APPENDIX ONE

Analytical Methods

Quality Assurance

Within the laboratory quality assurance is based on reference standard control charts, sample replication for batch methods and repetition of samples where replicates do not meet prescribed criteria. Precision of methods has been estimated from a preliminary error analysis based on repeated analysis of a single standard. While this gives an over optimistic estimate of long term precision (due to batch to batch variability) the reference standard used for the control chart is used to verify long term (batch to batch) precision. Accuracy is followed using the control chart where the reference standard used in each batch has been prepared from a stock standard prepared from chemicals independent of the calibration stocks and standards. This system has been used for the following analysis: nitrite, nitrate, ammonia, orthophosphate, total phosphorus, silicate, BOD_5. Essentially only one batch of TBTO, copper and aromatic hydrocarbons were run and the reference standard used in these cases was not independent of the calibration standard.

For the following parameters in-laboratory replicates were routinely run, i.e. the single field sample was split and run as a pair through the method: nitrite, nitrate, ammonia, orthophosphate, total phosphorus and silicate. Where replicates did not agree within 20% of the higher value (i.e. $s/\bar{x}$ for the pair > 0.16) the sample was repeated in the next batch. Samples which were outside the standards range were also repeated after appropriate dilution. No replicates were run for Chlorophyll-a, suspended sediments, particulate nitrogen, copper, TBTO or aromatic hydrocarbons. BOD_5 samples were replicated in the sense that serial dilutions were made but in marine samples values were so low that only the first dilution was used in the result calculation.

The limits of detection and sensitivity shown with each method reflect the particular method and instrumentation used. While general precision values are also given, as explained above, it should also be realized that these have been estimated from a standard near the upper end of the expected range of values and that precision near the limit of detection will not be as good.

Suspended Solids

The one litre water samples were filtered, with vacuum assistance, through pre-weighed 4.7 cm GF-C glass fibre filters, the filters dried at 95°C and the residue weighed. Limit of detection, 0.6 mg/l; sensitivity 0.4 mg/l.

Nutrient Samples

Samples were collected in individual sterile Whirl-pacs, frozen and stored frozen until required for analysis.

Orthophosphate

Analysis was by a molybdenum blue colour development method using ascorbic acid reductant and measurement at 885 nm (Grasshof, 1983). Limit of detection, 0.05 µg-at/l; sensitivity 0.03 µg-at/l; precision 15% at 0.2 µg-at/l.

Ammonia

Analysis was by an indophenol blue colour development method and measurement at 630 nm (Grasshof, 1983). Limit of detection, 0.07 µg-at/l; sensitivity 0.05 µg-at/l; precision 18% at 2 µg-at/l.

Nitrate and Nitrite

Nitrate was reduced to nitrite on a copper coated cadmium reduction column using a Flow Injection Analysis (FIA) system and nitrite measured on this system using the sulphonilamide/N-1-Naphthylethylene diamine colour reaction at 520 nm. Nitrate was calculated from the nitrate plus nitrite value and the nitrite value by difference. Nitrite limit of detection, 0.07 µg-at/l; sensitivity 0.03 µg-at/l; precision 5% at 2 µg-at/l. Nitrate limit of detection, 0.07 µg-at/l; sensitivity 0.03 µg-at/l; precision 11% at 2 µg-at/l.

Total Phosphorus

The sample was digested using alkaline persulphate and analysis of the resultant phosphate carried out using a molybdenum blue colour development on the FIA. Limit of detection 0.06 µg-at/l; sensitivity 0.04 µg-at/l; precision 20% at 0.5 µg-at/l.

Particulate Nitrogen

400 ml samples were filtered through GF-C filters and the residue analysed for nitrogen using a C,H,N analyser.

Silicate

Analysis was by a molybdenum blue colour development method using ascorbic acid reductant and measurement at 810 nm (Grasshof, 1983). Limit of detection 0.2 µg-at/l; sensitivity 0.1 µg-at/l; precision 8% at 5 µg-at/l.

Chlorophyll-a

1l water samples were filtered through GF-C filters, the residue and filter, ground, soaked in acetone overnight in the dark, extraction completed, the extract centrifuged and the pigments read at 750 and 665 nm (Strickland and Parsons, 1968). Limit of detection 0.05 mg/l; sensitivity 0.02 mg/l.

Copper

500 ml or 1l water samples were stabilized by distilled nitric acid addition for storage. Analysis consisted of concentration on a Chelex-100 resin column, elution and analysis using flame Atomic Absorption Spectroscopy (Denton and Burdon-Jones, 1986). The bottles used for collection and storage were cleaned with nitric acid and rinsed with double distilled, deionized water. Limit of detection 0.06 µg/l; sensitivity 0.02 µg/l; precision 5% at 0.5 µg/l but this is only calculated from a standard run at the AAS stage and does not include variability in the concentration stage.

Aromatic Hydrocarbons

2.5 l water samples collected in precleaned glass bottles were extracted with dichloromethane, the extracts reduced in volume using a rotary evaporator followed by blowing down with nitrogen and transferred to U.V. grade cyclohexane (Smith and Maher, 1984). Analysis was by fluorescence against chrysene standards (Anon, 1976). The results are expressed as

equivalent concentrations of chrysene. Limit of detection 0.05 µg/l C.E.; sensitivity 0.02 µg/l C.E., precision 5% at 0.2 µg/l C.E. but this is only calculated from a standard run at the spectrofluorimeter stage and does not include variability in the extraction stage.

Tri-(n-butyl) tin

500 ml of 1l water samples were collected in polythene bottles and stored at 2-4°C. Analysis was by reduction to the hydride using borohydride, flushing from the water using a helium stream and trapping of the hydrides on silanized glass wool at liquid nitrogen temperatures. The hydrides were removed from the trap in the helium stream by warming and separation of stannane, methyl tin hydrides and butyl tin hydrides on a temperature of elution basis. The eluted hydrides were analysed by passing into a heated silica tube in the Atomic Absorption Spectrometer (Balls, 1987; Maher, 1982). Limit of detection 5 ng/l; sensitivity 3 ng/l; precision approximately 20% at 10 ng/l (calculated from limited data set).

Total and Faecal Coliforms

Analysis was by sterile serial dilution, membrane filtration and incubation at 35°C or 44.5°C with METB agar medium (RWCV, 1988).

Petroleum Utilizing Bacteria

Analysis was serial dilution, addition of hexadecane, incubation at 25°C for 10 days and ennumeration using MPN tables (Larsen, 1986).

Biochemical Oxygen Demand (BOD_5)

Analysis was by serial dilution (in general for the marine samples, addition of seed only and 1:1 dilution with BOD dilution water and addition of seed) and measurement after 5 days at 20°C ($\pm$ 1°C). Initial and final dissolved oxygen readings were made using a YSI 57 D.O. meter calibrated against moist air. Limit of detection 0.08 mg/l; sensitivity 0.05 mg/l; precision 50% at 1 mg/l.

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l								mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1355	3/8.	3.2	80					0.2		5.6		4.5	0.14	0.21	1.4		0.39		168						109	41	83
100189	1245	1/8.	1.5	60					0.2	4.6	4	30	12			4.4	11.8	0.16		146		2.0				1600	370	11
240189	1330	4/8.	2.5	110					0.2																			
310189	1200	8/8.	2	97					0.2	5.8	0.9	28.2	10	0.21	10.7		12.0	0.29	1.2	143	1.0	5.1	3.5	<5		515	130	11
160289	1240	7/8.	1.1	16					0.2 0.5	6.4 2.5	10.2 9.0	29 29		0.28	1.6	0.14	5.5		0.39	429		1.7	1.7			2200	680	97

SITE 1

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP	SS	NO_2 -N	NO_3 -N	NH_4 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD. g/l C.E.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l							mg/l	mg/l	µg/l	ng/l		0/100ml	0/100ml	0/100ml
231288	1345	3/8.	3.2	80					0.2	2.1	10		5.9	0.43	0.71	13		0.48		536		0.5				20	0	10
100189	1230	1/8.	1.5	60					0.2 1.0	5 6	26	30	4.4	0.43	0.71	0.29	12.4	0.13	0.52	28		1.9				1400	360	24
240189	1310	4/8.	2.5	110					0.2					1.1	0.71													
310189	1145	8/8.	2.0	97					0.2 1.0	2.7 0.3	2.5 29	29 30	4.5	0.36	0.07	0.14	11.4	0.16	0.74	182		0.5	24	<5		185	84	
160289	1250	8/8.	1.1	16					0.2 0.5	7.1 6.6	0.02 15.2	28.5 30	2.1	3.8	0.07		5.3	0.29	0.90		0.5	2.8	3.5			800	318	2.6

SITE 2

DATE	TIME	CLOUD COVER	WIND SPEED m/s	WIND DIR.	WAVE HEIGHT m	WAVE DIR.	TOTAL DEPTH m	CLARITY (SECCHI DEPTH) m	SAMPLE DEPTH m	DO mg/l	SAL.	TEMP. °C	SS mg/l	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a mg/l	BOD mg/l	Cu µg/l	TBTO ng/l	AR. HYD. g/l C.E.	TC Org./ 100ml	FC Org./ 100ml	TH x 10 Org./ 100ml
														µg-at/l														
231288	1440	3/8.	3.2	90	0.2	80	2	>2	0.2	9	36		1.1	0.93	0.64			0.19	0.84	3.0		0.36		<5		0	0	3.1
									1.0	8.8																		
									2.0	8.9													6.7					
100189	1312	1/8.	2.8	60	0.02	80	5.5	>5.5	0.2	8.6	32	29	2.9	0.14	0.50	0.4	3.3	0.10	0.39	2.6	1.0	1.4	1.2	<5		0	0	3.6
									1.0	8.7	32	30																
									2.0	8.7	32	30																
									3.0	8.7	32	30																
									4.0	8.8	32	30	1.8	0.79	0.79	0.79	3.4	0.36	0.90	2.4			3	<5				
240189	1315	6/8.	7.7	110	0.8	110	3	2	0.2				5			<0.07	5.6	0.07	0.19	3.9	0.2	0.94	0.15	<5		0	0	2.8
310189	1045	8/8.	1.5	0	0.03	70	3.2	>3.2	0.2	6.3	33	28.2	0.2	0.79	0.71	0.29	4.4	0.10	0.32	2.6		0.38	2.2	<5		29	0	0.69
									1.0	6.5	33	28																
									2.0	7	33	28	0.8	0.93	1.1			0.10	0.58	2.3			5.0	<5				
160289	1202	6/8.	1.4	108	2.0	124	2.3	2	0.2	6.8	32	30	5.8	0.50	0.79	0.14	3.1			6.6	0.2	0.58	4.0	<5		8	4	40
									1.0	7.4	32	29.5																
									2.0	7.8	31	29.5				0.4												

SITE 5

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l							mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1500	3/8.	3.0	90	0.05	80	1.0	>1	0.2		35		3.3										0.15	<5		0	0	1.1
100189	1150	1/8.	1.4	80	0.05	90	3.0	>3	0.2		32.5	29	1.9									1.8	1.2	<5	0.1	0	0	2.4
240189	1415	4/8.	6.7	110	0.4	110	1.5	1.3	0.2				12.9									2.4	0.15	<5	0.3	1712	4	1.8
310189	1240	8/8.	3.3	30	0.1	70	1.0	>1	0.2	8.1	33	29	1.0									0.98	2.2	<5		0	0	1
160289									0.2													0.88	4.5	<5	2	24	16	50

SITE 6

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	ug-at/l							mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1510	3/8.	3.5	80	1.0	70	5.0	>5	0.2	8.4	35		1.7	0.79	0.71	0.07		0.19	0.52	1.7		0.24	1.2	<5		0	0	0.39
									1.0	8.3																		
									2.0	8.1																		
									3.0	8.1																		
									4.0	8.1	35		3.7	0.93	1.9	0.7		0.47	1.3	2.0			1.2	<5				
100189	1030	1/8.	0.43	60	0.2	80	8.5	5.5	0.2	7.7	32.5	29	1.3			0.43		0.13	0.52	4.1		1.0	0.68	<5		0	0	3.8
									1.0	7.6	32	29																
									2.0	7.4	32	29																
									3.0	7.4	32	29																
									4.0	7.4	32.5	29																
									5.0	7.4	32.5	29																
									6.0	7.5	32.5	29																
									7.0	7.6	32.5	29	1.7	0.21	0.87	0.43	4.5	0.13	0.77	3.4								
240189	1430	3/8.	6.2	110	1.2	110	3.2	3.0	0.2				6.8	0.5	0.58	0.21	4.6	0.10	0.44	2.9	0.4	1.6	0.7	<5		20	0	5.9
310189	1355	8/8.	3.2	10	0.2	8	4.0	>4	0.2	8.2	33	28	0.7	1.8	0.93		6.2	0.07	0.22	2.3	0.5	0.24		<5		0	0	0.51
									1.0	7.8	33	28																
									2.0	7.4	33	28																
									3.0	7.6	33	28		1.1	0.93			0.07	0.44	2.4		1.4		<5				
160289	1328	2/8.	4.1	95		95	1.3	>1.3	0.2	9.9	32.5	30	4			0.58	3.4	0.22	1.0	3.5	0.11	1.8		<5		2	0	48
									1.0	10.0	32.5	30																

SITE 7

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l							mg/l	mg/l	µ g/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1530	3/8.	4.9	80	0.4	50	4.0	>4	0.2	10.3	35		4.2	1.1	0.93	1.4		0.19	0.65	3.6		1.3		<5		0	0	0.41
									1.0	10.2																		
									2.0	8.8																		
									3.0	8.3	36		7.2	0.93	0.87	0.36		0.19	0.58	4.3			0.68	<5				
100189	1050	1/8.	0.9	70	0.1	80	9.0	5.5	0.2	7.5	32	29	2.0	1.1	0.71	0.66		0.16	0.44	3.1	0.05	1.0	0.68	<5		0	0	2.0
									1.0	7.5	32	29																
									2.0	7.4	32	29																
									3.0	7.3	32	29																
									4.0	7.4	32	29																
									5.0	7.5	31.5	29																
									6.0	7.3	32	30																
									7.0	7.4	32	30	2.5	0.50	0.87	0.21	3.3	0.19	0.52	3.6								
240189	1440	3/8.	6.0	100	1.3	100	5.0	3.3					3.2	0.87	0.93	0.69		0.10	0.36	2.7	0.6	0.7	0.56	<5		28	0	1.3
310189	1420	8/8.	3.0	20	0.1	50	4.5	>4.5	0.2	8.5	33	28.3	0.5	0.93	0.93	0.37	3.0	0.10	0.32	1.6		1.2	4.5	<5		0	0	
									1.0	8.5	33	28.3																
									2.0	7.8	33	28.3																
									3.0	7.6	33	28.2	0.6	2.0	0.79	0.35		0.10	0.39	2.6			16	<5				
160289	1329	2/8.	2.7	93		93	2.1	>2.1	0.2	10.0	32.5	30	5.5	0.66	0.87	0.50	3.1	0.22	7.3	205	0.31	1.4	1.8			30	0	12
									1.0	10.4	32.5	30																
									2.0	10.4	32.5	30																

SITE 8

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l							mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1545	2/8.	3.8	50	0.4	80	1.0	>1	0.2		35		1.3									0.82	0.15	<5		0	0	0.65
100189	1030	1/8.	1.5	90		90	4.0	>4	0.2		32		1.9									0.40	2.6	<5	0.1	4	0	5.5
240189	1450	3/8.	5.2	90	0.8	90	4.8	4.6	0.2				2.6									0.50	<0.07	<5	0.3	860	0	0.76
310189	1410	8/8.	2.7	40	0.1	80	3.0	>3	0.2	14.5	33	29	0.4									0.84	0.12	<5		0	0	0.37
160289	1350	3/8.	4.4	82		82	3.1	>3.1	0.2				3.5								0.93	1.7	1.4	<5	0.2	4	0	11

SITE 9

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l								mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1600	3/8.	2.0	70	0.05	100	2.0	2.0	0.2 1.0	9.6 8.9	35		4.8	0.93	0.71	0.14		0.22	0.77			0.12	<0.07	<5		0	0	0.91
100189	1000	1/8.	1.2	120	0.1	120	3.0	>3	0.2 1.0 2.0	7.7 7.8 7.9	31.5 31.5 31.5	29 29 30	15.7	<0.07	0.87	0.36 0.58		0.13	0.52 0.58	3.2		1.4	<0.07	<5		0	0	2.0
240189	1510	4/8.	6.4	90	0.4	90	1.5	>1.5	0.2				3.3	0.36	0.93	1.1		0.47	2.0	3.3	0.4	1.2	<0.07			2	0	0.85
310189	1450	8/8.	0.83	50	0.03	100	1.6	>1.6	0.2	8.0	33	28.2	1.2	0.58	0.93	0.21		0.10	0.45	3.2	1.3	1.1	8.0	<5		0	0	0.4
160289	1418	3/8.	3.1	96		96	3.1	2.8	0.2 1.0 2.0	8.1 7.9 7.9	32 32 32	30 30 29.5	7.8	3.1	0.87	0.21	4.7	0.26	1.0	3.4	1.5	0.95	3.5	<5		0	0	0.52

SITE 10

DATE	TIME	CLOUD COVER	WIND SPEED m/s	WIND DIR.	WAVE HEIGHT m	WAVE DIR.	TOTAL DEPTH m	CLARITY (SECCHI DEPTH) m	SAMPLE DEPTH m	DO mg/l	SAL.	TEMP °C	SS mg/l	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a mg/l	BOD mg/l	Cu µg/l	TBTO ng/l	AR. HYD. g/l C.E.	TC 0/100ml	FC 0/100ml	TH x 10 0/100ml
														µg-at/l														
231288	1255	1/8.	2.5	80	0.1	80	1.8	>1.8	0.2 1.0	10.1 10.0	36		2.6	13	6	39		5				0.66	1.2	<5		0	0	2.1
100189	1347	1/8.	3.0	60	0.01	60	2.3	>2.3	0.2				1.6									1.9	2.5	<5	0.1	0	0	4.3
240189	1245	5/8.	3.6	120	0.6	120	2.0	>2	0.2				6.3									1.5	0.7	<5	0.5	20	0	4.5
310189	1500	0/8.	2.0	30	0.1	70	1.5	>1.5	0.2	14.5	33	29	3.1									2.8	1.4	<5		0	0	1.8
160289	1130	7/8.	2.1	62		122	4.5	3.0	0.2				4.3									0.08	4.0	<5	1.3	10	0	9.1

SITE 11

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l								mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1235	6/8.	2.9	90	0.2	90	4.0	>4	0.2	7.9	35		3.3	0.87	0.36	0.50		0.16	0.58	2.8	0.45	1.6	<0.07	<5		0	0	0.64
									1.0	8.0																		
									2.0	8.0																		
									3.0	8.0	36		6.4	0.87	0.58	0.66		0.19	0.90	1.9	0.15		2.7	<5				
100189	1400	1/8.	1.6	60	0.02	70	5.5	>5.5	0.2	8.1	32	30	8.0	0.66	0.87	0.43	6.6	0.13	0.39	2.9	0.05	1.4	<0.07	<5		0	0	2.8
									1.0	8.1	32	30																
									2.0	8.3	32	30																
									3.0	8.2	32	30																
									4.0	8.0	32	30	2.8	0.66	0.87		6.2	0.16	0.77				3.8	<5				
240189	1230	5/8.	6.4	120	0.8	120	4.2	4.0	0.2				6.3	0.96	0.87	0.07	3.3	0.03	0.26	4.5	0.4	1.1	0.56			2	0	2.0
									3.0														2.2					
310189	1450	8/8.	0.93	50	0.03	110	1.6	>1.6	0.2	8.4	33	28.0	1.6	0.87	0.58	0.07	7.0	0.07	0.45	2.9		1.6	0.56	<5		0	0	0.28
									1.0	7.9	33	28.2																
									2.0	8.1	33	28.4	4.1	0.93	0.79	0.21	6.4	0.03	0.39	2.8				<5				
160289	1112	6/8.	1.9	120		140	2.2	>2.2	0.2	8.8	32	30	6.9	1.7	0.87	0.43	3.6	0.19	0.77		0.47	0.84	4.5	<5		0	0	11
									1.0	8.9	32	30																
									2.0	8.6	32	30																

SITE 12

DATE	TIME	CLOUD COVER	WIND SPEED m/s	WIND DIR.	WAVE HEIGHT m	WAVE DIR.	TOTAL DEPTH m	CLARITY (SECCHI DEPTH) m	SAMPLE DEPTH m	DO mg/l	SAL.	TEMP °C	SS mg/l	NO_2 -N µg-at/l	NO_3 -N µg-at/l	NH_3 -N µg-at/l	PN µg-at/l	PO_4 -P µg-at/l	TP µg-at/l	SIL. -Si µg-at/l	CHL. -a mg/l	BOD mg/l	Cu µg/l	TBTO ng/l	AR. HYD. g/l C.E.	TC 0/100ml	FC 0/100ml	TH x 10 0/100ml
231288	1210	6/8.	2.9	110	0.1	80	2.5	>2.5	0.2 1.0 2.0	8.5 8.5 8.5	35		2.2	0.79	2.1	0.64		1.1	1.5	5.2			2.2	<5		0	0	1.4
100189	1510	0/8.	3.5	70	0.01	90	2.5	>2.5	0.2	8.2	32	30	2.0	0.36	0.93	0.58	6.4	0.16	0.68	3.3		1.3		<5		0	0	3.4
240189	1130	4/8.	6.8	120	1.5	120	6.2	4.5	0.2				2.5	0.93	0.93	0.29	3.0	0.07	0.39	4.0	0.8	0.58	0.15	<5		10	0	1.4
310189																												
160289	1018	2/8.	2.8	122		120	3.3	>3.3	0.2 1.0 2.0 3.0	7.6 7.5 7.7 7.9	31 31 32 32	29 29 29 29	3.5	0.71	0.93	1.1	3.4	0.22	0.71	7.3	2	0.54	4.0	<5		2	0	30

SITE 13

DATE	TIME	CLOUD COVER	WIND SPEED	WIND DIR.	WAVE HEIGHT	WAVE DIR.	TOTAL DEPTH	CLARITY (SECCHI DEPTH)	SAMPLE DEPTH	DO	SAL.	TEMP.	SS	NO_2 -N	NO_3 -N	NH_3 -N	PN	PO_4 -P	TP	SIL. -Si	CHL. -a	BOD	Cu	TBTO	AR. HYD.	TC	FC	TH x 10
			m/s		m		m	m	m	mg/l		°C	mg/l	µg-at/l								mg/l	mg/l	µg/l	ng/l	g/l C.E.	0/100ml	0/100ml	0/100ml
231288	1125	6/8.	2.8	110	0.5		4.0	>4	0.2	8.6	35		34	0.87	0.36	<0.07		0.19	0.71	2.1				<5		0	0	5.2
									1.0	8.6																		
									2.0	9.0																		
									3.0	9.3	37		5.5	0.93	0.71	0.50		0.22	0.84	2.1			1.2	<5				
100189	1525	0/8.	2.6	60	0.01	120	1.3	>1.3	0.2	11.1	32	30	3.5	0.14	0.87	0.36	5.8	0.68		1.8		2.6	0.86	<5		0	0	11
240189	1100	4/8.	7.8	120	1.5	120	2.0	>2	0.2				1.4	2.1	0.93	0.21	3.0	0.10	0.52	6.9	0.20	1.6	0.7	<5		0	0	1.5
310189																												
160289	1043	2/8.	3.0	124		124	3.0	>3	0.2	7.6	32	29.5	3.9	0.87	1.6		3.8	0.19	0.58	5.8	0.60	0.56	2.5	<5		0	0	6.1
									1.0	7.7	32	29.5																
									2.0	7.9	32	29.5																
									3.0	8.2	32	29.5																

SITE 14

MAGNETIC QUAYS BASELINE SEDIMENT DATA*

SITE	DATE	TIME	W/SPD	W/DIR	WV/HT	WV/DIR	SDEP	TDEP	CLAR	CLOUD	SS
			m/min	DEG	m	DEG	m	m	m		mg/l
FB1	21/12/88	1120	67	-	-	-	0.2	2.5	>2.5	1/8	1.6
FB2	21/12/88	1139	-	-	-	-	0.2	3.0	>3.0	1/8	2.8
FB2	21/12/88	1139	-	-	-	-	2.0	3.0	>3.0	1/8	2.3
FB3	21/12/88	1149	67	-	-	-	0.2	5.2	5.1	1/8	3.6
FB3	21/12/88	1149	67	60	0.50	70	4.2	5.2	5.1	1/8	8.2
FB4	21/12/88	1200	67	60	0.50	70	0.2	10.0	4.0	1/8	2.7
FB4	21/12/88	1200	67	60	0.50	70	9.0	10.0	4.0	1/8	5.5
AB1	21/12/88	1220	83	140	-	-	0.2	2.3	>2.3	1/8	3.3
AB2	21/12/88	1225	83	110	-	-	0.2	5.6	>5.6	1/8	1.6
AB2	21/12/88	1225	83	110	-	-	4.6	5.6	>5.6	1/8	18.5
AB3	21/12/88	1250	67	-	-	-	0.2	6.5	5.5	1/8	3.0
AB3	21/12/88	1250	67	-	-	-	4.5	6.5	5.5	1/8	3.5
AB4	21/12/88	1240	100	320	-	-	0.2	8.4	5.5	1/8	5.1
AB4	21/12/88	1240	100	320	-	-	7.4	8.4	5.5	1/8	6.9
GB1a	21/12/88	1335	133	340	-	-	0.2	1.5	>1.5	2/8	2.7
GB2a	21/12/88	1345	67	30	0.10	90	0.2	3.7	>3.7	2/8	5.0
GB2a	21/12/88	1345	67	30	0.10	90	2.7	3.7	>3.7	2/8	6.9
GB3a	21/12/88	1400	142	40	0.20	70	0.2	8.5	4.5	2/8	2.0
GB3a	21/12/88	1400	142	40	0.20	70	7.5	8.5	4.5	2/8	5.9
GB4a	21/12/88	1405	175	40	0.20	60	0.2	9.3	3.5	2/8	5.0
GB4a	21/12/88	1405	175	40	0.20	60	8.3	9.3	3.5	2/8	3.1
GB1b	21/12/88	1445	167	70	0.10	80	0.2	1.3	>1.3	3/8	0.6
GB2b	21/12/88	1440	67	68	0.10	68	0.2	7.8	4.8	3/8	1.5
GB2b	21/12/88	1440	67	68	0.10	68	6.8	7.8	4.8	3/8	3.0
GB3b	21/12/88	1430	217	50	0.40	50	0.2	9.0	3.7	3/8	7.6
GB3b	21/12/88	1430	217	50	0.40	50	8.0	9.0	3.7	3/8	5.1
GB4b	21/12/88	1420	217	50	0.30	50	0.2	9.5	3.5	3/8	3.8
GB4b	21/12/88	1420	217	50	0.30	50	8.5	9.5	3.5	3/8	4.2
GB1c	21/12/88	1450	217	75	0.10	75	0.2	1.5	>1.5	3/8	2.3
GB2c	21/12/88	1455	217	40	0.20	54	0.2	7.0	5.0	3/8	1.4
GB2c	21/12/88	1455	217	40	0.20	54	6.0	7.0	5.0	3/8	1.0
GB3c	21/12/88	1505	241	50	0.20	54	0.2	8.5	3.8	3/8	2.3
GB3c	21/12/88	1505	241	50	0.20	54	7.5	8.5	3.8	3/8	2.3
GB4c	21/12/88	-	200	24	0.30	50	0.2	9.5	3.8	3/8	2.6
GB4c	21/12/88	-	200	24	0.30	50	8.5	9.5	3.8	3/8	3.5
GB1d	21/12/88	1525	267	35	0.20	95	0.2	1.5	>1.5	3/8	1.4
GB2d	21/12/88	1530	233	30	0.30	60	0.2	7.0	4.5	4/8	1.7
GB2d	21/12/88	1530	233	30	0.30	60	6.0	7.0	4.5	4/8	7.6
NB1a	21/12/88	1540	67	40	0.10	40	0.2	1.2	>1.2	4/8	1.7
NB2a	21/12/88	1540	183	74	0.20	74	0.2	2.9	>2.9	4/8	3.2
NB3a	21/12/88	-	217	34	0.30	54	0.2	6.7	4.0	4/8	2.9
NB3a	21/12/88	-	217	34	0.30	54	5.7	6.7	4.0	4/8	7.5
NB4a	21/12/88	1555	200	44	0.20	44	0.2	8.0	3.8	4/8	3.9
NB4a	21/12/88	1555	200	44	0.20	44	7.0	8.0	3.8	4/8	5.7
NB1c	21/12/88	1605	183	40	0.20	78	0.2	1.2	>1.2	4/8	1.2
NB2c	21/12/88	1610	150	80	0.30	80	0.2	1.9	>1.9	4/8	1.3
NB3c	21/12/88	1615	167	70	0.30	60	0.2	7.9	4.5	4/8	3.2
NB3c	21/12/88	1615	167	70	0.30	60	6.9	7.9	4.5	4/8	3.7
NB4c	21/12/88	1620	200	25	0.40	46	0.2	8.5	3.4	5/8	4.0
NB4c	21/12/88	1620	200	25	0.40	46	7.5	8.5	3.4	5/8	3.7