

**Central Reclamation, Phase III
Environmental Monitoring & Audit
Monthly Report No. 13
August 2004**

<i>Client</i>	Civil Engineering and Development Department 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-185-00	<i>Copy No.</i>	
<i>Date of Issue</i>	10 September 2004	<i>File Ref.</i>	L:\S-proj\CR3\CR3.NEW\3128\Reports\0185.doc
<i>Report Title</i>	Central Reclamation, Phase III Environmental Monitoring & Audit Monthly Report No. 13 - August 2004		
	<i>Name</i>	<i>Sign</i>	<i>Date</i>
<i>Prepared by :</i>	Albert Chan, ACL - Environmental Consultant		10 Sept. 2004
<i>Reviewed by :</i>	Susana Bezy, ACL – ET Leader		10 Sept. 2004
<i>Authorised by :</i>	Jon Varndell, ACL – Project Mgr		10 Sept. 2004
<i>Distribution</i>			
<i>Copy No</i>	<i>Issue to</i>	<i>Attention</i>	<i>Corr. Ref.</i>
1	CEDD	Mr H H Yeung	3128/M45/200/OC6415/al
2, 3	EPD	Mr M W Ho	3128/M45/200/OC6415/al
4	EPD (LCO)	Mr Allan Hung	3128/M45/200/OC6415/al
5	Leighton-China State-Van Oord JV	Mr Malcolm Plummer	3128/M45/200/OC6415/al
6	CRIII Sites/PRE	Mr Douglas Miller	3128/M45/200/OC6415/al
7	Independent Checker (Environment)	Mr Bill Douglas	3128/M45/200/OC6415/al
8	Environmental Team Leader	Ms Susana Bezy	3128/M45/200/OC6415/al
9	Office Copy		

	Page
1. INTRODUCTION	1
1.1 Basic Project Information	1
2. Environmental Status	2
2.1 Works Undertaken.....	2
2.2 Environmental Permits	2
2.3 Environmental Document Submission.....	2
2.4 Environmental Meetings	3
2.5 Environmental Monitoring Locations.....	3
3. EM&A Requirements	4
3.1 Summary of Impact EM&A Requirements.....	4
3.2 Environmental Quality Performance Limits	5
3.3 Event Action Plan	5
3.4 Implementation of Environmental Measures.....	5
4. Monitoring Results	6
4.1 Impact Monitoring Schedule in August 2004	6
4.2 Monitoring Methodology	7
4.3 Monitoring Equipment.....	7
4.4 Impact Monitoring Results	9
5. Environmental Complaint and Non-Compliance	15
5.1 Environmental Exceedances.....	15
5.2 Environmental Complaint and Prosecution.....	16
5.3 Environmental Enquiries	17
6. Forecast and Schedule.....	18
6.1 Key Issues for the Coming Month.....	18
6.2 Monitoring Schedules for the Coming Months	18
6.3 Construction Programme for the Next 3 Months	19
7. Conclusion	20

List of Annexes

Annex A	Project Organisation / Contact Information
Annex B	Contractor’s Work Programme
Annex C	Location of Monitoring Stations & Outfalls
Annex D	Environmental Quality Performance Limits for Air, Noise and Water Quality
Annex E	Event and Action Plan for Air, Noise and Water Quality
Annex F	Noise Monitoring Results
Annex G	Graphical Representation of Noise Monitoring Results
Annex H	Water Quality Monitoring Results
Annex I	Graphical Representation of Water Quality Monitoring Results
Annex J	Water Quality Exceedance Review
Annex K	IEC Site Inspection Report
Annex L	Summary of Changes

List of Tables

Table 2.1 - Summary of the Environmental License / Permit Status	2
Table 2.2 - Summary of the Contractor's Environmental Related Document Submissions to the Engineer’s Representatives (ER).....	3
Table 2.3 - Summary of Environmental Certification Sheet Submissions to the Environmental Protection Department (EPD).....	3
Table 3.1 - Summary of Impact EM&A Requirements	4
Table 4.1 - Water Quality Monitoring Programme (Seawater Intakes Stations)	6
Table 4.2 - Equipment for Air Quality Monitoring	7
Table 4.3 - Noise Monitoring Equipment	8
Table 4.4 - Equipment Used for Marine Water Quality Monitoring.....	8
Table 4.5 - Equipment Calibration Frequencies	8
Table 4.5 - Summary of Mid-Ebb Results for Marine-Based Stations	10
Table 4.6 - Summary of Mid-Flood Results for Marine-Based Stations	11
Table 4.7 - Summary of Mid-Ebb Results for Seawater Intake Stations.....	12
Table 4.8 - Summary of Mid-Flood Results for Seawater Intake Stations.....	13
Table 6.1 - Water Quality Monitoring Programme	18
Air Quality Action and Limit Levels for the City Hall Moni	20

ACL	Atkins China Limited
CEDD	Civil Engineering and Development Department
CRIII	Central Reclamation Phase III
EIA	Environmental Impact Assessment
EIAO	Environmental Impact Assessment Ordinance
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 (CRIII) Works, Contract No. HK 12/02, was awarded to Leighton China State Van Oord Joint Venture (LCSVO-JV) by the Territory Development Department (now called the Civil Engineering and Development Department (CEDD) after the merger of the Civil Engineering Department and the Territory Development Department on 1 July 2004), Hong Kong Islands and Islands Development Office. The works under the Contract HK 12/02 commenced on 28 February 2003. Contract HK 16/03 for the CRIII Hinterland Drainage Improvement Works was awarded to Wang Kee Construction Co. Ltd. and works for this contract commenced on 17 December 2003.

Atkins China Limited (ACL) has been appointed by CEDD 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 thirteenth 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 to 31 August 2004.

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 5, 12, 19 and 27 August 2004.
- Noise monitoring was performed continuously for 24 hours.
- Water quality monitoring was undertaken on the following days:
 - 2 August 2004
 - 4 August 2004
 - 6 August 2004
 - 9 August 2004
 - 11 August 2004
 - 13 August 2004
 - 16 August 2004
 - 18 August 2004
 - 20 August 2004
 - 23 August 2004
 - 25 August 2004
 - 27 August 2004
 - 30 August 2004

Exceedance of Action and Limit Levels

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

Continuous noise monitoring was carried out during the reporting period and noise quality exceedances were recorded on 10 August 2004. An investigation into the noise exceedances found that the noise levels were attributed to the surface breaking works near City Hall. The Event Action Plan for noise quality was followed and all relevant parties were informed of the exceedances. The Contractor immediately stopped concurrent breaking works with more than one breaker as a mitigation measure. Subsequent noise monitoring found that no further exceedances were attributed to project works.

From the analysis of water quality monitoring results collected during the reporting period, exceedances of the Action and Limit Levels were found on several occasions. Although DO levels below the Action Level were observed at seawater intake and marine-based stations, investigations found that they were due to natural variation or changes in ambient conditions and not caused by the project marine works. It was noted that when the DO Action Level was exceeded at the marine-based stations the control stations recorded similarly low DO levels.

The monitoring results from 9, 13, 20 and 25 August 2004 showed elevated concentrations of SS at a few seawater intake stations. Investigations into these monitoring results found that the SS levels may have been attributed to project marine works and appropriate actions were immediately undertaken in accordance with the Event and Action Plan for water quality. Additionally, the Contractor installed frame type silt curtains for rock filling works as a mitigation measure to reduce SS impacts.

An environmental meeting with EPD has been scheduled for early September to discuss the SS levels recorded in August and the Contractor's mitigation measures for marine works.

Complaint Log

A complaint with regard to dust emissions from concrete breaking work at the old heliport was received by EPD on 18 August 2004 and the ET was notified on 20 August 2004. The complaint was investigated and an ad-hoc dust measurement was taken at the site boundary. The investigation found that the measured dust level is well below the EM&A Action and Limit Levels and no dust emissions were observed during the works. Further, the Contractor implemented additional mitigation measures (increase watering of demolition area and installation of impervious sheeting around breaker) after receipt of complaint.

The ET will continue to closely monitor the works to ensure dust emissions are minimised.

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 5, 12, 19 and 27 August 2004. No environmental non-conformance and deficiencies were observed during the site inspections.

Future Key Issues

Future Key Issues are as follows:

- Sand filling works
- Marine piling works
- Surcharge material works
- Excavation works for the substructure of the Central Terminal Building (CTB)
- Landside cooling watermain works
- The Contractor submitted a proposal for a revised sequence of dredging and sand filling activities that is in variation of the environmental permit. Additionally, the Contractor is proposing to temporarily store pre-cast caissons at FRAE to mitigate the delay effects caused by the previous work suspension. An informal environmental meeting was scheduled in late August 2004 between the Contractor, ER, ET and IEC for an initial discussion of these proposals.

1. INTRODUCTION

1.1 Basic Project Information

The Territory Development Department (now called the Civil Engineering and Development Department (CEDD) after the merger of the Civil Engineering Department and the Territory Development Department on 1 July 2004) of 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. Contract HK 16/03 for the CRIII Hinterland Drainage Improvement Works was awarded to Wang Kee Construction Co. Ltd. and works for this contract commenced on 17 December 2003.

Atkins China Limited (ACL) has been commissioned by TDD (now called CEDD) 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 thirteen monthly EM&A Report under the EIAO, which presents the results of EM&A work conducted during the period from 1 to 31 August 2004, inclusive.

2. ENVIRONMENTAL STATUS

2.1 Works Undertaken

The works undertaken during the reporting month include marine piling, rock filling, sand filling, surcharge material works, demolition work at the old heliport, landside cooling watermain work, installation of vibration monitoring equipment and maintenance and necessary repair work for seawater intake silt screens.

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
1	<i>LCSVO-JV submitted an Application for a Permit to Dump Material (Uncontaminated Sediment) at Sea under the Dumping at Sea Ordinance (Ref. H2189/U2c/8714/MP/EY/ST/ec).</i>	<i>12 August 2004</i>	–
2	<i>LCSVO-JV submitted an Application for a Permit to Dump Material (Contaminated Sediment) at Sea under the Dumping at Sea Ordinance (Ref. H2189/U2c/8710/MP/EY/ST/ec).</i>	<i>11 August 2004</i>	–
3	<i>LCSVO-JV submitted an Application for Construction Noise Permit for Unloading and Installation of Pre-cast Caisson Units (Ref. H2189/U2c/8563/MP/EY/ST/ec).</i>	<i>5 August 2004</i>	–

2.3 Environmental Document Submission

A summary of the status of the submissions provided during the reporting month 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>New Marine Dumping Permits (EP/MD/05-053 & 54)</i>	-	<i>31 August 2004</i>
2	<i>New Construction Noise Permit GW-R0366-04</i>	-	<i>26 August 2004</i>
3	<i>Photographs of Silty Discharges from Culvert J and Outfall near JV Site Office (16 August 2004)</i>	-	<i>17 August 2004</i>
4	<i>Cancellation of WPCO Licence EP860/W10/WY0093</i>	-	<i>14 August 2004</i>
5	<i>New Construction Noise Permit PP-RS0018-04</i>	-	<i>11 August 2004</i>

A summary of the Environmental Certification Sheet submissions to EPD during the reporting month 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 Quarterly EM&A Report No. 4 for May through July 2004</i>	<i>3128/HK12/02 M45/200/OC6328/AC/al</i>	<i>13 August 2004</i>	-
2	<i>Certification and Verification for Variation of FEP Condition 3.2 - Advanced FRAE Seawall Dredging</i>	<i>3128/M45/200/OC6327/SB/ AC/al</i>	<i>10 August 2004</i>	-
3	<i>Certification of Monthly Environmental Report No. 12 - July 2004</i>	<i>3128/HK12/02 M45/200/OC6294/AC/al</i>	<i>9 August 2004</i>	-

2.4 Environmental Meetings

An informal environmental meeting was held on 26 August 2004 between the Contractor, ER, ET and IEC to discuss the Contractor's recent proposals on revising the reclamation phasing and the temporary storage of pre-cast caissons at FRAE.

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 has installed frame type silt curtains for rock filling works to reduce SS dispersion. Further, the Contractor carried out daily visual inspection of the silt screens for seawater intakes. Floating debris in the project area was collected at least once everyday and in the water body near cooling water intakes debris was collected at least three times a day. Bi-weekly diving inspections for the silt screens were also carried out during the reporting month.

4. MONITORING RESULTS

4.1 Impact Monitoring Schedule in August 2004

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 5, 12, 19 and 27 August 2004.

Air quality monitoring has not commenced yet as no significant work areas or construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers (ASR). However, an ad-hoc 1-hour TSP measurement was undertaken at the site boundary of CR13 on 24 August 2004 to assess whether dust emissions from the nearby demolition works at the old heliport are excessive. The measurement recorded an 1-hour TSP level of 310 µg/m³, which is well below the EM&A Action and Limit Levels. Further, no visible dust emissions were observed at the works area and it was noted appropriate air quality mitigation measures are being implemented.

Based on the above information, the dust impacts from the demolition works at the old Heliport is not considered to be significant.

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

Impact water quality monitoring at all monitoring stations was undertaken during this reporting month. The water quality monitoring schedule for August 2004 is presented in **Table 4-1**.

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

Date of Sampling	Tidal State	Timing of Sampling
2 August 2004	Mid Ebb	12:20 - 15:04
	Mid Flood	07:36 - 10:35
4 August 2004	Mid Ebb	13:16 - 15:56
	Mid Flood	07:48 - 10:38
6 August 2004	Mid Ebb	14:16 - 17:00
	Mid Flood	08:25 - 11:29
9 August 2004	Mid Ebb	07:37 - 11:03
	Mid Flood	13:02 - 15:44
11 August 2004	Mid Ebb	08:30 - 11:18
	Mid Flood	15:28 - 18:23
13 August 2004	Mid Ebb	09:56 - 13:07
	Mid Flood	15:06 - 18:04
16 August 2004	Mid Ebb	10:42 - 13:42
	Mid Flood	15:46 - 18:20
18 August 2004	Mid Ebb	13:00 - 15:13
	Mid Flood	07:24 - 10:40
20 August 2004	Mid Ebb	13:18 - 16:01
	Mid Flood	07:48 - 10:42

Date of Sampling	Tidal State	Timing of Sampling
23 August 2004	Mid Ebb	15:13 - 17:51
	Mid Flood	10:40 - 13:41
25 August 2004	Mid Ebb	07:40 - 10:59
	Mid Flood	15:13 - 17:52
27 August 2004	Mid Ebb	08:40 - 11:42
	Mid Flood	15:08 - 18:04
30 August 2004	Mid Ebb	10:36 - 13:38
	Mid Flood	15:50 - 18:32

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 (SLM)	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>

4.3.4 Equipment Calibration

The calibration frequencies of the monitoring equipment are provided in the following table.

Table 4.5 - Equipment Calibration Frequencies

Equipment	Calibration Frequency	Latest Calibration Date
Dissolved Oxygen Meter	Every 6 months	10 May 2004
Turbidimeter	Every 3 months for secondary standards; meter is calibrated prior to each measurement to the secondary standards	18 June 2004
pH Meter	Prior to each sampling day	–

Equipment	Calibration Frequency	Latest Calibration Date
Pyschrometer	Every 6 months	5 March 2004
Integrated SLM	Every year	20 August 2004

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 significantly dusty construction activities with the potential to impact air quality are within range of the closest air quality sensitive receivers.

An ad-hoc 1-hour TSP measurement was undertaken at the site boundary of CR-13 on 24 August 2004 to assess whether dust emissions from the nearby demolition works are excessive. The measurement recorded an 1-hour TSP level of 310 µg/m³, which is well below the EM&A Action and Limit Levels. Further, no visible dust emissions were observed at the works area. It was noted appropriate air quality mitigation measures, such as watering of demolition area and installation of impervious sheeting around the breaker head, are implemented during the works.

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	4.2	3.2	57.0	3.3	3
	max	7.3	4.9	94.6	8.3	8
	avg	5.3	4.0	71.3	5.1	6
	sd	0.9	0.5	11.9	1.4	1
C2	min	4.2	3.1	56.0	3.1	3
	max	7.2	4.5	89.6	7.8	10
	avg	5.1	3.9	68.8	4.6	6
	sd	0.9	0.5	10.6	1.3	2
M7	min	4.2	3.5	57.8	3.4	4
	max	7.0	4.9	89.0	7.1	8
	avg	5.3	4.1	70.9	4.8	6
	sd	0.8	0.5	9.0	1.1	1
M8	min	4.1	3.4	58.0	3.1	3
	max	7.5	4.9	90.9	7.4	8
	avg	5.2	4.1	70.3	4.9	6
	sd	1.0	0.4	9.1	1.1	1
M9	min	4.3	3.1	57.2	3.8	3
	max	7.2	5.8	93.2	8.1	10
	avg	5.2	4.0	70.4	5.3	6
	sd	0.9	0.7	10.4	1.2	2
M10	min	4.4	3.4	62.4	3.2	4
	max	7.4	4.7	93.3	7.2	10
	avg	5.6	4.0	73.4	4.8	6
	sd	1.0	0.4	10.2	1.3	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 4.1 and 7.5 mg/L with an average value of 5.4 mg/L and DO measurements in the bottom layer ranged from 3.4 to 4.9 mg/L with an average level of 4.0 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 4.2 to 7.3 mg/L with an average value of around 5.2 mg/L; DO measurements in the bottom layer ranged between 3.1 and 4.9 mg/L with an average level of 3.9 mg/L.

SS levels during mid-ebb tide ranged from 3 to 10 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 3 to 10 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 marine 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 generally 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	4.0	3.5	55.6	3.7	3
	max	7.6	6.0	105.1	8.0	9
	avg	5.2	4.1	70.4	5.3	6
	sd	1.2	0.7	14.9	1.5	2
C2	min	4.0	3.3	55.0	3.6	3
	max	8.5	6.3	116.7	6.8	8
	avg	5.3	4.0	71.6	4.5	6
	sd	1.4	0.8	17.5	0.9	1
M7	min	3.8	2.8	51.7	3.9	4
	max	8.0	5.9	108.7	8.2	9
	avg	5.1	3.9	68.4	5.0	6
	sd	1.4	0.7	16.7	1.2	1
M8	min	3.9	2.8	54.9	3.8	3
	max	9.0	4.5	110.9	7.8	8
	avg	5.4	3.9	71.3	5.0	6
	sd	1.7	0.4	17.0	1.4	1
M9	min	4.0	3.4	54.5	3.4	3
	max	7.6	4.7	97.4	9.2	10
	avg	5.1	3.9	68.3	5.1	6
	sd	1.3	0.4	14.3	1.5	2
M10	min	3.9	3.4	55.2	3.6	4
	max	8.3	6.4	114.6	8.0	9
	avg	5.4	4.3	73.4	5.2	6
	sd	1.4	0.9	17.1	1.6	1

During mid-flood tide, DO levels at marine-based impact stations (M8 & M10) in the surface to middle layer ranged from 3.9 to 9.0 mg/L with an average level of 5.4 mg/L while DO values in the bottom layer ranged between 2.8 and 6.4 mg/L with an average of 4.1 mg/L. Similar DO concentrations were recorded at the control stations in the surface to middle layer during mid-flood survey ranged between 4.0 and 8.5 mg/L with an average value of 5.2 mg/L and DO results in the bottom layer ranged from 3.3 and 6.3 mg/L with an average of 4.1 mg/L.

SS content ranged between 3 and 9 mg/L (for stations M8 & M10) with an average of 6 mg/L during mid-flood tide and ranged from 3 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 reporting month 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	3.2	46.6	2.3	4
	max	5.3	80.7	12.3	10
	avg	4.1	61.2	6.5	7
	sd	0.6	7.8	2.3	2
M2	min	2.7	42.2	4.3	8
	max	5.5	81.1	11.2	11
	avg	3.8	55.8	6.6	9
	sd	0.8	11.1	1.8	1
M3	min	3.1	45.6	4.1	6
	max	5.6	81.2	9.1	16
	avg	3.8	55.8	6.0	9
	sd	0.7	9.9	1.6	3
M4	min	3.1	47.0	4.1	6
	max	5.4	79.2	7.9	15
	avg	4.0	59.0	5.9	8
	sd	0.7	9.9	1.2	3
M5	min	3.1	48.8	4.1	6
	max	6.0	90.4	8.1	11
	avg	4.5	65.8	5.6	8
	sd	0.9	12.3	1.0	2
M6	min	3.3	47.8	3.5	6
	max	6.3	94.1	8.5	12
	avg	4.6	67.7	5.3	8
	sd	3.3	47.8	3.5	6
M11	min	3.6	51.5	2.6	4
	max	5.7	83.4	7.7	8
	avg	4.2	61.7	5.6	6
	sd	0.6	8.6	1.5	1
M12	min	3.6	52.1	3.8	5
	max	6.5	93.6	8.8	11
	avg	4.6	67.8	5.3	8
	sd	0.9	12.9	1.5	2

Seawater intake results during mid-ebb tide, Table 4.7, show that DO levels ranged from 2.7 to 6.5 mg/L with an average of 4.2 mg/L. SS ranged between 4 and 16 mg/L with an average value of 8 mg/L. The monitoring results show that water quality at seawater intake stations was generally good. Low DO levels at the intake stations were recorded during the reporting month but investigations found that they were not due to project works. Elevated SS levels at M3, M4, M6 and M12 were found on 16, 20, 25 and 30 August 2004. These levels were investigated and it was found that the elevated SS levels on 16 and 20 August may have been attributed to marine works. As such, actions were undertaken in accordance with the Event and Action Plan for water quality and mitigation measures such as the use of silt curtains for rock filling works were implemented. The elevated concentrations of SS recorded on all other days were found to be due to local influencing factors not related to project works.

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	3.3	48.2	4.2	4
	max	6.4	95.5	10.2	15
	avg	4.3	64.4	6.6	8
	sd	3.3	48.2	4.2	4
M2	min	2.4	38.7	4.3	3
	max	5.7	84.7	10.5	19
	avg	3.9	58.0	6.9	11
	sd	0.9	12.4	1.6	4
M3	min	2.8	42.8	4.0	4
	max	6.1	89.8	9.6	16
	avg	3.8	55.3	6.8	10
	sd	0.9	12.5	1.8	3

Station		Parameter			
		DO mg/L	DO % Sat.	Turbidity NTU	SS mg/L
M4	min	2.7	42.7	3.2	4
	max	7.1	104.6	14.0	24
	avg	4.3	63.5	6.2	9
	sd	1.0	14.7	2.7	5
M5	min	2.7	41.7	3.7	5
	max	5.9	87.0	11.1	13
	avg	4.1	59.7	6.2	8
	sd	0.8	11.3	2.1	3
M6	min	2.9	44.5	3.6	4
	max	5.7	85.8	9.0	11
	avg	4.0	58.1	5.7	8
	sd	0.7	10.9	1.7	2
M11	min	3.1	46.2	3.9	4
	max	6.0	90.9	9.5	10
	avg	4.2	62.1	6.0	8
	sd	0.7	12.2	1.7	2
M12	min	3.5	51.2	3.9	4
	max	5.6	84.1	8.5	12
	avg	4.2	62.1	5.9	8
	sd	0.6	9.2	1.4	2

During mid-flood survey, Table 4.8 shows that DO levels at seawater intake stations ranged from 2.4 to 7.1 mg/L with an average of 4.1 mg/L. SS ranged from 3 to 24 mg/L with an average SS content of 9 mg/L. The above results show that water quality during mid-flood tide was also generally good. Again, low DO levels were found but these were found to be not due to project works. The elevated SS levels found at stations M1, M3, M4 and M5 on 9, 13, 16 and 23 August were investigated. Appropriate actions were undertaken in accordance with the Event and Action Plan following the elevated SS levels. As mentioned previously, silt curtains were implemented as mitigation measures to further reduce SS dispersion.

4.4.3 Waste Management

No waste management audit was scheduled within this reporting period. The arrangement of waste management audit is detailed in the Waste Management Plan.

4.4.4 Landscape and Visual

As the major construction activities undertaken during the reporting month were related to marine 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

Noise quality exceedances were recorded on 10 August 2004. An investigation into the exceedances found that the noise levels were attributed to the surface breaking works near City Hall. The Event Action Plan for noise quality was followed and all relevant parties were informed of the exceedances.

It was noted that the Contractor had used one handheld breaker and one excavator mounted breaker concurrently for the works. After being notified of the exceedances, the Contractor immediately stopped concurrent breaking works as a mitigation measure. Subsequent noise monitoring found that no further exceedances were attributed to project works.

Noise exceedances were also recorded on the morning of 11 August 2004. However, an investigation found that the noise levels were attributed to a thunderstorm that occurred during monitoring. It was also noted that no works were carried out during the thunderstorm period.

5.1.3 Water Quality

Based on investigations and analyses of water quality monitoring results collected during the reporting month, it was found that the elevated concentrations of SS recorded on 9, 13, 20 and 23 August 2004 were possibly attributed to project works.

On 9 August 2004, SS exceedances were recorded at monitoring stations M3 and M4. An investigation into the elevated SS levels found that surcharge and armourstone removal works were undertaken in the vicinity. All relevant parties were notified of the exceedances and the procedures listed in the Event and Action Plan for water quality were followed. The results from the following sampling day, 11 August 2004, showed significant decreases in SS even though marine works were undertaken and no further exceedances were recorded.

On 13 August 2004, elevated concentrations of SS were recorded at monitoring stations M1 and M3. An investigation found that rock filling works were carried out in the vicinity of M3 during sampling. All relevant parties were informed of the exceedances and the procedures listed in the Event and Action Plan for water quality were followed. The Contractor was requested to install a frame type silt curtain for all rock filling works as a mitigation measure.

Elevated SS levels were also recorded on 20 August and 23 August 2004. An investigation found that the exceedances were likely attributed to rock filling and equipment installation (on seabed) works. The exceedance on 23 August was likely due to the concrete debris removal work near the affected monitoring station. Again, all parties were notified on the exceedances and the Event and Action Plan for water quality was followed. The Contractor was asked to

check the frame type silt curtains used for rock filling works and to prevent concrete debris from entering the sea during near shore demolition works.

Although DO levels below the Action Level were observed at seawater intake and marine-based stations, investigations found that they were due to natural variation or changes in ambient conditions and not caused by the project marine works. It was noted that when the DO Action Level was exceeded at the marine-based stations the control stations recorded similarly low DO levels. Further, the results do not show any significant gradient effects.

The ET will continue to monitor the Contractor's implementation of mitigation measures to ensure SS impacts are minimised. Further, the Contractor was asked to properly maintain all frame type silt curtains currently in use for marine works and to provide additional mitigation measures to further reduce impacts from marine works. Floating type silt curtains have been proposed as additional measures and the ET will monitor their effectiveness during marine works.

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 inspection with the IEC was conducted on 19 August 2004, and the IEC's site inspection report is provided in **Annex K**.

During the site inspection on 12 August 2004, an unlabelled oil drum was found at CR-13 and the Contractor was advised to affix a chemical label to the unmarked drum. Further, an oil sheen was identified on the deck of the flat top barge. The Contractor was asked to clean up the oil stains on the barge deck to prevent oily runoff from washing into the sea. During a subsequent site inspection, it was noted that the Contractor had installed a spill lip on the deck around the temporary oil storage area.

Small oil stains were also found underneath the crane of the dredger during the site inspection on 19 August 2004. The Contractor was advised to clear the oil. A spill lip was later added to the deck around the crane to prevent oily runoff from entering the sea. During the site inspection, wastewater was also found dripping outside the sedimentation tank as the wastewater flowed from one tank to another. The Contractor was asked to rectify the situation.

5.2 Environmental Complaint and Prosecution

A complaint with regard to dust emissions from concrete breaking works at the old heliport was received by EPD on 18 August 2004 and was forwarded to the ET on 20 August 2004. The complaint was immediately investigated after notification and an ad-hoc dust measurement was taken at the site boundary to identify any dust impacts. The investigation found that the measured dust level is well below the EM&A Action and Limit Levels and no visual dust emissions were observed during the works. Further, the Contractor implemented additional mitigation measures, such as increased watering of demolition area and installation of impervious sheeting around breaker, to further reduce potential dust impacts.

The ET will continue to closely monitor the works to ensure dust emissions are minimised.

5.3 Environmental Enquiries

No environmental enquiries were received during the reporting month.

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:

- Marine piling and sand filling works at IRAW;
- Surcharge material works at IRAW and IRAE;
- Substructure works for the Central Terminal Building (CTB);
- Superstructure works at Pier No. 7;
- Cooling watermain work; and
- Maintenance and necessary repairs to the seawater intake silt screens.

6.2 Monitoring Schedules for the Coming Months

The construction works scheduled for the coming months include marine piling, rock filling, sand placement, surcharge material works, cooling watermain work and CTB 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 significant 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 upcoming months is provided in the following table.

Table 6.1 - Water Quality Monitoring Programme

Date of Sampling	Sampling Time	
1 September 2004	08:30	14:00
3 September 2004	08:49	14:57
6 September 2004	11:51	16:28
8 September 2004	08:30	17:00
10 September 2004	09:36	17:00
13 September 2004	11:40	17:00
15 September 2004	12:00	17:30
17 September 2004	08:30	14:06
20 September 2004	10:41	16:15

Date of Sampling	Sampling Time	
22 September 2004	08:30	17:00
24 September 2004	08:53	16:54
27 September 2004	11:26	17:00
29 September 2004	12:00	17:30

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, exceedances of the water quality criteria were generally found to be not caused by the project works. The water quality within the project area was found to be generally good, but low DO levels have been recorded at seawater intake and marine-based stations. Investigations into the low DO levels found that they were not due to project works as control stations recorded similarly low levels. Elevated SS levels were recorded on several occasions in August 2004. Investigations into these exceedances found that they may have been attributable to project works. Appropriate actions were undertaken in accordance with the Event and Action Plan and the Contractor has installed silt curtains as a mitigation measure for marine works. The ET will continue to closely monitor the effectiveness of these silt curtains and other additional mitigation measures during marine works.

Although elevated SS levels were recorded at a few seawater intake stations, the results from the marine-based impact monitoring stations showed that offshore marine water quality was generally good. The marine-based 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.

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.