

**Central Reclamation, Phase III
Environmental Monitoring & Audit
Monthly Report No. 5
December 2003**

<i>Client</i>	Territory Development Department, Hong Kong Hong Kong Island and Islands Development Office		
<i>Project</i>	Supplementary Agreement No. 3 to Agreement No. CE 15/94 Central Reclamation, Phase III Design and Construction for the Minimum Option		
<i>Report No.</i>	3128-REP-160-00	<i>Copy No.</i>	
<i>Date of Issue</i>	5 January 2004	<i>File Ref.</i>	L:\S-proj\CR3\CR3.NEW\3128\ Reports\0160.doc
<i>Report Title</i>	Central Reclamation, Phase III Environmental Monitoring & Audit Monthly Report No. 5 - December2003		
	<i>Name</i>	<i>Sign</i>	<i>Date</i>
<i>Prepared by :</i>	Albert Chan, ACL - Environmental Consultant	_____	5 Jan. 2004
<i>Reviewed by :</i>	Susana Bezy, ACL – ET Leader	_____	5 Jan. 2004
<i>Authorised by :</i>	Jon Varndell, ACL – Project Mgr	_____	5 Jan. 2004
<i>Distribution</i>			
<i>Copy No</i>	<i>Issue to</i>	<i>Attention</i>	<i>Corr. Ref.</i>
1	TDD	Mr H H Yeung	3128/M45/200/OC5618/al
2, 3	EPD	Mr M W Ho	3128/M45/200/OC5618/al
4	EPD (LCO)	Mr Allan Hung	3128/M45/200/OC5618/al
5	Leighton-China State-Van Oord JV	Mr Malcolm Plummer	3128/M45/200/OC5618/al
6	CRIII Sites/PRE	Mr Douglas Miller	3128/M45/200/OC5618/al
7	Independent Checker (Environment)	Mr Bill Douglas	3128/M45/200/OC5618/al
8	Environmental Team Leader	Ms Susana Bezy	3128/M45/200/OC5618/al
9	Office Copy		

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ACL	Atkins China Limited
CRIII	Central Reclamation Phase III
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring and Audit
EPD	Environmental Protection Department
ER	Engineer’s Representatives
ET	Environmental Team
IEC	Independent Environmental Checker
LCSD	Leisure and Cultural Services Department
LCSVO-JV	Leighton China State Van Oord Joint Venture
TDD	Territory Development Department
TSP	Total Suspended Particulates
WMP	Waste Management Plan

Executive Summary

The Central Reclamation Phase III Works, Contract No. HK 12/02, was awarded to Leighton China State Van Oord Joint Venture (LCSVO-JV) by the Territory Development Department (TDD), Hong Kong Islands and Islands Development Office. The works under the Contract HK 12/02 commenced on 28 February 2003.

Atkins China Limited (ACL) has been appointed by TDD to implement the Environmental Monitoring and Audit (EM&A) programme that was identified in the EIA Report for the CRIII Project and is providing Environmental Team (ET) services during the duration of the construction works.

This is the fifth Monthly EM&A Report under the EIAO for the works specified in Section 1.3 of the CRIII EIA Report. This report summarises the monitoring results and audit findings of the EM&A programme during the reporting period from 1 December to 31 December 2003.

Environmental Monitoring and Audit Progress

The monthly EM&A programme was undertaken in accordance with the EM&A Manual. A summary of the monitoring activities performed in this reporting month is listed below:

- Environmental site inspections were undertaken on 4, 10, 18, 24 and 31 December 2003.
- Noise monitoring was performed continuously for 24 hours.
- Water quality monitoring was undertaken on the following days:
 - 1 December 2003
 - 3 December 2003
 - 5 December 2003
 - 8 December 2003
 - 10 December 2003
 - 12 December 2003
 - 15 December 2003
 - 17 December 2003
 - 19 December 2003
 - 22 December 2003
 - 24 December 2003
 - 26 December 2003
 - 29 December 2003
 - 31 December 2003

Exceedance of Action and Limit Levels

There was no environmental air quality monitoring required during the reporting period.

The noise monitoring results for the reporting period did not show any exceedances.

From the analysis of water quality monitoring results collected during the reporting period, no exceedances were identified as directly attributable to the project marine works. However, on a few occasions, the dissolved oxygen (DO) and suspended solids (SS) levels exceeded the Action and Limit Levels. Investigations found that they were due to natural variation in ambient conditions and/or local influencing factors. A review of the monitoring results showed that control stations located outside the project's influence had similar values as marine impact stations and seawater intake monitoring data showed variable results with localised exceedances near stormwater outfalls. These findings were similar to the conditions observed during baseline monitoring and silty discharges from outfalls within the project area were documented during the reporting month.

Complaint Log

There were no environmental complaints received during this reporting period.

Notifications of Summons and Prosecutions

There were no notifications of summons or prosecutions received with regard to the environment during this reporting period.

Site Inspection and Audit

Environmental site inspections for the CRIII project works area were undertaken on 4, 10, 18, 24 and 31 December 2003. Deficiencies were recorded during site inspections carried out on 4 and 9 December 2003. The Contractor was immediately notified and subsequently rectified the deficiencies.

Future Key Issues

Future Key Issues are as follows:

- Following the Contractor's proposal for an alternate dredging at IRAE during the daytime and at IRAW during the nighttime, a water quality monitoring programme was conducted for the alternate dredging trial at IRAW and IRAE between 3 and 13 December 2003. The monitoring programme, which was divided into a pre-alternate dredging trial phase and an alternated dredging trial phase, did not find any significant additional impacts to water quality attributable to the alternate dredging works. The ET Leader and IEC provided a certification of the alternate dredging at IRAW and IRAE on 19 December 2003 based on the results of the monitoring programme. The Contractor commenced alternate dredging at IRAW and IRAE on 22 December 2003 and an operational monitoring programme was implemented for the continued monitoring of the alternate dredging works.
- Dredging work at IRAE is still being limited to an area outside the 100 m Exclusion Zone around the Heliport. The delays to the relocation of the Heliport may delay the dredging in this zone.

1. INTRODUCTION

1.1 Basic Project Information

The Territory Development Department (TDD) of the Hong Kong Special Administrative Region (HKSAR) is constructing the Central Reclamation Phase III Project (CRIII).

The Main Works Contract HK 12/02 for CRIII commenced on 28th February 2003. Leighton-China State-Van Oord Joint Venture (LCSVO-JV) was awarded the Contract No. HK 12/02 for the construction of the CRIII Engineering Works. Construction works undertaken during the reporting month include dredging, reclamation up to the original seabed level only, marine site investigation, demolition preparation work at General Post Office (GPO) Walkway and temporary traffic diversion work at Lung Wui Road.

Atkins China Limited (ACL) has been commissioned by TDD to undertake the environmental monitoring and audit work for the project in accordance with the Environmental Permit (EP No. EP-122/2002) issued to TDD on 7 March 2002. The CRIII Project Organisation is shown in **Annex A**.

This is the fifth monthly EM&A Report under the EIAO, which presents the results of EM&A work conducted during the period from 1 December to 31 December 2003, inclusive.

2. ENVIRONMENTAL STATUS

2.1 Works Undertaken

The works undertaken during the reporting month were limited to dredging, rockfilling up to the original seabed level only, marine site investigation for the Eastern Seawall, maintenance and necessary repair work for seawater intake silt screens, demolition preparation work for the GPO Walkway and minor demolition works at Pier No. 7.

2.2 Environmental Permits

A summary of the status of all environmental permits, license, and/or notification to EPD for this project during the reporting period are presented in **Table 2.1**.

Table 2.1 - Summary of the Environmental License / Permit Status

Item	Item Description	Date of Application	Permit Status
	LCSVO-JV submitted a Permit to Dump Material (Contaminated Sediment) at Sea Under the Dumping at Sea Ordinance (Ref. H2189/U2c/4784/MP/CST/EY/ST/cm).	29 December 2003	–
	LCSVO-JV submitted an Application for Construction Noise Permit for the purpose of carrying out construction work near Man Yiu Street and Culvert F in Central.	24 December 2003	–
	LCSVO-JV submitted a notification for the surrender of existing Construction Noise Permit No. GW-TS0392-03 effective on 13 December 2003 (Ref. H2189/U2c/4604/MP/CST/EY/ST/cm).	13 December 2003	–
	LCSVO-JV submitted a Waste Water Discharge Licence Application (Ref. H2189/U2c/4521/MP/ATA/CKA/ST/cm) under the Water Pollution Control Ordinance that supersedes the application submitted on 31 July 2003 (Ref H2189/U2c/2189/MP/ATA/ST/ec).	9 December 2003	–
	LCSVO-JV submitted an Application for Construction Noise Permit Renewal of CNP No. GW-TS0264-03 (Ref. H2189/ U2c/4490/MP/CST/EY/ST/cm) for the use of Powered Mechanical Equipment (PME) for the purpose of carrying out construction work other than percussive piling.	6 December 2003	–
	LCSVO-JV submitted an Application for Construction Noise Permit (Ref. H2189/U2c/4461/ MP/ATA/CKA/ST/cm) for the Dismantling of Metal Framework Supporting Link Bridge of General Post Office (CNP No. GW-TS0560-03)	4 December 2003	19 December 2003

2.3 Environmental Document Submission

A summary of the status of the submissions provided during the month of December 2003 is presented in **Table 2.2**.

Table 2.2 - Summary of the Contractor's Environmental Related Document Submissions to the Engineer's Representatives (ER)

Item	Document Title	Version	Date of Submission to ER
1	<i>Photographs of Silty Discharge from Stormwater Drains (15 - 20 December 2003)</i>	-	22 December 2003
2	<i>Photographs of Silty Discharge from Stormwater Drains (18 & 19 December 2003)</i>	-	19 December 2003
3	<i>Data Plots and Statistical Results for Alternate Dredging Trial Monitoring Programme at IRAW & IRAE</i>	-	17 December 2003
4	<i>Photographs of Silty Discharge from Stormwater Drains (10, 12 & 13 December 2003)</i>	-	13 December 2003
5	<i>Submission of Impact Monitoring Data for (12 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	13 December 2003
6	<i>Submission of Impact Monitoring Data for (11 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	12 December 2003
7	<i>Submission of Impact Monitoring Data for (10 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	11 December 2003
8	<i>Submission of Impact Monitoring Data for (9 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	11 December 2003
9	<i>Submission of Impact Monitoring Data for (8 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	10 December 2003
10	<i>Submission of Impact Monitoring Data for (5 & 6 December 2003) for Alternate Dredging (Trial) at IRAW & IRAE</i>	-	9 December 2003
11	<i>Photographs of Silty Discharge from Stormwater Drains (4, 5 & 8 December 2003)</i>	-	9 December 2003
12	<i>Submission of Baseline Data for Alternate Dredging Monitoring (Pre-Alternate Dredging)</i>	-	6 December 2003
13	<i>Photographs of Silty Discharge from Stormwater Drains (27 - 29 November 2003)</i>	-	1 December 2003

A summary of the Environmental Certification Sheet submissions to EPD for the Month of December 2003 is presented in **Table 2.3**.

Table 2.3 - Summary of Environmental Certification Sheet Submissions to the Environmental Protection Department (EPD)

No	Certification Subject	Letter Ref.	Date of Submission to EPD	Approved Status
1	<i>Certification of Monthly Environmental Report No. 4 - November 2003</i>	<i>3128/M45/200/OC5521/Ac/al</i>	<i>8 December 2003</i>	-

2.4 Environmental Meetings

No environmental meetings were held during the reporting period.

2.5 Environmental Monitoring Locations

The environmental monitoring locations are provided in **Annex C**.

3. EM&A REQUIREMENTS

3.1 Summary of Impact EM&A Requirements

The EM&A programme requires environmental monitoring for air quality, noise, water quality, waste management and landscape and visual aspects as specified in the CRIII Project EIA. The EM&A requirements for each issue area are described in subsequent sections including:

- All required monitoring parameters;
- Action and Limit Levels; and
- Event-Action Plans.

A summary of impact EM&A requirements is presented in **Table 3-1**.

Table 3.1 - Summary of Impact EM&A Requirements

Parameters	Descriptions	Locations	Frequencies	Duration
TSP	24-Hour TSP	2 Locations	Once every 6 days	During dust generating construction works
	1-Hour TSP	2 Locations	Three times in every 6 days	During dust generating construction works
Noise	Leq (30 mins), L ₁₀ , L ₉₀ .	1 Location	Continuous measurements	Two weeks before Construction and During Construction
Water Quality	Dissolved Oxygen; Salinity; Temp; Suspended Solids; Turbidity.	14 Locations	3 times a week, Mid-ebb/flood tides	During Marine Works
Waste	On-Site Waste Audit	Active Work Sites	Periodically	During Construction
	On-Site Waste Inspection			
Landscape and Visual	Audits to ensure effective implementation of mitigation measures			During Construction
General Site Conditions	Environmental Site Inspection	Works areas and areas affected by works	Periodically	During Construction

3.2 Environmental Quality Performance Limits

Environmental Quality Performance Limits for air, noise and water quality as provided in the Baseline Monitoring Report (Final) are shown in Annex D.

3.3 Event Action Plan

The Event Action Plans for air, noise and water quality as provided in the Baseline Monitoring Report (Final) are shown in **Annex E**.

3.4 Implementation of Environmental Measures

The Contractor is required to implement mitigation measures listed in the EIA Report, EM&A Manual and Further Environmental Permit. During routine site inspections, the Contractor's implementation of mitigation measures is reviewed. With regard to mitigation measures for water quality, the Contractor carried out daily visual inspection of the silt screens for seawater intakes. Bi-weekly diving inspections for the silt screens were also carried out in December 2003. During the reporting month, there were no records of the Contractor not implementing relevant mitigation measures.

4. MONITORING RESULTS

4.1 Impact Monitoring Schedule in December 2003

Regular site inspections were carried out to assess whether the project's environmental protection and pollution control measures are in compliance with the contract specifications. Inspections were conducted on 4, 10, 18, 24 and 31 December 2003.

Air quality monitoring has not commenced yet as no work areas or construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers.

Continuous 24-hour noise monitoring was conducted during this report period.

Impact water quality monitoring at all monitoring stations was undertaken during this reporting month. The water quality monitoring schedule for December 2003 is presented in **Table 4-1**.

Table 4.1 - Water Quality Monitoring Programme (Seawater Intakes Stations)

Date of Sampling	Tidal State	Timing of Sampling
1 December 2003	Mid Ebb	07:27 - 10:54
	Mid Flood	12:27 - 15:06
3 December 2003	Mid Ebb	07:28 - 10:49
	Mid Flood	13:07 - 16:16
5 December 2003	Mid Ebb	09:02 - 12:42
	Mid Flood	14:32 - 17:14
8 December 2003	Mid Ebb	10:13 - 13:12
	Mid Flood	15:24 - 18:10
10 December 2003	Mid Ebb	10:32 - 13:07
	Mid Flood	15:54 - 18:30
12 December 2003	Mid Ebb	13:03 - 15:45
	Mid Flood	08:13 - 11:25
15 December 2003	Mid Ebb	07:11 - 09:50
	Mid Flood	14:37 - 17:15
17 December 2003	Mid Ebb	16:04 - 18:49
	Mid Flood	10:48 - 13:54
19 December 2003	Mid Ebb	07:40 - 10:45
	Mid Flood	13:02 - 15:37
22 December 2003	Mid Ebb	09:50 - 12:34
	Mid Flood	14:45 - 17:13
24 December 2003	Mid Ebb	11:44 - 14:11
	Mid Flood	06:38 - 09:11
26 December 2003	Mid Ebb	13:21 - 17:36
	Mid Flood	07:23 - 10:47

Date of Sampling	Tidal State	Timing of Sampling
29 December 2003	Mid Ebb	15:28 - 18:09
	Mid Flood	10:56 - 13:40
31 December 2003	Mid Ebb	07:42 - 10:36
	Mid Flood	12:28 - 15:16

4.2 Monitoring Methodology

4.2.1 Air Quality Monitoring

Air quality monitoring will be performed in accordance with the methodology described in the EM&A Manual once construction activities requiring air quality monitoring commence. The locations of the monitoring stations at City Hall and PLA Headquarters are shown in **Annex C**.

4.2.2 Noise Quality Monitoring

Continuous 24-hour noise monitoring was performed in accordance with the methodology described in the EM&A Manual in the reporting period. The location of the noise monitoring station at City Hall is shown in **Annex C**.

4.2.3 Water Quality Monitoring

Water quality monitoring was performed in accordance with the methodology described in the EM&A Manual. Monitoring for the reporting month was conducted at all stations, which comprises of 6 marine-based stations and 8 seawater intake stations. The locations of the monitoring stations are shown in **Annex C**.

4.3 Monitoring Equipment

4.3.1 Air Quality

The equipment that is used for air quality monitoring is listed in **Table 4-2**.

Table 4.2 - Equipment for Air Quality Monitoring

Parameter Measured	Equipment
24-Hour Sampling	High Volume Sampler Model GS2310 by Anderson Instruments to be used for both monitoring stations.
1-Hour Sampling	MicroDust pro Aerosol Monitoring System to be used for both monitoring locations.

4.3.2 Noise Quality

The equipment used for continuous noise quality monitoring is listed in **Table 4-3**.

Table 4.3 - Noise Monitoring Equipment

Equipment	Model
Integrated Sound Level Meter	B&K 2238
Calibrator	B&K 4231, Class 1

4.3.3 Water Quality

The equipment that was used for water quality monitoring is listed in **Table 4-4**.

Table 4.4 - Equipment Used for Marine Water Quality Monitoring

Parameter Measured	Equipment
Dissolved Oxygen and Temperature Measuring Equipment	<p>A Dissolved Oxygen meter YSI model 58 was used.</p> <ul style="list-style-type: none"> This instrument was portable and weatherproof and used a DC power source. The equipment was capable of measuring: DO levels in the range of 0-20 mg/l and 0-200% saturation; and Temperature of between 0 - 45 degree Celsius. The equipment had a membrane electrode with an automatic temperature compensation complete with a cable. In addition, a Wirling Psychrometer was used as a reference thermometer during the sampling.
Turbidity Measurement Instrument	<p>A Turbidimeter, HACH model 2100P was used for determining turbidity levels. The instrument is portable and weatherproof and uses a DC power source. The instrument includes a photoelectric sensor capable of measuring turbidity between 0-1000 NTU.</p>
PH	<p>A MP125 pH Meter from Mettler Toledo was used to measure pH.</p>
Salinity / Conductivity Meter	<p>A Salinity / Conductivity meter YSI model 63 and model 30 was used for determining salinity concentrations.</p>
Sample Containers and Storage	<p>Water samples for SS analysis were stored in high density polythene bottles with no preservative added, packed in ice and delivered to the laboratory, and analysed as soon as possible after collection.</p>

4.4 Impact Monitoring Results

4.4.1 Air Quality & Noise Monitoring Results

No air quality monitoring work was undertaken during the reporting period as no work areas or construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers.

Noise quality monitoring work was undertaken during the reporting period. The noise monitoring results are provided in **Annex F**. Graphical representation of the noise monitoring data is provided in **Annex G**.

4.4.2 Water Quality Monitoring Results

Water quality monitoring was undertaken at all water quality monitoring locations during the reporting period. The water quality monitoring results from this reporting period are presented in **Annex H**. Graphical representation of the water quality data is provided in **Annex I**. Summaries of the results are provided in Tables 4.5 to 4.9.

Marine-Based Stations

Monitoring stations M8 and M10 were selected as the marine-based impact stations as they are located outside the predicted influence of the dredging and reclamation works. The detection of water quality degradation at these two stations may indicate that project marine works are adversely affecting water quality in Victoria Harbour. Stations M7 and M9 are within the expected influence of the reclamation activities and are located along the works area boundary (or extent of the predicted sediment plume). As such, M7 and M9 are used as indicator stations to note any significant elevations in SS, turbidity or reductions in DO that may affect the marine-based impact monitoring stations.

Table 4.5 is a summary of the marine-based stations monitoring results during mid-ebb tide.

Table 4.5 - Summary of Mid-Ebb Results for Marine-Based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
C1	Min	5.7	5.5	78.7	3.3	5
	Max	7.2	7.0	92.6	6.6	8
	Avg	6.4	6.2	84.3	4.8	6
	Sd	0.4	0.5	4.5	1.2	1
C2	Min	4.8	4.6	65.7	2.9	5
	Max	7.3	7.2	92.2	5.3	8
	Avg	6.2	6.0	81.4	4.2	6
	sd	0.7	0.7	8.0	0.7	1
M7	min	4.9	4.9	67.8	3.1	4
	max	7.1	7.1	90.7	6.1	8
	avg	5.9	5.9	78.4	4.3	6
	sd	0.6	0.5	6.2	1.0	1
M8	min	5.0	4.9	68.8	3.2	4
	max	7.0	7.4	92.7	6.1	7
	avg	6.1	6.1	81.8	4.5	6
	sd	0.6	0.7	7.7	0.8	1

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
M9	min	5.1	5.1	71.0	3.2	5
	max	7.2	7.0	90.6	6.1	8
	avg	5.9	6.0	79.5	4.5	6
	sd	0.5	0.5	5.5	0.9	1
M10	min	5.2	5.1	71.6	3.5	5
	max	7.3	7.2	92.1	6.4	9
	avg	6.1	6.1	81.4	4.8	6
	sd	0.5	0.5	5.8	1.1	1

As Table 4.5 shows, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer during mid-ebb survey ranged between 5.0 and 7.3 mg/L with an average value of 6.1 mg/L and DO measurements in the bottom layer ranged from 4.9 to 7.4 mg/L with an average level of 6.1 mg/L. Similar DO levels were recorded at the control stations at which DO levels in the surface to middle layer during mid-ebb survey ranged from 4.8 to 7.3 mg/L with an average value of around 6.3 mg/L; DO measurements in the bottom layer ranged between 4.6 and 7.2 mg/L with an average level of 6.1 mg/L.

SS levels during mid-ebb tide ranged from 4 to 9 mg/L with an average value of 6 mg/L at the marine-based impact stations (M8 & M10), which is comparable to results from the control stations in which SS content ranged from 5 to 8 mg/L with an average of 6 mg/L. The results showed no clear gradient effect (high SS and low DO levels from near-field stations M7 and M9 to far-field stations M8 and M10), which indicates that dredging works are not adversely affecting marine water quality outside the work site boundary in Victoria Harbour. Marine water quality at impact monitoring stations was found to be similar to that at the control stations also indicating that project marine works were not adversely affecting water quality in Victoria Harbour.

Table 4.6 is a summary of monitoring results from marine-based stations during mid-flood tide.

Table 4.6 - Summary of Mid-Flood Results for Marine-Based Stations

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
C1	min	5.8	5.7	78.7	2.9	4
	max	7.3	6.8	92.2	7.7	8
	avg	6.4	6.1	84.2	4.8	6
	sd	0.4	0.4	3.9	1.3	1
C2	min	4.9	4.6	66.5	2.9	4
	max	7.2	7.0	94.1	6.1	9
	avg	6.2	6.0	81.2	4.6	6
	sd	0.7	0.7	8.2	0.9	1
M7	min	4.4	4.5	62.1	2.9	4
	max	7.2	6.9	90.6	6.4	8
	avg	5.7	5.6	75.6	4.8	6

Station		Parameter				
		DO (S&M) mg/L	DO (B) mg/L	DO % Sat. (DA)	Turbidity (DA) NTU	SS (DA) mg/L
	sd	0.7	0.6	7.9	1.1	1
M8	min	4.8	4.8	66.7	3.3	4
	max	7.2	7.5	93.1	6.2	9
	avg	6.0	6.0	80.3	4.6	6
	sd	0.7	0.7	8.4	0.9	1
M9	min	4.8	4.8	67.9	3.5	5
	max	7.3	7.2	92.6	8.1	10
	avg	5.8	5.7	77.5	4.8	6
	sd	0.6	0.6	6.6	1.3	1
M10	min	4.8	4.8	66.9	3.7	5
	max	7.0	7.3	90.9	8.1	8
	avg	6.0	5.9	79.7	5.3	7
	sd	0.6	0.7	7.1	1.1	1

During mid-flood tide, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer ranged from 4.8 to 7.5 mg/L with an average level of 6.0 mg/L while DO values in the bottom layer ranged between 4.8 and 7.5 mg/L with an average of 6.0 mg/L. Similar DO concentrations were recorded at the control stations in the surface to middle layer during mid-flood survey ranged between 4.9 and 7.3 mg/L with an average value of 6.3 mg/L and DO results in the bottom layer ranged from 4.6 and 7.0 mg/L with an average of 6.1 mg/L.

SS content ranged between 4 and 9 mg/L (for stations M8 & M10) with an average of 7 mg/L during mid-flood tide and ranged from 4 to 9 mg/L with an average value of 6 mg/L at the control stations. Again, the results showed no clear gradient effect and no significant difference between control stations and marine-based impact stations. Therefore, the marine-based station results indicate that during the month of December the dredging works were not adversely affecting water quality outside the work site boundary.

Seawater Intake Stations

Table 4.7 is a summary of monitoring results from seawater intake stations during mid-ebb tide.

Table 4.7 - Summary of Mid-Ebb Results for Seawater Intake Stations

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M1	min	4.4	61.1	4.1	5
	max	6.3	82.8	9.2	14
	avg	5.3	71.1	6.5	8
	sd	0.5	5.9	1.6	2

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M2	min	4.2	58.7	3.9	6
	max	5.9	78.4	7.3	12
	avg	5.2	69.3	5.2	9
	sd	0.5	6.5	1.0	2
M3	min	4.2	57.8	3.8	6
	max	6.1	79.7	7.3	14
	avg	5.3	70.3	5.0	9
	sd	0.6	7.3	1.1	2
M4	min	4.4	57.9	3.0	5
	max	6.4	83.6	6.8	12
	avg	5.3	70.4	4.6	8
	sd	0.6	7.0	1.3	2
M5	min	4.6	62.2	2.7	5
	max	6.2	81.5	8.2	11
	avg	5.4	72.3	4.9	8
	sd	0.5	5.7	1.4	2
M6	min	4.1	55.2	3.3	5
	max	5.9	77.0	11.8	21
	avg	5.1	67.7	5.5	9
	sd	0.6	6.7	2.1	4
M11	min	4.2	58.1	3.2	5
	max	6.0	80.2	8.3	8
	avg	5.3	70.6	5.0	7
	sd	0.6	6.5	1.6	1
M12	min	4.1	55.8	3.2	5
	max	6.0	77.9	5.9	9
	avg	5.0	67.4	4.7	7
	sd	0.6	7.5	0.9	1

Seawater intake results during mid-ebb tide, Table 4.7, show that DO levels ranged from 4.1 to 6.4 mg/L with an average of 5.2 mg/L. SS ranged between 5 and 21 mg/L with an average value of 8.1 mg/L. The monitoring results show that water quality at seawater intake stations was generally good. Only a few low DO levels and elevated SS levels, such as at station M6, were found during the reporting month. The poor water quality at M6 is also due to adverse impacts from outfalls located adjacent to the station. During the reporting month large quantities of silty discharges from outfalls were observed and documented near station M5 on various occasions. Observations noted that the large patches of brown silty water generally dispersed westwards after discharge from the outfall. A figure showing the location of various outfalls along the seawall within the project area is shown in **Annex C**.

Table 4.8 is a summary of monitoring results from seawater intake stations during mid-flood tide.

Table 4.8 - Summary of Mid-Flood Results for Seawater Intake Stations

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M1	min	4.2	58.5	3.9	6
	max	6.0	78.9	11.2	12
	avg	5.2	70.3	6.8	9
	sd	0.6	7.9	2.3	1
M2	min	4.2	58.5	4.3	6
	max	5.9	78.3	7.6	12
	avg	5.2	70.3	5.7	8
	sd	0.6	6.5	1.0	2
M3	min	4.1	56.2	4.2	7
	max	5.9	79.4	9.3	15
	avg	5.2	70.0	5.9	10
	sd	0.7	7.8	1.4	3
M4	min	4.3	58.8	2.9	4
	max	6.1	80.0	7.6	10
	avg	5.4	72.1	4.9	7
	sd	0.5	6.2	1.2	1
M5	min	4.6	61.7	3.2	3
	max	5.9	79.0	9.0	10
	avg	5.4	72.0	4.6	6
	sd	0.5	6.2	1.4	2
M6	min	4.2	57.2	3.8	4
	max	5.7	76.4	7.9	9
	avg	5.1	67.5	4.6	7
	sd	0.5	6.2	1.1	1
M11	min	4.5	61.7	3.8	5
	max	6.1	81.1	6.3	10
	avg	5.4	72.7	5.1	8
	sd	0.6	7.0	0.9	1
M12	min	4.2	58.0	3.3	4
	max	5.6	75.0	9.1	14
	avg	5.1	68.1	5.3	8
	sd	0.5	6.1	1.6	3

During mid-flood survey, Table 4.8 shows that DO levels at seawater intake stations ranged from 4.1 to 6.1 mg/L with an average of 5.3 mg/L. SS ranged from 3 to 15 mg/L with an average SS content of 8 mg/L. The above results show that water quality during mid-flood tide was also generally good. Again, a few low DO levels and localised high SS levels were found but these were found to be not due to project works. The few instances of poor water quality at several seawater intake stations were due to adverse impacts from outfalls located adjacent to the stations. As mentioned previously, large quantities of silty discharges from outfalls near station M5 have been observed and documented on various occasions during the reporting month. A

figure showing the location of various outfalls along the seawall within the project area is shown in **Annex C**.

4.4.3 Waste Management

A waste management audit was conducted on 18 December 2003 during this reporting period to check the Contractor's conformity with their updated Waste Management Plan (WMP) issued on 27 November 2003. The audit did not find any non-conformity with the Contractor's WMP.

4.4.4 Landscape and Visual

As the works undertaken during the reporting month were related to site investigation works, minor demolition works and dredging works, the landscape and visual impacts are considered to be minimal.

5. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

5.1 Environmental Exceedances

The total number of exceedances for air, noise and water quality are presented in following sections.

5.1.1 Air Quality

No air quality monitoring work was undertaken during the reporting period.

5.1.2 Noise Quality

No exceedances of noise quality were observed during the reporting period.

5.1.3 Water Quality

A few DO levels were found to have exceeded the Action Level at seawater intake stations during the reporting month. Investigations found that they were due to natural variation or changes in ambient conditions and not caused the project marine works. Annex J provides a summary of the exceedances. It was noted that during the reporting month, water quality at marine-based impact monitoring stations (M8 and M10) was found to be similar to the control stations and the ambient level of DO was generally above 4.7 mg/L.

The December 2003 monitoring results also showed occasional elevated concentrations of SS above the Action and/or Limit Level at seawater intake stations. Investigations into these monitoring results found that the SS levels may be attributed to discharge influences from outfalls located in proximity of seawater intake monitoring stations. All of the high SS concentrations recorded were shown to be localised conditions as no sediment plumes were detected at the marine-based impact stations and no unusual concentrations were measured at adjacent monitoring stations during the same time. High SS levels were often recorded at locations (stations M1 to M6) with outfalls and stormwater culverts that discharge into the harbour. Baseline monitoring results showed similar localised elevated concentrations of SS.

5.1.4 Waste Management

No non-compliances with regard to waste management were recorded in the reporting month.

5.1.5 Landscape and Visual

No non-compliance with regard to landscape and visual aspects were recorded in the reporting month.

5.1.6 Site Environmental Audit

No environmental non-compliances were found during environmental site inspections conducted during the reporting period. A joint site environmental inspection with the IEC was conducted on 10 December 2003.

One deficiency was found during an environmental site inspection conducted on 4 December 2003. The deficiency had to deal with a small damaged section of the silt curtain surrounding

the grab dredger. Dredging works were temporarily stopped while the damaged geo-textile section was replaced.

During a site inspection carried out by site staff on 9 December 2003, a yellowish plume was seen near the grab dredger at 15:00. The Contractor was immediately notified of the appearance of the plume and they stopped all dredging activities to investigate the cause of the plume upon receipt of the notification. It was noted that the yellowish plume disappeared 30 minutes after dredging was stopped. Dredging resumed after the investigation did not find any anomalies with the dredging works. Another site observation was made at 15:30 and no other plumes around the dredger or hopper barge were detected after the dredging recommenced. The EM&A water quality monitoring conducted the following day (10 December 2003) did not find any exceedances.

5.2 Environmental Complaint and Prosecution

No environmental complaints were received during the reporting period. Further, no environmental prosecution notices or summons were received during the reporting period.

6. FORECAST AND SCHEDULE

6.1 Key Issues for the Coming Month

The key issues to be considered in the coming month include the following:

- It is anticipated that the Contractor will undertake alternate dredging at IRAW and IRAE after their proposal was accepted during this reporting period. An operational water quality monitoring programme is to be carried out for the duration of the alternate dredging works to check for any additional impacts to water quality;
- Maintenance and necessary repairs to the seawater intake silt screens will continue.

6.2 Monitoring Schedules for the Next 3 Months

The construction works scheduled in January 2004 include dredging at IRAE and IRAW, marine site investigation for the Eastern Seawall and site investigation works. Based on the Contractor's programme, the Environmental Monitoring Programme for the next three months is planned as follows:

TSP (24 hr and 1 hr monitoring)

Upon commencement of dust generating activities within range of the closest air quality sensitive receiver, dependent upon the Contractor's programme.

Noise (Continuous Measurements)

The noise monitoring programme throughout the entire construction period is 24-hour continuous.

Water Quality Monitoring

The water quality monitoring schedule for the next 3 months is provided in the following table.

Table 6.1 - Water Quality Monitoring Programme

Date of Sampling	Sampling Time	
2 January 2004	08:30	14:33
5 January 2004	10:30	16:00
7 January 2004	11:30	17:00
9 January 2004	08:30	14:00
12 January 2004	10:00	15:30
14 January 2004	11:39	17:25
16 January 2004	08:30	14:00
19 January 2004	10:00	15:30
21 January 2004	12:00	17:30
24 January 2004	09:00	14:30
26 January 2004	10:14	15:52
28 January 2004	11:25	17:00

Date of Sampling	Sampling Time	
30 January 2004	12:00	17:30
2 February 2004	10:18	17:00
4 February 2004	11:00	16:30
6 February 2004	12:00	17:30
9 February 2004	08:48	14:21
11 February 2004	09:52	15:48
13 February 2004	11:05	17:00
16 February 2004	09:15	17:00
18 February 2004	11:00	16:30
20 February 2004	12:00	17:30
23 February 2004	08:43	14:32
25 February 2004	09:30	15:40
27 February 2004	10:14	17:00
1 March 2004	08:47	17:00
3 March 2004	10:24	17:00
5 March 2004	11:30	17:00
8 March 2004	08:30	14:00
10 March 2004	08:33	14:38
12 March 2004	09:33	16:06
15 March 2004	08:30	17:00
17 March 2004	10:00	15:30
19 March 2004	11:49	17:00
22 March 2004	08:30	14:00
24 March 2004	08:30	14:27
26 March 2004	08:33	15:22
29 March 2004	08:30	17:00
31 March 2004	08:53	17:00

6.3 Construction Programme for the Next 3 Months

The construction programme for the next 3 months is provided in **Annex B** and will be updated by the Contractor.

The ET will follow the Contractor's proposed programme to ensure the compliance of environmental performance and proper implementation of all necessary mitigation measures.

7. CONCLUSION

During the reporting period, no exceedances of environmental performance criteria were found to be caused by the project works. The water quality was found to be generally good, but a few low DO levels and localised elevated SS concentrations were recorded. These levels were investigated and have been attributed to either ambient conditions or adverse influencing factors unrelated to project marine works. It was found that discharges from outfalls and stormwater culverts located near seawater intake monitoring stations are major influencing factors that adversely impact water quality within the works site area.

The marine-based impact monitoring stations established to monitor the overall impact of the reclamation activities on water quality in Victoria were shown to have similar results as the control stations which are located outside the influence of project works. As such, the water quality monitoring results did not indicate that the marine works were adversely affecting water quality outside the works boundary in Victoria Harbour.

One deficiency and one major site observation were noted on site inspections during the reporting period. The Contractor subsequently rectified the deficiency and made appropriate investigations after being notified.

The monitoring work for this reporting month has been independently verified by the Independent Environmental Checker (IEC) and has been found to be in compliance with the requirements of the EM&A programme.