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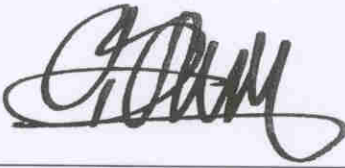
Contract No. CV/2002/04

Penny's Bay Reclamation Stage 2

Monthly EM&A Report for September 2003

October 2003

(Revision 1)

Approved By	 <hr/> <p>(Environmental Team Leader)</p>
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REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

MEMCL accepts no responsibility for changes made to this report by third parties.

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EXECUTIVE SUMMARY

This is the third monthly Environmental Monitoring and Audit (EM&A) report prepared by Maunsell Environmental Management Consultants Limited (MEMCL), the designated Environmental Team (ET), for the Project "Penny's Bay Reclamation Stage 2". This report presents the results of EM&A works conducted in the month of September 2003 (26 August to 25 September 2003).

In the reporting month, the following construction activities took place:

- Sediment dredging by grab dredgers;
- Sandfilling by barge;
- Seawall construction.

The total dredged volume in the month was 286,500 m³ and the average dredging rate was 64,694 m³ per week. The total sand filled volume in the month was 800 m³ which was filled on 2 September. The total volume of uncontaminated materials dumped at East Nine Pins in the reporting period was 372,450 m³.

Monitoring of 24-hour Total Suspended Particulates (TSP), noise, water quality and ecology was performed and the results were checked and reviewed. Site audits were conducted on weekly basis. The implementation of the environmental mitigation measures, Event and Action Plans and environmental complaint handling procedures were also checked.

Environmental Monitoring Works

Environmental Monitoring and Audit Progress

A summary of monitoring and audit activities conducted in the reporting period is listed below:

24-hour TSP monitoring	5 sessions
Day, evening and night time Noise monitoring	7 sessions
Water quality monitoring	13 sessions
Terrestrial ecology monitoring	1 sessions
Marine mammals monitoring	2 sessions
Subtidal monitoring	0 session
Joint Environmental site inspection	4 sessions

Air Quality

All measured 24-hour TSP concentrations in the reporting month were below the Action and Limit (AL) Levels.

Noise

All measured noise levels during daytime were below the Action and Limit (AL) Levels in the reporting month.

One exceedance of limit level during evening time was recorded on 25 September. The work method and number of plants on-site on the monitoring day were similar to the previous few weeks. ET's assessment has shown that this was not due to works of Reclamation Stage 2 and this has been confirmed by the IEC.

Fifty four exceedances of limit level during night-time were recorded in September. Most measured noise levels at NM1 and NM2 were within the range of the baseline level while no land-based construction activity related to works of Reclamation Stage 2 was conducted nearby NM3. The work method and number of plants were similar throughout the reporting period. ET's assessment has shown that these were not due to works of Reclamation Stage 2 and this has been confirmed by the IEC.

Water Quality

Thirteen monitoring sessions were scheduled for discrete marine water quality, NH₃N and TIN and, TBT/PAHs/PCBs monitoring respectively. Monitoring was performed on schedule other than 2 September 2003 when monitoring for ebb tide was cancelled due to issue of Strong Wind Signal No.8 by the Hong Kong Observatory in the afternoon.

For DO, turbidity and suspended solids, forty eight exceedances were recorded in the reporting month. The ET considered that the exceedances were not attributed to the works of Reclamation Stage 2. The IEC has carried out an assessment of the data based on the exceedance investigation reports and concluded that all exceedances recorded in the reporting month were not due to the works and no further action is required.

TIN and NH₃-N monitoring results were comparable to those recorded in the previous month. Comparison of monitoring results since commencement of works with EPD's data would be provided in a separate submission.

PAHs and PCBs levels recorded were all below the limit level. For TBT, eleven exceedances were recorded. All exceedances were not due to works of Reclamation Stage 2 as the TBT levels recorded were within the range of the levels recorded prior to dredging.

DO and turbidity levels recorded at Cheung Sha Wan and Ma Wan continuous water quality monitoring station were generally comparable with those obtained from discrete marine water quality monitoring.

Terrestrial Ecology

Field survey of White-bellied Sea Eagles was conducted on 9th September. Roosting and foraging activities were recorded. A single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site during the survey. Two White-bellied Sea Eagles soaring over Pa Tau Kwu was noted by the ET during weekly site inspection on 19th September. There was no evidence to indicate that the works at Penny's Bay have disturbed the White-bellied Sea Eagles.

Marine Mammal Monitoring

Marine mammal surveys were conducted on 11 and 18 September. No dolphin or porpoise was observed on both days. No disturbance to the marine mammals due to construction activities was evidenced in the reporting month.

Subtidal Monitoring

No subtidal monitoring was scheduled for the month. The next subtidal monitoring is scheduled in February 2004.

Environmental Licensing and Permitting

Permits granted to the Project include the Environmental Permit for the Project, construction noise permit and dumping permit. Information of these permits is provided in Table 8.1.

Implementation Status of Environmental Mitigation Measures

Minor splashing of material was observed during loading of a barge. The Contractor was reminded to avoid splashing of material during loading of barges. The loading practice was improved by the next site inspection. Stockpiles of sand located at Portion A2 which belongs to Penny's Bay Rail Link Contract were not covered entirely. The Contractor was reminded to cover all stockpiles on-site properly. The situation was improved by the next site inspection.

The Contractor was reminded to properly display the Construction Noise Permit (CNP) at the site entrance for inspection. The CNP was properly displayed by the next site inspection.

The Contractor was recommended to provide a valve to the drip tray under the generator. A valve was provided by mid-September. However, the valve was broken and the Contractor was recommended to replace it as soon as possible.

Environmental Non-conformance

Fifty-five exceedances of noise limit level, thirty exceedances of water quality action level and eighteen exceedances of water quality limit level were recorded in the reporting month. ET's assessment has shown that all exceedances were not due to works of Reclamation Stage 2 and this has been confirmed by the IEC.

No complaint, summons or prosecutions related to environmental issues was made against the Penny's Bay Reclamation Project in the reporting period.

Future Key Issues

Key issues to be considered in the coming month include:

- Generation of dust from activities on-site
- Noise from operating equipment and machinery on-site
- Loss of sediment from dredging and filling
- Maintenance of silt curtains
- Storage of chemicals/fuel and chemical waste/waste oil on site

1. INTRODUCTION

Background

- 1.1 Maunsell Environmental Management Consultants Limited (MEMCL) (hereinafter called the "ET") was appointed by Gammon Skanska Limited (GSL) (hereinafter called the "Contractor") to undertake Environmental Monitoring and Audit for "Penny's Bay Reclamation Stage 2" (hereinafter called the "Project"). Under the requirements of Section 4 of Environmental Permit EP-054/2000/D, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, noise, water quality and ecology are required for the Project.
- 1.2 This report summarises the environmental monitoring and audit works for the Project in September 2003 (from 26 August to 25 September 2003).

Project Organisation

- 1.3 The structure of the environmental management team is shown in Figure 1.1.

Construction Works undertaken during the Reporting Month

- 1.4 The major construction activities undertaken in September were seawall construction, sand filling by barge and sediment dredging by grab dredger. The total volume of dredged material in the month was 286,500 m³ (in-situ volume) and the average dredging rate was 64,694 m³ per week. The total sand filled volume in the month was 800 m³ which was filled on 2 September. No public fill was imported in the reporting month. Uncontaminated materials were dumped at East Nine Pins. The total dumped volume in the reporting period was 372,450 m³. The total volume of dredged material, filled volume and dumped volume since commencement of construction were 452,758m³, 10,212m³ and 588,950m³ respectively. Daily records of dredged / dumped and sandfilled volumes are presented in Appendix A.
- 1.5 A layout plan of the Project is provided in Figure 1.2.
- 1.6 The estimated amounts of different types of waste generated by the activities of the Project in the month are shown in Table 1.1.

Table 1.1 Estimated Amounts of Waste Generated in September 2003

Waste Type	Examples	Estimated Amount (m ³)	Disposal Locations
Site clearance waste	Vegetation, refuse on land	Nil	Not applicable
C&D waste	Used silt curtains	Nil	Not applicable
Dredged material	Marine sediments	372,450	East Nine Pins Dumping Ground
Chemical waste	Contaminated Sand (site)	Nil	Not applicable
	Used oil, spent solvent (site)	Nil	Not applicable
	Used oil, spent solvent (vessels)	Nil	Not applicable
	Used spent oil filter (site)	Nil	Not applicable
	Used empty pail (site)	Nil	Not applicable
	Contaminated lube oil (site)	Nil	Not applicable
General waste	Domestic waste (site) collected in garbage bins	48	SENT landfill
	Domestic waste (site) collected in sludge tank	36	Pillar Point Sewage Treatment Works
	Domestic waste (marine)	Nil	Not applicable

Compliance with EP conditions

- 1.7 A summary of the reporting requirement of compliance with EP conditions of the Project as of September 2003 are listed in Table 1.2

Table 1.2 Environmental Permit Submission

Environmental Permit Submission	EP-054/2000/D Condition No.	Status
EM&A Manual	2.3	Submitted
Waste Management Plan	2.8	Submitted
Fill Import Programme	2.9	Submitted
Reclamation Schedule	2.11	Submitted
Baseline Monitoring Report	4.4	Submitted
Monthly EM&A Report for August 2003	4.5	Submitted

Summary of EM&A Requirements

- 1.8 The EM&A programme requires environmental monitoring for air quality, noise, water quality, terrestrial and marine ecology, and waste management. The EM&A requirements for each parameter are described in subsequent sections, including:
- All monitoring parameters;
 - Action and Limit levels for all environmental parameters;
 - Event-Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA final report;
 - Environmental requirements in contract documents.
- 1.9 The environmental licensing and permits are described in Section 8.
- 1.10 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 8 of the Report.

2. AIR QUALITY MONITORING

Monitoring Requirements

- 2.1 24-hour TSP monitoring was conducted to monitor the air quality. Appendix B shows the established Action/Limit Levels for the environmental monitoring works.

Monitoring Equipment

- 2.2 High volume samplers (HVS - Model GMWS-2310 Accu-Vol) complete with the appropriate sampling inlets were installed for 24-hour TSP sampling. The HVS composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50 Appendix B). Table 2.1 summarises the equipment that was used in the dust-monitoring programme.

Table 2.1 TSP Monitoring Equipment

Equipment	Model
HVS	GMWS 2310 c/w of TSP sampling inlet
Calibration Kit	GMW 25

Monitoring Parameters, Frequency and Duration

- 2.3 The monitoring parameters and frequency are summarised in Table 2.2. The monitoring schedule for the reporting month is shown in Appendix C.

Table 2.2 Air Quality Monitoring Parameters and Frequency

Location	Parameter	Duration	Frequency
AM1	1-hour TSP	1 hour	3 times every 6 days*
	24-hour TSP	24 hours	Once every six days
AM2	1-hour TSP	1 hour	3 times every 6 days*
	24-hour TSP	24 hours	Once every six days

* This only applies after complaint is made.

Monitoring Locations

- 2.4 In accordance with the EM&A Manual, two air quality monitoring stations, as shown in Figure 2.1, were selected for 24-hour TSP sampling. Table 2.3 describes the location of the air quality monitoring stations.

Table 2.3 Location of Air Quality Monitoring Stations

ASR No.	Identity / Description
AM1	Penny's Bay Power Station
AM2	Luk Keng Tsuen

Monitoring Methodology

Installation

2.5 The HVSs were installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.

- A horizontal platform with appropriate support to secure the samplers against gusty wind was provided.
- No two HVSs were placed less than 2 meters apart.
- The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
- A minimum of 2 meters separation from walls, parapets and penthouses was required for rooftop samplers.
- No furnace or incinerator flues were nearby.
- Airflow around the sampler was unrestricted.
- Permission was obtained to set up the samplers and to obtain access to the monitoring stations.

Preparation of Filter Papers by ALS Technichem (HK) Pty Ltd.

- Glass fibre filters, G810 were labeled and sufficient filters that were clean and without pinholes were selected.
- All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ± 3 °C; the relative humidity (RH) was < 50% and not variable by more than ± 5 %. A convenient working RH was 40%.
- *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes.

Field Monitoring

- The power supply was checked to ensure the HVS works properly.
- The filter holder and the area surrounding the filter were cleaned.
- The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
- Then the shelter lid was closed and was secured with the aluminum strip.
- The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- A new flowrate record sheet was set into the flow recorder.
- The flow rate of the HVS was checked and adjusted at around 1.1 m³/min. The range specified in the EM&A Manual was between 0.6-1.7 m³/min.
- The programmable timer was set for a sampling period of 24 hrs \pm 1 hr, and the starting time, weather condition and the filter number were recorded.
- The initial elapsed time was recorded.
- At the end of sampling, the sampled filter was removed carefully and folded in half length

so that only surfaces with collected particulate matter were in contact.

- It was then placed in a clean plastic envelope and sealed.
- All monitoring information was recorded on a standard data sheet.
- Filters were sent to *ALS Technichem (HK) Pty Ltd.* for analysis.

Maintenance & Calibration

- The HVSs and their accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVSs are calibrated at bi-monthly intervals using GMW-25 Calibration Kit throughout all stages of the air quality monitoring. Calibration details are provided in Appendix J.

Results and Observations

- 2.6 Dust monitoring was conducted as scheduled in the reporting month. All monitoring data and graphical presentation of the monitoring results are provided in Appendix D.
- 2.7 Monitoring of 24-hour TSP was conducted at all monitoring stations on 3, 9, 15, 19 and 25 September.
- 2.8 Measured 24-hour TSP concentrations in the month were all below the Action/Limit levels. No exceedance of 24-hour TSP Action/Limit levels was reported.

3. NOISE MONITORING

Monitoring Requirements

- 3.1 Noise monitoring was conducted at three monitoring stations as specified in the EM&A Manual. Appendix B shows the established Action/Limit Levels for noise.

Monitoring Equipment

- 3.2 Integrating Sound Level Meters were employed for noise monitoring. They were Type 1 sound level meters capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Portable electronic wind speed indicator capable of measuring the wind speed in m/s were employed to check the wind speed. Table 3.1 details the noise monitoring equipment used.

Table 3.1 Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K 2236 or Rion NL 14
Calibrator	B&K 4231
Portable Wind Speed Indicator	Anemometer 840003

Monitoring Parameters, Frequency and Duration

- 3.3 Noise monitoring was conducted three times per monitoring day, covering all time periods. The monitoring period, duration, parameters and frequency of noise measurement are presented in Table 3.2. The monitoring schedule for the reporting month is provided in Appendix C.

Table 3.2 Noise Monitoring Parameters, Period and Frequency

Time Period	Duration (min)	Parameters	Frequency
Daytime (0700 to 1900)	30	L_{eq}	Once every six days
*Evening (1900 to 2300)	5		
*Night-time (2300 to 0700 of next day)	5		

*Noise monitoring to be conducted only when construction work is in progress.

Monitoring Locations

- 3.4 In accordance with the EM&A Manual, noise monitoring was conducted at three designated monitoring stations as shown in Figure 3.1. Table 3.3 describes the locations of these monitoring stations.

Table 3.3 Noise Monitoring Locations

NSR No.	Identity / Description
NM1	Sea Crest Villa (Peng Chau)
NM2	Crestmont Villa (Discovery Bay)
NM3	Luk Keng Tsuen

Monitoring Methodology*Field Monitoring*

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces. For reference, a correction of +3dB(A) was made to the free field measurements.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
 - frequency weighting: A
 - time weighting : Fast
 - time measurement : 30 minutes / 5 minutes
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.
- During the monitoring period, the L_{eq} was recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.
- It is noted that evening and night-time monitoring at all monitoring stations were conducted unattended, as the proprietor did not allow monitoring personnel to attend the equipment during these periods.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter and calibrator is sent to Sun Creation Engineering Limited to check and calibrate at yearly intervals. Calibration details are provided in Appendix J.

Results and Observations

3.5 Noise monitoring was conducted at the 3 designated monitoring stations during daytime,

evening time and night-time period on 27, 28 August and 8, 9, 17, 19 and 25 September in the reporting month. Monitoring session scheduled on 3 and 15 September were postponed to 8 and 17 September respectively due to typhoon and heavy rain.

- 3.6 All monitoring data and graphical presentation of the monitoring results are provided in Appendix E.
- 3.7 Construction activities were undertaken 24 hours a day, 7 days a week in September. Therefore, noise levels during restricted hours were also monitored in the reporting month.
- 3.8 No exceedance of limit level during daytime was recorded in the month.
- 3.9 One exceedance of limit level during evening time was recorded on 25 September. The work method and number of plants on-site on the monitoring day were similar to the previous few weeks. ET's assessment has shown that this was not due to the works of Reclamation Stage 2 and this has been confirmed by the IEC.
- 3.10 Fifty four exceedances of limit level during night-time were recorded in September. Most measured noise levels at NM1 and NM2 were within the range of the baseline level (44.2 – 58.2 for NM1 and 40.7 – 59.6 for NM2 during night-time) while no land-based construction activity related to works of Reclamation Stage 2 was conducted nearby NM3. In addition, the work methods and number of plants were similar throughout the reporting period. ET's assessment has shown that these were not due to the works of Reclamation Stage 2 and this has been confirmed by the IEC.

4. WATER QUALITY MONITORING

Discrete Marine Water Quality Monitoring

Monitoring Requirements

- 4.1 Marine water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. For marine water quality monitoring, measurements were taken at both mid-flood and mid-ebb tides at three depth locations (i.e., 1 m below surface, mid-depth and 1 m from seabed), where appropriate. Appendix B shows the established Action/Limit Levels for the environmental monitoring works.

Monitoring Equipment

- 4.2 Table 4.1 summarised the equipment used for discrete marine water quality monitoring.

Table 4.1 Discrete Marine Water Quality Monitoring Equipment

Equipment	Model and Make
DO and Temperature Measuring Meter	YSI Model 6820 CE-C-M-Y
Salinity Meter	
Turbidimeter	
Water Sampler	Widco or Niskin Water sampler

Monitoring Parameters, Frequency and Duration

- 4.3 Table 4.2 summarised the monitoring parameters, frequencies and duration of the marine water quality monitoring as required in the EM&A Manual. The monitoring parameters and frequency of water quality monitoring for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Table 4.2 Discrete Marine Water Quality Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
<i>Sensitive Receiver Stations</i> SR1, SR2, SR3, SR4, SR5, SR6, SR7, SR8, SR9 & SR10	Depth(m) Temperature, (°C) Salinity (ppt) Dissolved Oxygen (mg/L)	Three times per week during mid-ebb & mid-flood tides	3 (Surface, Mid-Depth & Bottom)
<i>Control Stations</i> CS1, CS2, CS3, CS4, CS5, CS6 & CS7	Dissolved Oxygen Saturation (%) Turbidity (NTU) Suspended Solids (mg/L)		
<i>Gradient Stations</i> G1, G2, G3, G4, G5, G6, G7, G8, G9, G10, G11, G12, G13, G14 & G15	Nitrogen (Ammonia)* (NH ₃ -N) (mg/L) Total Inorganic Nitrogen* (TIN) (mg/L)		

* Monitoring would be conducted from commencement of dredging and subject to review after initial two months.

Monitoring Locations

- 4.4 In accordance with the EM&A Manual, thirty-two stations (10 Sensitive Receiver Stations, 7 Control Stations and 15 Gradient Stations) were designated for discrete marine water quality monitoring. The ten Sensitive Receiver (SR) Stations were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Control Stations (CS) were chosen to facilitate comparison of the water quality of the SR stations with ambient water quality conditions and, the fifteen Gradient Stations (G) were chosen to assist in the identification of the source of any impact. The locations of these monitoring stations are summarized in Table 4.3 and depicted in Figure 4.1.

Table 4.3 Discrete Marine Water Quality Monitoring Locations

Type	Location	HK Metric Grid E	HK Metric Grid N
Control Stations	CS1	818 678	823 526
	CS2	817 764	820 890
	CS3	826 137	822 377
	CS4	825 255	814 229
	CS5	823 171	810 014
	CS6	825 871	824 880
	CS7	819 888	808 851
Gradient Stations	G1	824 506	821 250
	G2	824 506	819 229
	G3	826 256	818 219
	G4	822 756	818 219
	G5	821 272	822 301
	G6	822 500	823 400
	G7	824 222	822 150
	G8	823 904	820 689
	G9	824 159	820 632
	G10	821 000	816 000
	G11	821 055	814 210
	G12	820 000	813 000
	G13	824 090	824 242
	G14	822 438	814 903
	G15	821 043	810 667
Sensitive Receiver Stations	SR1	825 607	816 216
	SR2	820 268	817 870
	SR3	821 033	819 153
	SR4	823 827	823 208
	SR5	823 827	823 705
	SR6	824 511	823 518
	SR7	823 810	823 590
	SR8	818 766	811 267
	SR9	819 133	810 932
	SR10	818 700	810 600

*Monitoring Methodology*Instrumentation

- 4.5 A multiparameter meter (Model YSI 6820 CE-C-M-Y) was used to measure dissolved oxygen, temperature, salinity and turbidity.

Operating/Analytical Procedures

- 4.6 A Global Positioning System (GPS) was used to ensure that the correct location was selected prior to sample collection.

- 4.7 A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.
- 4.8 All in-situ measurements were taken at 3 water depths, namely 1m below water surface, mid-depth, and 1m from seabed, except where the water depth was less than 6m, the mid-depth measurement was omitted. If the water depth was less than 3m, only the mid-depth position was monitored.
- 4.9 At each measurement/sampling depth, two consecutive measurements of dissolved oxygen content and turbidity were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.
- 4.10 Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then packed in cool-boxes (cooled at 4°C without being frozen), and delivered to *ALS Technichem (HK) Pty Ltd.* for the analysis of suspended solids concentrations. The analysis followed *APHA Standard Methods for the Examination of Water and Wastewater* 19th Edition 2540D. *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples was analyzed. The QA/QC results are summarized in Appendix H.

Maintenance and Calibration

- 4.11 All in situ monitoring instruments would be calibrated and certified by *Wellab Ltd.* at 3-monthly intervals throughout all stages of the water quality monitoring programme. Calibration details are provided in Appendix J.
- 4.12 The dissolved oxygen probe of YSI 6820 was calibrated once a day by wet bulb method. Before the calibration routine, the sensor for dissolved oxygen was thermally equilibrated in water-saturated air. Calibration cup is served as a calibration chamber and it was loosened from airtight condition before it is used for the calibration. Calibration was carried out in a water sample with a known concentration of dissolved oxygen. The sensor was immersed in the water and after thermal equilibration, the known mg/L value was keyed in and the calibration was carried out automatically.
- 4.13 The turbidity probe of YSI 6820 is calibrated two times a month. Before the measurement, a zero check in distilled water was performed with the turbidity probe of YSI 6820. The probe was calibrated with a solution of known NTU.

Results and Observations

- 4.14 Appendix F1 presents the discrete marine water quality monitoring data and Appendix F2 shows the graphical presentation of the monitoring results. Note that in Appendix F1, the "sea condition" is given as indicative information and does not necessarily adhere to any standard sea state descriptions. In general, "calm" means small or no waves were observed; "rough"

includes white-capped sea or rougher; and “moderate” means all conditions in between “calm” and “rough”. Key findings and observations for water quality monitoring are presented below.

- 4.15 Thirteen monitoring sessions were scheduled in September. Monitoring at all designated monitoring stations were performed on schedule other than 2 September when monitoring for ebb tide was cancelled due to issue of Strong Wind Signal No.8 by the Hong Kong Observatory in the afternoon.
- 4.16 Total number of exceedances for dissolved oxygen, turbidity and suspended solids at each sensitive receiver for the month are summarised in Table 4.4.

Table 4.4 Water Quality Exceedance Summary

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
SR 1	Action	0	0	0	0	1	0	0	0	1	0
	Limit	0	0	0	0	2	3	0	0	2	3
SR 2	Action	0	0	0	0	2	3	1	2	3	5
	Limit	0	0	0	0	1	6	0	0	1	6
SR 3	Action	0	0	0	1	2	0	0	1	2	2
	Limit	0	0	0	0	1	3	0	0	1	3
SR 4	Action	0	0	0	1	0	6	0	1	0	8
	Limit	0	1	0	0	0	0	0	0	0	1
SR 5	Action	0	1	1	1	0	2	0	0	1	4
	Limit	0	0	0	0	0	0	0	0	0	0
SR 6	Action	0	0	0	0	0	2	0	1	0	3
	Limit	0	0	0	0	0	1	0	0	0	1
SR 7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 8	Action	0	0	0	0	0	0	1	0	1	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR 10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
Total	Action	0	1	1	3	5	13	2	5	30	
	Limit	0	1	0	0	4	13	0	0	18	

Note: S = Surface, M = Mid-depth

- 4.17 Fourty eight exceedances were reported in September. The ET considered the exceedances were mainly due to local effects and poor regional water quality and the exceedances were not attributed to the works of Reclamation Stage 2. The IEC has carried out an assessment of the data based on the NOE submissions of September and concluded that the NOEs recorded in September were not due to the works and no further action was required.
- 4.18 The QA/QC results for laboratory testing in the month were acceptable. The QA/QC results are summarized in Appendix I.

Dissolved Oxygen

- 4.19 Six exceedances were recorded in September. They were recorded at SR3 (1) and 5 (1) during ebb tide and at SR4 (2) and 5 (2) during flood tide on 22 September. The ET considered the

exceedances were not due to the works as during ebb tide, SR3 and 5 are located upstream of Reclamation Stage 2 works area while during flood tide, the DO levels recorded at upstream gradient stations G8 and 9 (stations closer to the construction site) were higher than those recorded at SR4 and 5 (stations further downstream).

Turbidity and Suspended Solids

4.20 For turbidity, thirty-five exceedances were recorded in September, with 18 exceeded Action Level and 17 exceeded Limit Level respectively. Out of the 35 exceedances, 9 were recorded during ebb tide and 26 were recorded during flood tide.

4.21 For suspended solids, seven action level exceedances were recorded in September. Out of the 7 exceedances, 2 were recorded during ebb tide and 5 were recorded during flood tide.

SR1

4.22 Three exceedances of turbidity level at SR1 were recorded during ebb tide. The ET considered that the exceedances were not attributed to works of Reclamation Stage 2 as water quality at SR1 during ebb tide is mainly affected by incoming water from upstream gradient stations G1 and 7. Water quality at G1 and 7 was already poor on monitoring days when exceedance was recorded which suggested that pollution source from Kap Shui Mun Channel had deteriorated the water quality.

4.23 Three exceedances of turbidity level at SR1 were recorded during flood tide. The ET considered that the exceedances were not attributed to works of Reclamation Stage 2 as SR1 is located upstream of Reclamation Stage 2 works area during flood tide.

SR2 & SR3

4.24 Six exceedances of turbidity level and one exceedance of SS level at SR2 and 3 were recorded during ebb tide. The ET considered that water quality at upstream gradient stations G1 and 7 was already poor which suggested pollution source from Kap Shui Mun Channel have already deteriorated the water quality. In addition, water quality to the east and south of the work site was poor at both mid-ebb and mid-flood tides which suggested that regional water quality was already poor. This suggested that the exceedances at SR2 and 3 were not due to works of Reclamation Stage 2. Moreover, coincidence of changes in dredging rates and or change in work method was not observed. No non-compliant on work method, construction plant and frame-type silt curtains was observed.

4.25 Twelve exceedances of turbidity level and three exceedances of SS level at SR2 and 3 were recorded during flood tide. The ET considered that the exceedances were not attributed to works of Reclamation Stage 2 as SR2 and 3 are located upstream of Reclamation Stage 2 works area during flood tide.

Ma Wan Fish Culture Zone

4.26 Eight exceedances of turbidity level and once exceedance of SS level were recorded at SR4 and 5 during flood tide. The ET considered that the exceedances were not due to works of Reclamation Stage 2 as the turbidity and SS levels recorded at upstream gradient stations G8 and 9 (stations closer to the construction site) were lower than those recorded at SR4 and 5

(stations further downstream) which suggested that exceedances at SR4 and 5 were not due to works of Reclamation Stage 2.

SR6

- 4.27 Three exceedances of turbidity level and one exceedance of SS level were recorded at SR6 during flood tide. The ET considered that the exceedances were not due to works of Reclamation Stage 2 as water from Reclamation Stage 2 works area does not reach SR6 during flood tide according to the EIA flow pattern.

Total Inorganic Nitrogen and Un-ionised Ammonia

- 4.28 The monitoring results of total inorganic nitrogen (TIN) and un-ionised ammonia (NH₃N) recorded in September are provided in Appendix F1. Monitoring results in September were comparable to those recorded in the previous month. The EM&A Manual requires that the TIN and NH₃-N monitoring results be compared with the EPD routine monitoring data over the past 5 years. Comparison of monitoring results since commencement of works with EPD's data would be provided in a separate submission.

Monitoring of TBT/PAHs/PCBs

Monitoring Requirements

- 4.29 Monitoring of Tributyl Tin (TBT), Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) levels in waters before and during the initial phases of dredging operations in Penny's Bay is required under Clause 2.15 of the Permit.

Monitoring Equipment

- 4.30 Table 4.5 summarises the equipment used for the monitoring of TBT, PAHs and PCBs.

Table 4.5 TBT, PAHs and PCBs Monitoring Equipment

Equipment	Model and Make
Water Sampler	Widco or Niskin Water sampler

Monitoring Parameters, Frequency and Duration

- 4.31 Table 4.6 summarised the monitoring parameters, frequencies and duration of the monitoring of TBT, PAHs and PCBs. The monitoring parameters and frequency of TBT, PAHs and PCBs monitoring for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Table 4.6 TBT, PAHs and PCBs Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
TPP1, TPP2, TPP2, TPP3, TPP4, TPP5, TPP6 & TPP7	Tributyl Tin (TBT, µg/L), Polycyclic Aromatic Hydrocarbons (PAHs, µg/L), Polychlorinated Biphenyls (PCBs, µg/L)	Two times within one week during mid-ebb and mid-flood tides before dredging Three times per week during mid-ebb and mid-flood tides during dredging (subject to review after 2 months monitoring)	3 (Composite Sample of Surface, Mid-Depth & Bottom)

Monitoring Locations

- 4.32 In accordance with the EM&A Manual, seven stations were designated for TBT, PAHs and PCBs monitoring. The locations of these monitoring stations are summarized in Table 4.7 and depicted in Figure 4.2.

Table 4.7 TBT, PAHs and PCBs Monitoring Locations

Location	HK Metric Grid E	HK Metric Grid N
TPP1	823 798	823 630
TPP2	823 842	823 165
TPP3 (Control)	826 327	818 446
TPP4	824 084	819 562
TPP5	823 238	818 568
TPP6	823 800	820 000
TPP7	819 133	810 932

Monitoring Methodology

- 4.33 Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then packed in cool-boxes (cooled at 4°C without being frozen), and delivered to *ALS Technichem (HK) Pty Ltd.* for the analysis. The Standard Methods for Laboratory Analysis of Water Samples are summarised in Table 4.8. *ALS Technichem (HK) Pty Ltd.* has comprehensive quality assurance and quality control programmes.
- 4.34 A Global Positioning System (GPS) was used to ensure that the correct location was selected prior to sample collection.

- 4.35 A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.

Table 4.8 Standard Methods for Laboratory Analysis of Water Samples

Parameter	Preparation Method	Testing Method
TBT	UNEP/IOC/IAEA *	
PAHs (light)	USEPA 1311	USEPA 8270
PAHs (heavy)	USEPA 1311	USEPA 8270
Total PCBs	USEPA 1311	USEPA 8082

*IAEA's Marine Environment Laboratory reference methods available from UNEP/Water or Marine Environmental Studies Laboratory at IAEA Marine Environment Laboratory.

Results and Observations

- 4.36 Thirteen monitoring sessions were scheduled in September. Monitoring at all designated monitoring stations were performed on schedule other than 2 September when monitoring for ebb tide was cancelled due to issue of Strong Wind Signal No.8 by the Hong Kong Observatory in the afternoon. Tabulated and graphical presentation of monitoring results from 15 August to 12 September are provided in Appendix H. Monitoring results from 14 to 24 September would be provided in the next monthly EM&A report.
- 4.37 In the reporting period, the PAHs and PCBs levels recorded were all below the limit level.
- 4.38 For TBT, eleven exceedances were recorded. They were recorded on 19, 27, 29, 31 August and 10 September. All exceedances were not due to works of Reclamation Stage 2 as the TBT levels recorded were within the range of the levels recorded prior to dredging.

Continuous Marine Water Quality Monitoring

Monitoring Requirements

- 4.39 In accordance with Clause 26.33 of Particular Specification Section 26, 24-hour continuous water quality monitoring at Cheung Sha Wan and Ma Wan Fish Culture Zone (FCZ) were required to be conducted to closely monitor the impacts of works on water quality throughout the duration of the marine works. The monitoring data should be transmitted in real time to the ET, ENPO, EPD, AFCD and ER's offices. The ET should perform data auditing, analyse monitoring data and submit monitoring data to the ER, ENPO, AFCD and EPD. Also, the ET should report the 24-hr continuous water quality monitoring data in the monthly EM&A reports.

Monitoring Equipment

- 4.40 Table 4.9 summarises the equipment of continuous marine water quality monitoring.

Table 4.9 Continuous Marine Water Quality Monitoring Equipment

Equipment	Model
Data Acquisition System	YSI 6200
Multi-Sensor Probe	YSI 6820
Dissolved Oxygen Sensor	YSI 6562
Temperature & Conductivity Sensor	YSI 6560
Turbidity Sensor	YSI 6026

Monitoring Parameters, Frequency and Duration

- 4.41 Table 4.10 summarizes the monitoring parameters and frequencies of continuous marine water quality monitoring.

Table 4.10 Continuous Marine Water Quality Monitoring Parameters, Period and Frequency

Monitoring Station	Parameters (unit)	Frequency	No. of Depths
Cheung Sha Wan FCZ Ma Wan FCZ	Temperature, (°C) Salinity (ppt) Dissolved Oxygen (mg/L) Dissolved Oxygen Saturation (%) Turbidity (NTU)	Continuous	1 to 2 m below water surface (stations mounted on floating platforms)

Monitoring Locations

- 4.42 The locations of the two continuous marine water quality monitoring stations at Cheung Sha Wan and Ma Wan FCZs are summarized in Table 4.11 and depicted in Figure 4.3.

Table 4.11 Continuous Marine Water Quality Monitoring Locations

Type	Location	HK Metric Grid E	HK Metric Grid N
Continuous Monitoring Stations	Cheung Sha Wan	818954	811025
	Ma Wan	823784	823766

*Monitoring Methodology*Operation

- 4.43 Continuous water quality monitoring stations were provided at Cheung Sha Wan and Ma Wan FCZ. The monitoring probes were located at offshore fish racks at both Ma Wan FCZ (about

100 metres from shore) and Cheung Sha Wan FCZ (about 800 metres from shore). Small buoys were placed on the sea surface to indicate the locations of these two monitoring probes. Data loggers and modems were placed inside a storage house on nearby fish rafts.

- 4.44 Water quality parameters of dissolved oxygen, turbidity, salinity and temperature were measured at intervals of 5 minutes. The monitoring data were then transmitted to ER, ENPO, EPD, AFCD and MEMCL Head Office at regular intervals via modems and telephone lines. All these devices were programmed to operate 24 hours a day, 7 days a week.

Maintenance and Calibration

- 4.45 The following practices were implemented to enhance the reliability of the equipment:
- Both sites were visited by ET's field staff at least twice a week to clean and maintain the equipment;
 - All probes were calibrated at least once a week. Calibration method follows those outlined in Section 4.11 to 4.13.

Results and Observations

- 4.46 Appendix G presents the water quality monitoring data and graphical presentation of the monitoring results obtained from Cheung Sha Wan and Ma Wan continuous water quality monitoring station.
- 4.47 DO levels were high while turbidity levels were low in Cheung Sha Wan FCZ.
- 4.48 Periods of high turbidity levels were recorded at Cheung Sha Wan on 15 and 16 September. After inspections these high readings were caused by bio-fouling of the equipment. Turbidity levels dropped back to normal levels after maintenance.
- 4.49 Due to equipment failure no data was recorded at Cheung Sha Wan station from 26 August to 6 September.
- 4.50 DO levels were high while turbidity levels were low in Ma Wan FCZ.
- 4.51 Due to data logger malfunction, no data was recorded at Ma Wan station from 26 August to 16 September and 24 to 25 September.
- 4.52 Apart from the affected period mentioned above, DO and turbidity levels recorded from discrete and continuous water quality monitoring are similar in magnitude. Direct comparison is not possible since these monitoring were not conducted at the exact same location.

5. TERRESTRIAL ECOLOGY

Monitoring Requirements

- 5.1 Monitoring of the White-bellied Sea Eagles at Pa Tau Kwu was required to be conducted by an avian specialist as specified in the EM&A Manual. Appendix M shows the Event and Action Plan for the monitoring works.

Monitoring Equipment

- 5.2 Equipment used for the monitoring includes Fieldscope 20-60x and Binocular 10x.

Monitoring Parameters, Frequency and Duration

- 5.3 Field surveys for the White-bellied Sea Eagles were to be conducted twice per month during periods of breeding activity (October to April), and once per month at other times of the year. Information on the responses to any disturbances, behaviour, and breeding activity of the White-bellied Sea Eagles was recorded. The monitoring frequency for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Monitoring Locations

- 5.4 In accordance with the EM&A Manual, monitoring of the White-bellied Sea Eagles was conducted at Pa Tau Kwu. The monitoring location is shown at Figure 5.1.

Monitoring Methodology

- 5.5 Each monitoring survey was undertaken at Pa Tau Kwu, about 100 m from the nest to avoid disturbance to the normal behaviour of the White-bellied Sea Eagles.
- 5.6 Activities of the White-bellied Sea Eagles, including feeding, perching/roosting, preening, soaring, flying, nesting, and territorial guarding and the time spent on each activity, were recorded. The responses and reactions to any disturbance to the White-bellied Sea Eagles were also recorded.

Results and Observations

Introduction

- 5.7 In the reporting month, field survey was conducted on 9 September between 8:30am and 5:40pm. The construction activity in the vicinity of Pa Tau Kwu on the monitoring day was sediment dredging by grab dredger. The monitoring results are summarised and presented in Table 5.1
- 5.8 Photographic records of the White-bellied Sea Eagle were presented in Figure 5.2.

Table 5.1 Time Allocation (%) for White-bellied Sea Eagle (female and male) activity at Pa Tau Kwu in September 2003

Weather Conditions	Sunny	
	Individual A (female)	Individual B (male)
Feeding	0%	2%
Territorial guarding	0%	0%
Roosting/ Preening	0%	5%
Soaring nearby	0%	0%
Distant flight/ foraging	0%	93%
Incubating	0%	0.0%
Total	0%	100%

Note: Distant flight/foraging includes out of sight time.

Breeding activity

- 5.9 The monitoring month is the last month before the breeding season for local White-bellied Sea Eagles is considered to commence. No breeding activity was recorded.

General observations

- 5.10 During the monitoring visit (9th September), one White-bellied Sea Eagle, thought to be the male bird, was recorded. It appeared to be in a healthy condition. As was the case in last two monitoring surveys (conducted on 26th July and 16th August), the female bird was not seen throughout the observation period. The last sighting of the female bird during monitoring observations was on 4th July for a related project (Infrastructure for Penny's Bay, Contract 1). Despite the apparent absence of the female bird on the monitoring day, the Environmental Team (who were conducting weekly site audits at the time) observed 2 White-bellied Sea Eagles soaring close to each other over the Pa Tau Kwu Headland on September 19th. The birds flew close to one another for a short period before flying away in separate directions.
- 5.11 Over the monitoring day, the single White-bellied Sea Eagle (considered to be the male) spent most of the time (about 93%) in distant flight or out of sight. At about 2pm was the only part of the day that the WBSE was in view. The bird spent time (5%) perching and preening in a *Ficus variegata* tree at the nesting territory and also consuming unidentified prey (2%) which was brought back to the perch from distant flight.

Disturbance

- 5.12 No behaviours indicating disturbance to the WBSE from construction works of Reclamation Stage 2 were observed.

Conclusion

- 5.13 White-Bellied Sea Eagle monitoring was undertaken on 9th September 2003. A single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site during the monitoring day. The female bird was not recorded on the monitoring day, but the presence of two White-bellied Sea Eagles soaring over Pa Tau Kwu was noted by the ET during weekly

site inspection on 19th September. According to monitoring observations on 9th September, it appeared that the male bird was in healthy condition. No behaviour to indicate disturbance from the project works was recorded during the observation period.

6. MARINE MAMMAL MONITORING

Monitoring Requirements

- 6.1 Construction-phase marine mammal monitoring is required to be conducted by a qualified research team to evaluate whether there have been any effects on the animals.

Monitoring Equipment

- 6.2 Table 6.1 summarises the equipment used for the marine mammal monitoring.

Table 6.1 Marine Mammal Monitoring Equipment

Equipment	Model
Global Positioning System (GPS)	Magellan NAV 5000D
Camera	Canon auto-focus camera with 300m zoom lens
Laser Binoculars	Busnell Yardage Pro
Marine Binocular	Fujinon 7 × 50 marine binocular with compass

Monitoring Parameter, Frequencies and Duration

- 6.3 Marine mammal monitoring is required twice per month. The monitoring data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong. The monitoring frequency for the month are described in the following sections. The monitoring schedule for the month is provided in Appendix C.

Monitoring Location

- 6.4 The marine mammal monitoring was conducted at East Lantau. The detailed monitoring location with transect lines are shown in Figure 6.1.

Monitoring Procedures

- 6.5 Line transect surveying techniques have now been standardised in Hong Kong Special Administrative Region Waters, in order to ensure that data from all surveys are directly comparable.
- 6.6 Survey boat was equipped with an open upper deck, which allowed for observer eye levels at 4-5m above water level and relatively unobstructed forward visibility between 270⁰ and 90⁰. When monitoring started, the boat travelled along the transects at a speed of approximately 7-8 knots (13-15 km/hr).
- 6.7 On arrival at East Lantau survey area, the survey vessel, containing four vessel-based survey

personnel proceeded along transects in the vicinity of the reclamation area. On the return journey, observations for incidental dolphin sightings were undertaken. Observations continued until the boat reached the designated arrival/departure pier.

Vessel-based Observations

- 6.8 A critical consideration in the survey was to ensure a strict timed quantification of “sighting effort” in order to maximise the comparative value of the field survey results. The time and position for the start and end of a period of intensive, uninterrupted effort and the sighting conditions associated with it were recorded. The collection of effort data allowed comparisons to be made with a single study as well as between studies. Strict recording of time, speed, position and distance travelling along the designated transect (“on-effort”) were recorded. Time spent during any deviation from the transect was recorded as “off-effort”. This effort data allowed dolphin abundance to be calculated using line transect methodology.
- 6.9 Vessel-based transect observations by a 4 person team were conducted by searching the 180⁰ degree swath in front of the survey vessel (270⁰ – 90⁰). The area behind the vessel was not searched, although dolphins observed here can be recorded as off-effort sightings. There were four survey personnel on board the vessel. A primary observer scanned the entire search path (270⁰ – 90⁰) continuously with 7x50 marine binoculars with the second member of the team designated the data recorder, scanned the same area with naked eyes and occasional binocular checks. The third observer rotated into the observation team after half an hour, thus relieving one of the initial team members. Observers were shifted every half-hour. While on-effort, observers were instructed to ignore potential sighting cues that could bias the sighting distance calibration (e.g. pair-trawl fishing vessels).
- 6.10 A Global Positioning System should be available onboard during every field survey.
- 6.11 Sighting records for the initial sighting with time, position, distance, and angle data were recorded during the survey, and verified between primary observer and data recorder. All other information, such as sea state, weather conditions (Beaufort Scale), as well as notes on dolphin group size, age classes, behaviour, association with fishing boat, direction of movement, response to boat and others were completed at the end of the sighting. Standard forms for all dolphin monitoring were used.

Results and Observations

- 6.12 Marine mammal surveys were conducted on 11 and 18 September. The weather was sunny on both days.
- 6.13 No dolphin or porpoise was observed on both days.
- 6.14 No other factor, including weather conditions that might have affected the results of the monitoring was observed.
- 6.15 No disturbance to the marine mammals due to construction activities was observed in the reporting month.

7. SUBTIDAL MONITORING

Monitoring Requirements

- 7.1 No subtidal monitoring was scheduled for the month. The next subtidal monitoring is scheduled in February 2004 as the monitoring frequency is once every six months.

8. ENVIRONMENTAL AUDIT

Site Environmental Audit

- 8.1 Site audit would be carried out once per week to monitor environmental issues on the construction sites to ensure that all mitigation measures were implemented timely and properly. The site audit records of September 2003 are attached in Appendix K.

Review of Environmental Monitoring Procedures

- 8.2 The monitoring works conducted by the monitoring team were inspected regularly. The following observations have been recorded for the monitoring works:

Air Quality Monitoring

- The monitoring team recorded all observations around the monitoring stations within and outside of the construction site.
- The monitoring team recorded the temperature, air pressure and weather conditions on the monitoring day.

Noise Monitoring

- The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring result.
- Major noise sources were identified and recorded. Other intrusive noise attributing to the result was trimmed off by pausing the monitoring temporarily.

Water Quality Monitoring

The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring results.

- Major water pollution sources were identified and recorded.

Ecology Monitoring

- The avian specialist recorded all observations around the monitoring location, which might affect the result.
- Major disturbances, if any, were identified and recorded.

Status of Environmental Licensing and Permitting

- 8.3 All permits/licences obtained as of September 2003 are summarised in Table 8.1.

Table 8.1 Summary of Environmental Licensing and Permit Status

Permit No.	Valid Period		Section	Status
	From	To		
Environmental Permit				
EP-054/2000/D	06/03/03	N/A	Reclamation of about 280 ha. of land at Penny's Bay, construction of about 3.3 km of seawall, two ferry piers and construction of about 1.5km long open drainage channel.	Valid
Construction Noise Permit				
GW-UW0208-03	23/07/03	20/01/04	Derrick barge, tug boat, grab dredger, hopper barge, pelican barge, generator, lorry with crane at Penny's Bay (evening and night-time).	Valid
Dumping Permit				
EP/MD/04-019	19/06/03	30/09/03	Hopper barge.	Valid
EP/MD/04-057	1/10/03	15/03/04	Hopper barge.	Valid

Implementation Status of Environmental Mitigation Measures

- 8.4 During site inspections in September, the following observations and recommendations were made.

Dust Mitigation Measures

- 8.5 No violation was observed during site inspections in the month.

Water Quality Mitigation Measures

- 8.6 Silt curtains were maintained regularly.
- 8.7 Minor splashing of material was observed during loading of a barge. The Contractor was reminded to avoid splashing of material during loading of barges. The loading practice was improved by the next site inspection.
- 8.8 Stockpiles of sand located at Portion A2 which belongs to Penny's Bay Rail Link Contract were not covered entirely. The Contractor was reminded to cover all stockpiles on-site properly. The situation was improved by the next site inspection.

Noise

- 8.9 Quiet plants were adopted for construction activities. Quiet plants including grab dredger, hopper barge, tug boat, derrick barge, generator and crane lorry were used for works near Pa Tau Kwu. Noise assessment had shown these plants adopted on-site were quiet plants as their sound power level (SPL) were below the SPL as specified in the *Technical Memorandum on Noise from Construction Work Other than Percussive Piling*.

- 8.10 The Contractor was reminded to properly display the Construction Noise Permit (CNP) at the site entrance for inspection. The CNP was properly displayed by the next site inspection.

Ecology

- 8.11 No violation was observed during site inspections in the month.

Waste / Chemical Management

- 8.12 Drip tray with adequate capacity was provided to the waste oil drum in the temporary Chemical Waste Storage Area at Portion B4. Rainwater in drip tray with waste oil drums was also removed.
- 8.13 The Contractor was recommended to provide a valve to the drip tray under the generator. A valve was provided by mid-September. However, the valve was broken and the Contractor was recommended to replace it as soon as possible.
- 8.14 A Chinese character on the label of the chemical waste storage area was incorrect. The Contractor was reminded to rectify the character as soon as possible.

Landscape and Visual

- 8.15 No violation was observed during site inspections in the month.

Environmental Mitigation Implementation Schedule (EMIS)

- 8.16 According to the Environmental Permit, the mitigation measures detailed in the permits are required to be implemented. An updated summary of the EMIS is presented in Appendix L.

Implementation Status of Event/Action Plans

- 8.17 The Event and Action Plans for air quality, noise, water quality and white-bellied sea eagle are presented in Appendix M.
- 8.18 No exceedance of Action/Limit Levels for 24-hour TSP concentrations was reported in the month.
- 8.19 No exceedance of noise limit level during daytime was recorded in the month. Exceedance of noise limit level during evening time and night time were not due to works of Reclamation Stage 2. No action was required to be carried out.
- 8.20 All exceedances of water quality were not due to works of Reclamation Stage 2. No action was required to be carried out.
- 8.21 All exceedances of TBT were not due to works of Reclamation Stage 2. No action was required to be carried out.

Implementation Status of Environmental Complaint Handling Procedures

Summary of the Complaints and Prosecutions

- 8.22 Appendix N presents the environmental complaint flow diagram of the Project. No complaint, summons or prosecution related to environmental issues was received or made against the Project in September 2003.

9. FUTURE KEY ISSUES

Key Issues for the Coming Month

9.1 Key issues to be considered in the coming month include:

- Generation of dust from activities on-site
- Noise from operating equipment and machinery on-site
- Loss of sediment from dredging and filling
- Maintenance of silt curtains
- Storage of chemicals/fuel and chemical waste/waste oil on site

Monitoring Schedules for the Next Month

9.2 The environmental monitoring schedules for the next month are shown in Appendix C.

Construction Program for the Next 3 Months

9.3 The construction programme for the next 3 months is shown in Appendix O.

10. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 10.1 Environmental impact monitoring was performed in September 2003. All monitoring results in the reporting month were checked and reviewed.
- 10.2 All measured 24-hour TSP concentrations in the month were below the Action and Limit (AL) Levels.
- 10.3 One exceedance of limit level at evening time and fifty four exceedances of limit level at night time were recorded in September. For exceedances recorded at NM1 and NM2, ET's assessment had shown that the work method and number of plants on-site were similar throughout the reporting period or the measured noise levels were within the range of the baseline level. For exceedances recorded at NM3, ET's assessment had shown that no land-based construction activity related to works of Reclamation Stage 2 was conducted nearby NM3. These exceedances were thus not due to the works of Reclamation Stage 2 and this has been confirmed by the IEC.
- 10.4 For DO, turbidity and suspended solids, forty eight water quality exceedances were recorded in the reporting month. The ET considered the exceedances were not attributed to the works of Reclamation Stage 2. The IEC has carried out an assessment of the data based on the exceedance investigation reports and concluded that all exceedances recorded in the reporting month were not due to the works and no further action is required.
- 10.5 TIN and NH₃-N monitoring results were comparable to those recorded in the previous month. Comparison of monitoring results since commencement of works with EPD's data would be provided in a separate submission.
- 10.6 PAHs and PCBs levels recorded were all below the limit level. For TBT, eleven exceedances were recorded. All exceedances were not due to works of Reclamation Stage 2 as the TBT levels recorded were within the range of the levels recorded prior to dredging.
- 10.7 DO and turbidity levels recorded at continuous marine water quality monitoring station at Cheung Sha Wan and Ma Wan were generally comparable with those obtained from discrete marine water quality monitoring.
- 10.8 A single White-bellied Sea Eagle, considered to be the male, was observed at the monitoring site during the survey in September. The female bird was not recorded on the monitoring day, but the presence of two White-bellied Sea Eagles soaring over Pa Tau Kwu was noted by the ET during weekly site inspection on 19th September. There was no evidence to indicate that the works of Reclamation Stage 2 have disturbed the White-bellied Sea Eagles.
- 10.9 No dolphin or porpoise was observed in the reporting month. No disturbance to the marine mammals due to construction activities was therefore observed in the reporting month.
- 10.10 No complaint, summons or prosecutions related to environmental issues was made against the Penny's Bay Reclamation Project in the reporting period.

Recommendations

10.11 According to the environmental audit performed in the reporting month, the following recommendations are made:

Air Quality Impact

- To prohibit any open burning on site.
- To regularly maintain the machinery and vehicles on site.
- To follow up any exceedance caused by the construction works.
- To implement dust suppression measures on dry surfaces.

Noise Impact

- To inspect the noise sources from inside and outside of the site.
- To follow up any exceedance caused by the construction works.
- To space out noisy equipment and position as far away as possible from sensitive receivers.

Water Impact

- To regularly maintain the silt curtains and make sure they are in the right positions.
- To complete the construction of seawall as early as practicable.
- To ensure barges are loaded carefully to avoid splashing of material.
- To ensure open stockpiles of construction materials are covered with tarpaulin or similar fabric during rainstorm.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To avoid any discharge of chemical waste or oil directly from the site.