Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Environmental Monitoring and Audit

Baseline Monitoring Report

Report Authorized For Issue By:	For and on Behalf of Black & Veatch Hong Kong Limited

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Table of Content

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List of Appendix

List of Figure

List of Table

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Executive Summary

This baseline monitoring report prepared by the Environmental Team (ET) of Black & Veatch Ltd for baseline monitoring under the Environmental Permit No. EP-224/2005 (the EP) for the Project of "Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung. Under the requirements of Section 4 of the EP, EM&A programme as set out in the EM&A Manual is required to be implemented during the construction and operation phases of the Project.

Prior to the commencement of construction works, baseline of air quality, water quality and ecology monitoring that were performed in November and December 2005 in order to establish the background environmental conditions in the vicinity of the Project area. Based on the monitoring results, action and limit levels were determined.

14 sets of 1-hour TSP and 24-hour TSP monitoring were carried out on 29th November to 12th December 2005 for 14 days at Bungalow A (GCA B1) at Kau Sai Chau during the baseline monitoring according to the revised EM&A Manual. The average 1-hour TSP and 24-hour TSP levels at Bungalow A were in the range of 33.3-56.8 $\mu g/m^3$ and 56.4-147.2 $\mu g/m^3$ respectively. The 1-hour TSP and 24-hour TSP results were generally found to be staying in low to intermediate levels. The monitoring results and calculated action and limit levels are shown in Section 2 of this report.

12 sets of water quality monitoring at 9 marine and 7 freshwater stations were carried out on 26th Nov, 28th Nov, 30th Nov, 2nd Dec, 5th Dec, 7th Dec, 9th Dec, 12th Dec, 14th Dec, 16th Dec, 19th Dec and 21st Dec 2005. Water quality monitoring parameters including dissolved oxygen, temperature turbidity, suspended solids, pH, salinity, nitrate nitrogen, nitrite nitrogen, ammonia nitrogen, total phosphorus, chlorophyll a and other relevant data (such as water depth, monitoring time, tidal stages and weather condition) were recorded during the baseline monitoring. The monitoring results and calculated action and limit levels are shown in Section 3 in this report.

Baseline terrestrial ecology surveys were conducted on 16, 20 and 22 December 2005. The habitats within the project sites, in particular the three natural streams (Stream A, B, & C) remained natural and were of similar conditions as recorded during the EIA study. While the baseline marine ecology surveys were conducted 13, 19, 20 and 21 December 2005. Site B2, C, D2 and a Control Site were surveyed for corals while Site D3 was surveyed for seagrasses. The seagrass beds in Site D3 were found of smaller area and lower coverage percentage than those recorded during the EIA study. 20 hard corals of significant sizes and of good conditions were selected and tagged at each of the sites for coral monitoring. All 80 tagged corals were recommended to be monitored in the EM&A programme.

The landscape and visual site survey was carried on 26th Nov and 21st Dec 2005. During the period of the baseline monitoring, no major construction activity was carried out. The site situation is similar to the baseline characteristics during the EIA study. Section 5 is summarized the site survey in this report.

Data collected and details of all the locations were reviewed and analyzed to establish the Action and Limit Levels for air quality and water quality during impact/compliance monitoring. The benchmark of pre-construction freshwater and marine ambient conditions of the area has been established through baseline monitoring surveys. These together with EPD longer term marine monitoring data and EIA recommendations have been considered in determining the construction phase action and limit levels for impact monitoring purpose. Statistical analysis of the baseline marine and river water quality data was also performed and provided in the Section 3 of the report.

Details of the operation phase monitoring specified in the EM&A Manual should be subject to review taking into account findings of the construction impact monitoring. Such details should be reported in the monthly EM&A reports as the project progress.

The measured results of the monitoring parameters are considered representative of the pre-construction ambient conditions prior to the commencement of the works. In conclusion, the Contractor is advised to be aware of any site practice that may give rise to significant pollution to the existing environment. Implementation of necessary remedial measures should be instigated to rectify the potential impact on sensitive receivers located in the vicinity of the construction area.

1. Introduction

1.1 Background of the Project

1.1.1 China Harbour Engineering Co. (Group) (the Contractor) was commissioned by the Hong Kong Jockey Club to carry out the Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung. Black & Veatch was employed by the Hong Kong Jockey Club as Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project. Project location is at Kau Sai Chau, Port Shelter, Northeast New Territories east of Sai Kung. The Project is more closely defined as being on the east side of Kau Sai Chau immediately south of the existing public golf course (Figure 1.1).

1.1.2 The Project comprises the following (Figure 1.2):

- Construction of a third 18-hole public golf course on the east side of the island, south of the existing golfing area;
- A new irrigation lake to collect surface runoff from new 18-hole golf course. Water stored at the new irrigation lake can also be diverted to existing reservoir for tertiary treatment and recycling;
- A new desalination plant adjacent to the existing pier serve as an additional irrigation water supply for the new golf course during dry season; and
- Expansion of existing administration and maintenance buildings.

1.2 Objectives of EM&A programme

1.2.1 The construction and operation impacts resulting from the implementation of the Project are specified in the EIA Report. The EIA Report also specifies mitigation measures which need to be implemented to ensure compliance with the required environmental criteria. The EIA recommends that environmental monitoring will be necessary to assess the effectiveness of measures implemented to mitigate potential environmental impacts during construction of the Project. Regular environmental auditing during construction is also recommended to ensure that potential impacts are adequately addressed through the implementation of the mitigation measures defined in the EIA Report.

1.3 Project Organisation

1.3.1 Project organization and lines of communication are shown in Figure 1.3.

1.4 Structure of the Report

1.4.1 Following this introductory section, the report is set out as follows:

- Section 2 details the baseline air quality monitoring requirement s and results;
- Section 3 details the baseline water quality monitoring requirements, methodology results;
- Section 4 details the baseline ecology monitoring requirements, methodology and results;
- Section 5 Conclusion Landscape and Visual; and
- Section 6 Conclusion and Recommendations

2. AIR QUALITY

The baseline air quality monitoring will be conducted in accordance with the EM&A manual. Details are summarized below.

2.1 Air Quality Parameters

2.1.1 The air quality parameters include 1-Hour Total Suspended Particulates (1Hr-TSP) and 24-Hour Total Suspended Particulates (24-Hr TSP):

- 24-hour TSP level of samples will be collected using filters and High Volume Sampler and the collected samples will be determined by a local HOKLAS accredited laboratory upon receipt of the samples; and
- 1-hour TSP level will be performed in-situ.

2.2 Monitoring Equipment

2.2.1 High volume samplers (HVS - Model GS-2310 Accu-vol) complete with the appropriate sampling inlets were installed for 24-hour TSP sampling. The HVS is composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50 Appendix B). A portable dust meter was used for the 1-hour TSP monitoring. The table summarises the equipment used.

Table 2.1 Air Quality Monitoring Equipment

Equipment	Model
HVS Sampler	GS 2310 Accu-vol system
Calibrator	GMW 25
1-hour TSP Dust Meter	Laser Dust Monitor – Model LD-1 (L)

2.3 Monitoring Parameters, Frequency and Duration

2.3.1 Baseline monitoring shall be carried out to determine the ambient 1-hour and 24-hour TSP levels at the designated monitoring locations, as shown in Table 2.2, prior to the commencement of the Project works. During baseline monitoring, there shall not be any construction or dust generating activities in the vicinity of the monitoring stations.

2.3.2 TSP baseline monitoring shall be carried out for a continuous period of at least two weeks under typical weather conditions, with the 24-hour and three 1-hour ambient measurements taken daily at each monitoring location. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust producing sources shall also be recorded throughout the baseline monitoring period.

Table 2.2 Air Quality Monitoring Equipment

Monitoring station	Parameter	Frequency
GCA B1*	24-Hour TSP	Daily, for 14 consecutively days

Monitoring station	Parameter	Frequency
	1-Hour TSP	3 times (at three consecutive hours)/day, for 14 consecutive days

Remarks: * - Bungalow A, adjacent ot Kau Sai Chau Public Golf Course Administration Building

Table 2.3 Air Quality Monitoring Period

Location	Monitoring Period	
GCA B1	**1-Hour TSP**	**24-Hour TSP**
	29 Nov 2005 – 12 Dec 2005	29 Nov 2005 – 12 Dec 2005

2.4 Monitoring Methodology

24-hour TSP Monitoring

(i) Field Monitoring, Operation & Analytical Procedures

2.4.1 Operating/analytical procedures for the operation of HVS are as follows. The sampler was placed on a horizontal platform with appropriate supporting structure such that:

- the filter was at least 1.3 meters above ground;
- no two samplers should be placed less than 2 metres apart;
- the distance between the sampler and an obstacle, such as buildings, would be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 metres separation from walls, parapets and penthouses would be required for the rooftop samplers;
- a minimum of 2 metres separation from any supporting structure, measured horizontally would be required;
- airflow around the sampler would be unrestricted;
- no furnaces or incineration flues would be operating near the sampler;
- the sampler would be more than 20 metres from the dripline; and
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.

2.4.2 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m^3/min. and 1.4 m^3/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

2.4.3 For TSP sampling, fibreglass filters (G810) were used [Note: these filters have a collection efficiency of > 99% for particles of 0.3 mm diameter].

2.4.4 The power supply was checked to ensure the sampler worked properly.

2.4.5 On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.

2.4.6 The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.

2.4.7 The filter was aligned on the screen so that the gasket formed an air-tight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.

2.4.8 The shelter lid was closed and secured with the aluminum strip.

2.4.9 The timer was then programmed. Information was recorded on the record sheeting, which included the starting time, the weather condition, and the filter number (the initial weight of the filter paper can be found out by using the filter number).

2.4.10 After sampling, the filter was transferred from the filter holder of the HVS to a sealable plastic bag and sent to the laboratory for weighing. The elapsed time was also recorded.

2.4.11 Before weighing, all filters were conditioned for 24 hours before weighing under temperature of 25°C ±3°C and the relative humidity (RH) < 50% ±5%, preferably 40%. *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes.

(ii) Maintenance

2.4.12 Proper maintenance would be provided for the HVS as follows:

- The HVS motors and their accessories have been properly maintained. Appropriate maintenance such as routine motor brushes replacement (time interval for replacement is about 500 hours) and electrical wiring checking have been conducted to ensure that the equipment and necessary power supply were in good working condition.
- Initial calibration of HVS was conducted upon installation of equipment. The subsequent calibration would be provided at 2-month intervals using GMW-25 Calibration Kit.

1-hour TSP Monitoring

(i) Measuring Procedures

2.4.13 The measuring procedures of the 1-hour dust meter have been in accordance with the Manufacturer's Instruction Manual as follows:

- Set POWER to "ON", push BATTERY button, make sure that the meter's indicator is in the range with a red line and allow the instrument to stand for about 3 minutes (Then, the air sampling inlet has been capped).
- Push the knob at MEASURE position.
- Push "O-ADJ" button. (Then meter's indication is 0).
- Push the knob at SENSI ADJ position and set the meter's indication to S value described on the Test Report using the trimmer for SENSI ADJ.
- Pull out the knob and return it to MEASURE position.
- Push "START" button.
- All measurement procedures in section 2.3 of the approved EM&A Manual are followed during the reporting period.

(i) Maintenance

2.4.14 The 1-hour TSP meter would be checked at 3-mnth intervals and calibrated at 1-year intervals throughout all stages of the air quality baseline monitoring.

2.3 Results and Observations

2.5.1 The baseline air quality monitoring results for GCA B1 are summarized in Table 2.4. Monitoring data and graphical presentation of the 1-hour and 24-hour TSP monitoring results are presented in Appendix C.

Table 2.4 Summary of Baseline Air Quality Monitoring Results

Location	Average 1-hour TSP concentration, µg/m³ (Range)	Average 24-hour TSP concentration, µg/m³ (Range)
GCA B1	41.9 (33.3-56.8)	88.3 (56.4-147.2)

2.5.2 The weather condition during the monitoring periods was general fine. No major dust impacts were identified since there was no construction work around the monitoring stations during the baseline monitoring. Dust monitoring data from the air quality monitoring station can, therefore, be used as background indicator at Kau Sai Chau.

2.5 Action and Limit Levels

2.5.1 The Action and Limit Levels have been set in accordance with the Environmental Monitoring and Audit Manual, which states as following table.

Table 2.5 Action and Limit Levels for Air Quality

Parameter	Action Level (1)	Limit Level
TSP (24 hour average)	▪ BL ≤ 200 µg m^{-3}, AL = (BL * 1.3 + LL)/2 ▪ BL > 200 µg m^{-3}, AL = LL	260 µg m^{-3}
TSP (1 hour average)	▪ BL ≤ 384 µg m^{-3}, AL = (BL * 1.3 + LL)/2 ▪ BL > 384 µg m^{-3}, AL = LL	500 µg m^{-3}

(1) BL = Baseline level, AL = Action level, LL = Limit level.

2.5.2 Following these criteria, the Action and Limit Levels for air quality have been set as follows:

Table 2.6 Derived Action and Limit Levels for 24-hour and 1-hour TSP

Parameter	Location	Action Level	Limit Level
TSP (24 hour average)	GCA B1	(88.3 * 1.3 + 260) / 2 = **187.4 µg m^{-3}**	260 µg m^{-3}
TSP (1 hour average)	GCA B1	(41.9 * 1.3 + 500) / 2 = **277.2 µg m^{-3}**	500 µg m^{-3}

3. WATER QUALITY

3.1 Monitoring Requirements

3.1.1 In accordance with the EM&A manual, baseline of dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity at 7 freshwater water quality monitoring stations and 9 marine water quality monitoring stations during construction phase were established. In addition to the above parameters, water quality monitoring parameters also include nitrate nitrogen (NO_3-N), nitrite nitrogen (NO_2-N), ammonia nitrogen (NH_3-N), total phosphorus (TP) and selected pesticides parameters. Baseline water quality monitoring at designated locations, at a frequency of 3 days per week, for consecutive weeks prior to commencement of works.

3.2 Monitoring Equipment

3.2.1 The parameters of dissolved oxygen, temperature, turbidity, pH and salinity were measured in-situ and the suspended solids were analysed in a HOKLAS accredited laboratory. The water quality monitoring equipment deployed is described in Table 3.1.

Table 3.1Discrete Water Quality Monitoring Equipment

Equipment	Model
Multi-meter	YSI 6920
Water Sample	Wildco Alpha Water Bottle (Vertical)

3.3 Monitoring Parameters, locations, Frequency and Duration

3.3.1 For marine water quality, measurements shall be taken at both mid-flood and mid-ebb tides and at three water depths (1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted). Should the water depth be less than 3 m, only the mid-depth station will be monitored.

3.3.2 For the stream course, measurements shall be taken at mid-water depth.

3.3.3 The water quality parameters which need to be monitored are as follows:

- Marine water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity
- Stream water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS) and pH

3.3.4 Additional marine and stream water quality monitoring parameters for the baseline monitoring also include nitrate nitrogen (NO_3-N), nitrite nitrogen (NO_2-N), ammonia nitrogen (NH_3-N), total phosphorus (TP) and Chl-a.

3.3.5 In association with the water quality parameters, relevant data including monitoring location/position, time, weather conditions, and any special phenomena shall also be measured.

3.3.6 Measurements shall be taken at all designated monitoring locations including control stations, 3 days per week, for a period of 4 consecutive weeks prior to commencement of works. The interval between of monitoring shall not be less than 36 hours. The purpose of the baseline monitoring is to establish ambient conditions without any discharge from the Project.

3.3.7 There shall be no construction works in the vicinity of the stations during baseline monitoring.

3.4 Monitoring Locations

3.4.1 The water monitoring locations (Figure 3.1) are summarized in Table 3.2.

Table 3.2 Water Quality Monitoring Locations and Parameters for Baseline Monitoring

Identification Number	Location	Approx. water depth	Co-ordinates		Monitoring parameters
Marine Water (9 stations)			**latitude**	**longitude**	
TTC	Tai Tau Chau Fish Culture Zone	9.5 m	22° 22' 03.7"	114° 19' 19.6"	**In-Situ: DO, Temp., Turbidity, pH and Salinity** **Laboratory testing: SS, NO_3-N, NO_2-N, NH_3-N, TP and Chl-a.**
KLW	Kai Lung Wan Fish Culture Zone	13 m	22° 22' 10.6"	114° 18' 01.4"	
KS	Kau Sai Fish Culture Zone	11 m	22° 20' 26.5"	114° 18' 59.9"	
M_BP	Temporary barging point	9.6 m	22° 21' 50.6"	114° 19' 16.7"	
M_RO1	Desalination plant south of the existing pier	5 m	22° 21' 51.8"	114° 18' 17.7"	
M _ Marsh	Discharge point at the existing marsh	7.7 m	22° 22' 19.8"	114° 19' 05.4"	
M _ Coral	Marine water of Port Shelter	10.2m	22° 21' 21.3"	114° 19' 42.7"	
M _ A	Water Control Station of Port Shelter	7.5 m	22° 22' 51.3"	114° 18' 34.5"	
M _ B	Water Control Station of Port Shelter	16.5 m	22° 20' 26.4"	114° 20' 11.8"	
Fresh Water (7 stations)					
F_UA F_DA	Upstream and downstream of stream A	-	22° 21' 32.3" 22° 21' 33.5"	114° 19' 06.5" 114° 19' 06.8"	
F_UB F_DB	Upstream and downstream of stream B	-	22° 21' 23.9" 22° 21' 27.2"	114° 19' 16.1" 114° 19' 16.0"	
F_UC F_DC	Upstream and downstream of stream C	-	22° 21' 14.8" 22° 21' 03.5"	114° 19' 26.4" 114° 19' 32.0"	
F _ Inland M	Downstream of the existing marsh (Inland)	-	22° 22' 17.9"	114° 18' 59.1"	

3.5 Monitoring Methodology

3.5.1 Dissolved oxygen (DO), temperature, turbidity, pH and salinity were measured in situ at the designated water quality monitoring stations. General observation, weather conditions, with the sampling time, date and location were marked on the field record sheet.

3.5.2 Water samples were taken from each monitoring station for laboratory analysis. The sample identification number, sampling location, data, time, project name and parameter for analyses were required to label on all sampling bottles.

3.5.3 The samples were placed in a cooler with ice (to 4°C without being frozen) and kept away from sunlight. Samples were submitted to a Hong Kong Accreditation Scheme (HOKLAS) or other international accredited laboratory for analysis within 24 hours of sampling.

3.6 Maintenance / Calibration

Calibration of In-Situ Instruments

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

Laboratory Analysis

3.6.2 All laboratory work were carried out by ALS Technichem Pty Ltd (HOKLAS accredited laboratory). Water samples of about 3 bottles of (1,000 ml x 1, 250 ml x 1 brown bottle and 100 ml x 1 sulfuric preserved) were collected at the monitoring and control stations for carrying out the laboratory determinations. The determination work will be start within 24 hours after collection of the water samples. The analyses shall follow the standard methods according to APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, or an equivalent method approved by EPD.

Table 3.3 Analytical Methods to be applied to Water Quality Samples

Determinant, unit	Standard Method	Reporting Limit
Suspended Solids	APHA 2540 D	2 mg/L
Nitrate Nitrogen	APHA 4500-NO_3^-	0.01 mg/L
Nitrite Nitrogen	APHA 4500-NO_2^-	0.01 mg/L
Ammonia Nitrogen	APHA 4500-NH_3(D)	0.01 mg/L
Total phosphorus	ASTM D515-88B	0.02 mg/L*
Chlorophyll a	APHA 10200 H2 &3	0.5 µg/L

Remarks: The detection limit for TP has been revised to 0.02 mg/L after reviewing the baseline data.

3.7 QA/QC Procedure

3.7.1 ALS Technichem Pty Ltd. has comprehensive quality assurance and quality control programmes. For QA/QC procedures of parameters, one duplicate sample was analysed for every batch of 20 samples as required by HOKLAS.

3.8 Results and Observations

3.8.1 Baseline stream and marine water quality monitoring were carried out 3 days per week for 4 weeks prior to commencement of works from 26 November 2005 to 21 December 2005. Baseline monitoring results are presented in Appendices C & D.

3.8.2 The weather condition during the baseline monitoring period is generally fine. No major water pollution source during the baseline monitoring period.

3.8.3 Baseline marine water quality monitoring data is compared with the EPD monitoring data (2003 and 2004) at Port Shelter (PM4 and PM9 are the nearest stations to the proposed third golf course at Kau Sai Chau) and presented in Appendix F. In general, baseline marine water quality monitoring parameters of salinity, DO (surface + middle), DO (bottom), pH, suspended solids and total inorganic nitrogen are very similar to EPD dry season monitoring data in 2003 and 2004. The average values of turbidity, ammonia nitrogen and chlorophyll a (EPD dry season

monitoring data in 2003 and 2004) are comparatively higher than the baseline water quality monitoring data.

3.8.4 For total phosphorus, the entire baseline monitoring results is undetectable. For nitrite nitrogen, approximate 78% monitoring results are also undetectable. However, the average values of nitrite nitrogen, nitrate nitrogen and total phosphorus (EPD dry season monitoring data in 2003 and 2004) are comparatively lower than the baseline water quality monitoring data. The baseline water qualities for these parameters represent a worse case scenario in this report. Although these parameters are detected below their detection limits in most of the time during the whole baseline monitoring period, reported concentrations are also same as the detection limit. In real situation, those values should below their detection limits.

3.8.5 Control stations are necessary to compare the water quality from potential impacted sites with the ambient water quality. Control stations shall be located within the same body of water as the impact monitoring stations but shall be outside the area of influence of the works, and as far as practicable, not affected any other works. M_A and M_B were the established marine control stations to demonstrate the ambient water quality and natural/seasonal variation in Port Shelter which was outside the impact zone of the project. The action and limit levels shall be reviewed during the operation phase and make reference to the monitoring data of control stations during construction phase is necessary.

3.8.6 Tentative impact monitoring programme is based on the tentative construction programme provided by Contractor (Appendix H) and summarizes as follows table.

Table 3.4 Tentative Stream and Marine Impact Monitoring Programme (Construction Phase)

Major construction activities	Tentative construction period	Tentative monitoring period	Monitoring parameter	Monitoring Locations
Cut & Fill for Holes (1-18)	Jan 2006 to Feb 2007	Approx. 12 months	DO, Temp., Turbidity, pH, Salinity & SS.	All
Turf establishment	First phase: July to Sept 2006. Second phase: May to Jul 2007	During the turf establishment period where the permanent low flow drainage system is not yet completed.	DO, Temp., Turbidity, pH, Salinity, SS, NO_3-N, NO_2-N, NH_3-N, TIN, TP and selected pesticides#	*
Dredging for RO pipelines	Mid-Feb to Apr 2006	Approx. 1.5 months	DO, Temp., Turbidity, pH, Salinity & SS.	M_RO1, KLW, M_A, M_B
General works (minor)	Jan 2006 to Jul 2008	Whole construction period	DO, Temp., Turbidity, pH, Salinity & SS.	All

Remarks:
The action and limit level for each parameter is the same as shown in Tables 3.10 & 3.11.
* - There is no detail information from Contractor on the turf establishment programme. Monitoring location(s) will be selected by the application of nutrients/pesticides areas and quantity to the nearest stream/marine impact monitoring station(s). The nearest station(s) will be selected for monitoring. The monthly EM&A programme shall report the actual application and usage of nutrient and pesticides for the justification of monitoring locations during construction phase.
# - For M_RO1, monitoring parameters shall exclude nutrients and selected pesticides as it is outside the impact zone of the new turf establishment area.

3.8.7 The action and Limit levels have been set in accordance with the Environmental Monitoring and Audit Manual, which states in the following table.

Table 3.5 Derivation of Action and Limit Levels for Stream and Marine Waters

Parameters	Action	Limit
DO in mg L^{-1} (Surface, Middle & Bottom)	**Marine Water** Surface and Middle 5 percentile of baseline data for surface and middle layer Bottom 5 percentile of baseline data for bottom layer	**Marine Water** Surface and Middle 1 percentile of baseline data for surface and middle layer or 5 mg/L for FCZs Bottom 1 percentile of baseline data for bottom layer or 2 mg/L for FCZs
DO in mg L^{-1} (mid-depth)	**Inland Water** 5 percentile of baseline data	**Inland Water** 4 mg/L
pH (depth-averaged)	N/A N/A	**Inland Water** 6.0 - 9.0 **Marine Water** 6.5 - 8.5
SS in mg L^{-1} (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Turbidity in NTU (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Salinity in ppt (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Ammonia Nitrogen (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Nitrate Nitrogen (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Nitrite Nitrogen (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
TIN in mg L^{-1} (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data
Total Phosphorus in mgL^{-1} (depth-averaged)	95 percentile of baseline data	99 percentile of baseline data

3.8.8 Tables 3.6 a-m and 3.7 a-l present the average value, minimum and maximum for baseline marine water monitoring results (9 monitoring stations) and river water quality monitoring results (7 monitoring stations) respectively.

Table 3.6a – Marine Water Quality - Average, minimum and maximum values for water depth

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Water Depth (m)	Average	5.0	13.1	7.5	7.7	9.7	9.6	10.2	16.5	11.3
	Min	4.3	12.5	7.2	7.2	9.3	8.5	9.2	15.3	9.3
	Max	5.8	13.9	8.2	8.5	10.0	10.4	11.0	18.0	12.8
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Water Depth (m)	Average	5.0	13.4	7.5	7.8	9.5	9.7	10.2	16.4	11.0
	Min	4.0	12.6	6.3	7.2	8.8	9.2	8.9	15.1	9.8
	Max	5.8	13.9	7.9	8.3	10.1	10.3	11.1	17.8	12.5
Tidal Average		5.0	13.2	7.5	7.8	9.6	9.7	10.2	16.5	11.2

Table 3.6b – Marine Water Quality - Average, minimum and maximum values for water temperature

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Temp. (^{o}C)	Average	20.8	20.7	20.3	20.4	20.4	20.4	20.5	20.6	20.8
	Min	17.5	17.7	16.7	17.5	17.3	17.3	17.2	17.2	17.7
	Max	23.4	23.2	23.1	23.3	23.4	23.2	23.3	23.1	23.2
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Temp. (^{o}C)	Average	20.8	20.6	20.4	20.4	20.4	20.5	20.6	20.7	20.9
	Min	17.5	17.1	16.8	17.3	17.3	17.5	17.5	17.2	17.7
	Max	23.5	23.4	23.5	23.5	23.7	23.5	23.7	23.6	23.5
Tidal Average		20.8	20.8	20.4	20.4	20.5	20.5	20.6	20.7	20.9

Table 3.6c – Marine Water Quality - Average, minimum and maximum values for Salinity

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Salinity (ppt)	Average	32.8	33.0	33.0	33.1	33.1	33.2	33.2	33.4	33.4
	Min	28.3	28.8	32.2	32.1	32.1	32.1	27.5	32.0	31.9
	Max	34.2	34.4	34.0	34.0	34.0	34.0	34.0	33.9	34.0
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Salinity (ppt)	Average	32.8	33.0	32.6	32.9	33.1	32.9	33.2	33.4	33.5
	Min	28.5	32.2	22.3	30.2	32.1	24.1	25.7	32.4	32.0
	Max	34.3	34.2	34.1	34.2	34.3	34.2	34.2	34.3	34.3
Tidal Average		32.8	33.0	32.8	33.0	33.1	33.1	33.2	33.4	33.5

Table 3.6d – Marine Water Quality - Average, minimum and maximum values for Dissolved Oxygen

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
DO (mg/L) Surface & Middle	Average	7.1	7.1	7.0	7.1	7.0	7.1	7.0	6.9	6.9
	Min	5.2	6.1	5.6	6.2	5.3	6.2	5.8	5.7	6.1
	Max	8.7	8.2	8.1	8.3	8.3	8.4	8.4	8.5	8.4
Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
DO (mg/L) Bottom	Average	7.0	7.0	7.3	7.1	7.0	7.1	7.0	6.9	6.9
	Min	5.1	6.2	6.4	6.3	6.5	6.2	5.9	5.9	6.3
	Max	8.6	8.3	8.3	8.4	8.4	8.0	8.2	8.0	8.4
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
DO (mg/L) Surface & Middle	Average	7.2	6.9	7.0	7.0	6.9	7.0	7.0	7.0	6.8
	Min	5.6	5.1	5.3	6.2	6.1	6.0	5.8	6.1	5.7
	Max	8.3	8.3	8.3	8.4	8.2	8.2	8.3	8.4	8.1
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
DO (mg/L) Bottom	Average	7.3	6.9	7.2	6.9	7.0	7.0	7.0	7.0	6.8
	Min	5.9	5.3	6.2	6.2	6.1	5.9	5.8	6.0	5.8
	Max	8.4	8.0	8.2	8.1	8.3	8.2	8.2	8.3	8.2
Tidal Average	DO (Surface & Middle)	7.1	7.0	7.0	7.0	6.9	7.0	7.0	6.9	6.8
	DO (Bottom)	7.1	7.0	7.2	7.0	7.0	7.0	7.0	6.9	6.9

Table 3.6e – Marine Water Quality - Average, minimum and maximum values for pH

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
pH	Average	8.2	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	Min	8.1	8.1	8.0	8.1	8.1	8.1	8.2	8.2	8.1
	Max	8.4	8.4	8.4	8.4	8.4	8.4	8.5	8.4	8.5
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
pH	Average	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	Min	8.0	7.9	8.1	8.1	8.1	8.2	8.2	8.1	8.0
	Max	8.5	8.5	8.5	8.4	8.4	8.4	8.4	8.4	8.5
Tidal Average		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3

Table 3.6f – Marine Water Quality - Average, minimum and maximum values for Turbidity

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Turbidity (NTU)	Average	1.5	1.7	2.3	1.9	1.9	2.2	2.2	2.1	1.6
	Min	< 1.0	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	Max	2.5	4.6	6.5	3.3	3.2	3.7	7.8	4.1	3.8
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Turbidity (NTU)	Average	2.1	1.8	2.1	2.0	2.0	1.9	2.0	2.1	1.8
	Min	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	< 1.0	< 1.0
	Max	8.7	3.2	3.2	3.3	4.2	2.7	3.3	3.8	3.3
Tidal Average		1.8	1.7	2.2	2.0	2.0	2.1	2.1	2.1	1.7

Table 3.6g – Marine Water Quality - Average, minimum and maximum values for Suspended Solids

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
SS (mg/L)	Average	3	3	4	2	3	3	3	3	2
	Min	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
	Max	6	7	15	3	4	3	6	7	3
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
SS (mg/L)	Average	3	3	2	3	3	3	3	3	2
	Min	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
	Max	6	5	3	4	5	5	4	11	5
Tidal Average		3.1	2.7	3.3	2.6	2.8	2.5	2.8	3.2	2.3

Table 3.6h – Marine Water Quality - Average, minimum and maximum values for Ammonia Nitrogen

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NH_3-N (mg/L)	Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.01	0.03	0.04	0.02	0.03	0.02	0.01	0.02	0.03
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NH_3-N (mg/L)	Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Tidal Average		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table 3.6i – Marine Water Quality - Average, minimum and maximum values for Nitrite Nitrogen

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NO_2-N (mg/L)	Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.02	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NO_2-N (mg/L)	Average	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Tidal Average		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Table 3.6j – Marine Water Quality - Average, minimum and maximum values for Nitrate Nitrogen

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NO_3-N (mg/L)	Average	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.09	0.09	0.08	0.09	0.09	0.09	0.08	0.09	0.08
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
NO_3-N (mg/L)	Average	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.08	0.09	0.08	0.08	0.09	0.08	0.08	0.09	0.08
Tidal Average		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02

Table 3.6k – Marine Water Quality - Average, minimum and maximum values for Total Inorganic Nitrogen

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
TIN (mg/L)	Average	0.04	0.05	0.05	0.04	0.05	0.04	0.04	0.05	0.05
	Min	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	Max	0.11	0.12	0.10	0.12	0.12	0.11	0.10	0.11	0.10
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
TIN (mg/L)	Average	0.05	0.05	0.04	0.04	0.04	0.04	0.05	0.05	0.05
	Min	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
	Max	0.10	0.11	0.10	0.10	0.12	0.10	0.10	0.12	0.10
Tidal Average		0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.05

Remarks: Total Inorganic Nitrogen is determined by summation of Ammonia Nitrogen, Nitrate Nitrogen and Nitrite Nitrogen

Table 3.6l – Marine Water Quality - Average, minimum and maximum values for Total Phosphorus

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
TP (mg/L)	Average	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Min	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Max	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
TP (mg/L)	Average	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	Min	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Max	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Tidal Average		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Table 3.6m – Marine Water Quality - Average, minimum and maximum values for Chlorophyll a

Mid-Ebb		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Chl-a (ug/L)	Average	0.8	0.8	1.0	1.0	1.1	1.1	1.4	0.9	0.8
	Min	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.7	1.1	< 0.5	< 0.5
	Max	1.2	1.4	1.8	1.8	2.1	1.6	2.2	1.8	1.1
Mid-Flood		M_RO1	KLW	M_A	M_Marsh	TTC	M_BP	M_Coral	M_B	KS
Chl-a (ug/L)	Average	0.8	0.9	1.1	1.3	1.3	1.2	1.4	1.1	0.9
	Min	< 0.5	< 0.5	0.7	0.7	0.8	0.8	0.7	0.6	< 0.5
	Max	1.1	1.9	1.6	3.4	2.5	2.0	2.6	1.9	1.4
Tidal Average		0.8	0.9	1.0	1.1	1.2	1.1	1.4	1.0	0.8

Table 3.7a – River Water Quality - Average, minimum and maximum values for Water Temperature

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
Temp. (^{o}C)	Average	16.1	17.3	17.0	16.6	17.4	16.9	16.8
	Min	11.3	11.8	11.5	11.9	11.0	11.1	11.9
	Max	21.2	22.4	21.3	20.6	22.0	21.1	21.9

Table 3.7b – River Water Quality - Average, minimum and maximum values for Salinity

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
Salinity (ppt)	Average	< 0.1	< 0.1	≤ 0.1	≤ 0.1	< 0.1	< 0.1	≤ 0.1
	Min	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Max	< 0.1	< 0.1	0.1	0.1	< 0.1	< 0.1	0.1

Table 3.7c – River Water Quality - Average, minimum and maximum values for Dissolved Oxygen

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
DO (mg/L)	Average	8.3	9.0	8.4	8.7	8.4	8.8	8.0
	Min	7.2	7.1	6.4	6.2	5.9	6.3	5.9
	Max	10.9	11.0	10.5	10.7	10.8	11.6	10.1

Table 3.7d – River Water Quality - Average, minimum and maximum values for pH

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
pH	Average	7.4	7.5	7.7	7.1	6.5	6.8	7.0
	Min	7.1	7.2	7.5	6.8	6.0	6.2	6.5
	Max	7.8	7.7	8.1	7.7	7.1	7.1	7.9

Table 3.7e – River Water Quality - Average, minimum and maximum values for Turbidity

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
Turbidity (NTU)	Average	1.5	2.1	2.0	1.4	1.3	1.1	1.8
	Min	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.0
	Max	2.0	4.3	3.9	2.0	2.6	2.4	3.9

Table 3.7f – River Water Quality - Average, minimum and maximum values for Suspended Solids

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
SS (mg/L)	Average	< 2	< 2	4	2	2	2	≤ 2
	Min	< 2	< 2	< 2	< 2	< 2	< 2	< 2
	Max	< 2	< 2	8	3	4	3	2

Table 3.7g – River Water Quality - Average, minimum and maximum values for Ammonia Nitrogen

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
NH_3-N (mg/L)	Average	0.01	0.01	< 0.01	< 0.01	≤ 0.01	≤ 0.01	< 0.01
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	0.01	0.01	< 0.01	< 0.01	0.01	0.01	< 0.01

Table 3.7h – River Water Quality - Average, minimum and maximum values for Nitrite Nitrogen

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
NO_2-N (mg/L)	Average	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Min	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	Max	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Table 3.7i – River Water Quality - Average, minimum and maximum values for Nitrate Nitrogen

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
NO_3-N (mg/L)	Average	0.08	0.06	0.06	0.09	0.07	0.06	< 0.01
	Min	0.07	0.06	0.04	0.06	0.04	0.04	< 0.01
	Max	0.09	0.07	0.10	0.10	0.13	0.07	< 0.01

Table 3.7j – River Water Quality - Average, minimum and maximum values for Total Inorganic Nitrogen

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
TIN (mg/L)	Average	0.10	0.08	0.08	0.11	0.09	0.08	0.03
	Min	0.09	0.08	0.06	0.08	0.06	0.06	0.03
	Max	0.11	0.09	0.12	0.12	0.15	0.09	0.03

Remarks: Total Inorganic Nitrogen is determined by summation of Ammonia Nitrogen, Nitrate Nitrogen and Nitrite Nitrogen

Table 3.7k – River Water Quality - Average, minimum and maximum values for Total Phosphorus

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
TP (mg/L)	Average	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Min	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Max	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Table 3.7l – River Water Quality - Average, minimum and maximum values for Chlorophyll a

		F_UA	F_DA	F_UB	F_DB	F_UC	F_DC	F_Inland Marsh
Chl-a (ug/L)	Average	0.5	0.5	0.5	< 0.5	0.5	0.5	0.5
	Min	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Max	0.5	0.5	0.5	< 0.5	0.6	0.6	0.8

3.9 Statistical Analysis of Baseline Monitoring Data

Marine Water Quality

3.9.1 One way Analysis of Variance (ANOVA) was applied to the test for the differences in the baseline marine water quality monitoring data between 9 designated marine water quality monitoring stations. The analysis results showed that no significant differences were found for DO, SS, NH_3-N, NO_3-N and TIN parameters among all 9 designated marine quality monitoring stations. For total Phosphorus, all marine monitoring stations were measured below the detection limits during the whole baseline monitoring period. No statistical analysis is required. For pH, the control level will be based on the WQO range, thus no ANOVA was applied. The baseline water quality monitoring includes the chlorophyll a and salinity but they will be the monitoring parameters required during the operation phase only. Thus no action and limit levels are devised for chlorophyll a and salinity for the construction phase impact monitoring purpose.

Table 3.8 Summary of Result of ANOVA

Parameter	Stations	Degree of Freedom	P-Value	F-Value
DO (surface & middle)	All	8	0.6089	0.7931
DO (Bottom)	All	8	0.8014	0.5703
Suspended Solids	All	8	0.2273	1.3350
Ammonia Nitrogen	All	8	0.9459	0.3479
Nitrate Nitrogen	All	8	0.9907	0.1993
Total Inorganic Nitrogen	All	8	0.9444	0.3513
Salinity	All	8	**0.0001**	3.9232
Turbidity	All	8	**0.0004**	3.5542
Nitrite Nitrogen	All	8	**0.0028**	3.0583

3.9.2 As significant results for the parameters of salinity, turbidity and nitrite nitrogen were obtained, the baseline data from the 9 stations cannot be pooled for these individual parameters. In view of this complexity, reference has been made to EPD longer term database for all the parameters.

3.9.3 EPD has a long-term marine water monitoring data at Port Shelter. Control stations of M_A and M_B are the two nearest EPD monitoring locations to PM4 and PM9 respectively. The average, minimum and maximum values for PM4 and PM9 with respect to various parameters in 2003 and 2004 are shown in Appendix F. Table 3.9 indicates the characteristic of marine water quality throughout the years 2003 and 2004 of PM4 and PM9.

Table 3.9 EPD marine water quality data at 2003-2004 (PM4 & PM9)

	95 %-ile (5 %-ile)	**99 %-ile (1 %-ile)**
Dissolved Oxygen (mg/L)		
Surface + Middle	(4.9)	(4.6)
Bottom	(3.7)	(3.4)
pH	8.4	8.5
Salinity (ppt)	34.9	35.2
Turbidity (NTU)	10.3	11.5
Nitrite Nitrogen (mg/L)	0.015	0.039
Total Inorganic Nitrogen (mg/L)	0.07	0.13
Total Phosphorus (mg/L)	0.030	0.036
Chlorophyll-a (microgram/L)	3.8	7.8
Suspended Solids (mg/L)	6.1	10.6
Ammonia Nitrogen (mg/L)	0.038	0.044
Nitrate Nitrogen (mg/L)	0.026	0.084

3.9.4 As the baseline monitoring was carried out within one month from Nov to Dec 2005, it represents the dry season characteristics of the marine water quality in Port Shelter. As reflected in Appendix F, there exhibits a remarkable seasonal variation within Port Shelter Water Control Zone in respect of salinity, SS, NO_2-N, NO_3-N, TIN, TP and Chl-a. It is recommended that the determination of the action and limit levels for the impact monitoring of the third golf course should take into account the long-term EPD monitoring in Port Shelter in 2003 and 2004, final EIA report and existing golf course guideline values.

3.9.5 In view of the EIA findings, the action and limit levels of marine water quality are divided into two main groups for all parameters except total phosphorus, they are (i) fish culture zones and (ii) other impact monitoring locations (serve for corals mainly).

- For fish culture zones, the action and limit levels are more stringent that are derived mainly from the dry season baseline monitoring results. In general, the dry season water quality is better than in the wet season (Appendix F).

- For other impact monitoring locations, the action and limit levels are derived with the consideration of the EPD long-term monitoring data in Port Shelter, EIA report and existing golf course guideline values except turbidity. With the consideration of EPD long-term monitoring data at Port Shelter to derive the action and limits levels, it can give a full picture of the natural variation of marine water quality in Port Shelter. Table 3.10 summarizes the derived action and limit levels for marine water quality.

- For total phosphorus (TP), since all baseline monitoring results were below the detection limit of 0.1 mg/L at all monitoring stations, the trigger level of TP has adopted the existing golf course guideline value of 0.09mg/L. The detection limit for TP has been revised from the original 0.1 mg/L to 0.02 mg/L to ensure changes to the ambient level can be monitored.

- For the monitoring of pesticides during the turf establishment period (construction phase) and operation phase of the third golf course, no confirmative information can be provided by project proponent at this early baseline monitoring stage. Specific monitoring locations and selected pesticides for turf application will be notified EPD/AFCD at later stage. Details on turf establishment areas, monitoring locations, type of the pesticides selected for application and monitoring results will be provided in the subsequent monthly EM&A report for the turf establishment period. The turfgrass management for the third golf course will follow the approved Turfgrass Management Plan in the EIA report.

Table 3.10 Derived Summaries of Action and Limit Levels for Marine Water Quality

Parameters	Location	Action	Location	Limit
DO (Surface & Middle)	FCZ	6.0 mg/L	FCZ	5.3 mg/L
	All except FCZ	4.9 mg/L	All except FCZ	4.6 mg/L
DO (Bottom)	All	3.7 mg/L	All	3.4 mg/L
pH (depth-averaged)		N/A	All	6.5 - 8.5
SS (Depth-averaged)☆	FCZ	4.5 mg/L	FCZ	5.6 mg/L
	All except FCZ	6.1 mg/L	All except FCZ	10.6 mg/L
SS (Depth-averaged) Dredging for submarine pipelines⊕	M_RO1	6.1 mg/L	M_RO1	10.6 mg/L
Turbidity (Tby) (depth-averaged) ☆	FCZ	2.9 NTU☼	FCZ	3.9 NTU☼
	All except FCZ	3.3 NTU☼	All except FCZ	6.2 NTU☼
Ammonia Nitrogen (depth-averaged)	FCZ	0.02 mg/L	FCZ	0.03 mg/L
	All except FCZ	0.05 mg/L Δ	All except FCZ	0.05 mg/L Δ
Nitrate Nitrogen (depth-averaged)	FCZ	0.08 mg/L	FCZ	0.09 mg/L
	All except FCZ	0.09mg/L Δ	All except FCZ	0.09 mg/L Δ
Nitrite Nitrogen (depth-averaged)	FCZ	0.02 mg/L θ	FCZ	0.02 mg/L θ
	All except FCZ	0.02 mg/L	All except FCZ	0.04 mg/L
TIN (depth-averaged)	FCZ	0.12 mg/L	FCZ	0.14 mg/L
	All except FCZ	0.16 mg/L	All except FCZ	0.18 mg/L
Total Phosphorus (depth-averaged)	All	0.09 mg/L Δ	All	0.09 mg/L Δ

Remarks:
☆ : Action and limit levels are subjected to review especially for wet season throughout the construction phase of the project.
⊕ : Action and limit levels are subjected to review before the dredging works.
☼ : All are based on EM&A baseline monitoring data due to marked difference between EPD turbidity data and those from the baseline survey.
Δ : For nutrient monitoring (except NO_2-N) at non-FCZ stations, the trigger level has made reference to the existing golf course guideline values. The guideline value of NO_2-N is below the current detection limit of 0.01mg/L and thus not used.
θ : The same action and limit level of 0.02 mg/L is determined from the EM&A baseline data as 78% of the NO_2-N data are <= 0.01 mg/L and all remaining 22% equal to 0.02 mg/L.
FCZ including fish culture zones of Kai Lung Wan, Tai Tau Chau and Kau Sai
All except FCZ including remaining impact monitoring station of M_RO1, M_Marsh, M_BP and M_Coral.
Control monitoring locations: M_A & M_B

Inland Water Quality

3.9.6 Summary of the derived Action and Limit Levels for freshwater qualities is shown in Table 3.11. As there is no available long-term water quality monitoring reference data for the three identified streams, the set up of action and limit levels requires basing on the EM&A baseline monitoring data. After reviewing the raw baseline data for all three streams (A, B and C) and freshwater inland marsh water quality, all parameters are varied within a very limited range (range of average values for all freshwater monitoring locations - DO : 8.0 – 9.0 mg/L; pH : 6.5 – 7.7; turbidity : 1.1 – 2.0 NTU; SS : $\leq$ 2 – 4 mg/L; NH_3-N : $\leq$ 0.01 mg/L; NO_2-N : < 0.01 mg/L; NO_3-N : 0.01 – 0.09 mg/L; TIN : 0.03 – 0.11 mg/L and TP : < 0.1 mg/L). In addition, all three streams are located close together and similar water qualities for all three streams are expected. It is recommended that all data can pool together to set up the action and limit levels for freshwater quality.

Table 3.11 Derived Summaries of Action and Limit Levels for Freshwater Water Quality

Parameters	Location	Action	Location	Limit
DO (mid-depth)		6.3 mg/L	All	4 mg/L ξ
pH (mid-depth)		N/A	All	6.0 - 9.0
SS (mid-depth) ☆	All	3.8 mg/L or 120% of upstream control station's SS at the same tide of the same day	All	8 mg/L or 130% of upstream control station's SS at the same tide of the same day
Turbidity (Tby) (mid-depth) ☆	All	3.1 NTU or 120% of upstream control station's Tby at the same tide of the same day	All	4 NTU or 130% of upstream control station's Tby at the same tide of the same day
Ammonia Nitrogen (mid-depth)		N/A	All	0.01 mg/L
Nitrate Nitrogen (mid-depth)	All	0.10 mg/L	All	0.11 mg/L
Nitrite Nitrogen (mid-depth)		N/A	All	0.01 mg/L
TIN (mid-depth)	All	0.12 mg/L	All	0.13 mg/L
Total Phosphorus (mid-depth)		N/A	All	0.02 mg/L

Remarks:
☆ : Action and limit levels are subjected to review especially for wet season.
Freshwater monitoring locations: F_UA, F_DA, F_UB, F_DB, F_UC, F_DC and F_Inland Marsh
As most of the freshwater samples were reported of NH_3-N, NO_3-N levels below the detection limit of 0.01 mg/L, limit level is set at 0.01 mg/L. Similarly for TP, a limit level of 0.02 mg/L (the detection limit of TP) is imposed.
ξ : Water Quality Objectives of the Port Shelter

Follow up actions

3.9.7 Joint site visit (marine survey and visit to the new golf course site) with EPD was held on 19 Dec 2005 during the baseline monitoring period. Inconsistency with certain EM&A requirements were raised by EPD in the following observations.

- Composite water sample was collected from each of the marine monitoring stations for laboratory testing on the required parameters. According to the EM&A Manual, the Action and Limit levels are to be determined from depth-average baseline data (Table 3.3 refers).
- At some monitoring stations, water depth was determined from a sonde rather than from an echo sounder. That was not consistent with S 3.3.8 of the Manual.
- According to S 3.3.13, a DGPS should be deployed to locate the monitoring stations. Unfortunately, the DGPS was found turned off throughout the marine survey.
- From S 3.3.6, it may suggest a water sampler attached to a10m line to be used. However, the water depth at certain areas within the Port Shelter can far exceed 10m (e.g. PM8 of EPD marine station). As a general rule, the survey team should be equipped with appropriate field monitoring tools to accommodate the real situations.

3.9.8 ET and IEC had looked into these issues and take necessary actions to rectify the situation in order to satisfy the EM&A requirements as contained in the EM&A Manual for the project. After discussed with IEC, it is considered the baseline water quality monitoring result is representative and valid. The actions and responses are shown as follows:

- Composite water sample can represent the background water quality for the control and impact monitoring stations in Port Shelter in general. The baseline monitoring report serves the purpose of recording the pre-construction status of the background water quality and set out the action and limit levels for the construction and operation phases of the project. The result of the baseline water quality is considered valid and acceptable. During the impact monitoring, for in-situ measurements, the depth-averaged values will be calculated by taking the arithmetic means of reading for all three depths while water samples will be taken from all three depths. Tests will be done on individual grab samples instead of composite samples.
- Echo sounder will be used for water depth detection instead of sonde measurement in future monitoring.
- The sampling team locates the sampling locations by the land mark and DGPS. During impact monitoring, DGPS and land mark will be used to locate the monitoring locations at all times.
- The total length of the water sampler has a 30m line in length. For deepest monitoring location M_B, water depth is less than 20m. It will be sufficient to measure and take water samples at all monitoring locations.

4. ECOLOGY

4.1 Introduction

4.1.1 The ecological baseline survey for the ecological EM&A were conducted in accordance with the EM&A manual.

4.1.2 As stipulated in the EM&A Manual, the ecological baseline surveys for terrestrial ecology would be conducted before commencement of any works on site, or any setting out of works or storage areas. Baseline survey would consist of a walk-over survey. While the majority of the Project Area would be subject to site formation, natural streams would be partially or fully preserved and protected by buffer zones, and therefore would constitute the primary target of the terrestrial ecological monitoring. Special attention should thus be paid to ecologically sensitive streams to ensure minimum damage to existing vegetation and streams. It may be necessary to rope off and protect specific habitats (e.g. natural stream courses) or species of special interest identified during the EIA study or during the walk-over surveys. The purpose of the baseline survey was to confirm and describe the pre-works ecological conditions, with reference to the written descriptions and habitat maps included in the EIA Report.

4.2 Ecological Mitigation Measures and Implementations

4.2.1 Ecological mitigation measures to be implemented during the construction phase include the following:

- Establishment of buffer zones for the natural stream courses during both construction and operational phase.
- Provision of temporary bypass channels or pipes during construction phase for stream courses subject to pipe culverting.
- Protection of water quality of the natural stream courses and temporary bypass channels or pipes.
- Transplantation of coral colonies within the dredging area for the desalination plant (**Figure 4.2**).
- Avoidance of corals when the anchoring points are deployed, and to shift the floating temporary barging point to the location with least corals within the mapping area.
- Regular site audit of ecological mitigation measures and good site practice.

4.3 Terrestrial Ecological Conditions Reported in the EIA

4.3.1 As reported in the EIA Report, there were four perennial natural streams (Stream A-D) with a combined length of 2.6 km within the Assessment Area for the EIA Study. Streams A, B & C were located within the Project Area, while Stream D was outside the Project Ares and acted as the main stream draining the western part of the Assessment Area. Buffer Zone would be established for the three streams within the Project Area along their partial length (Stream A) or full length (Streams B & C) (see **Figure 4.1** in the EM&A Manual). Moreover, Streams B, C & D will be monitored for aquatic fauna monthly during the construction phase.

4.3.2 Streams on Kau Sia Chau were not previously considered to be of special conservation importance by local ecologists and are not listed by government among the 33 ecologically important streams/rivers (EISs) in HKSAR.

4.3.3 Although the streams have not been affected by developments or pollution sources, they are relatively small. Water depth was less than 0.3m in most of the stream reaches.

4.3.4 Stream A is located within the Project Area. It includes two main tributaries (A1 and A2 in Figure 8.2 of the EIA Report). Stream A was heavily silted with sediments from eroded hillsides all year round, particularly downstream of the confluence of the two main tributaries. The stream had low flow.

4.3.5 Stream B is located within the Project Area. It had clear flow (with little sediment in the stream beds) of moderate volume during the wet season. This stream has two main tributaries, B1 and B2 (see Figure 8.2 of the EIA Report). Comparing the maps published in 1998 and 2004 (Countryside Series: Sai Kung & Clear Water Bay), it was found that B2 has become a tributary of Stream B for a few years only. Another branch (B3 in Figure 8.2 of the EIA Report) was shown on the 1998 version of the map, but has been replaced by a new branch (i.e. B2) in the 2004 version. Field survey during the present EIA study also confirmed that B2 is a current tributary while B3 no longer flows. Stream B also contains a long estuarine section of muddy sandy substrate.

4.3.6 Stream C is located within the Project Area. It has had low but clear flow. In contrast to Stream B, Stream C drains to a sandy beach at Kau Chung Wan, and therefore lacks a clear estuarine zone.

4.3.7 Stream D is located outside the Project Area but within the Assessment Area and is the main stream draining the west side of the Assessment Area. It had clear water and moderate flow levels. Stream D is the only stream with deeper water depth among the four streams (water depth over 0.3 m in some of the stream reaches).

4.3.8 In terms of vegetation, no distinct riparian zone had developed due to the limited size of the ravines and young age of the vegetation. Vegetation dominance and composition resembled that of shrubland, except that more tree species with greater heights (mostly less than 4-5m) were found. Examples of trees included *Schefflera heptaphylla*, *Machilus chekiangensis*, and *Gordonia axillaris* and *Ormosia emarginata*. Due to the presence of water and probably the disturbance-shelter effect of the ravine, the plant diversity was slightly higher than in shrubland. A total of 110 species of vegetation were recorded.

4.3.9 Three protected plant species were recorded in the ravines during the EIA Study (see Figure 8.3 in the EIA Report). These include 2 terrestrial orchids, Bamboo Orchid *Arundina graminifolia* (A. chinense) and Beardly Orchid *Peristylus tentaculatus*, and Chinese New Year Flower *Enkianthus quinqueflorus*. The orchid family (Orchidaceae) is protected under the Forestry Regulations. Both orchid species are very common locally and can be found in grasslands and at streamsides (Xing *et al*. 2000).

4.3.10 In addition to these locally protected species, two additional tree species of conservation concern were recorded during the tree survey for the Project: 1 *Artocarpus hypargyreus* and 3 *Ixonanthes reticulata*. Their approximate locations are shown on Figure 8.3 of the EIA Report and are plotted in detail in the landscape chapter of the EIA Report. *Artocarpus hypargyreus* is common in Hong Kong but listed as "Near Threatened" by IUCN and as rare and endangered in Guangdong Province in the China Plant Red Data Book. *Ixonanthes reticulata* is common in Hong Kong, listed as "Vulnerable" by (IUCN) and as rare and endangered in Guangdong Province in the China Plant Red Data Book. Neither of these species is protected in Hong Kong.

4.3.11 Bird abundance and species richness were very low in the ravine habitats of the 3 streams within the Project Area (Table 8.4-2& App. 8.10 of the EIA Report). All recorded species (e.g., Spotted Dove *Streptopelia chinensis*, Black Drongo *Dicrurus macrocercus*) are common and

widespread in Hong Kong (Carey *et al*. 2001). Both bird density and species richness in the ravine habitat of Stream D were low, but higher than those in the other 3 streams in the Project Area. This was related to the denser vegetation cover and the resulting greater habitat complexity. Greater vegetation density and complexity enhance habitat quality for birds, and result in higher bird abundance (Fuller 1995). Ravines typically support denser and more diverse vegetation cover in fire-disclimax landscapes because of their higher moisture levels that ameliorate fire impacts.

4.3.12 A total of 16 species of butterfly were recorded in the ravine habitats of the three surveyed streams in the Project Area (App. 8.13 of the EIA Report). Abundance and species richness of butterflies was very low in all 3 surveyed streams, and was lowest in Stream A (Table 8.4-3 of the EIA Report). All the recorded species except Bush Hopper *Ampittia dioscorides* are common and widespread in Hong Kong (Yiu 2004). Bush Hopper was recorded in the ravine of Stream C. This species is uncommon in Hong Kong, and inhabits marshy grassland, disused paddy fields and gardens (Bascombe *et al*. 1999).

4.3.13 A total of 15 species of butterfly were recorded in the ravine habitat of Stream D (App. 8.16 of the EIA Report). Abundance and species richness of butterflies in Stream D were low (Table 8.4-3 of the EIA Report). All except the Green Flash *Artipe eryx* are common or very common in Hong Kong. Green Flash is uncommon in Hong Kong (Yiu 2004) and it typically inhabits woodland and shrubland (ibid.).

4.3.14 In total 9 species of dragonflies were recorded in the ravine habitats of the 3 surveyed streams, and all are common or abundant in Hong Kong (App. 8.14 of the EIA Report). Abundance and species richness of dragonflies were very low in all 3 surveyed streams, and were lowest at Stream A. This was due to the sedimentation in this stream that covered the natural streambed. Sedimentation caused destruction of habitats for larval dragonflies. Soil erosion is a widespread agent of habitat degradation on the Project Area because of past land uses that removed or degraded protective vegetation. In addition, theses 3 streams are not large and flow volume is highly seasonal. Maturation of larvae of some species of dragonflies (e.g., Gomphidae) spans more than a year, but these 3 streams are often dry when rainfall is low. This may restrict the uses of these 3 streams as breeding habitat for dragonflies.

4.3.15 Abundance and species richness of dragonflies were low in the ravine habitat of Stream D (Table 8.4-4 of the EIA Report). All the dragonfly species recorded in Stream D are common and widespread in Hong Kong (App. 13 of the EIA Report).

4.3.16 Three reptile species were recorded in the Project Area Red-eared Slider (a terrapin), Chinese Cobra and King Cobra (snakes). Red-eared Sliders were found in Stream B during the surveys. This is an exotic species in Hong Kong, and is of no conservation interest except as a potential threat to native fauna. King Cobra was recorded in shrubland near Stream A and Chinese Cobra in Stream C. King Cobra is uncommon while Chinese Cobra is fairly common (Karsen et al. 1998). Both Chinese Cobra and King Cobra are listed in Appendix II of CITES (Zhao 1998), and both inhabit a wide range of habitats (Karsen et al. 1998).

4.3.17 Eggs of Brown Tree Frog were observed in Stream C in April 2001. This species is common and widespread in Hong Kong (Karsen et al. 1998, Lau and Dudgeon 1999). Croaking of Asian Common Toads and Gunther's Frogs was heard at Streams A and B in April 2005. Both are common and widespread in Hong Kong (Karsen et al. 1998, Lau and Dudgeon 1999).

4.3.18 A total of eleven fish species were recorded (Table 8.4.5 of the EIA Report). None of them is rare or protected under Hong Kong legislation or CITES.

4.3.19 Stream B is the most diverse and abundant in terms of freshwater fish species among the surveyed streams. Eleven species were recorded here, including all species recorded during the survey. But most species were found in brackish water. The intact estuarine area at the mouth of Stream B has greater habitat complexity, which probably contributes to the high species richness recorded there.

4.3.20 No freshwater fish were recorded in Stream A, where vegetation cover was the least dense and the streambed was covered by mud from nearby eroded hill slopes. Abundance and diversity of aquatic invertebrates was also low, contributing to the low fish diversity and abundance in Stream A.

4.3.21 Although all species are native, only one species of fish (i.e. *Rhinogobius duospilus*) was a typical freshwater fish, while the others were more or less estuarine species.

4.3.22 Besides fishes, diverse aquatic invertebrates are also found (Table 8.4.6 of the EIA Report). Except for Stream A, which was heavily silted and supported only one common shrimp species, Streams B, C and D had moderate aquatic invertebrate diversity and abundance.

4.3.23 Three species of Atyid shrimp were recorded on Kau Sai Chau, i.e. *Caridina cantonensis*, *Caridina elongapoda*, and *Caridina trifasciata*.

4.3.24 The first two pereiopods (walking legs) of atyid shrimp are chelate and are characterized by well-developed tufts of setae for the collection of food. They are all detritivores feeding mainly on leaf litter from riparian vegetation. Members of this genus are often found in pools of mountain streams with clean water where flow rates are low and leaf litter accumulates. They are all tiny animals (with carapace length less than 1 cm). Hong Kong atyids generally have an annual life cycle (Dudgeon 1985) and direct development. In Hong Kong four species of this genus have been reported, namely, *Caridina cantonensis*, *C. apodosis*, *C. trifasciata* and *C. serrata* (Yam 2003). Among these, *C. serrata* is endemic to Hong Kong Island. It is therefore considered of conservation concern due to its restricted distribution (Fellowes *et al*. 2001).

4.3.25 *Caridina cantonensis* is the most widespread and abundant species of the four. Body size is usually larger, up to 1 cm in carapace length. Although a truly freshwater species, it can be found in some less optimum conditions. In the present survey, they were recorded in all four streams on Kau Sai Chau, including Stream A which is heavily silted and where only two aquatic species were found.

4.3.26 *Caridina elongapoda* was not reported in previous studies of Caridina in Hong Kong, but is a widespread species from China, and Tai Wan to Africa. It can be found in some streams in Hong Kong, in particular near estuaries. On Kau Sai Chau *C. elongapoda* occupied the lower stream reaches while *C. cantonensis* occupied the upper reaches.

4.3.27 One unknown species of Caridina shrimp was found in the middle reaches of Stream C and the upper to middle reaches of Stream D during surveys conducted for the present EIA study in November 2000. Specimens of this shrimp were sent for identification and were confirmed as *Caridina trifasciata*. This species was first found at Tsak Yue Wu (near Pak Tam Chung), Sai Kung in September 2000 and was described as a species new to science (Yam and Cai 2003). Kau Sai Chau constitutes the second area of occurrence for this species. Specimens collected in Macau were sent for identification based on similarity to the confirmed *C. trifasciata* (Leung Va personal communication). If confirmed, this would be the third known site for *C. trifasciata*. Besides morphological differences by which this species was distinguished from other Caridina species, this shrimp has three distinctive deep colour transverse bands on the body. In 2005, this shrimp was also found at the middle reaches of Stream B.

4.3.28 The endemic freshwater crab *Nanhaipotamon hongkongense* was recorded in streams C and D. All three species of freshwater crabs recorded in Hong Kong (*Cryptopotamon anacoluthon*, *N. hongkongense*, and *Sommaniathelphusa zanklon*) are endemic. Among them, *N. hongkongense* is usually found at higher elevations and sometimes at locations distant from water sources. It is therefore also referred to as Mountain Crab. Though generally uncommon, this species is widespread throughout Hong Kong. Although all are relatively common and widespread in Hong Kong, these three freshwater crabs are considered of potential global concern by some local ecologists (Fellowes *et al*. 2001).

4.3.29 *Pseudosesarma patshuni* is a sesarmine crab and can be found near streams in some regions of Hong Kong including Lantau (its type locality) and Sai Kung.

4.3.30 An estuarine crab *Varuna* sp. was seen at the lower reach of Stream B. It is a common aquatic invertebrate in lowland reaches of Hong Kong streams.

4.3.31 Palaemonid shrimp (or Long-armed shrimp) *Macrobrachium* sp. (Family Palaemonidae) were collected in the pools along the streams. *Macrobrachium* sp. is commonly found in streams throughout Hong Kong. It is predatory and active at night. It was found in all streams surveyed.

4.3.32 Freshwater snail *Brotia hainanensis*, which is usually found in streams with good water quality, was found at both tributaries of Stream B, and at Streams C and D.

4.4 Terrestrial Ecology Baseline Survey For EM&A

4.4.1 The objectives of the Baseline Survey are to confirm the pre-works ecological conditions, with reference to the written descriptions and habitat maps included in the EIA Report, and to facilitate the construction phase aquatic fauna monitoring which aims to determine the status of *Caridina trifasciata* and *Nanhaipotamon hongkongensis*.

4.4.2 The Baseline Surveys were conducted on 16, 20 and 22 December 2005. Other than pathways to facilitate the EM&A baseline sampling on environmental parameters such as water quality and air quality by ET personnel, no major construction works were conducted within the site.

4.4.3 The demarcation of the stream buffer zone had not been established at the time of the baseline survey (see **Photo Plate 4.1**). As advised by the works contractor, stream buffer zone demarcation will be established when the works fronts are approaching each stream and will be completed before wet season in 2006.

4.4.4 Vegetation, wildlife associated with streams or ravine habitat, and aquatic fauna were checked during the baseline survey.

4.4.5 In general, the streams and the riparian vegetation were in natural conditions similar to the condition during EIA study. Water levels in the 4 streams were low due to dry season. Photos of Streams A to D were shown in **Photo Plate 4.1**.

4.4.6 Habitats encountered during the baseline ecological monitoring included shrubland, stream/ravine, coastal/backshore and reservoir/pond/marsh. The habitats and vegetation generally remained intact within the project site, within the stream buffer zone and outside the project area. Other than the historical erosion of hillsides and the access paths to the project site, no earthwork, human or fire disturbance was observed. No additional plant species of conservation importance other than those specified in the EIA Report was encountered.

4.4.7 Atyid shrimp *Caridina trifasciata* were found in Stream B, Stream C & Stream D during the present baseline survey (see **Photo Plate 4.1**). Abundance was low in all streams but slightly

higher in Stream C. Small-sized individuals of *Caridina trifasciata*, presumably juveniles, were also found. The endemic freshwater crab *Nanhaipotamon hongkongense* which had been recorded before in Streams C and D, however, was not found during the present baseline survey.

4.4.8 Only a few birds were seen in the ravine habitats of the 4 streams during the baseline surveys, and all were common and widespread species (e.g., Chinese Bulbul *Pycnonotus sinensis*). No dragonfly, butterfly and herpetofauna was sighted during the baseline surveys, and this was due to the timing of the surveys in cool and dry weather.

4.4.9 Vegetation cover is one of the most important habitat factors affecting avifauna community composition. No major change in ravine vegetation cover as compared to the EIA stage was observed during the present baseline surveys in December 2005. Therefore, it is expected that the ecological value of the ravine habitats as wildlife habitats remain similar as compared to the EIA stage.

4.5 Marine Ecological Baseline Survey

Introduction

4.5.1 As stated in the EM&A Manual, prior to the commencement of all construction works, a baseline survey of natural corals would be conducted. At each of the Site C, B2, Site D2 and a Control Site near the AFCD's Coral Buoy at Sharp Island (see **Figure 4.1**), 20 natural coral colonies were selected and tagged. Each of the tagged coral colonies was identified to species level and photographed. Information on location, size and general condition of the surrounding environment were recorded. Other information shall also be recorded such as the survey date, time, climate, sea and tidal conditions.

Methodology

4.5.2 The surveys on corals and seagrasses were conducted by two experienced marine ecologists (see the CVs of the Marine Ecologists in **Appendix H**).

4.5.3 The Marine Ecological Baseline Survey were conducted on 13, 19, 20, & 21 December 2005. The weather conditions were fair: cloudy and windy on all survey date. At each site to be monitored for corals, 20 colonies of natural corals in good conditions (i.e. generally intact and no sign of bleaching) and significant sizes (preferably over 20 cm in diameter) were selected on site. As reported in the EIA Report, the distribution of coral colonies in some monitoring sites, especially those on the eastern shore of Kau Sia Chau Island, was limited to a narrow stripe from the coast. Therefore it is not feasible to tag corals at pre-set water depths as in some other EM&A programmes in Hong Kong. However efforts were paid to arrange the selected corals to cover different water depths as far as possible. The 20 monitored corals were divided into two groups of ten corals. The ten corals in each group were, as far as practicable, located linear and parallel to the shore. This arrangement could facilitate the monitoring of the potential shading effect on corals caused by the floating barge in Site B2 by comparing the conditions of tagged corals directly beneath the barge with those away from the barge. The two groups were located on two distances from the shore, with the first group closer to the shore while the second group farther. Each selected coral was attached with a plastic label with an assigned code. The percentage of mortality, percentage of sign of bleaching and coverage percentage of deposited sediments were estimated on site and recorded. Photographs of each tagged coral were also taken for comparisons with the results from coming construction phase monitoring. The species and the size of each tagged corals were also recorded.

Results

Monitoring site B2

4.5.4 Site B2 is the location for the temporary barging point (22'21.887N, 114'19.250E). This site faces toward Kai Chau to the east of Kau Sai Chau. This site is also adjacent to an abandoned pier which is though used by previous fish culture operators in the nearby Tiu Cham Wan FCZ.

4.5.5 The coastline is natural rocky shore with steep gradient. As reported in the EIA Report, only the near-shore part of the seabed was covered by hard substrates (bedrock and boulders) at Site B2. The seabed could be divided into three section according to the substrate. At the most landward part the substrate was granite rocks. Seawards to those hard substrates, there was a steeper slope of sandy bottom with boulders. The seabed profile dropped rapidly to a deeper elevation. Further seaward, the substrates changed to muddy.

4.5.6 The hard coral coverage was low in this site (estimated to be less than 5%). Besides hard corals, other marine organisms included Long-spined sea urchin *Diadema setosum*, and Black sea cucumber *Holothuria vagabunda*. All were common marine species.

4.5.7 No construction works had been conducted at this location before and during the present baseline survey.

4.5.8 At this site, 20 natural corals were selected and tagged with plastic labels with codes ranging from B-01 to B-20. The distribution of these selected corals covered both the areas within and outside the proposed floating barging point boundary (see **Figure 4.2**). The selected corals included *Favia speciosa*, *Platygyra acuta*, *Turbinaria peltata*, *Leptastrea pruinosa*, *Cyphastrea serailia*, *Plesiastrea versipora* ,*Goniastrea aspera*, and *Lithophyllon undulatum*. Sizes of these tagged corals ranged from 15 cm to 60 cm. The selected species include various growth forms (massive - *Favia speciosa*, *Goniastrea aspera*, *Platygyra acuta, Cyphastrea serailia* & *Plesiastrea versipora*; encrusting – *Leptastrea pruinosa, Goniastrea aspera* & *Cyphastrea serailia*; laminar - *Turbinaria peltata* & *Lithophyllon undulatum*) and species previously recorded in the site during the EIA study (40% of the previously recorded species).

4.5.9 All selected corals were not covered by sediment (0% coverage of sediment) and had no sign of bleaching (0% bleaching), and had no polyp recently died (0% mortality). Photographs of each tagged coral were taken. These data and photos would be used as the baseline conditions of these tagged corals and would be compared with the data and photos from the coming construction phase monitoring,

Monitoring site D2

4.5.10 Site D2 (22'21.890N, 114'18.307E) is close to the dredging area for the desalination plant. The monitoring site was not within the impacted area like Site B2, but was located about 80m to the south of the existing ferry pier, where an area of hard substrates (bedrock and boulders) was present.

4.5.11 The seabed was covered by bedrock. The bedrock cover continued to over 100m south from the pier. It was estimated that less than 5% coverage of corals on the bedrock area, but the sizes of those colonies were fairly large (some reach 30cm).

4.5.12 Major corals species included *Favia speciosa*, *Favites abdita*, and *Goniastrea aspera*. Other marine organisms included Long-spined sea urchin *Diadema setosum*, Soft-spined sea urchin *Salamacis dussumieri* and Black sea cucumber *Holothuria vagabunda*. All were common marine species. Some seagrass individuals (*Halophila ovalis*) had been previously found

scattering on the sandy substrate between pier and the bedrock in low density, but was not found during the present baseline survey.

4.5.13 No dredging works for the desalination plant had been conducted near this location before and during the present baseline survey.

4.5.14 At this site, 20 natural corals were selected and tagged with plastic labels with codes ranging from D-01 to D-20. The distribution of these selected corals ran along the contour of the bedrock, rather than parallel with the coastline as most natural corals occurred along the bed rock edge (see **Figure 4.2**). The selected corals included *Favia speciosa*, *Goniastrea aspera*, *Platygyra acuta*, *Pavona decussate*, *Psammocora superficialis*, and *Turbinaria peltata*,. Sizes of these tagged corals ranged from 15 cm to 55 cm. The selected species include various growth forms (massive - *Favia speciosa*, *Goniastrea aspera*, *Platygyra acuta*, & *Psammocora superficialis*; encrusting – *Goniastrea aspera & Psammocora superficialis*; laminar - *Pavona decussate* & *Turbinaria peltata*) and species previously recorded in the site during the EIA study (40% of the previously recorded species).

4.5.15 All selected corals were not covered by sediment (0% coverage of sediment) and had no sign of bleaching (0% bleaching), and had no polyp recently died (0% mortality). Photographs of each tagged coral were taken. These data and photos would be used as the baseline conditions of these tagged corals and would be compared with the data and photos from the coming construction phase monitoring,

Monitoring site C

4.5.16 This site is at Kap Lo Kok (22’21.408N, 114’19.662E) on the southeast coastline of Kau Sai Chau. The coastline is natural rocky shore with steep gradient. Although the section of coastline was more exposed, Site C was partially protected by a mall headland to the south.

4.5.17 Site C had a high coral coverage (over 30%) among the sites investigated during the EIA Study on the eastern coast of Kau Sai Chau Island. The sizes of coral colonies at Site C were also larger than those at other sites. Dominant hard coral species included *Platygyra carnosus*, *Goniopora columna*, and *Turbinaria peltata*. Other marine organisms included Starfish *Luidia maculata*.

4.5.18 This site would not be directly impacted by the new golf course project. No construction works had been conducted near this location before and during the present baseline survey.

4.5.19 At this site, 20 natural corals were selected and tagged with plastic labels with codes ranging from C-01 to C-20. The distribution of these selected corals ran two linear groups parallel with the coastline (see **Figure 4.2**). The selected corals included *Platygyra carnosus*, *Platygyra acuta*, *Favia speciosa*, *Favites abdita*, *Turbinaria peltata*, *Goniopora columna*, and *Favites pentagona*. The sizes of these selected corals ranged from 18 to 60 cm. The selected species include various growth forms (massive - *Favia speciosa*, *Favites pentagona*, *Platygyra carnosus*, *Platygyra acuta*; encrusting - *Favites abdita* & *Favites pentagona*; laminar - *Turbinaria peltata*) and species previously recorded in the site during the EIA study (30% of the previously recorded species).

4.5.20 All selected corals were not covered by sediment (0% coverage of sediment) and had no sign of bleaching (0% bleaching), and had no polyp recently died (0% mortality). Photographs of each tagged coral were taken. These data and photos would be used as the baseline conditions of these tagged corals and would be compared with the data and photos from the coming construction phase monitoring,

Control Site

4.5.21 Control Site is the buoy of coral marker established by AFCD in Sharp Island. Similar with Site C, both the coral coverage percentage and the sizes of coral colonies were high at this site.

4.5.22 This site had a high coral coverage (about 40%) as recorded during Reefcheck organized by AFCD. Compared with other sites investigated during the EIA Study on Kau Sai Chau Island, the sizes of coral colonies at Control Site were larger than those at Kau Sia Chau. Only the corals in Site C had comparable sizes, but they were of a lower coverage. Dominant hard coral species included *Platygyra carnosus*.

4.5.23 This site is a control outside the assessment area for the EIA of the project and would not be directly or indirectly impacted by the new golf course project. No works from other projects had been conducted near this location before and during the present baseline survey.

4.5.24 At this site, 20 natural corals were selected and tagged with plastic labels with codes ranging from X-01 to X-20. Although Control Site would not be impacted by the Project, the arrangement of the tagged corals was also two linear groups parallel to the shore (see **Figure 4.2**). The selected corals included *Platygyra carnosus*, *Platygyra acuta* , *Pavona decussate*, *Hydnophora exesa*, *Favites abdita*, *Cyphastrea serailia*, *Favia speciosa*, and *Goniastrea aspera*. The selected species include various growth forms (massive - *Favia speciosa*, *Platygyra carnosus*, *Platygyra acuta, Cyphastrea serailia*, *Goniastrea aspera*; encrusting - *Favites abdita, Cyphastrea serailia Goniastrea aspera Goniastrea aspera*; laminar - *Pavona decussate*, *Turbinaria peltata*). There was no previously record of the coral species in the Control Site from the EIA study, but as observed during the dive survey, the selected species had covered many of the coral species occurring there, in particular the dominant *Platygyra carnosus*.

4.5.25 All selected corals were not covered by sediment (0% coverage of sediment) and had no sign of bleaching (0% bleaching), and had no polyp recently died (0% mortality). Photographs of each tagged coral were taken. These data and photos would be used as the baseline conditions of these tagged corals and would be compared with the data and photos from the coming construction phase monitoring,

Tagged corals

4.5.26 The species of corals to be tagged included the following 15 species: *Cyphastrea serailia*, *Favia speciosa*, *Favites abdita*, *Favites pentagona*, *Goniastrea aspera*, *Goniopora columna*, *Hydnophora exesa*, *Leptastrea pruinosa*, *Lithophyllon undulatum*, *Pavona decussate*, *Platygyra acuta*, *Platygyra carnosus*, *Plesiastrea versipora*, *Psammocora superficialis*, and *Turbinaria peltata*. Their sizes ranged from 15 to 60 cm. All tagged corals were in good conditions, without significant sign of mortality and bleaching, or being covered by sediments.

4.5.27 **Photo Plates 4.2** to **4.9** show the photos of each tagged corals. The assigned number, species and sizes of the tagged corals were listed in **Table 4.1** below.

Table 4.1 List of tagged corals with sizes and species

Code of tagged corals	Species	Size (cm)	Mortality (%)	Sedimentation (%)	Bleaching (%)
Site B2					
B-01	*Platygyra acuta*	18	0	0	0
B-02	*Favia speciosa*	16	0	0	0
B-03	*Turbinaria peltata*	15	0	0	0
B-04	*Leptastrea pruinosa*	30	0	0	0
B-05	*Cyphastrea serailia*	15	0	0	0
B-06	*Favia speciosa*	20	0	0	0
B-07	*Favia speciosa*	16	0	0	0
B-08	*Turbinaria peltata*	60	0	0	0
B-09	*Favia speciosa*	18	0	0	0
B-10	*Favia speciosa*	23	0	0	0
B-11	*Turbinaria peltata*	37	0	0	0
B-12	*Plesiastrea versipora*	30	0	0	0
B-13	*Plesiastrea versipora*	17	0	0	0
B-14	*Goniastrea aspera*	20	0	0	0
B-15	*Lithophyllon undulatum*	37	0	0	0
B-16	*Favia speciosa*	18	0	0	0
B-17	*Favia speciosa*	15	0	0	0
B-18	*Turbinaria peltata*	23	0	0	0
B-19	*Favia speciosa*	20	0	0	0
B-20	*Favia speciosa*	20	0	0	0
Site C					
C-01	*Platygyra carnosus*	60	0	0	0
C-02	*Platygyra carnosus*	55	0	0	0
C-03	*Favia speciosa*	47	0	0	0
C-04	*Favites abdita*	30	0	0	0
C-05	*Turbinaria peltata*	45	0	0	0
C-06	*Favia speciosa*	32	0	0	0
C-07	*Platygyra acuta*	50	0	0	0
C-08	*Platygyra acuta*	54	0	0	0
C-09	*Favia speciosa*	25	0	0	0
C-10	*Platygyra acuta*	47	0	0	0
C-11	*Favia speciosa*	22	0	0	0
C-12	*Platygyra acuta*	37	0	0	0
C-13	*Platygyra carnosus*	25	0	0	0
C-14	*Favia speciosa*	30	0	0	0
C-15	*Goniopora columna*	35	0	0	0
C-16	*Platygyra carnosus*	40	0	0	0
C-17	*Goniopora columna*	20	0	0	0
C-18	*Platygyra carnosus*	50	0	0	0
C-19	*Favites pentagona*	30	0	0	0
C-20	*Favia speciosa*	18	0	0	0
Site D2					
D-01	*Favia speciosa*	20	0	0	0
D-02	*Favia speciosa*	20	0	0	0
D-03	*Favia speciosa*	25	0	0	0
D-04	*Goniastrea aspera*	25	0	0	0

Code of tagged corals	Species	Size (cm)	Mortality (%)	Sedimentation (%)	Bleaching (%)
D-05	*Goniastrea aspera*	23	0	0	0
D-06	*Platygyra acuta*	15	0	0	0
D-07	*Favia speciosa*	35	0	0	0
D-08	*Goniastrea aspera*	25	0	0	0
D-09	*Goniastrea aspera*	15	0	0	0
D-10	*Favia speciosa*	25	0	0	0
D-11	*Pavona decussata*	25	0	0	0
D-12	*Platygyra acuta*	23	0	0	0
D-13	*Pavona decussata*	20	0	0	0
D-14	*Favia speciosa*	20	0	0	0
D-15	*Psammocora superficialis*	16	0	0	0
D-16	*Turbinaria peltata*	55	0	0	0
D-17	*Favia speciosa*	25	0	0	0
D-18	*Psammocora superficialis*	35	0	0	0
D-19	*Turbinaria peltata*	47	0	0	0
D-20	*Pavona decussata*	54	0	0	0
Control Site					
X-01	*Platygyra carnosus*	30	0	0	0
X-02	*Platygyra carnosus*	40	0	0	0
X-03	*Platygyra carnosus*	35	0	0	0
X-04	*Pavona decussata*	35	0	0	0
X-05	*Hydnophora exesa*	50	0	0	0
X-06	*Platygyra carnosus*	30	0	0	0
X-07	*Platygyra carnosus*	35	0	0	0
X-08	*Favites abdita*	20	0	0	0
X-09	*Cyphastrea serailia*	45	0	0	0
X-10	*Cyphastrea serailia*	40	0	0	0
X-11	*Platygyra carnosus*	30	0	0	0
X-12	*Platygyra acuta*	35	0	0	0
X-13	*Platygyra acuta*	38	0	0	0
X-14	*Platygyra acuta*	35	0	0	0
X-15	*Platygyra acuta*	45	0	0	0
X-16	*Platygyra acuta*	55	0	0	0
X-17	*Favia speciosa*	30	0	0	0
X-18	*Platygyra acuta*	65	0	0	0
X-19	*Goniastrea aspera*	50	0	0	0
X-20	*Cyphastrea serailia*	45	0	0	0

4.5.28 As stated in the EM&A Manual, no less than 15 tagged colonies, upon AFCD approval, would be selected for monitoring at each site. Priority shall be given to the largest and undamaged colonies as those colonies are likely to be more prone to sedimentation. In view of the significant sizes and good conditions of all tagged corals, it is recommenced that all 80 tagged coral colonies (i.e. all 20 in each of the surveyed sites) would be monitored during the monitoring programme (covering both construction and operation phases). This could maintain the high species coverage and the wide distribution of the tagged corals at each site established during the baseline survey. By maximizing the number of corals to be monitored, the accuracy of the monitoring results could be enhanced and it could facilitate, if necessary, a better statistical evaluation for the assessment of trigger and action levels.

Seagrass monitoring

4.5.29 As stipulated in the EM&A Manual, a baseline survey would also be conducted for seagrass at site D3 before the commencement of any construction works. The extent of the seagrass beds, the coverage percentage and health conditions of seagrasses would be recorded. Site D2 would also be checked for the presence of seagrass individuals during the baseline monitoring. If seagrasses were also found in Site D2 in the baseline monitoring, the monitoring programme on seagrasses during construction and operation phases would expand to cover Site D2.

4.5.30 The baseline survey for seagrasses was conducted on 21 December 2005. Seagrass beds and scattered individuals of seagrasses were discovered at Site D3 (200 m south of the existing pier, at the estuary of Stream D) and Site D2 respectively during the EIA study. During the present baseline survey, no seagrass individual was found in Site D2, while the extent and density of seagrasses at Site D3 dropped significantly (see Photo Plate 4.10). Although it seemed to be in a health condition (leaf blades were green and intact), the seagrasses found in Site D3 were small in size and scattered. In areas with seagrasses, the coverage percentage was estimated to be about 10% only (compared with the over 70% coverage reported during the EIA study). The extent of areas with seagrasses was also smaller than the extent recorded during the EIA study (around 30m x 50m in the present survey vs over 50% of the surveyed area (i.e. 100m x 100m) in the EIA study). Seagrasses in Hong Kong are known for a strong seasonality, to expand during winter and to retreat during summer. From the small sizes of the leaf blades, the seagrasses found in Site D3 might be young individuals of the 2005-2006 winter.

5. Landscape and Visual

Site surveys were carried out on 26 November 2005 and 21 December 2005. During the period of the baseline monitoring, no major construction activity was carried out. The site situation is similar to the baseline characteristics during the EIA study. This is also verified by ecology terrestrial baseline survey in Section 4.4. The Project area is in natural condition which is similar to the condition during EIA study, hence, there is no change of landscape resource, landscape character area and the view conditions of each visually sensitive receiver.

6. Revision for inclusion into EM&A Manual

A joint site visit with Jockey Club was carried out on 26 November 2005 for the original proposed air quality monitoring location in the EM&A manual (administration building) which was found not suitable for installation and facing towards to the existing golf course. A new air quality monitoring location was proposed (Bungalow A), it faces towards and near to the proposed third golf course than the original proposed one. The new proposed location had been agreed with IEC before the baseline monitoring was being carried out. This has been included in the revised EM&A manual.

The EP permit (EP/224-2005) Section 4.1 states that additional water quality monitoring shall be carried out after heavy rain storm or when there is an overflow event from the reservoir, irrigation buffer lake or detention ponds/tanks. This has been included in the revised EM&A manual.

For the water quality monitoring locations, latitude and longitude locations have been revised after confirming on site during the baseline monitoring period. This has been included in the revised EM&A manual.

The recommended Action and Limit levels for air quality, stream and marine water qualities has been revised.

7. Conclusions and Recommendations

Baseline environmental study regarding the air quality, water quality and ecology was conducted for the Project.

From the baseline results of air quality monitoring, low level of 1-hour TSP and 24-hour TSP were reported. No noticeable impact was found near the monitoring stations during the baseline monitoring.

According to the baseline air quality monitoring result, low local impact was found near the monitoring station. Therefore, air quality monitoring data from all monitoring stations can be used as background indicator at Kau Sai Chau golf course.

Baseline marine and river water monitoring were carried out at 9 and 7 designated monitoring stations from 21 November to 21 December 2005.

Baseline terrestrial ecology surveys were conducted on 16, 20 and 22 December 2005. The habitats within the project sites, in particular the three natural streams (Stream A, B, & C) remained natural and were of similar conditions as recorded during the EIA study. While the baseline marine ecology surveys were conducted 13, 19, 20 and 21 December 2005. Site B2, C, D2 and a Control Site were surveyed for corals while Site D3 was surveyed for seagrasses. The seagrass beds in Site D3 were found of smaller area and lower coverage percentage than those recorded during the EIA study. 20 hard corals of significant sizes and of good conditions were selected and tagged at each of the sites for coral monitoring. All 80 tagged corals were recommended to be monitored in the EM&A programme.

Site surveys were carried on 26 November and 21 December 2005 for the landscape and visual baseline monitoring.

The measured results of the monitoring parameters are considered representative of the pre-construction ambient conditions prior to the commencement of the works. It is recommended that the Action and Limit Levels established from the baseline monitoring results should be used as performance criteria in the EM&A of the Project.

Appendix A
Baseline Monitoring Schedule

Baseline Monitoring Schedule

Day		Water Quality	Air Quality	Ecology (Terrestrial and Marine Ecology
26-Nov-05	Sat			
27-Nov-05	Sun			
28-Nov-05	Mon			
29-Nov-05	Tue			
30-Nov-05	Wed			
1-Dec-05	Thu			
2-Dec-05	Fri			
3-Dec-05	Sat			
4-Dec-05	Sun			
5-Dec-05	Mon			
6-Dec-05	Tue			
7-Dec-05	Wed			
8-Dec-05	Thu			
9-Dec-05	Fri			
10-Dec-05	Sat			
11-Dec-05	Sun			
12-Dec-05	Mon			
13-Dec-05	Tue			
14-Dec-05	Wed			
15-Dec-05	Thu			
16-Dec-05	Fri			
17-Dec-05	Sat			
18-Dec-05	Sun			
19-Dec-05	Mon			
20-Dec-05	Tue			
21-Dec-05	Wed			
22-Dec-05	Thu			

Appendix B
Weather Condition

Date			Air Temperature ^{o}C (Sai Kung)		Relative Humidity (%)	Rainfall
			Maximum	Minimum		
26 November, 2005	Sat	Cloudy	18.3	24	72-79	-
28 November, 2005	Mon	Cloudy	21.2	25.9	68-78	-
29 November, 2005	Tue	Fine	20.8	24.7	72-79	Trace
30 November, 2005	Wed	Cloudy	19.1	21.7	62-71	Trace
1 December, 2005	Thu	Fine	17.9	22.3	68-87	-
2 December, 2005	Fri	Fine	18.4	23.6	66-91	-
3 December, 2005	Sat	Fine	21	23.5	65-82	-
4 December, 2005	Sun	Fine	15.7	21.6	55-77	-
5 December, 2005	Mon	Cloudy	11.2	15.7	47-63	-
6 December, 2005	Tue	Cloudy	9.8	12	48-59	-
7 December, 2005	Wed	Fine	10.7	15.7	49-62	-
8 December, 2005	Thu	Fine	14.5	19.1	50-79	-
9 December, 2005	Fri	Fine	16.6	20	65-87	-
10 December, 2005	Sat	Fine	18.7	22.4	66-87	-
11 December, 2005	Sun	Fine	15.3	20.7	58-88	-
12 December, 2005	Mon	Fine	13.1	16.5	56-74	-
13 December, 2005	Tue	Fine	12.3	16.3	59-68	Trace
14 December, 2005	Wed	Fine	12.4	16.1	37-62	-
15 December, 2005	Thu	Fine	10.9	16.3	36-46	-
16 December, 2005	Fri	Fine	10.6	17.4	34-67	-
17 December, 2005	Sat	Fine	12.5	18.2	26-74	-
18 December, 2005	Sun	Cloudy	10.3	15.1	35-69	-
19 December, 2005	Mon	Fine	10.4	16.4	46-84	-
20 December, 2005	Tue	Fine	13	18.8	51-84	-
21 December, 2005	Wed	Fine	12.1	16.1	23-60	-
22 December, 2005	Thu	Fine	9.9	15.0	22-46	-
23 December, 2005	Fri	Fine	9.1	16.7	37-74	-

Appendix C
Baseline Monitoring Results

Air Quality

Baseline Air Quality Monitoring Results

1-hour TSP Monitoring Results at Station GCA B1

Date	Starting Time	Concentration, µg/m3			
		1st	2nd	3rd	Average
29-Nov-05	13:11	43.5	46.0	41.1	43.5
30-Nov-05	12:10	56.8	52.6	53.7	54.4
01-Dec-05	11:25	45.8	51.1	42.5	46.5
02-Dec-05	10:40	43.7	40.2	46.5	43.5
03-Dec-05	10:20	38.7	43.9	45.8	42.8
04-Dec-05	11:05	36.6	40.6	39.2	38.8
05-Dec-05	11:05	42.0	38.5	44.5	41.7
06-Dec-05	10:20	33.3	35.6	39.6	36.2
07-Dec-05	11:20	43.1	40.6	41.6	41.8
08-Dec-05	10:30	40.9	39.9	42.6	41.1
09-Dec-05	10:25	44.5	41.7	38.4	41.5
10-Dec-05	11:40	37.6	38.4	35.1	37.0
11-Dec-05	10:45	38.1	37.5	37.0	37.5
12-Dec-05	11:20	40.1	37.4	44.9	40.8
				Min.	33.3
				Max.	56.8
				Average	41.9

Air Quality Monitoring Results

24-hour TSP Monitoring Results at Station GCA B1

Date	Filter Weight (g)		Flow Rate (m^3/min.)		Elapse Time		Sampling Time(hrs.)	Conc. ($\mu g/m^3$)	Weather Condition	Particulate weight(g)	Av. flow (m^3/min)	Total vol. (m^3)
	Initial	Final	Initial	Final	Initial	Final						
29-Nov-05	3.6080	3.8812	1.32	1.32	9122.3	9145.8	23.4	147.2	Fine	0.27	1.32	1856.4
30-Nov-05	3.5461	3.7878	1.37	1.37	9145.8	9169.6	23.9	123.2	Cloudy	0.24	1.37	1961.3
01-Dec-05	3.5835	3.7326	1.29	1.29	9169.6	9193.6	24.0	80.1	Fine	0.15	1.29	1861.9
02-Dec-05	3.5702	3.6716	1.29	1.29	9193.6	9216.8	23.2	56.4	Fine	0.10	1.29	1797.5
03-Dec-05	3.5836	3.7584	1.29	1.29	9216.8	9240.8	24.0	94.0	Fine	0.17	1.29	1860.4
04-Dec-05	3.5643	3.7578	1.29	1.29	9240.8	9264.8	24.0	103.9	Fine	0.19	1.29	1861.9
05-Dec-05	3.5694	3.7268	1.29	1.29	9264.8	9288.1	23.3	87.0	Cloudy	0.16	1.29	1808.4
06-Dec-05	3.6085	3.7427	1.32	1.32	9288.1	9312.1	24.0	70.5	Cloudy	0.13	1.32	1903.7
07-Dec-05	3.6158	3.7533	1.29	1.29	9312.1	9336.0	24.0	74.0	Fine	0.14	1.29	1858.8
08-Dec-05	3.6010	3.7581	1.29	1.29	9336.0	9360.0	23.9	84.6	Fine	0.16	1.29	1858.0
09-Dec-05	3.5908	3.7386	1.35	1.35	9360.0	9384.0	24.0	76.0	Fine	0.15	1.35	1944.0
10-Dec-05	3.5759	3.7361	1.29	1.29	9384.0	9407.6	23.6	87.5	Fine	0.16	1.29	1831.7
11-Dec-05	3.5906	3.7508	1.35	1.35	9407.6	9431.6	24.0	82.4	Fine	0.16	1.35	1944.0
12-Dec-05	3.5914	3.7162	1.24	1.24	9431.6	9455.6	24.0	70.1	Fine	0.12	1.24	1779.8

Min	56.4
Max	147.2
Average	88.3

Water Quality

M_RO1	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:23	4.5	1.0	22.8	33.8	7.1	8.2	1.1
mid-ebb	28/11/2005	08:00	4.3	1.0	23.3	34.2	7.3	8.1	**1.0**
mid-ebb	30/11/2005	14:16	4.7	1.0	23.0	28.3	6.3	8.3	1.3
mid-ebb	02/12/2005	12:46	5.3	1.0	23.4	33.8	5.2	8.1	1.3
mid-ebb	05/12/2005	13:47	4.6	1.0	22.2	32.1	6.9	8.2	1.0
mid-ebb	07/12/2005	04:31	5.8	1.0	20.8	33.0	7.6	8.4	2.2
mid-ebb	09/12/2005	05:51	5.0	1.0	20.6	32.9	6.4	8.2	1.6
mid-ebb	12/12/2005	07:34	5.2	1.0	19.5	32.1	6.3	8.4	2.2
mid-ebb	14/12/2005	08:56	5.3	1.0	19.5	32.8	8.7	8.2	2.2
mid-ebb	16/12/2005	12:46	5.6	1.0	18.8	33.3	7.5	8.4	2.1
mid-ebb	19/12/2005	12:59	5.1	1.0	18.2	32.9	7.3	8.3	1.2
mid-ebb	21/12/2005	03:31	5.0	1.0	17.7	32.1	8.3	8.3	1.1
Average			5.0	1.0	20.8	32.6	7.1	8.3	1.5
Min			4.3	1.0	17.7	28.3	5.2	8.1	1.0
Max			5.8	1.0	23.4	34.2	8.7	8.4	2.2

M_RO1	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:18	4.5	1.0	23.5	33.8	8.0	8.0	**1.0**
mid-flood	28/11/2005	12:45	4.8	1.0	23.3	34.3	7.3	8.0	1.0
mid-flood	30/11/2005	09:01	5.2	1.0	23.1	34.0	6.1	8.3	1.1
mid-flood	02/12/2005	07:32	4.4	1.0	23.1	33.5	6.5	8.2	**1.0**
mid-flood	05/12/2005	08:31	4.0	1.0	22.3	32.3	7.3	8.3	1.2
mid-flood	07/12/2005	09:51	5.8	1.0	20.8	33.0	8.1	8.5	2.4
mid-flood	09/12/2005	10:49	5.8	1.0	20.4	32.5	7.2	8.3	1.7
mid-flood	12/12/2005	12:51	5.6	1.0	19.7	33.0	6.4	8.2	2.5
mid-flood	14/12/2005	14:16	5.2	1.0	19.6	33.3	5.6	8.5	2.1
mid-flood	16/12/2005	07:31	4.9	1.0	18.7	32.5	7.6	8.4	2.1
mid-flood	19/12/2005	08:07	5.1	1.0	17.7	32.3	7.6	8.4	2.5
mid-flood	21/12/2005	07:14	5.2	1.0	17.5	32.1	8.3	8.3	2.2
Average			5.0	1.0	20.8	33.1	7.2	8.3	1.7
Min			4.0	1.0	17.5	32.1	5.6	8.0	1.0
Max			5.8	1.0	23.5	34.3	8.3	8.5	2.5

BOLD value - < Detection Limit

M_RO1	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:22	4.5	3.5	22.8	33.8	7.1	8.2	**1.0**
mid-ebb	28/11/2005	07:59	4.3	2.1	23.2	33.7	7.3	8.1	**1.0**
mid-ebb	30/11/2005	14:15	4.7	3.7	23.0	33.8	5.6	8.2	**1.0**
mid-ebb	02/12/2005	12:45	5.3	4.3	23.1	33.8	5.1	8.1	1.1
mid-ebb	05/12/2005	13:46	4.6	3.6	22.2	32.0	6.9	8.2	1.4
mid-ebb	07/12/2005	04:30	5.8	4.8	20.8	33.1	7.7	8.3	2.1
mid-ebb	09/12/2005	05:50	5.0	4.0	20.5	32.9	6.4	8.2	2.5
mid-ebb	12/12/2005	07:33	5.2	4.2	19.6	32.8	6.2	8.4	1.5
mid-ebb	14/12/2005	08:55	5.3	4.3	19.4	32.8	8.6	8.2	1.3
mid-ebb	16/12/2005	12:45	5.6	4.6	18.6	33.2	7.5	8.4	1.9
mid-ebb	19/12/2005	12:58	5.1	4.1	18.0	32.9	7.3	8.3	1.2
mid-ebb	21/12/2005	03:30	5.0	4.0	17.5	32.2	8.1	8.3	1.5
Average			5.0	3.9	20.7	33.1	7.0	8.2	1.5
Min			4.3	2.1	17.5	32.0	5.1	8.1	1.0
Max			5.8	4.8	23.2	33.8	8.6	8.4	2.5

M_RO1	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:17	4.5	3.5	23.2	33.6	7.9	8.0	1.6
mid-flood	28/11/2005	12:44	4.8	3.8	23.3	34.2	7.4	8.0	3.1
mid-flood	30/11/2005	09:00	5.2	4.2	23.1	28.5	6.6	8.3	1.2
mid-flood	02/12/2005	07:31	4.4	3.4	22.9	33.5	7.2	8.3	1.0
mid-flood	05/12/2005	08:30	4.0	3.0	22.3	32.3	7.3	8.2	2.8
mid-flood	07/12/2005	09:50	5.8	4.8	20.4	33.0	8.4	8.5	8.7
mid-flood	09/12/2005	10:48	5.8	4.8	20.3	32.5	7.4	8.2	1.8
mid-flood	12/12/2005	12:50	5.6	4.6	19.7	32.8	6.2	8.3	2.0
mid-flood	14/12/2005	14:15	5.2	4.2	19.6	33.3	5.9	8.4	2.0
mid-flood	16/12/2005	07:30	4.9	3.9	18.5	32.5	7.5	8.4	3.4
mid-flood	19/12/2005	08:06	5.1	4.1	17.9	32.3	7.6	8.4	1.3
mid-flood	21/12/2005	07:13	5.2	4.2	17.7	32.5	8.2	8.3	1.6
Average			5.0	4.0	20.7	32.6	7.3	8.3	2.5
Min			4.0	3.0	17.7	28.5	5.9	8.0	1.0
Max			5.8	4.8	23.3	34.2	8.4	8.5	8.7

BOLD value - < Detection Limit

M_RO1		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.8
mid-ebb	28/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.6
mid-ebb	30/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	**0.5**
mid-ebb	02/12/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	**0.5**
mid-ebb	05/12/2005	3	**0.01**	0.01	0.03	0.05	**0.1**	0.9
mid-ebb	07/12/2005	2	**0.01**	0.02	0.03	0.06	**0.1**	0.6
mid-ebb	09/12/2005	3	0.01	**0.01**	0.02	0.04	**0.1**	1.1
mid-ebb	12/12/2005	6	**0.01**	0.01	0.01	0.03	**0.1**	1.0
mid-ebb	14/12/2005	4	**0.01**	0.01	0.01	0.03	**0.1**	1
mid-ebb	16/12/2005	2	**0.01**	0.02	0.01	0.04	**0.1**	0.5
mid-ebb	19/12/2005	3	**0.01**	0.01	0.02	0.04	**0.1**	0.6
mid-ebb	21/12/2005	**2**	0.01	**0.01**	0.09	0.11	**0.1**	1.2
Average		3	0.01	0.01	0.02	0.04	0.1	0.8
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		6	0.01	0.02	0.09	0.11	0.1	1.2
95%-ile		5	0.01	0.02	0.06	0.08	0.1	1.1
99%-ile		6	0.01	0.02	0.08	0.10	0.1	1.2

M_RO1		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	5	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.0
mid-flood	28/11/2005	5	**0.01**	**0.01**	0.01	0.03	**0.1**	0.5
mid-flood	30/11/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.5
mid-flood	02/12/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	0.6
mid-flood	05/12/2005	**2**	**0.01**	0.01	0.02	0.04	**0.1**	**0.5**
mid-flood	07/12/2005	3	0.02	0.02	0.03	0.07	**0.1**	0.8
mid-flood	09/12/2005	3	0.02	0.01	0.02	0.05	**0.1**	0.8
mid-flood	12/12/2005	6	0.02	0.01	0.02	0.05	**0.1**	1.1
mid-flood	14/12/2005	5	**0.01**	0.01	0.01	0.03	**0.1**	1.1
mid-flood	16/12/2005	2	**0.01**	0.02	0.01	0.04	**0.1**	0.8
mid-flood	19/12/2005	3	**0.01**	0.01	0.03	0.05	**0.1**	0.9
mid-flood	21/12/2005	**2**	0.01	**0.01**	0.08	0.10	**0.1**	1
Average		3	0.01	0.01	0.02	0.05	0.1	0.8
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		6	0.02	0.02	0.08	0.10	0.1	1.1
95%-ile		5	0.02	0.02	0.05	0.08	0.1	1.1
99%-ile		6	0.02	0.02	0.07	0.10	0.1	1.1

BOLD value - < Detection Limit

KLW	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:34	13.3	1.0	22.8	33.7	7.0	8.2	**1.0**
mid-ebb	28/11/2005	08:11	12.9	1.0	23.2	33.8	7.0	8.1	**1.0**
mid-ebb	30/11/2005	14:27	12.6	1.0	23.1	34.0	7.0	8.3	**1.0**
mid-ebb	02/12/2005	12:57	12.9	1.0	23.2	33.2	6.8	8.2	1.1
mid-ebb	05/12/2005	13:58	13.1	1.0	22.3	32.5	8.2	8.3	1.7
mid-ebb	07/12/2005	04:42	13.5	1.0	20.7	33.0	7.6	8.3	1.9
mid-ebb	09/12/2005	12:57	12.5	1.0	20.7	32.9	6.4	8.2	1.3
mid-ebb	12/12/2005	07:45	13.1	1.0	19.5	33.1	6.3	8.4	2.0
mid-ebb	14/12/2005	09:07	13.6	1.0	19.6	33.3	6.8	8.2	1.9
mid-ebb	16/12/2005	12:57	13.9	1.0	18.7	33.3	7.5	8.4	2.7
mid-ebb	19/12/2005	13:08	13.0	1.0	18.1	32.9	7.3	8.4	**1.0**
mid-ebb	21/12/2005	03:42	12.5	1.0	17.7	32.5	8.2	8.3	**1.0**
Average			13.1	1.0	20.8	33.2	7.2	8.3	1.5
Min			12.5	1.0	17.7	32.5	6.3	8.1	1.0
Max			13.9	1.0	23.2	34.0	8.2	8.4	2.7

KLW	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:29	12.6	1.0	22.6	33.7	6.6	8.3	**1.0**
mid-flood	28/11/2005	12:56	13.6	1.0	23.4	34.1	7.3	7.9	**1.0**
mid-flood	30/11/2005	09:12	13.5	1.0	23.1	33.8	6.1	8.3	**1.0**
mid-flood	02/12/2005	07:43	13.2	1.0	23.1	33.5	5.1	8.1	**1.0**
mid-flood	05/12/2005	08:42	13.4	1.0	22.2	32.3	6.6	8.3	1.8
mid-flood	07/12/2005	10:02	13.8	1.0	20.8	33.0	7.3	8.5	2.5
mid-flood	09/12/2005	08:00	13.9	1.0	20.4	32.5	7.0	8.3	1.4
mid-flood	12/12/2005	13:02	13.4	1.0	19.6	32.2	6.2	8.4	2.1
mid-flood	14/12/2005	14:27	13.7	1.0	19.6	32.8	7.1	8.5	2.8
mid-flood	16/12/2005	07:42	12.8	1.0	18.7	32.4	7.6	8.4	2.1
mid-flood	19/12/2005	08:02	13.3	1.0	17.8	32.4	7.7	8.4	1.2
mid-flood	21/12/2005	07:23	13.0	1.0	17.2	32.3	8.3	8.4	1.6
Average			13.4	1.0	20.7	32.9	6.9	8.3	1.6
Min			12.6	1.0	17.2	32.2	5.1	7.9	1.0
Max			13.9	1.0	23.4	34.1	8.3	8.5	2.8

BOLD value - < Detection Limit

KLW	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:33	13.3	6.6	22.8	34.4	6.9	8.2	1.0
mid-ebb	28/11/2005	08:10	12.9	6.5	23.1	28.8	7.0	8.1	**1.0**
mid-ebb	30/11/2005	14:26	12.6	6.3	23.1	34.1	7.0	8.3	**1.0**
mid-ebb	02/12/2005	12:56	12.9	6.5	23.0	33.8	6.4	8.1	1.0
mid-ebb	05/12/2005	13:57	13.1	6.6	22.5	32.9	7.1	8.2	1.9
mid-ebb	07/12/2005	04:41	13.5	6.8	20.8	33.1	7.4	8.4	2.0
mid-ebb	09/12/2005	12:56	12.5	6.3	20.3	32.9	6.1	8.2	1.3
mid-ebb	12/12/2005	07:44	13.1	6.6	19.5	32.1	6.4	8.4	1.8
mid-ebb	14/12/2005	09:06	13.6	6.8	19.6	32.8	6.6	8.2	2.2
mid-ebb	16/12/2005	12:56	13.9	6.9	18.6	33.3	7.5	8.4	4.6
mid-ebb	19/12/2005	13:07	13.0	6.5	17.8	32.9	7.2	8.4	1.1
mid-ebb	21/12/2005	03:41	12.5	6.2	17.8	32.3	8.1	8.3	1.5
Average			13.1	6.5	20.7	32.8	7.0	8.3	1.7
Min			12.5	6.2	17.8	28.8	6.1	8.1	1.0
Max			13.9	6.9	23.1	34.4	8.1	8.4	4.6

KLW	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:28	12.6	6.3	22.6	34.0	7.0	8.1	**1.0**
mid-flood	28/11/2005	12:55	13.6	6.8	23.1	34.2	7.3	7.9	1.9
mid-flood	30/11/2005	09:11	13.5	6.8	23.1	33.8	6.0	8.3	**1.0**
mid-flood	02/12/2005	07:42	13.2	6.6	23.0	33.5	5.3	8.1	**1.0**
mid-flood	05/12/2005	08:41	13.4	6.7	22.3	32.7	6.8	8.3	2.5
mid-flood	07/12/2005	10:01	13.8	6.9	20.7	33.0	7.2	8.5	2.3
mid-flood	09/12/2005	07:59	13.9	7.0	20.4	32.5	7.0	8.3	1.6
mid-flood	12/12/2005	13:01	13.4	6.7	19.7	32.9	6.5	8.4	2.0
mid-flood	14/12/2005	14:26	13.7	6.9	19.6	33.3	6.9	8.5	2.7
mid-flood	16/12/2005	07:41	12.8	6.4	18.7	32.4	7.6	8.4	2.4
mid-flood	19/12/2005	08:01	13.3	6.6	17.7	32.5	7.7	8.4	**1.0**
mid-flood	21/12/2005	07:22	13.0	6.5	17.4	32.3	8.2	8.4	2.2
Average			13.4	6.7	20.7	33.1	7.0	8.3	1.8
Min			12.6	6.3	17.4	32.3	5.3	7.9	1.0
Max			13.9	7.0	23.1	34.2	8.2	8.5	2.7

BOLD value - < Detection Limit

KLW	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:32	13.3	12.3	22.4	34.4	6.7	8.2	2.3
mid-ebb	28/11/2005	08:09	12.9	12.9	23.1	33.1	6.8	8.1	2.5
mid-ebb	30/11/2005	14:25	12.6	11.6	23.1	34.0	7.1	8.3	**1.0**
mid-ebb	02/12/2005	12:55	12.9	11.9	22.9	33.8	6.6	8.1	1.0
mid-ebb	05/12/2005	13:56	13.1	12.1	22.1	32.5	6.7	8.3	1.5
mid-ebb	07/12/2005	04:40	13.5	12.5	20.4	33.1	7.3	8.4	1.9
mid-ebb	09/12/2005	12:55	12.5	11.5	20.1	32.9	6.2	8.2	1.5
mid-ebb	12/12/2005	07:43	13.1	12.1	19.5	32.7	6.8	8.2	1.8
mid-ebb	14/12/2005	09:05	13.6	12.6	19.6	32.8	6.9	8.2	2.2
mid-ebb	16/12/2005	12:55	12.8	11.8	18.6	32.4	7.5	8.3	3.9
mid-ebb	19/12/2005	13:06	13.0	12.0	17.7	32.9	7.2	8.4	1.1
mid-ebb	21/12/2005	03:40	12.5	11.5	17.7	32.5	8.3	8.3	1.9
Average			13.0	12.1	20.6	33.1	7.0	8.3	1.9
Min			12.5	11.5	17.7	32.4	6.2	8.1	1.0
Max			13.6	12.9	23.1	34.4	8.3	8.4	3.9

KLW	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:27	12.6	11.6	22.4	34.0	7.0	8.2	2.2
mid-flood	28/11/2005	12:54	13.6	12.6	23.0	34.2	7.3	7.9	2.1
mid-flood	30/11/2005	09:10	13.5	12.5	23.0	33.9	5.9	8.3	1.8
mid-flood	02/12/2005	07:41	13.2	12.2	22.9	33.5	5.3	8.1	1.0
mid-flood	05/12/2005	08:40	13.4	12.4	22.2	32.3	6.5	8.3	1.7
mid-flood	07/12/2005	10:00	13.8	12.8	20.6	32.9	7.3	8.5	2.5
mid-flood	09/12/2005	07:58	13.9	12.9	20.0	32.5	6.8	8.2	2.1
mid-flood	12/12/2005	13:00	13.4	12.4	19.5	32.6	6.6	8.3	2.0
mid-flood	14/12/2005	14:25	13.7	12.7	19.6	33.2	6.8	8.5	2.4
mid-flood	16/12/2005	07:40	13.9	12.9	18.6	33.3	7.4	8.4	3.2
mid-flood	19/12/2005	08:00	13.3	12.3	17.5	32.5	7.8	8.4	1.1
mid-flood	21/12/2005	07:21	13.0	12.0	17.1	32.3	8.0	8.3	2.1
Average			13.4	12.4	20.5	33.1	6.9	8.3	2.0
Min			12.6	11.6	17.1	32.3	5.3	7.9	1.0
Max			13.9	12.9	23.0	34.2	8.0	8.5	3.2

BOLD value - < Detection Limit

KLW		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	0.8
mid-ebb	28/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.6
mid-ebb	30/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.7
mid-ebb	02/12/2005	2	0.01	**0.01**	0.01	0.03	**0.1**	0.5
mid-ebb	05/12/2005	3	0.01	0.01	0.02	0.04	**0.1**	0.8
mid-ebb	07/12/2005	3	0.03	0.03	0.01	0.07	**0.1**	0.9
mid-ebb	09/12/2005	**2**	0.02	0.01	0.01	0.04	**0.1**	1.4
mid-ebb	12/12/2005	7	0.01	0.01	0.03	0.05	**0.1**	1.0
mid-ebb	14/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	1
mid-ebb	16/12/2005	2	**0.01**	0.02	0.01	0.04	**0.1**	0.6
mid-ebb	19/12/2005	3	0.01	0.01	0.02	0.04	**0.1**	0.7
mid-ebb	21/12/2005	2	0.02	**0.01**	0.09	0.12	**0.1**	1
Average		3	0.01	0.01	0.02	0.05	0.1	0.8
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		7	0.03	0.03	0.09	0.12	0.1	1.4
95%-ile		5	0.02	0.02	0.06	0.09	0.1	1.2
99%-ile		7	0.03	0.03	0.08	0.11	0.1	1.4

KLW		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.7
mid-flood	28/11/2005	**2**	**0.01**	**0.01**	0.01	0.03	**0.1**	0.6
mid-flood	30/11/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	0.7
mid-flood	02/12/2005	**2**	0.02	**0.01**	0.02	0.05	**0.1**	**0.5**
mid-flood	05/12/2005	5	**0.01**	0.01	0.04	0.06	**0.1**	1.9
mid-flood	07/12/2005	2	0.01	0.02	0.03	0.06	**0.1**	0.8
mid-flood	09/12/2005	3	0.01	0.01	0.02	0.04	**0.1**	0.7
mid-flood	12/12/2005	4	**0.01**	0.01	0.01	0.03	**0.1**	1.2
mid-flood	14/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	1.1
mid-flood	16/12/2005	3	**0.01**	0.01	0.02	0.04	**0.1**	0.8
mid-flood	19/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	0.7
mid-flood	21/12/2005	**2**	0.01	**0.01**	0.09	0.11	**0.1**	1
Average		3	0.01	0.01	0.02	0.05	0.1	0.9
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		5	0.02	0.02	0.09	0.11	0.1	1.9
95%-ile		4	0.01	0.01	0.06	0.08	0.1	1.5
99%-ile		5	0.02	0.02	0.08	0.10	0.1	1.8

BOLD value - < Detection Limit

M_A	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:56	7.3	1.0	22.5	33.4	7.3	8.2	1.6
mid-ebb	28/11/2005	08:33	7.6	1.0	22.9	32.5	7.4	8.0	1.7
mid-ebb	30/11/2005	14:49	7.2	1.0	23.1	34.0	7.4	8.3	2.0
mid-ebb	02/12/2005	13:19	7.3	1.0	23.0	33.6	7.4	8.2	1.7
mid-ebb	05/12/2005	14:20	7.3	1.0	22.1	33.0	6.6	8.2	1.9
mid-ebb	07/12/2005	05:04	7.2	1.0	20.5	33.1	7.0	8.4	2.2
mid-ebb	09/12/2005	13:19	7.4	1.0	19.5	32.6	7.2	8.3	1.1
mid-ebb	12/12/2005	08:07	7.3	1.0	19.1	32.7	6.3	8.4	1.3
mid-ebb	14/12/2005	09:29	8.2	1.0	18.8	33.1	7.6	8.3	2.2
mid-ebb	16/12/2005	13:19	7.9	1.0	18.7	33.2	7.5	8.4	1.7
mid-ebb	19/12/2005	13:25	7.6	1.0	17.3	33.0	7.3	8.3	1.1
mid-ebb	21/12/2005	04:02	7.6	1.0	17.7	32.4	8.0	8.3	1.5
Average			7.5	1.0	20.4	33.1	7.3	8.3	1.7
Min			7.2	1.0	17.3	32.4	6.3	8.0	1.1
Max			8.2	1.0	23.1	34.0	8.0	8.4	2.2

M_A	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:51	7.8	1.0	22.9	33.6	7.2	8.2	1.3
mid-flood	28/11/2005	13:18	7.7	1.0	23.5	34.1	6.8	8.1	3.1
mid-flood	30/11/2005	09:34	7.9	1.0	23.0	32.1	7.3	8.1	2.0
mid-flood	02/12/2005	08:05	7.4	1.0	22.7	32.5	7.6	8.2	1.6
mid-flood	05/12/2005	09:04	7.3	1.0	22.0	32.7	6.4	8.3	1.5
mid-flood	07/12/2005	10:24	7.5	1.0	20.2	33.0	6.6	8.5	2.3
mid-flood	09/12/2005	08:22	6.3	1.0	20.0	33.0	6.3	8.1	2.2
mid-flood	12/12/2005	13:24	7.2	1.0	19.4	32.6	6.2	8.3	1.9
mid-flood	14/12/2005	14:49	7.9	1.0	18.9	33.3	5.3	8.4	2.2
mid-flood	16/12/2005	08:04	7.6	1.0	18.4	33.0	7.6	8.4	1.7
mid-flood	19/12/2005	08:30	7.2	1.0	17.1	32.7	7.1	8.4	**1.0**
mid-flood	21/12/2005	07:46	7.6	1.0	17.8	32.8	8.3	8.4	2.0
Average			7.5	1.0	20.5	33.0	6.9	8.3	1.9
Min			6.3	1.0	17.1	32.1	5.3	8.1	1.0
Max			7.9	1.0	23.5	34.1	8.3	8.5	3.1

BOLD value - < Detection Limit

M_A	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:55	7.3	3.6	22.4	33.4	7.3	8.2	2.0
mid-ebb	28/11/2005	08:32	7.6	3.8	22.9	32.5	7.3	8.0	2.9
mid-ebb	30/11/2005	14:48	7.2	3.6	23.1	34.0	7.2	8.3	1.9
mid-ebb	02/12/2005	13:18	7.3	3.6	22.9	33.7	6.7	8.2	1.7
mid-ebb	05/12/2005	14:19	7.3	3.6	22.0	32.9	6.6	8.3	1.5
mid-ebb	07/12/2005	05:03	7.2	3.6	20.4	33.2	6.8	8.3	2.1
mid-ebb	09/12/2005	13:18	7.4	3.7	19.5	32.6	5.7	8.3	2.0
mid-ebb	12/12/2005	08:06	7.3	3.6	19.3	32.8	5.9	8.2	2.2
mid-ebb	14/12/2005	09:28	8.2	4.1	18.9	33.0	5.6	8.3	2.1
mid-ebb	16/12/2005	13:18	7.9	3.9	18.4	33.0	7.6	8.4	2.0
mid-ebb	19/12/2005	13:24	7.6	3.8	17.1	33.0	7.3	8.3	1.8
mid-ebb	21/12/2005	04:01	7.6	3.8	17.6	32.5	8.1	8.3	2.2
Average			7.5	3.7	20.4	33.1	6.8	8.3	2.0
Min			7.2	3.6	17.1	32.5	5.6	8.0	1.5
Max			8.2	4.1	23.1	34.0	8.1	8.4	2.9

M_A	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:50	7.8	3.9	22.7	33.6	7.1	8.2	1.5
mid-flood	28/11/2005	13:17	7.7	3.8	23.0	31.4	6.8	8.1	3.2
mid-flood	30/11/2005	09:33	7.9	3.9	22.9	32.1	7.5	8.1	2.1
mid-flood	02/12/2005	08:04	7.4	3.7	22.7	32.5	7.8	8.2	1.4
mid-flood	05/12/2005	09:03	7.3	3.6	22.0	32.7	6.4	8.3	1.3
mid-flood	07/12/2005	10:23	7.5	3.7	20.2	33.0	6.6	8.5	1.6
mid-flood	09/12/2005	08:21	6.3	3.1	19.5	33.0	6.3	8.1	3.0
mid-flood	12/12/2005	13:23	7.2	3.6	19.5	33.0	6.5	8.2	2.2
mid-flood	14/12/2005	14:48	8.2	4.1	18.9	33.0	7.6	8.3	2.1
mid-flood	16/12/2005	08:03	7.6	3.8	18.4	33.0	7.6	8.3	2.0
mid-flood	19/12/2005	08:29	7.2	3.6	17.0	32.7	7.2	8.4	1.0
mid-flood	21/12/2005	07:45	7.6	3.8	17.7	32.7	8.2	8.4	1.6
Average			7.5	3.7	20.4	32.7	7.1	8.3	1.9
Min			6.3	3.1	17.0	31.4	6.3	8.1	1.0
Max			8.2	4.1	23.0	33.6	8.2	8.5	3.2

BOLD value - < Detection Limit

M_A	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	07:54	7.3	6.3	22.6	33.2	7.4	8.2	2.1
mid-ebb	28/11/2005	08:31	7.6	6.6	22.9	32.5	7.4	8.0	3.4
mid-ebb	30/11/2005	14:47	7.2	6.2	23.0	34.0	7.4	8.3	2.0
mid-ebb	02/12/2005	13:17	7.3	6.3	22.9	33.5	6.8	8.2	2.4
mid-ebb	05/12/2005	14:18	7.3	6.3	21.6	32.8	6.4	8.3	2.1
mid-ebb	07/12/2005	05:02	7.2	6.2	20.3	33.1	6.9	8.3	2.1
mid-ebb	09/12/2005	13:17	7.4	6.4	19.5	32.6	7.1	8.2	2.0
mid-ebb	12/12/2005	08:05	7.3	6.3	19.4	32.9	6.9	8.2	2.1
mid-ebb	14/12/2005	09:27	8.2	7.2	18.9	33.1	7.7	8.3	1.6
mid-ebb	16/12/2005	13:17	7.9	6.9	16.8	33.3	7.7	8.3	6.5
mid-ebb	19/12/2005	13:23	7.6	6.6	16.7	33.0	7.4	8.3	6.2
mid-ebb	21/12/2005	04:00	7.6	6.6	17.1	32.2	8.3	8.3	4.5
Average			7.5	6.5	20.1	33.0	7.3	8.2	3.1
Min			7.2	6.2	16.7	32.2	6.4	8.0	1.6
Max			8.2	7.2	23.0	34.0	8.3	8.3	6.5

M_A	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	16:49	7.8	6.8	22.7	33.6	7.3	8.3	2.0
mid-flood	28/11/2005	13:16	7.7	6.7	23.0	34.1	6.7	8.1	2.9
mid-flood	30/11/2005	09:32	7.9	6.9	22.9	22.3	7.8	8.1	2.1
mid-flood	02/12/2005	08:03	7.4	6.4	22.6	32.5	7.7	8.2	3.0
mid-flood	05/12/2005	09:02	7.3	6.3	21.9	32.7	6.4	8.3	2.5
mid-flood	07/12/2005	10:22	7.5	6.5	20.2	33.0	6.6	8.5	2.2
mid-flood	09/12/2005	08:20	6.3	5.3	19.4	33.0	6.2	8.1	3.2
mid-flood	12/12/2005	13:22	7.2	3.6	19.6	32.8	6.8	8.2	2.5
mid-flood	14/12/2005	14:47	8.2	7.2	18.9	33.1	7.7	8.3	1.6
mid-flood	16/12/2005	08:02	7.6	6.6	18.3	33.0	7.6	8.4	1.8
mid-flood	19/12/2005	08:28	7.2	6.2	16.8	32.8	7.2	8.3	2.4
mid-flood	21/12/2005	07:44	7.6	6.6	17.7	32.3	8.2	8.4	2.5
Average			7.5	6.3	20.3	32.1	7.2	8.3	2.4
Min			6.3	3.6	16.8	22.3	6.2	8.1	1.6
Max			8.2	7.2	23.0	34.1	8.2	8.5	3.2

BOLD value - < Detection Limit

M_A		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.5
mid-ebb	28/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	0.7
mid-ebb	30/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	0.8
mid-ebb	02/12/2005	15	0.04	**0.01**	0.02	0.07	**0.1**	1.0
mid-ebb	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.4
mid-ebb	07/12/2005	5	0.02	0.02	0.03	0.07	**0.1**	0.7
mid-ebb	09/12/2005	5	**0.01**	**0.01**	0.02	0.04	**0.1**	1.8
mid-ebb	12/12/2005	4	**0.01**	**0.01**	0.02	0.04	**0.1**	1.1
mid-ebb	14/12/2005	3	**0.01**	0.01	0.01	0.03	**0.1**	1
mid-ebb	16/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	0.6
mid-ebb	19/12/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1
mid-ebb	21/12/2005	**2**	0.01	**0.01**	0.08	0.10	**0.1**	1.1
Average		4	0.01	0.01	0.02	0.05	0.1	1.0
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		15	0.04	0.02	0.08	0.10	0.1	1.8
95%-ile		9	0.03	0.01	0.05	0.08	0.1	1.6
99%-ile		14	0.04	0.02	0.07	0.10	0.1	1.8

M_A		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.9
mid-flood	28/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.7
mid-flood	30/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.6
mid-flood	02/12/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.9
mid-flood	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.5
mid-flood	07/12/2005	2	0.02	0.02	0.02	0.06	**0.1**	1.0
mid-flood	09/12/2005	**2**	0.01	0.01	0.02	0.04	**0.1**	1.2
mid-flood	12/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.0
mid-flood	14/12/2005	3	**0.01**	0.01	0.01	0.03	**0.1**	1.2
mid-flood	16/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	0.7
mid-flood	19/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.9
mid-flood	21/12/2005	**2**	0.01	**0.01**	0.08	0.10	**0.1**	1.1
Average		2	0.01	0.01	0.02	0.04	0.1	1.1
Min		2	0.01	0.01	0.01	0.03	0.1	0.7
Max		3	0.02	0.02	0.08	0.10	0.1	1.6
95%-ile		3	0.01	0.01	0.05	0.08	0.1	1.5
99%-ile		3	0.02	0.02	0.07	0.10	0.1	1.6

BOLD value - < Detection Limit

M_Marsh	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:10	7.2	1.0	22.9	33.7	7.2	8.2	1.4
mid-ebb	28/11/2005	08:47	7.2	1.0	23.0	32.6	7.2	8.1	1.3
mid-ebb	30/11/2005	15:03	7.8	1.0	23.2	34.0	6.6	8.3	2.4
mid-ebb	02/12/2005	13:33	7.6	1.0	22.8	32.5	6.6	8.2	1.4
mid-ebb	05/12/2005	14:34	7.3	1.0	21.5	33.0	7.0	8.3	1.6
mid-ebb	07/12/2005	05:18	7.9	1.0	19.8	33.2	6.6	8.4	2.4
mid-ebb	09/12/2005	13:33	8.1	1.0	20.0	32.6	7.1	8.3	1.6
mid-ebb	12/12/2005	08:21	7.7	1.0	19.0	32.9	6.2	8.4	1.9
mid-ebb	14/12/2005	09:43	8.5	1.0	18.7	33.1	7.2	8.3	1.5
mid-ebb	16/12/2005	13:33	7.9	1.0	18.3	33.3	7.6	8.4	1.7
mid-ebb	19/12/2005	13:40	7.7	1.0	17.8	32.9	7.3	8.4	1.2
mid-ebb	21/12/2005	04:14	7.9	1.0	17.6	32.1	8.3	8.3	1.6
Average			7.7	1.0	20.4	33.0	7.1	8.3	1.7
Min			7.2	1.0	17.6	32.1	6.2	8.1	1.2
Max			8.5	1.0	23.2	34.0	8.3	8.4	2.4

M_Marsh	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:05	7.2	1.0	23.2	33.4	7.6	8.2	1.3
mid-flood	28/11/2005	13:32	7.8	1.0	23.5	34.2	6.8	8.1	1.6
mid-flood	30/11/2005	09:48	7.9	1.0	23.0	32.2	7.0	8.2	1.4
mid-flood	02/12/2005	08:19	7.7	1.0	22.8	32.5	6.6	8.2	1.4
mid-flood	05/12/2005	09:18	7.5	1.0	21.4	32.8	6.9	8.3	1.9
mid-flood	07/12/2005	10:38	7.7	1.0	19.4	33.2	6.2	8.4	3.2
mid-flood	09/12/2005	08:36	8.0	1.0	20.7	33.1	6.3	8.2	1.9
mid-flood	12/12/2005	13:38	7.7	1.0	19.1	33.2	6.4	8.3	1.7
mid-flood	14/12/2005	15:03	8.0	1.0	18.7	33.4	7.2	8.4	2.3
mid-flood	16/12/2005	08:18	8.3	1.0	17.5	33.4	7.6	8.4	2.0
mid-flood	19/12/2005	08:43	8.2	1.0	17.5	32.9	7.0	8.4	**1.0**
mid-flood	21/12/2005	07:56	8.0	1.0	17.6	32.6	8.2	8.3	1.3
Average			7.8	1.0	20.4	33.1	7.0	8.3	1.8
Min			7.2	1.0	17.5	32.2	6.2	8.1	1.0
Max			8.3	1.0	23.5	34.2	8.2	8.4	3.2

BOLD value - < Detection Limit

M_Marsh	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:09	7.2	3.6	22.8	33.7	7.1	8.2	1.6
mid-ebb	28/11/2005	08:46	7.2	3.6	23.0	32.6	7.1	8.1	1.3
mid-ebb	30/11/2005	15:02	7.8	3.9	23.2	34.0	6.2	8.3	2.4
mid-ebb	02/12/2005	13:32	7.6	3.8	23.3	32.7	6.8	8.2	1.6
mid-ebb	05/12/2005	14:33	7.3	3.6	21.7	32.9	6.7	8.3	2.0
mid-ebb	07/12/2005	05:17	7.9	3.9	19.7	33.2	6.6	8.4	3.3
mid-ebb	09/12/2005	13:32	8.1	4.0	19.9	32.6	7.0	8.3	1.6
mid-ebb	12/12/2005	08:20	7.7	3.8	19.4	33.1	6.8	8.2	2.1
mid-ebb	14/12/2005	09:42	8.5	4.2	18.7	33.1	7.3	8.3	2.2
mid-ebb	16/12/2005	13:32	7.9	3.9	17.6	33.3	7.6	8.3	2.1
mid-ebb	19/12/2005	13:39	7.7	3.8	17.7	32.9	7.2	8.4	1.1
mid-ebb	21/12/2005	04:13	7.9	3.8	17.5	32.6	8.2	8.3	1.5
Average			7.7	3.8	20.4	33.1	7.1	8.3	1.9
Min			7.2	3.6	17.5	32.6	6.2	8.1	1.1
Max			8.5	4.2	23.3	34.0	8.2	8.4	3.3

M_Marsh	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:04	7.2	3.6	23.4	33.5	7.7	8.2	1.8
mid-flood	28/11/2005	13:31	7.8	3.9	23.2	34.1	6.8	8.1	2.7
mid-flood	30/11/2005	09:47	7.9	3.9	23.0	32.2	7.1	8.2	1.4
mid-flood	02/12/2005	08:18	7.7	3.8	22.9	32.5	6.7	8.2	2.2
mid-flood	05/12/2005	09:17	7.5	3.7	21.6	32.7	7.0	8.2	2.1
mid-flood	07/12/2005	10:37	7.7	3.8	19.5	30.2	6.3	8.4	2.7
mid-flood	09/12/2005	08:35	8.0	4.0	20.5	33.1	6.2	8.2	2.0
mid-flood	12/12/2005	13:37	7.7	3.8	19.6	33.2	6.5	8.3	2.2
mid-flood	14/12/2005	15:02	8.0	4.0	18.7	33.3	7.2	8.4	2.3
mid-flood	16/12/2005	08:17	8.3	4.1	17.5	33.4	7.6	8.4	1.8
mid-flood	19/12/2005	08:42	8.2	4.1	17.3	32.8	7.0	8.4	**1.0**
mid-flood	21/12/2005	07:55	8.0	4.0	17.6	32.5	8.4	8.3	2.0
Average			7.8	3.9	20.4	32.8	7.0	8.3	2.0
Min			7.2	3.6	17.3	30.2	6.2	8.1	1.0
Max			8.3	4.1	23.4	34.1	8.4	8.4	2.7

BOLD value - < Detection Limit

M_Marsh	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:08	7.2	6.2	22.7	33.7	7.0	8.2	1.4
mid-ebb	28/11/2005	08:45	7.2	6.2	23.0	32.7	7.2	8.1	2.4
mid-ebb	30/11/2005	15:01	7.8	6.8	23.2	34.0	6.3	8.3	2.8
mid-ebb	02/12/2005	13:31	7.6	6.6	23.3	33.5	6.6	8.2	1.7
mid-ebb	05/12/2005	14:32	7.3	6.3	21.7	33.0	6.9	8.3	2.0
mid-ebb	07/12/2005	05:16	7.9	6.9	19.6	33.3	6.4	8.4	3.1
mid-ebb	09/12/2005	13:31	8.1	7.0	19.8	32.6	7.0	8.3	1.7
mid-ebb	12/12/2005	08:19	7.7	6.7	19.4	33.4	6.8	8.2	2.5
mid-ebb	14/12/2005	09:41	8.5	7.5	18.8	33.1	7.3	8.3	2.5
mid-ebb	16/12/2005	13:31	7.9	6.9	17.7	33.1	7.7	8.3	2.4
mid-ebb	19/12/2005	13:38	7.7	6.7	17.7	32.9	7.2	8.4	1.0
mid-ebb	21/12/2005	04:12	7.9	6.9	17.5	32.1	8.4	8.3	2.0
Average			7.7	6.7	20.4	33.1	7.1	8.3	2.1
Min			7.2	6.2	17.5	32.1	6.3	8.1	1.0
Max			8.5	7.5	23.3	34.0	8.4	8.4	3.1

M_Marsh	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:03	7.2	6.2	23.0	33.6	7.0	8.2	2.1
mid-flood	28/11/2005	13:30	7.8	6.8	23.0	31.1	6.9	8.1	2.4
mid-flood	30/11/2005	09:46	7.9	6.9	23.0	32.2	7.0	8.2	1.8
mid-flood	02/12/2005	08:17	7.7	6.7	22.8	32.5	6.8	8.2	2.2
mid-flood	05/12/2005	09:16	7.5	6.5	21.8	32.9	6.9	8.3	2.1
mid-flood	07/12/2005	10:36	7.7	6.7	19.4	33.2	6.3	8.4	3.3
mid-flood	09/12/2005	08:34	8.0	7.0	20.2	33.1	6.2	8.2	2.5
mid-flood	12/12/2005	13:36	7.7	6.7	19.6	33.5	6.3	8.2	2.4
mid-flood	14/12/2005	15:01	8.0	7.0	18.7	33.4	7.2	8.4	2.5
mid-flood	16/12/2005	08:16	8.3	7.3	17.4	33.4	7.6	8.3	2.1
mid-flood	19/12/2005	08:41	8.2	7.2	17.3	32.8	7.0	8.4	**1.0**
mid-flood	21/12/2005	07:54	8.0	7.0	17.8	32.8	8.1	8.3	2.1
Average			7.8	6.8	20.3	32.9	6.9	8.3	2.2
Min			7.2	6.2	17.3	31.1	6.2	8.1	1.0
Max			8.3	7.3	23.0	33.6	8.1	8.4	3.3

BOLD value - < Detection Limit

M_Marsh		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.6
mid-ebb	28/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.8
mid-ebb	30/11/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	1.2
mid-ebb	02/12/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	1.2
mid-ebb	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.4
mid-ebb	07/12/2005	2	0.02	0.02	0.01	0.05	**0.1**	0.7
mid-ebb	09/12/2005	3	0.02	**0.01**	0.02	0.05	**0.1**	1.8
mid-ebb	12/12/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	0.8
mid-ebb	14/12/2005	2	0.01	0.01	0.01	0.03	**0.1**	0.7
mid-ebb	16/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	0.5
mid-ebb	19/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	1.1
mid-ebb	21/12/2005	**2**	0.02	**0.01**	0.09	0.12	**0.1**	1.3
Average		2	0.01	0.01	0.02	0.04	0.1	1.0
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		3	0.02	0.02	0.09	0.12	0.1	1.8
95%-ile		3	0.02	0.01	0.05	0.08	0.1	1.6
99%-ile		3	0.02	0.02	0.08	0.11	0.1	1.8

M_Marsh		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	4	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.3
mid-flood	28/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.4
mid-flood	30/11/2005	4	**0.01**	**0.01**	0.01	0.03	**0.1**	3.4
mid-flood	02/12/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.7
mid-flood	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.8
mid-flood	07/12/2005	3	0.02	0.01	0.02	0.05	**0.1**	1.0
mid-flood	09/12/2005	2	0.01	0.01	0.02	0.04	**0.1**	1.0
mid-flood	12/12/2005	3	0.01	**0.01**	0.01	0.03	**0.1**	1.0
mid-flood	14/12/2005	3	**0.01**	0.01	0.01	0.03	**0.1**	1.1
mid-flood	16/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	0.7
mid-flood	19/12/2005	4	**0.01**	**0.01**	0.03	0.05	**0.1**	0.7
mid-flood	21/12/2005	**2**	0.01	**0.01**	0.08	0.10	**0.1**	1.2
Average		3	0.01	0.01	0.02	0.04	0.1	1.3
Min		2	0.01	0.01	0.01	0.03	0.1	0.7
Max		4	0.02	0.01	0.08	0.10	0.1	3.4
95%-ile		4	0.01	0.01	0.05	0.07	0.1	2.5
99%-ile		4	0.02	0.01	0.07	0.09	0.1	3.2

BOLD value - < Detection Limit

TTC	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:20	9.3	1.0	23.0	33.7	7.2	8.2	1.8
mid-ebb	28/11/2005	08:57	9.7	1.0	23.1	32.7	7.3	8.1	1.6
mid-ebb	30/11/2005	15:13	10.0	1.0	23.2	34.0	7.2	8.3	2.0
mid-ebb	02/12/2005	13:43	9.9	1.0	23.4	33.2	6.8	8.2	1.5
mid-ebb	05/12/2005	14:44	9.7	1.0	21.7	32.9	7.0	8.3	1.6
mid-ebb	07/12/2005	05:28	9.3	1.0	19.7	33.2	6.5	8.4	2.0
mid-ebb	09/12/2005	13:43	9.5	1.0	20.2	32.7	6.8	8.3	1.3
mid-ebb	12/12/2005	08:31	9.3	1.0	19.2	32.6	6.8	8.2	1.9
mid-ebb	14/12/2005	09:53	9.9	1.0	18.7	33.5	6.9	8.4	1.9
mid-ebb	16/12/2005	13:43	9.8	1.0	18.0	33.4	7.7	8.4	2.7
mid-ebb	19/12/2005	13:50	9.9	1.0	17.7	33.1	7.2	8.4	**1.0**
mid-ebb	21/12/2005	04:42	10.0	1.0	17.3	32.6	8.3	8.4	1.5
Average			9.7	1.0	20.4	33.1	7.1	8.3	1.7
Min			9.3	1.0	17.3	32.6	6.5	8.1	1.0
Max			10.0	1.0	23.4	34.0	8.3	8.4	2.7

TTC	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:15	9.0	1.0	23.7	33.6	7.1	8.2	1.1
mid-flood	28/11/2005	13:42	10.0	1.0	23.6	34.3	7.1	8.2	1.6
mid-flood	30/11/2005	09:58	10.1	1.0	23.2	32.4	6.8	8.2	3.4
mid-flood	02/12/2005	08:29	9.7	1.0	22.9	32.6	6.6	8.2	1.5
mid-flood	05/12/2005	09:28	9.9	1.0	21.5	32.6	7.1	8.3	1.1
mid-flood	07/12/2005	10:48	9.0	1.0	19.5	33.3	6.1	8.4	1.7
mid-flood	09/12/2005	08:46	8.8	1.0	20.8	33.1	6.2	8.3	1.9
mid-flood	12/12/2005	13:48	9.0	1.0	19.4	33.1	6.5	8.2	2.0
mid-flood	14/12/2005	15:13	9.8	1.0	18.8	33.2	6.3	8.4	1.9
mid-flood	16/12/2005	08:28	9.6	1.0	17.5	33.6	7.7	8.4	1.6
mid-flood	19/12/2005	08:49	9.5	1.0	17.5	32.8	7.0	8.4	**1.0**
mid-flood	21/12/2005	08:06	9.9	1.0	17.6	32.1	8.0	8.3	1.5
Average			9.5	1.0	20.5	33.1	6.9	8.3	1.7
Min			8.8	1.0	17.5	32.1	6.1	8.2	1.0
Max			10.1	1.0	23.7	34.3	8.0	8.4	3.4

BOLD value - < Detection Limit

TTC	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:19	9.3	4.6	22.9	33.7	6.8	8.1	2.8
mid-ebb	28/11/2005	08:56	9.7	4.8	23.1	32.8	7.2	8.1	1.5
mid-ebb	30/11/2005	15:12	10.0	5.0	23.1	34.0	6.8	8.3	2.1
mid-ebb	02/12/2005	13:42	9.9	4.9	23.1	33.6	7.0	8.2	1.5
mid-ebb	05/12/2005	14:43	9.7	4.8	21.6	33.1	7.1	8.3	1.9
mid-ebb	07/12/2005	05:27	9.3	4.6	19.7	33.2	6.6	8.4	1.9
mid-ebb	09/12/2005	13:42	9.5	4.7	20.1	32.7	6.8	8.3	1.5
mid-ebb	12/12/2005	08:30	9.3	4.6	19.3	32.8	6.6	8.2	2.0
mid-ebb	14/12/2005	09:52	9.9	4.9	18.8	33.2	5.3	8.3	1.8
mid-ebb	16/12/2005	13:42	9.8	4.9	17.5	33.4	7.6	8.4	1.7
mid-ebb	19/12/2005	13:49	9.9	4.9	17.6	33.1	7.1	8.4	1.3
mid-ebb	21/12/2005	04:21	10.0	5.0	17.5	32.3	8.2	8.3	2.0
Average			9.7	4.8	20.4	33.2	6.9	8.3	1.8
Min			9.3	4.6	17.5	32.3	5.3	8.1	1.3
Max			10.0	5.0	23.1	34.0	8.2	8.4	2.8

TTC	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:14	9.0	4.5	23.5	33.6	7.1	8.2	2.1
mid-flood	28/11/2005	13:41	10.0	5.0	23.1	32.3	7.1	8.1	2.0
mid-flood	30/11/2005	09:57	10.1	5.0	23.2	32.4	7.1	8.2	4.2
mid-flood	02/12/2005	08:28	9.7	4.8	22.9	32.5	6.6	8.2	1.4
mid-flood	05/12/2005	09:27	9.9	4.9	21.7	32.8	6.9	8.2	2.0
mid-flood	07/12/2005	10:47	9.0	4.5	19.5	33.3	6.1	8.4	1.9
mid-flood	09/12/2005	08:45	8.8	4.4	20.5	33.1	6.2	8.3	2.0
mid-flood	12/12/2005	13:47	9.0	4.5	19.6	33.3	6.4	8.3	2.1
mid-flood	14/12/2005	15:12	9.8	4.9	18.7	33.5	6.9	8.4	2.0
mid-flood	16/12/2005	08:27	9.6	4.8	17.5	33.6	7.7	8.4	1.8
mid-flood	19/12/2005	08:48	9.5	4.7	17.5	32.8	7.0	8.4	**1.0**
mid-flood	21/12/2005	08:05	9.9	4.9	17.6	32.6	8.2	8.3	1.7
Average			9.5	4.7	20.4	33.0	6.9	8.3	2.0
Min			8.8	4.4	17.5	32.3	6.1	8.1	1.0
Max			10.1	5.0	23.5	33.6	8.2	8.4	4.2

BOLD value - < Detection Limit

TTC	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:18	9.3	8.3	22.8	33.7	6.5	8.1	2.3
mid-ebb	28/11/2005	08:55	9.7	8.7	23.1	32.8	7.1	8.1	3.2
mid-ebb	30/11/2005	15:11	10.0	9.0	23.1	34.0	6.5	8.3	2.2
mid-ebb	02/12/2005	13:41	9.9	8.9	22.9	33.6	6.9	8.2	2.4
mid-ebb	05/12/2005	14:42	9.7	8.7	21.6	33.1	7.2	8.3	2.1
mid-ebb	07/12/2005	05:26	9.3	8.3	19.7	33.2	6.5	8.4	2.0
mid-ebb	09/12/2005	13:41	9.5	8.5	20.0	32.7	6.8	8.3	2.3
mid-ebb	12/12/2005	08:29	9.3	8.3	19.5	32.9	6.7	8.3	2.5
mid-ebb	14/12/2005	09:51	9.9	8.9	18.7	33.1	7.3	8.3	1.3
mid-ebb	16/12/2005	13:41	9.8	8.8	17.4	33.4	7.5	8.4	**1.0**
mid-ebb	19/12/2005	13:48	9.9	8.9	17.4	33.1	7.1	8.4	2.7
mid-ebb	21/12/2005	04:20	10.0	9.0	17.4	32.1	8.4	8.3	2.5
Average			9.7	8.7	20.3	33.1	7.0	8.3	2.2
Min			9.3	8.3	17.4	32.1	6.5	8.1	1.0
Max			10.0	9.0	23.1	34.0	8.4	8.4	3.2

TTC	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:13	9.0	8.0	23.4	33.6	7.5	8.2	2.2
mid-flood	28/11/2005	13:40	10.0	9.0	23.1	34.2	7.1	8.1	2.8
mid-flood	30/11/2005	09:56	10.1	9.1	23.2	32.5	7.0	8.2	2.3
mid-flood	02/12/2005	08:27	9.7	8.7	22.9	32.5	6.5	8.2	1.9
mid-flood	05/12/2005	09:26	9.9	8.9	21.6	32.7	6.9	8.3	2.2
mid-flood	07/12/2005	10:46	9.0	8.0	19.5	33.3	6.1	8.4	2.2
mid-flood	09/12/2005	08:44	8.8	7.8	20.0	33.1	6.7	8.2	2.3
mid-flood	12/12/2005	13:46	9.0	8.0	19.7	33.4	6.8	8.3	2.4
mid-flood	14/12/2005	15:11	9.8	8.8	18.6	33.5	6.9	8.4	2.0
mid-flood	16/12/2005	08:26	9.6	8.6	17.5	33.6	7.7	8.4	2.7
mid-flood	19/12/2005	08:47	9.5	8.5	17.3	32.9	7.0	8.4	**1.0**
mid-flood	21/12/2005	08:04	9.9	8.9	17.7	32.4	8.3	8.4	2.2
Average			9.5	8.5	20.4	33.1	7.0	8.3	2.2
Min			8.8	7.8	17.3	32.4	6.1	8.1	1.0
Max			10.1	9.1	23.4	34.2	8.3	8.4	2.8

BOLD value - < Detection Limit

TTC		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.2
mid-ebb	28/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
mid-ebb	30/11/2005	4	**0.01**	**0.01**	**0.01**	0.03	**0.1**	2.1
mid-ebb	02/12/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	1.2
mid-ebb	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.1
mid-ebb	07/12/2005	3	0.03	0.02	0.02	0.07	**0.1**	0.6
mid-ebb	09/12/2005	3	0.02	**0.01**	0.02	0.05	**0.1**	2.1
mid-ebb	12/12/2005	4	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.0
mid-ebb	14/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.9
mid-ebb	16/12/2005	**2**	0.01	0.01	0.01	0.03	**0.1**	0.5
mid-ebb	19/12/2005	**2**	**0.01**	**0.01**	0.02	0.04	**0.1**	0.9
mid-ebb	21/12/2005	3	0.02	**0.01**	0.09	0.12	**0.1**	0.9
Average		3	0.01	0.01	0.02	0.05	0.1	1.1
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		4	0.03	0.02	0.09	0.12	0.1	2.1
95%-ile		4	0.02	0.01	0.05	0.09	0.1	2.1
99%-ile		4	0.03	0.02	0.08	0.11	0.1	2.1

TTC		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	5	**0.01**	**0.01**	0.01	0.03	**0.1**	1.4
mid-flood	28/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.2
mid-flood	30/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	2.5
mid-flood	02/12/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.8
mid-flood	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.0
mid-flood	07/12/2005	2	0.02	0.01	0.02	0.05	**0.1**	0.9
mid-flood	09/12/2005	3	0.02	0.02	0.01	0.05	**0.1**	0.8
mid-flood	12/12/2005	4	**0.01**	**0.01**	0.01	0.03	**0.1**	1.1
mid-flood	14/12/2005	4	0.01	0.01	0.01	0.03	**0.1**	1.2
mid-flood	16/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	1.1
mid-flood	19/12/2005	**2**	**0.01**	**0.01**	0.03	0.05	**0.1**	1.1
mid-flood	21/12/2005	**2**	0.02	**0.01**	0.09	0.12	**0.1**	1.1
Average		3	0.01	0.01	0.02	0.04	0.1	1.3
Min		2	0.01	0.01	0.01	0.03	0.1	0.8
Max		5	0.02	0.02	0.09	0.12	0.1	2.5
95%-ile		4	0.02	0.01	0.06	0.08	0.1	2.1
99%-ile		5	0.02	0.02	0.08	0.11	0.1	2.4

BOLD value - < Detection Limit

M_BP	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:29	9.7	1.0	23.0	33.6	7.2	8.1	1.1
mid-ebb	28/11/2005	09:06	9.8	1.0	23.1	33.2	7.6	8.2	1.5
mid-ebb	30/11/2005	15:22	10.4	1.0	23.2	34.0	6.7	8.3	2.2
mid-ebb	02/12/2005	13:52	10.0	1.0	23.2	33.9	7.5	8.2	2.3
mid-ebb	05/12/2005	14:53	9.8	1.0	22.0	33.1	6.9	8.3	1.8
mid-ebb	07/12/2005	05:37	8.5	1.0	19.6	33.3	6.4	8.4	2.0
mid-ebb	09/12/2005	13:52	9.6	1.0	20.3	32.8	7.0	8.3	1.8
mid-ebb	12/12/2005	08:40	9.3	1.0	19.4	32.7	6.2	8.4	2.0
mid-ebb	14/12/2005	10:02	9.8	1.0	18.8	33.2	7.3	8.3	1.8
mid-ebb	16/12/2005	13:52	9.8	1.0	18.0	33.4	7.7	8.4	2.7
mid-ebb	19/12/2005	13:58	8.9	1.0	17.8	33.2	7.2	8.4	**1.0**
mid-ebb	21/12/2005	04:30	9.8	1.0	17.4	32.1	8.2	8.4	1.1
Average			9.6	1.0	20.5	33.2	7.2	8.3	1.8
Min			8.5	1.0	17.4	32.1	6.2	8.1	1.0
Max			10.4	1.0	23.2	34.0	8.2	8.4	2.7

M_BP	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:24	9.8	1.0	23.1	33.4	7.5	8.2	1.5
mid-flood	28/11/2005	13:51	10.2	1.0	23.5	32.5	7.5	8.2	1.8
mid-flood	30/11/2005	10:07	10.3	1.0	23.2	24.1	7.2	8.2	1.2
mid-flood	02/12/2005	08:38	9.7	1.0	22.9	32.6	7.2	8.2	1.7
mid-flood	05/12/2005	09:37	9.8	1.0	22.1	32.4	7.1	8.3	1.9
mid-flood	07/12/2005	10:57	9.3	1.0	19.5	33.4	6.1	8.4	2.5
mid-flood	09/12/2005	08:55	9.9	1.0	20.8	33.2	6.1	8.3	2.1
mid-flood	12/12/2005	13:57	9.6	1.0	19.5	32.7	6.5	8.4	1.4
mid-flood	14/12/2005	15:22	10.0	1.0	18.7	33.5	7.0	8.4	1.2
mid-flood	16/12/2005	08:37	9.6	1.0	17.5	33.6	7.7	8.4	1.6
mid-flood	19/12/2005	08:55	9.2	1.0	17.5	32.8	6.9	8.4	**1.0**
mid-flood	21/12/2005	08:15	9.4	1.0	17.7	32.4	8.2	8.3	1.6
Average			9.7	1.0	20.5	32.2	7.1	8.3	1.6
Min			9.2	1.0	17.5	24.1	6.1	8.2	1.0
Max			10.3	1.0	23.5	33.6	8.2	8.4	2.5

BOLD value - < Detection Limit

M_BP	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:28	9.7	4.8	23.0	33.7	7.1	8.1	2.2
mid-ebb	28/11/2005	09:05	9.8	4.9	23.1	32.8	7.4	8.2	1.7
mid-ebb	30/11/2005	15:21	10.4	5.2	23.2	34.0	6.7	8.3	2.2
mid-ebb	02/12/2005	13:51	10.0	5.0	22.9	33.8	7.2	8.2	3.7
mid-ebb	05/12/2005	14:52	9.8	4.9	22.2	33.4	7.1	8.2	2.7
mid-ebb	07/12/2005	05:36	8.5	4.2	19.6	33.3	6.4	8.4	2.4
mid-ebb	09/12/2005	13:51	9.6	4.8	20.2	32.8	6.9	8.3	2.2
mid-ebb	12/12/2005	08:39	9.3	4.6	19.6	32.9	6.3	8.4	2.4
mid-ebb	14/12/2005	10:01	9.8	4.9	18.8	33.2	7.2	8.3	2.1
mid-ebb	16/12/2005	13:51	9.8	4.9	17.5	33.4	7.6	8.4	1.7
mid-ebb	19/12/2005	13:57	8.9	4.4	17.8	33.2	7.2	8.4	1.0
mid-ebb	21/12/2005	04:29	9.8	4.9	17.6	32.1	8.4	8.3	1.7
Average			9.6	4.8	20.5	33.2	7.1	8.3	2.2
Min			8.5	4.2	17.5	32.1	6.3	8.1	1.0
Max			10.4	5.2	23.2	34.0	8.4	8.4	3.7

M_BP	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:23	9.8	4.9	23.4	33.4	7.6	8.2	2.0
mid-flood	28/11/2005	13:50	10.2	5.1	23.3	34.2	7.3	8.2	2.1
mid-flood	30/11/2005	10:06	10.3	5.1	23.2	32.6	6.8	8.2	1.2
mid-flood	02/12/2005	08:37	9.7	4.8	22.9	32.6	6.4	8.2	2.0
mid-flood	05/12/2005	09:36	9.8	4.9	22.1	33.3	6.4	8.3	2.0
mid-flood	07/12/2005	10:56	9.3	4.6	19.5	33.4	6.1	8.4	2.6
mid-flood	09/12/2005	08:54	9.9	4.9	20.6	33.1	6.0	8.3	2.4
mid-flood	12/12/2005	13:56	9.6	4.8	19.4	33.3	6.6	8.4	2.2
mid-flood	14/12/2005	15:21	10.0	5.0	18.6	33.6	7.0	8.4	2.4
mid-flood	16/12/2005	08:36	9.6	4.8	17.5	33.6	7.7	8.4	1.8
mid-flood	19/12/2005	08:54	9.2	4.6	17.5	32.8	7.0	8.4	**1.0**
mid-flood	21/12/2005	08:14	9.4	4.7	17.7	32.9	8.2	8.4	1.6
Average			9.7	4.9	20.5	33.2	6.9	8.3	1.9
Min			9.2	4.6	17.5	32.6	6.0	8.2	1.0
Max			10.3	5.1	23.4	34.2	8.2	8.4	2.6

BOLD value - < Detection Limit

M_BP	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	08:27	9.7	8.7	22.9	33.7	7.0	8.1	3.3
mid-ebb	28/11/2005	09:04	9.8	8.8	23.1	32.9	7.4	8.2	1.6
mid-ebb	30/11/2005	15:20	10.4	9.4	23.2	34.0	7.0	8.3	2.3
mid-ebb	02/12/2005	13:50	10.0	9.0	23.0	33.6	7.0	8.2	3.7
mid-ebb	05/12/2005	14:51	9.8	8.8	22.3	33.5	6.9	8.3	2.8
mid-ebb	07/12/2005	05:35	8.5	8.5	19.6	33.3	6.5	8.3	2.3
mid-ebb	09/12/2005	13:50	9.6	8.6	20.2	32.8	6.9	8.3	2.5
mid-ebb	12/12/2005	08:38	9.3	8.3	19.6	32.9	6.2	8.4	2.0
mid-ebb	14/12/2005	10:00	9.8	8.8	18.8	33.1	7.3	8.3	2.8
mid-ebb	16/12/2005	13:50	9.8	8.8	17.4	33.4	7.5	8.3	**1.0**
mid-ebb	19/12/2005	13:56	8.9	7.9	17.5	33.3	7.2	8.4	3.7
mid-ebb	21/12/2005	04:28	9.8	8.8	17.3	32.3	8.0	8.3	2.9
Average			9.6	8.7	20.4	33.2	7.1	8.3	2.6
Min			8.5	7.9	17.3	32.3	6.2	8.1	1.0
Max			10.4	9.4	23.2	34.0	8.0	8.4	3.7

M_BP	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:22	9.8	8.8	23.2	33.7	7.7	8.2	2.0
mid-flood	28/11/2005	13:49	10.2	9.2	23.2	34.2	7.3	8.2	2.1
mid-flood	30/11/2005	10:05	10.3	9.3	23.2	32.7	6.8	8.2	1.6
mid-flood	02/12/2005	08:36	9.7	8.7	22.9	32.6	6.5	8.2	2.6
mid-flood	05/12/2005	09:35	9.8	4.9	22.6	32.9	6.9	8.3	2.0
mid-flood	07/12/2005	10:55	9.3	8.3	19.5	33.4	6.1	8.4	2.4
mid-flood	09/12/2005	08:53	9.9	8.9	20.1	33.2	5.9	8.3	2.4
mid-flood	12/12/2005	13:55	9.6	8.6	19.7	32.8	6.7	8.4	2.5
mid-flood	14/12/2005	15:20	10.0	9.0	18.7	33.5	6.9	8.4	2.0
mid-flood	16/12/2005	08:35	9.6	8.6	17.5	33.6	7.7	8.4	2.7
mid-flood	19/12/2005	08:53	9.2	8.2	17.5	32.9	7.0	8.4	1.5
mid-flood	21/12/2005	08:13	9.4	8.4	17.6	32.3	8.2	8.3	2.1
Average			9.7	8.4	20.5	33.1	7.0	8.3	2.2
Min			9.2	4.9	17.5	32.3	5.9	8.2	1.5
Max			10.3	9.3	23.2	34.2	8.2	8.4	2.7

BOLD value - < Detection Limit

M_BP		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	1.3
mid-ebb	28/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.0
mid-ebb	30/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	1.0
mid-ebb	02/12/2005	**2**	**0.01**	**0.01**	0.01	0.03	**0.1**	1.3
mid-ebb	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.4
mid-ebb	07/12/2005	2	0.01	0.02	0.02	0.05	**0.1**	0.7
mid-ebb	09/12/2005	3	0.02	0.01	0.01	0.04	**0.1**	1.6
mid-ebb	12/12/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	1.1
mid-ebb	14/12/2005	3	**0.01**	0.01	0.01	0.03	**0.1**	0.9
mid-ebb	16/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.9
mid-ebb	19/12/2005	2	**0.01**	**0.01**	0.03	0.05	**0.1**	0.8
mid-ebb	21/12/2005	2	0.01	**0.01**	0.09	0.11	**0.1**	1
Average		3	0.01	0.01	0.02	0.04	0.1	1.1
Min		2	0.01	0.01	0.01	0.03	0.1	0.7
Max		3	0.02	0.02	0.09	0.11	0.1	1.6
95%-ile		3	0.01	0.01	0.06	0.08	0.1	1.5
99%-ile		3	0.02	0.02	0.08	0.10	0.1	1.6

M_BP		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.9
mid-flood	28/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.6
mid-flood	30/11/2005	5	**0.01**	**0.01**	**0.01**	0.03	**0.1**	2.0
mid-flood	02/12/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.4
mid-flood	05/12/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	0.9
mid-flood	07/12/2005	2	0.02	0.02	0.02	0.06	**0.1**	0.8
mid-flood	09/12/2005	3	0.02	0.02	0.01	0.05	**0.1**	0.9
mid-flood	12/12/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.6
mid-flood	14/12/2005	2	0.01	**0.01**	0.02	0.04	**0.1**	1.2
mid-flood	16/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.8
mid-flood	19/12/2005	2	**0.01**	**0.01**	0.03	0.05	**0.1**	1
mid-flood	21/12/2005	2	**0.01**	**0.01**	0.08	0.10	**0.1**	1.1
Average		3	0.01	0.01	0.02	0.04	0.1	1.2
Min		2	0.01	0.01	0.01	0.03	0.1	0.8
Max		5	0.02	0.02	0.08	0.10	0.1	2.0
95%-ile		4	0.02	0.02	0.05	0.08	0.1	1.8
99%-ile		5	0.02	0.02	0.07	0.10	0.1	2.0

BOLD value - < Detection Limit

M_Coral	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	09:18	10.6	1.0	23.0	33.8	7.2	8.2	1.3
mid-ebb	28/11/2005	09:55	9.3	1.0	23.1	33.1	7.2	8.2	2.4
mid-ebb	30/11/2005	15:30	10.6	1.0	23.2	33.9	5.8	8.3	1.9
mid-ebb	02/12/2005	14:00	10.3	1.0	23.3	33.7	6.8	8.2	1.7
mid-ebb	05/12/2005	15:01	10.0	1.0	22.0	32.8	6.6	8.3	2.0
mid-ebb	07/12/2005	06:26	10.2	1.0	19.2	33.4	7.1	8.4	2.0
mid-ebb	09/12/2005	14:41	9.7	1.0	20.4	33.2	6.7	8.3	1.8
mid-ebb	12/12/2005	09:29	10.1	1.0	19.4	32.7	6.3	8.4	2.2
mid-ebb	14/12/2005	10:51	9.2	1.0	19.0	33.3	7.5	8.5	1.7
mid-ebb	16/12/2005	14:00	10.7	1.0	18.7	33.6	7.6	8.4	1.8
mid-ebb	19/12/2005	14:11	11.0	1.0	18.0	33.4	7.2	8.4	**1.0**
mid-ebb	21/12/2005	05:19	10.8	1.0	17.2	32.6	8.4	8.3	1.1
Average			10.2	1.0	20.5	33.3	7.0	8.3	1.7
Min			9.2	1.0	17.2	32.6	5.8	8.2	1.0
Max			11.0	1.0	23.3	33.9	8.4	8.5	2.4

M_Coral	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:32	10.4	1.0	23.1	33.6	7.5	8.3	1.8
mid-flood	28/11/2005	13:59	10.4	1.0	23.7	34.2	7.3	8.2	1.5
mid-flood	30/11/2005	10:56	9.6	1.0	23.1	33.1	7.0	8.3	2.3
mid-flood	02/12/2005	09:27	8.9	1.0	22.9	33.2	6.3	8.2	2.5
mid-flood	05/12/2005	10:26	10.1	1.0	22.3	33.1	6.8	8.4	2.2
mid-flood	07/12/2005	11:05	10.4	1.0	19.7	33.4	6.0	8.4	2.1
mid-flood	09/12/2005	09:03	9.2	1.0	20.9	33.2	6.0	8.3	2.0
mid-flood	12/12/2005	14:05	10.3	1.0	19.5	32.8	6.6	8.4	2.1
mid-flood	14/12/2005	15:30	10.6	1.0	19.0	33.5	7.1	8.4	1.6
mid-flood	16/12/2005	09:26	11.1	1.0	17.6	33.5	7.8	8.4	1.5
mid-flood	19/12/2005	09:41	10.9	1.0	17.6	33.3	6.7	8.4	1.5
mid-flood	21/12/2005	08:22	11.0	1.0	17.6	32.4	8.3	8.3	1.7
Average			10.2	1.0	20.6	33.3	6.9	8.3	1.9
Min			8.9	1.0	17.6	32.4	6.0	8.2	1.5
Max			11.1	1.0	23.7	34.2	8.3	8.4	2.5

BOLD value - < Detection Limit

M_Coral	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	09:17	10.6	5.3	22.9	33.8	7.2	8.2	1.4
mid-ebb	28/11/2005	09:54	9.3	4.6	23.1	33.2	7.4	8.2	3.5
mid-ebb	30/11/2005	15:29	10.6	5.3	23.2	34.0	5.9	8.3	2.2
mid-ebb	02/12/2005	13:59	10.3	5.1	23.0	33.8	6.7	8.2	2.4
mid-ebb	05/12/2005	15:00	10.0	5.0	22.3	32.7	7.0	8.4	2.1
mid-ebb	07/12/2005	06:25	10.2	5.1	19.6	33.5	6.2	8.4	7.8
mid-ebb	09/12/2005	14:40	9.7	4.8	20.4	33.2	6.7	8.3	1.9
mid-ebb	12/12/2005	09:28	10.1	5.0	19.5	33.2	6.2	8.4	1.7
mid-ebb	14/12/2005	10:50	9.2	4.6	19.0	33.4	7.5	8.4	1.8
mid-ebb	16/12/2005	13:59	10.7	5.3	17.8	33.7	7.7	8.4	1.4
mid-ebb	19/12/2005	14:10	11.0	5.5	17.8	33.3	7.2	8.4	**1.0**
mid-ebb	21/12/2005	05:18	10.8	5.4	17.6	32.8	8.4	8.3	1.4
Average			10.2	5.1	20.5	33.4	7.0	8.3	2.4
Min			9.2	4.6	17.6	32.7	5.9	8.2	1.0
Max			11.0	5.5	23.2	34.0	8.4	8.4	7.8

M_Coral	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:31	10.4	5.2	23.4	33.6	7.9	8.3	1.7
mid-flood	28/11/2005	13:58	10.4	5.2	23.7	34.2	7.3	8.2	1.6
mid-flood	30/11/2005	10:55	9.6	4.8	23.1	33.1	7.0	8.3	2.0
mid-flood	02/12/2005	09:26	8.9	4.4	22.9	33.2	6.6	8.2	2.3
mid-flood	05/12/2005	10:25	10.1	5.0	22.3	33.2	6.7	8.3	1.8
mid-flood	07/12/2005	11:04	10.4	5.2	19.7	33.4	6.1	8.4	1.9
mid-flood	09/12/2005	09:02	9.2	4.6	20.4	33.3	5.8	8.3	1.9
mid-flood	12/12/2005	14:04	10.3	5.1	19.6	33.4	6.7	8.3	2.2
mid-flood	14/12/2005	15:29	10.6	5.3	19.0	33.5	7.1	8.4	2.1
mid-flood	16/12/2005	09:25	11.1	5.5	17.6	33.5	7.8	8.4	1.9
mid-flood	19/12/2005	09:40	10.9	5.4	17.6	33.3	6.7	8.4	1.1
mid-flood	21/12/2005	08:21	11.0	5.5	17.7	33.0	8.3	8.4	1.6
Average			10.2	5.1	20.6	33.4	7.0	8.3	1.8
Min			8.9	4.4	17.6	33.0	5.8	8.2	1.1
Max			11.1	5.5	23.7	34.2	8.3	8.4	2.3

BOLD value - < Detection Limit

M_Coral	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	09:16	10.6	9.6	22.9	33.8	7.1	8.2	3.3
mid-ebb	28/11/2005	09:53	9.3	8.3	23.1	27.5	7.6	8.2	4.0
mid-ebb	30/11/2005	15:28	10.6	9.6	23.2	34.0	5.9	8.3	2.2
mid-ebb	02/12/2005	13:58	10.3	9.3	22.9	33.7	7.0	8.2	2.8
mid-ebb	05/12/2005	14:59	10.0	9.0	22.6	33.2	6.7	8.3	2.2
mid-ebb	07/12/2005	06:24	10.2	9.2	20.0	33.4	6.6	8.4	2.5
mid-ebb	09/12/2005	14:39	9.7	8.7	20.2	33.2	6.8	8.3	2.9
mid-ebb	12/12/2005	09:27	10.1	9.1	19.4	33.3	6.3	8.3	2.1
mid-ebb	14/12/2005	10:49	9.2	8.2	19.0	33.3	7.4	8.4	2.5
mid-ebb	16/12/2005	13:58	10.7	9.7	17.6	33.7	7.7	8.4	1.8
mid-ebb	19/12/2005	14:09	11.0	10.0	17.5	33.4	7.2	8.4	1.5
mid-ebb	21/12/2005	05:17	10.8	9.8	17.4	32.3	8.2	8.3	2.0
Average			10.2	9.2	20.5	32.9	7.0	8.3	2.5
Min			9.2	8.2	17.4	27.5	5.9	8.2	1.5
Max			11.0	10.0	23.2	34.0	8.2	8.4	4.0

M_Coral	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:30	10.4	9.4	23.1	33.7	7.4	8.3	2.1
mid-flood	28/11/2005	13:57	10.4	9.4	23.2	34.2	7.3	8.2	3.3
mid-flood	30/11/2005	10:54	9.6	8.6	23.1	25.7	7.3	8.3	2.0
mid-flood	02/12/2005	09:25	8.9	7.9	22.9	33.1	6.5	8.2	1.9
mid-flood	05/12/2005	10:24	10.1	9.1	22.1	33.3	6.4	8.3	2.3
mid-flood	07/12/2005	11:03	10.4	9.4	20.1	33.6	6.5	8.4	2.2
mid-flood	09/12/2005	09:01	9.2	8.2	20.3	33.3	5.8	8.3	1.7
mid-flood	12/12/2005	14:03	10.3	9.3	19.6	33.5	6.7	8.4	1.9
mid-flood	14/12/2005	15:28	10.6	9.6	18.9	33.5	7.1	8.4	2.4
mid-flood	16/12/2005	09:24	11.1	10.1	17.6	33.6	7.8	8.4	3.3
mid-flood	19/12/2005	09:39	10.9	9.9	17.5	33.4	6.7	8.4	2.1
mid-flood	21/12/2005	08:20	11.0	10.0	17.6	33.2	8.2	8.3	2.5
Average			10.2	9.2	20.5	32.8	7.0	8.3	2.3
Min			8.9	7.9	17.5	25.7	5.8	8.2	1.7
Max			11.1	10.1	23.2	34.2	8.2	8.4	3.3

BOLD value - < Detection Limit

M_Coral		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	**2**	**0.01**	**0.01**	0.01	0.03	**0.1**	1.1
mid-ebb	28/11/2005	5	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.4
mid-ebb	30/11/2005	6	**0.01**	**0.01**	0.01	0.03	**0.1**	1.6
mid-ebb	02/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.1
mid-ebb	05/12/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	2.2
mid-ebb	07/12/2005	**2**	0.01	0.01	0.02	0.04	**0.1**	1.3
mid-ebb	09/12/2005	3	0.01	0.01	0.02	0.04	**0.1**	1.4
mid-ebb	12/12/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.7
mid-ebb	14/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	1.4
mid-ebb	16/12/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	1.2
mid-ebb	19/12/2005	2	**0.01**	**0.01**	0.03	0.05	**0.1**	1.1
mid-ebb	21/12/2005	2	0.01	**0.01**	0.08	0.10	**0.1**	1.2
Average		3	0.01	0.01	0.02	0.04	0.1	1.4
Min		2	0.01	0.01	0.01	0.03	0.1	1.1
Max		6	0.01	0.01	0.08	0.10	0.1	2.2
95%-ile		5	0.01	0.01	0.05	0.07	0.1	1.9
99%-ile		6	0.01	0.01	0.07	0.09	0.1	2.1

M_Coral		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.9
mid-flood	28/11/2005	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.1
mid-flood	30/11/2005	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	2.6
mid-flood	02/12/2005	**2**	**0.01**	**0.01**	0.01	0.03	**0.1**	1.3
mid-flood	05/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	1.2
mid-flood	07/12/2005	4	0.02	0.01	0.02	0.05	**0.1**	1.4
mid-flood	09/12/2005	3	0.02	0.02	0.02	0.06	**0.1**	0.9
mid-flood	12/12/2005	2	0.02	**0.01**	**0.01**	0.04	**0.1**	1.6
mid-flood	14/12/2005	4	**0.01**	**0.01**	0.02	0.04	**0.1**	1.9
mid-flood	16/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	1.1
mid-flood	19/12/2005	2	**0.01**	0.01	0.03	0.05	**0.1**	0.7
mid-flood	21/12/2005	2	0.01	**0.01**	0.08	0.10	**0.1**	1.2
Average		3	0.01	0.01	0.02	0.05	0.1	1.4
Min		2	0.01	0.01	0.01	0.03	0.1	0.7
Max		4	0.02	0.02	0.08	0.10	0.1	2.6
95%-ile		4	0.02	0.01	0.05	0.08	0.1	2.2
99%-ile		4	0.02	0.02	0.07	0.10	0.1	2.5

BOLD value - < Detection Limit

M_B	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:21	17.2	1.0	22.8	33.7	7.0	8.2	1.5
mid-ebb	28/11/2005	10:58	16.3	1.0	23.1	33.3	7.5	8.2	1.6
mid-ebb	30/11/2005	15:44	16.7	1.0	23.0	33.9	5.7	8.3	2.3
mid-ebb	02/12/2005	14:14	15.8	1.0	23.1	33.7	6.5	8.2	2.3
mid-ebb	05/12/2005	15:15	17.2	1.0	22.2	33.8	6.9	8.4	1.9
mid-ebb	07/12/2005	07:29	16.6	1.0	19.8	33.2	7.0	8.2	1.6
mid-ebb	09/12/2005	15:44	18.0	1.0	20.8	33.2	6.8	8.3	2.3
mid-ebb	12/12/2005	10:32	16.4	1.0	19.8	33.1	6.4	8.4	1.8
mid-ebb	14/12/2005	11:54	17.0	1.0	19.1	33.4	6.5	8.3	1.8
mid-ebb	16/12/2005	14:14	15.3	1.0	18.7	33.5	7.5	8.4	2.3
mid-ebb	19/12/2005	14:29	16.0	1.0	18.1	33.3	6.9	8.4	2.4
mid-ebb	21/12/2005	06:22	15.8	1.0	17.2	32.2	8.5	8.4	2.1
Average			16.5	1.0	20.6	33.4	6.9	8.3	2.0
Min			15.3	1.0	17.2	32.2	5.7	8.2	1.5
Max			18.0	1.0	23.1	33.9	8.5	8.4	2.4

M_B	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:46	17.0	1.0	23.0	33.6	7.3	8.2	1.6
mid-flood	28/11/2005	14:13	16.6	1.0	23.6	34.3	7.4	8.1	1.5
mid-flood	30/11/2005	11:59	16.5	1.0	23.0	33.5	6.5	8.3	3.2
mid-flood	02/12/2005	10:30	16.0	1.0	22.9	33.3	6.5	8.2	2.0
mid-flood	05/12/2005	11:29	17.1	1.0	22.4	33.6	6.7	8.2	1.7
mid-flood	07/12/2005	11:19	15.9	1.0	20.1	33.1	6.6	8.2	1.5
mid-flood	09/12/2005	09:17	17.8	1.0	21.0	33.3	6.6	8.3	1.8
mid-flood	12/12/2005	14:19	16.3	1.0	19.9	33.5	6.4	8.4	2.0
mid-flood	14/12/2005	15:44	17.2	1.0	19.3	33.5	6.9	8.4	1.7
mid-flood	16/12/2005	10:29	15.3	1.0	18.6	33.1	7.7	8.4	2.9
mid-flood	19/12/2005	10:51	15.1	1.0	17.8	33.1	7.3	8.4	**1.0**
mid-flood	21/12/2005	08:36	15.9	1.0	17.7	32.6	8.4	8.3	1.5
Average			16.4	1.0	20.8	33.4	7.0	8.3	1.9
Min			15.1	1.0	17.7	32.6	6.4	8.1	1.0
Max			17.8	1.0	23.6	34.3	8.4	8.4	3.2

BOLD value - < Detection Limit

M_B	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:20	17.2	8.6	22.9	33.8	7.0	8.3	2.0
mid-ebb	28/11/2005	10:57	16.3	8.1	23.1	33.4	7.6	8.2	1.3
mid-ebb	30/11/2005	15:43	16.7	8.3	23.0	33.9	5.8	8.3	2.6
mid-ebb	02/12/2005	14:13	15.8	7.9	22.8	33.7	6.3	8.2	2.4
mid-ebb	05/12/2005	15:14	17.2	8.6	22.6	33.4	6.7	8.3	2.1
mid-ebb	07/12/2005	07:28	16.6	8.3	19.9	33.1	6.8	8.2	2.5
mid-ebb	09/12/2005	15:43	18.0	9.0	20.6	33.2	6.8	8.3	2.3
mid-ebb	12/12/2005	10:31	16.4	8.2	19.9	33.2	6.5	8.2	2.1
mid-ebb	14/12/2005	11:53	17.0	8.5	19.3	33.5	6.4	8.3	2.2
mid-ebb	16/12/2005	14:13	15.3	7.6	18.1	33.6	7.5	8.3	1.9
mid-ebb	19/12/2005	14:28	16.0	8.0	17.9	33.4	7.0	8.4	**1.0**
mid-ebb	21/12/2005	06:21	15.8	7.9	17.3	32.0	8.3	8.3	2.2
Average			16.5	8.3	20.6	33.3	6.9	8.3	2.1
Min			15.3	7.6	17.3	32.0	5.8	8.2	1.0
Max			18.0	9.0	23.1	33.9	8.3	8.4	2.6

M_B	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:45	17.0	8.5	23.1	33.6	7.5	8.2	1.3
mid-flood	28/11/2005	14:12	16.6	8.3	23.1	34.2	7.3	8.1	1.6
mid-flood	30/11/2005	11:58	16.5	8.2	23.0	33.5	6.5	8.3	3.0
mid-flood	02/12/2005	10:29	16.0	8.0	22.8	33.2	6.1	8.2	2.4
mid-flood	05/12/2005	11:28	17.1	8.5	22.4	33.8	7.0	8.2	1.6
mid-flood	07/12/2005	11:18	15.9	7.9	20.0	33.5	6.1	8.4	2.2
mid-flood	09/12/2005	09:16	17.8	8.9	20.7	33.3	6.6	8.3	2.2
mid-flood	12/12/2005	14:18	16.3	8.1	20.2	33.6	6.5	8.4	2.4
mid-flood	14/12/2005	15:43	17.2	8.6	19.3	33.4	6.3	8.3	2.1
mid-flood	16/12/2005	10:28	15.3	7.6	17.8	33.4	7.7	8.4	2.0
mid-flood	19/12/2005	10:50	15.1	7.5	17.8	33.1	7.3	8.3	**1.0**
mid-flood	21/12/2005	08:35	15.9	7.9	17.8	32.4	8.0	8.4	1.8
Average			16.4	8.2	20.7	33.4	6.9	8.3	2.0
Min			15.1	7.5	17.8	32.4	6.1	8.1	1.0
Max			17.8	8.9	23.1	34.2	8.0	8.4	3.0

BOLD value - < Detection Limit

M_B	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:19	17.2	16.2	22.6	33.6	7.0	8.3	1.3
mid-ebb	28/11/2005	10:56	16.3	15.3	23.1	33.4	7.8	8.3	1.4
mid-ebb	30/11/2005	15:42	16.7	15.7	23.0	33.9	5.9	8.3	2.4
mid-ebb	02/12/2005	14:12	15.8	14.8	22.8	33.7	6.6	8.2	2.9
mid-ebb	05/12/2005	15:13	17.2	16.2	22.0	33.6	6.8	8.2	2.5
mid-ebb	07/12/2005	07:27	16.6	15.6	20.1	33.8	6.6	8.2	2.0
mid-ebb	09/12/2005	15:42	18.0	17.0	20.3	33.3	6.9	8.3	2.9
mid-ebb	12/12/2005	10:30	16.4	15.4	20.1	33.4	6.5	8.2	2.4
mid-ebb	14/12/2005	11:52	17.0	16.0	19.6	33.8	6.7	8.2	1.9
mid-ebb	16/12/2005	14:12	15.3	14.3	17.3	33.6	7.5	8.3	4.1
mid-ebb	19/12/2005	14:27	16.0	15.0	17.8	33.4	6.9	8.4	**1.0**
mid-ebb	21/12/2005	06:20	15.8	14.8	17.3	32.0	8.0	8.3	1.2
Average			16.5	15.5	20.5	33.5	6.9	8.3	2.2
Min			15.3	14.3	17.3	32.0	5.9	8.2	1.0
Max			18.0	17.0	23.1	33.9	8.0	8.4	4.1

M_B	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	17:44	17.0	16.0	23.2	33.8	7.6	8.2	1.6
mid-flood	28/11/2005	14:11	16.6	15.6	23.1	34.3	7.5	8.2	2.1
mid-flood	30/11/2005	11:57	16.5	15.5	23.0	33.5	6.5	8.3	3.4
mid-flood	02/12/2005	10:28	16.0	15.0	22.8	33.3	6.4	8.2	2.1
mid-flood	05/12/2005	11:27	17.1	16.1	22.6	33.1	6.7	8.2	2.2
mid-flood	07/12/2005	11:17	15.9	14.9	20.0	33.5	6.0	8.4	2.0
mid-flood	09/12/2005	09:15	17.8	16.8	20.4	33.3	6.1	8.3	3.4
mid-flood	12/12/2005	14:17	16.3	15.3	20.5	33.6	6.4	8.4	2.8
mid-flood	14/12/2005	15:42	17.2	16.2	19.1	33.3	6.9	8.4	2.9
mid-flood	16/12/2005	10:27	15.3	14.3	17.2	33.3	7.8	8.4	3.8
mid-flood	19/12/2005	10:49	15.1	14.1	17.8	33.1	7.3	8.3	**1.0**
mid-flood	21/12/2005	08:34	15.9	14.9	17.7	32.6	8.3	8.4	2.6
Average			16.4	15.4	20.6	33.4	7.0	8.3	2.5
Min			15.1	14.1	17.2	32.6	6.0	8.2	1.0
Max			17.8	16.8	23.2	34.3	8.3	8.4	3.8

BOLD value - < Detection Limit

M_B		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	**2**	**0.01**	0.01	0.01	0.03	**0.1**	1.1
mid-ebb	28/11/2005	2	**0.01**	**0.01**	0.01	0.03	**0.1**	1.2
mid-ebb	30/11/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.6
mid-ebb	02/12/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.5
mid-ebb	05/12/2005	4	**0.01**	0.02	0.02	0.05	**0.1**	1.1
mid-ebb	07/12/2005	3	0.02	0.02	0.03	0.07	**0.1**	0.7
mid-ebb	09/12/2005	4	0.02	0.02	0.02	0.06	**0.1**	0.6
mid-ebb	12/12/2005	3	0.01	0.01	0.01	0.03	**0.1**	1.8
mid-ebb	14/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	1.2
mid-ebb	16/12/2005	7	**0.01**	0.01	0.03	0.05	**0.1**	0.7
mid-ebb	19/12/2005	2	**0.01**	**0.01**	0.04	0.06	**0.1**	0.6
mid-ebb	21/12/2005	**2**	0.01	**0.01**	0.09	0.11	**0.1**	0.9
Average		3	0.01	0.01	0.03	0.05	0.1	0.9
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		7	0.02	0.02	0.09	0.11	0.1	1.8
95%-ile		5	0.02	0.02	0.06	0.09	0.1	1.5
99%-ile		7	0.02	0.02	0.08	0.11	0.1	1.7

M_B		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	11	**0.01**	**0.01**	0.02	0.04	**0.1**	1.4
mid-flood	28/11/2005	3	**0.01**	**0.01**	**0.01**	0.03	**0.1**	1.3
mid-flood	30/11/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.7
mid-flood	02/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	0.6
mid-flood	05/12/2005	3	**0.01**	0.02	0.03	0.06	**0.1**	1.0
mid-flood	07/12/2005	3	**0.01**	0.01	0.02	0.04	**0.1**	1.6
mid-flood	09/12/2005	3	0.02	0.02	0.02	0.06	**0.1**	0.9
mid-flood	12/12/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	1.9
mid-flood	14/12/2005	4	**0.01**	0.01	0.02	0.04	**0.1**	1.1
mid-flood	16/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	1
mid-flood	19/12/2005	3	0.02	**0.01**	0.04	0.07	**0.1**	0.6
mid-flood	21/12/2005	**2**	0.02	**0.01**	0.09	0.12	**0.1**	1.1
Average		3	0.01	0.01	0.03	0.05	0.1	1.1
Min		2	0.01	0.01	0.01	0.03	0.1	0.6
Max		11	0.02	0.02	0.09	0.12	0.1	1.9
95%-ile		7	0.02	0.02	0.06	0.09	0.1	1.7
99%-ile		10	0.02	0.02	0.08	0.11	0.1	1.9

BOLD value - < Detection Limit

KS	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:53	9.3	1.0	23.1	33.7	7.0	8.3	1.3
mid-ebb	28/11/2005	11:30	12.4	1.0	23.1	33.6	7.4	8.1	**1.0**
mid-ebb	30/11/2005	16:14	10.5	1.0	23.0	34.0	6.9	8.3	**1.0**
mid-ebb	02/12/2005	14:44	12.5	1.0	23.2	33.7	6.1	8.2	1.3
mid-ebb	05/12/2005	15:45	11.5	1.0	22.0	33.4	6.5	8.2	1.6
mid-ebb	07/12/2005	07:59	12.0	1.0	20.7	33.3	6.2	8.3	1.1
mid-ebb	09/12/2005	16:16	10.5	1.0	20.8	33.2	6.7	8.3	1.6
mid-ebb	12/12/2005	11:04	11.0	1.0	19.6	33.1	6.3	8.4	1.2
mid-ebb	14/12/2005	12:26	12.8	1.0	19.6	33.2	7.5	8.5	1.9
mid-ebb	16/12/2005	14:44	9.6	1.0	18.8	33.7	7.0	8.4	2.5
mid-ebb	19/12/2005	15:03	12.0	1.0	18.1	33.5	7.0	8.4	1.3
mid-ebb	21/12/2005	06:54	12.0	1.0	17.7	31.9	8.3	8.3	**1.0**
Average			11.3	1.0	20.8	33.4	6.9	8.3	1.4
Min			9.3	1.0	17.7	31.9	6.1	8.1	1.0
Max			12.8	1.0	23.2	34.0	8.3	8.5	2.5

KS	Surface								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	18:14	9.8	1.0	23.3	33.6	7.6	8.3	1.3
mid-flood	28/11/2005	14:41	11.0	1.0	23.5	34.3	7.3	8.1	**1.0**
mid-flood	30/11/2005	12:29	10.7	1.0	23.0	34.1	6.6	8.3	**1.0**
mid-flood	02/12/2005	11:00	11.1	1.0	23.0	33.4	6.1	8.2	1.2
mid-flood	05/12/2005	11:59	11.9	1.0	22.5	33.4	6.3	8.2	1.5
mid-flood	07/12/2005	11:47	12.4	1.0	20.8	33.6	5.7	8.5	2.0
mid-flood	09/12/2005	09:45	9.9	1.0	20.8	33.5	5.9	8.4	1.6
mid-flood	12/12/2005	14:47	11.5	1.0	19.6	33.3	6.5	8.4	2.0
mid-flood	14/12/2005	16:12	12.5	1.0	19.6	33.2	7.0	8.4	1.7
mid-flood	16/12/2005	10:59	10.0	1.0	18.8	33.4	7.5	8.3	3.3
mid-flood	19/12/2005	11:20	10.0	1.0	18.0	33.1	6.7	8.4	1.7
mid-flood	21/12/2005	09:03	11.2	1.0	17.8	32.1	8.0	8.3	**1.0**
Average			11.0	1.0	20.9	33.4	6.8	8.3	1.6
Min			9.8	1.0	17.8	32.1	5.7	8.1	1.0
Max			12.5	1.0	23.5	34.3	8.0	8.5	3.3

BOLD value - < Detection Limit

KS	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:52	9.3	4.6	23.1	33.8	7.0	8.3	1.2
mid-ebb	28/11/2005	11:29	12.4	6.2	23.0	33.5	7.5	8.1	1.0
mid-ebb	30/11/2005	16:13	10.5	5.2	23.0	34.0	6.9	8.3	**1.0**
mid-ebb	02/12/2005	14:43	12.5	6.2	22.9	33.7	6.2	8.2	1.3
mid-ebb	05/12/2005	15:44	11.5	5.7	22.1	33.6	6.6	8.2	1.6
mid-ebb	07/12/2005	07:58	12.0	6.0	20.7	33.5	6.4	8.2	1.1
mid-ebb	09/12/2005	16:15	10.5	5.2	20.6	33.2	6.6	8.3	1.9
mid-ebb	12/12/2005	11:03	11.0	5.5	19.8	33.5	6.2	8.4	1.4
mid-ebb	14/12/2005	12:25	12.8	6.4	19.6	33.3	7.5	8.5	2.0
mid-ebb	16/12/2005	14:43	9.6	4.8	18.8	33.7	7.0	8.3	3.1
mid-ebb	19/12/2005	15:02	12.0	6.0	18.0	33.5	6.7	8.4	1.4
mid-ebb	21/12/2005	06:53	12.0	6.0	17.8	32.1	8.4	8.4	1.5
Average			11.3	5.7	20.8	33.4	6.9	8.3	1.5
Min			9.3	4.6	17.8	32.1	6.2	8.1	1.0
Max			12.8	6.4	23.1	34.0	8.4	8.5	3.1

KS	Middle								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	18:13	9.8	4.9	23.4	33.7	7.5	8.3	1.6
mid-flood	28/11/2005	14:40	11.0	5.5	23.1	34.3	7.2	8.1	**1.0**
mid-flood	30/11/2005	12:28	10.7	5.3	23.0	33.8	6.7	8.3	**1.0**
mid-flood	02/12/2005	10:59	11.1	5.5	22.9	33.4	6.6	8.2	1.6
mid-flood	05/12/2005	11:58	11.9	5.9	22.4	33.6	6.7	8.2	2.1
mid-flood	07/12/2005	11:46	12.4	6.2	20.8	33.6	5.7	8.5	1.9
mid-flood	09/12/2005	09:44	9.9	4.9	20.6	33.5	5.8	8.4	2.0
mid-flood	12/12/2005	14:46	11.5	5.7	19.8	33.7	6.6	8.4	1.8
mid-flood	14/12/2005	16:11	12.5	6.2	19.6	33.7	6.9	8.4	3.0
mid-flood	16/12/2005	10:58	10.0	5.0	18.7	33.4	7.5	8.3	2.1
mid-flood	19/12/2005	11:19	10.0	5.0	18.0	33.1	6.7	8.4	1.5
mid-flood	21/12/2005	09:02	11.2	5.6	17.9	32.0	8.1	8.3	1.1
Average			11.0	5.5	20.8	33.5	6.8	8.3	1.7
Min			9.8	4.9	17.9	32.0	5.7	8.1	1.0
Max			12.5	6.2	23.4	34.3	8.1	8.5	3.0

BOLD value - < Detection Limit

KS	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-ebb	26/11/2005	10:51	9.3	8.3	23.1	33.8	7.0	8.3	1.5
mid-ebb	28/11/2005	11:28	12.4	11.4	23.0	33.5	7.5	8.1	1.7
mid-ebb	30/11/2005	16:12	10.5	9.5	23.0	34.0	6.9	8.3	**1.0**
mid-ebb	02/12/2005	14:42	12.5	11.5	22.9	33.8	6.3	8.2	1.4
mid-ebb	05/12/2005	15:43	11.5	10.5	22.3	33.7	6.4	8.2	1.4
mid-ebb	07/12/2005	07:57	12.0	11.0	20.6	33.4	6.5	8.3	1.6
mid-ebb	09/12/2005	16:14	10.5	9.5	20.6	33.3	6.4	8.2	1.3
mid-ebb	12/12/2005	11:02	11.0	10.0	20.3	33.8	6.7	8.4	2.1
mid-ebb	14/12/2005	12:24	12.8	11.8	19.6	33.2	7.6	8.4	2.0
mid-ebb	16/12/2005	14:42	9.6	8.6	18.8	33.7	7.0	8.3	3.8
mid-ebb	19/12/2005	14:57	12.0	11.0	18.0	33.5	6.7	8.4	1.8
mid-ebb	21/12/2005	06:52	12.0	11.0	17.7	32.4	8.4	8.4	3.0
Average			11.3	10.3	20.8	33.5	6.9	8.3	1.9
Min			9.3	8.3	17.7	32.4	6.3	8.1	1.0
Max			12.8	11.8	23.1	34.0	8.4	8.4	3.8

KS	Bottom								
tide condition	Date	time	Water depth (m)	Sampling depth (m)	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)
mid-flood	26/11/2005	18:12	9.8	8.8	23.5	33.6	7.6	8.3	1.4
mid-flood	28/11/2005	14:39	11.0	10.0	23.0	34.3	7.2	8.0	2.2
mid-flood	30/11/2005	12:27	10.7	9.7	23.0	33.9	6.7	8.3	**1.0**
mid-flood	02/12/2005	10:58	11.1	10.1	22.9	33.3	6.2	8.2	1.5
mid-flood	05/12/2005	11:57	11.9	10.9	22.4	33.4	6.8	8.2	2.0
mid-flood	07/12/2005	11:45	12.4	11.4	20.8	33.4	6.0	8.4	2.5
mid-flood	09/12/2005	09:43	9.9	8.9	20.6	33.5	5.8	8.4	1.9
mid-flood	12/12/2005	14:45	11.5	10.5	20.1	33.6	6.0	8.4	2.2
mid-flood	14/12/2005	16:10	12.5	11.5	19.6	33.7	6.9	8.4	2.5
mid-flood	16/12/2005	10:57	10.0	9.0	18.7	33.4	7.5	8.3	2.1
mid-flood	19/12/2005	11:19	10.0	9.0	17.9	33.1	6.8	8.3	1.4
mid-flood	21/12/2005	09:01	11.2	10.2	17.7	32.6	8.2	8.4	2.5
Average			11.0	10.0	20.9	33.5	6.8	8.3	1.9
Min			9.8	8.8	17.7	32.6	5.8	8.0	1.0
Max			12.5	11.5	23.5	34.3	8.2	8.4	2.5

BOLD value - < Detection Limit

KS		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-ebb	26/11/2005	2	**0.01**	0.01	0.01	0.03	**0.1**	1.1
mid-ebb	28/11/2005	3	**0.01**	**0.01**	0.01	0.03	**0.1**	**0.5**
mid-ebb	30/11/2005	3	**0.01**	**0.01**	0.02	0.04	**0.1**	0.7
mid-ebb	02/12/2005	**2**	0.01	**0.01**	0.01	0.03	**0.1**	**0.5**
mid-ebb	05/12/2005	2	**0.01**	0.02	0.02	0.05	**0.1**	0.8
mid-ebb	07/12/2005	2	0.03	0.02	0.02	0.07	**0.1**	0.8
mid-ebb	09/12/2005	2	0.02	0.02	0.01	0.05	**0.1**	1.0
mid-ebb	12/12/2005	2	0.01	0.02	0.01	0.04	**0.1**	0.8
mid-ebb	14/12/2005	2	0.01	0.02	0.01	0.04	**0.1**	1.1
mid-ebb	16/12/2005	2	**0.01**	0.02	0.01	0.04	**0.1**	0.5
mid-ebb	19/12/2005	2	**0.01**	0.01	0.03	0.05	**0.1**	0.6
mid-ebb	21/12/2005	3	**0.01**	**0.01**	0.08	0.10	**0.1**	1.1
Average		2	0.01	0.02	0.02	0.05	0.1	0.8
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		3	0.03	0.02	0.08	0.10	0.1	1.1
95%-ile		3	0.02	0.02	0.05	0.08	0.1	1.1
99%-ile		3	0.03	0.02	0.07	0.10	0.1	1.1

KS		Depth-averaged						
tide condition	Date	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
mid-flood	26/11/2005	5	**0.01**	**0.01**	0.01	0.03	**0.1**	1.4
mid-flood	28/11/2005	2	**0.01**	**0.01**	0.02	0.04	**0.1**	0.6
mid-flood	30/11/2005	**2**	**0.01**	**0.01**	0.01	0.03	**0.1**	0.6
mid-flood	02/12/2005	**2**	**0.01**	**0.01**	0.02	0.04	**0.1**	**0.5**
mid-flood	05/12/2005	2	**0.01**	0.02	0.02	0.05	**0.1**	0.7
mid-flood	07/12/2005	2	0.01	0.02	0.02	0.05	**0.1**	0.8
mid-flood	09/12/2005	2	0.02	0.02	0.02	0.06	**0.1**	0.6
mid-flood	12/12/2005	2	**0.01**	0.01	0.02	0.04	**0.1**	1.1
mid-flood	14/12/2005	2	0.01	0.02	0.01	0.04	**0.1**	1.3
mid-flood	16/12/2005	2	**0.01**	0.02	0.01	0.04	**0.1**	0.9
mid-flood	19/12/2005	3	**0.01**	0.01	0.03	0.05	**0.1**	0.9
mid-flood	21/12/2005	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	1.1
Average		2	0.01	0.01	0.02	0.05	0.1	0.9
Min		2	0.01	0.01	0.01	0.03	0.1	0.5
Max		5	0.02	0.02	0.08	0.10	0.1	1.4
95%-ile		4	0.01	0.02	0.05	0.08	0.1	1.3
99%-ile		5	0.02	0.02	0.07	0.10	0.1	1.4

BOLD value - < Detection Limit

F_UA	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	11:37	20.3	**0.1**	7.7	7.6	**1.0**	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
28/11/2005	12:14	21.2	**0.1**	7.2	7.8	**1.0**	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
30/11/2005	13:39	20.5	**0.1**	7.4	7.2	1.1	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
02/12/2005	12:10	19.9	**0.1**	7.2	7.4	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
05/12/2005	13:09	15.3	**0.1**	7.5	7.6	2.0	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
07/12/2005	08:43	14.3	**0.1**	7.5	7.3	1.2	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	0.5
09/12/2005	17:00	16.9	**0.1**	7.3	7.5	2.0	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
12/12/2005	11:48	15.3	**0.1**	7.2	7.3	1.9	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
14/12/2005	13:10	14.3	**0.1**	9.2	7.6	2.0	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
16/12/2005	12:09	12.3	**0.1**	10.8	7.4	1.6	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
19/12/2005	12:13	12.1	**0.1**	9.5	7.1	1.6	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
21/12/2005	10:14	11.3	**0.1**	10.9	7.4	1.4	**2**	0.01	**0.01**	0.07	0.09	**0.1**	**0.5**
Average		16.1	0.1	8.3	7.4	1.5	2	0.01	0.01	0.08	0.10	0.1	0.5
Min		11.3	0.1	7.2	7.1	1.0	2	0.01	0.01	0.07	0.09	0.1	0.5
Max		21.2	0.1	10.9	7.8	2.0	2	0.01	0.01	0.09	0.11	0.1	0.5
95%-ile (5%-ile)			0.1	(7.2)	7.7	2.0	2	0.01	0.01	0.09	0.11	0.1	0.5
99%-ile (1%-ile)			0.1	(7.2)	7.8	2.0	2	0.01	0.01	0.09	0.11	0.1	0.5

F_DA	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	11:41	21.3	**0.1**	7.8	7.6	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
28/11/2005	12:18	21.3	**0.1**	7.1	7.7	1.4	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
30/11/2005	13:43	22.4	**0.1**	9.2	7.6	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
02/12/2005	12:14	20.9	**0.1**	8.6	7.4	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
05/12/2005	13:13	16.1	**0.1**	8.3	7.5	1.6	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
07/12/2005	08:47	18.0	**0.1**	8.7	7.7	3.7	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	0.5
09/12/2005	17:04	16.9	**0.1**	8.3	7.5	2.0	**2**	0.01	**0.01**	0.06	0.08	**0.1**	**0.5**
12/12/2005	11:52	16.0	**0.1**	8.9	7.3	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
14/12/2005	13:14	15.1	**0.1**	10.0	7.6	1.8	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
16/12/2005	12:13	14.1	**0.1**	11.0	7.2	2.7	**2**	0.01	**0.01**	0.06	0.08	**0.1**	**0.5**
19/12/2005	12:17	13.5	**0.1**	9.6	7.4	4.3	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
21/12/2005	10:18	11.8	**0.1**	11.0	7.5	3.1	**2**	0.01	**0.01**	0.06	0.08	**0.1**	**0.5**
Average		17.3	0.1	9.0	7.5	2.1	2	0.01	0.01	0.06	0.08	0.1	0.5
Min		11.8	0.1	7.1	7.2	1.0	2	0.01	0.01	0.06	0.08	0.1	0.5
Max		22.4	0.1	11.0	7.7	4.3	2	0.01	0.01	0.07	0.09	0.1	0.5
95%-ile (5%-ile)			0.1	(7.5)	7.7	4.0	2	0.01	0.01	0.07	0.09	0.1	0.5
99%-ile (1%-ile)			0.1	(7.2)	7.7	4.2	2	0.01	0.01	0.07	0.09	0.1	0.5

BOLD value - < Detection Limit

F_UB	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	11:23	21.3	0.1	7.8	7.9	**1.0**	4	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
28/11/2005	12:00	20.6	0.1	7.9	7.5	**1.0**	**2**	**0.01**	**0.01**	0.10	0.12	**0.1**	**0.5**
30/11/2005	13:25	20.6	0.1	6.4	7.5	1.3	2	**0.01**	**0.01**	0.10	0.12	**0.1**	**0.5**
02/12/2005	11:56	19.6	0.1	6.9	7.6	1.1	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
05/12/2005	12:55	16.1	0.1	8.6	7.6	2.1	8	**0.01**	**0.01**	0.05	0.07	**0.1**	**0.5**
07/12/2005	08:29	15.0	**0.1**	8.9	7.5	2.3	2	**0.01**	**0.01**	0.1	0.12	**0.1**	0.5
09/12/2005	16:46	18.6	0.1	7.9	8.0	2.9	2	**0.01**	**0.01**	0.05	0.07	**0.1**	**0.5**
12/12/2005	11:34	16.4	0.1	8.5	7.7	2.0	8	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
14/12/2005	12:56	14.4	**0.1**	9.7	7.6	1.6	3	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
16/12/2005	11:55	15.1	**0.1**	10.0	7.8	1.8	2	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
19/12/2005	12:01	14.9	**0.1**	8.0	8.1	3.9	8	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
21/12/2005	10:00	11.5	**0.1**	10.5	7.7	2.9	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
Average		17.0	0.1	8.4	7.7	2.0	4	0.01	0.01	0.06	0.08	0.1	0.5
Min		11.5	0.1	6.4	7.5	1.0	2	0.01	0.01	0.04	0.06	0.1	0.5
Max		21.3	0.1	10.5	8.1	3.9	8	0.01	0.01	0.10	0.12	0.1	0.5
95%-ile (5%-ile)			0.1	(6.7)	8.0	3.4	8	0.01	0.01	0.10	0.12	0.1	0.5
99%-ile (1%-ile)			0.1	(6.5)	8.1	3.8	8	0.01	0.01	0.10	0.12	0.1	0.5

F_DB	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	08:55	19.1	**0.1**	9.7	7.5	**1.0**	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
28/11/2005	09:32	20.6	0.1	7.3	7.2	**1.0**	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
30/11/2005	10:33	20.6	0.1	6.2	6.9	**1.0**	**2**	**0.01**	**0.01**	0.10	0.12	**0.1**	**0.5**
02/12/2005	09:04	19.6	0.1	7.5	6.9	1.3	**2**	**0.01**	**0.01**	0.08	0.10	**0.1**	**0.5**
05/12/2005	10:03	16.3	0.1	8.8	7.1	1.5	**2**	**0.01**	**0.01**	0.10	0.12	**0.1**	**0.5**
07/12/2005	06:03	14.9	0.1	9.0	7.3	2.0	3	**0.01**	**0.01**	0.1	0.12	**0.1**	**0.5**
09/12/2005	14:18	17.6	**0.1**	8.6	7.4	1.4	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
12/12/2005	09:06	16.0	**0.1**	8.2	6.8	1.7	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
14/12/2005	10:28	15.3	**0.1**	9.7	7.0	1.7	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
16/12/2005	09:03	13.8	**0.1**	10.2	6.8	1.6	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
19/12/2005	09:15	13.2	**0.1**	8.6	7.7	1.6	**2**	**0.01**	**0.01**	0.09	0.11	**0.1**	**0.5**
21/12/2005	05:56	11.9	**0.1**	10.7	7.0	1.5	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
Average		16.6	0.1	8.7	7.1	1.4	2	0.01	0.01	0.09	0.11	0.1	0.5
Min		11.9	0.1	6.2	6.8	1.0	2	0.01	0.01	0.06	0.08	0.1	0.5
Max		20.6	0.1	10.7	7.7	2.0	3	0.01	0.01	0.10	0.12	0.1	0.5
95%-ile (5%-ile)			0.1	(6.8)	7.6	1.8	2	0.01	0.01	0.10	0.12	0.1	0.5
99%-ile (1%-ile)			0.1	(6.3)	7.7	2.0	3	0.01	0.01	0.10	0.12	0.1	0.5

BOLD value - < Detection Limit

F_UC	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	09:50	22.0	**0.1**	5.9	6.2	1.6	4	**0.01**	**0.01**	0.13	0.15	**0.1**	**0.5**
28/11/2005	10:27	21.1	**0.1**	7.1	7.1	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
30/11/2005	11:28	20.7	**0.1**	7.9	7.0	**1.0**	2	**0.01**	**0.01**	0.05	0.07	**0.1**	**0.5**
02/12/2005	09:59	20.3	**0.1**	7.2	6.8	**1.0**	2	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
05/12/2005	10:58	16.3	**0.1**	8.9	6.6	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
07/12/2005	06:58	12.7	**0.1**	10.5	6.8	1.4	**2**	0.01	**0.01**	0.09	0.11	**0.1**	0.6
09/12/2005	15:13	18.9	**0.1**	8.3	6.7	2.1	2	0.01	**0.01**	0.07	0.09	**0.1**	**0.5**
12/12/2005	10:01	17.2	**0.1**	7.2	6.0	2.6	2	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
14/12/2005	11:23	16.5	**0.1**	8.8	6.0	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
16/12/2005	09:58	16.1	**0.1**	9.4	6.0	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
19/12/2005	10:07	16.1	**0.1**	8.8	6.1	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
21/12/2005	05:51	11.0	**0.1**	10.8	6.3	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
Average		17.4	0.1	8.4	6.5	1.3	2	0.01	0.01	0.07	0.09	0.1	0.5
Min		11.0	0.1	5.9	6.0	1.0	2	0.01	0.01	0.04	0.06	0.1	0.5
Max		22.0	0.1	10.8	7.1	2.6	4	0.01	0.01	0.13	0.15	0.1	0.6
95%-ile (5%-ile)			0.1	(6.6)	7.0	2.3	3	0.01	0.01	0.11	0.13	0.1	0.5
99%-ile (1%-ile)			0.1	(6.0)	7.1	2.5	4	0.01	0.01	0.13	0.15	0.1	0.6

F_DC	Mid depth												
Date	time	Temp (°C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	10:03	19.9	**0.1**	7.4	6.8	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
28/11/2005	10:40	21.1	**0.1**	6.3	7.0	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
30/11/2005	11:41	21.0	**0.1**	7.9	7.1	**1.0**	3	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
02/12/2005	10:12	20.9	**0.1**	7.1	6.9	**1.0**	**2**	**0.01**	**0.01**	0.04	0.06	**0.1**	**0.5**
05/12/2005	11:11	17.0	**0.1**	8.6	7.0	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
07/12/2005	07:11	12.9	**0.1**	11.6	6.8	2.4	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	0.6
09/12/2005	15:26	17.1	**0.1**	8.5	6.8	**1.0**	**2**	0.01	**0.01**	0.05	0.07	**0.1**	**0.5**
12/12/2005	10:14	17.0	**0.1**	7.9	6.2	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
14/12/2005	11:36	15.8	**0.1**	9.7	6.8	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
16/12/2005	10:11	14.6	**0.1**	9.8	6.6	**1.0**	**2**	**0.01**	**0.01**	0.07	0.09	**0.1**	**0.5**
19/12/2005	10:21	14.5	**0.1**	9.7	6.7	**1.0**	**2**	**0.01**	**0.01**	0.06	0.08	**0.1**	**0.5**
21/12/2005	06:04	11.1	**0.1**	11.0	6.6	**1.0**	**2**	0.01	**0.01**	0.07	0.09	**0.1**	**0.5**
Average		16.9	0.1	8.8	6.8	1.1	2	0.01	0.01	0.06	0.08	0.1	0.5
Min		11.1	0.1	6.3	6.2	1.0	2	0.01	0.01	0.04	0.06	0.1	0.5
Max		21.1	0.1	11.6	7.1	2.4	3	0.01	0.01	0.07	0.09	0.1	0.6
95%-ile (5%-ile)			0.1	(6.7)	7.0	1.6	2	0.01	0.01	0.07	0.09	0.1	0.5
99%-ile (1%-ile)			0.1	(6.4)	7.1	2.2	3	0.01	0.01	0.07	0.09	0.1	0.6

BOLD value - < Detection Limit

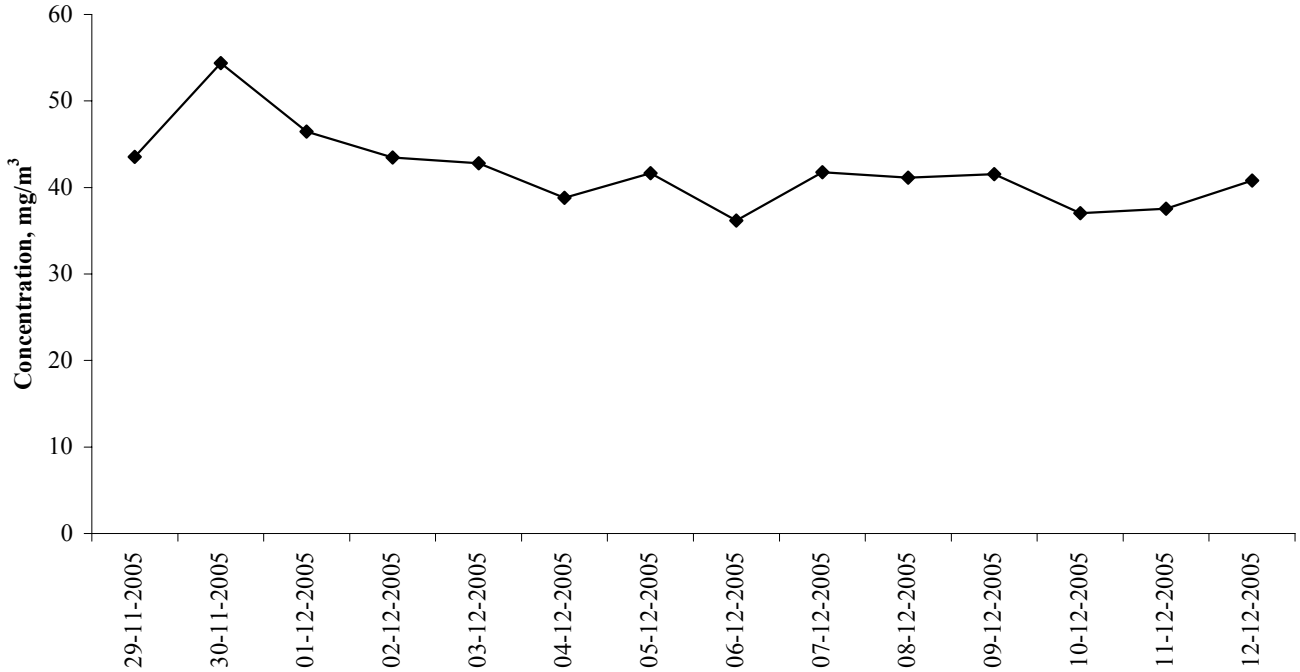
F_Inland Marsh	Mid depth												
Date	time	Temp (^{o}C)	Salinity (ppt)	DO (mg/L)	pH	Turbidity (NTU)	SS (mg/L)	NH_3-N (mg/L)	NO_2-N (mg/L)	NO_3-N (mg/L)	TIN (mg/L)	TP (mg/L)	Chl a (µg/L)
26/11/2005	12:04	20.7	**0.1**	5.9	6.9	1.1	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
28/11/2005	12:41	21.9	0.1	6.1	7.1	1.6	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
30/11/2005	14:06	21.1	0.1	6.7	7.0	1.5	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
02/12/2005	12:37	19.9	**0.1**	6.6	6.7	3.9	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
05/12/2005	13:36	16.3	**0.1**	8.7	6.5	2.3	2	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
07/12/2005	09:10	14.6	0.1	9.8	7.9	1.6	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	0.8
09/12/2005	17:27	16.6	**0.1**	7.6	6.9	1.0	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
12/12/2005	12:15	16.6	0.1	7.7	6.8	1.6	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
14/12/2005	13:37	14.5	**0.1**	9.3	7.2	2.2	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
16/12/2005	12:36	14.4	**0.1**	9.6	6.9	1.3	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
19/12/2005	12:42	12.9	**0.1**	8.4	6.8	1.6	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
21/12/2005	10:41	11.9	**0.1**	10.1	6.9	1.9	**2**	**0.01**	**0.01**	**0.01**	0.03	**0.1**	**0.5**
Average		16.8	0.1	8.0	7.0	1.8	2	0.01	0.01	0.01	0.03	0.1	0.5
Min		11.9	0.1	5.9	6.5	1.0	2	0.01	0.01	0.01	0.03	0.1	0.5
Max		21.9	0.1	10.1	7.9	3.9	2	0.01	0.01	0.01	0.03	0.1	0.8
95%-ile (5%-ile)			0.1	(6.0)	7.5	3.0	2	0.01	0.01	0.01	0.03	0.1	0.6
99%-ile (1%-ile)			0.1	(5.9)	7.8	3.7	2	0.01	0.01	0.01	0.03	0.1	0.8

BOLD value - < Detection Limit

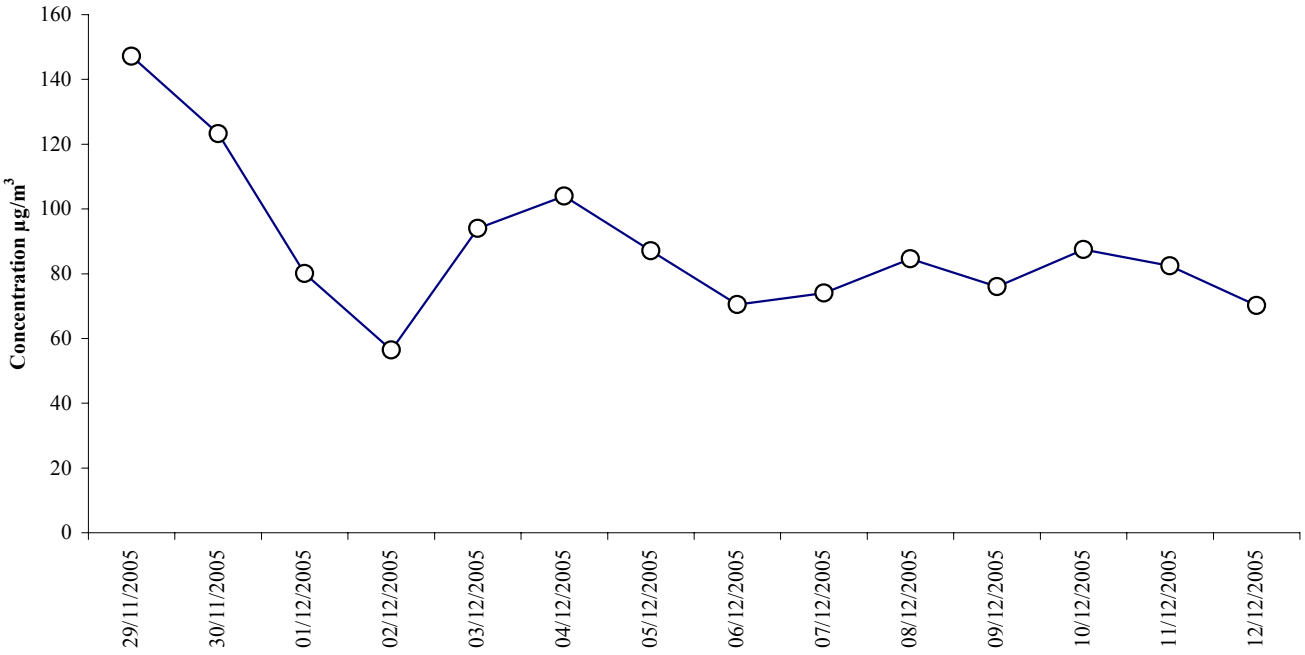
Appendix D
Baseline Monitoring Results (Graphical)

Air Quality

Air Quality : GCA B1 (1-hr TSP)



Air Quality : GCA B1 (24-hr TSP)



Water Quality
(Figures)

Figure 1a Marine Water Quality - Salinity (Mid Ebb)

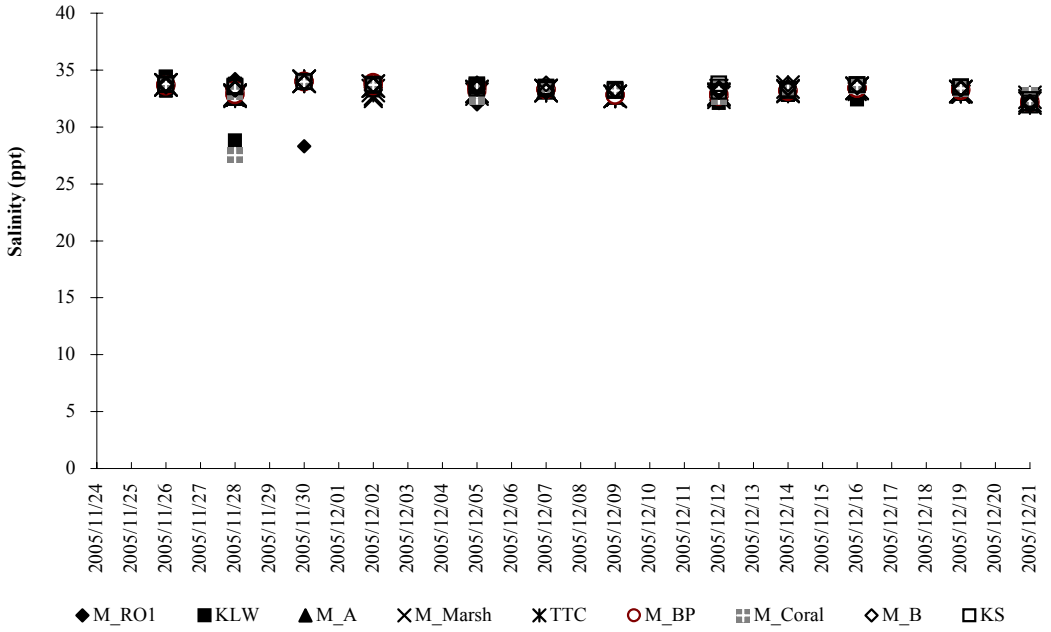


Figure 1b Marine Water Quality - Salinity (Mid Flood)

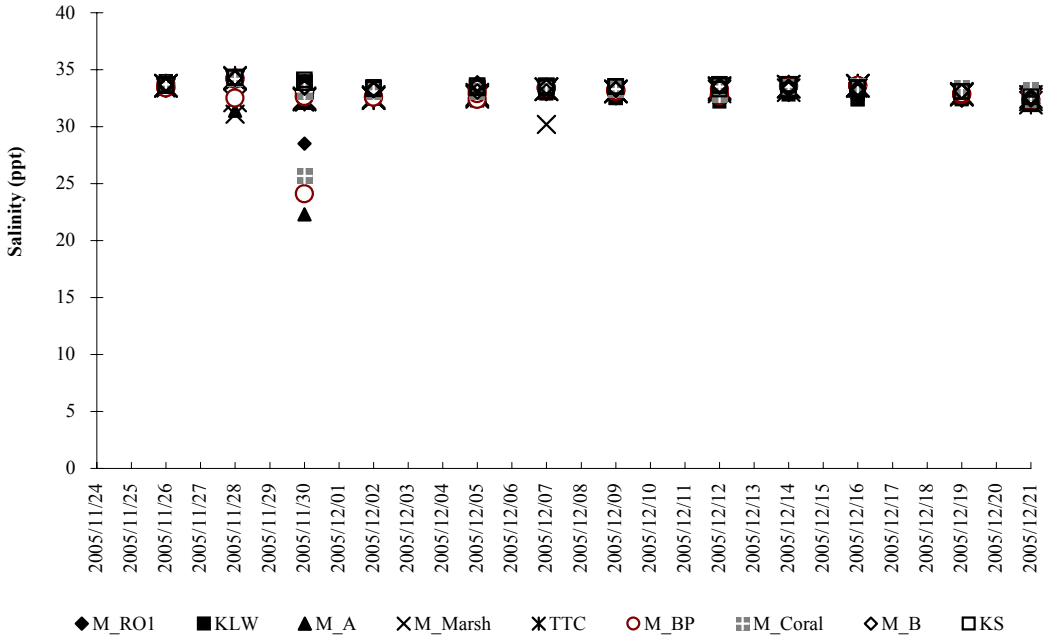


Figure 2a Marine Water Quality - Dissolved Oxygen - Surface & Middle (Mid Ebb)

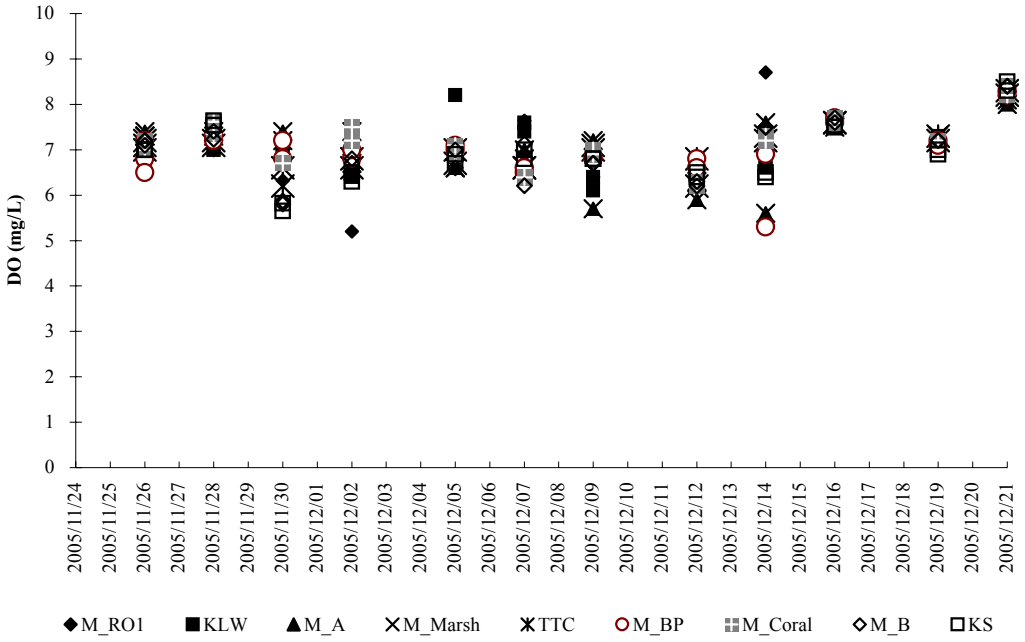


Figure 2b Marine Water Quality - Dissolved Oxygen - Bottom (Mid Ebb)

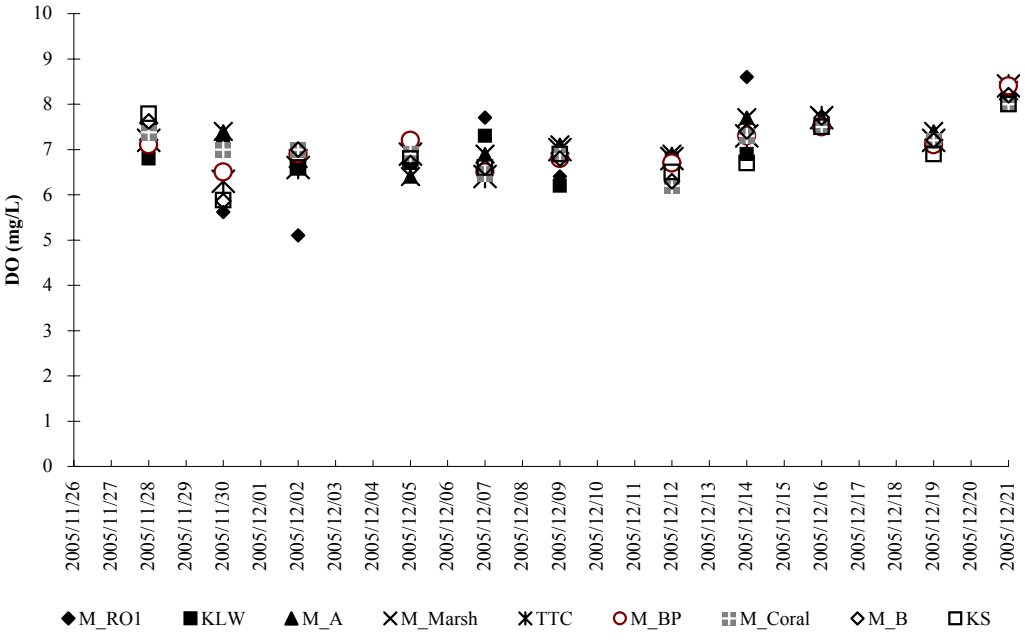


Figure 2c Marine Water Quality - Dissolved Oxygen - Surface & Middle (Mid Flood)

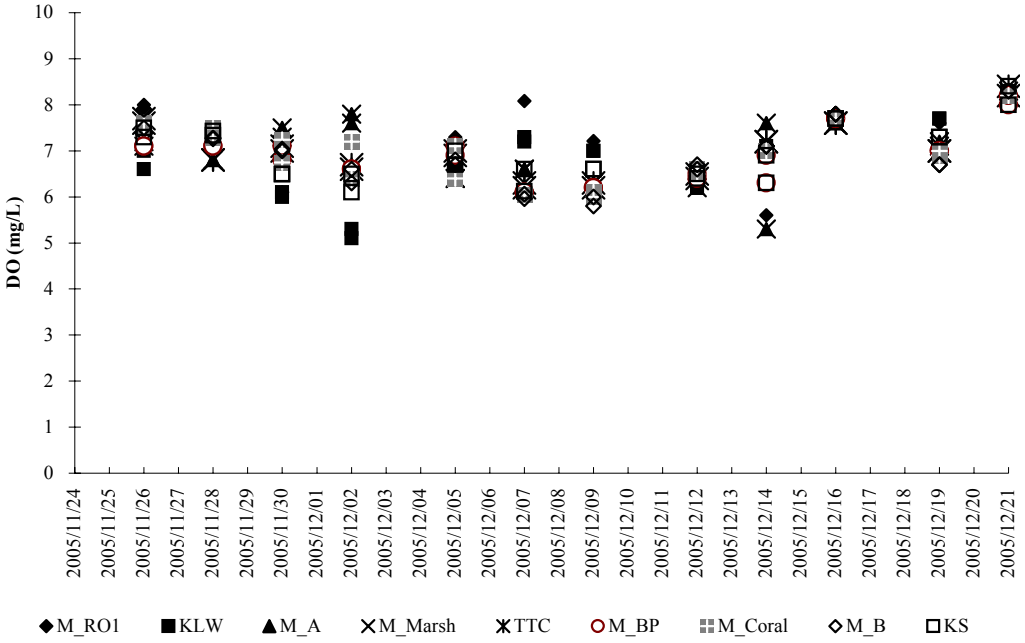


Figure 2d Marine Water Quality - Dissolved Oxygen - Bottom (Mid Flood)

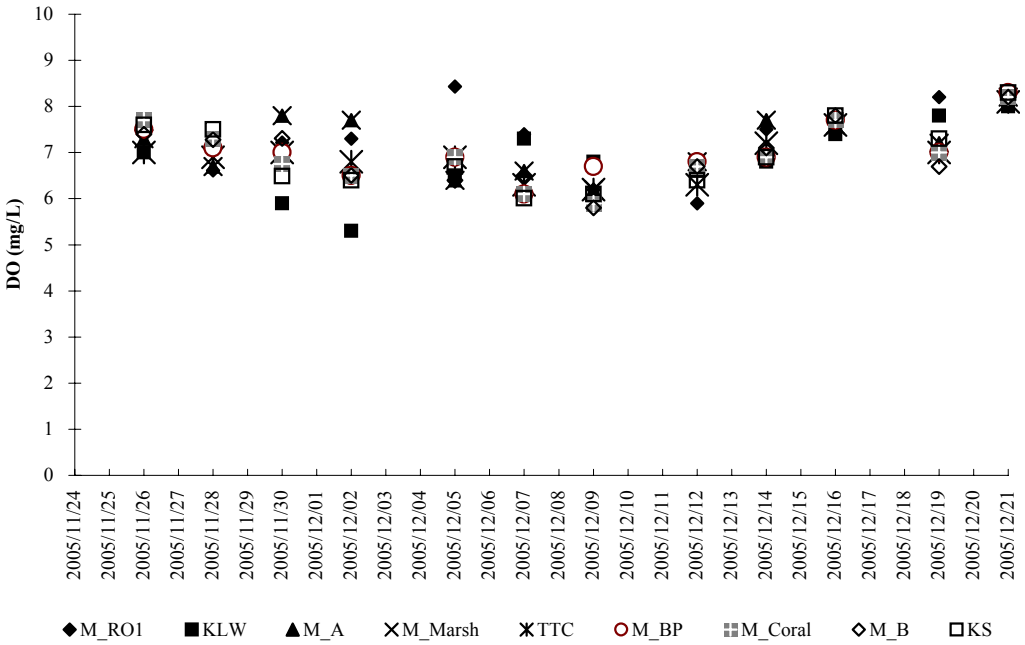


Figure 3a Marine Water Quality -pH (Mid Ebb)

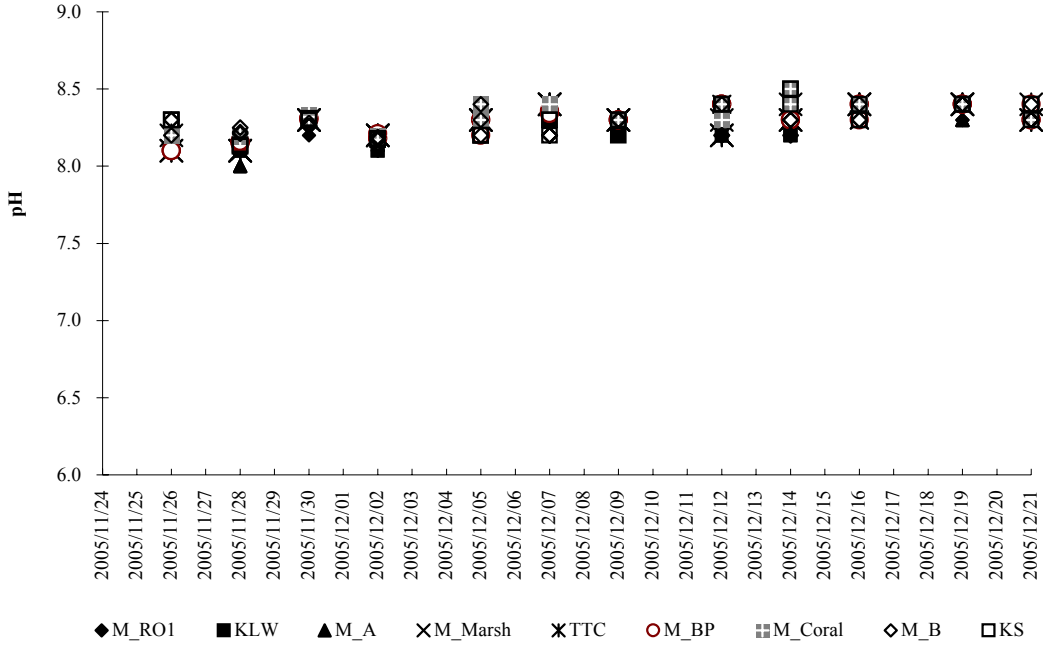


Figure 3b Marine Water Quality - pH (Mid Flood)

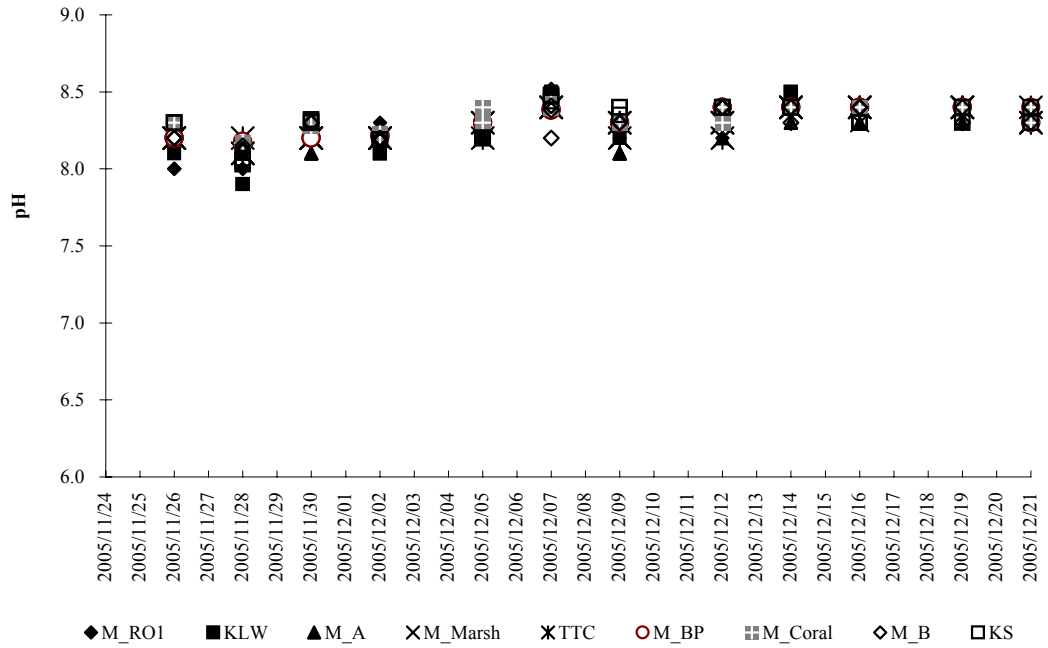


Figure 4a Marine Water Quality - Turbidity (Mid Ebb)

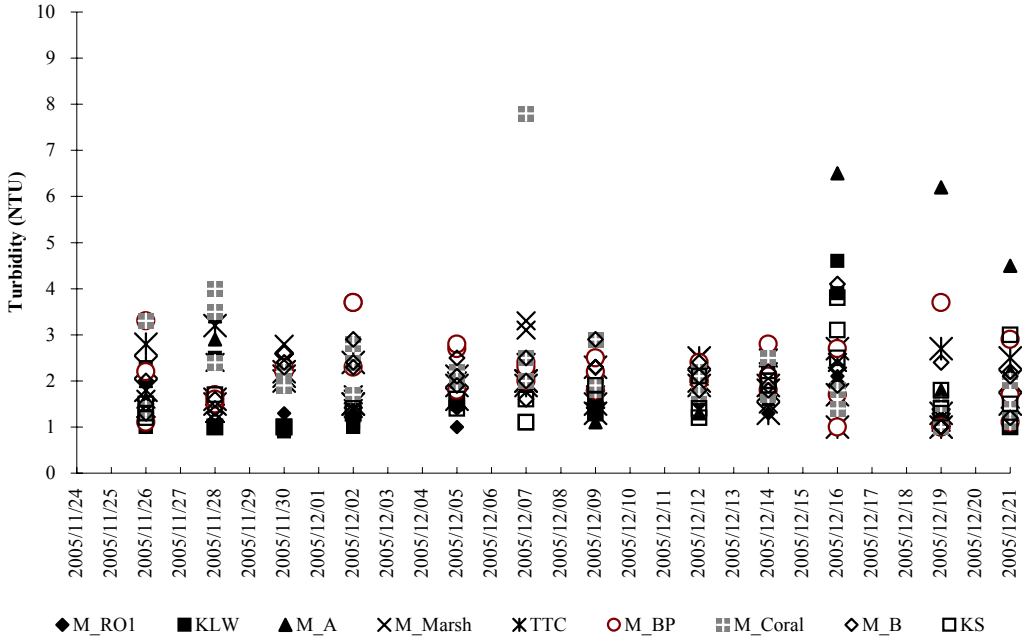


Figure 4b Marine Water Quality - Turbidity (Mid Flood)

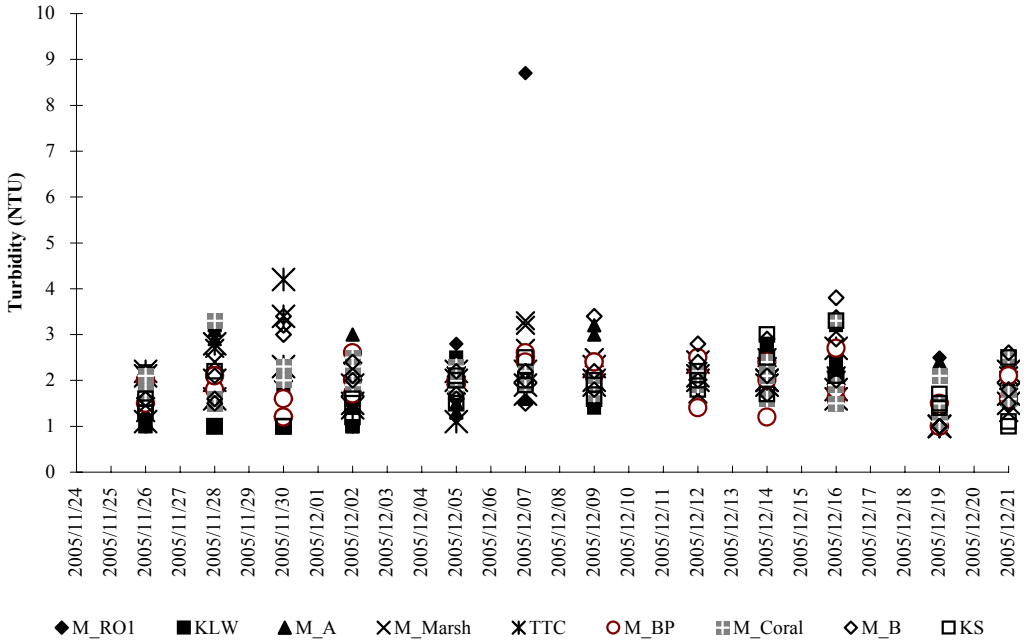


Figure 5a Marine Water Quality - Suspendied Solids (Mid Ebb)

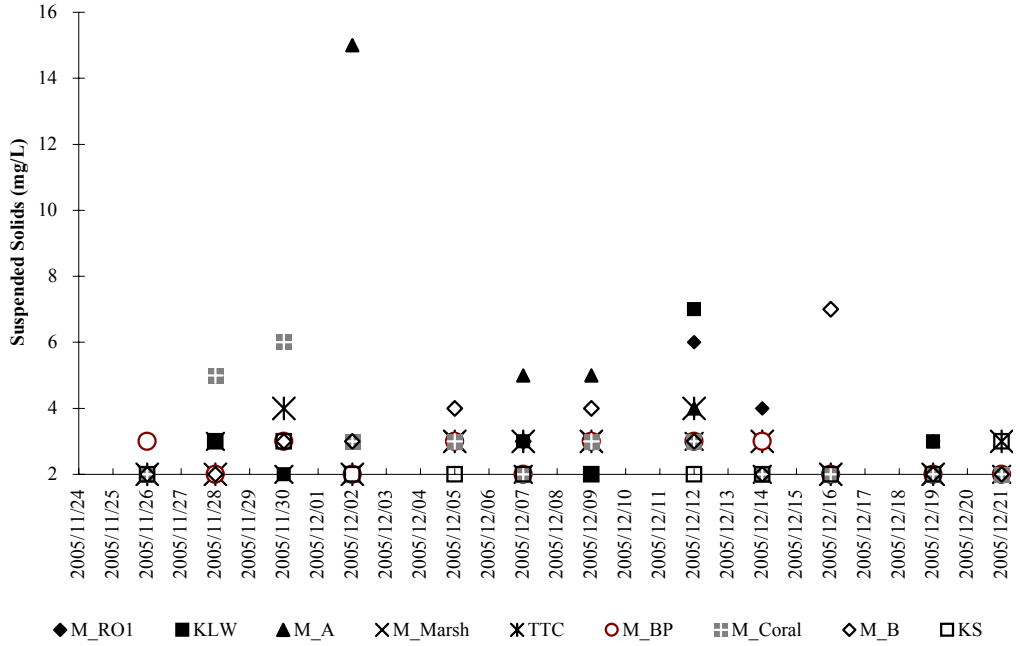


Figure 5b Marine Water Quality - Suspendied Solids (Mid Flood)

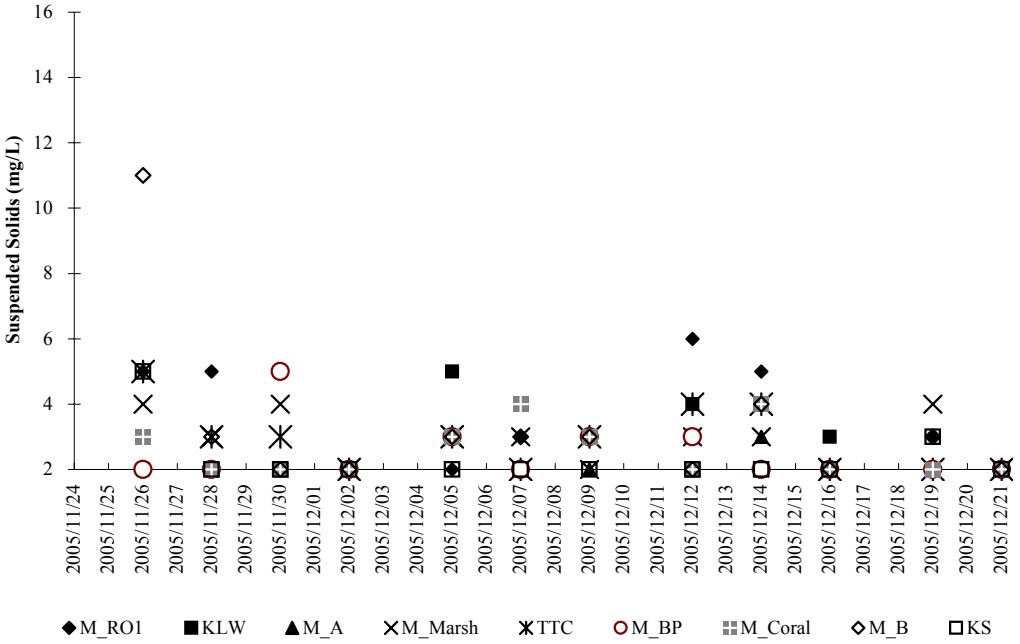


Figure 6a Marine Water Quality - Ammonia Nitrogen (Mid Ebb)

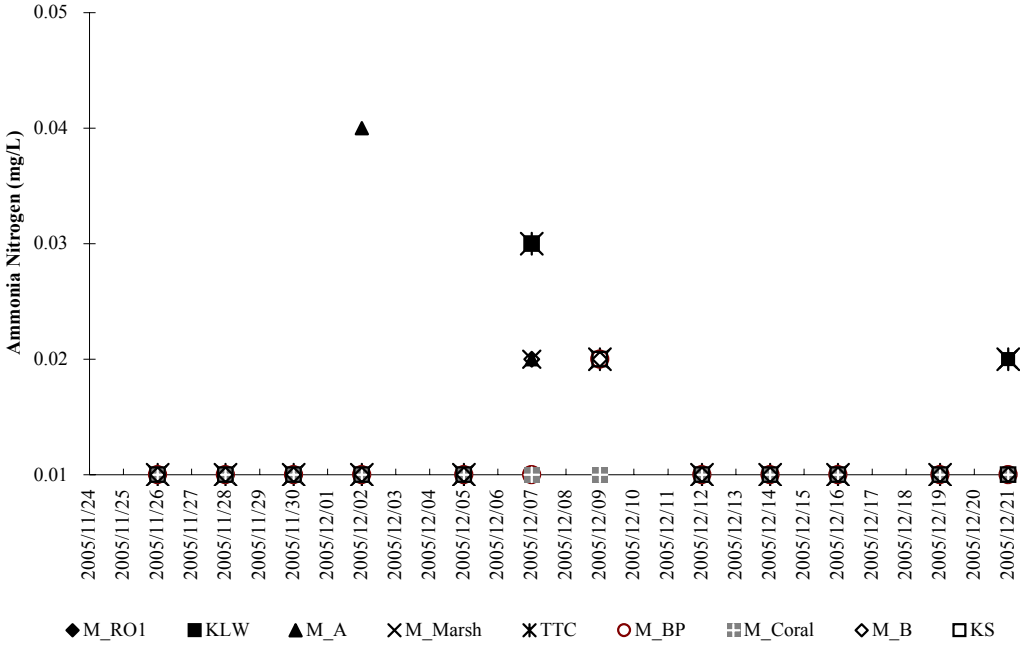


Figure 6b Marine Water Quality - Ammonia Nitrogen (Mid Flood)

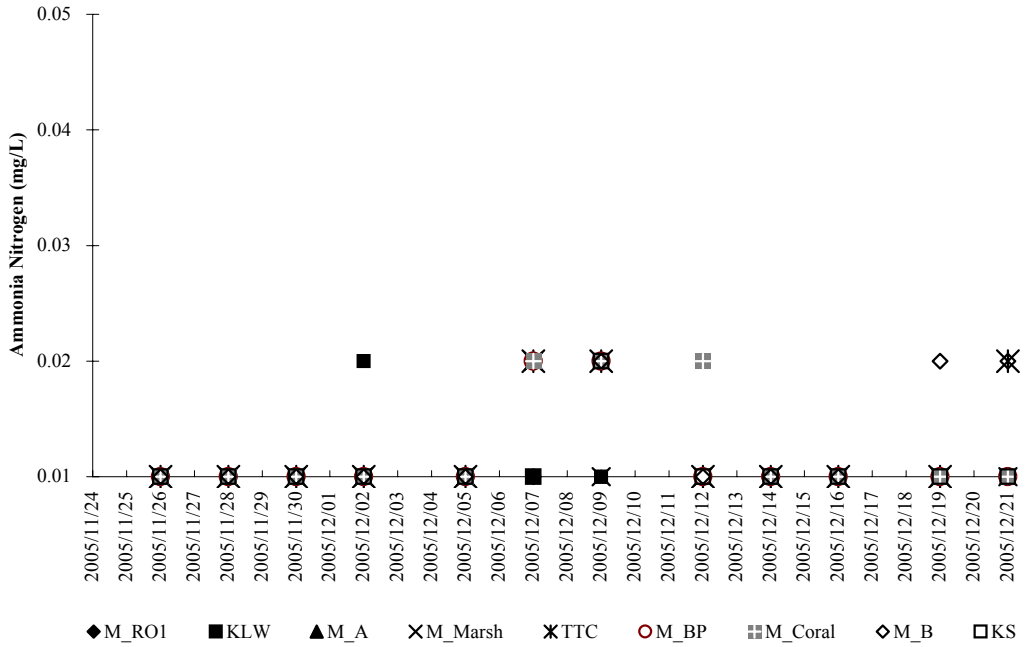


Figure 7a Marine Water Quality - Nitrite Nitrogen (Mid Ebb)

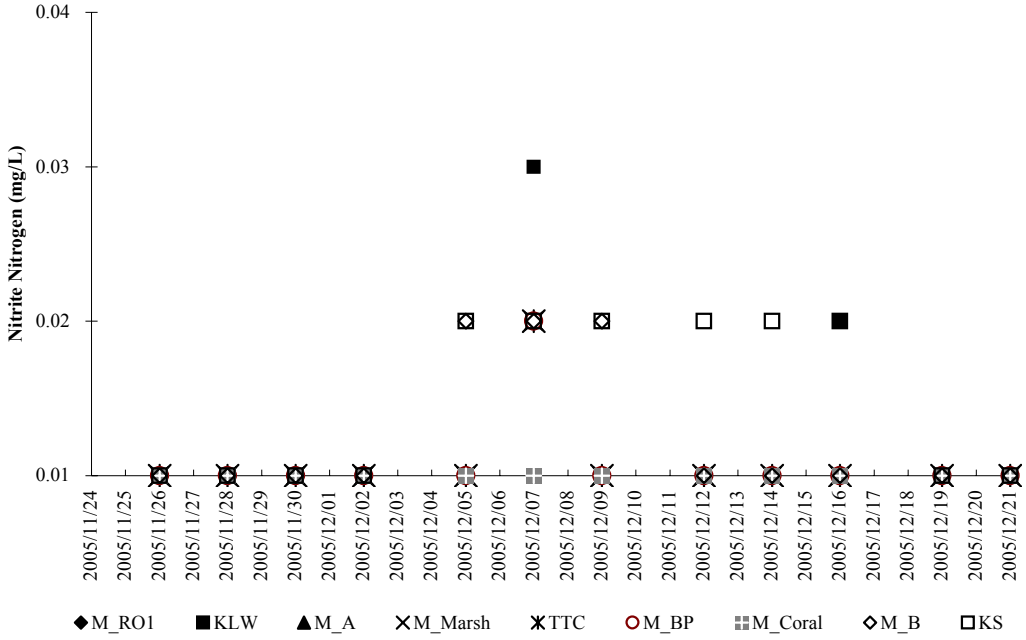


Figure 7b Marine Water Quality - Nitrite Nitrogen (Mid Flood)

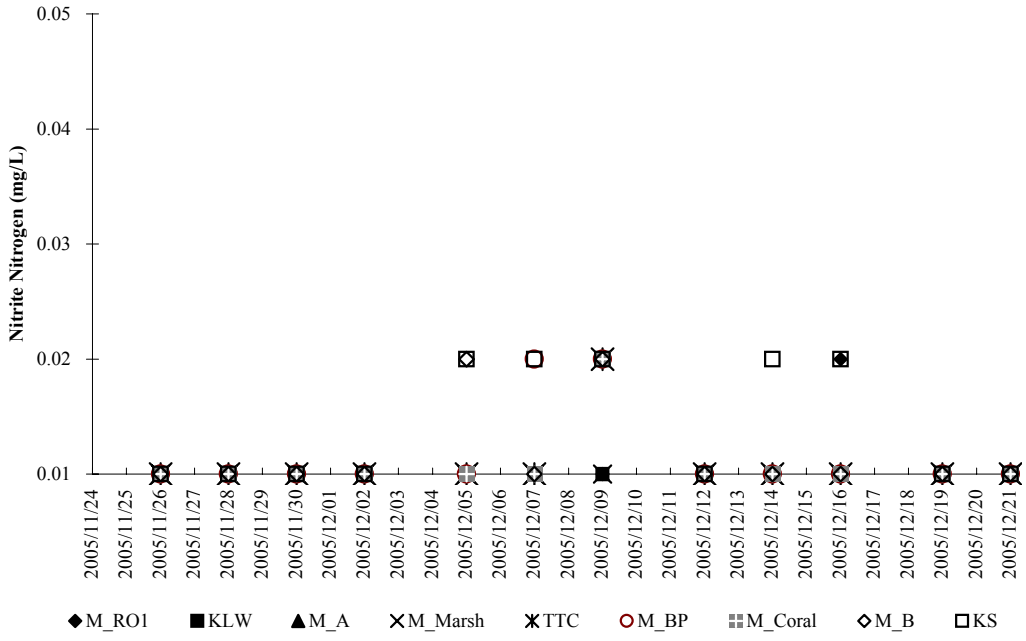


Figure 8a Marine Water Quality - NitrateNitrogen (Mid Ebb)

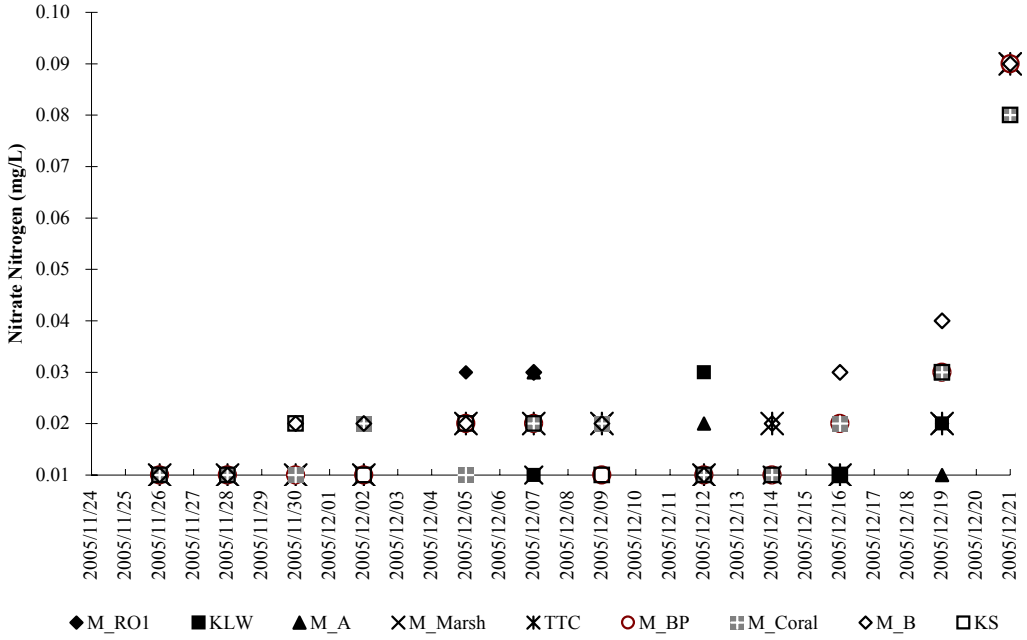


Figure 8b Marine Water Quality - Nitrate Nitrogen (Mid Flood)

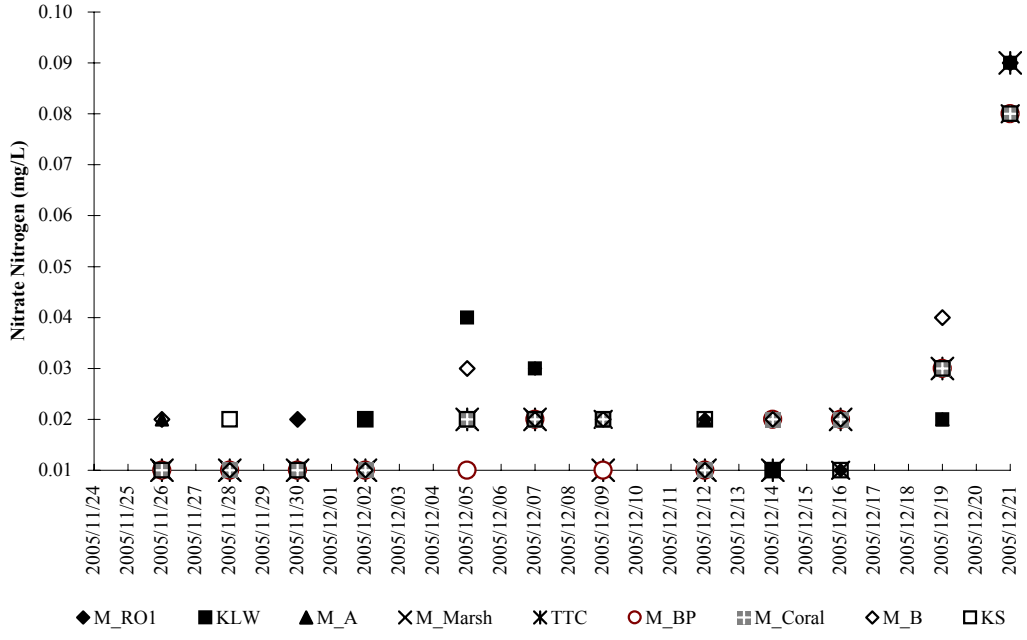


Figure 9a Marine Water Quality - Total Inorganic Nitrogen (Mid Ebb)

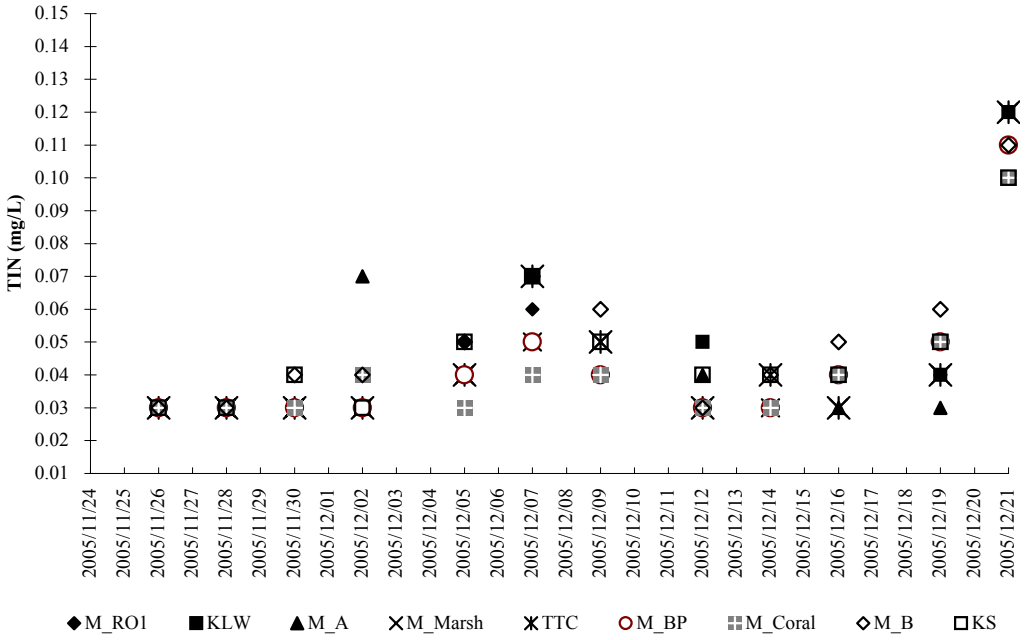


Figure 9b Marine Water Quality - Total Inorganic Nitrogen (Mid Flood)

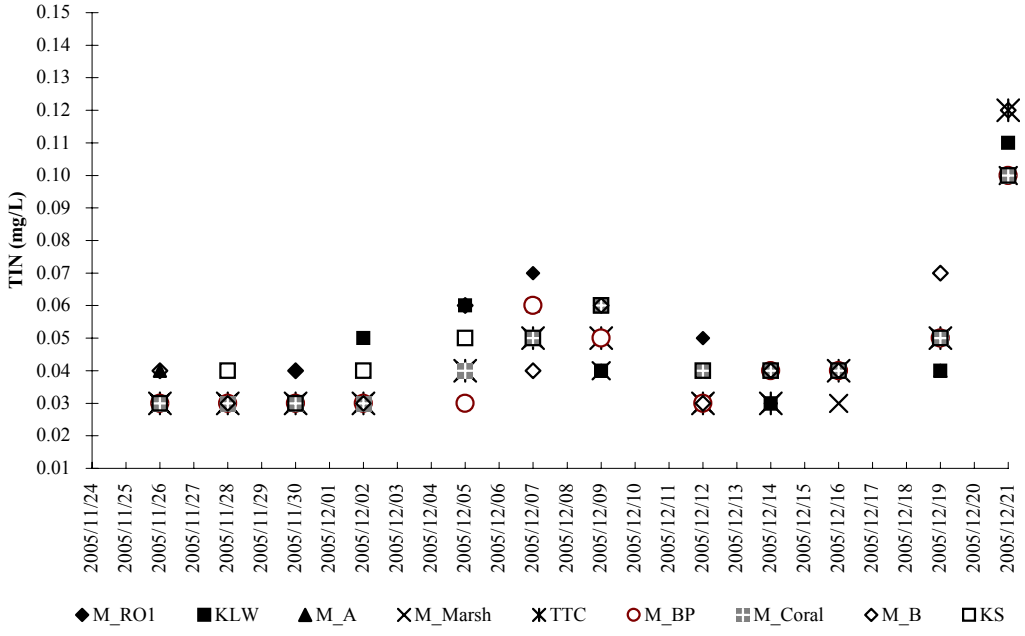


Figure 10a Marine Water Quality - Total Phosphate (Mid Ebb)

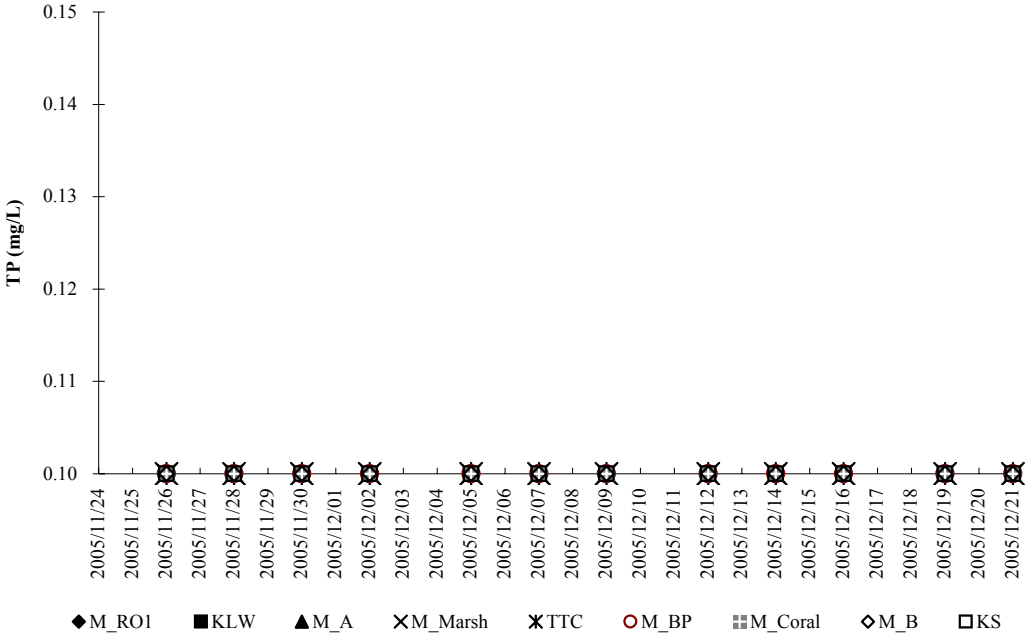


Figure 10b Marine Water Quality - Total Phosphate (Mid Flood)

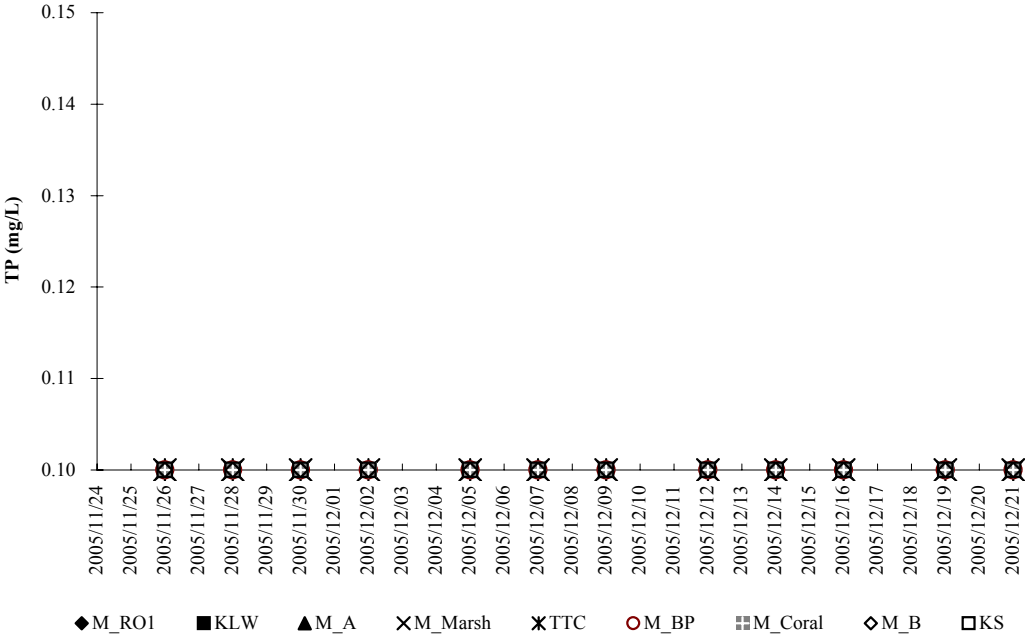


Figure 11a Marine Water Quality - Chlorophyll a (Mid Ebb)

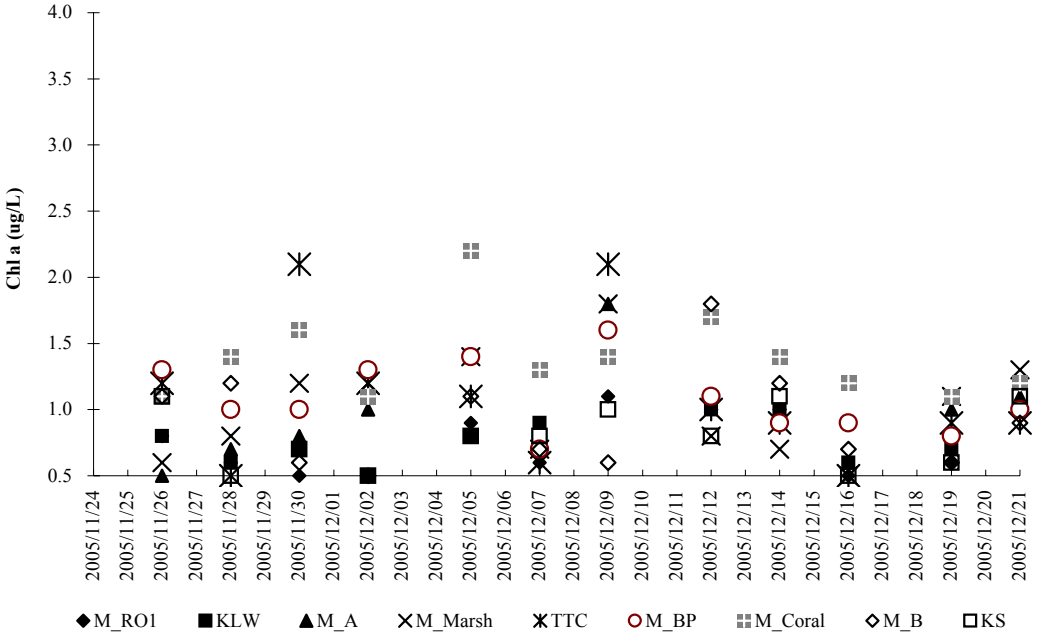


Figure 11b Marine Water Quality - Chlorophyll a (Mid Flood)

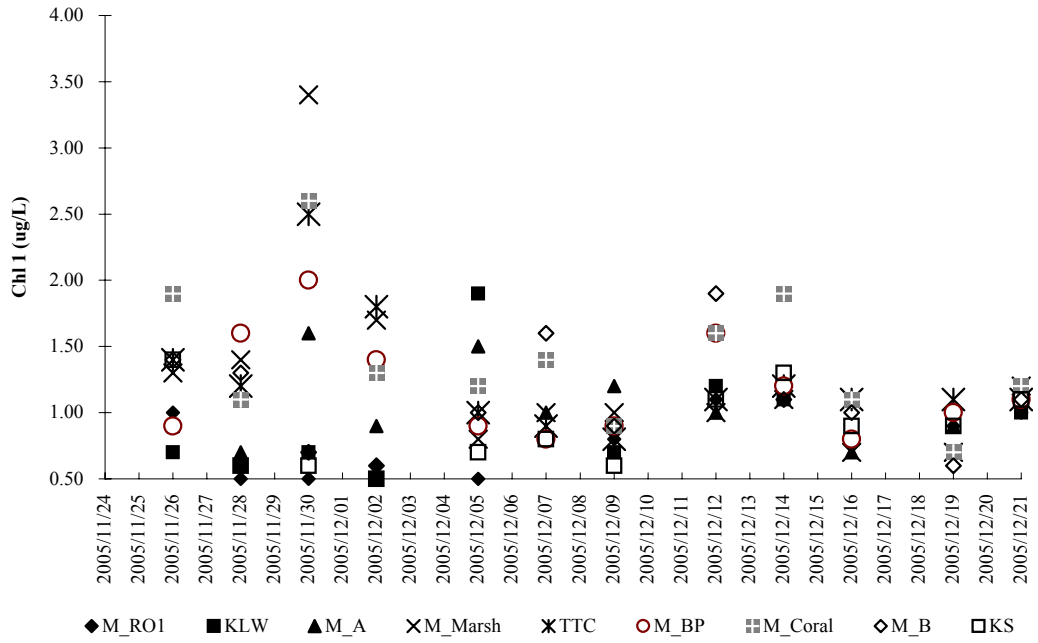


Figure 12 River Water Quality Salinity (Depth-Averaged)

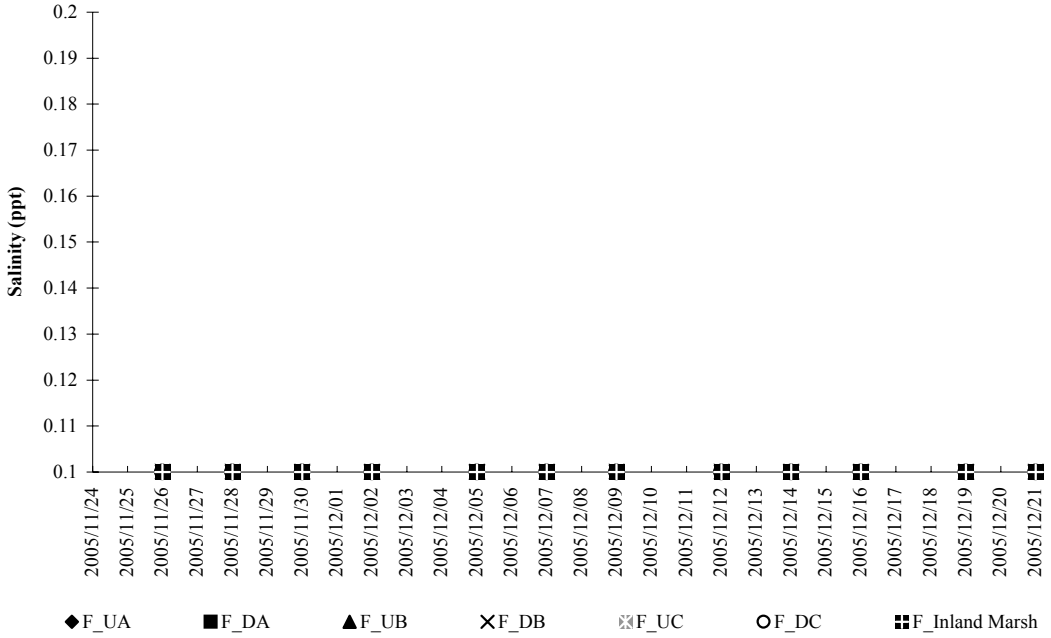


Figure 13 River Water Quality Dissolved Oxygen (Depth-Averaged)

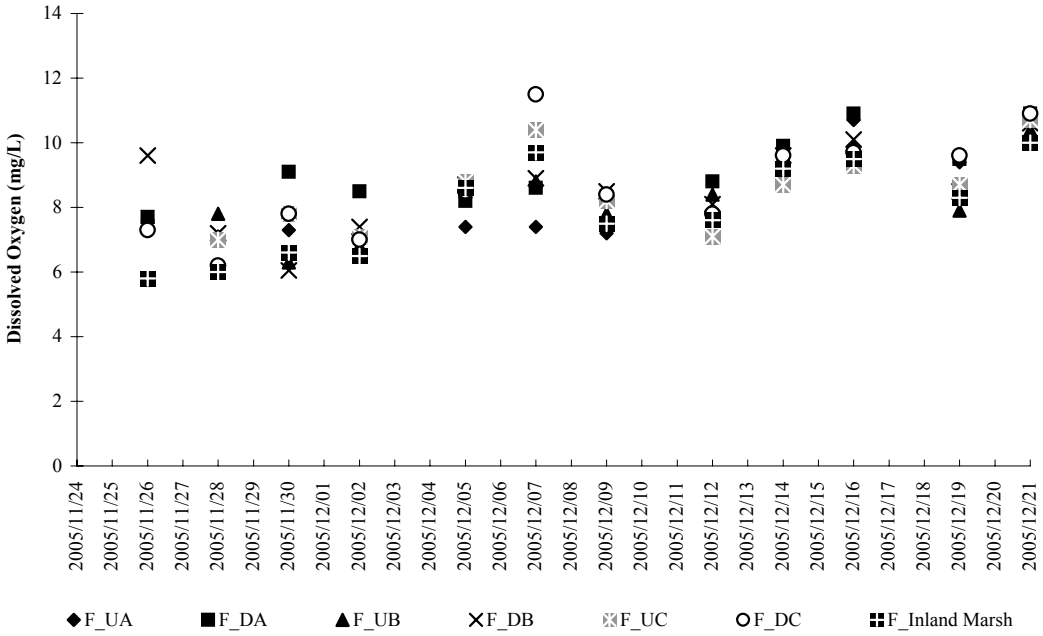


Figure 14 River Water Quality pH (Depth-Averaged)

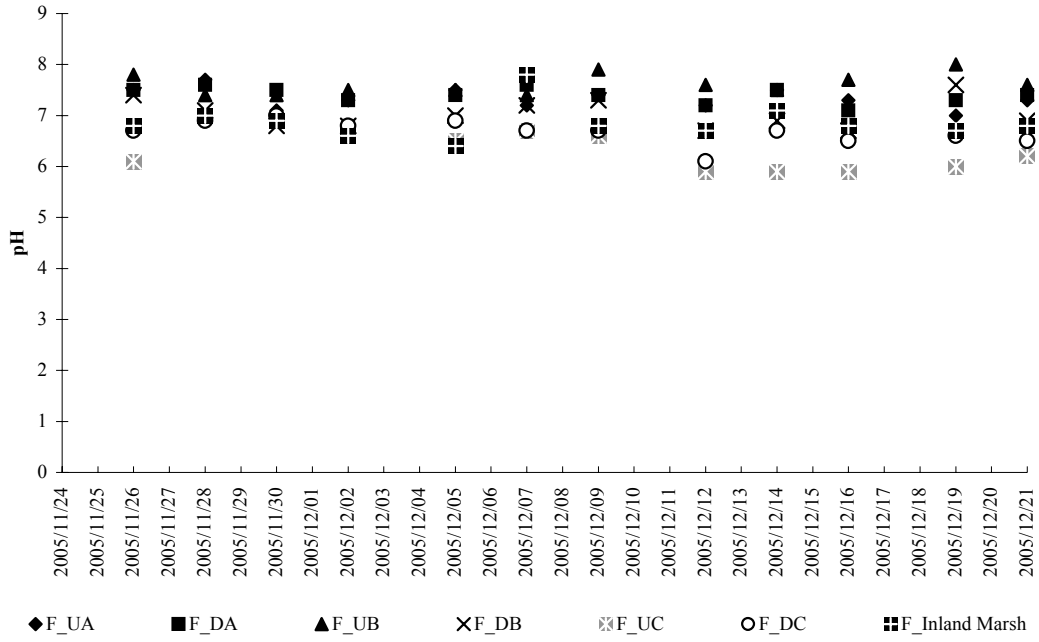


Figure 15 River Water Quality Turbidity (Depth-Averaged)

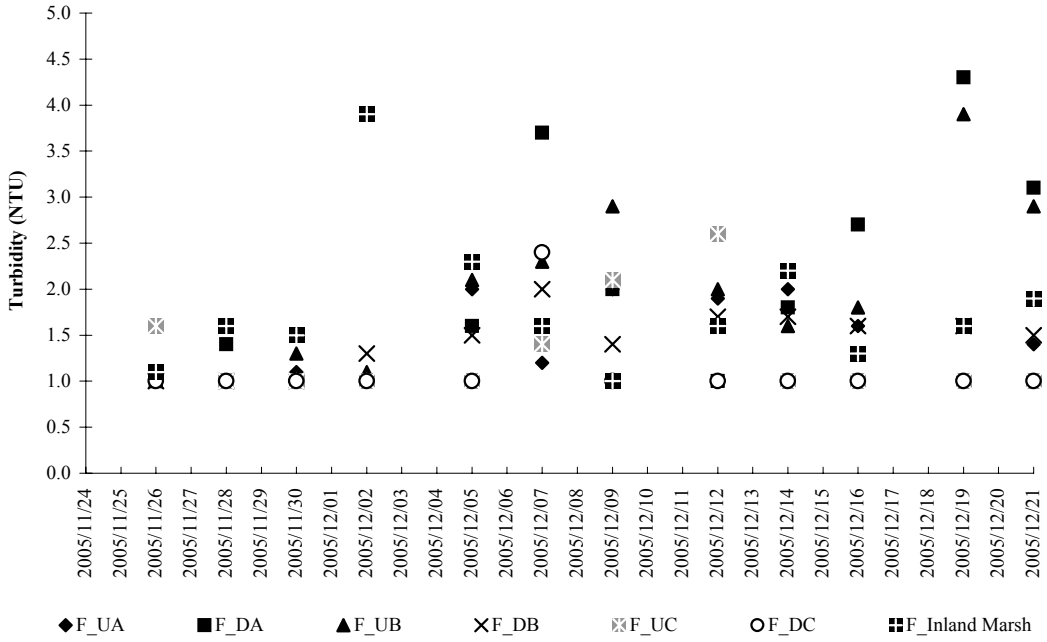


Figure 16 River Water Quality Suspended Solids (Depth-Averaged)

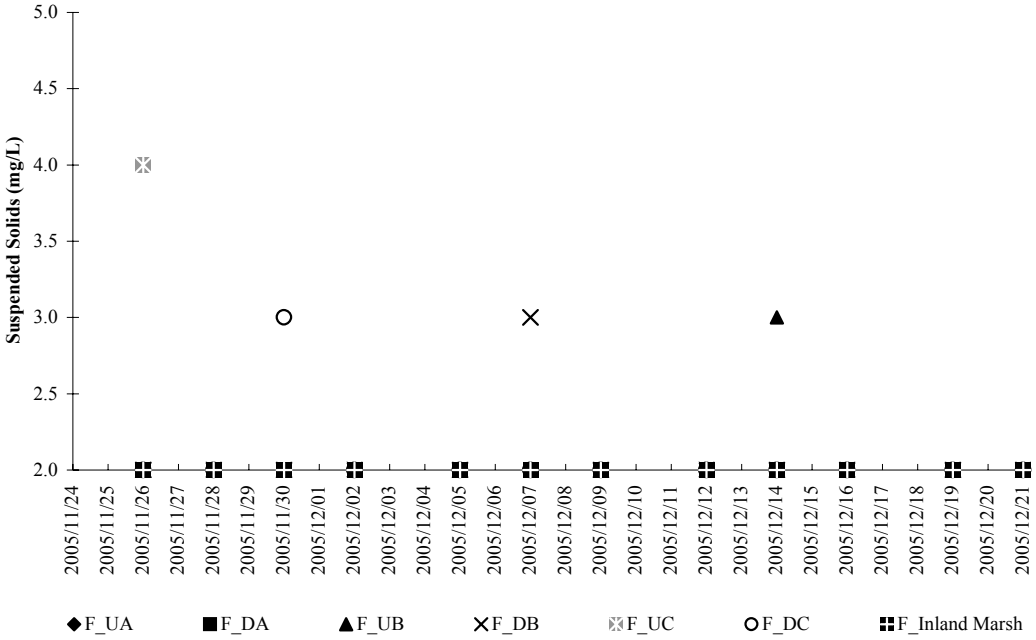


Figure 17 River Water Quality Ammonia Nitrogen (Depth-Averaged)

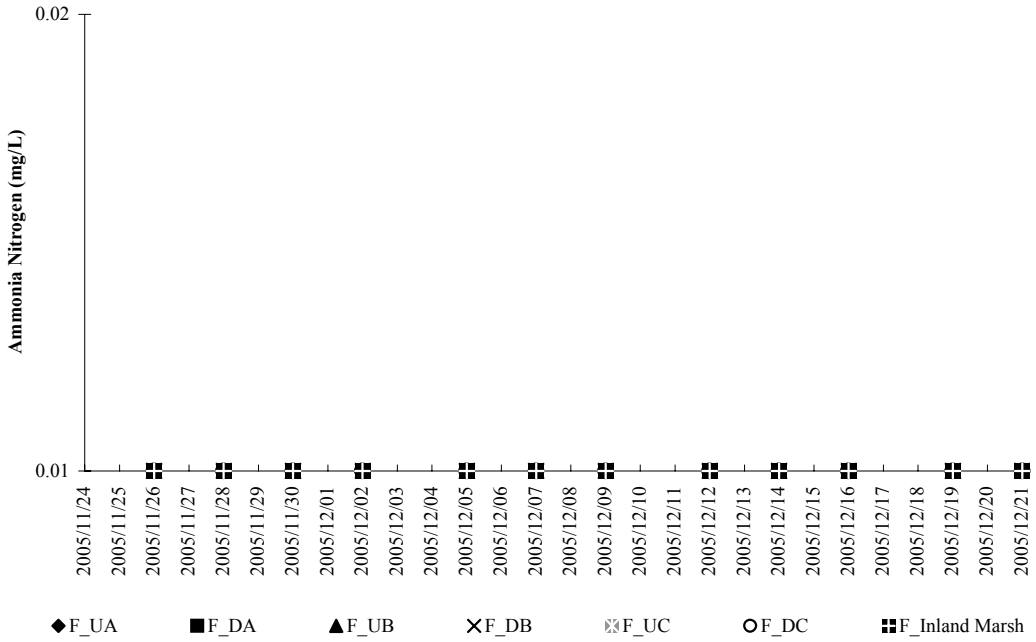


Figure 18 River Water Quality Nitrite Nitrogen (Depth-Averaged)

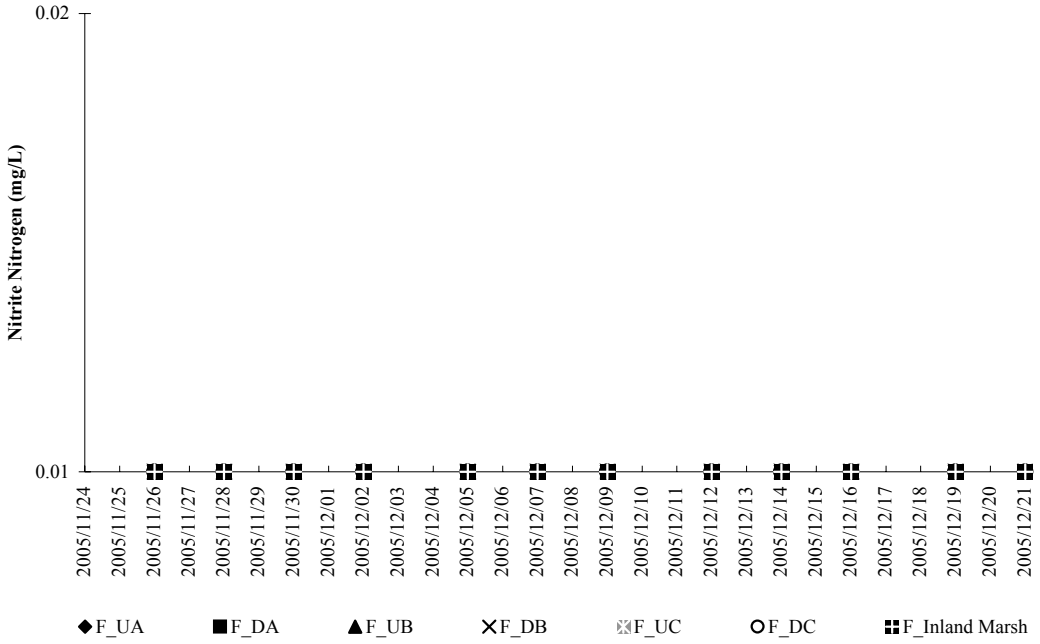


Figure 19 River Water Quality Nitrate Nitrogen (Depth-Averaged)

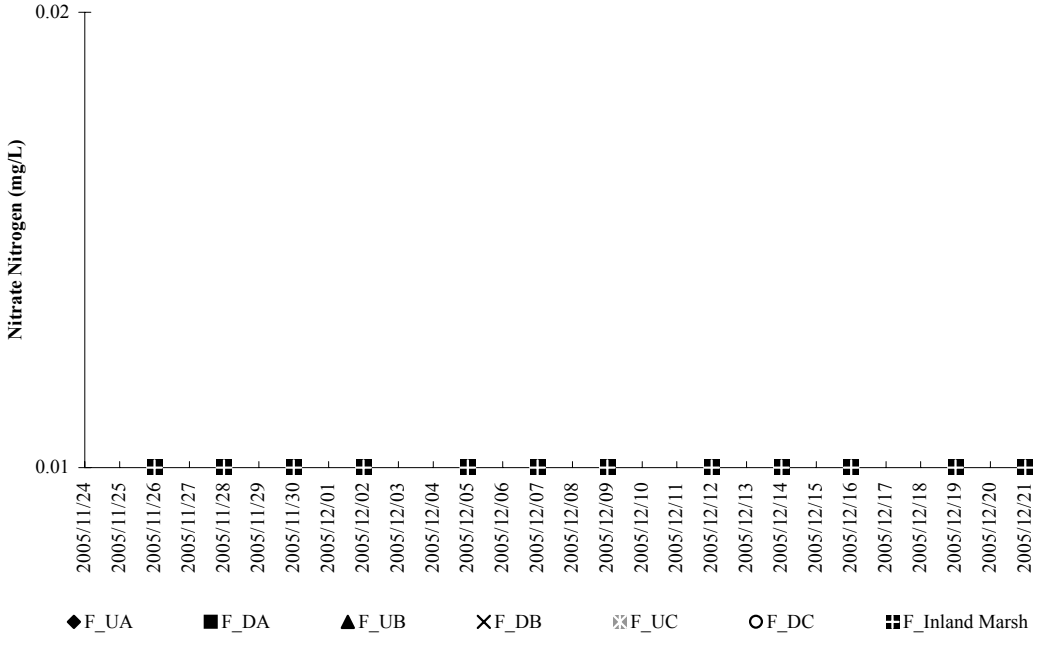


Figure 20 River Water Quality Total Inorganic Nitrogen (Depth-Averaged)

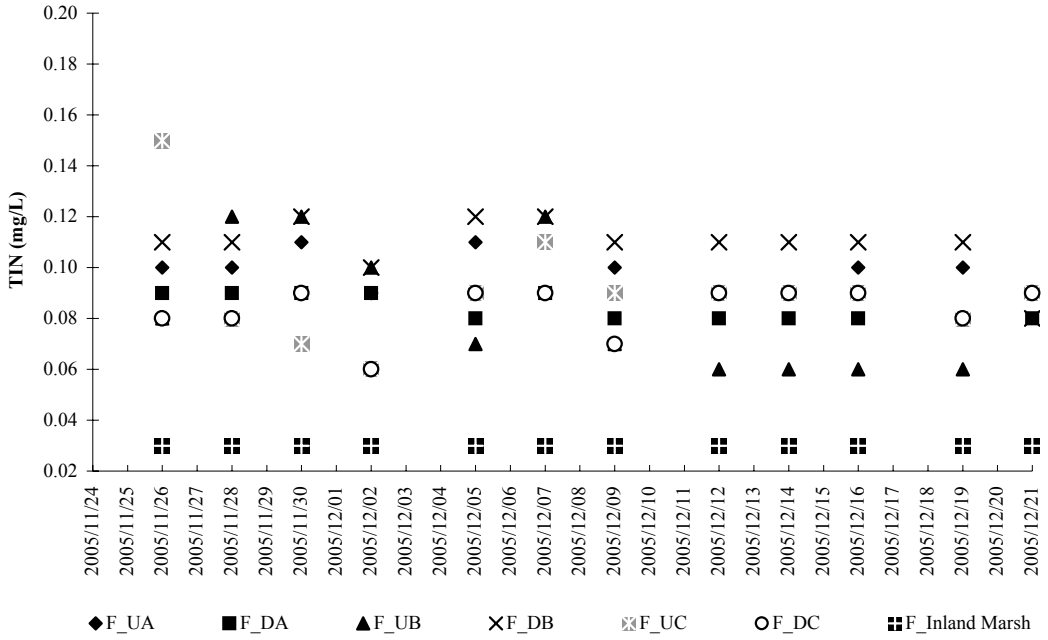


Figure 21 River Water Quality Total Phosphate (Depth-Averaged)

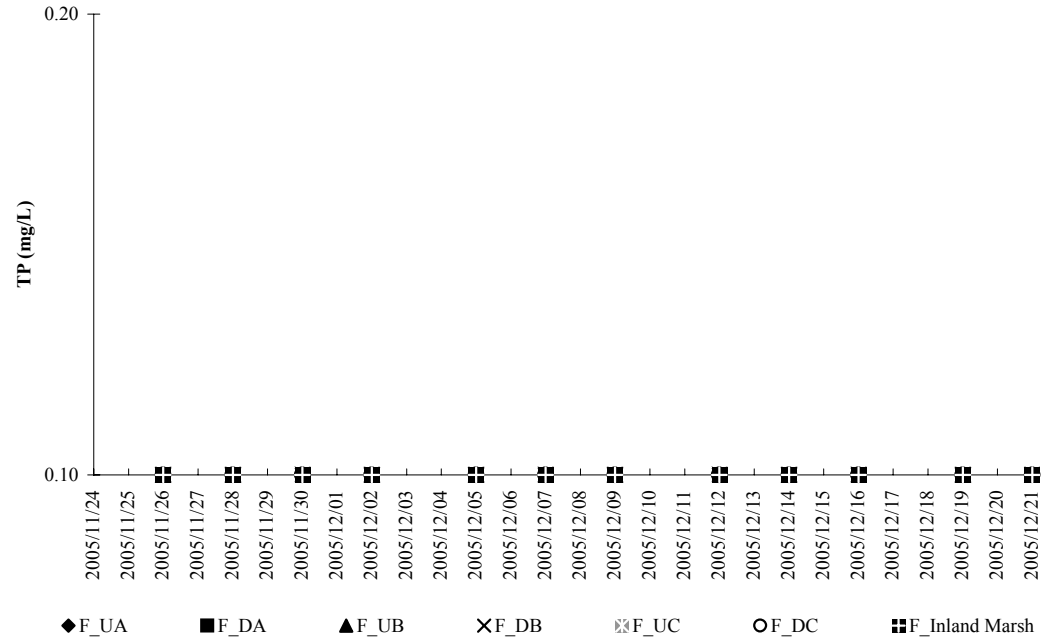
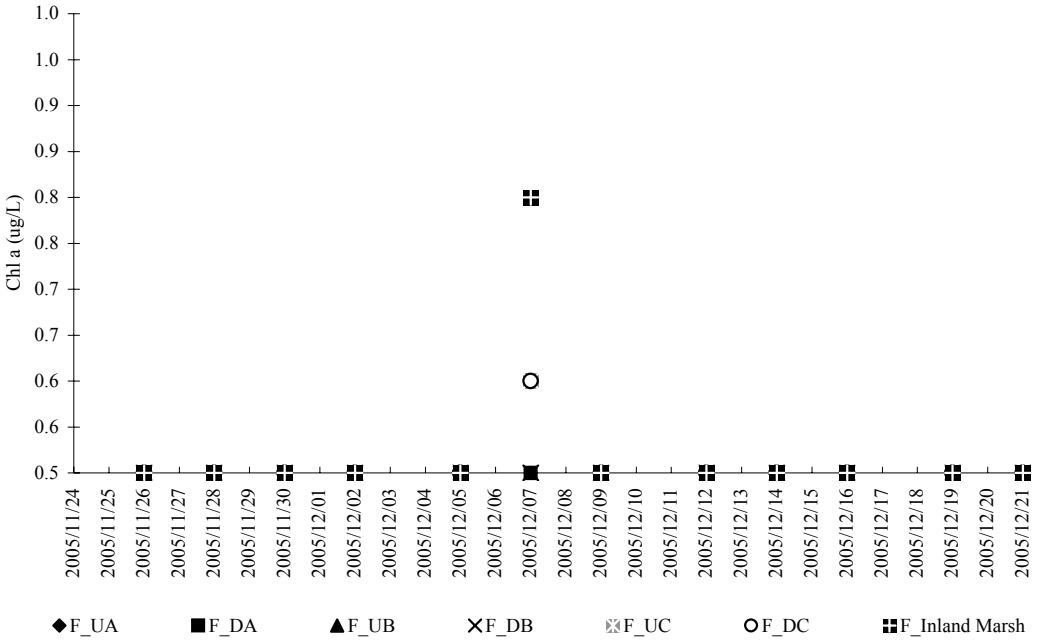
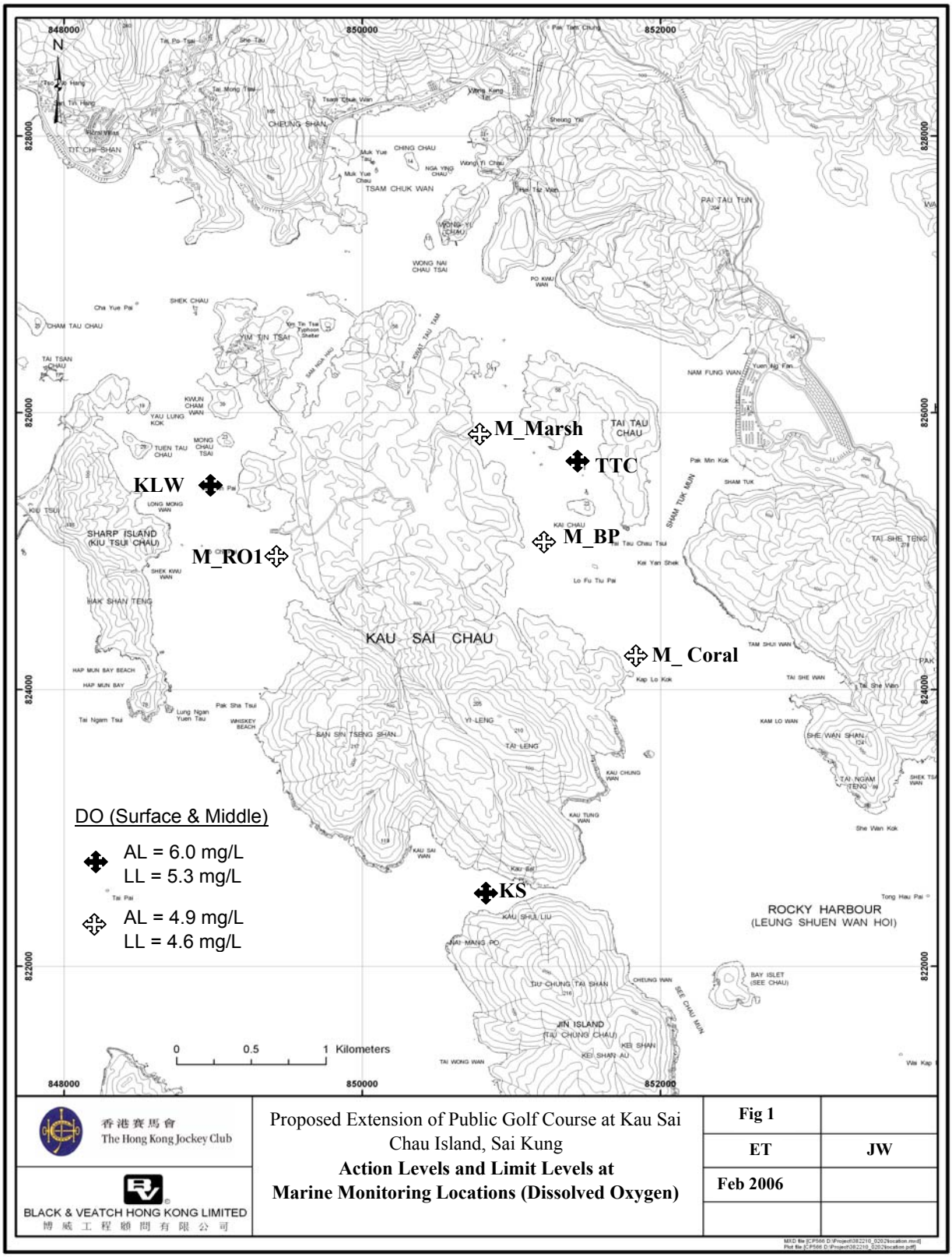


Figure 22 River Water Quality Chlorophyll a (Depth-Averaged)



Water Quality
(Action Levels and Limit Levels)

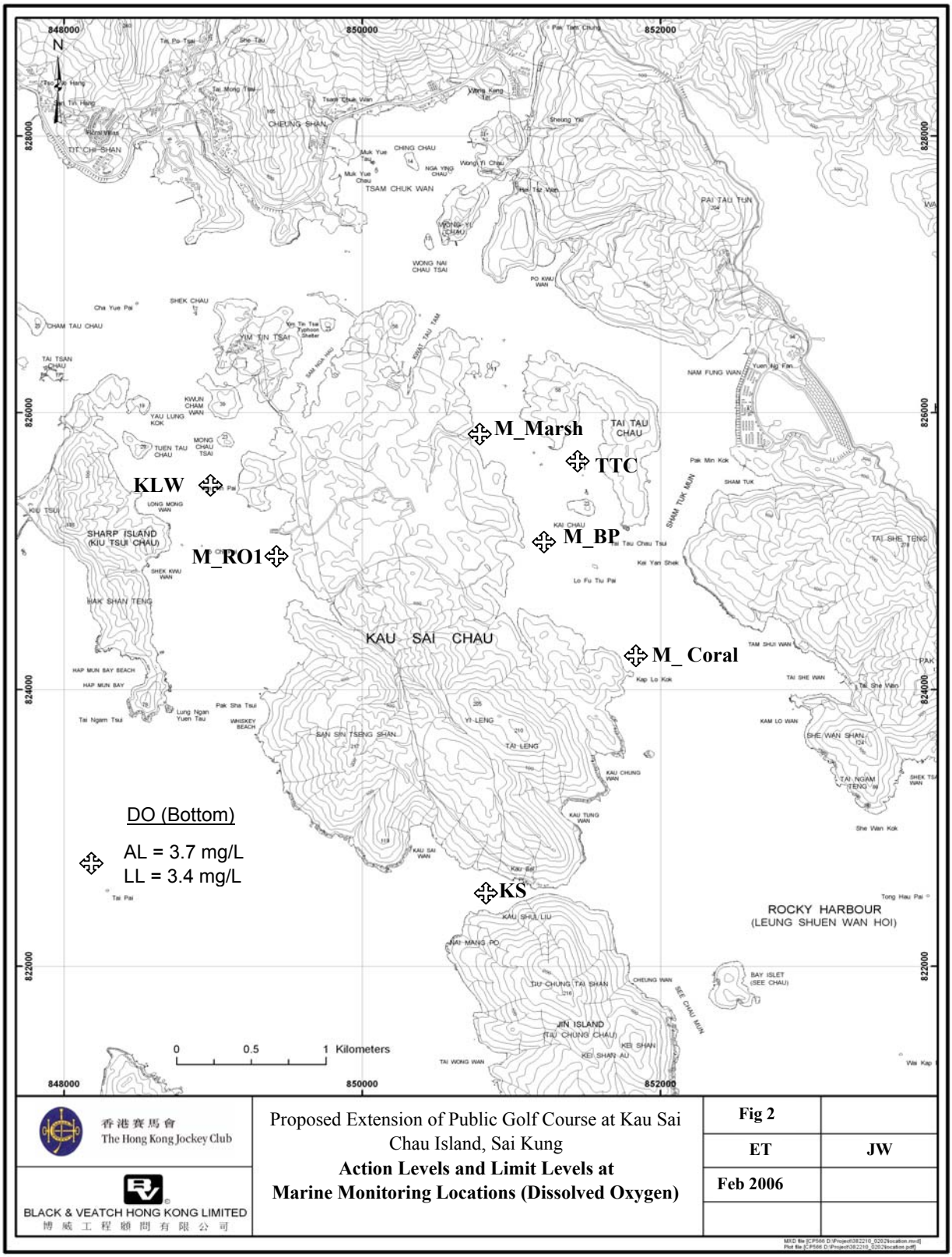


香港賽馬會
The Hong Kong Jockey Club

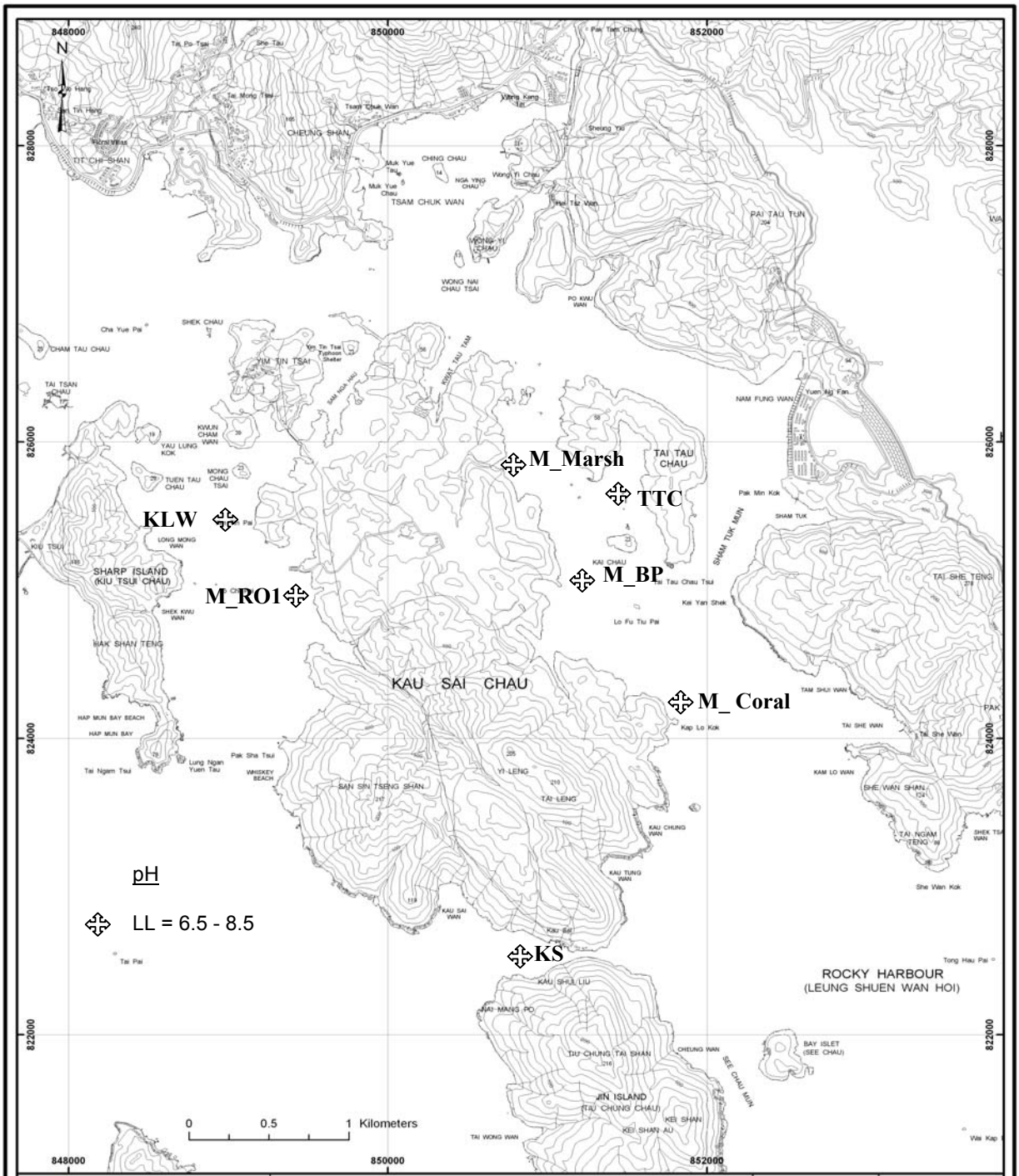
BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung
Action Levels and Limit Levels at Marine Monitoring Locations (Dissolved Oxygen)

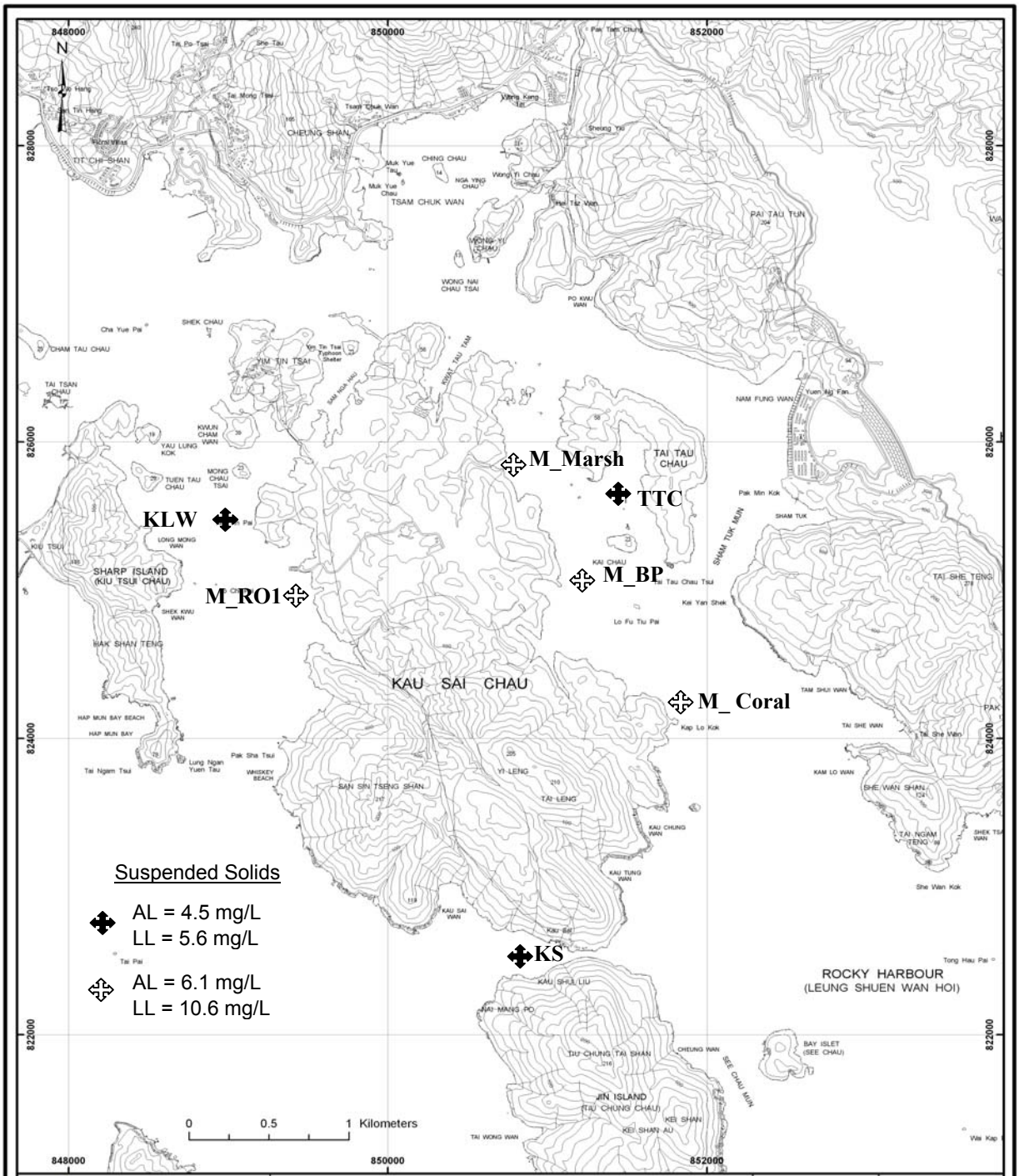
Fig 1	
ET	**JW**
Feb 2006	



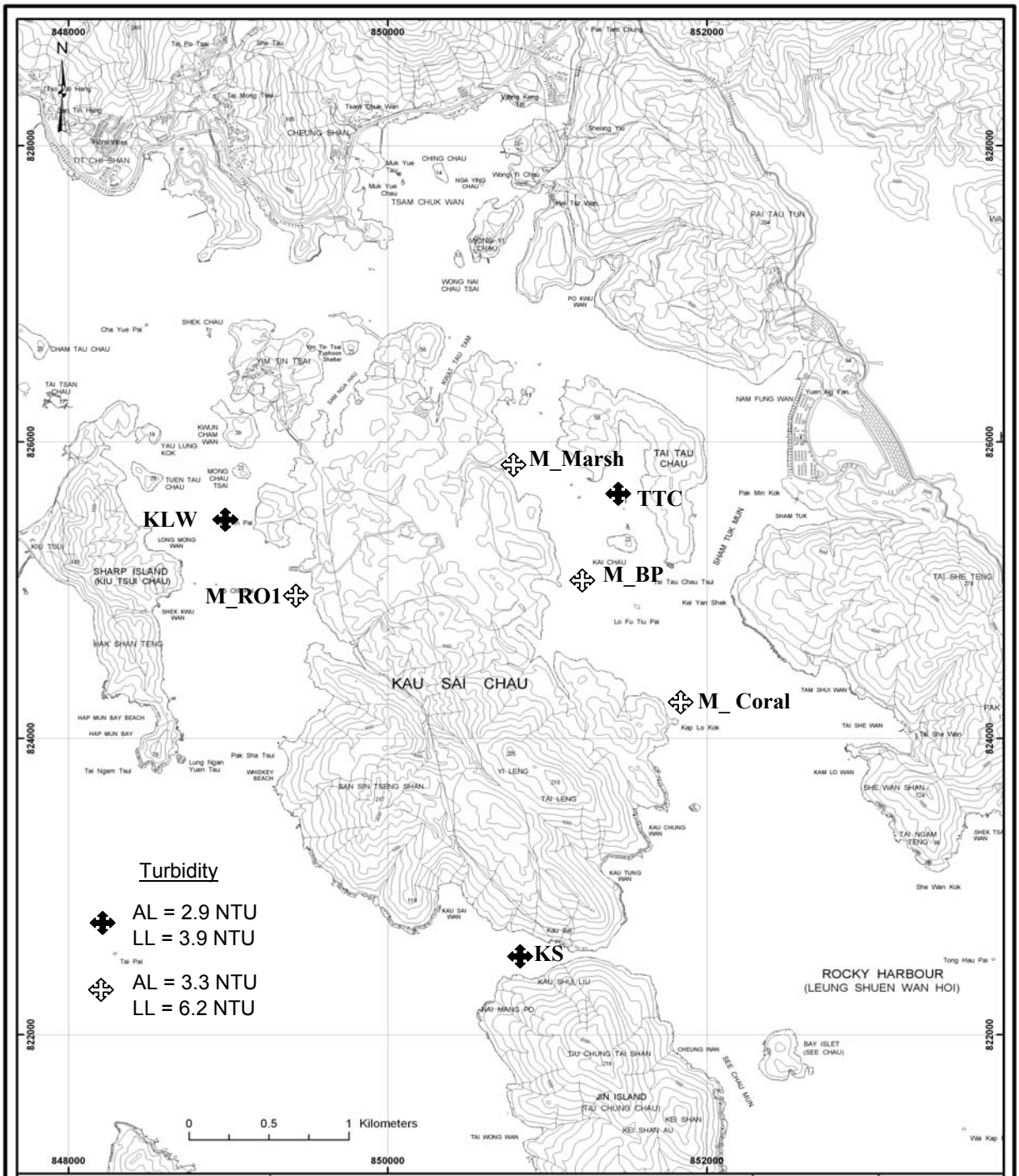
香港賽馬會 The Hong Kong Jockey Club	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (Dissolved Oxygen)**	**Fig 2**	
		ET	**JW**
BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司		**Feb 2006**	



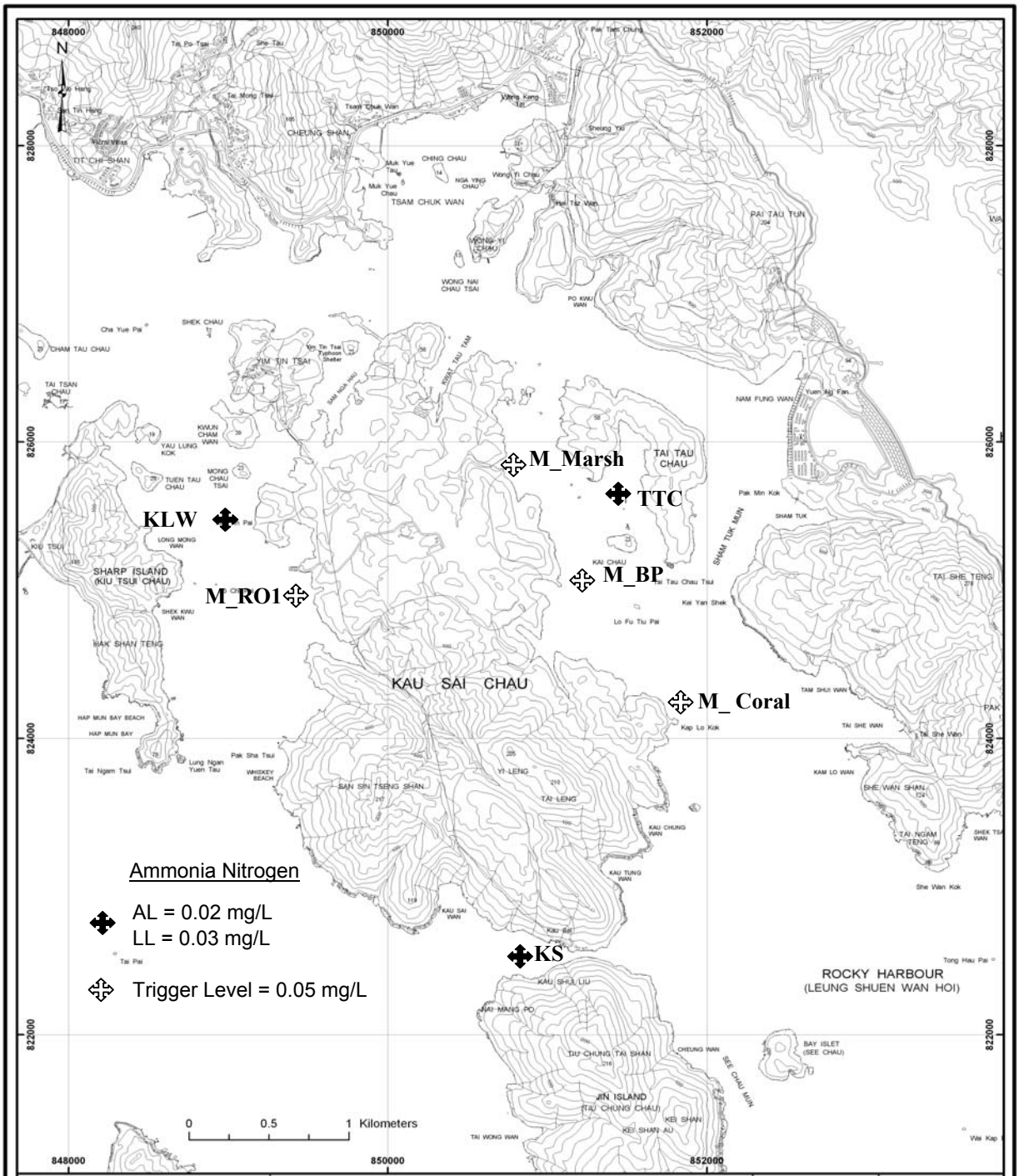
香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (pH)**	**Fig 3**	
		ET	**JW**
		Feb 2006	



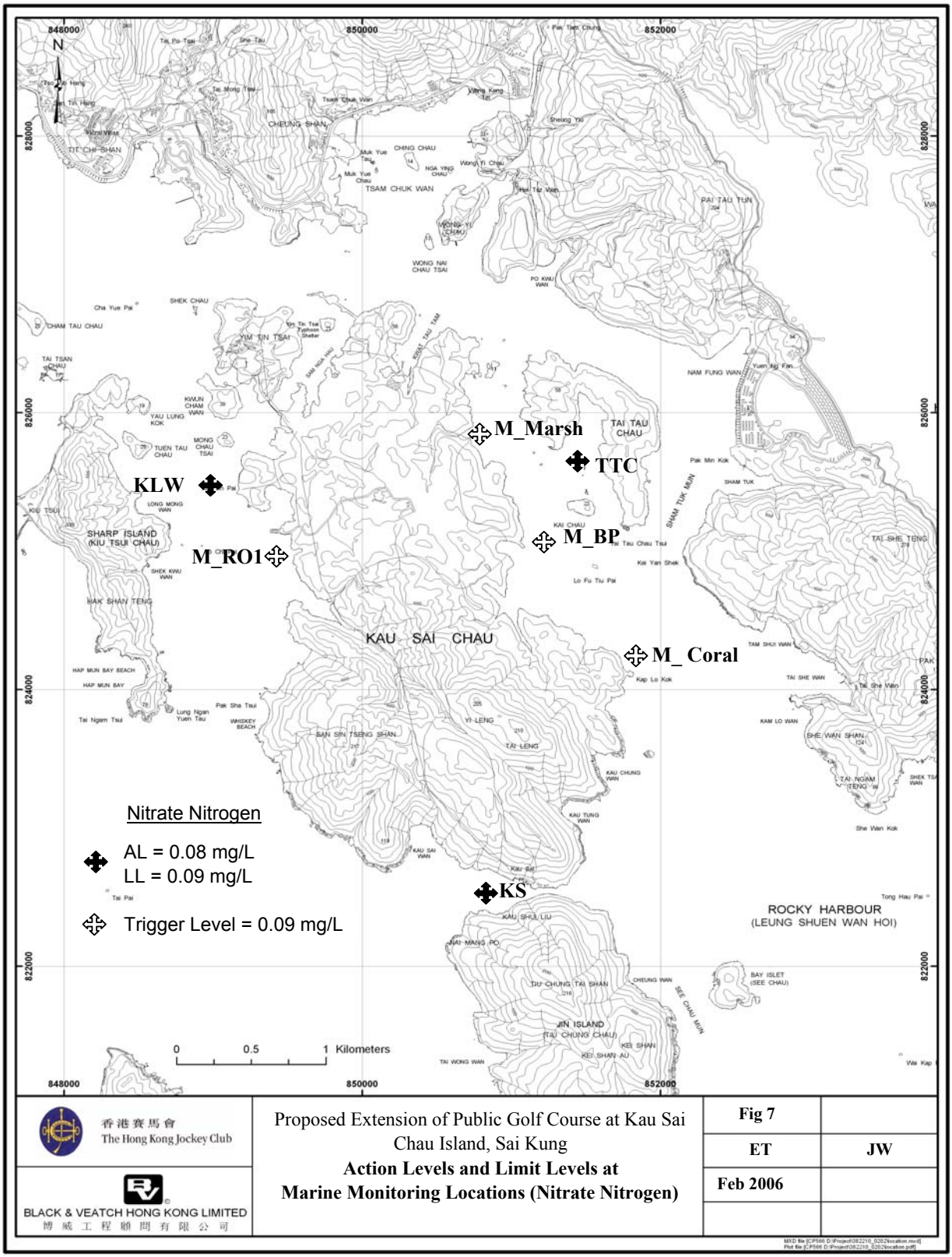
香港賽馬會 The Hong Kong Jockey Club	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (Suspended Solids)**	**Fig 4**	
		ET	**JW**
BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司		**Feb 2006**	



香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (Turbidity)**	**Fig 5**	
		ET	**JW**
		Feb 2006	



香港賽馬會 The Hong Kong Jockey Club	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (Ammonia Nitrogen)**	**Fig 6**	
		ET	**JW**
BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司		**Feb 2006**	



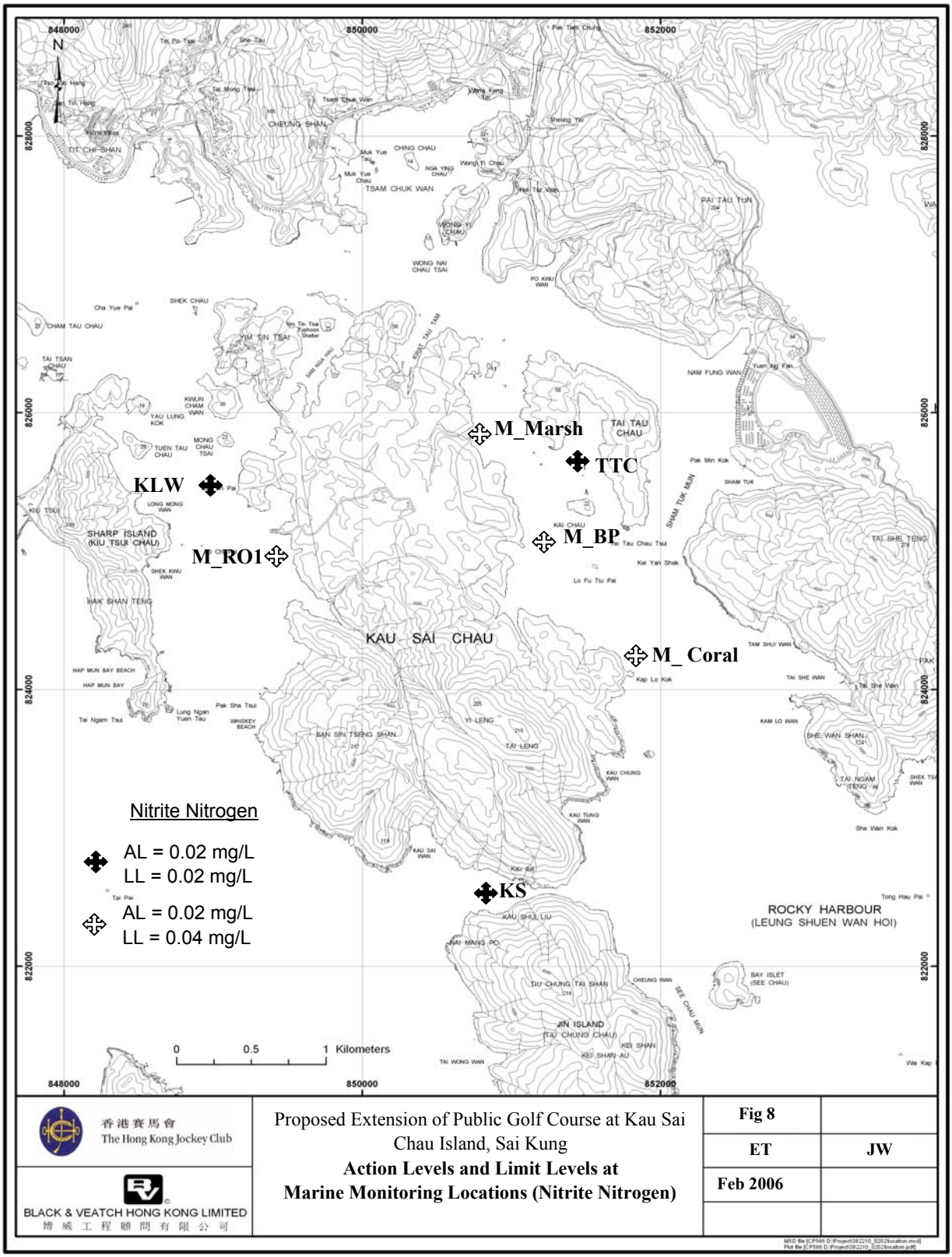
香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

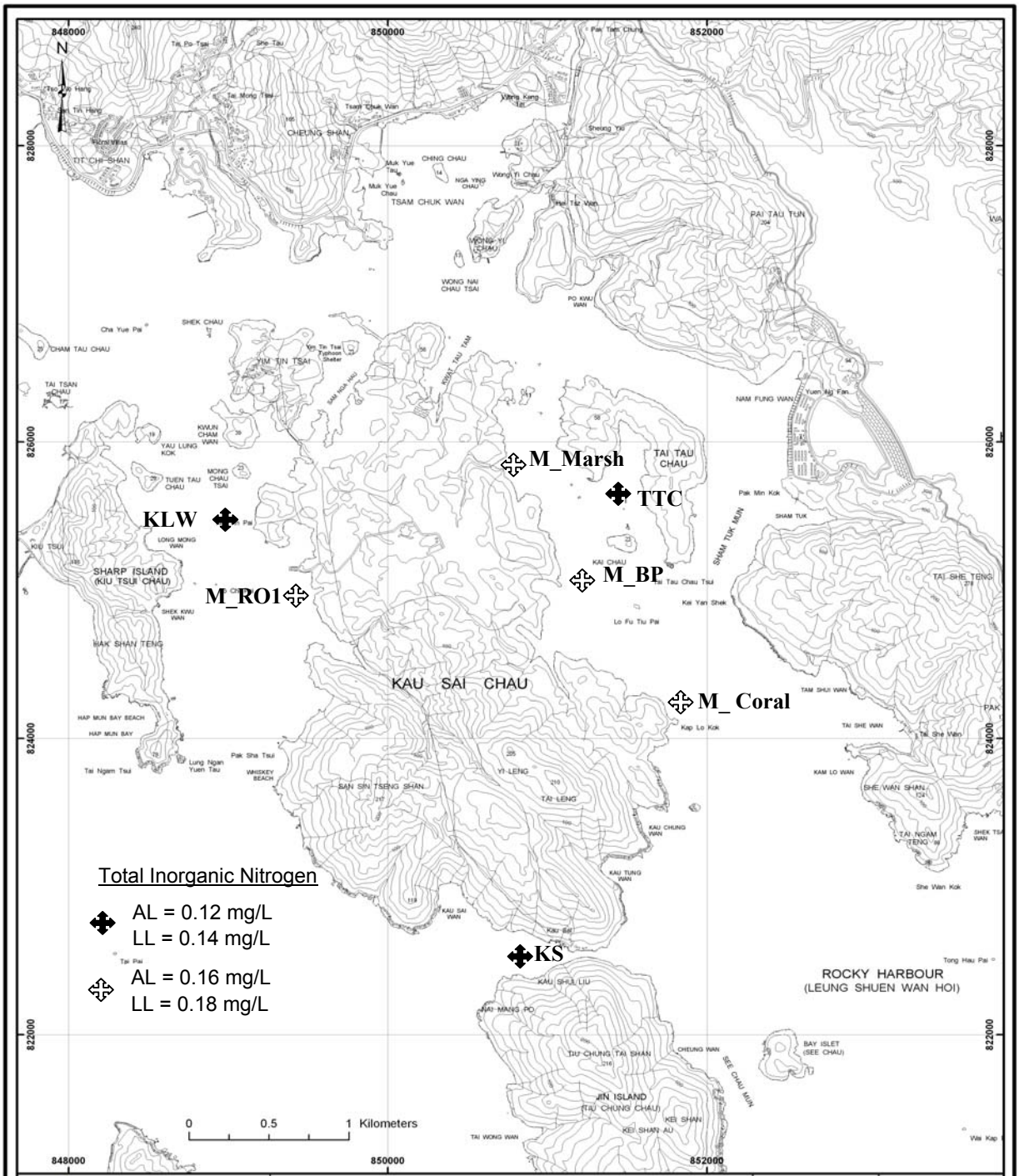
Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Marine Monitoring Locations (Nitrate Nitrogen)

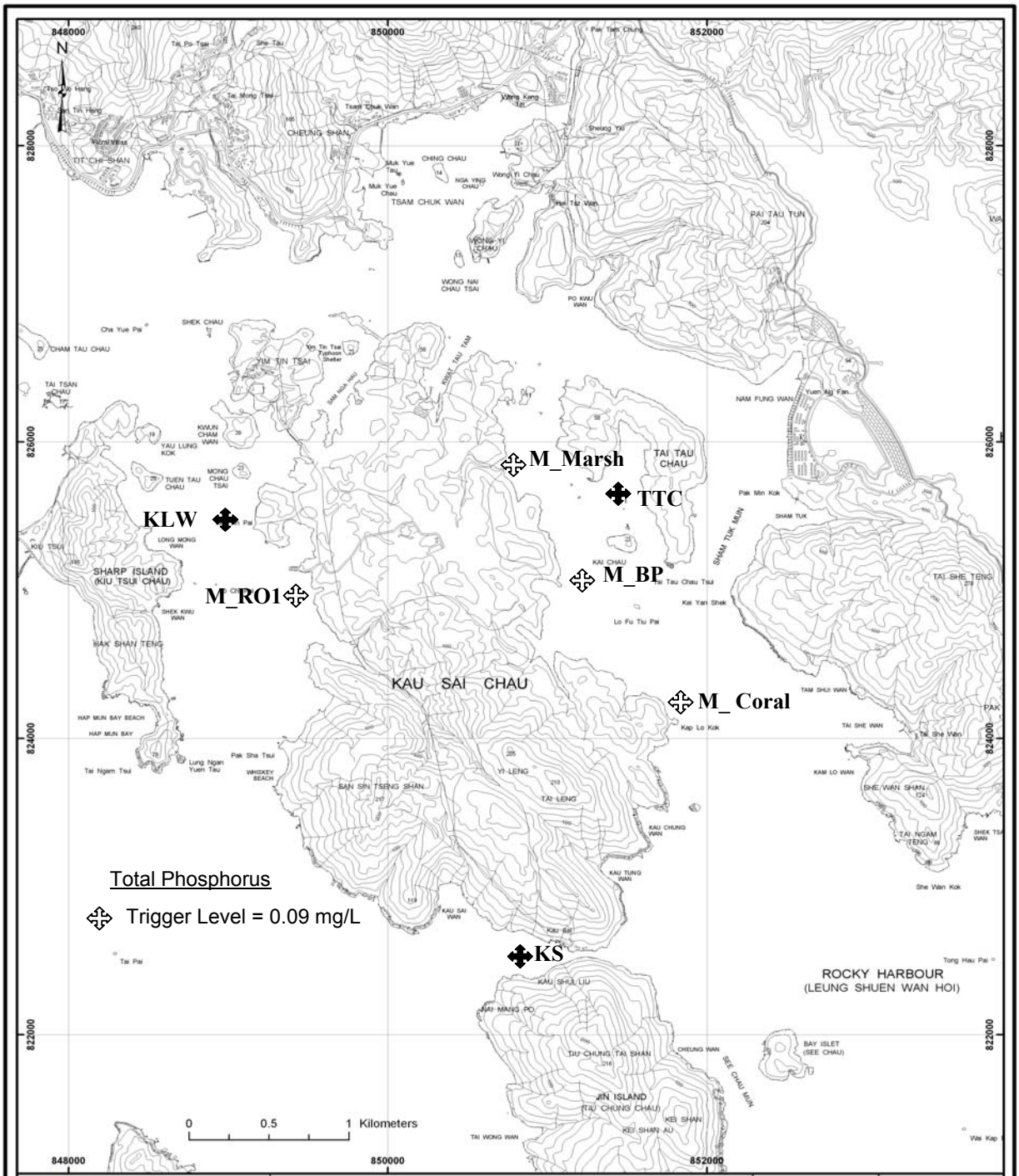
Fig 7	
ET	**JW**
Feb 2006	



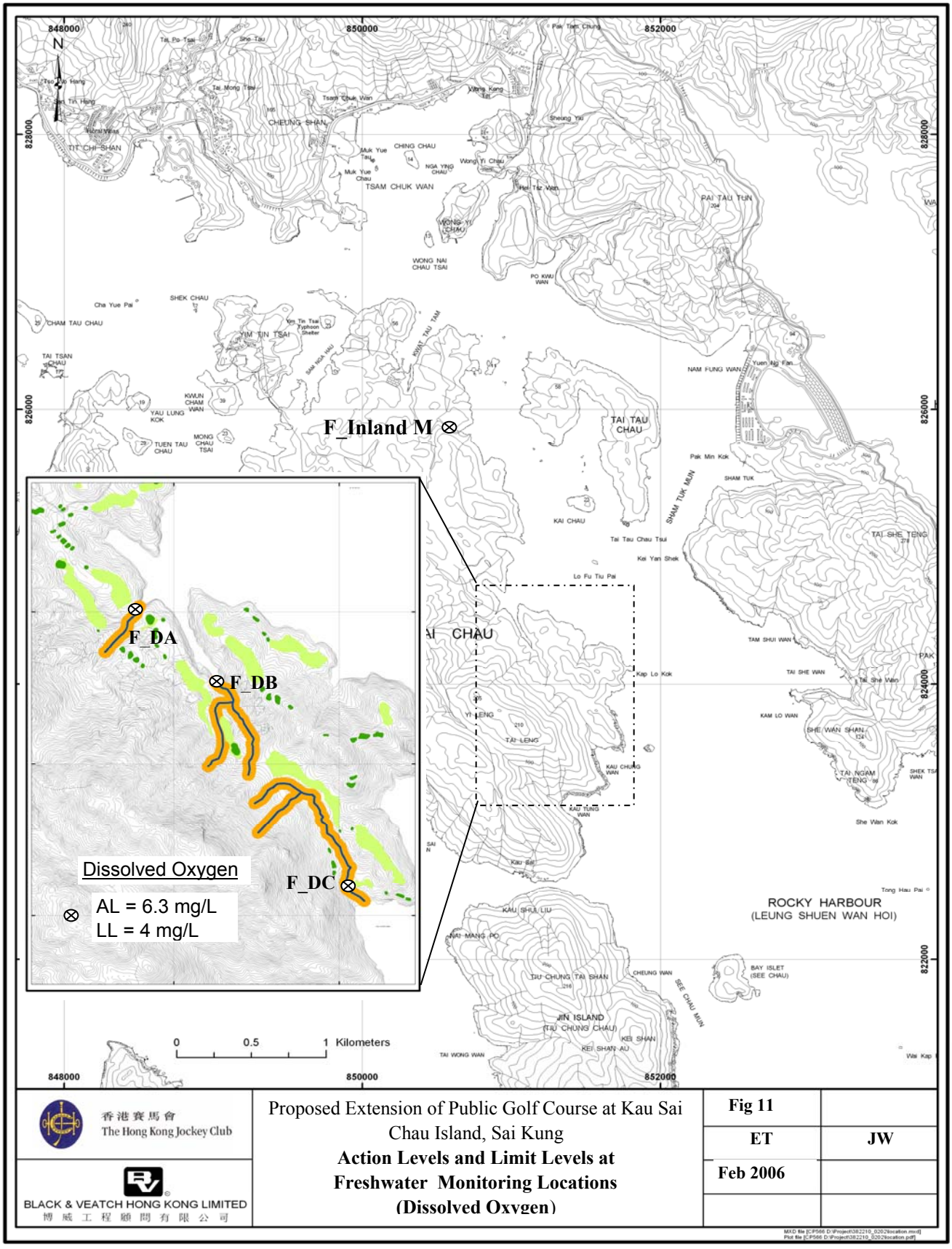
香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (Nitrite Nitrogen)**	**Fig 8**	
		ET	**JW**
		Feb 2006	



香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (TIN)**	**Fig 9**	
		ET	**JW**
		Feb 2006	



香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Marine Monitoring Locations (TP)**	**Fig 10**	
		ET	**JW**
		Feb 2006	



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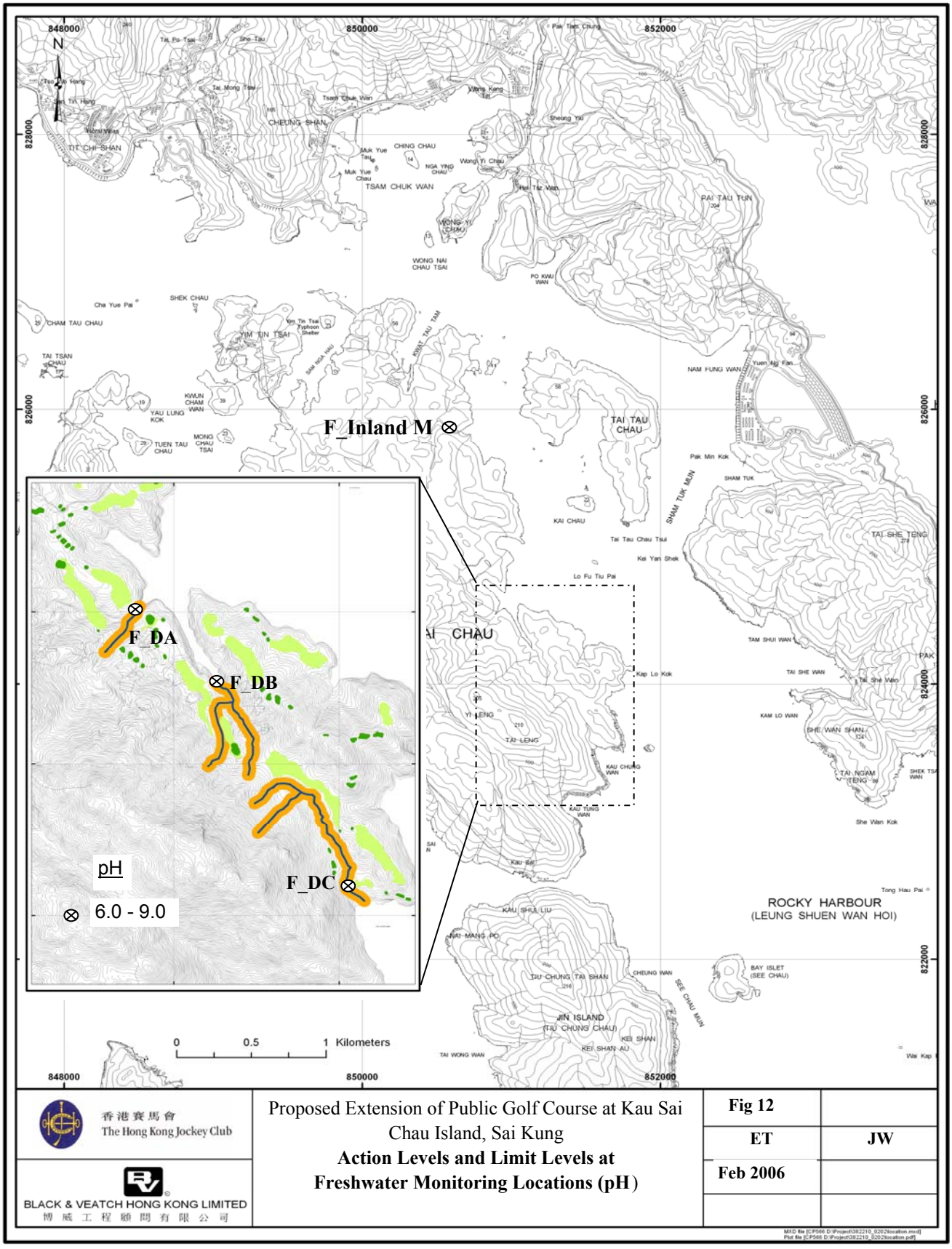
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Dissolved Oxygen)

Fig 11	
ET	**JW**
Feb 2006	



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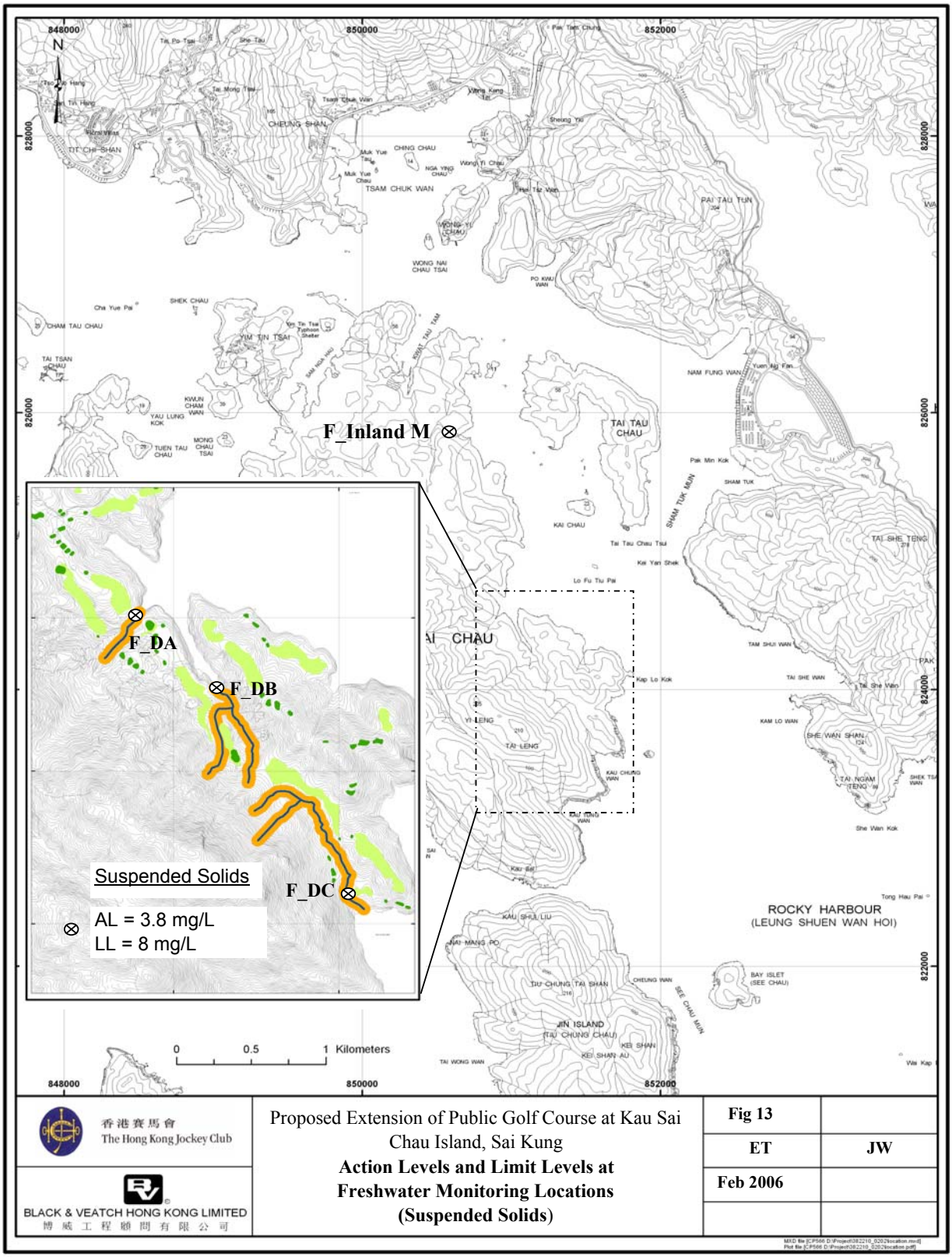
博威工程顧問有限公司

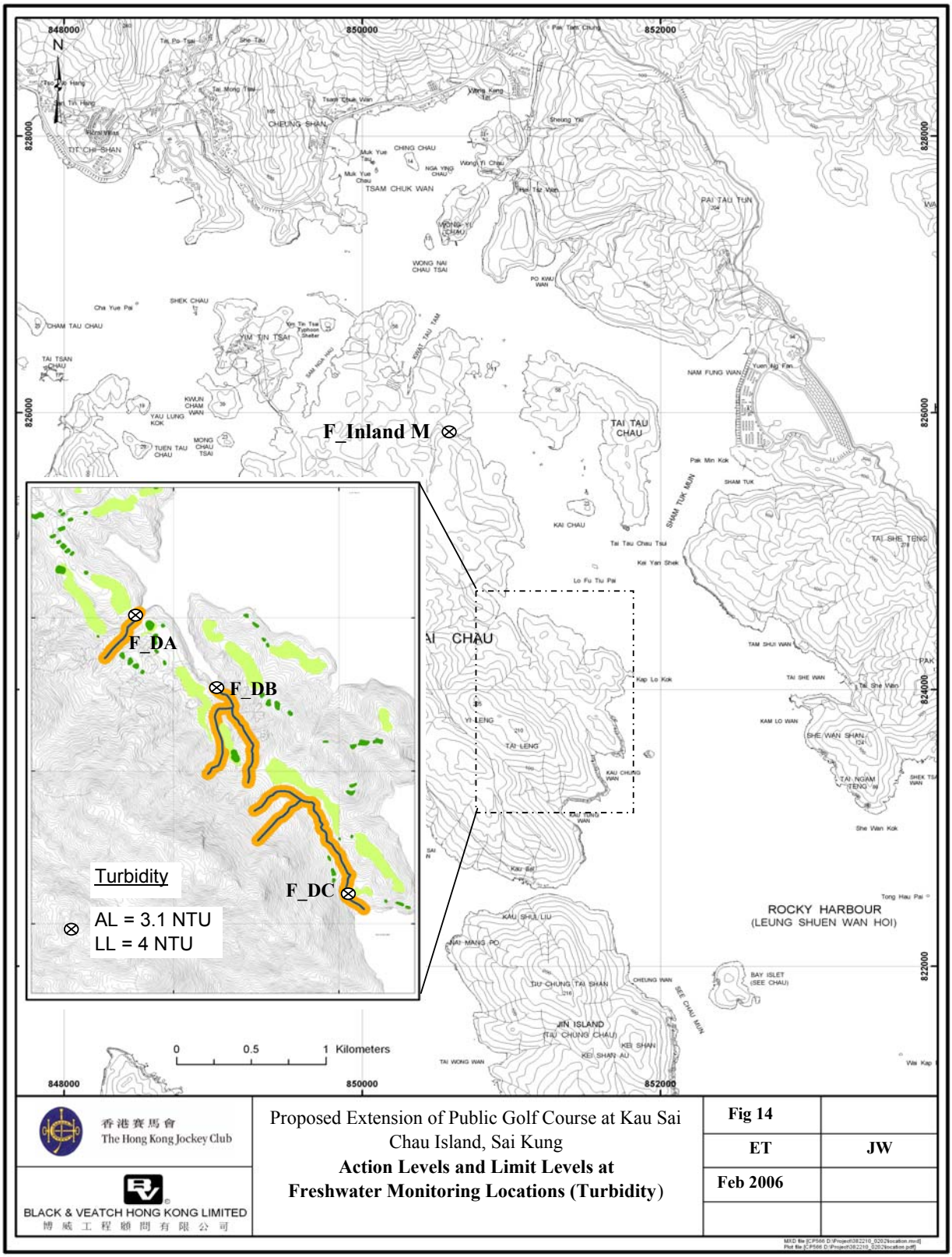
Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (pH)

Fig 12	
ET	**JW**
Feb 2006	



香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung **Action Levels and Limit Levels at Freshwater Monitoring Locations (Suspended Solids)**	**Fig 13**	
		ET	**JW**
		Feb 2006	



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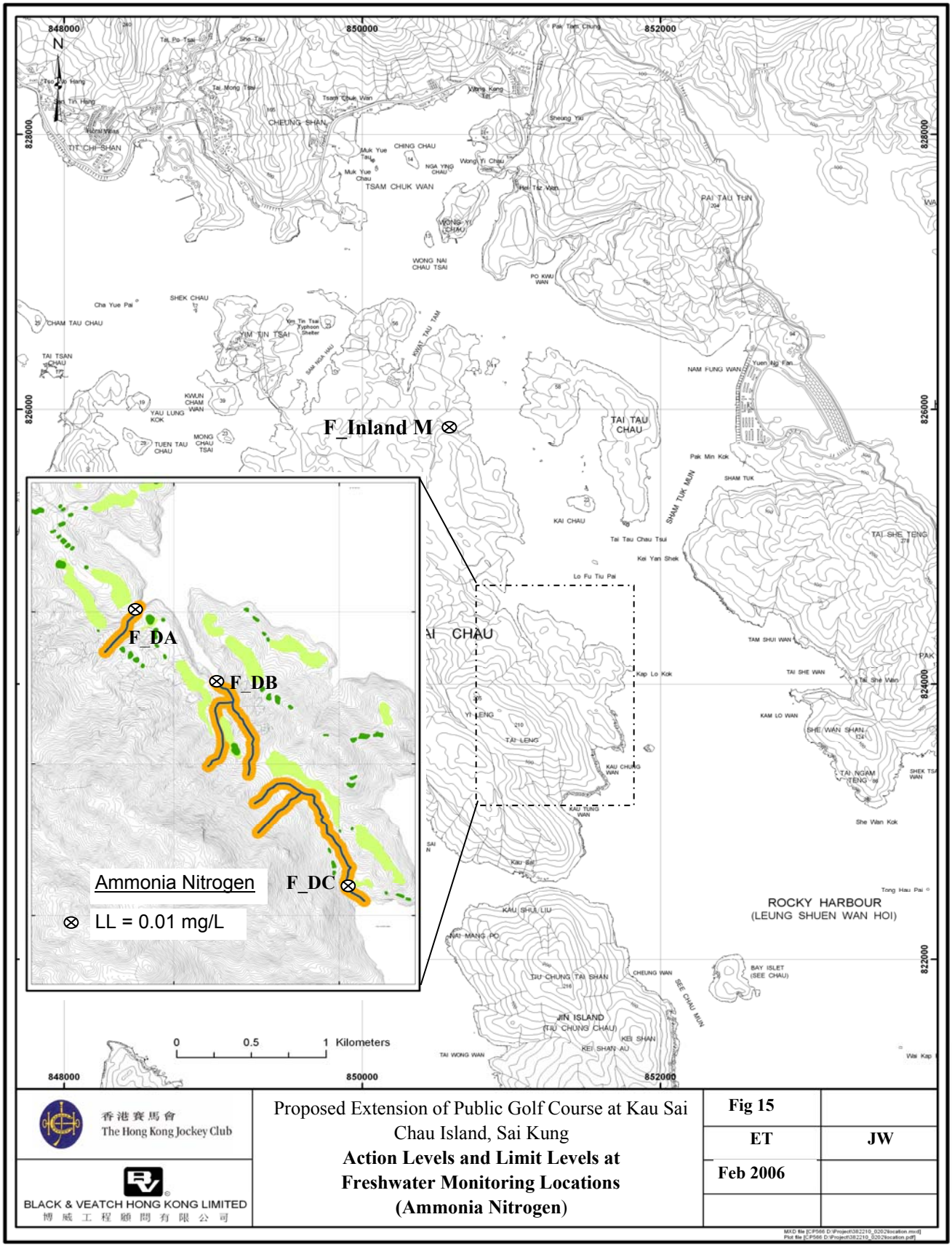
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Turbidity)

Fig 14	
ET	**JW**
Feb 2006	



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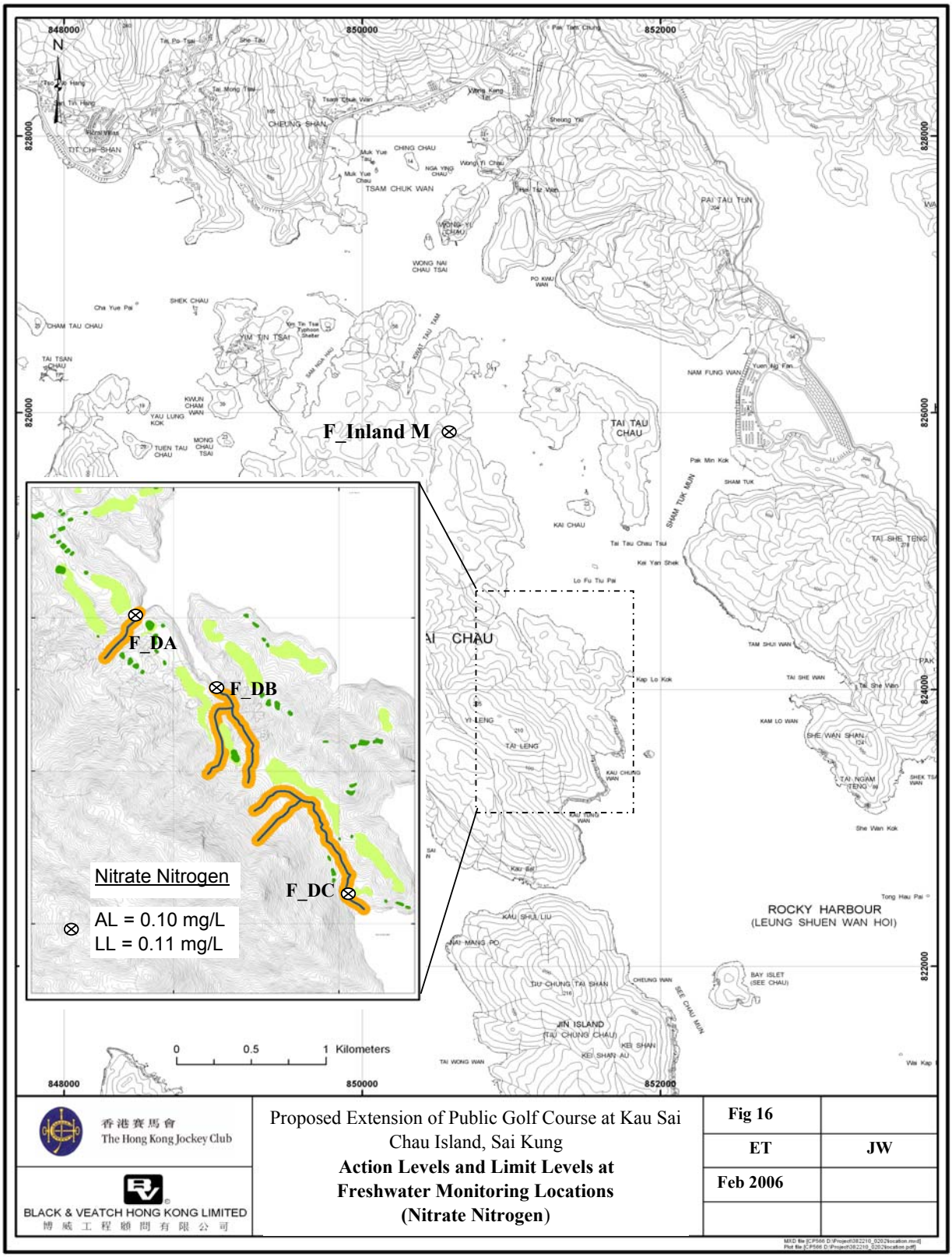
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Ammonia Nitrogen)

Fig 15	
ET	**JW**
Feb 2006	



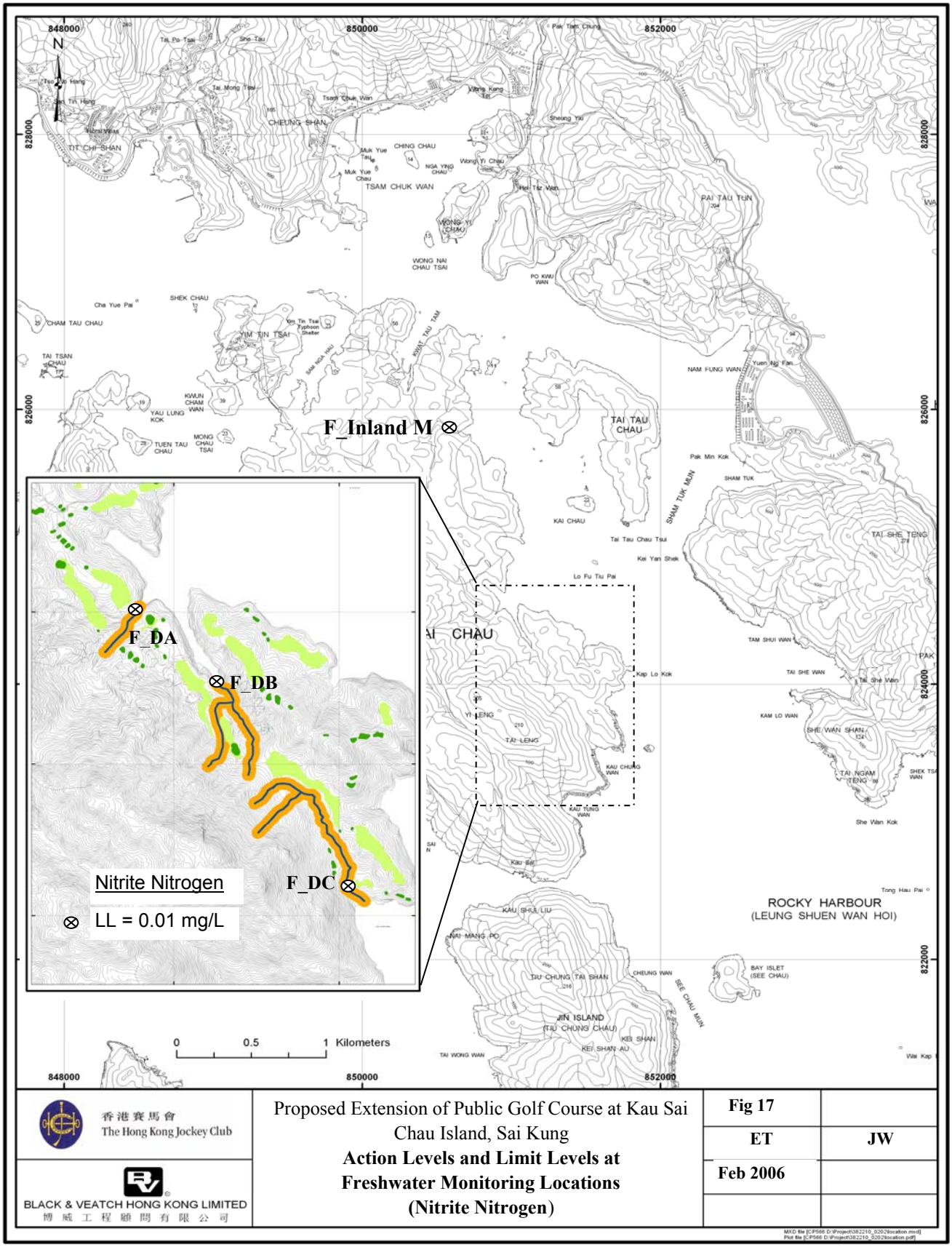
香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Nitrate Nitrogen)

Fig 16	
ET	**JW**
Feb 2006	



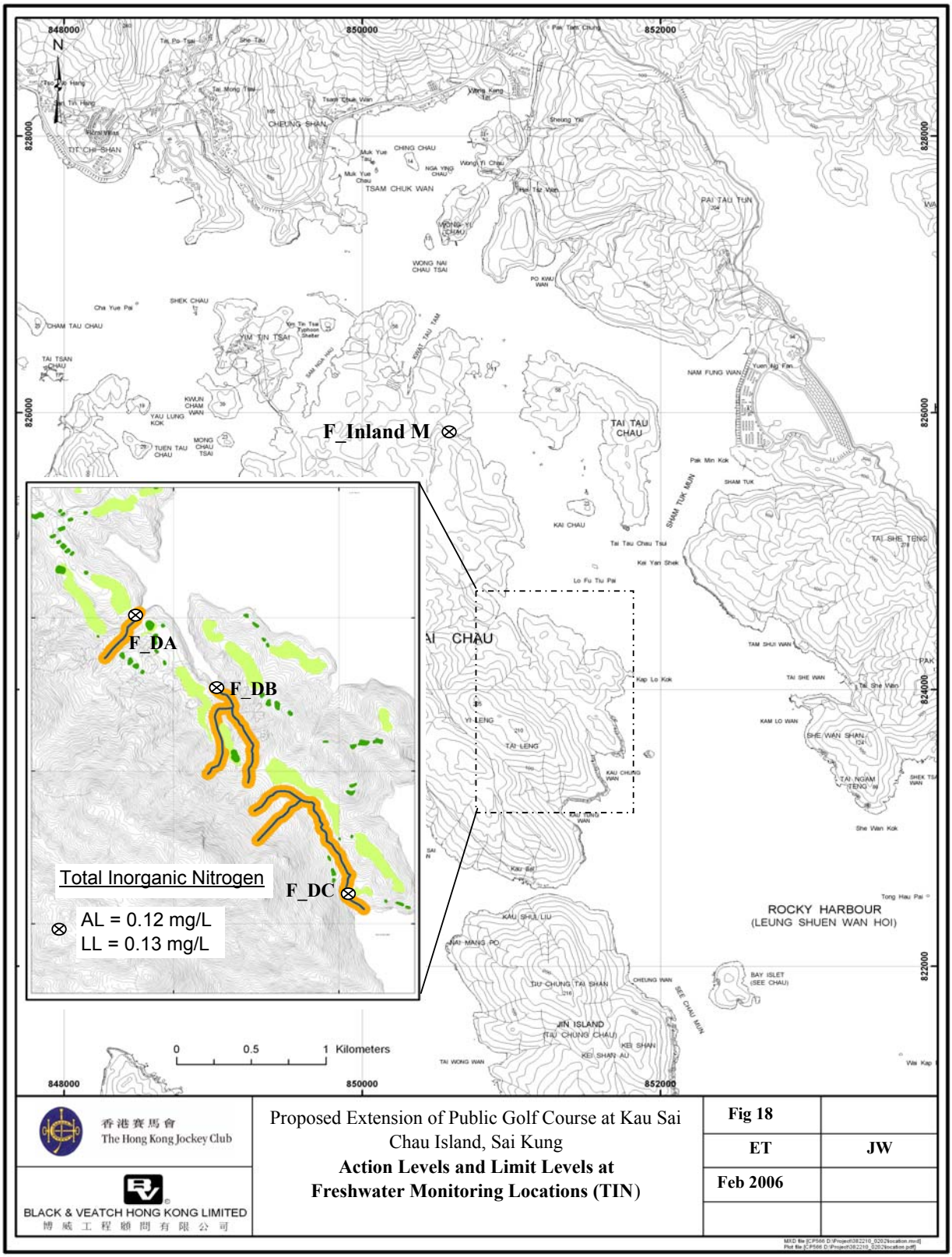
香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Nitrite Nitrogen)

Fig 17	
ET	**JW**
Feb 2006	



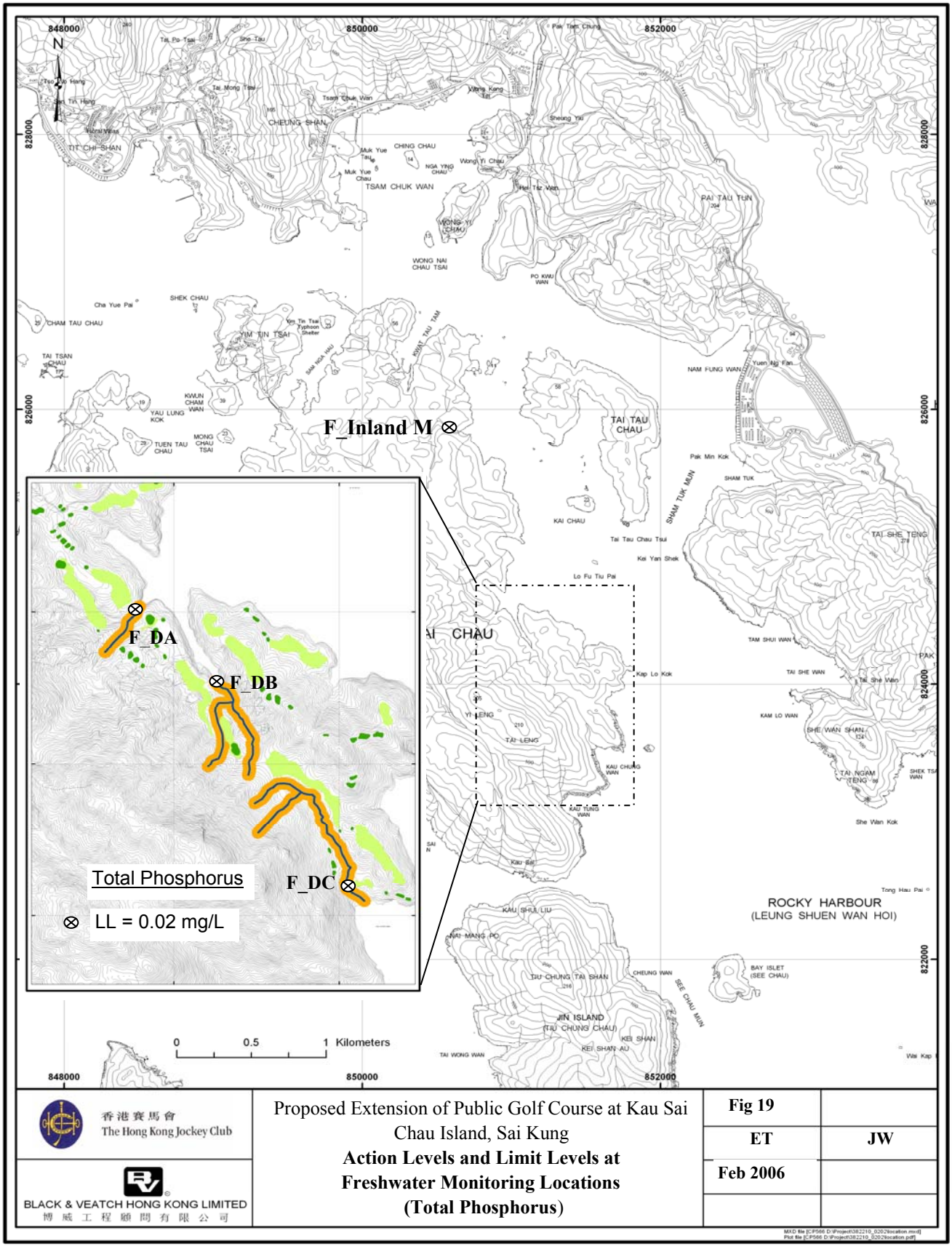
香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (TIN)

Fig 18	
ET	**JW**
Feb 2006	



香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Action Levels and Limit Levels at Freshwater Monitoring Locations (Total Phosphorus)

Fig 19	
ET	**JW**
Feb 2006	

Appendix E
Calibration Certificate for In-Situ Monitoring Equipment

MAUNSELL | AECOM

EQUIPMENT CALIBRATION RECORD

Type: ***Laser Dust Monitor***
Manufacturer/Brand: ***SIBATA***
Model No.: ***LD-1***
Equipment No.: ***A.005.05a***
Sensitivity Adjustment Scale Setting: ***510 CPM***

Operator: *Eddie Yang (EWNY)*

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*
Venue: *Cyberport (Pui Ying Secondary School)*
Model No.: *Series 1400AB*
Serial No: Control: *140AB219899803*
Sensor: *1200C143659803* K_o: *12500*
Last Calibration Date*: *18 June 2005*

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): *510* CPM
Sensitivity Adjustment Scale Setting (After Calibration): *510* CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	09-07-05	10:00 - 11:00	27.3	90	0.04908	2087	34.78
2	09-07-05	14:00 - 15:00	28.6	85	0.03566	1711	28.52
3	09-07-05	15:00 - 16:00	28.2	84	0.03059	1495	24.92
4	09-07-05	16:00 - 17:00	28.3	84	0.02393	1189	19.82

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
2. Total Count was logged by Laser Dust Monitor
3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X
Slope (K-factor): *0.0013*
Correlation coefficient: *0.9311*

Validity of Calibration Record: *9 July 2006*

Remarks:

QC Reviewer: *Eddie Yang* Signature: Eddie Date: 9/7/2005

Maunsell

Maunsell Environmental Management Consultants Ltd.
TSP High Volume Sampler
Field Calibration Report

Station	KSC Public Golf Course Bungalow A (GCA B1)	Operator:	Gary Choi
Cal. Date:	29-Nov-05	Next Due Date:	28-Jan-06
Equipment No.:	A-001-47T	Serial No.	B/M200HX

Ambient Condition			
Temperature, Ta (K)	297	Pressure, Pa (mmHg)	752.6

Orifice Transfer Standard Information					
Equipment No.:	843	Slope, mc	2.03361	Intercept, bc	-0.04908
Last Calibration Date:	07-Dec-04	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	06-Dec-05	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) **X - axis**	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) **Y-axis**
18	11.7	3.41	1.70	51.0	50.84
13	9.2	3.02	1.51	45.0	44.86
10	7.2	2.67	1.34	39.0	38.87
7	4.3	2.07	1.04	29.0	28.91
5	2.7	1.64	0.83	20.0	19.94

By Linear Regression of Y on X

Slope , mw = 35.1775 **Intercept, bw =** -8.4934

Correlation Coefficient* = 0.9975

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ **37.36**

Remarks:

QC Reviewer: Eddie Jang Signature: Eddie Date: 29/11/2005

P:/General/HVS/KSC/GCA B1_29Nov05.xls

ALS TECHNICHEM (HK) Pty Ltd

ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:	MR THOMAS WONG	**Batch:**	HK46603
CLIENT:	ENOVATIVE ENV TECHNOLOGY LTD	**Sub Batch:**	0
ADDRESS:	RM 3704, SIK MAN HOUSE HOMANTIN ESTATE KOWLOON	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	25/10/2005
		DATE OF ISSUE:	31/10/2005
ORDER No.:		**SAMPLE TYPE:**	EQUIPMENT
PROJECT:		**No. of SAMPLES:**	1

COMMENTS

The calibration procedure used for the analysis has been applied for the calibration of the above instrument.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd

11/F
Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsenviro.com

Alice Wong
Laboratory Manager - Hong Kong

Abbreviations: *% SPK REC denotes percentage spike recovery*
CHK denotes duplicate check sample
LOR denotes limit of reporting
LCS % REC denotes Laboratory Control Sample percentage recovery

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of Tubidimeter

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : Y5068

Equipment No. : ENO 003

Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2130B

Date of Calibration : 25/10/2005

Testing Results :

Expected Reading	Recording Reading
0.0 NTU	0.0 NTU
4.0NTU	4.2 NTU
16.0NTU	16.0 NTU
80.0NTU	80.0 NTU
160NTU	161NTU
Allowing Deviation	±10%

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of Conductivity System

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : 02B0148

Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2510B

Equipment No. : ENO 003

Date of Calibration : 25/10/2005

Testing Results :

Expected Reading	Recording Reading
1412 uS/cm 6667 uS/cm 58670 uS/cm	1467 uS/cm 6699 uS/cm 58430 uS/cm
Allowing Deviation	±10%

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of Salinity System

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : 02B0148

Equipment No. : ENO 003

Calibration Method : This meter was calibrated in accordance with standard method APHA (19th Ed.) 2520 A and B

Date of Calibration : 25/10/2005

Testing Results :

Expected Reading	Recording Reading
10.0 g/L	9.8 g/L
20.0 g/L	20.3 g/L
30.0 g/L	30.2 g/L
Allowing Deviation	±10%

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of Thermometer

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : 02B0148

Equipment No. : ENO 003

Date of Calibration : 25/10/2005

Testing Results :

Reference Temperature (^{0}C)	Recorded Temperature (^{0}C)
0.0 ^{0}C 20.0 ^{0}C	0.0 ^{0}C 20.2 ^{0}C
Allowing Deviation	±2.0^{0}C

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of DO System

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : 02B0148

Equipment No. : ENO 003

Date of Calibration : 25/10/2005

Testing Results :

Expected Reading	Recording Reading
0.0 mg/L 2.3 mg/L 4.8 mg/L 8.2 mg/L	0.0 mg/L 2.2 mg/L 5.0 mg/L 8.2 mg/L
Allowing Deviation	±0.2 mg/L

CERTIFICATE OF ANALYSIS

Batch: HK46603
Sub Batch : 0
Date of Issue: 31/10/2005
Client: ENOVATIVE ENV TECHNOLOGY LTD
Client Reference:

Calibration of pH System

Item : YSI SONDE Environmental Monitoring System

Model No. : 6920-C-M

Serial No. : 02B0148

Equipment No. : ENO 003

Calibration Method : In House Method

Date of Calibration : 25/10/2005

Testing Results :

Expected Reading	Recording Reading
4.0	4.0
7.0	7.0
10.0	9.9
Allowing Deviation	±0.2 unit

ENOVATIVE
ENVIRONMENTAL TECHNOLOGY

Project: **Proposed Extension of Public Golf Course at Kau Sai Chau Island**

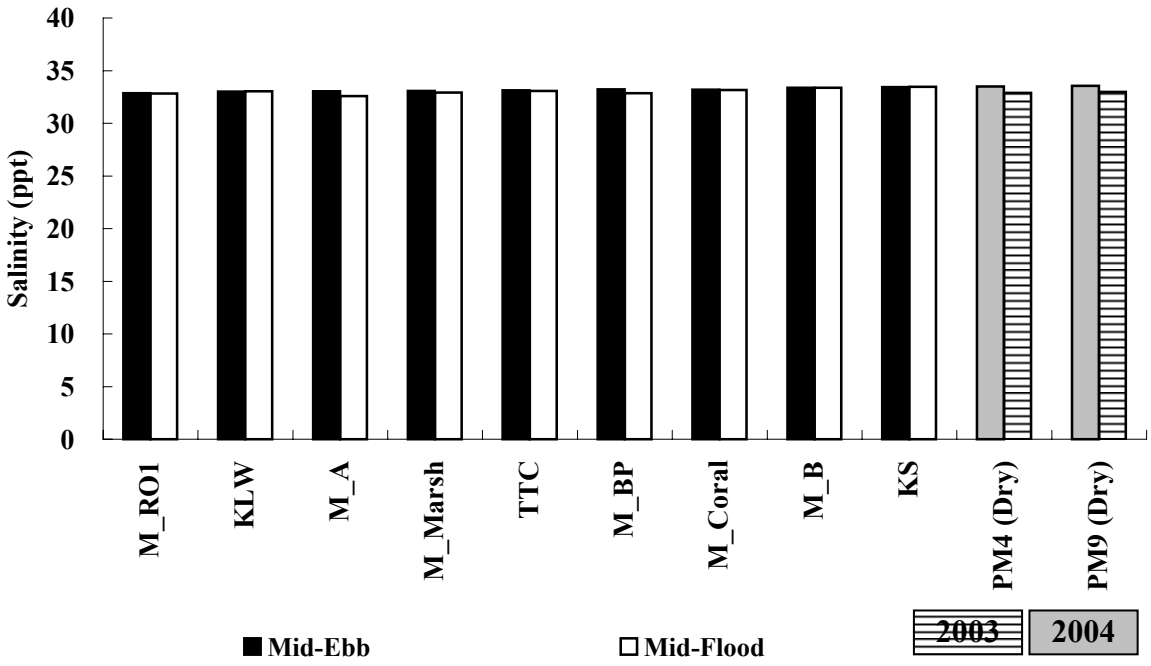
Daily checking and calibration record

Instrument: **YSI 6920 (ENO 003)**

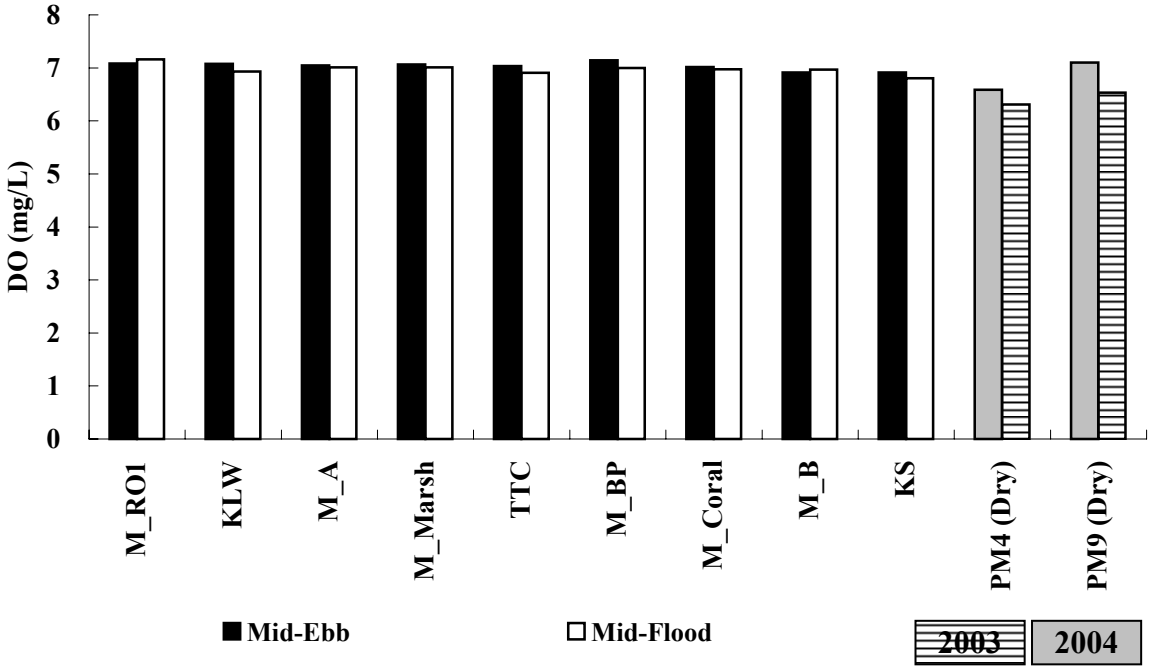
Date	pH checking			DO wet bulb calibration	Staff	Remark
	4.0	7.0	10.0			
26/11/05	4.0	7.0	9.9	100%	Thomas Wong	[signature]
28/11/05	3.9	7.0	10.0	New membrane 100%	Thomas Wong	[signature]
30/11/05	4.0	6.9	10.0	100%	Thomas Wong	[signature]
2/12/05	4.0	6.9	9.9	100%	Thomas Wong	[signature]
5/12/05	4.0	7.0	10.0	100%	Thomas Wong	[signature]
7/12/05	4.0	6.9	10.0	100%	Thomas Wong	[signature]
9/12/05	4.0	6.9	9.9	100%	Thomas Wong	[signature]
12/12/05	3.9	6.9	9.9	100%	Thomas Wong	[signature]
14/12/05	4.0	6.9	10.0	New membrane 100%	Thomas Wong	[signature]
16/12/05	3.9	7.0	10.0	100%	Thomas Wong	[signature]
19/12/05	4.0	6.9	10.0	100%	Thomas Wong	[signature]
21/12/05	4.0	7.0	10.0	100%	Thomas Wong	[signature]

Appendix F
Marine Water Quality at Port Shelter (EPD 2003 & 2004)

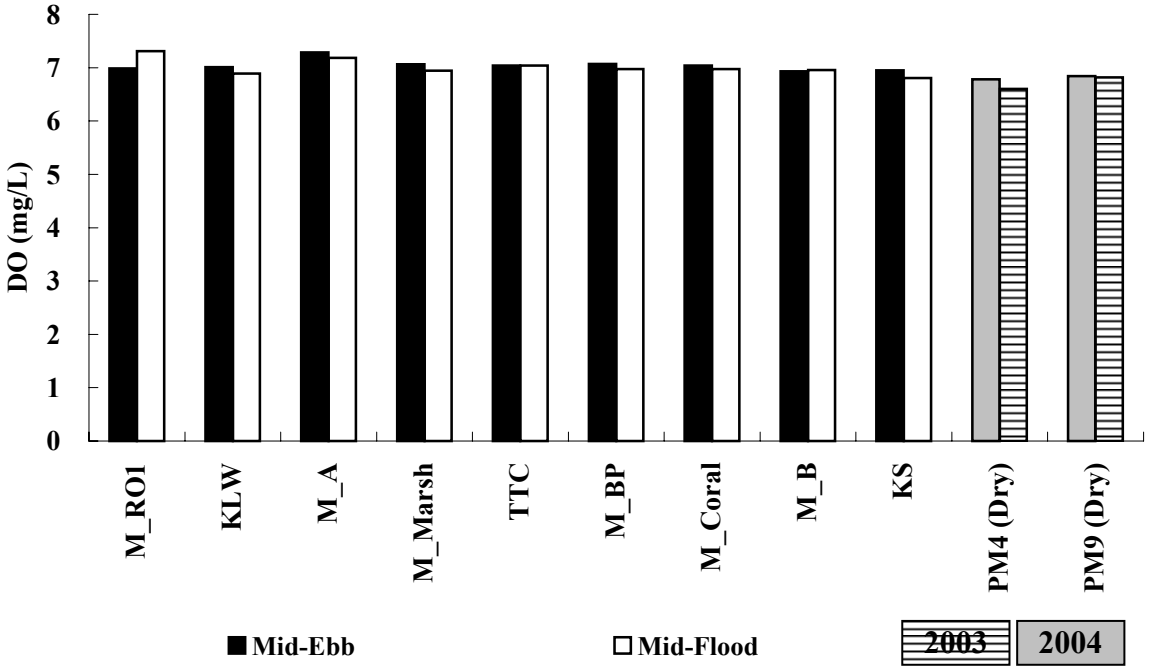
Salinity : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)



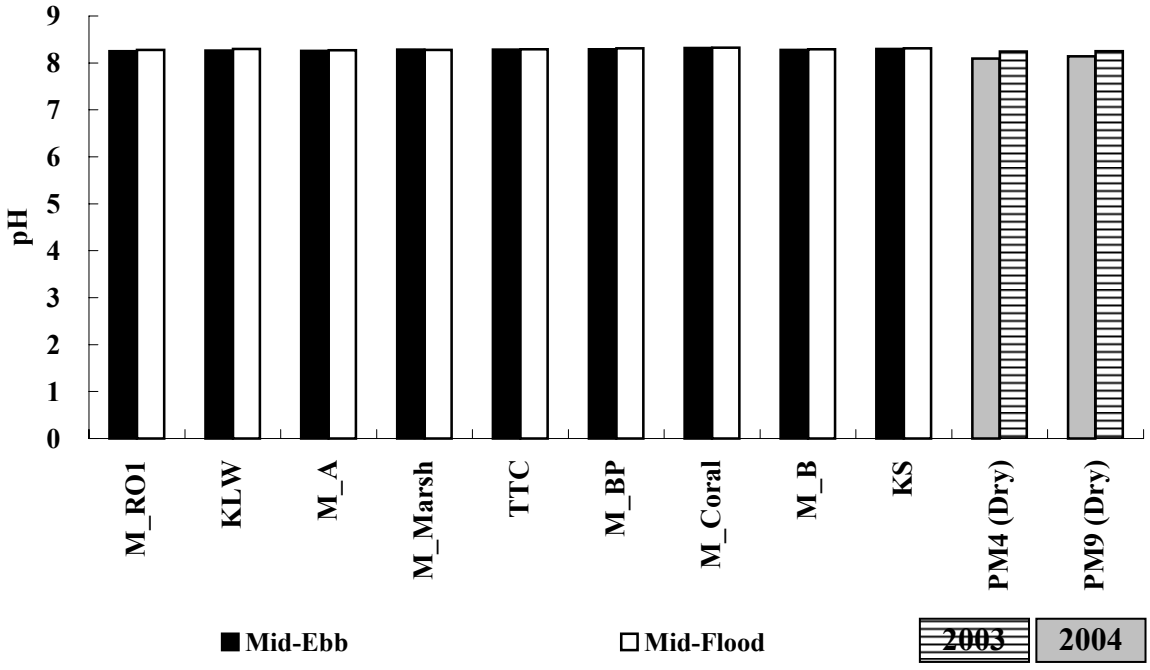
Dissolved Oxygen : Surface + Middle (Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations Apr - Oct 04 (Dry Season 2003-2004)



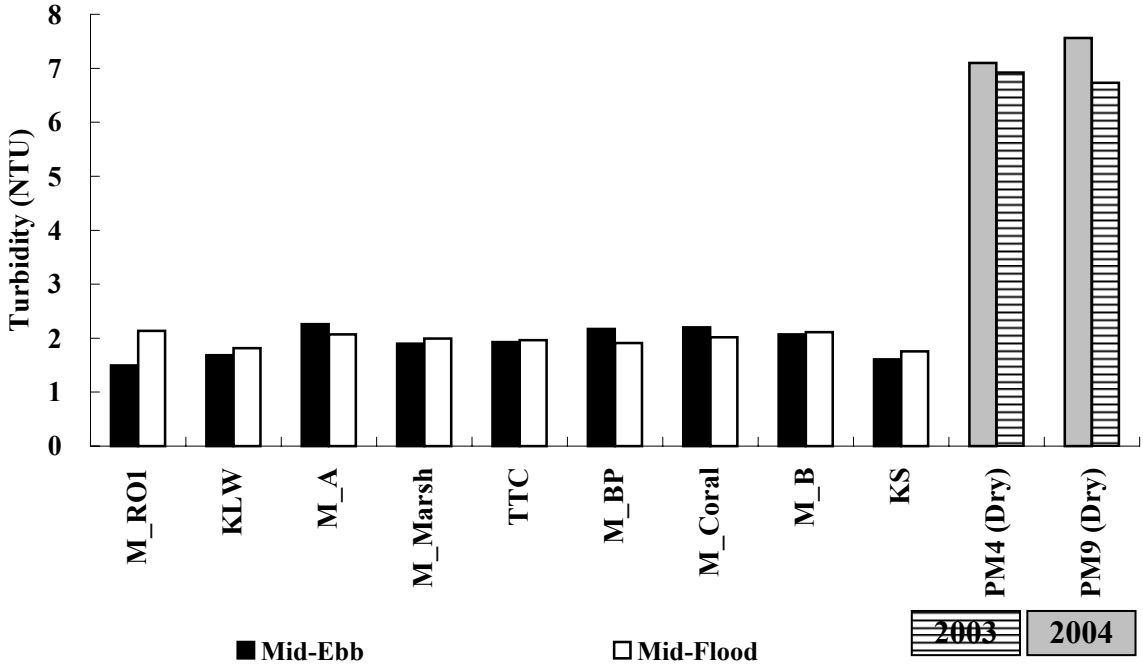
Dissolved Oxygen : Bottom (Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)



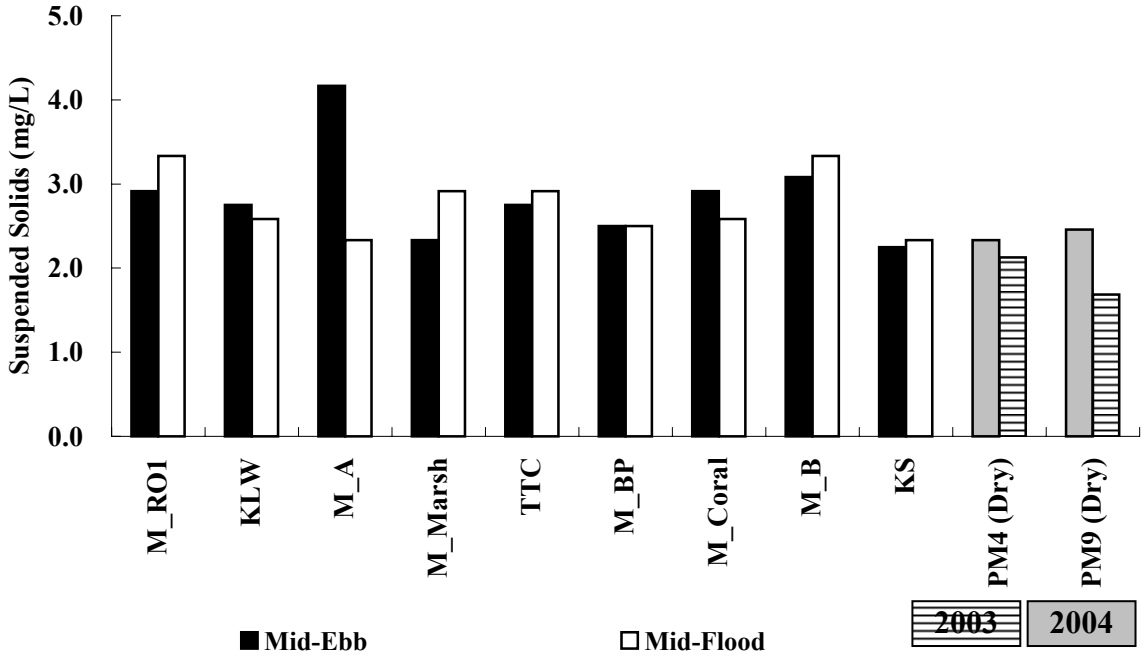
pH : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)



Turbidity : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

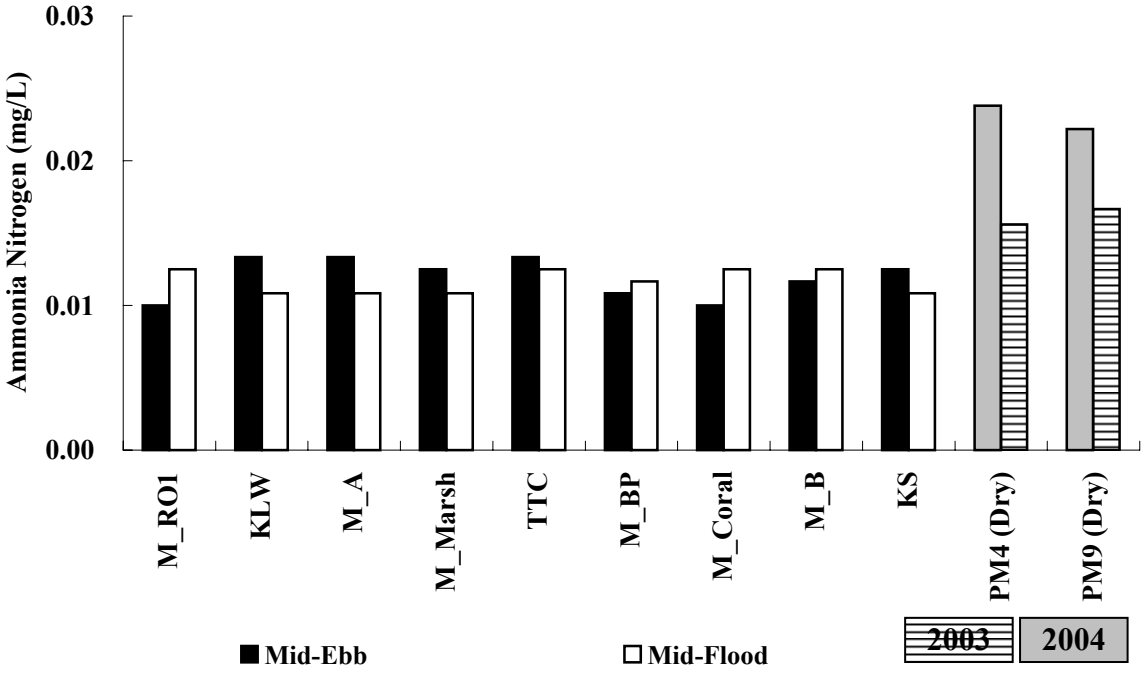


Suspended Solids : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

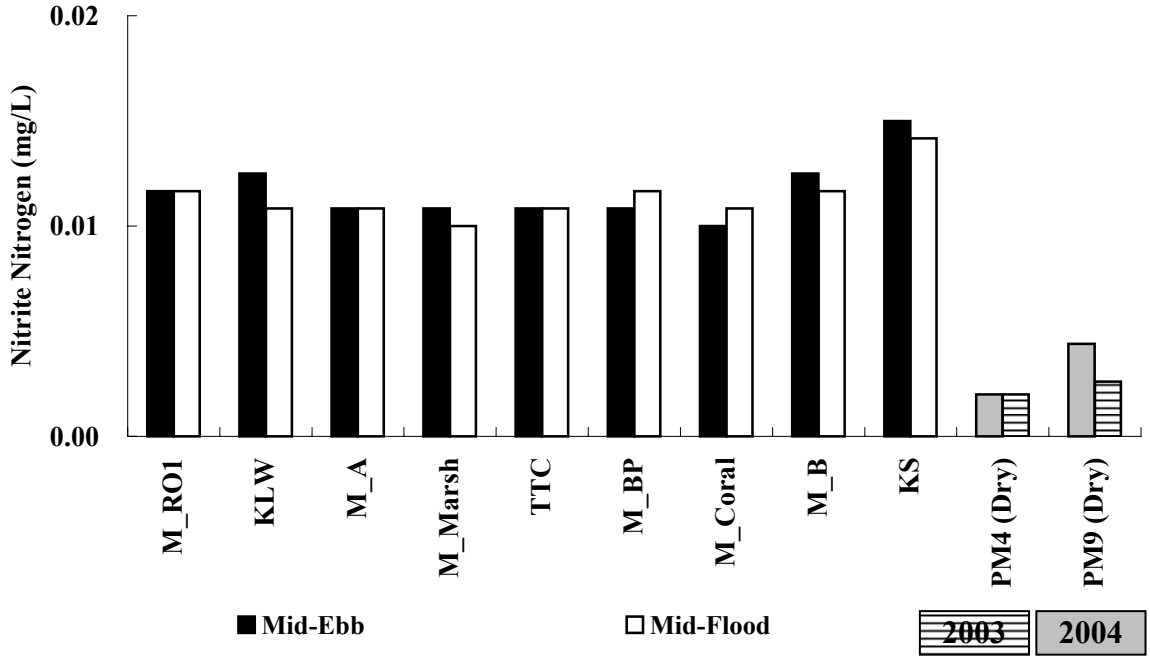


Suspended Solids
Detection limit: EPD (0.5 mg/L); HOKLAS lab (2 mg/L)

Ammonia Nitrogen : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

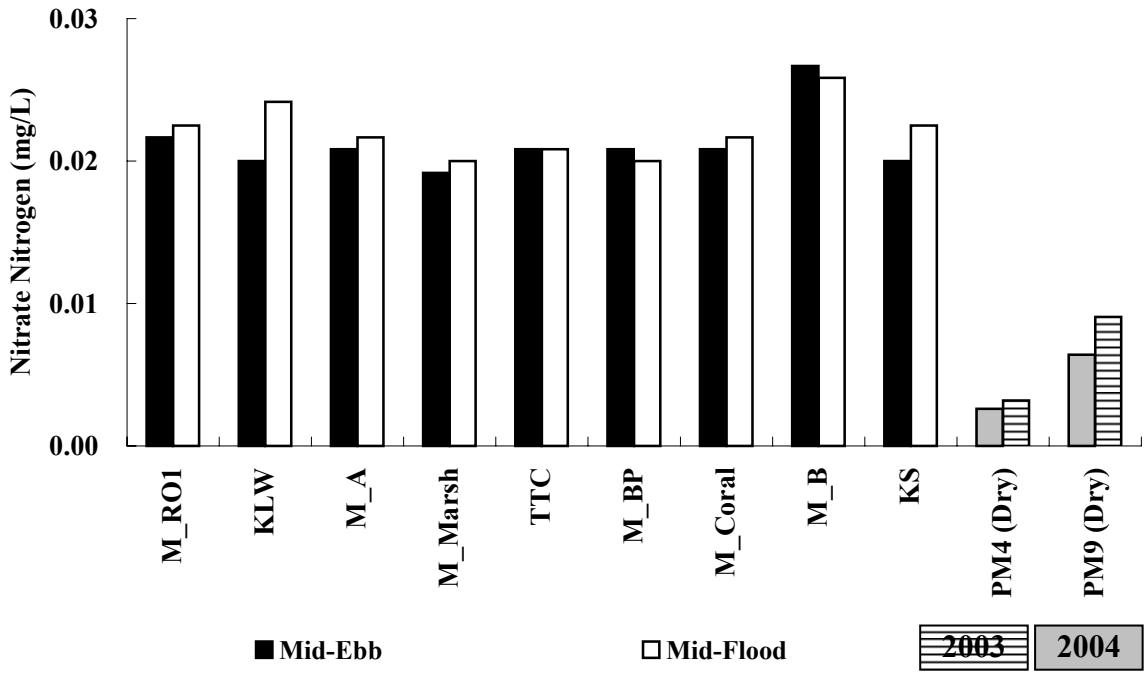


Nitrite Nitrogen : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

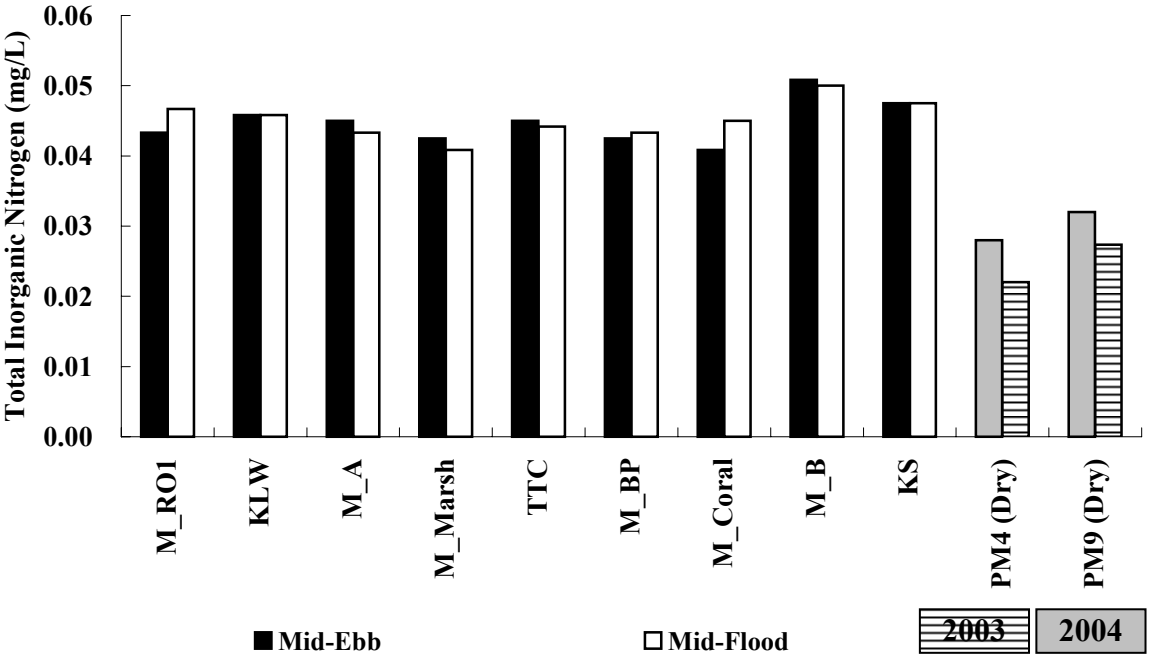


Ammonia Nitrogen
Detection limit: EPD (0.005 mg/L); HOKLAS lab (0.01 mg/L)
Nitrite Nitrogen
Detection limit: EPD (0.002 mg/L); HOKLAS lab (0.01 mg/L)

Nitrate Nitrogen : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

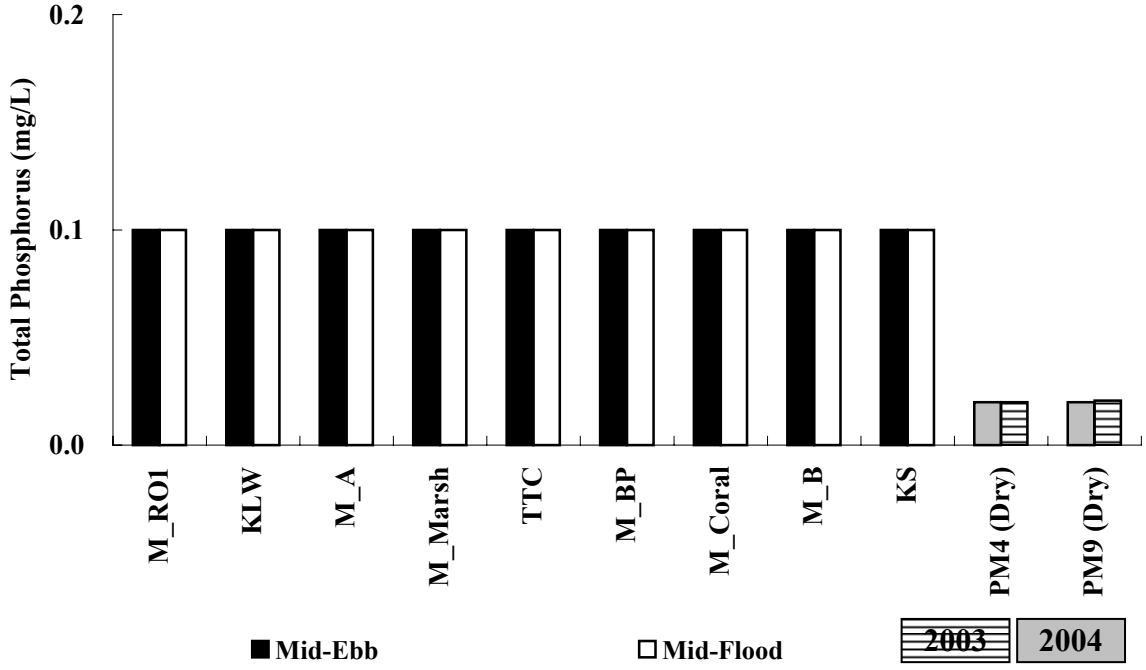


Total Inorganic Nitrogen : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

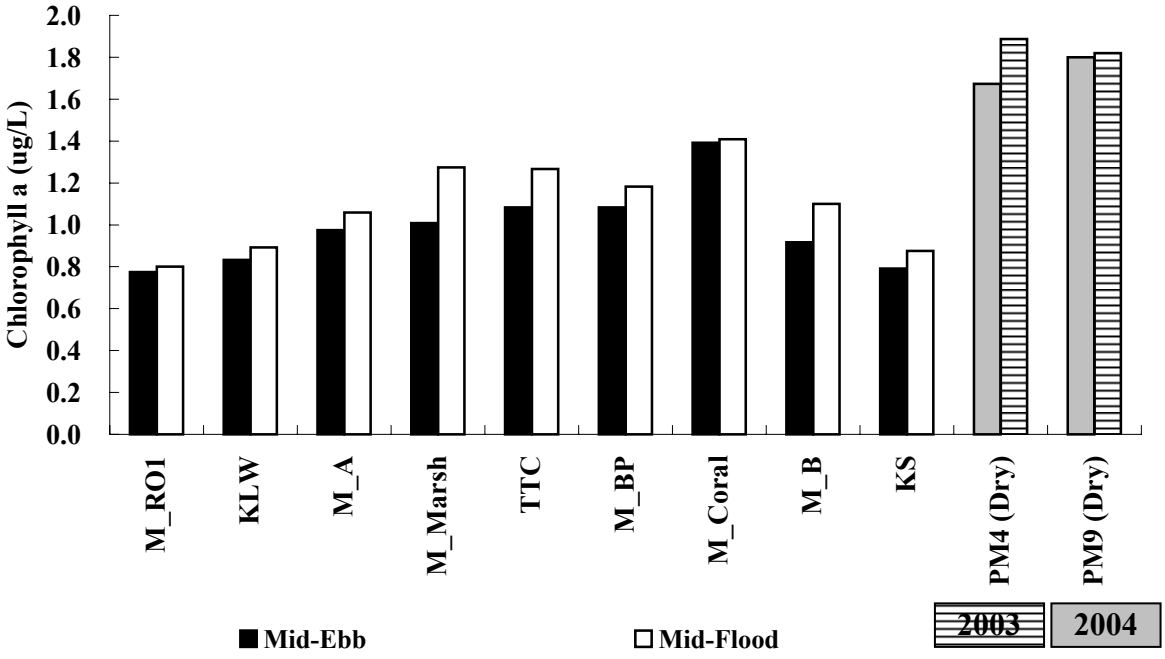


Nitrate Nitrogen
Detection limit: EPD (0.002 mg/L); HOKLAS lab (0.01 mg/L)

Total Phosphorus: Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

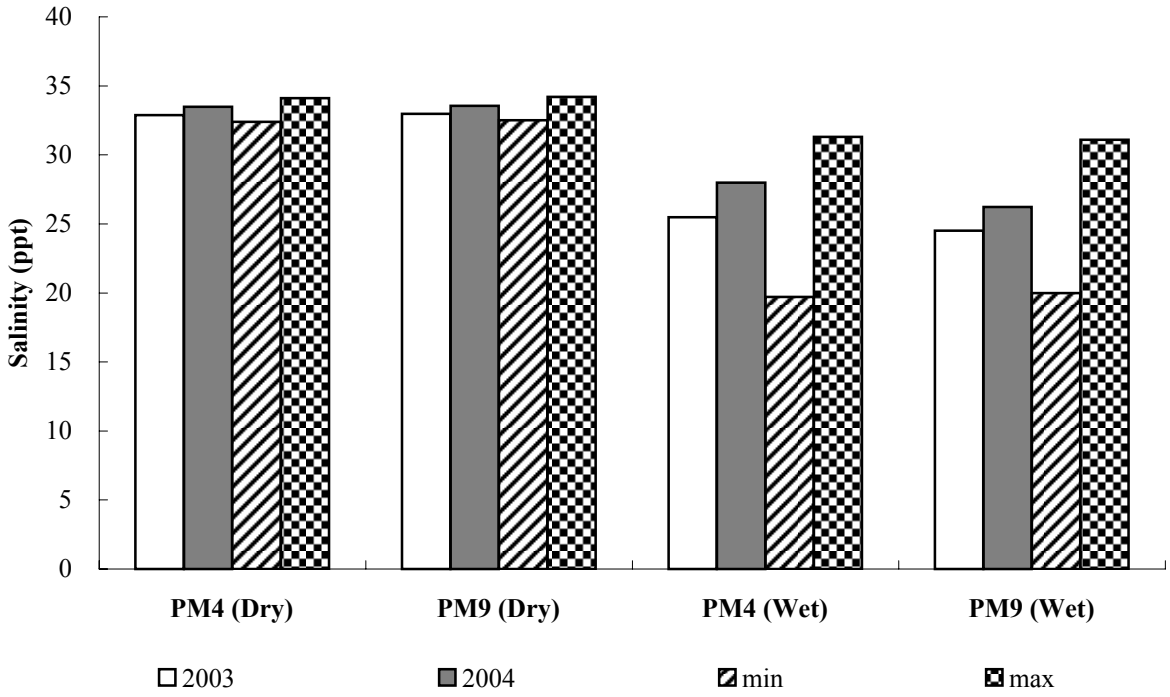


Chlorophyll a : Baseline monitoring Nov - Dec 05 and nearest EPD monitoring locations (Dry Season 2003-2004)

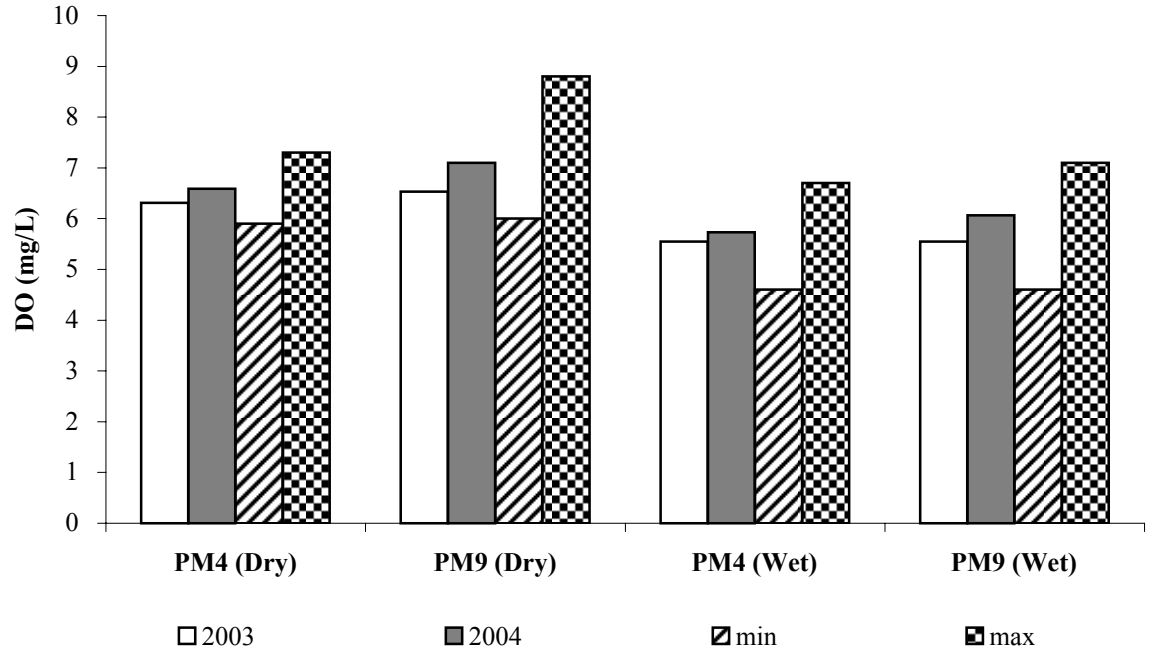


Total Phosphate
Detection limit: EPD (0.02 mg/L); HOKLAS lab (0.1 mg/L)
Chl-a
Detection limit: EPD (0.2 ug/L); HOKLAS lab (0.5 ug/L)

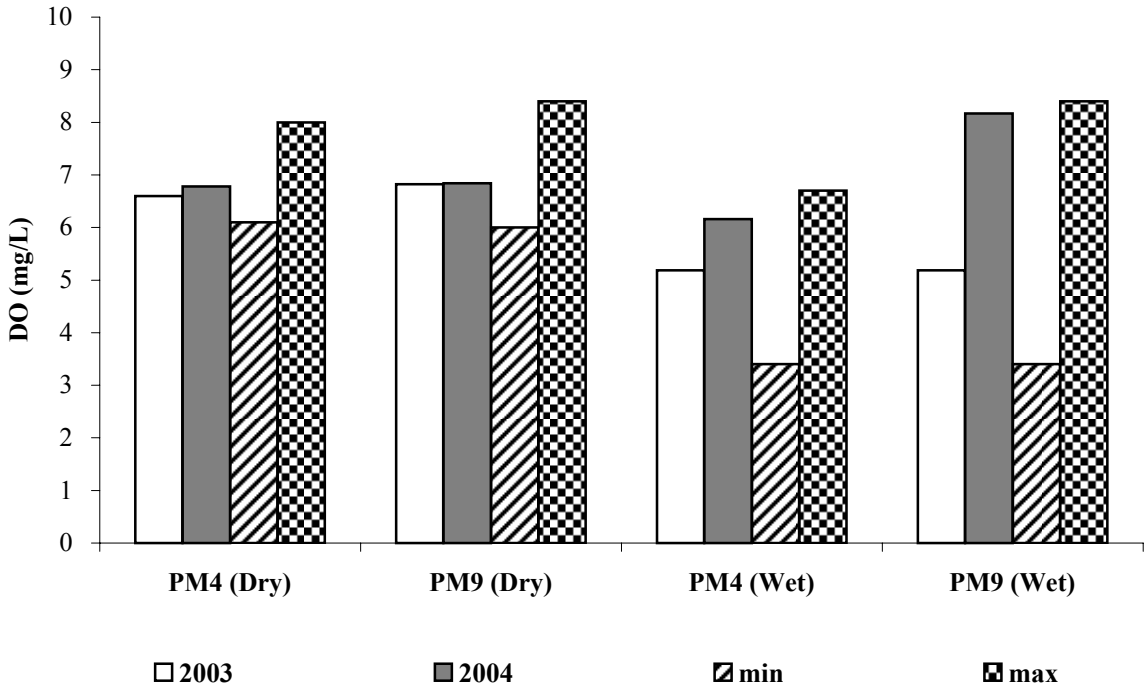
Salinity : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



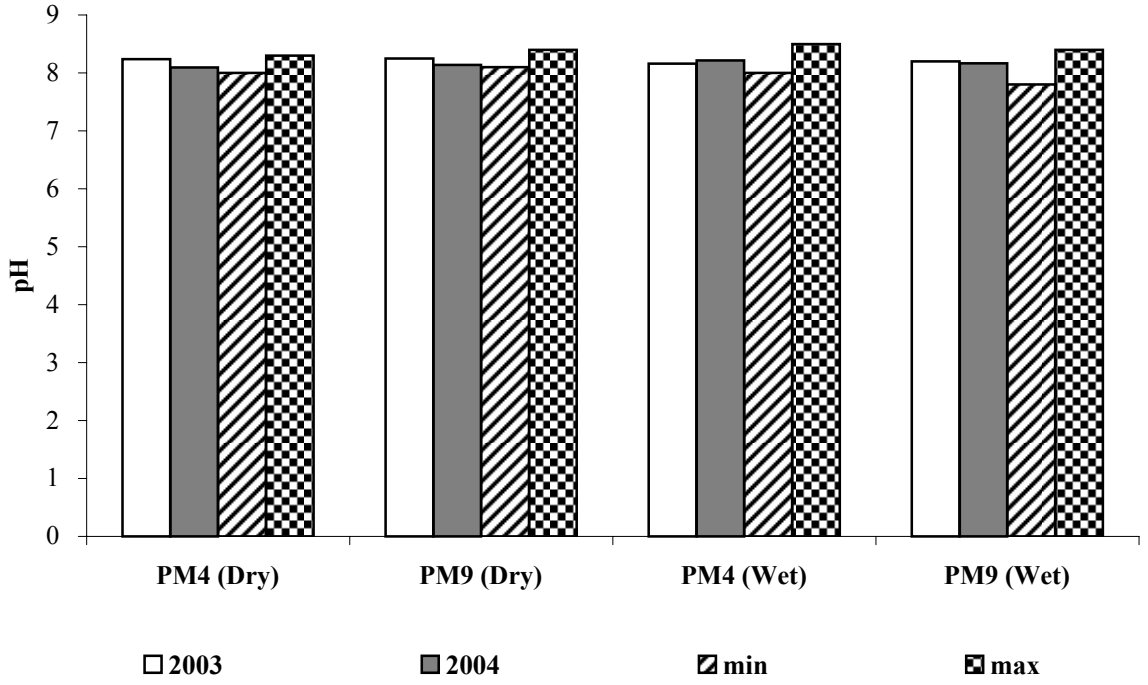
Dissolved Oxygen (Surface + middle) : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



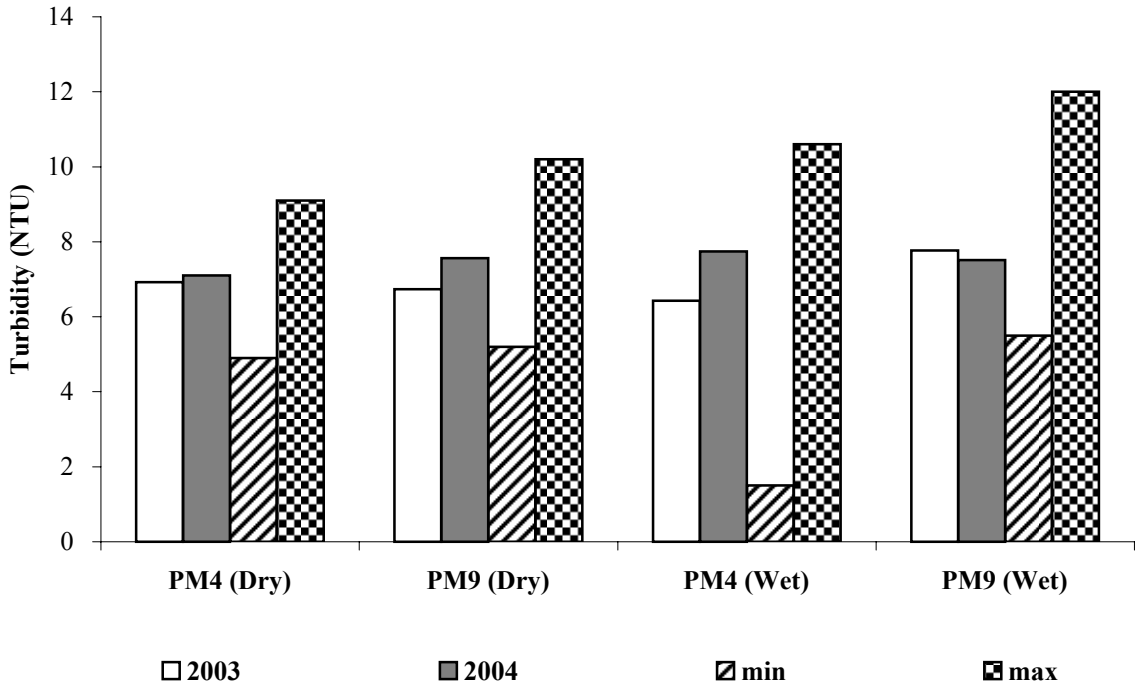
Dissolved Oxygen (bottom) : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



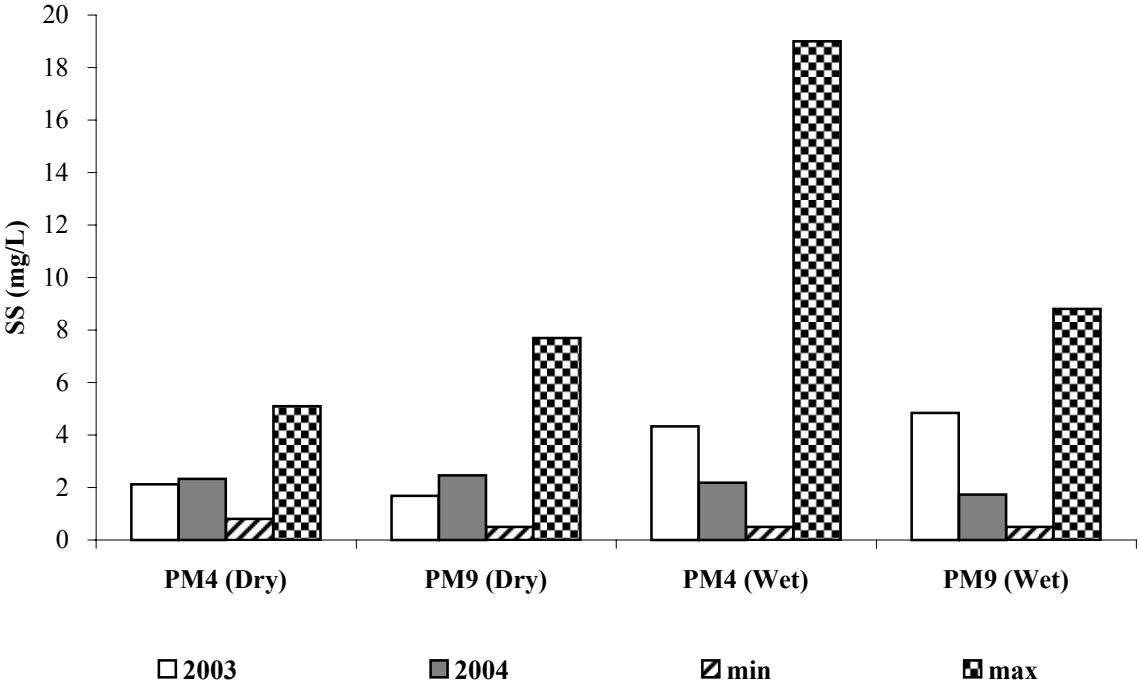
pH : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



Turbidity : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

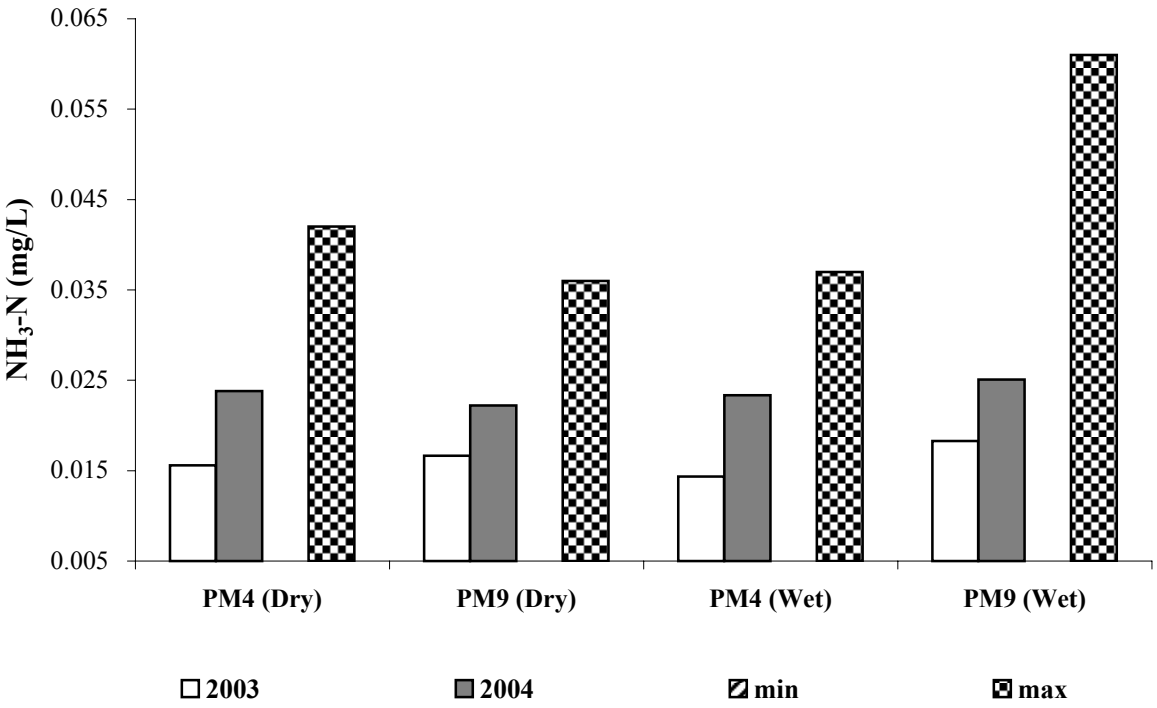


Suspended Solids : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

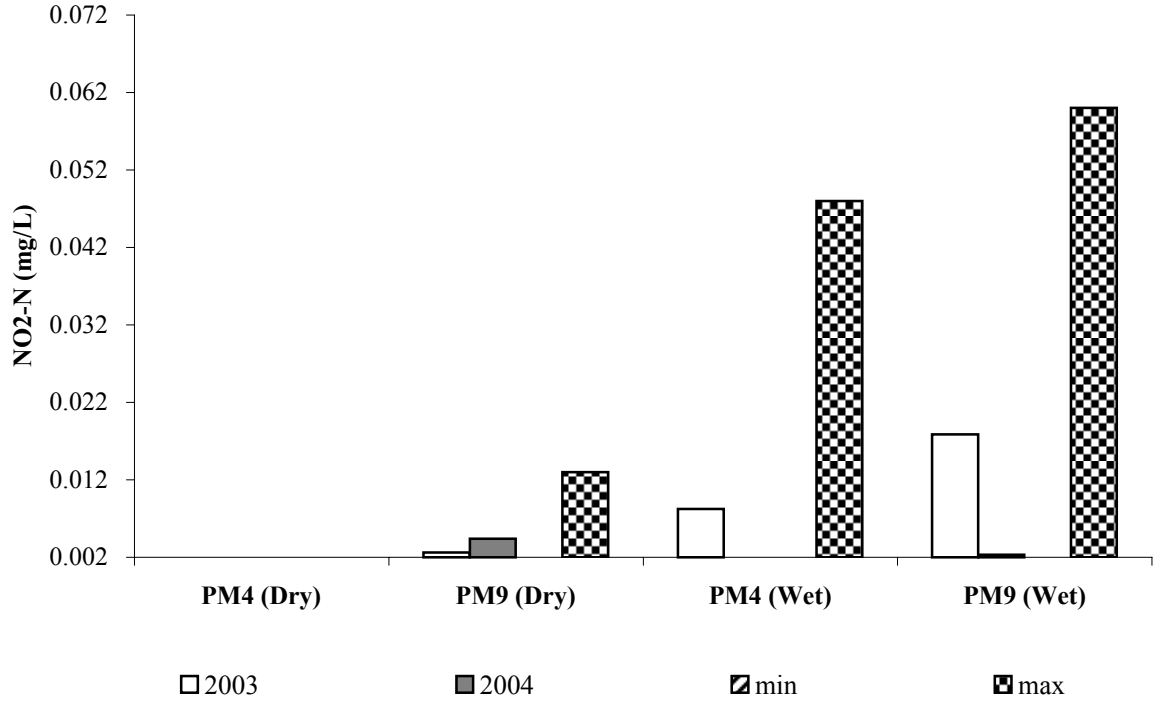


Suspended Solids
Detection limit: EPD (0.5 mg/L)

Ammonia Nitrogen : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

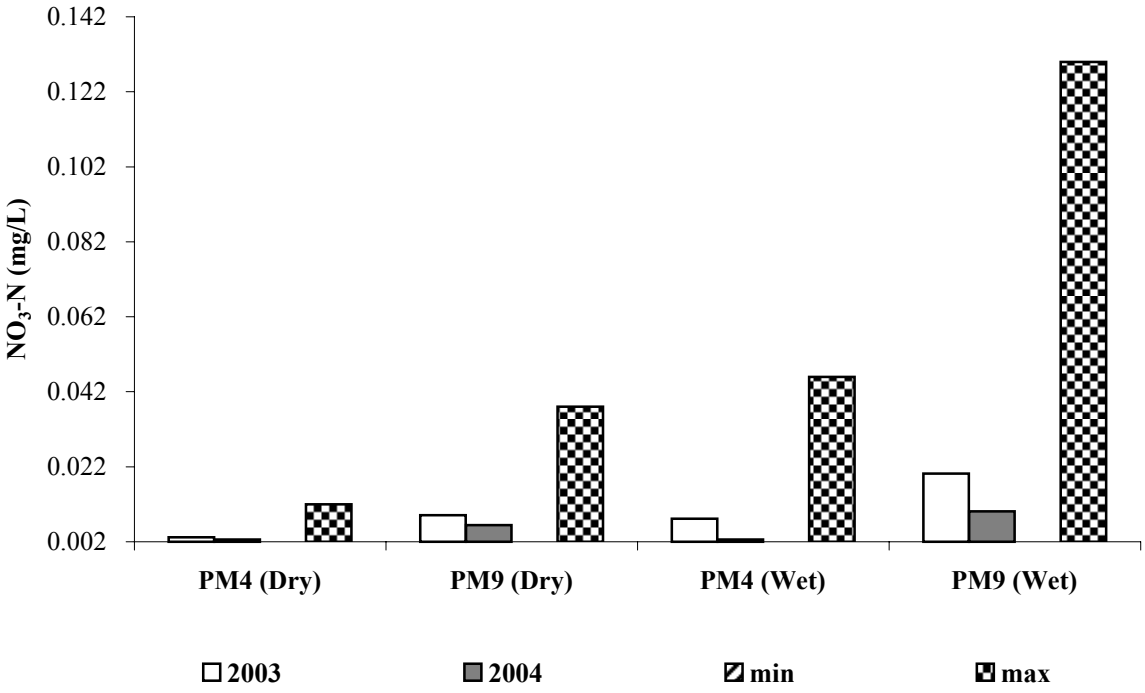


Nitrite Nitrogen : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

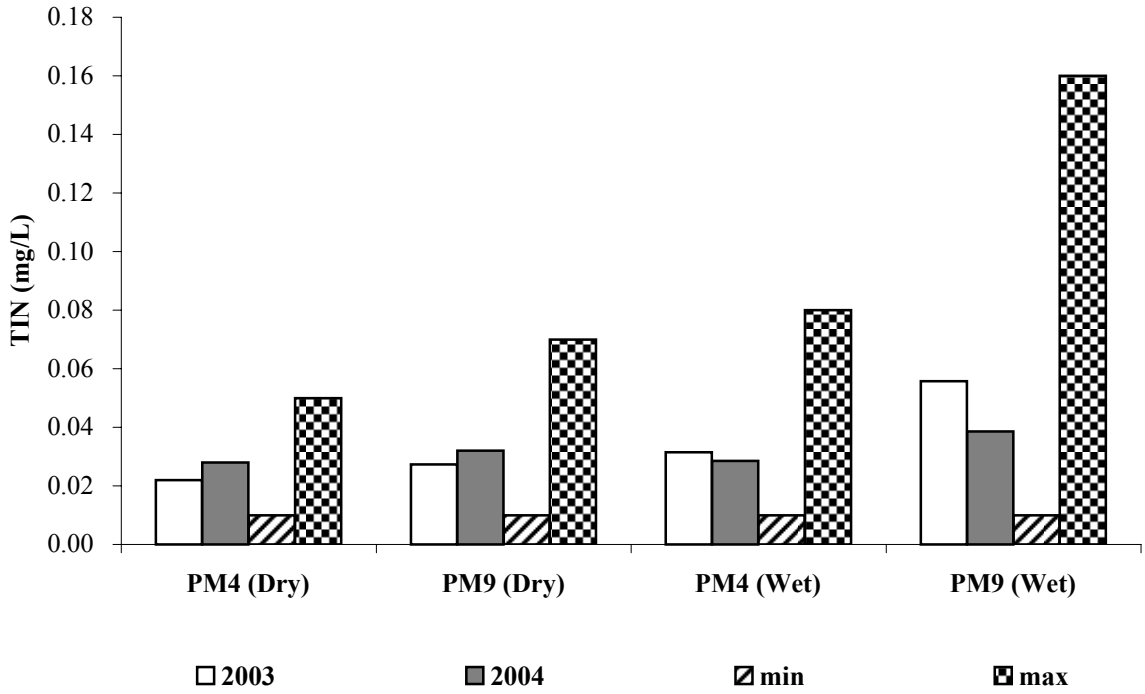


Ammonia Nitrogen
Detection limit: EPD (0.005 mg/L)
Nitrite Nitrogen
Detection limit: EPD (0.002 mg/L)

Nitrate Nitrogen : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

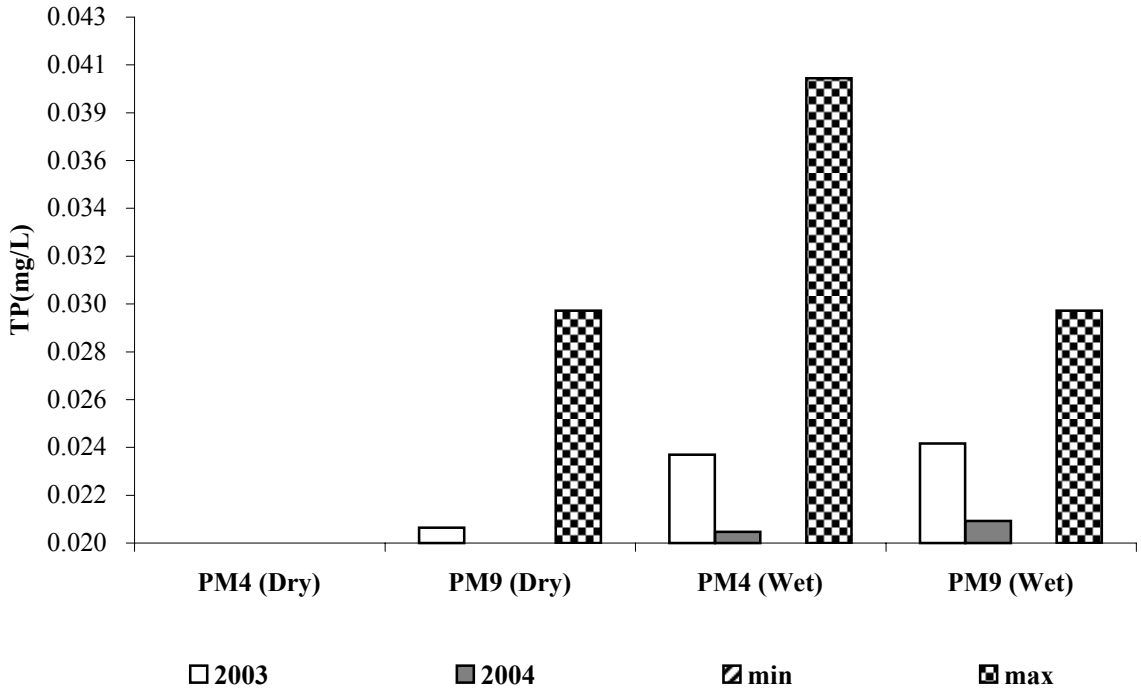


Total Inorganic Nitrogen : EPD monitoring Data 2003-2004 (Dry and Wet seasons)

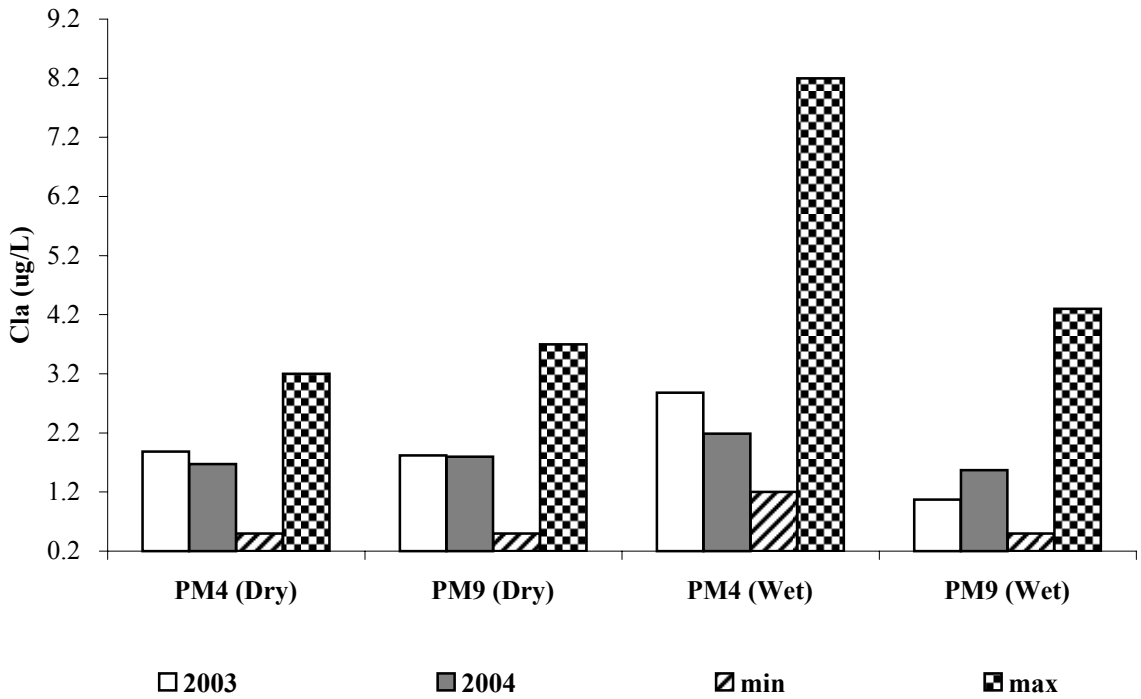


Nitrate Nitrogen
Detection limit: EPD (0.002 mg/L)

Total Phosphorus : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



Chlorophyll a : EPD monitoring Data 2003-2004 (Dry and Wet seasons)



Total Phosphate
Detection limit: EPD (0.02 mg/L)
Chlorophyll a
Detection limit: EPD (0.2 ug/L)

Appendix G
PHOTOS PLATES FOR ECOLOGY BASELINE MONITORING

List of Photo Plates

Plate 4.1 Stream

Stream A

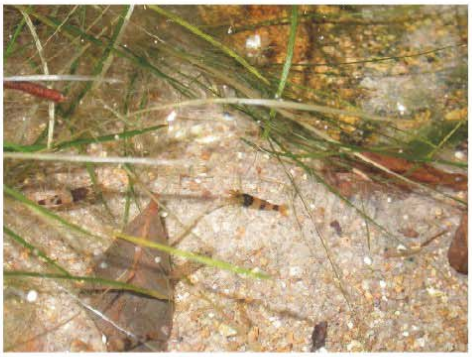
Stream B

Stream B close-up

Stream C

Stream C close-up

Stream D



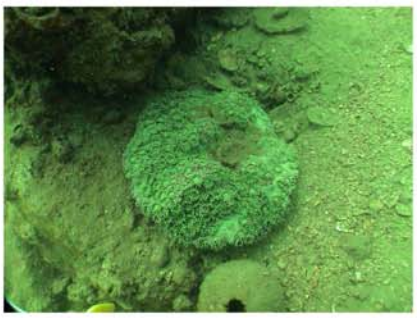
Caridina trifasciata

Plate 4.2 Coral Baseline (number 1 to 10)

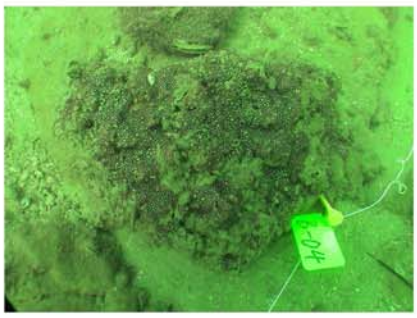
B-01

B-02

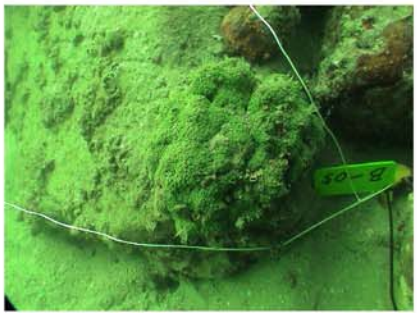
B-03



B-04

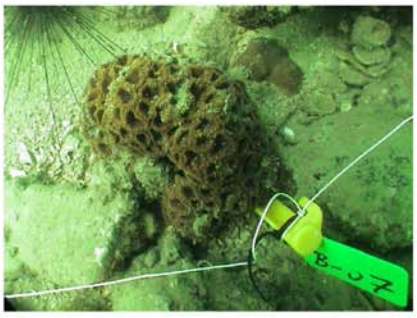


B-05

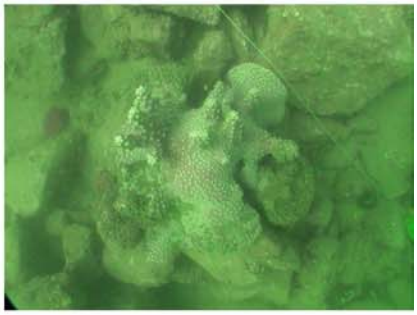


B-06

B-07



B-08



B-09

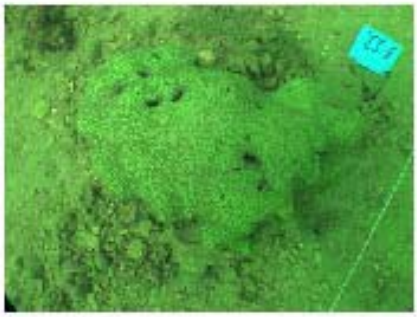
B-10

Plate 4.3 Coral Baseline (number 11 to 20)

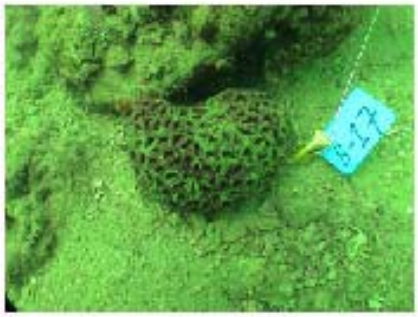
B-11

B-16

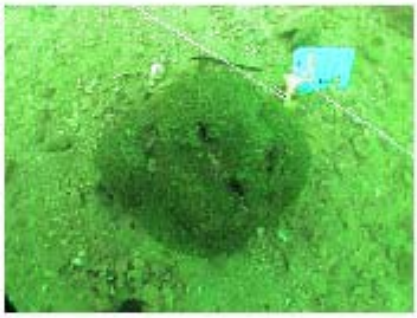
B-12



B-17



B-13



B-18

B-14

B-19

B-15

B-20

Plate 4.4 C Coral Baseline (number 1 to 10)

C-01

C-06

C-02

C-07

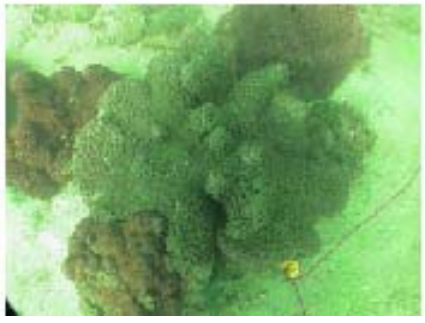
C-03

C-08

C-04

C-09

C-05



C-10

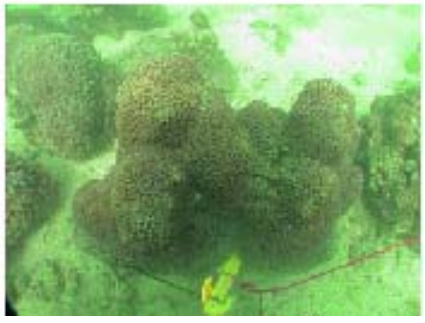


Plate 4.5 C Coral Baseline (number 11 to 20)

C-11

C-16

C-12

C-17

C-13

C-18

C-14

C-19

C-15

C-20

Plate 4.6 D Coral Baseline (number 1 to 10)

D-01

D-06

D-02

D-07

D-03

D-08

D-04

D-09

D-05

D-10

Plate 4.7 D Coral Baseline (number 11 to 20)

D-11

D-16

D-12

D-17

D-13

D-18

D-14

D-19

D-15

D-20

Plate 4.8 Control Coral Baseline (number 1 to 10)

X-01

X-06

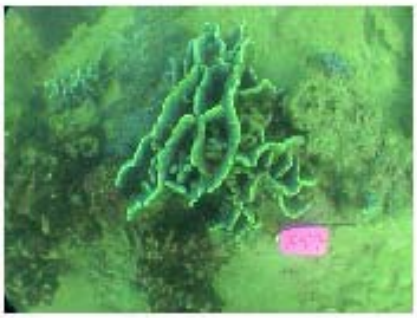
X-02

X-07

X-03

X-08

X-04



X-09

X-05

X-10

Plate 4.9 Control Coral Baseline (number 11 to 20)

X-11

X-16

X-12

X-17

X-13

X-18

X-14

X-19

X-15

X-20

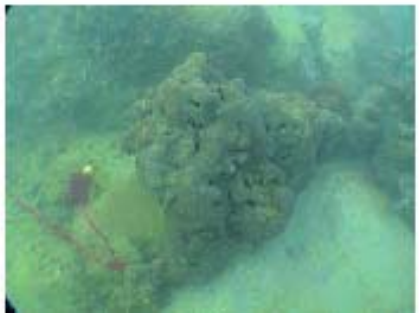


Plate 4.10 D3 Seagrass Baseline

Seagrass photo -1

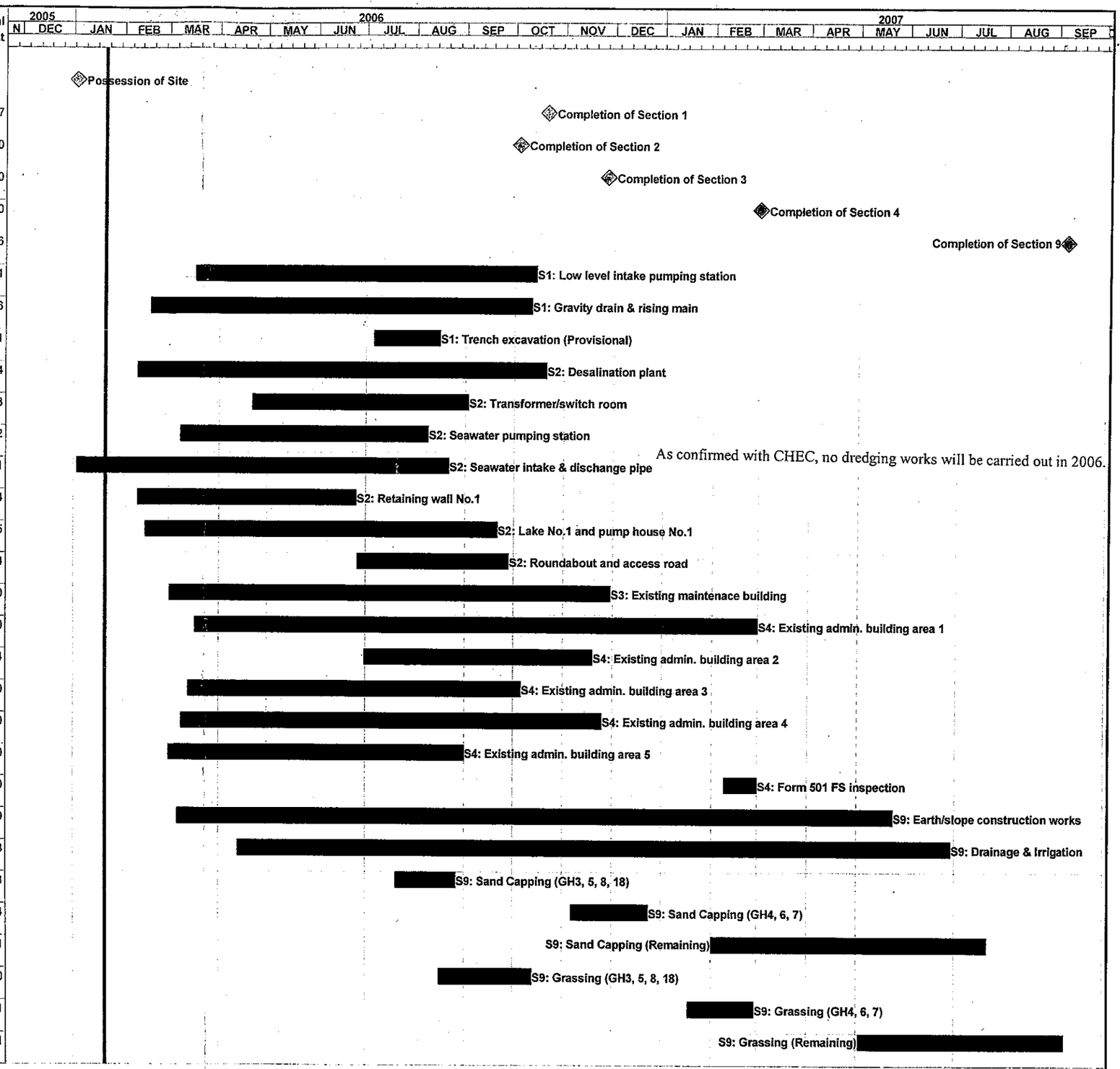
Seagrass photo -2

Seagrass photo -3

Seagrass photo -4

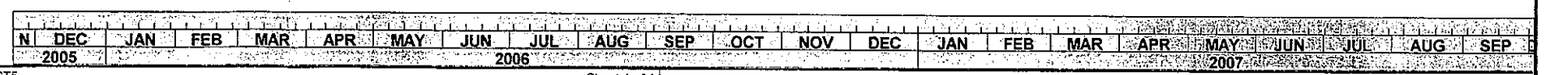
Appendix H
Tentative Construction Programme

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish	Total Float
SUMMARY PROGRAMME					
SU00100	Possession of Site	0	03/01/06A		
SU00110	Completion of Section 1	0		20/10/06	-17
SU00120	Completion of Section 2	0		03/10/06	0
SU00130	Completion of Section 3	0		26/11/06	0
SU00140	Completion of Section 4	0		28/02/07	0
SU00150	Completion of Section 9	0		06/09/07	-36
SU00160	S1: Low level intake pumping station	172*	17/03/06	14/10/06	-11
SU00170	S1: Gravity drain & rising main	192*	18/02/06	11/10/06	-6
SU00180	S1: Trench excavation (Provisional)	35*	06/07/06	15/08/06	41
SU00190	S2: Desalination plant	207*	10/02/06	20/10/06	-14
SU00200	S2: Transformer/switch room	111*	22/04/06	02/09/06	18
SU00210	S2: Seawater pumping station	124*	08/03/06	08/08/06	22
SU00220	S2: Seawater intake & dischange pipe	187*	03/01/06A	21/08/06	21
SU00230	S2: Retaining wall No.1	109*	10/02/06	24/06/06	4
SU00240	S2: Lake No.1 and pump house No.1	179*	15/02/06	20/09/06	-15
SU00250	S2: Roundabout and access road	80*	26/06/06	27/09/06	4
SU00260	S3: Existing maintenace building	223*	02/03/06	29/11/06	0
SU00270	S4: Existing admin. building area 1	282*	17/03/06	28/02/07	0
SU00280	S4: Existing admin. building area 2	118*	30/06/06	18/11/06	64
SU00290	S4: Existing admin. building area 3	169*	13/03/06	05/10/06	0
SU00300	S4: Existing admin. building area 4	213*	09/03/06	24/11/06	0
SU00310	S4: Existing admin. building area 5	150*	01/03/06	31/08/06	0
SU00320	S4: Form 501 FS inspection	17*	09/02/07	28/02/07	0
SU00330	S9: Earth/slope construction works	357*	07/03/06	23/05/07	-29
SU00350	S9: Drainage & Irrigation	356*	13/04/06	28/06/07	-23
SU00360	S9: Sand Capping (GH3, 5, 8, 18)	33*	20/07/06	26/08/06	53
SU00370	S9: Sand Capping (GH4, 6, 7)	42*	06/11/06	23/12/06	-4
SU00380	S9: Sand Capping (Remaining)	139*	01/02/07	21/07/07	-31
SU00390	S9: Grassing (GH3, 5, 8, 18)	48*	16/08/06	12/10/06	100
SU00400	S9: Grassing (GH4, 6, 7)	32*	18/01/07	27/02/07	21
SU00410	S9: Grassing (Remaining)	106*	03/05/07	06/09/07	-31



As confirmed with CHEC, no dredging works will be carried out in 2006.

Temporary barging point at KSC was commenced in mid-March 06. It will be completed by the end of April 06.



Start Date	28/12/05
Finish Date	06/09/07
Data Date	21/01/06
Run Date	01/03/06 15:33

Summary Bar
Progress Bar

?Primavera Systems, Inc.

KST5

Sheet 1 of 1

China Harbour Engineering Co.
Third Golf Course at Kau Sai Chau
Summary Programme

Date	Revision	Checked	Approved
28/12/05	4th Final for Submission	Tim	
01/03/06	Ver 5th (KST5)	Tim	

Appendix I
Curricula Vitae of Marine Ecologists

LAI Chi Sing, Vincent
Marine Ecologist and Aquatic Ecologist

Profession:	Ecological Consultant
Position:	Aquatic Ecologist, Ecosystems Ltd.
Primary Responsibility:	To perform aquatic fauna & fisheries surveys and to carry out ecological and fisheries impact assessment.
Years with Firm:	7
Date of Birth:	1969
Nationality:	Hong Kong SAR, China

Education and Professional Qualifications

MPhil, Coastal Ecology, University of Hong Kong, 1996

BSc, Marine Biology and Environmental Biology, Chinese University of Hong Kong, 1992

Certified Advanced Open Water Diver (PADI)

Member, Marine Biological Association of Hong Kong

Key Qualifications

- Broad academic and practical experience with coastal and marine ecology, particularly of the Hong Kong area. Special strength in identification of Decapoda.
- Experience in designing and conducting field surveys and reporting for ecological and fisheries impact assessment.
- Languages: Cantonese (native), English (fluent)

Personal Profile

Mr. Lai is the Aquatic Ecologist at Ecosystems Ltd who has broad academic background and practical experience in marine and freshwater ecology. He earned his Master of Philosophy in Coastal Ecology from the University of Hong Kong in 1996. He speaks fluent English in addition to Cantonese, and is a citizen of Hong Kong. He is a Certified Open Water Diver (PADI). He is knowledgeable in marine invertebrates of the South China region, especially on crustaceans.

He has particular responsibility for all marine and freshwater ecological impact assessment and studies undertaken by the company. In addition to his responsibilities in ecology, he is the Fisheries Consultant of Ecosystems Ltd.. He has extensive experience with the Hong Kong EIA process including the application of EIA Ordinance and Technical Memorandum, designing and conducting ecological and fisheries field surveys and studies for EIA and EM&A, reporting, data analysis, proposing mitigation measures and project management.

Since joining Ecosystems Ltd. in 1999, Mr. Lai has worked on numerous projects in HKSAR and conducted freshwater surveys, including Ngong Ping Sewage Treatment Works and Sewerage, Yuen Long and Kam Tin Sewerage and Sewage Disposal, Stage I: Sewers, Rising Mains and Ancillary Pumping Stations, Drainage improvements in Tsuen Wan and Kwai Chung – Tsuen Wan Drainage Tunnel, Drainage improvements in Northern Hong Kong Island – Hong Kong West Drainage Tunnel.

He has conducted a number of EM&A programmes such as Operation-phase Monitoring of Route 3 Highway at Sham Tsang Stream, Ngau Tam Mei-Kam Tin-Yuen Long Main Drainage Channel Ecology Monitoring, Ecological Monitoring for Mangrove Cutting Works at the River Outlets of Tin Shui Wai Western Drainage and Shan Pui River Channel, Independent Checker for the implementation of Tai O Sheltered Boat Anchorage, and field trials for Study on Wetland Compensation. He also participated in the Development of an Ecological Monitoring Programme for the Mai Po and Inner Deep Bay Ramsar Site.

Local cetaceans especially Chinese White Dolphin is the major concern in many infrastructure projects in western Hong Kong waters such as Tai O Sheltered Boat Anchorage, Upgrading and Expansion Works of San Wai Sewage

Treatment Works and Expansion of Ha Tsuen Pumping Station, Shenzhen Western Corridor - Investigation and Planning, Hong Kong- Zhuhai- Macao-Bridge, and Lantau Logistics Park.

Mr. Lai has also conducted dive surveys for a number of EIA studies in Hong Kong, including the *Drainage improvements in Northern Hong Kong Island – Hong Kong West Drainage Tunnel*, *Feasibility Study on Housing Development at Whitehead and Lee On in Ma On Shan***,** *Hong Kong Outlying Islands Sewerage Stage 1 Phase II Package J - Sok Kwu Wan Sewage Collection, Treatment and Disposal Facilities*, and *Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung – Environmental Impact Assessment.*

Mr. Lai has been invited since 2002 to provide training lectures for the participants of the activities of "Reef Check" programs, co-organised by the Reef Check Foundation and Agriculture, Fisheries and Conservation Department. The objectives of this activity are to monitor the health status of corals in Hong Kong and increase public awareness and attention on coral conservation.

Experience Record

1999 - to date ***Aquatic Ecologist, Ecosystems Ltd., Hong Kong***

Nov 2005 – to date Drainage Improvement in Southern Lantau**, Arup**

Aquatic Ecologist for ecological mitigations and design of a proposed drainage improvement, aw well as establishing ecological baseline for EM&A purpose in Mui Wo, Lantau. Input on the design of the drainage channels and conduct stream fauna surveys on the site.

Feb 2005 – to date NENT Landfill Extension**, Arup**

Aquatic Ecologist for ecological impact assessment study of a proposed extension of the NENT Landfill. Conduct stream fauna surveys on and around the site.

Feb 2005 – to date Private-Public Partnership at Mui Tsz Lam**, New World.**

Aquatic Ecologist. Conduct stream surveys and impact assessments. Potential impacts on stream habitats and fauna is the major concern in the proposal. Client: New World Development.

Feb 2005 – to date Private-Public Partnership at Sha Lo Tung**, Sha Lo Tung Development.**

Aquatic Ecologist. Conduct stream surveys and impact assessments. Potential impacts on stream habitats and fauna is the major concern in the proposal. Client: Sha Lo Tung Development.

Feb 2005 – to date Private-Public Partnership at Tai Ho**, Swire Property.**

Aquatic Ecologist. Conduct stream surveys and impact assessments. Potential impacts on stream habitats and fauna is the major concern in the proposal. Client: Swire Property.

Feb 2005 – to date Lantau Logistics Park Development**, Arup.**

Project Manager, & Aquatic Ecologist. Conduct stream, intertidal and dolphin ecological surveys and impact assessments. Potential impacts on Chinese White Dolphin is the major concern in marine ecology. Client: Civil, Engineering and Development Department.

Mar. 2004 - to date Hong Kong – Zhuhai – Macao Bridge Hong Kong Section and North Lantau Highway Connection**, ARUP**.

Ecologist & Fisheries Consultant. Conduct impact assessments on marine and intertidal ecology as well as fisheries. Potential impacts on Chinese White Dolphin is the major concern in marine ecology. Client: Highways Department.

Aug. 2003 – Mar. 2005 Drainage improvements in Tsuen Wan and Kwai Chung – Tsuen Wan Drainage Tunnel**, Mott Connell HK**.

Project Manager, & Ecologist. Conduct stream and intertidal ecological surveys and impact assessments. Client: Drainage Services Department.

Aug. 2003 - to date Drainage improvements in Northern Hong Kong Island – Hong Kong West Drainage Tunnel**, Black & Vetch HK**.

Project Manager, Fisheries Consultant & Ecologist. Conduct impact assessments on fisheries, terrestrial and marine ecology. Supervise terrestrial and marine ecological surveys. Client: Drainage Services Department.

Apr. 2003 – Feb. 2005 Ecological Monitoring for Mangrove Cutting Works at the River Outlets of Tin Shui Wai Western Drainage and Shan Pui River Channel: Extension 2003-2004.

Project Manager & Ecologist. Monitoring of benthos, bird use and mangrove regeneration at two channel sections under management. Client: Drainage Services Department.

Dec. 2002 – Mar. 2005 Drainage improvements in Northern New Territories– Package B**, ERM HK.**

Aquatic Ecologist for ecological baseline surveys of an assessment of a proposed improvement of the existing drainage systems in northern part of New Territories. Conduct ecological surveys, and establish ecological baseline conditions. Ecosystems sub-consulted to Environmental Resources Management Hong Kong. Client: Drainage Service Department.

Apr. 2002 – Feb. 2005 Aberdeen, Ap Lei Chau and Pok Fu Lam Sewerage – Stage 1 Remainder and Stage 2**, Atkins China Ltd.**

Aquatic Ecologist for ecological assessment of a proposed renewal of the existing sewerage systems and construction of pumping stations in southern part of Hong Kong Island. It is part of the schemes recommended under the "Aberdeen, Ap Lei Chau and Pokfulam Sewerage Master Plan". Conduct ecological surveys, assess various options and potential impacts and advise on mitigation measures. Ecosystems sub-consulted to Environmental Management Ltd. Client: Drainage Service Department.

Apr. 2002 – Nov 2002 Easterly Link Road – Feasibility Study**, Ove Arup and Partners Ltd.**

Assessment of various alignment options linking Deep Bay Link and Yuen Long Highway. Key ecological issues include loss of intertidal and other wetland habitats. Client: Highways Department.

Apr. 2002 – Jun. 2004 EIA and TIA Studies for Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2 – Investigation**, Ove Arup and Partners Ltd.**

Aquatic Ecologist for ecological study and impact assessment of a proposed sewerage and sewage disposal system for the north-west New Territories. Client: Drainage Service Department.

Oct. 2001 – Oct. 2002 Ngong Ping Sewage Treatment Works and Sewerage**, EML Ltd.**

Aquatic Ecologist for ecological assessment of proposed sewage treatment work in Ngong Ping, Lantau Island. Conduct field surveys; assess potential impacts and advise on mitigation measures and need for further studies. Client: Drainage Service Department.

Sep. 2001 – Feb. 2003 Ecological Monitoring for Mangrove Cutting Works at the River Outlets of Tin Shui Wai Western Drainage and Shan Pui River Channel

Ecologist. Monitoring of benthos at two channel sections under management. Client: Drainage Services Department.

Aug. 2001 – Oct. 2002 Shenzhen Western Corridor – Investigation and Planning**, Ove Arup & Partners**

Freshwater and Marine Ecologist for ecological assessment of proposed bridge/tunnel connecting Shekou and Outer Deep Bay. Conduct field surveys including stream and inter-tidal habitat surveys, as well as dolphin surveys by helicopter and fixed-wing aircraft; identify constraints, assess alignment options and potential impacts and advise on mitigation measures and need for further studies. Client: Highway Department.

Aug. 2001- Mar. 2003 San Wai Sewage Treatment Work and Upgrading of Ha Tsuen Pumping Station**, EML-Hong Kong, Ltd.**

Aquatic Ecologist for ecological assessment of proposed sewage treatment work in San Wai and expansion of Ha Tsuen Pumping Station. Conduct field surveys; assess potential impacts and advise on mitigation measures and need for further studies. Client: Drainage Service Department.

Jul. 2001 - Dec. 2001 Provision of Service on Providing Biodiversity Database, **BBV Hong Kong Ltd.**

Provided biodiversity advise and technical support for development of a GIS biodiversity database. Reviewed existing biodiversity database and presented in workshops. Ecosystems sub-consulted to Binnie Black and Veatch Ltd. Client: Agriculture Fisheries and Conservation Department.

Jul. 2001 - Oct. 2001 Tai O - Ngong Ping Ecological Surveys**, ERM-Hong Kong, Ltd.**

Aquatic Ecologist. Conduct fauna surveys for the EIA of the proposed sewerage works from Ngong Ping to Tai O. Client: Drainage Service Department.

Jul. 2000 - to date Study on Wetland Compensation. Field Trials – Monitoring Works**, BBV Hong Kong Limited.**

Conduct aquatic fauna surveys for baseline and trial monitoring of fish ponds at various sites. Client: Agriculture, Fisheries and Conservation Department.

Apr. - Jun. 2001 Explosive Ordnance Disposal Facility, Hong Kong **- Ove Arup & Partners**

Marine and Freshwater Ecologist for ecological assessment of proposed explosives disposal facility for use by Hong Kong Police Force. Conduct baseline surveys at two sites at Cape Collinson and Tseung Kwan O; identify constraints, assess potential impacts and advise on mitigation measures and need for further studies. Client: Civil Engineering Department.

Oct. 2000 - 2003 Planning and EIA for Further Recreational Facilities on Kau Sai Chau, Hong Kong **- Binnie Black and Veatch**

Marine and Freshwater Ecologist for ecological and fisheries study of proposed recreational facilities on the island of Kau Sai Chau, Port Shelter. Proposals include an extension to the existing public golf facilities, and hiking trails. Provided input at initial planning stage to avoid sensitive aquatic receivers, conduct baseline surveys and assess finalized designs. Key issues include natural coastal habitats, freshwater marshes and streams, and nearby fish culture zones. Client: Kau Sai Chau Public Golf Course Ltd.

Aug. - Oct. 2000 Additional Study on Waste to Energy Facility, Hong Kong **- Environmental Management Ltd.**

Marine Ecologist for ecological and fisheries study of a proposed waste incineration and cogeneration plant in north-west New Territories. Conduct intertidal and benthic surveys of habitats on and around the site, identify resources of importance, assess and evaluate impacts to aquatic ecology, and compare the study site to other proposed sites in terms of ecological suitability for the development. Client: Environmental Protection Department.

May 2000 - to date Residential Proposal for San Tin, Hong Kong

Aquatic Ecologist for proposed residential development and ecological reserve in northern New Territories of Hong Kong. The reserve is designed to offset wetland losses due to the residential development, through a

combination of wetland creation and wetland enhancement. The site is close to Mai Po and Inner Deep Bay, Hong Kong's first Ramsar site. Review prior studies, conduct baseline surveys, provide input to planning of wetland reserve. Client: private.

Feb. 2000 - Feb. 2001 Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development, Hong Kong **- Environmental Management Ltd.**

Marine Ecologist for feasibility study of a proposed major urban area redevelopment in central Kowloon. The site, a former airport, is now slated for residential and related urban development. Conducted benthic surveys on reclamation sites inside Kowloon Bay and next to Kai Tak runway. Assessed and evaluated impacts to benthos and aquatic life, developed mitigation measures. Client: Territory Development Department.

Jan. 2000 - Apr. 2001 EIA of Yuen Long and Kam Tin Sewerage and Sewage Disposal, Stage I: Sewers, Rising Mains and Ancillary Pumping Stations, Hong Kong **- ERM-Hong Kong Ltd.**

Aquatic Ecologist for ecological study of a proposed sewerage and sewage disposal system for the north-west New Territories. Conduct surveys of aquatic communities of the site, identify ecological resources of importance for use in EIA. Client: Drainage Services Department.

Jan. 2000 - Mar. 2003 Feasibility Study on Housing Development at Whitehead and Lee On in Ma On Shan, Hong Kong **- Binnie Black & Veatch**

Marine Ecologist for EIA of proposed urban development on mixed-use site including former detention centre and agricultural lands. Conducted soft shore surveys, described coastal habitats, identified ecological constraints, evaluated development options, assessed ecological impacts and proposed mitigation measures. Client: Territory Development Department.

Nov. 1999 - Sep. 2000 Environmental Monitoring of Jetty Decommissioning at Gemini Beach, Hong Kong **- Route 3 Contractors Consortium**

Project Manager. Project monitors environmental parameters, especially air and noise pollution, to assess the impact of coastal jetty decommissioning on nearby residential areas. The jetty was built for construction of Route 3 Highway.

Jan. 1999 - 2001 Operation-phase Monitoring of Route 3 Highway, Hong Kong **- Route 3 Contractors Consortium**

Aquatic Ecologist. Conduct periodic sampling of aquatic fauna in stream affected by highway construction. Sampling sites include a control and impacted site along the stream. Monitoring results will indicate success of stream restoration measures undertaken as part of the mitigation measures for construction of the highway.

Feb. 1999 - Mar. 2001 Construction-phase Monitoring of Main Drainage Channels for Ngau Tam Mei, Yuen Long and Kam Tin, Hong Kong

Intertidal Ecologist. Seasonal monitoring of intertidal fauna in existing and constructed drainage channels in Inner Deep Bay. Monitoring results will provide quantitative data on intertidal community recolonisation, relevant to the ecology of internationally significant conservation areas in Inner Deep Bay. Client: Territory Development Department.

Feb. 1999 – Oct. 2003 Outlying Islands Sewerage Stage 1 Phase II Package J - Sok Kwu Wan Sewage Collection, Treatment and Disposal Facilities, Hong Kong **- Maunsell Environmental Management Consultants Ltd.**

Ecology Project Manager and Intertidal Ecologist for EIA of sewage treatment and disposal provisioning for coastal community on Lamma Island. Survey intertidal communities, assess project impacts and develop impact mitigation measures. Key issues include impacts to natural coastline, intertidal and benthic communities and Fish Culture Zones. Client: Drainage Services Department.

Feb. - Aug. 1999 Development of an Ecological Monitoring Programme for the Mai Po and Inner Deep Bay Ramsar Site, Hong Kong **- Hyder Env. Consultants Ltd.**

Intertidal Ecologist on project to develop long-term ecological monitoring programme for Hong Kong's first and China's seventh Ramsar Site. Field test monitoring methodologies to enable quantification of changes in selected parameters which will direct management action. Focus on mudflat fauna sampling. Client: Agriculture and Fisheries Department.

Feb. - Aug. 1999 Tai O Sheltered Boat Anchorage, Hong Kong **- Scott Wilson (Hong Kong)**

Aquatic Ecologist for EIA of coastal boat anchorage and associated preparation of mangrove restoration site. Conduct filed surveys including intertidal survey and land-based dolphin surveys. Assess impacts to intertidal and marine ecology, assist in development of mitigation measures and monitoring protocols. Provide input to design of mangrove area. Client: Civil Engineering Department.

Feb. - Aug. 1999 Tseung Kwan O Development Phase III Road P2, Hong Kong **- Scott Wilson (Hong Kong)**

Aquatic Ecologist for EIA of coastal road to connect Tseung Kwan O New Town Centre with eastern Kowloon road network. Conducted baseline surveys including benthic and intertidal sampling, assessed impacts upon coastal and nearshore habitats and developed appropriate mitigation measures. Client: Civil Engineering Department.

Feb. - Jun. 1999 Feasibility Study for Intensification and Extension of Tseung Kwan O New Town, Hong Kong **- Maunsell Environmental Management Consultants Ltd.**

Ecology Project Manager and Intertidal and Marine Ecologist. Review existing data and conduct field surveys for feasibility study on expansion of harbour reclamation at New Town site in Junk Bay, South-east New Territories. Assess ecological impacts of construction on the site and propose mitigation measures. Client: Civil Engineering Department.

Publications

Cai, Y.X., Yam, S. W. & Lai, C. S. in preparation. A revision and new records of the Atyid shrimps in Hong Kong.

Dai, A. Y., Yang, S. L. & Lai, C. S. in press. A revision of the genus *Clistocoeloma* in China and the descriptions of a few new species (Crustacea: Brachyura: Grapsidae). Raffles Bulletin of Zoology.

Dai, A. Y., Lee, S. Y. and Lai C. S. in press. A revision of the sesarmine crabs of Hong Kong, II. (Crustacea: Brachyura: Grapsidae: Sesarminae). Raffles Bulletin of Zoology.

Fong, T.C.W., V.C.S. Lai & H.T.H. Lui 2005. *Photographic Guide Series to Hong Kong Nature (2): Estuarine Organisms - Mangrove, Mudflat and Seagrass Bed.* HK Discovery limited.

Lai, C. S. 1994. Crabs, extraordinarily diverse creatures. Elite International Diver Newsletter 19: 21-23 (in Chinese).

Lai, C. S. 1999. New record of a sesarmine crab, *Episesarma versicolor*, for Hong Kong. *Porcupine!* 20:8-9.

Lai, C. S. 1999. A new record of Leucosiid crab (*Ebalia malefactrix*) for Hong Kong. *Porcupine!* 20: 9.

Lai, C. S. 2002. Crab - Tail-less Sideway Walker. *About Life. Autumn Sep. 2002*. World Wide Fund for Nature Hong Kong.

Yau, M. L., T. D. Dahmer and V. C. S. Lai. 2000. Mangrove compensation at Tai O: turning impacts into assets through co-ordination. Paper presented at International Association of Impact Assessment 2000 Conference, 19-23 June 2000, Hong Kong.

Keith L W Kei
Marine Ecologist

Mr. Kei is a Marine Ecologist with extensive experience in marine ecology, particularly in assessment and management of corals in Hong Kong. Mr Kei has conducted coral surveys for a number of submarine cable and pipeline projects in Hong Kong, including the *Seabed Survey Work and Associated Environmental Services for the Proposed 132kV Cable Circuits from A Kung Wan to Sai Kung Pier* and the *Proposed 11kV Cable Circuits from Tai Mong Tsai to Kiu Tsui,* as well as Impact Assessment of Sand Dredging at the West Po Toi Marine Borrow Area.

Mr. Kei is leading the Reef Check Foundation and organised the activities of "Reef Check" in Hong Kong since 1998. The objectives of this activity are to monitor the health status of corals in Hong Kong and increase public awareness and attention on coral conservation. Since 2000, the Reef Check Foundation is collaborating with Agriculture, Fisheries and Conservation Department to organise the activity.

Due to his experience in coastal ecology management, Mr. Kei has recently been invited as a trainer for two training programs in Hainan and Weizhou, China, organised by UNEP and NOAA respectively. The training aims to instruct the staffs of Sanya National Coral Reefs Natural Protective Area and proposed Weizhou Coral Protected Area to undertake underwater ecological surveys (including fish, invertebrate, coral and seagrass).

In addition to the above, Mr. Kei have conducted a number of ecological survey and impact assessment for local consultant companies including Environment Resource Management ERM, Maunsell Consultants Company Ltd. and Ecosystem.

Fields of Competence

1. Coral Habitat Assessment
2. Environmental Impact Assessment
3. Marine/Coastal Ecology Management
4. Natural Resources and Conservation

Education

1. MPhil Marine Biology (1997), The Hong Kong University of Science and Technology
2. BSc (Honours) in Biology (1995), The Hong Kong University of Science and Technology

Professional Affiliations & Registrations

1. China-Hong Kong co-ordinator and trainer of Global Reef Check survey

Languages

1. English
2. Cantonese
3. Mandarin

Enivronmental Impact Assessment and Monitoring experiences

Underwater Ecological Surveys Training, 2000-2001. Mr. Kei has been invited by United Nations Environment Programme (UNEP) and National Oceanic and Atmospheric Administration (NOAA) as a trainer to instruct training courses in Sanya National Coral Reefs Natural Protective Area (Hainan) and the proposed Weizhou Coral Protected Area (Guangxi) respectively. The training courses aimed to train the staffs of the protected areas to undertake underwater ecological surveys, including fish, invertebrate, coral and seagrass.

Hong Kong Reef Check Surveys Training, 1998 – Present.
Mr. Kei has been voluntary working as a Reef Check Trainer to teach different Reef Check teams in Hong Kong to conduct coral reef survey every year**.**

Consultancy Work for ERM:

1. "Seabed Survey Work for the Proposed 132kV Cable Circuits from A Kung Wan to Sai Kung Pier and Tai Mong Tsai to Kiu Tsui, 1999 – 2000"
2. "EIA Study for Construction of an International Theme Park in Penny's Bay of North Lantau"
3. "Seabed Survey Work for the Proposed 132kV Cable Circuits from A Kung Wan to Sai Kung Pier"
4. Coral Mapping at Fo Tau Fan Chau and Pak Lap
5. Coral Mapping at Kau Lau Wan and Lai Chi Chong
6. Rapid Ecological Assessment of seabed at Tai Tam Bay

Consultancy Work for Maunsell:

1. Full Ecological Dive Survey and Impact Assessment of Sand Dredging at the West Po Toi Marine Borrow Area
2. Full Ecological Dive Survey at Pak A Coral Transplanting Areas
3. EIA and Environmental Monitoring at Penny's Bay
4. EIA and Environmental Monitoring at Tung Lung Chau Marine Borrow Area

Consultancy Work for Ecosystems Ltd.

1. Rapid Ecological Assessment of seabed at Pak Shek
2. Rapid Ecological Assessment of seabed at Cyber Port
3. Rapid Ecological Assessment of seabed at Lamma Island
4. Rapid Ecological Assessment and Coral Mapping at Kau Sai Chau

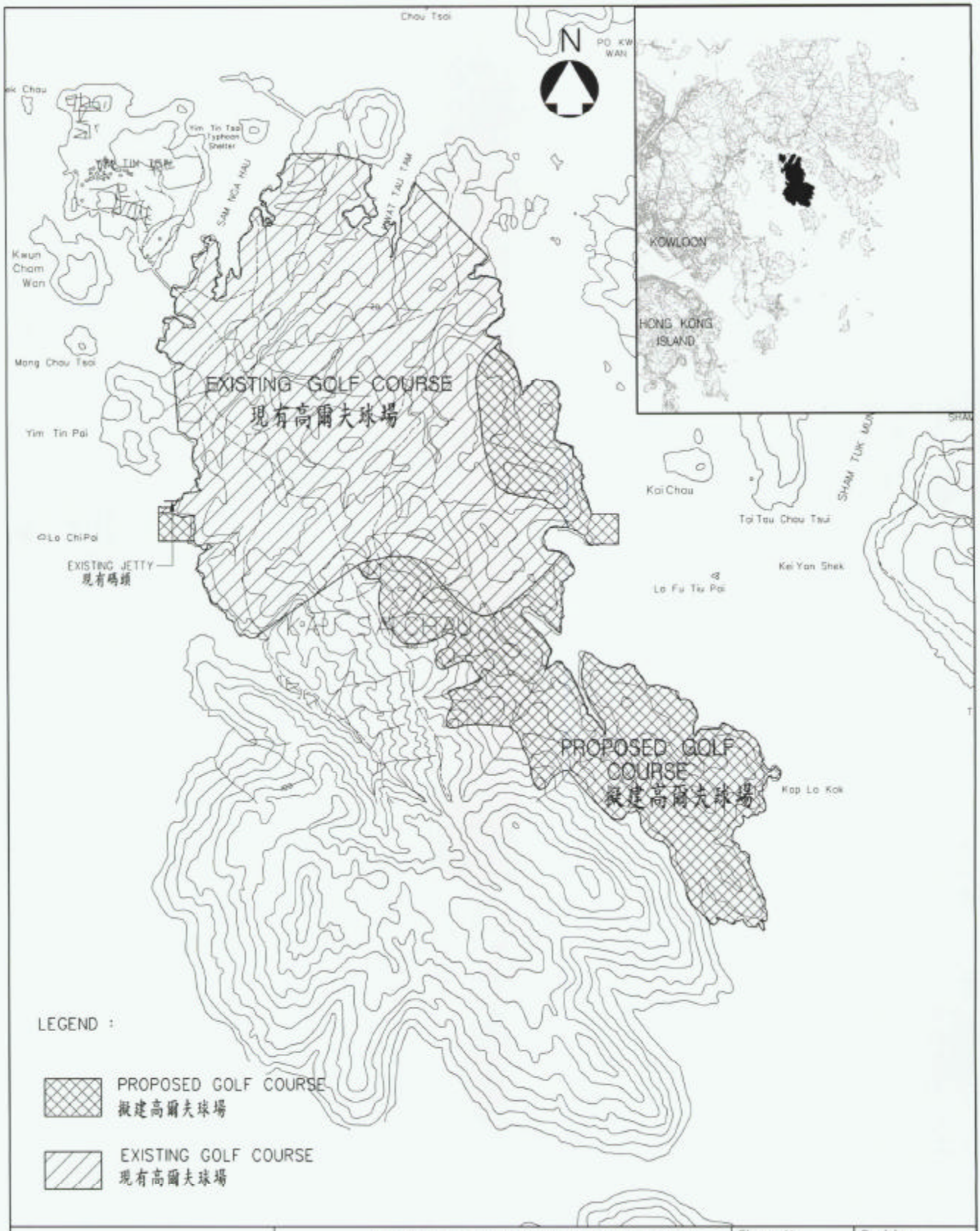
Consultancy Work for CM2

1. Rapid Ecological Assessment of seabed at Tung Wan, Ma Wan
2. Rapid Ecological Assessment of seabed at Park View Island Pier

Others:

1. Approved Ecologist by Agriculture, Fisheries and Conversation Department, Hong Kong
2. Excellent diving skills (Diving Instructor level)
3. Well experiences on underwater videography and photography

FIGURES



The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

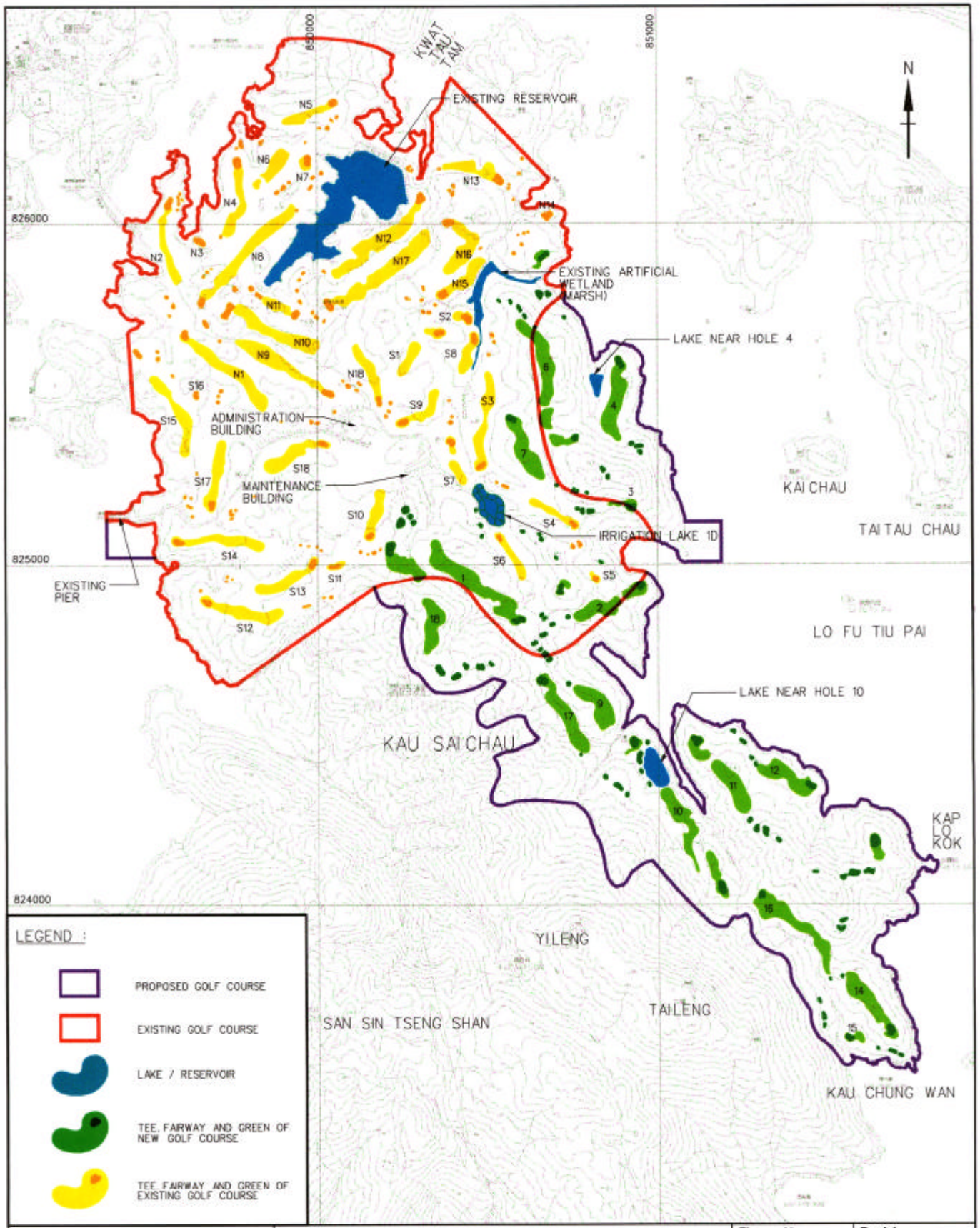
PROPOSED EXTENSION OF PUBLIC GOLF COURSE AT KAU SAI CHAU, SAI KUNG

西貢滘西洲公眾高爾夫球場擬建擴建工程

PROJECT LOCATION AND KEY FEATURES

工程位置圖

Figure No.	Revision
1.1	-
Reference	File Name
-	3822100201-1.1.DGN
Prepared	Checked
ET	JW
Date	Scale
MAY 2005	N.T.S.



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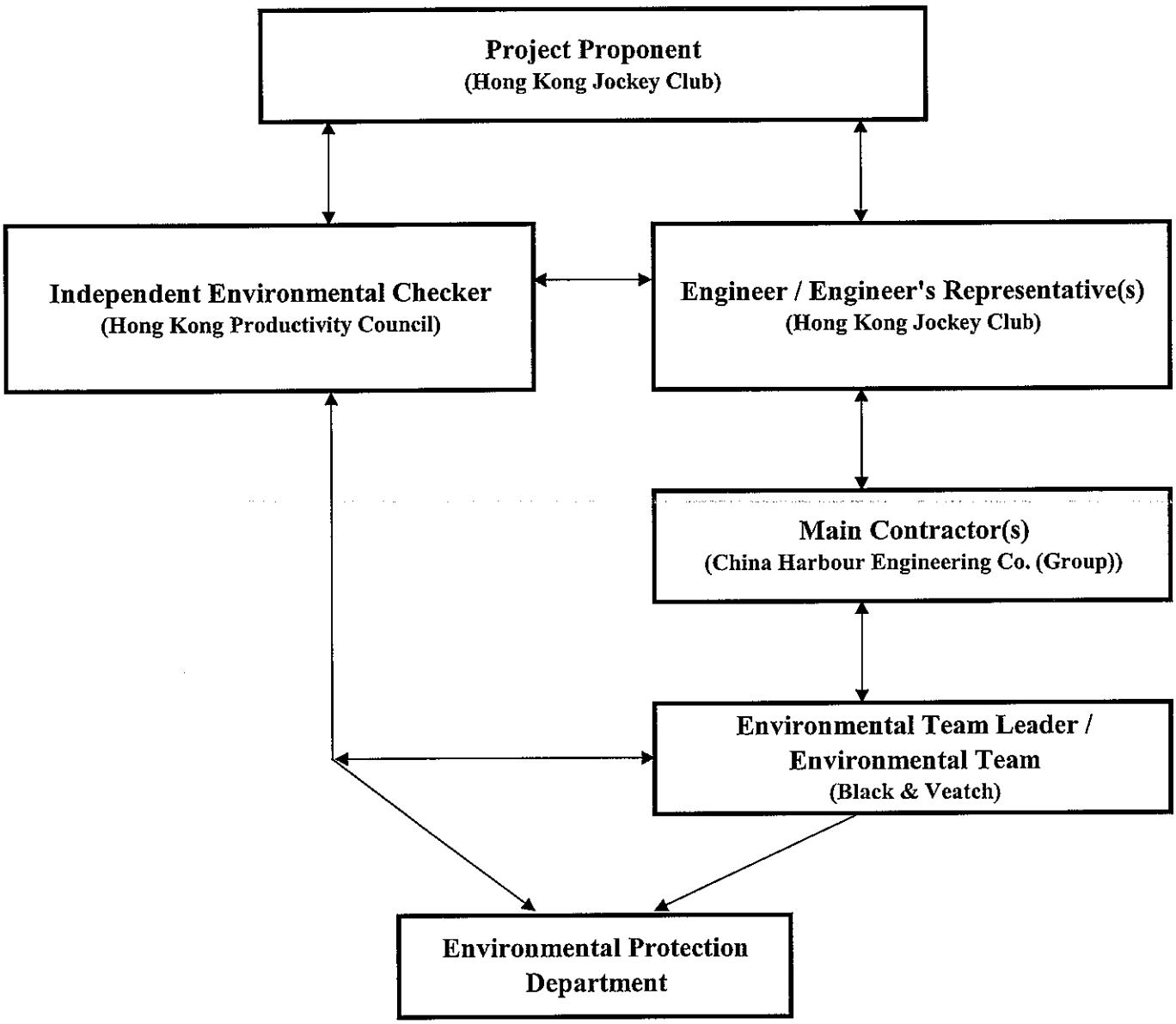
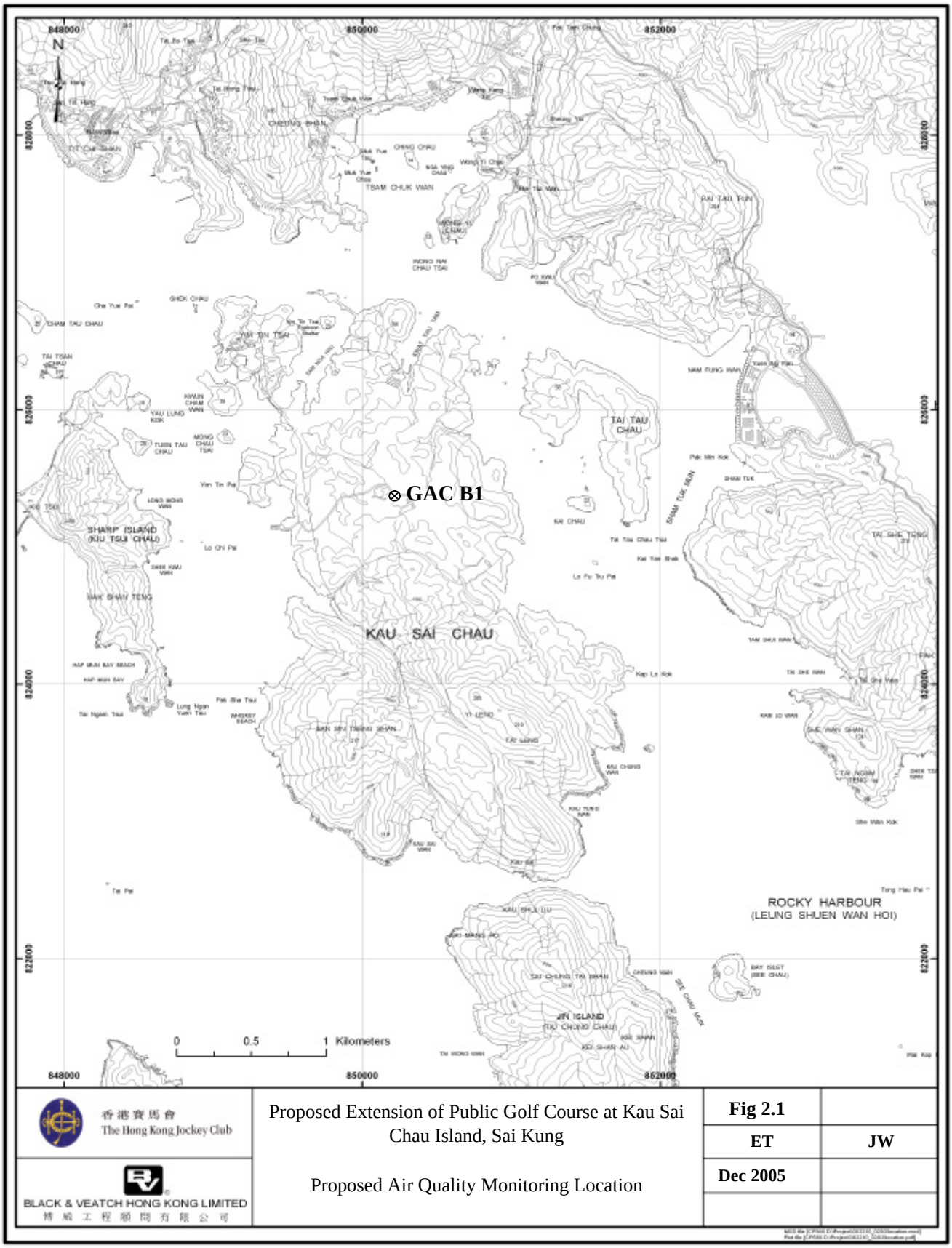
PROPOSED EXTENSION OF PUBLIC GOLF COURSE AT KAU SAI CHAU, SAI KUNG

PROPOSED 18-HOLE THIRD GOLF COURSE (MASTER LAYOUT PLAN)

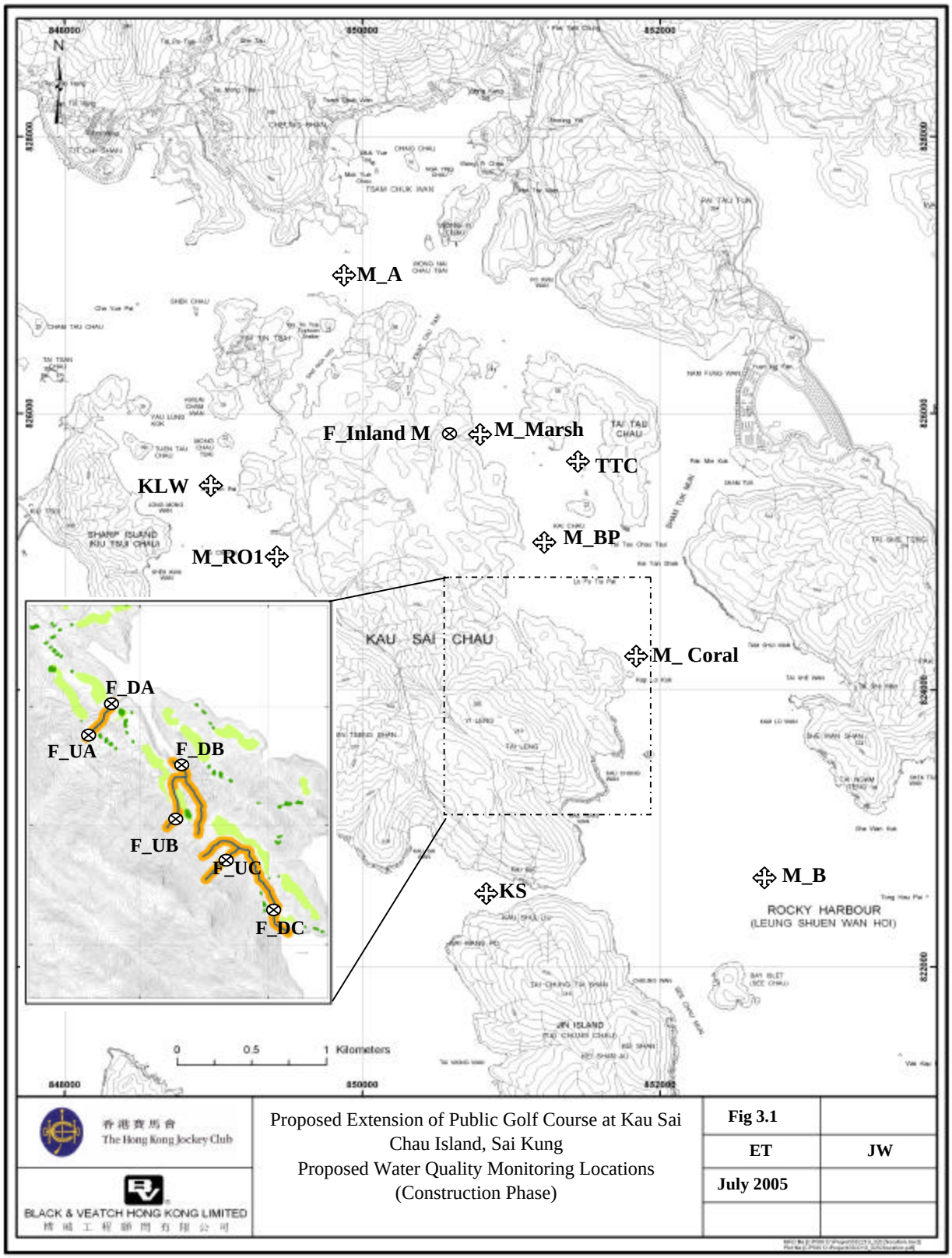
Figure No.	Revision
2.1	-
Reference	File Name
-	3822100201-2.1.DGN
Prepared	Checked
ET	JW
Date	Scale
MAY 2005	1 : 15000 (A4)

Figure 1.3
Project Organisation and Lines of Communication





香港賽馬會 The Hong Kong Jockey Club	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung	**Fig 2.1**	
		ET	**JW**
BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Air Quality Monitoring Location	**Dec 2005**	



香港賽馬會 The Hong Kong Jockey Club BLACK & VEATCH HONG KONG LIMITED 博威工程顧問有限公司	Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung Proposed Water Quality Monitoring Locations (Construction Phase)	Fig 3.1	
		ET	JW
		July 2005	

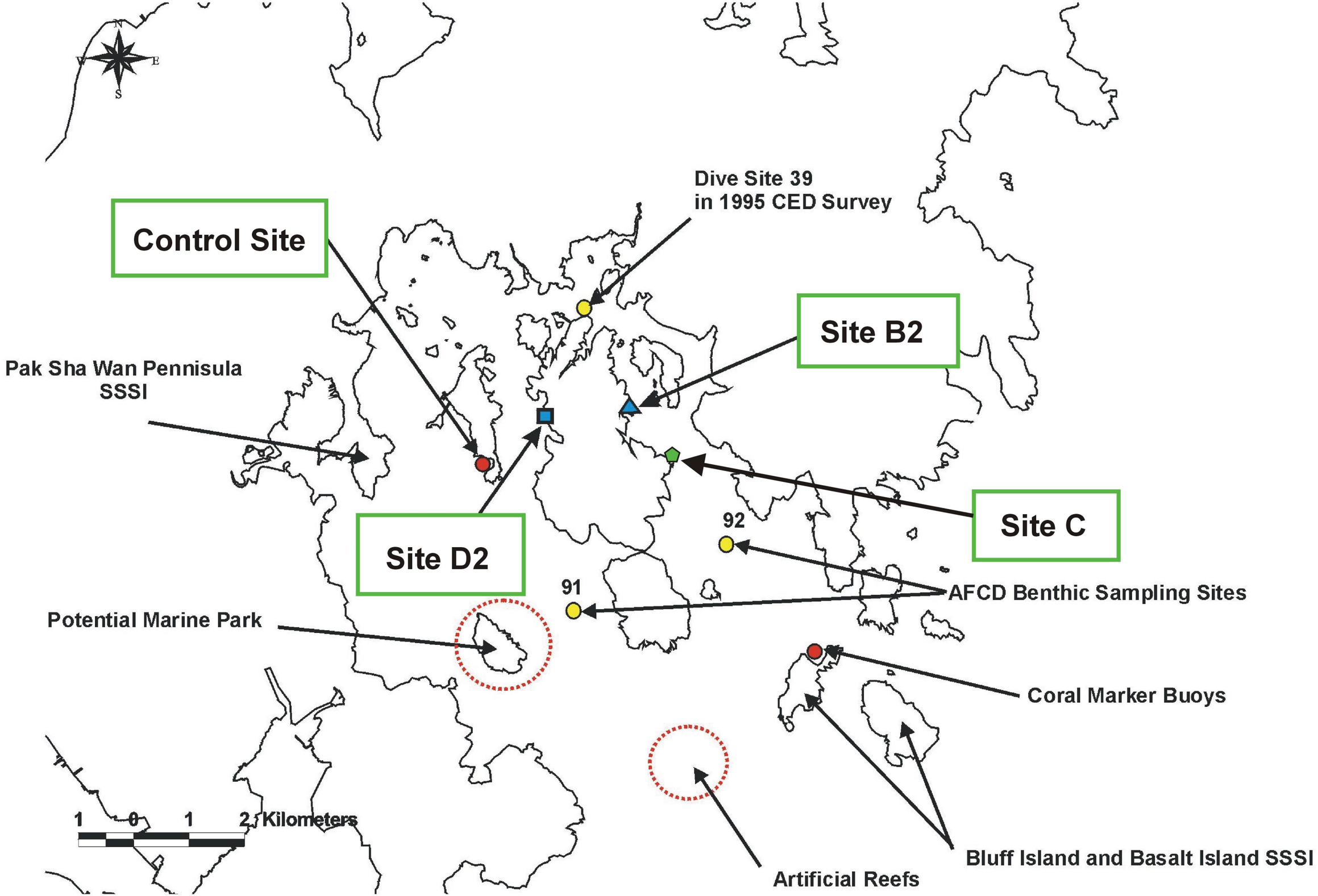
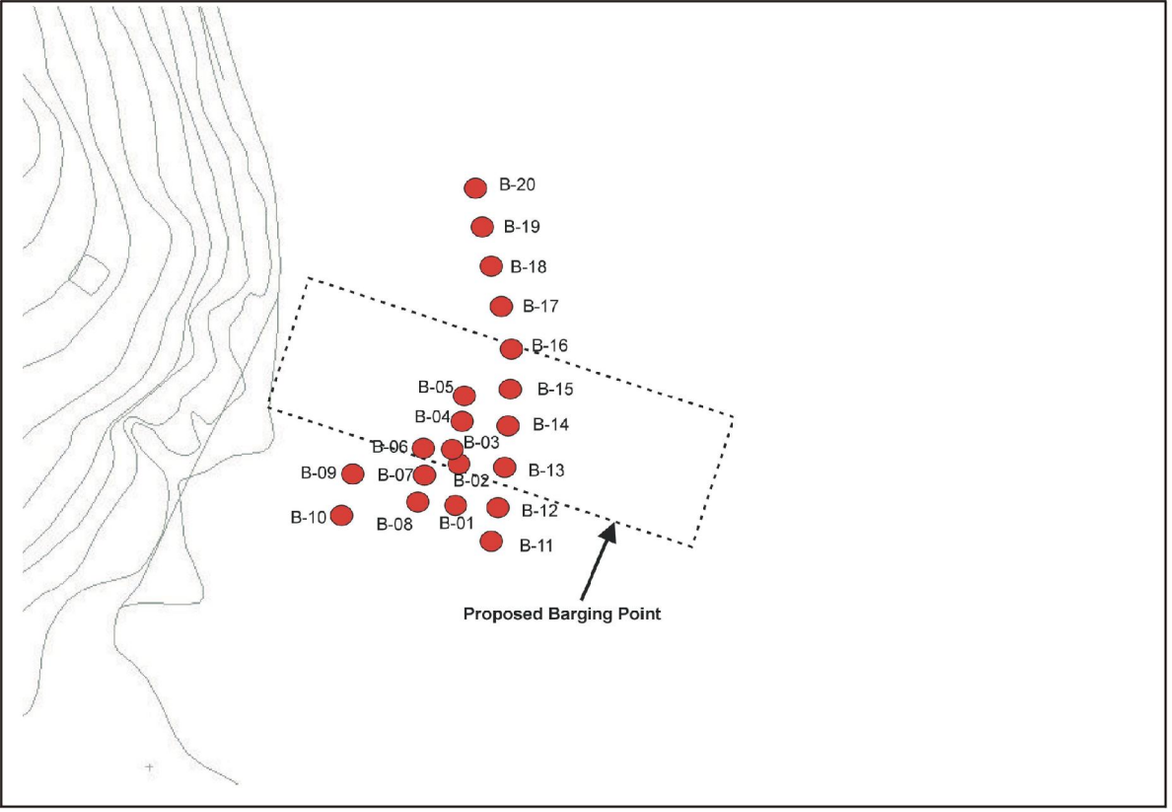
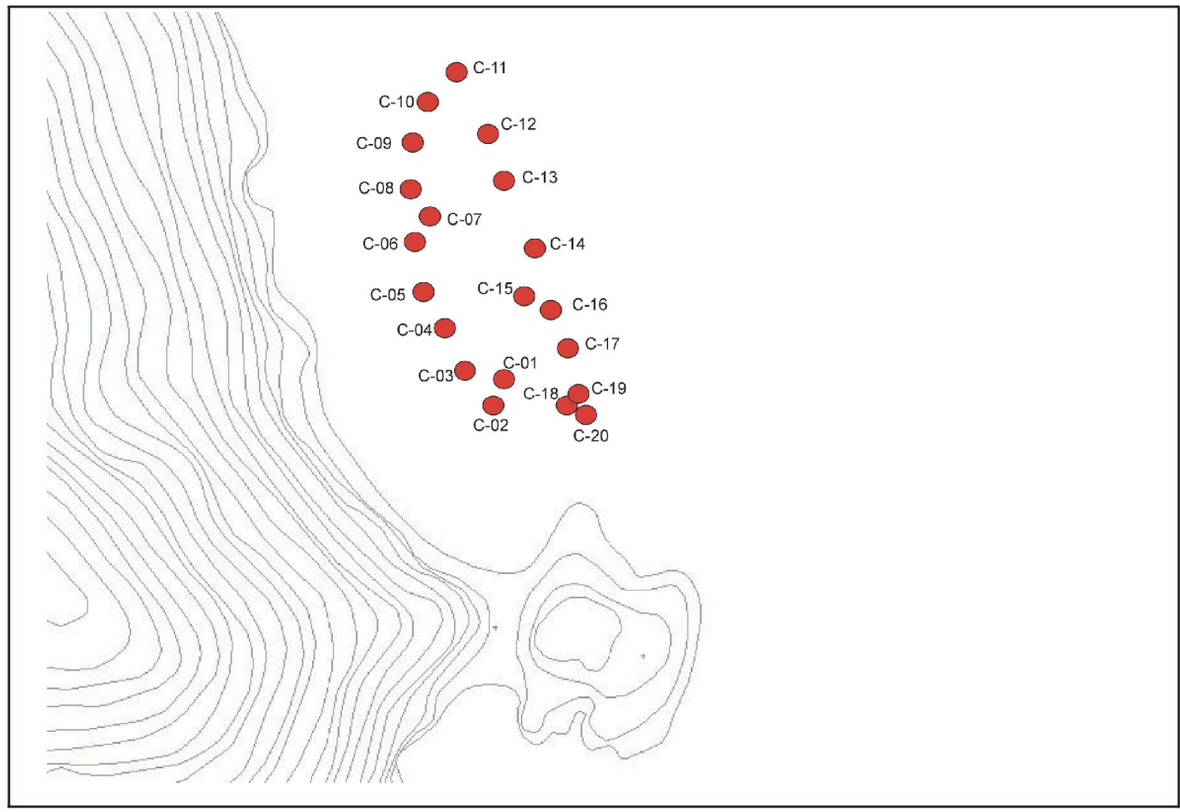


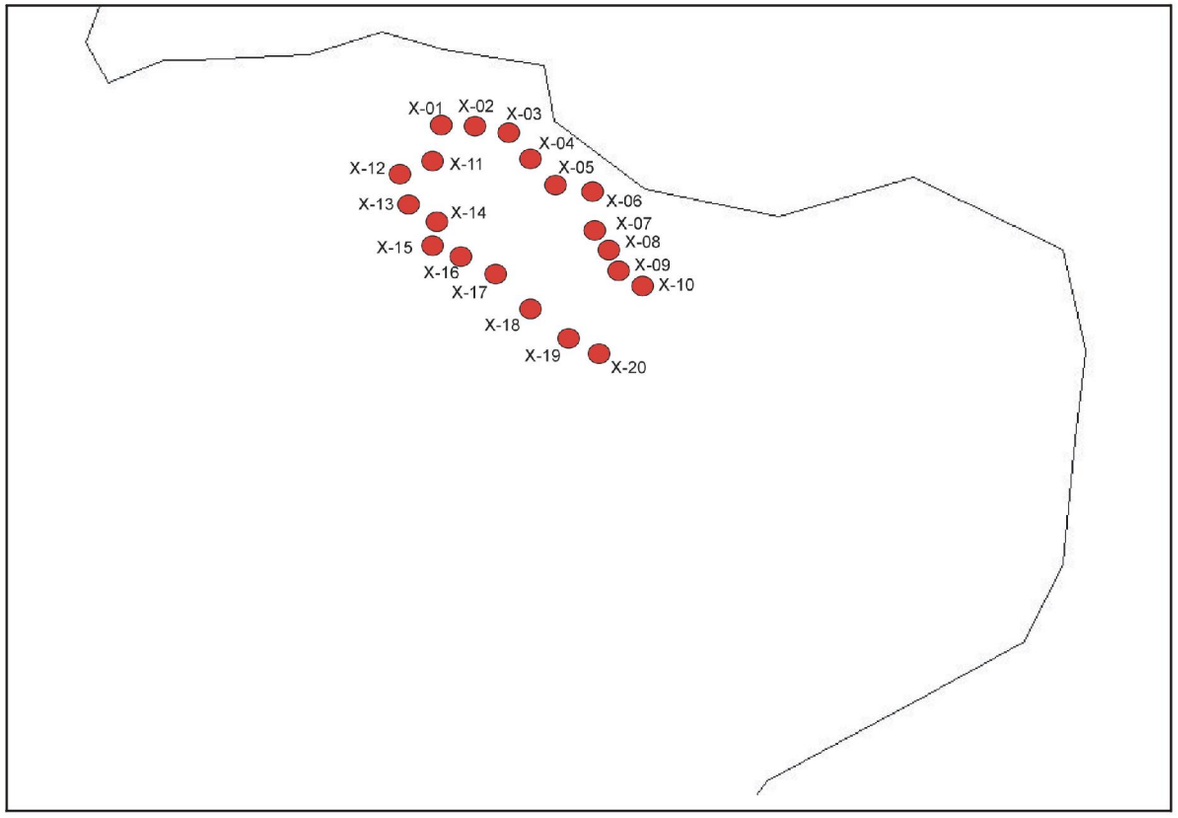
Figure 4.1 The locations of the four coral monitoring sites ( )



Site B2



Site C

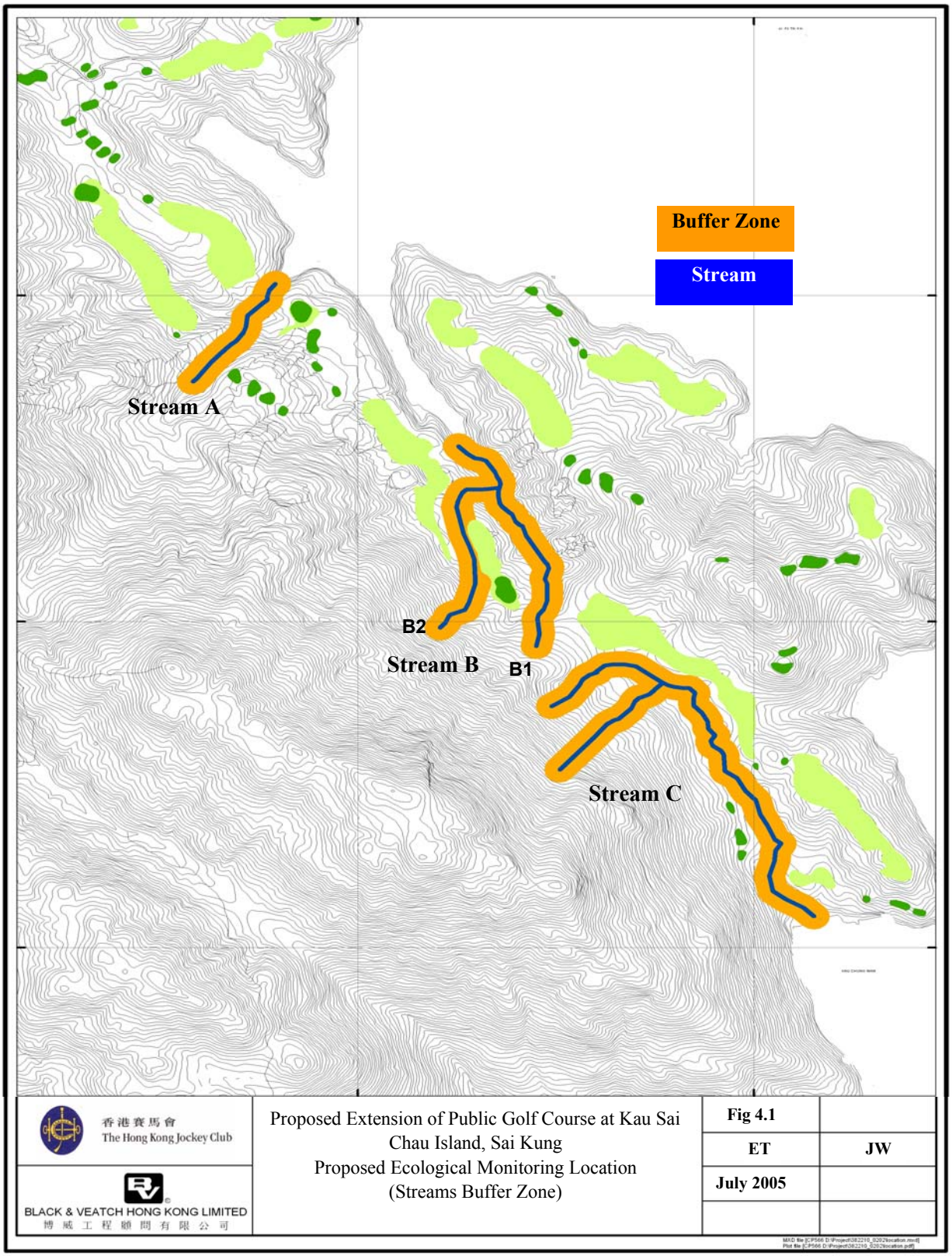


Control Site

Site D2

Figure 4.2 Indicative locations of the tagged corals at four monitoring sites

EM&A Manual Figures (Ecology)



香港賽馬會
The Hong Kong Jockey Club

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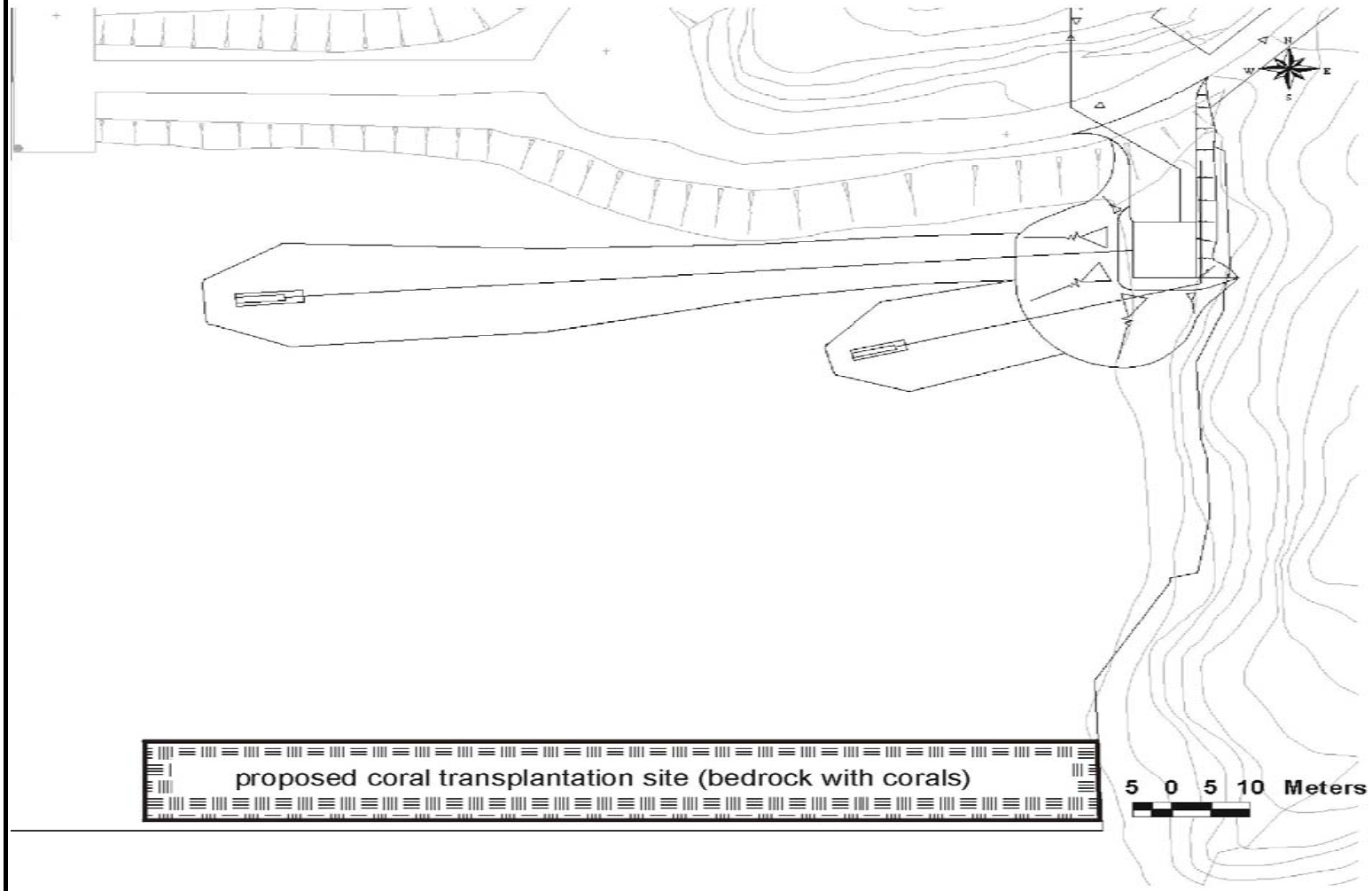
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung
Proposed Ecological Monitoring Location
(Streams Buffer Zone)

Fig 4.1	
ET	JW
July 2005	



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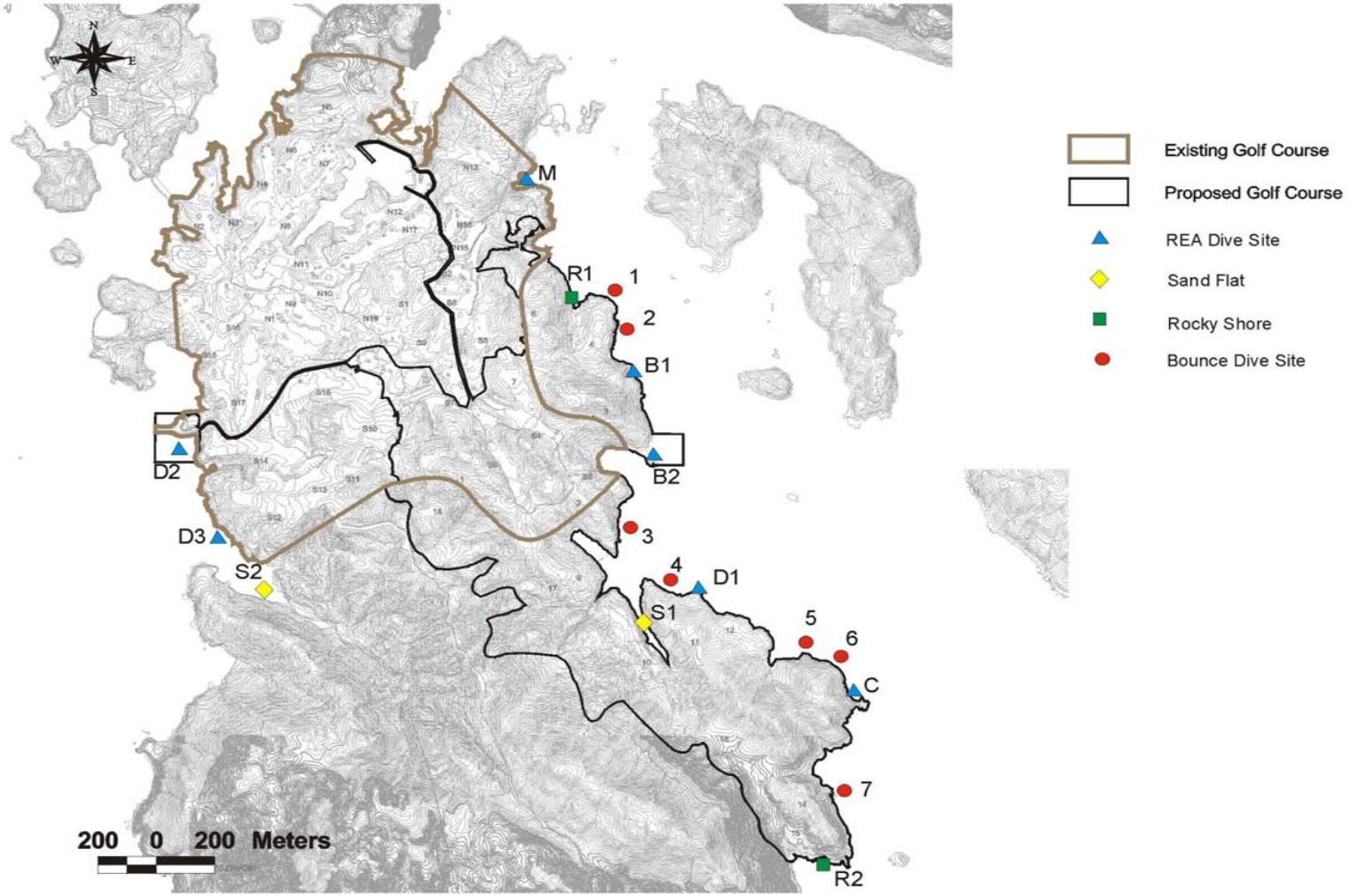
Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Location of proposed coral transplantation site (Bedrock with corals)

Fig 4.2

Prepared	Checked
ET	JW

Date Jun-05



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The Hong Kong Jockey Club

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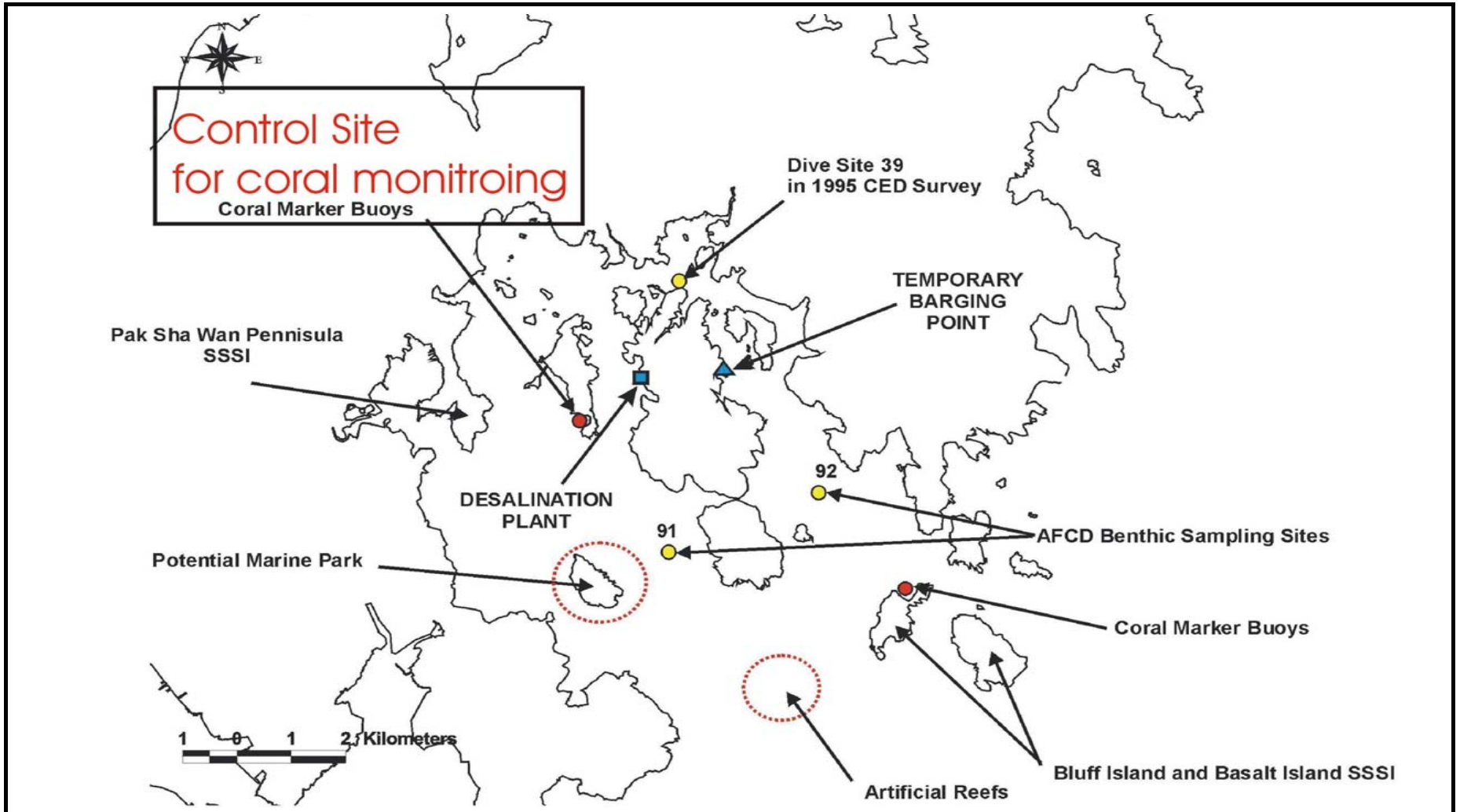
Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Location of coral and seagrass monitoring (Sites D2, D3 and C)

Fig 4.3

Prepared	Checked
ET	JW

Date: Jun-05



香港賽馬會
The Hong Kong Jockey Club

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung

Control Site for Natural Coral Monitoring

Fig 4.4

Prepared	Checked
ET	JW

Date: Jun-05