried out by a local HOKLAS- accredited laboratory, ALS Techichem Pty (HK) Limited (HOKLAS No. 66). The specified testing services provided by ALS as shown in Table 4-4 are accredited under the HOKLAS Scheme.

Table 4-4 Analytical Methods applied to Marine Water Quality Samples

Determinant	Standard Method	Detection Limit
Suspended solids (mg/L)	ALS Method EA-025	2.0 mg/L
Total Inorganic Nitrogen (mg/L)	ALS Method EK-055A	0.01 mg/L
Ammonia Nitrogen (mg/L)	ALS Method EK-055A	0.01 mg/L

EQUIPMENT CALIBRATION

- 4.21 Initial calibration of the HVS was performed upon installation and thereafter at bi-monthly intervals in accordance with the manufacturer's instruction using the NIST-certified standard calibrator. The calibration data are properly documented and the records are maintained by ET for future reference.
- 4.22 The 1-Hr TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment is checked before and after each monitoring event. A comparison test was carried out with a HVS. A conversion factor (K) of 4.0 was generated in accordance with the equipment manufacturer's instruction. The meter counts in minutes multiplied by the conversion factor will generate the equivalent dust concentration by HVS.
- 4.23 The sound level meters are calibrated using an acoustic calibrator prior to and after measurements. The meters are regularly calibrated in accordance with the manufacturer's instructions. Prior to and following each noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements are considered valid only if the calibration levels before and after the noise measurement agree to within 1.0 dB.
- 4.24 All in-situ water monitoring instruments are checked, calibrated and certified by a HOKLAS accredited laboratory before use and subsequently re-calibrated at 3-monthly intervals. Responses of sensors and electrodes are checked with standard solutions before each use.
- 4.25 The calibration certificates of the monitoring equipment used during the impact monitoring program are attached in **Appendix D**.

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 4.26 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house certified (ISO 9001:2000) Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.
- 4.27 The monitoring data recorded in the equipment eg. 1-Hr TSP meters and noise meters are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data.
- 4.28 For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

5.0 IMPACT MONITORING RESULTS

5.01 The impact EM&A program was carried out by the ET in compliance with the project EM&A Manual during the period from 26 February to 25 March 2006 at the designated locations. The impact monitoring schedules are presented in **Appendix E** and the monitoring results are detailed in the following sub-sections.

AIR QUALITY

5.02 The impact air quality monitoring data is summarized in **Tables 5-1**. Graphical plots of the 24-Hr TSP and 1-Hr TSP results are shown in **Appendix F** respectively.

Table 5-1 Summary of 24-Hr and 1-Hr TSP Monitoring Results

Date	24-Hr TSP (ug/m ³)	1-Hr TSP (ug/m ³)			
		Start Time	1 st TSP Measurement	2 nd TSP Measurement	3 rd TSP Measurement
29-Mar-06	134	10:02	248	255	273
3-Apr-06	82	09:48	278	196	102
8-Apr-06	115	13:02	92	86	97
12-Apr-06	62	09:46	72	66	79
18-Apr-06	93	09:51	194	187	172
24-Apr-06	128	11:12	37	82	63
Action Level	163	-	346		
Limit Level	260	-	500		

* Exceedances are in bold.

No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting month.

5.03 The meteorological data during the monitoring period are summarized in **Appendix G**.

NOISE

5.04 The impact noise monitoring results are summarized in **Table 5-2**. Graphical plots of the monitoring data are presented in **Appendix F**.

Table 5-2 Summary of Noise Monitoring Results

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected* Leq30
29-Mar-06	09:59	53.5	63.9	63.8	68.5	64.7	62.1	64.5	67.5
3-Apr-06	10:20	57.9	52.0	50.1	51.3	47.5	45.0	52.6	55.6
8-Apr-06	10:14	56.4	55.2	53.4	64.0	60.6	58.7	59.5	62.5
12-Apr-06	09:54	62.7	64.2	61.5	62.4	75.5	63.0	68.8	71.8
18-Apr-06	09:53	52.6	58.9	55.1	59.4	56.1	57.3	57.1	60.1
24-Apr-06	09:59	61.9	55.2	64.2	58.5	48.0	67.7	62.7	65.7
Limit Level		-						-	75

* A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

MARINE WATER QUALITY

5.05 The impact water monitoring results are presented in **Appendix H** and the graphical plots of are presented in **Appendix I**. **Table 5-3** presents the total number of exceedance for dissolved oxygen, turbidity, suspended solids and TIN at each sensitive receiver for the month.

Table 5-3 Summary of Exceedances for Marine Water Quality

Station	Exceedance Level	DO		Turbidity		SS		NH ₃		TIN	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
W1	Action	0	0	0	0	0	0	4	3	0	0
	Limit	0	0	0	0	0	0	2	2	0	0
W2	Action	0	0	0	0	0	0	5	3	0	0
	Limit	0	0	0	0	0	0	2	2	0	0
Total	Action	0	0	0	0	0	0	9	6	0	0
	Limit	0	0	0	0	0	0	4	4	0	0

* Exceedances are in bold.

5.06 There were 8 limit and 15 action level exceedances in Ammonia recorded in this reporting month. The limit level exceedances were recorded on 3 & 6 April 2006 at W1 & W2 during ebb tide & flood tide. For action level exceedances, nine exceedances were recorded during ebb tide on 8, 10, 12, 20, 22 and 24 April 2006; and six exceedances were recorded during flood tide on 29 Mar, 8 and 22 April 2006 at W1 & W2.

According to the site construction dairy was provided by contractor, there was no marine work carried out on those dates. The ammonia levels measured at the control stations at C1 & C2 were also high in values. The ET therefore considered that the exceedances were not due to the project.

6.0 WASTE MANAGEMENT

A joint site audit with IEC was performed on 24 April 2006 in this reporting month. The results and findings for the audit are presented below.

Records of Waste Quantities

All types of waste arising from the construction work are classified into the following:

- Excavated material;
- Construction & demolition (C&D) material;
- Chemical waste; and
- General refuse.

The quantities of waste for disposal in this reporting month are summarized in **Tables 6-1** and **6-2**. Whenever possible, materials were reused on-site as far as practicable.

Table 6-1 Summary of Quantities of Waste for Disposal

Type of Waste	Quantity	Disposal Location
Excavated Material (Spent lube oil) (Liters)	-	N/A
Empty Site Vehicle Batteries (Nos.)	-	N/A
Excavated material (Uncontaminated) (m ³)	453.17	Peng Chau Transfer Facility
Broken Rock (m ³)	434.53	Peng Chau Transfer Facility
Construction & Demolition Material (Inert) (tons)	4.07	Peng Chau Transfer Facility
Construction & Demolition Material (Non-Inert) (tons)	-	N/A
Asbestos C&D Materials (m ³)	-	N/A
Chemical Waste (Liters)	-	N/A
Wastewater Collected for Off-site Treatment (m ³)	-	N/A
General Refuse (tons)	-	Peng Chau Transfer Facility
Dredged Materials (m ³)	-	N/A

Table 6-2 Summary of Quantities of Recycling Materials

Type of Waste	Quantity	Disposal Location
Recycled Metal (kg)	-	NA
Recycled Paper (kg)	-	NA
Recycled Plastic (kg)	-	NA

7.0 SITE INSPECTION

Representatives of the Engineer and the Contractor carried out joint site inspection every week to evaluate the site environmental performance. A monthly audit with representatives of RE, Contractor, IEC and ET was carried out on 24 April 2006. No non-compliance was noted and some observations were made on general site housekeeping.

The following presents the observations and recommendations made during the audit:

- The Contractor was reminded to properly treat the wastewater satisfying the discharge standards before discharging.
- As advised by the Contractor, no truck would go outside the site boundary and the trucks would be well washed before running on the paved road on site.
- The Contractor was reminded to provide impervious sheeting or spraying for the soil/rock stockpiles.

8.0 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

8.1 Environmental Complaint and Prosecution

No environmental complaint was received in this reporting month. A statistical summary table

of any complaint details is presented in **Table 8-1**.

No prosecution and summon was received in this reporting month.

Table 8-1 Statistical Summary of Environmental Complaints

Reporting Month	Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
August 2005	0	0	NA
September 2005	0	0	NA
October 2005	0	0	NA
November 2005	0	0	NA
December 2005	0	0	NA
January 2006	0	0	NA
February 2006	0	0	NA
March 2006	0	0	NA
April 2006	0	0	NA

9.0 IMPLEMENTATION STATUS OF MITIGATION MEASURES

AAJV has been implementing the required environmental mitigation measures according to the project Mitigation Implementation Schedule. The implementation schedule with mitigation measures is presented in the First Impact EM&A report.

A summary of environmental mitigation measures generally implemented by AAJV in this reporting month is presented as follows;

Water Quality

- Drainage channels are provided to convey run-off into appropriate treatment facilities;
- Drainage systems are regularly and adequately maintained.

Landscaping

- Tree protection measures are provided to existing trees;
- No tree is unnecessarily lopped or felled.

Air Quality

- Vehicles are cleaned of mud and debris before leaving the site;
- Site vehicles are limited to within 15 km/hr;
- Public roads around the site entrance/exit have been kept clean and free from dust;
- No dark/black smoke emissions from site vehicles and generators;
- Provide dust suppression measures to reduce dust emission from stockpile.

Noise

- Works and equipment are located to minimise noise nuisance from the nearest sensitive receiver;
- Idle equipment is either turned off or throttled down;
- Powered Mechanical Equipment are covered or shielded by appropriate acoustic materials.

Waste and Chemical Management

- Waste is properly segregated into appropriate containers/areas;
- Excavated materials were reused where practicable.
- A chemical waste storage area is provided on site;

General

- The site is kept tidy and clean.

10.0 IMPACT FORECAST

10.1 Key Issues for the Coming Month

Key issues to be considered in the coming month include:

- Implementation of dust suppression measures at all times;
- Potential marine water quality impact due to construction works near the seafront;
- Potential marine water quality impact due to rainy season (April to October) for avoiding untreated runoff discharging to the sea;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures.

A 3-month rolling program is presented in **Appendix J**.

11.0 CONCLUSION

The EM&A program in April 2006 was undertaken in compliance with the EM&A manual for the Peng Chau Sewage Treatment Works Upgrade. A summary of environmental compliance for air, noise and water quality in this reporting month is presented as follows:

Summary of Monitoring Exceedances

Env. Quality	Parameters	Compliance %	Investigation & Corrective Actions
Air Quality	1-hour TSP	100	Not Required for 100% Compliance
	24-hour TSP	100	Not Required for 100% Compliance
Noise	Leq (30min) Daytime	100	Not Required for 100% Compliance
Water Quality	Suspended Solids	100	Not Required for 100% Compliance
	Turbidity	100	Not Required for 100% Compliance
	Dissolved Oxygen	100	Not Required for 100% Compliance
	Ammonia	100	Not Required for Non Project-Related Exceedances
	TIN	100	Not Required for 100% Compliance

11.01 No exceedance in 1-Hr TSP and 24-Hr TSP measurements was recorded in this reporting month.

11.02 All noise levels measured at AN1 were below the Limit level and no complaint was received in this reporting month.

11.03 There were 8 limit and 15 action level exceedances in Ammonia recorded in this reporting month. The limit level exceedances were recorded on 3 & 6 April 2006 at W1 & W2 during ebb tide & flood tide. For action level exceedances, nine exceedances were recorded during ebb tide on 8, 10, 12, 20, 22 and 24 April 2006; and six exceedances were recorded during flood tide on 29, 8 and 22 April 2006 at W1 & W2.

According to the site construction diary was provided by contractor, there was no marine work carried out on those dates. The ammonia levels measured at the control stations at C1 & C2 were also high in values. The ET therefore considered that the exceedances were not due to the project.

11.04 No environmental complaint or summon was received in this reporting month.

Recommendations

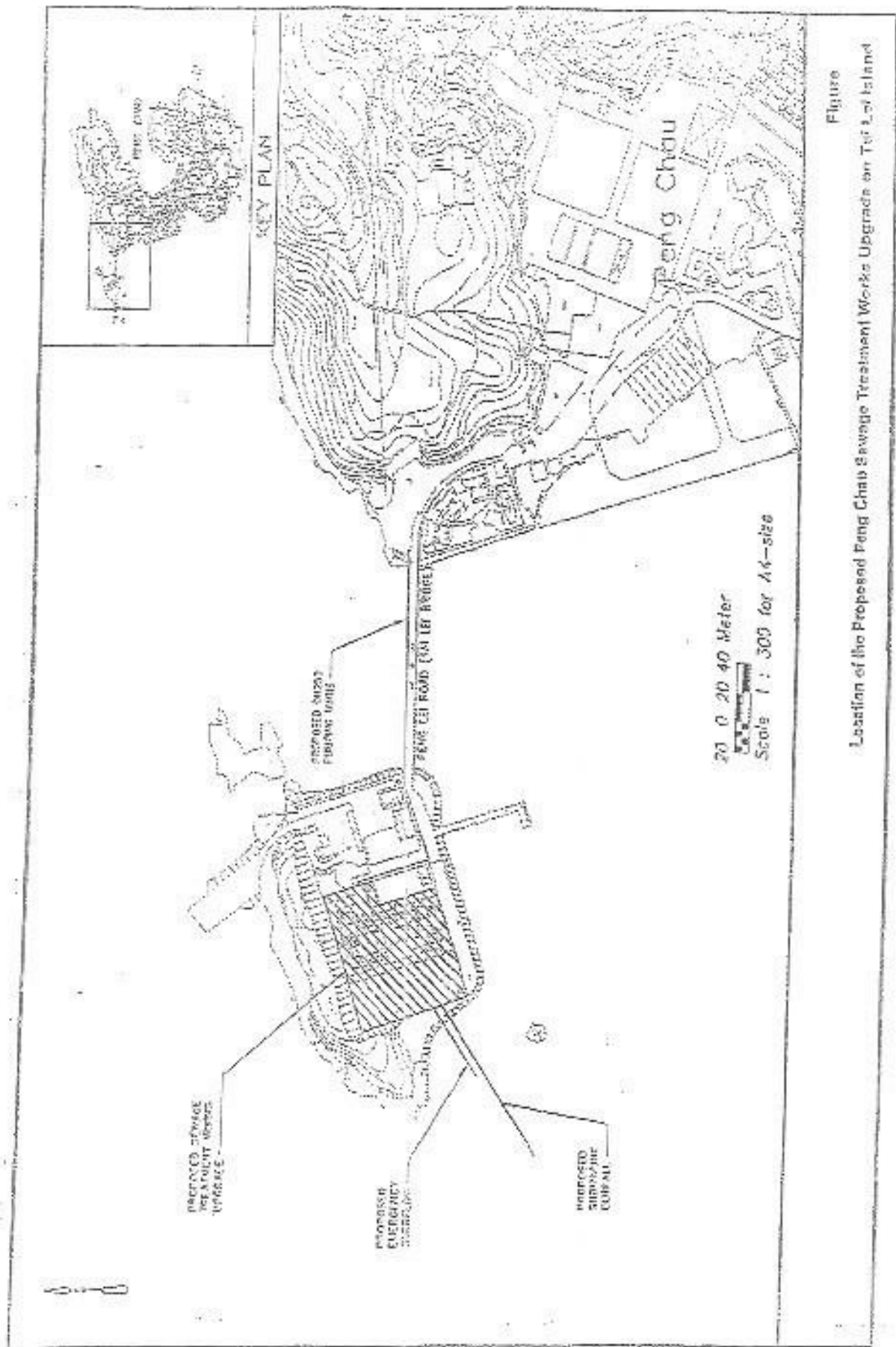
11.05 Based on the joint site inspection records on 24 April 2006, the following key recommendations are pertinent:

- The Contractor was reminded to properly treat the wastewater satisfying the discharge standards before discharging.
- As advised by the Contractor, no truck would go outside the site boundary and the trucks would be well washed before running on the paved road on site.
- The Contractor was reminded to provide impervious sheeting or spraying for the soil/rock stockpiles.

The ET will continue to implement the EM&A program and audit the implementation of the environmental mitigation measures.

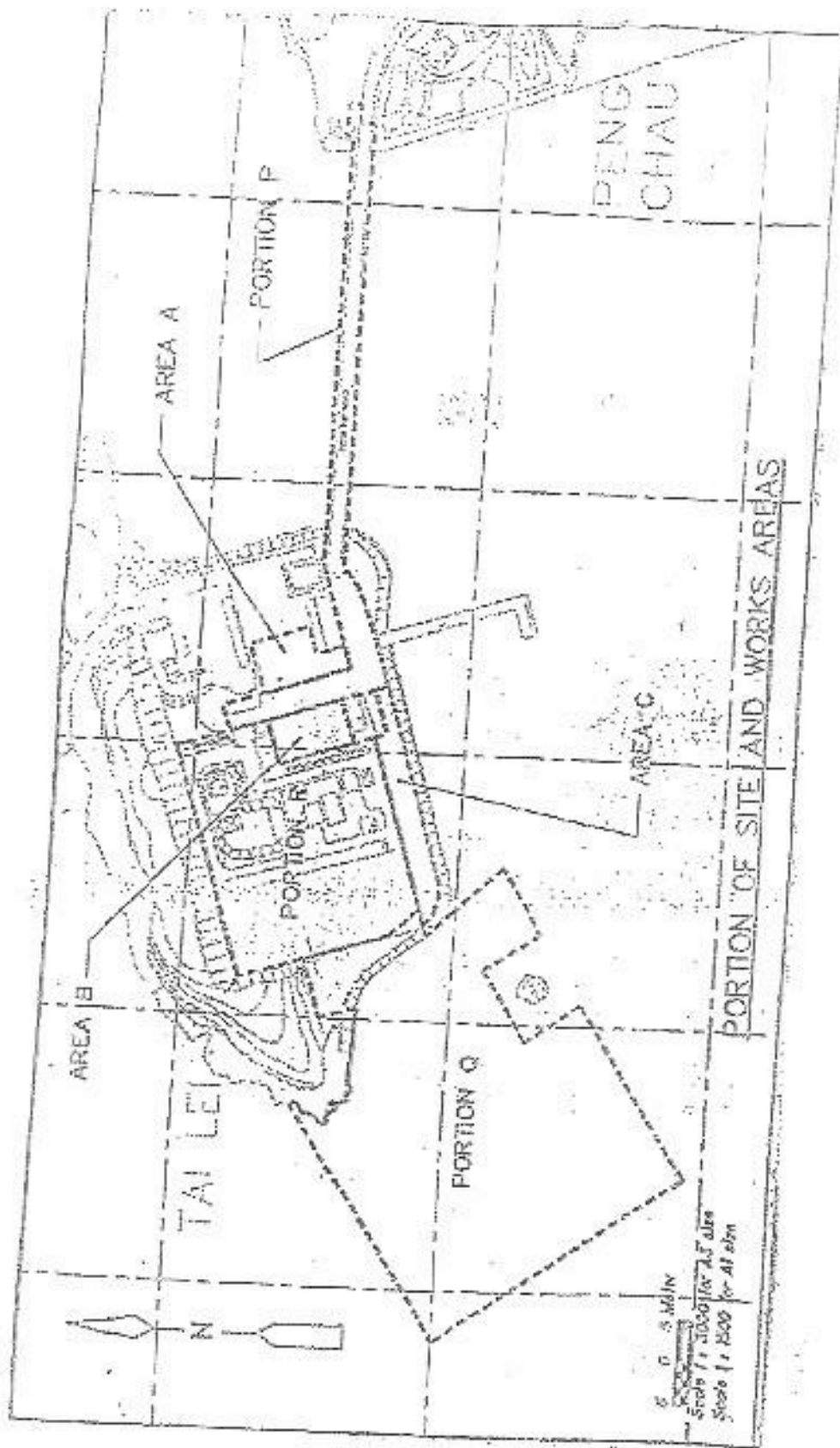
11.06 AAJV has been demonstrating sound environmental performance in running this project and has been awarded "The Best Construction Site Housekeeping Award" for the year of 2005.

Appendix A
Project Site Layout



Figure

Location of the Proposed Peng Chau Sewage Treatment Works Upgrade on Top 2 of Island



Appendix B

Environmental Organization Structure

Contact Details of Key Personnel

Organization	Project Role	Designation	Name of Key Staff	Tel No.	Fax No.
DSD	Employer	Permit Holder	Ir David Leung	2594-7281	2827-8526
CDM	Engineer's Representative	Project Engineer	Mr. Stephen Ng	2428-2332	2424-9114
		Resident Engineer	Mr. Alfred Cheung	2983-9303	2983-9843
		ARE	Mr. Alex Yeung	2983-9303	2983-9843
BMT Asia	Independent Environmental Checker	IEC	Mr. Antony Wong	2815-2221	2815-3377
		IEC'S Representative	Mr. Benny Ng	2815-2221	2815-3377
Acciona-ATAL	Main Contractor	Project Manager	Mr. William Chan	2983-0092	2983-0381
		Site Agent	Mr. Mingo Li	2983-0092	2983-0381
AUES	Contractor's Environmental Team	Environmental Team Leader (ETL)	Mr. Cliff Lam	2959-6059	2959-6079
		Project Supervisor	Mr. Benjamin Tam	2959-6059	2959-6079

Appendix C

Locations of Designated Monitoring Stations

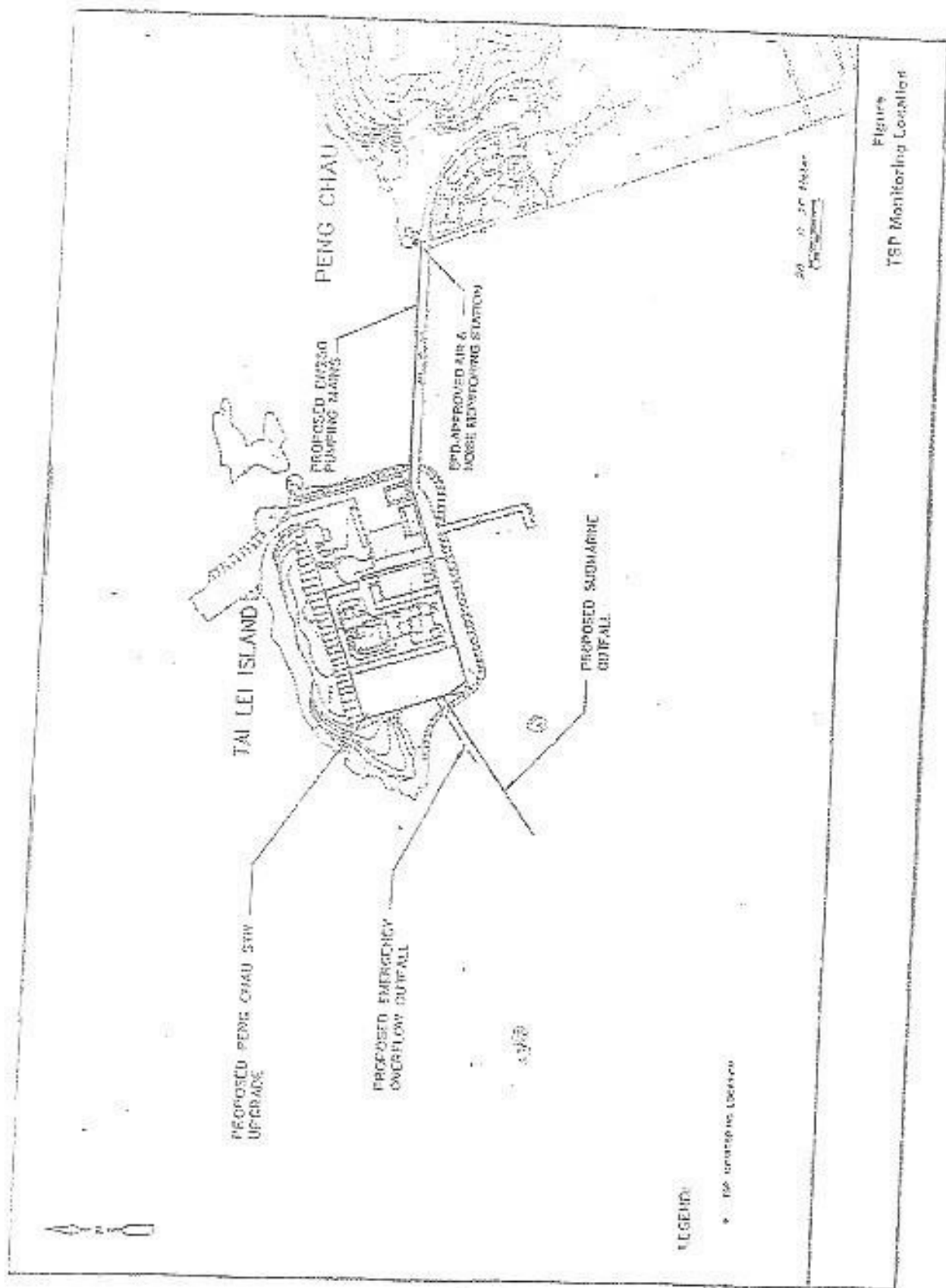
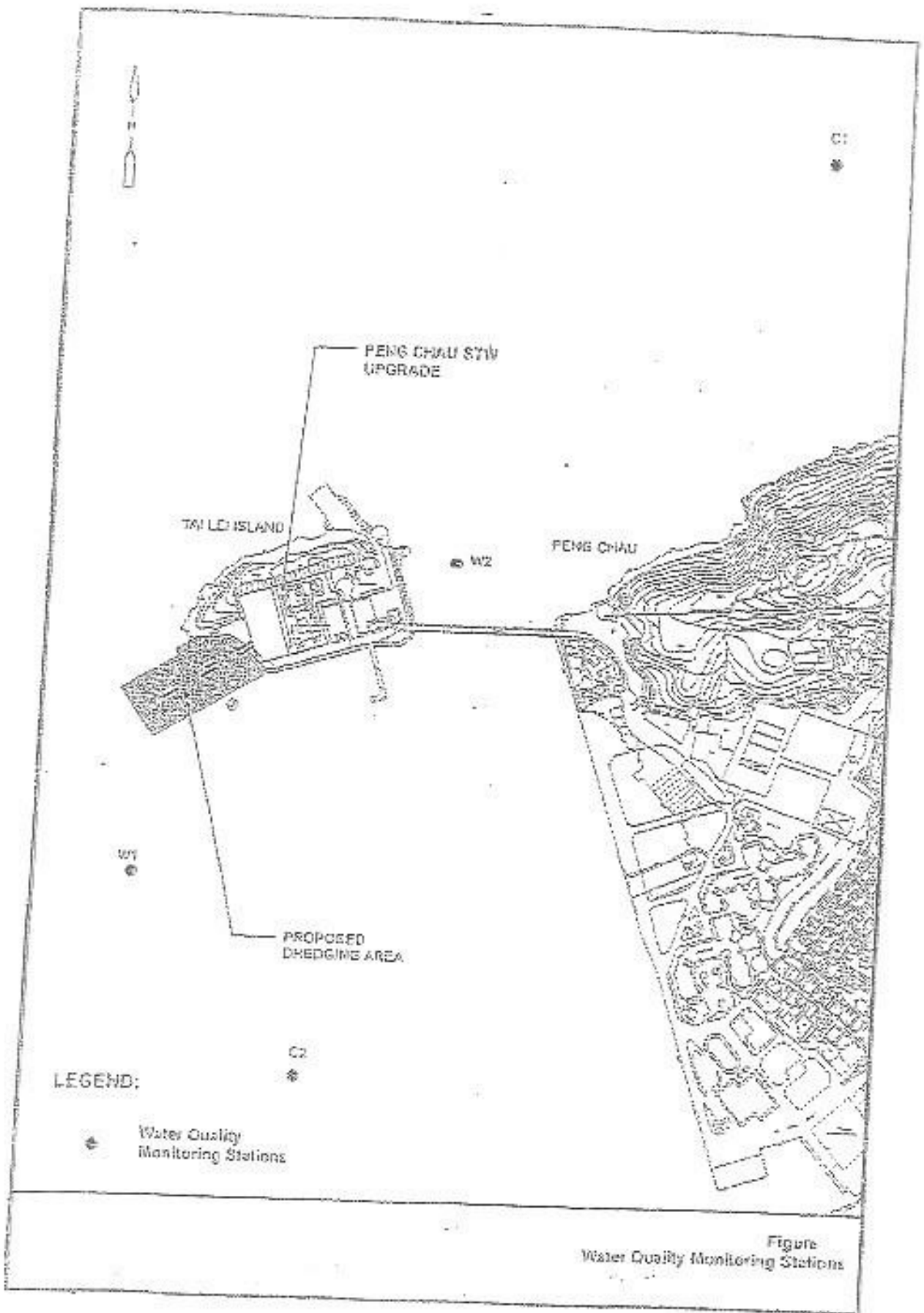


Figure
TSP Monitoring Location



Appendix D
Equipment Calibration Certificates

Equipment Calibration List for Peng Chau Sewage Treatment Works Upgrade Project

Note: Calibration certificates will only be provided if monitoring equipment is re-calibrated or new.

Item	Aspect	Description of Equipment	Serial No.	Date of Calibration	Date of Next Calibration
1	Air	Greasby Anderson GMWS2310 High Volume Sampler	AN1	10 Feb 06	10 May 06
2		Sibata LD-3	362337	22 Jun 05	21 Jun 06
3*	Noise	Bruel & Kjaer 4231 Acoustical Calibrator	2292167	13 Apr 06	12 Apr 06
4*		Bruel & Kjaer 2238 Integrating Sound Level Meter	2285762	8 Jul 05	7 Jul 06
5**	Water	YSI Model 85	98A0725AB	20 Jan 06	20 Apr 06
6**		Hach Turbidimeter 2100P	981200020015	27 Feb 06	26 May 06

* Calibration done in this reporting month, see calibration certificate attached.

** The equipment is borrowed from ALS Laboratory



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C061596

Certificate of Calibration

This is to certify that the equipment

Description : Acoustical Calibrator (EQ016)

Manufacturer : Bruel & Kjaer

Model No. : 4231

Serial No. : 2292167

*has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C061596.*


The equipment is supplied by

Co. Name : Action-United Environmental Services and Consulting

Address : Unit A, 20/F., Gold King Industrial Building,

35-41 Tai Lin Pai Road, Kwai Chung, N.T.

Date of Issue : 13 April 2006

Certified by : 
C.F. Leung

The test equipment used for testing are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o: 1/F, Tsing Shan Wai Exchange Building, 1 Hing On Lane, Tsui Mau, New Territories, Hong Kong

Tel: 2927 8886 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Certificate of Conformance

Action-United Environmental Services
Unit 3206-07, Clifford Centre
778-784 Cheung Sha Wan Road
Kowloon,
Hong Kong

Customer Reference:
2KS050205

Service Request:
1-03141756

Date:
08-Jul-05

We hereby declare that
-2236--- Integrating Sound Level Meter Serial Number: 225782
has been tested and passed all test.

The instrument has been tested according to published specifications at the date of the test.
All tests have been performed using calibrated equipment, traceable to National or International Standards
or by ratio measurements.

Certificate issued
08-Jul-05



Ole E. Sørensen

Global Service Manager
For and on behalf of Brüel & Kjær HQ



Recommended date for next check: Jul-2006

Brüel & Kjær is certified under ISO 9001: Year 2000, assuring that all calibration data is retained on file and is available for inspection upon request.

Note:

Although this certificate states that your instrument complied with all specifications at the time of the test, this is not a calibration certificate.

Appendix E

Impact Monitoring Schedules

Impact Monitoring Schedules – April 06

Date		Dust Monitoring		Noise Monitoring	Marine Monitoring	
		1-Hr TSP	24-Hr TSP		Mid Ebb	Mid Flood
26-Mar-06	Sun					
27-Mar-06	Mon				11:28(11:28)	16:44(16:44)
28-Mar-06	Tue					
29-Mar-06	Wed				12:34(12:34)	09:00(06:37)
30-Mar-06	Thu					
31-Mar-06	Fri				13:44(13:44)	09:00(07:29)
1-Apr-06	Sat					
2-Apr-06	Sun					
3-Apr-06	Mon				15:53(15:53)	09:00 (08:47)
4-Apr-06	Tue					
5-Apr-06	Wed					
6-Apr-06	Thu				17:00(19:32)	09:00(06:51)
7-Apr-06	Fri					
8-Apr-06	Sat				10:59(10:59)	15:11(15:11)
9-Apr-06	Sun					
10-Apr-06	Mon				11:29(11:29)	09:00(05:38)
11-Apr-06	Tue					
12-Apr-06	Wed				12:10(12:10)	09:00(06:10)
13-Apr-06	Thu					
14-Apr-06	Fri					
15-Apr-06	Sat					
16-Apr-06	Sun					
17-Apr-06	Mon					
18-Apr-06	Tue				14:56(14:56)	09:00(07:50)
19-Apr-06	Wed					
20-Apr-06	Thu				17:00(17:01)	09:00(04:16)
21-Apr-06	Fri					
22-Apr-06	Sat				17:00(19:47)	09:00(07:15)
23-Apr-06	Sun					
24-Apr-06	Mon				10:22(10:22)	15:37(15:37)
25-Apr-06	Tue					

** Time in bracket denotes the mid-ebb and mid-flood time according to tides at Chi Ma Wan

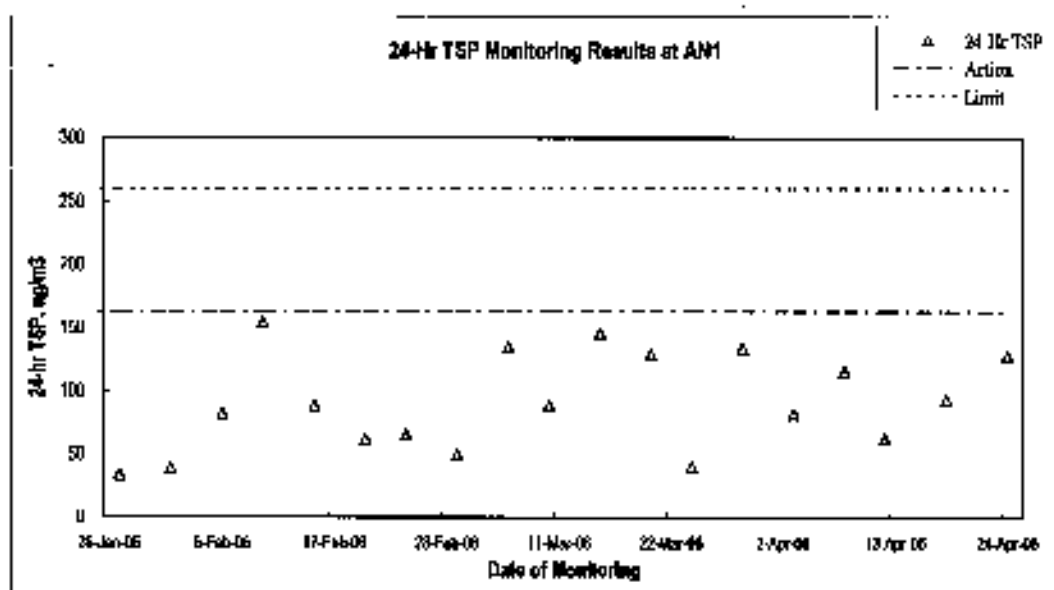
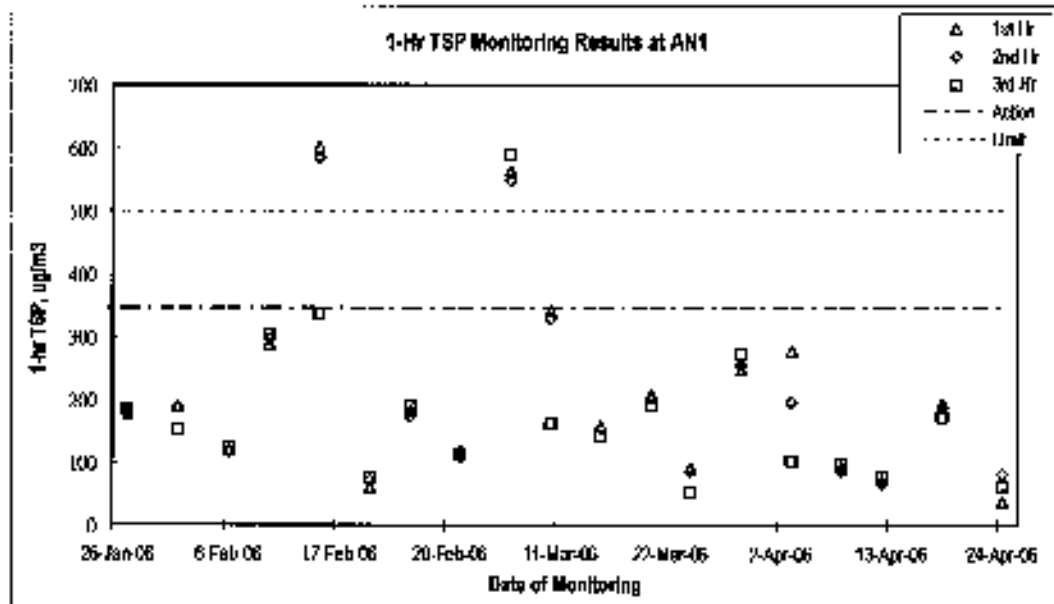
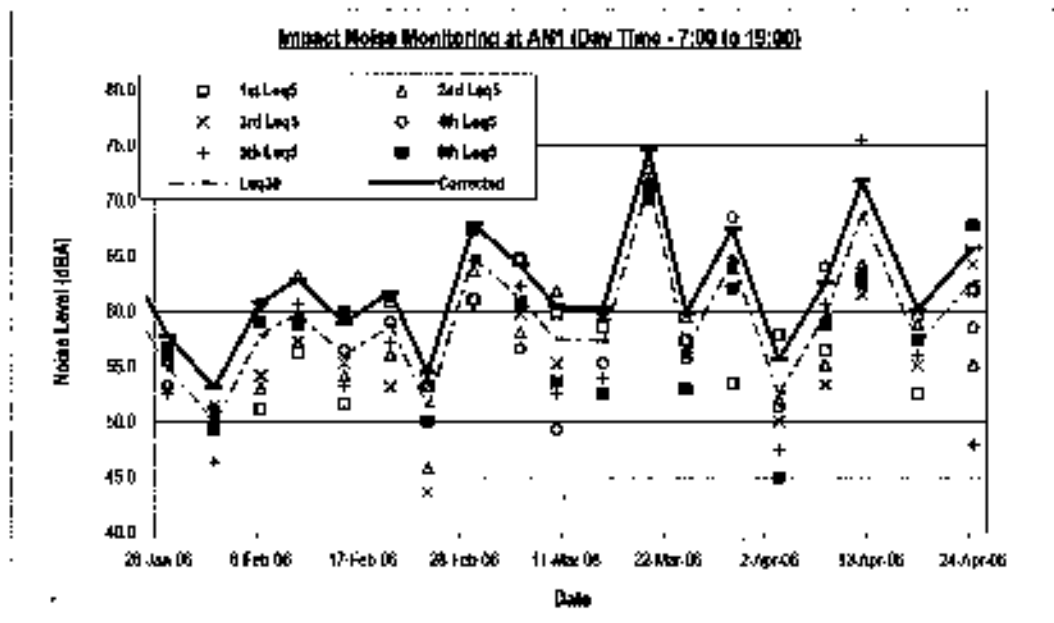
Impact Monitoring Schedules – May 06

Date		Dust Monitoring		Noise Monitoring	Marine Monitoring	
		1-Hr TSP	24-Hr TSP		Mid Ebb	Mid Flood
26-Apr-06	Wed				17:00(17:38)	09:00(05:25)
27-Apr-06	Thu					
28-Apr-06	Fri				17:00(19:25)	09:00(06:20)
29-Apr-06	Sat					
30-Apr-06	Sun					
1-May-06	Mon					
2-May-06	Tue				15:40(15:40)	09:00(07:59)
3-May-06	Wed					
4-May-06	Thu				17:00(17:26)	09:00(04:54)
5-May-06	Fri					
6-May-06	Sat				17:00(19:40)	09:00(07:13)
7-May-06	Sun					
8-May-06	Mon				10:19(10:19)	15:37(15:37)
9-May-06	Tue					
10-May-06	Wed					
11-May-06	Thu				11:34(11:34)	09:00(05:09)
12-May-06	Fri					
13-May-06	Sat				12:29(12:29)	09:00(05:51)
14-May-06	Sun					
15-May-06	Mon				13:35(13:35)	09:00(06:39)
16-May-06	Tue					
17-May-06	Wed					
18-May-06	Thu				16:02(16:02)	09:00(08:10)
19-May-06	Fri					
20-May-06	Sat				17:00(18:07)	09:00(05:38)
21-May-06	Sun					
22-May-06	Mon				09:00(08:53)	14:07(14:07)
23-May-06	Tue					
24-May-06	Wed				10:26(10:26)	16:34(16:34)
25-May-06	Thu					

** Time in bracket denotes the mid-ebb and mid-flood time according to tides at Chi Ma Wan

Appendix F

Graphical Plots of Air and Noise Monitoring Results



Appendix G
Monthly Meteorological Data

Date		Weather	Lau Fau Shan Station				
			Total Rainfall (mm)	Mean Air Temperature (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
26-Mar-06	Sun	rain/ fog	3	19	30	95	E
27-Mar-06	Mon	cloudy/ rain/ mist/ moderate	1.1	17.7	25	95	E
28-Mar-06	Tue	fine/ moderate	-	19.8	25	70	NW/N
29-Mar-06	Wed	fine/ moderate	-	19.5	29	70	E
30-Mar-06	Thu	cloudy/ sunny/ moderate	Trace	21	26	85	E
31-Mar-06	Fri	cloudy/ rain/ mist/ moderate	Trace	22.9	20	95	E
1-Apr-06	Sat	sunny/ moderate	Trace	22.6	17	90	E
2-Apr-06	Sun	sunny/ mist/ rain	0.1	22.7	4	90	SE/S
3-Apr-06	Mon	fine/ haze/ cloudy/ moderate	Trace	23.8	10	95	SE/S
4-Apr-06	Tue	cloudy/ sunny/ moderate	-	23.7	9	95	SE/S
5-Apr-06	Wed	sunny/ moderate	-	24.9	12	95	SE/S
6-Apr-06	Thu	cloudy/ rain/ moderate	Trace	24.7	20	100	E/SE
7-Apr-06	Fri	misty/ rain/ sunny/ cloudy	Trace	21.4	19	90	E
8-Apr-06	Sat	sunny/ cloudy/ moderate	-	21.7	28	90	E
9-Apr-06	Sun	misty/ sunny	Trace	24.7	12	95	SE/S
10-Apr-06	Mon	cloudy/ sunny/ showers	Trace	26	12	95	S/SW
11-Apr-06	Tue	hot/ sunny/ moderate	Trace	25.9	18	95	SE/S
12-Apr-06	Wed	sunny/ showers/ cloudy/ moderate	Trace	26.4	12	90	SE/S
13-Apr-06	Thu	cloudy	0.9				
14-Apr-06	Fri	cloudy	0.1				
15-Apr-06	Sat	cloudy/ rain	1				
16-Apr-06	Sun	cloudy	Trace	22.6	25	70	E/SE
17-Apr-06	Mon	cloudy	-	23.7	6	85	E
18-Apr-06	Tue	sunny/ cloudy/ moderate	-	25.3	6	90	W/NW
19-Apr-06	Wed	fine/ haze	-	25	35	90	E
20-Apr-06	Thu	cloudy/ moderate	0.2	23.9	9	90	E
21-Apr-06	Fri	fine/ moderate	-	25.3	3	95	S/SW
22-Apr-06	Sat	fine/ cloudy/ moderate	-	26.8	12	95	SE/S
23-Apr-06	Sun	sunny/ showers	-	24.4	30	95	E
24-Apr-06	Mon	cloudy/ moderate/ showers/ thunderstorms	109.4	23.8	35	95	E
25-Apr-06	Tue	rain/ mist/ sunny	Trace	22.6	25	70	E/SE

Appendix H

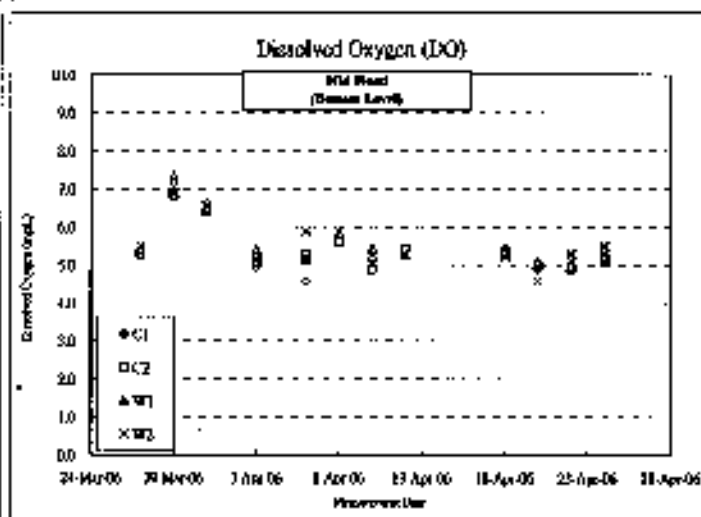
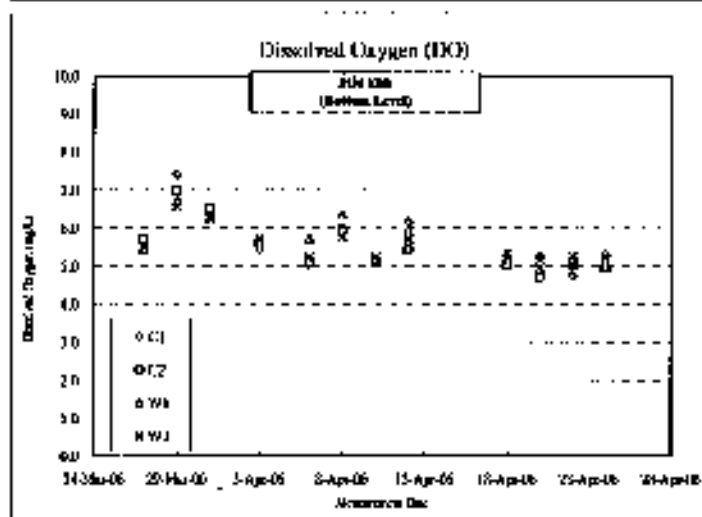
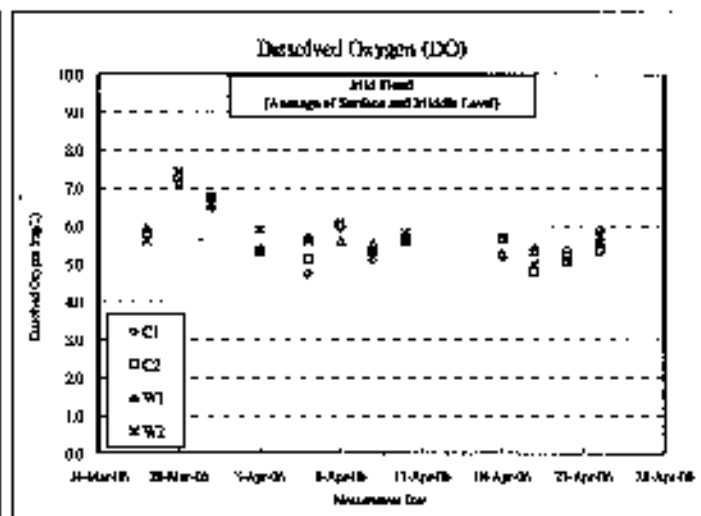
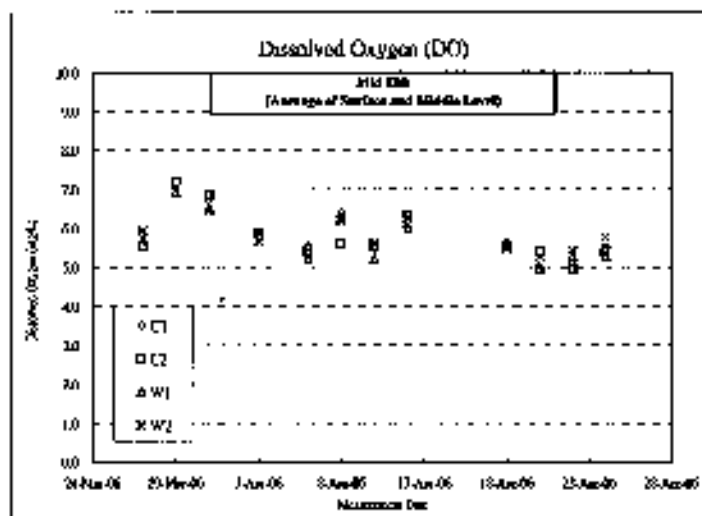
Marine Water Quality Monitoring Results

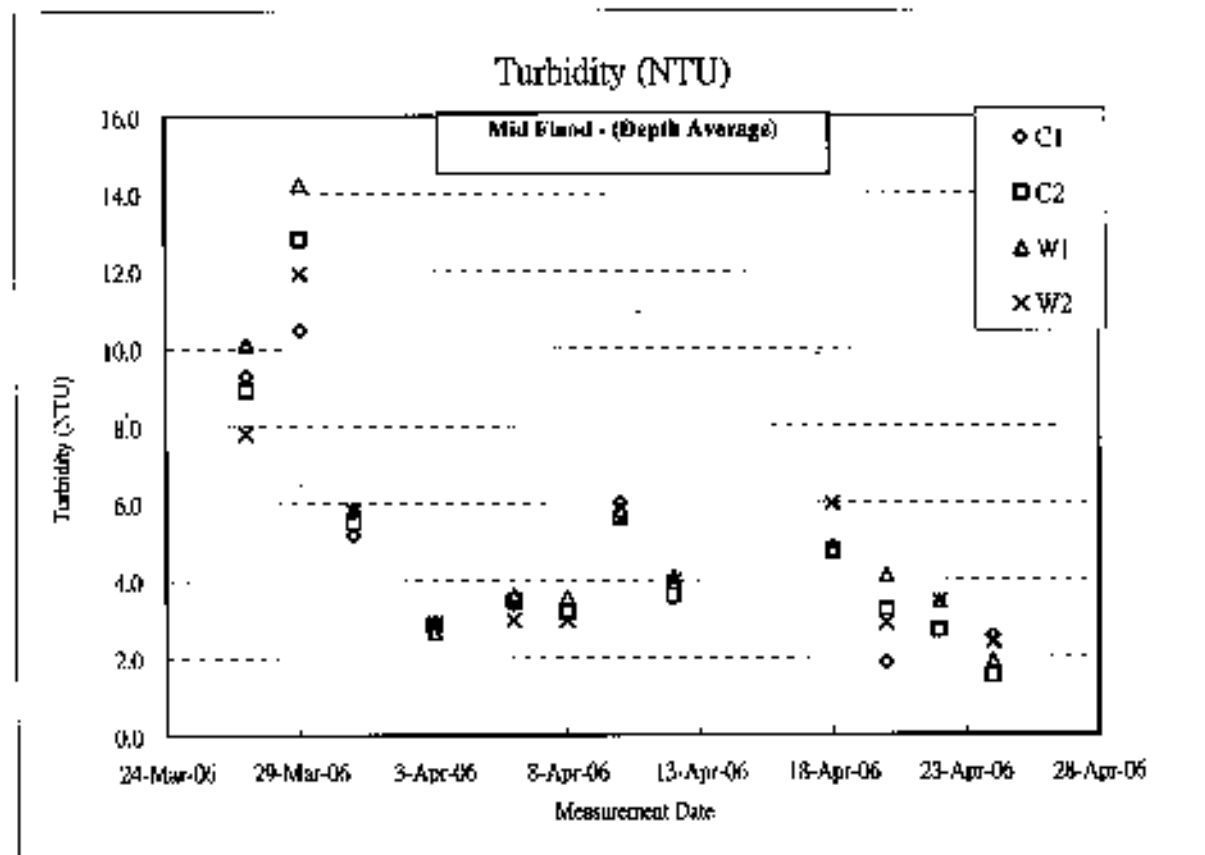
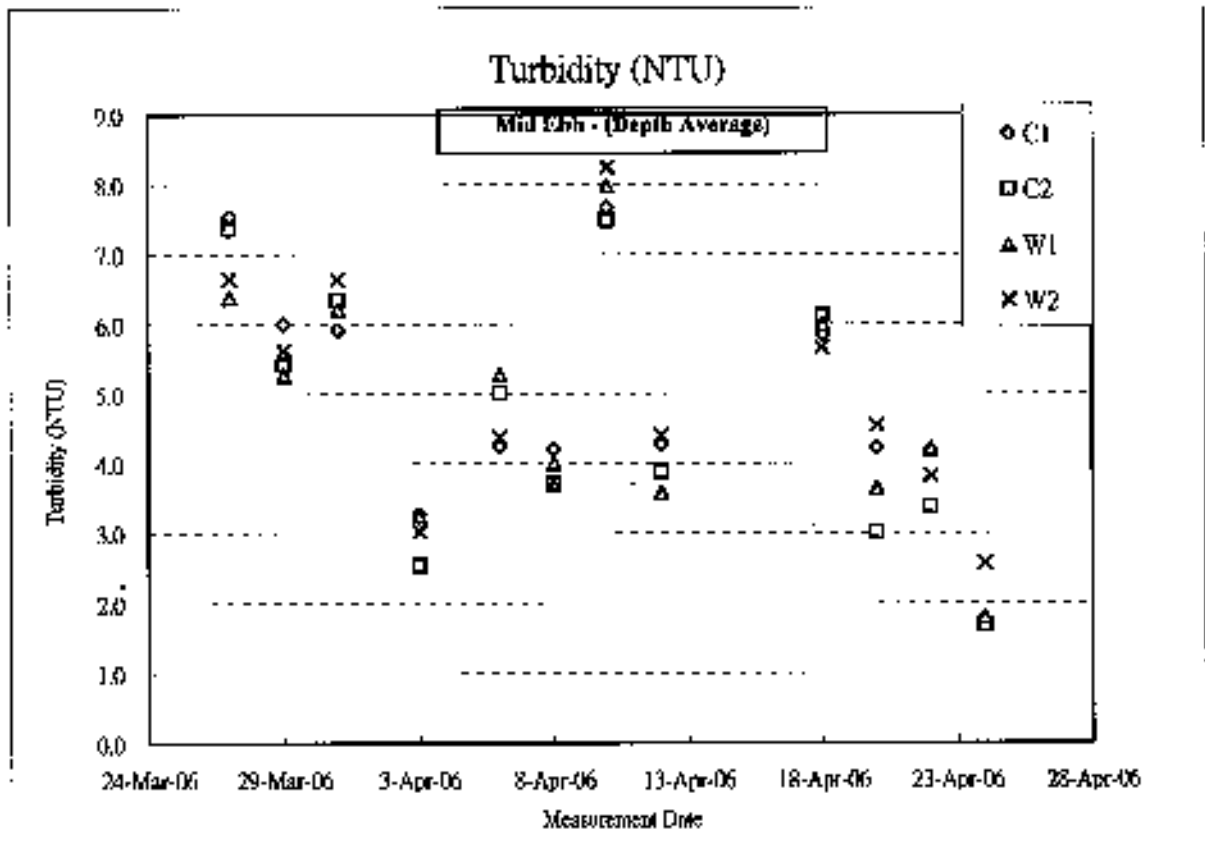
Sample ID		Year	Depth (ft)	Component (ppm)			DO (mg/L)			Turbidity (NTU)			SS (mg/L)			Ammonia (ppm)			Nitrate (mg/L)		
	Total Depth	Surf	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	

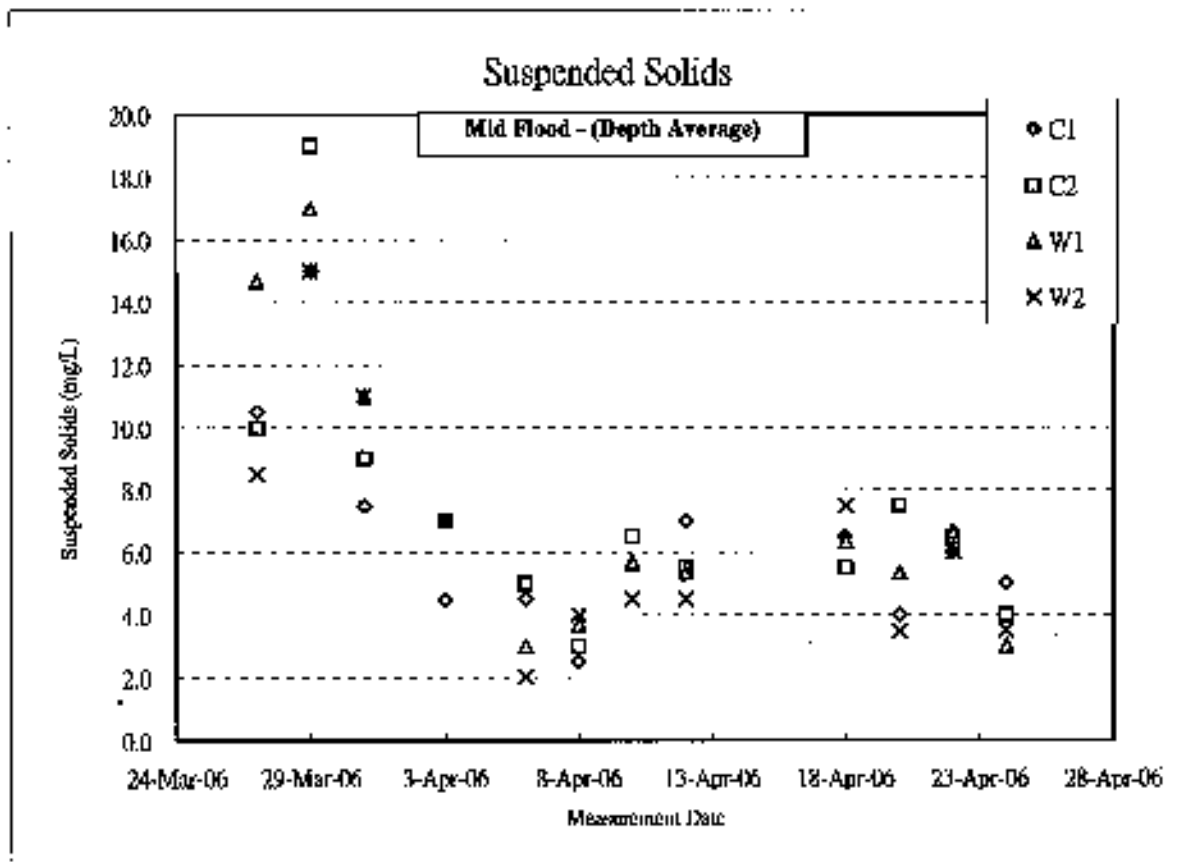
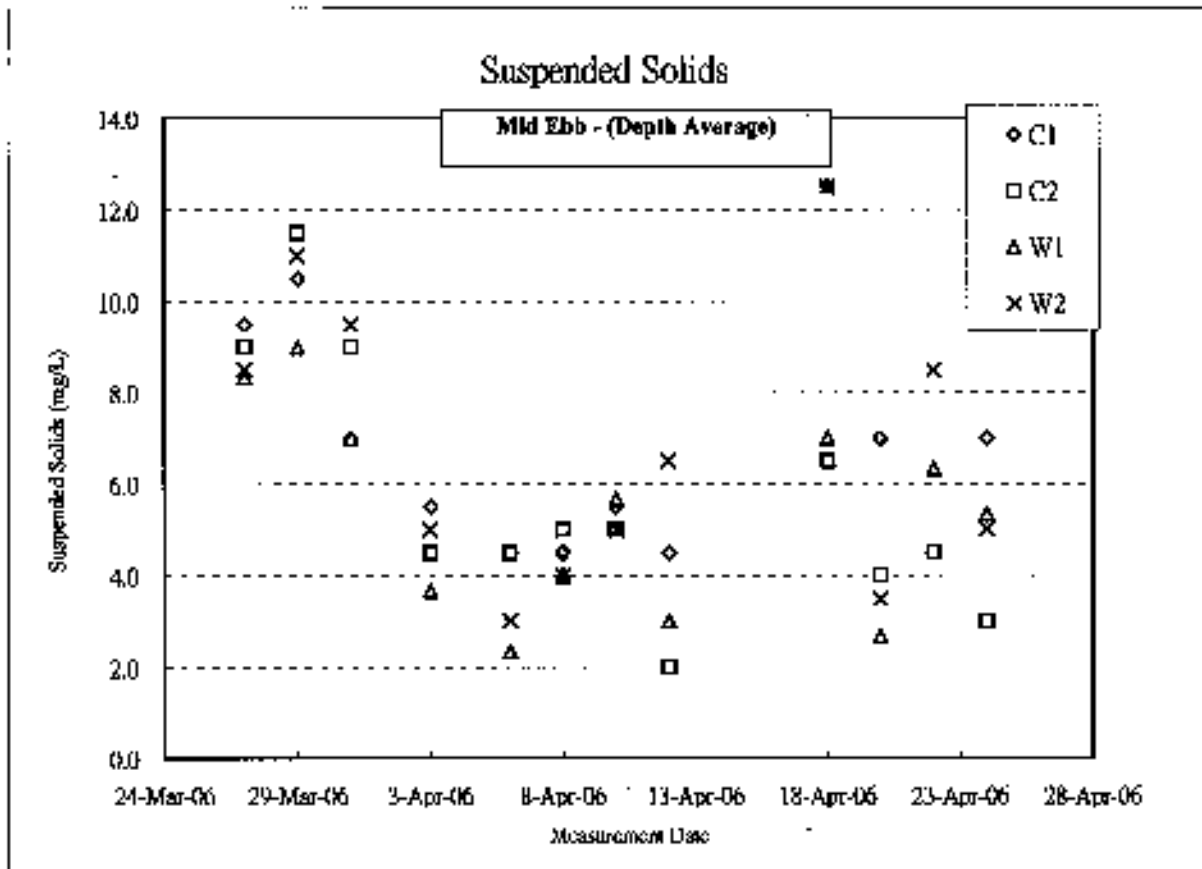
Sample ID		Year	Depth (ft)	Temperature (°C)			DO (ppm)			Turbidity (NTU)			SS (mg/L)			Ammonia (ppm)			Nitrate (mg/L)		
	Total Depth	Surf	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	MB (ppm)	MD (ppm)	ME (ppm)	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	
C1	5.5	Surf	2.5	2.5	2.5	1.2	1.2	1.2	4.1	4.1	4.1	5.0	5.0	5.0	0.07	0.07	0.07	0.00	0.00	0.00	

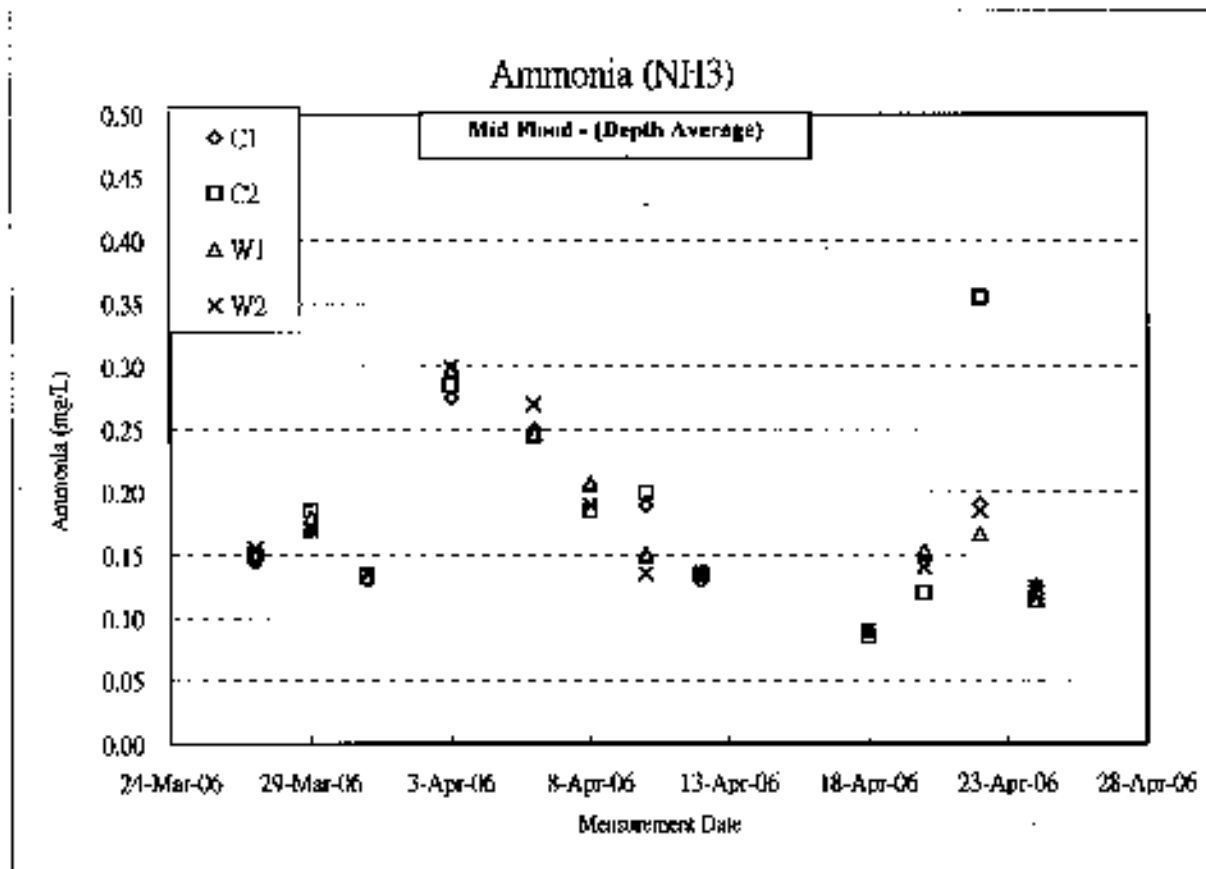
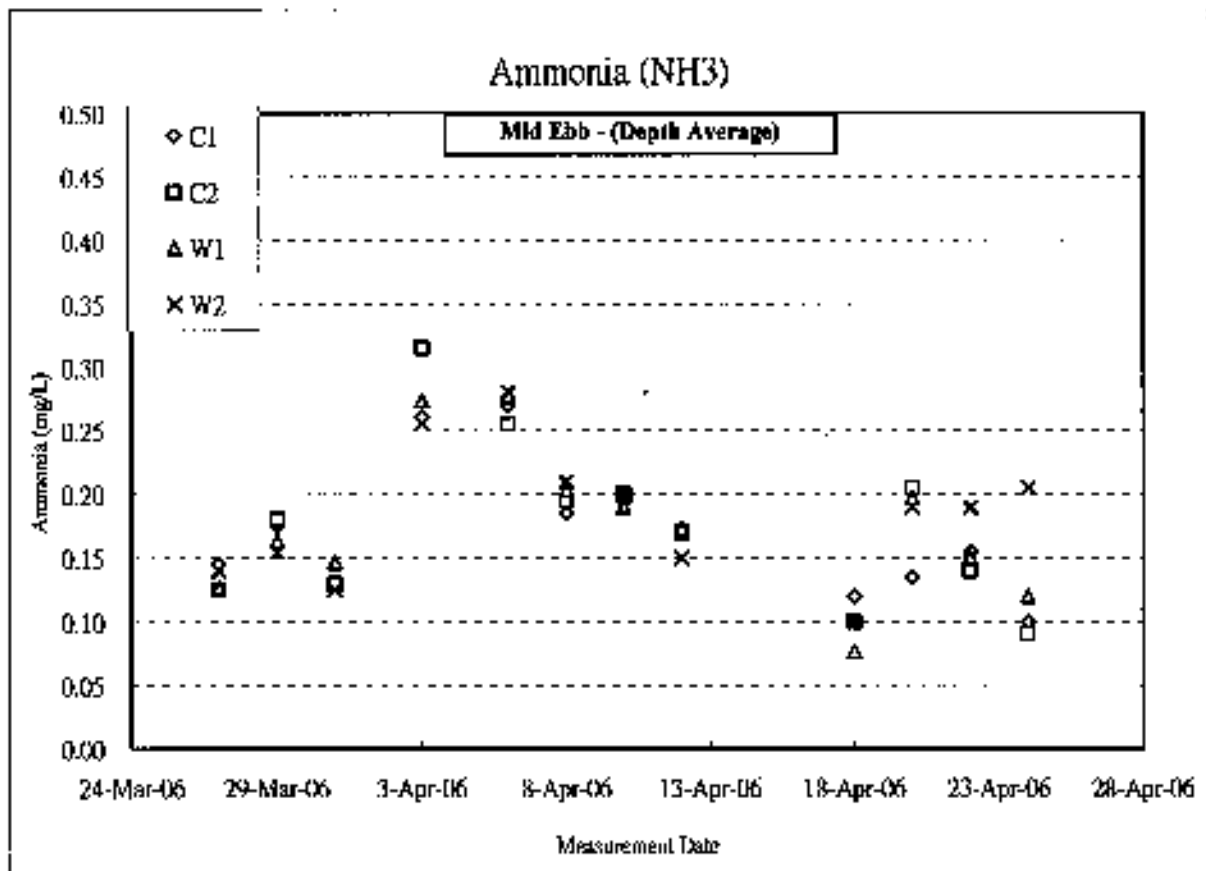
Appendix I

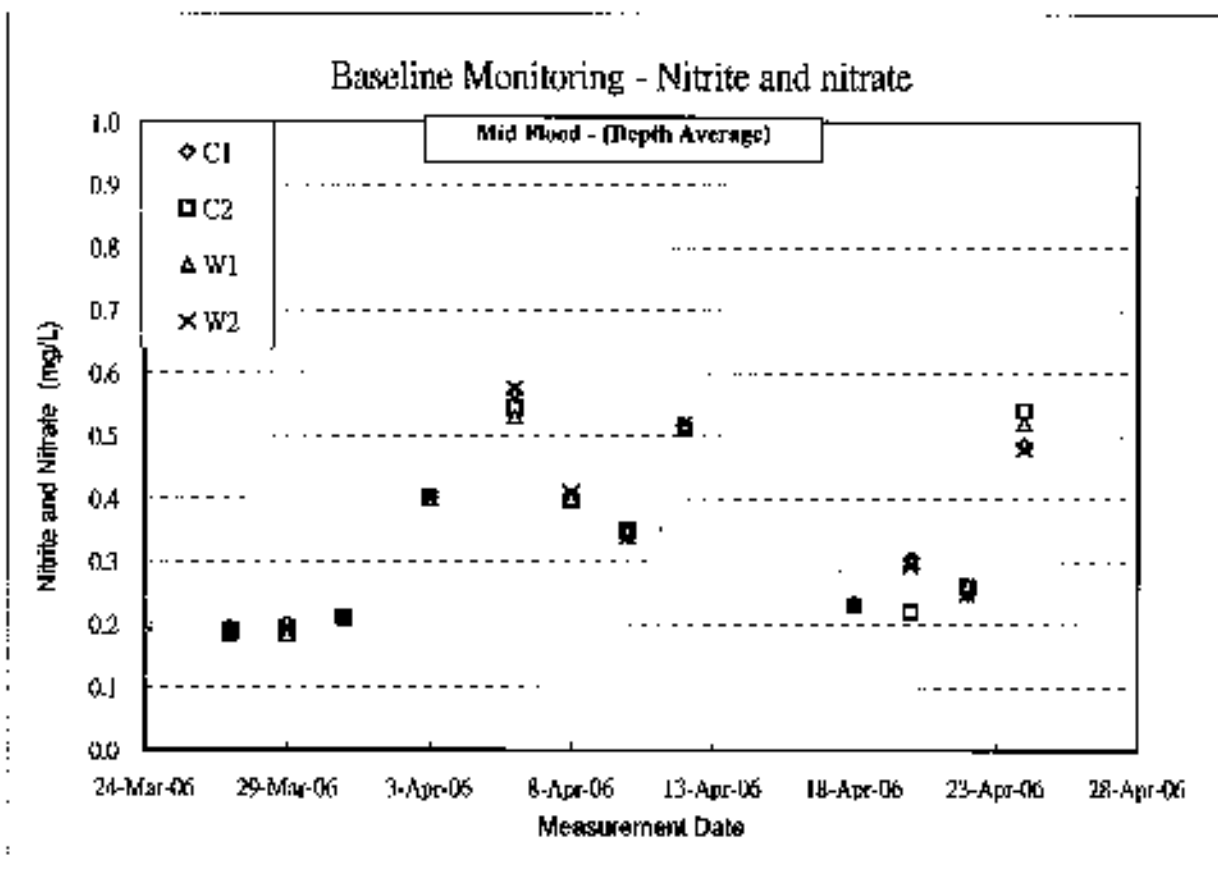
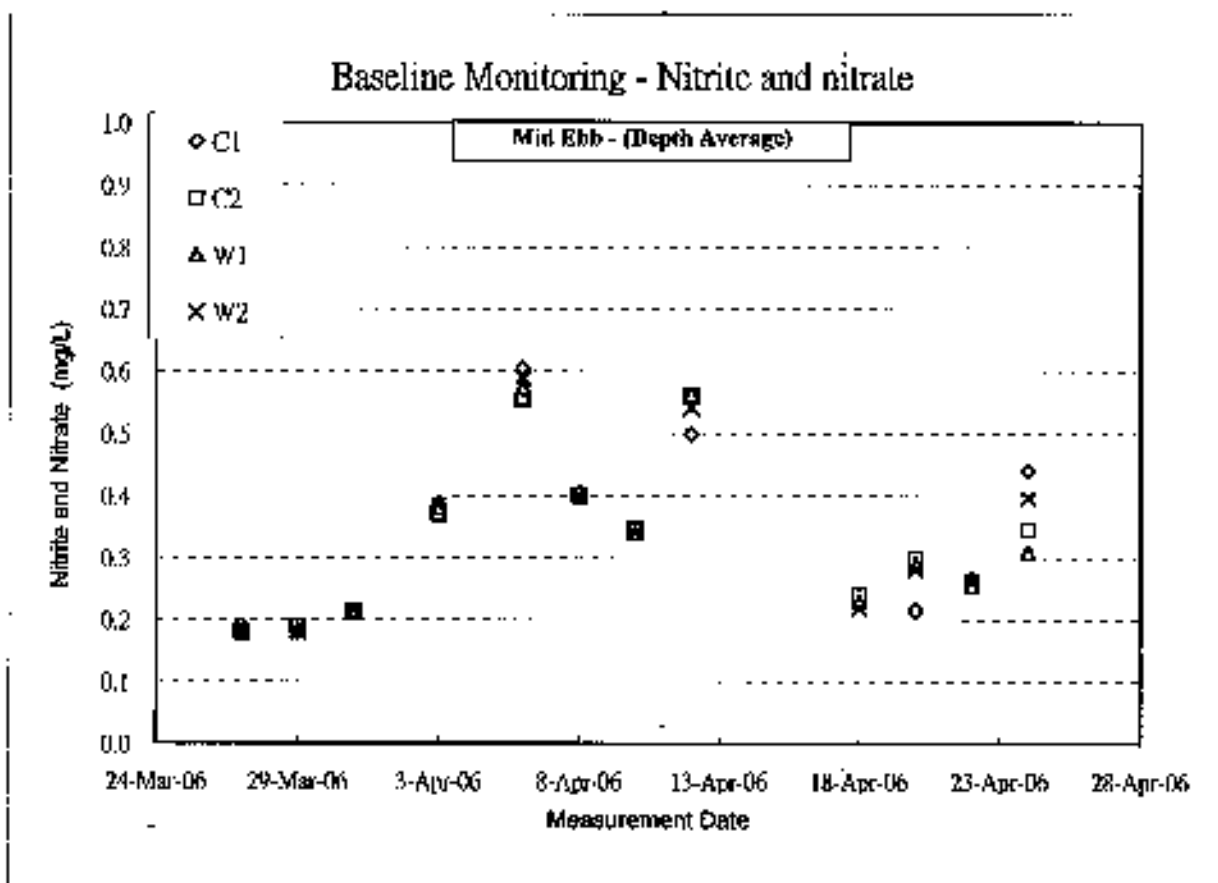
Graphical Plots of Water Monitoring Results

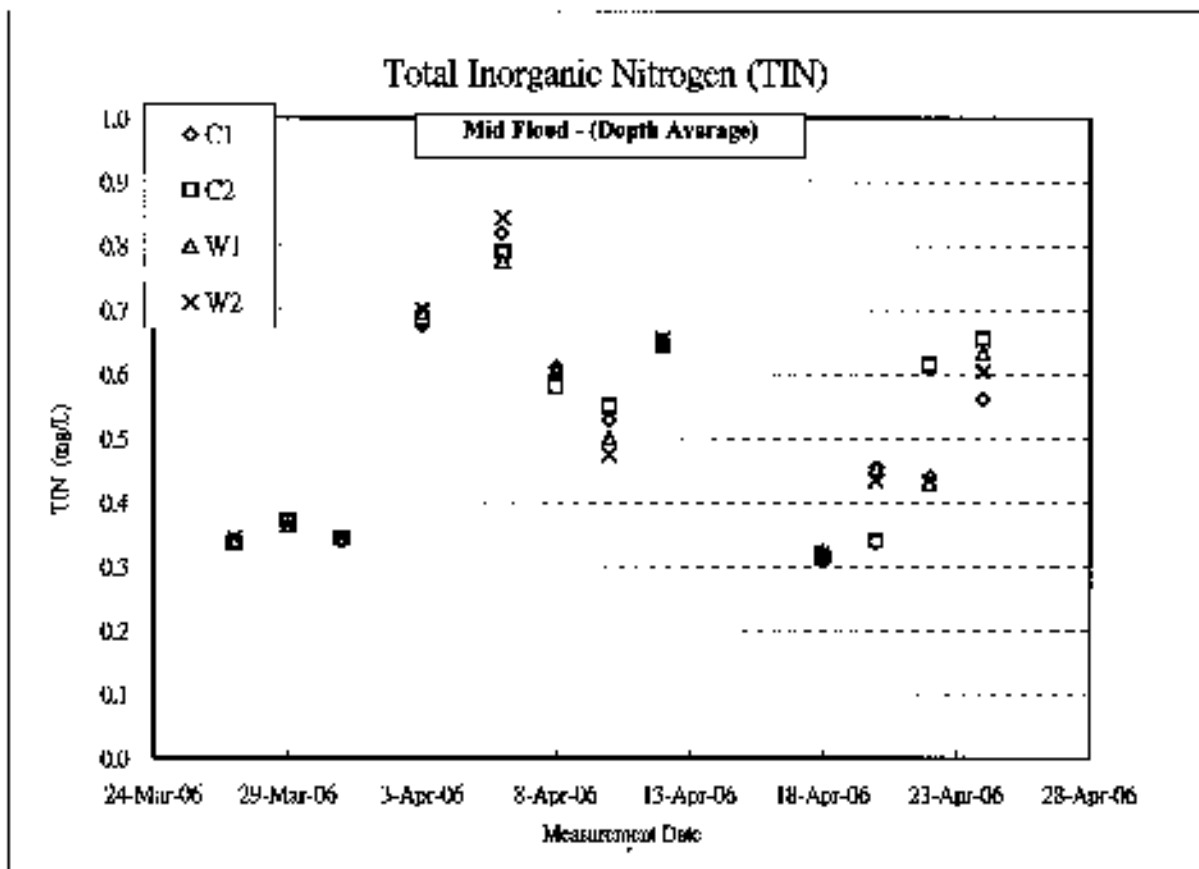
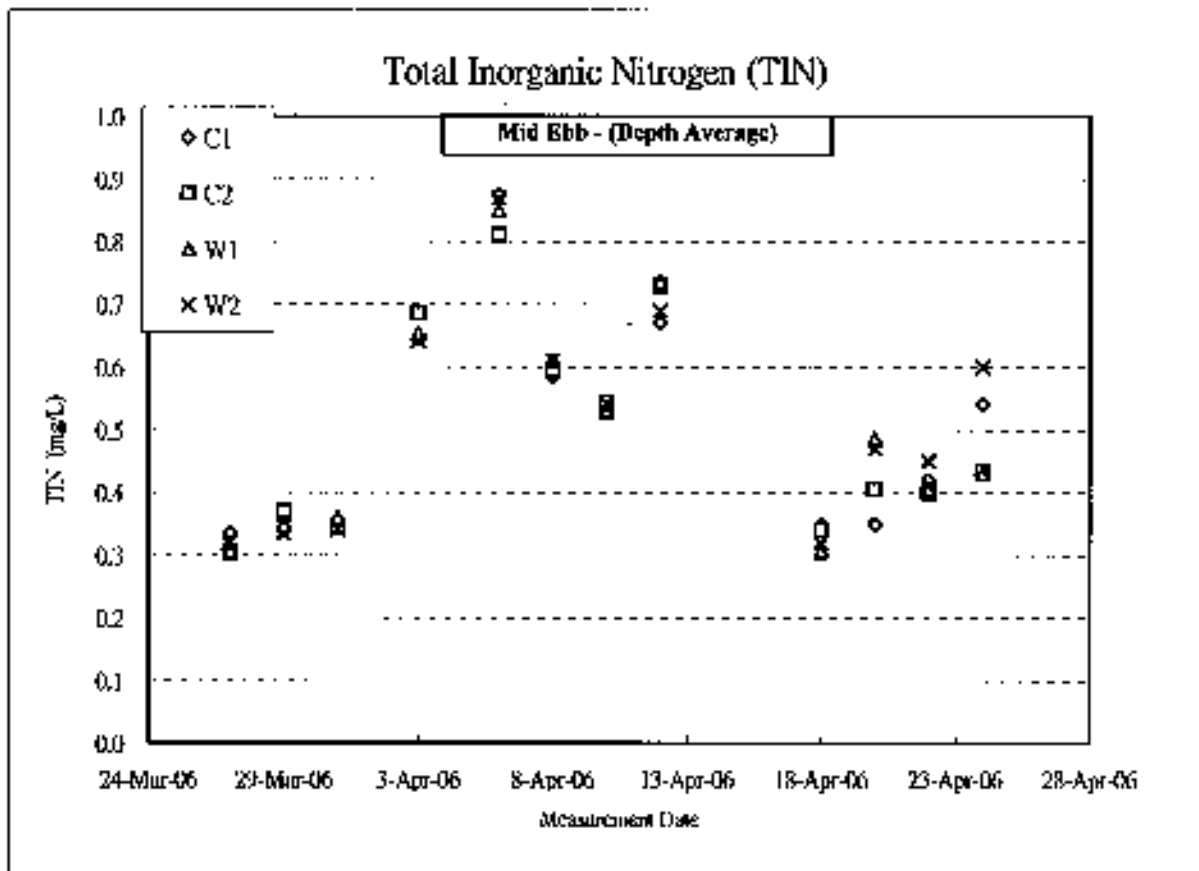






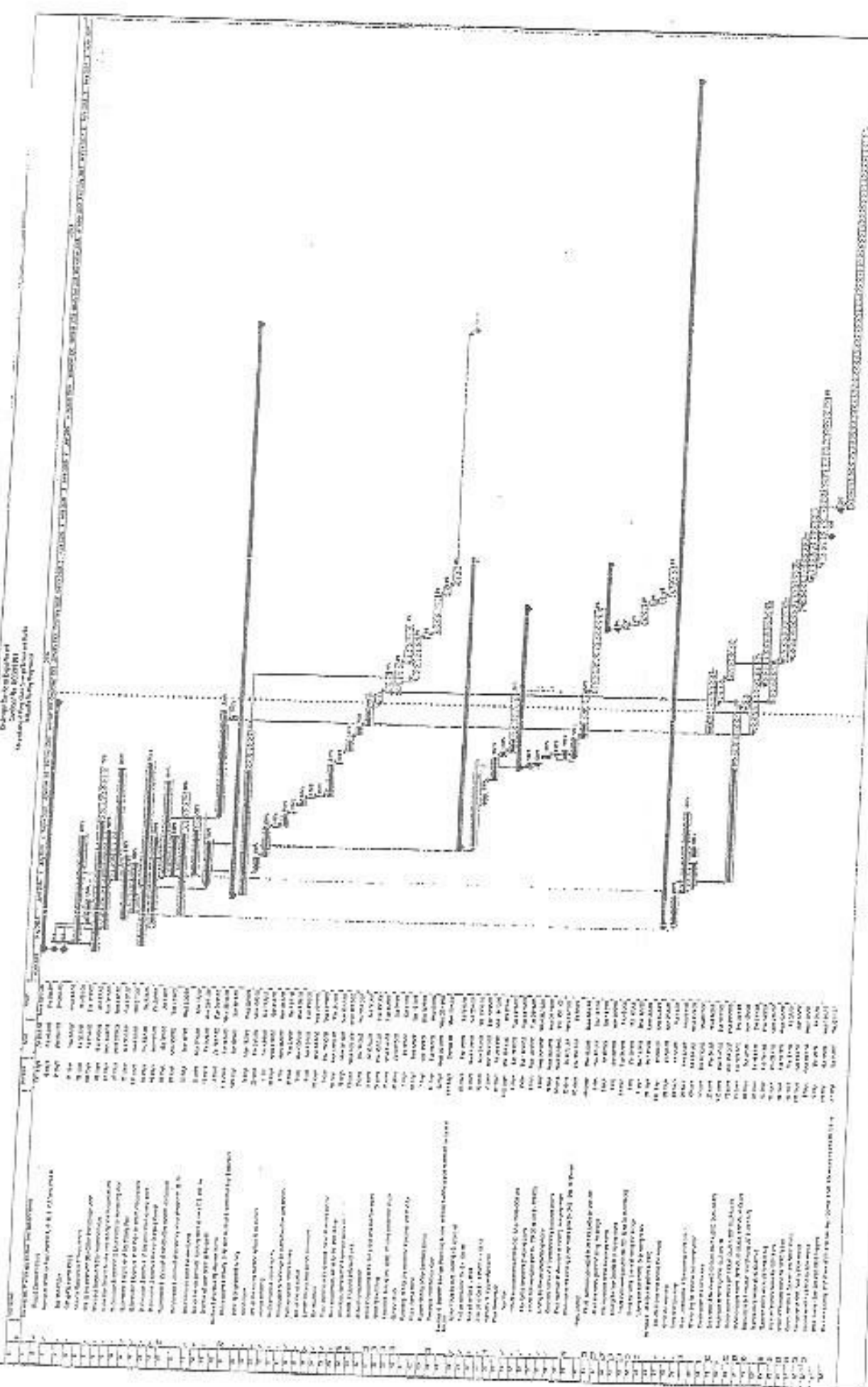






Appendix J
Three-Month Rolling Program

Design: See also Report of
 Mr. Howard C. Chey, 10/10/1911
 Howard C. Chey, Engineer



No. 1000
 Date: 10/10/1911
 Scale: 1/2" = 1'-0"
 Author: H. C. Chey
 Title: Design of a Pump
 Material: Cast Iron
 Weight: 150 lbs.
 Dimensions: 12" x 12" x 12"

To: Ben Tan From: Howard Chey