

## Ocean Park Master Redevelopment Project

### Quarterly Environmental Monitoring & Audit Report – from January to March 2012

Certified by  on 20-April-12

Lindsay Pickles (ETL)

Verified by Independent Environmental Checker on 20-April-12

IEC Certificate attached in the submission? Yes

Ocean Park Master Redevelopment Project

Quarterly EM&A Report for January to March 2012

Submitted by Ocean Park Corporation on 20-04-2012

This is to verify that

Quarterly EM&A Report for January to March 2012

Submitted by Ocean Park Corporation

On 20-04-2012

Has been verified by the undersigned.

Signed



Dr Anne F Kerr  
Independent Environmental Checker (IEC)  
Retained by Ocean Park Corporation  
pursuant to Environmental Permit No. EP-249/2006/B

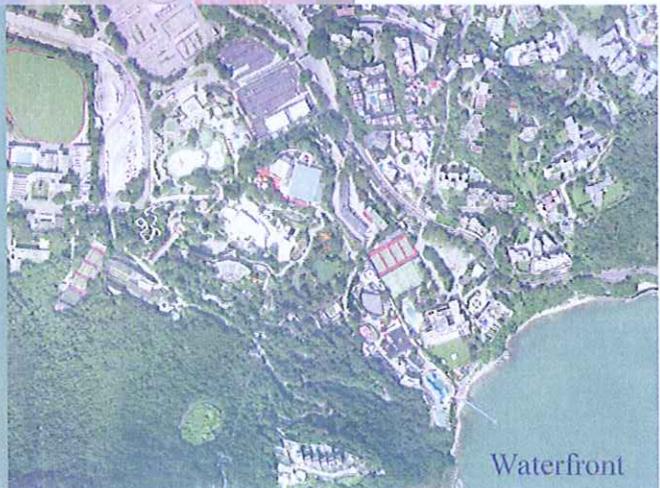
Date

20 April 2012



## Ocean Park Master Redevelopment Project

Quarterly Environmental Monitoring & Audit Report –  
from January 2012 to March 2012



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## EXECUTIVE SUMMARY

This is the twentieth combined Quarterly Environmental Monitoring and Audit (EM&A) report for the Project "Master Redevelopment Project of Ocean Park". This report summarizes the EM&A works performed in the period between 26 December 2011 and 25 March 2012 for construction works and between 27 November 2011 and 26 February 2012 for Operational monitoring.

On completion of the works and opening of the Entry Plaza, Aqua City and Grand Aquarium to the public on 27 January 2011, the construction works under CI07 have been completed, and, as advised to EPD on 1 April 2011 (PD/PW/GOV/151/006107), no further construction monitoring for noise and air quality would be carried out.

Environmental monitoring for the Parks Operations commenced upon the opening of Aqua City and with the commencement of the Symbio Show on 27 January 2011.

Following the completion of one year's monitoring, a justification paper has been presented for the termination of the Air Quality (RSP) and Noise monitoring programmes for the operation of the Lagoon night shows. Approval has been received on 13 February 2012

### Environmental Monitoring – Construction Works

#### *Environmental Monitoring and Audit Progress*

A summary of monitoring and audit activities for the construction works conducted in the reporting quarter is listed below:

Coral monitoring	1 session for Site 1-5 and Control Station C
Environmental site inspection	3 sessions (include IEC audit)

#### *Air Quality & Noise Monitoring*

Construction air quality & Noise monitoring have ceased since January 2011

#### *Terrestrial Ecology*

Terrestrial ecology monitoring had ceased since September 2008.

#### *Coral Monitoring*

The ninth coral monitoring survey, after the Coral Re-tagging exercise in November 2009, was conducted on 5 February 2012 for Site 1-5 & Control Station in the reporting quarter. The results showed that there was no exceedance of Action and Limit Levels.

### *Environmental Monitoring – Symbio Show*

Monitoring was carried out from 27 November 2011 – 26 February 2012, for Operational Monitoring.

To satisfy potentials concerns over RSP concentrators, monitoring has been carried out at a total of 3 monitoring stations. Monthly monitoring has taken place at each of the monitoring stations. No exceedance of A/L Level is monitored during the reporting period.

Noise monitoring was conducted at five designated noise monitoring locations in accordance with the approved EM&A Manual with 27 measurement sessions being carried out at each of the 5 monitoring stations.

Noise Monitoring results indicated that the background corrected Noise Levels have complied with the Limit Levels at most of the monitoring stations during most of the monitoring dates.

Noise exceedances in the background corrected noise levels were recorded at AON1 (Open Area adjacent to Police Training School), due to high background noise from visitors and traffic, at AON3 (Woodgreen Estate) and AON5 (Hau Yuen) due to the traffic noise from Shouson Hill Road and at AON4 (Manly Villa) due to insect noise.

#### ***Environmental Complaints and Prosecutions***

No complaint, non-compliance from IEC, summons or prosecution related to environmental issues was made against the Project within the reporting quarter.

## 1. INTRODUCTION

### Background

- 1.1 The “Master Redevelopment Project of Ocean Park” (hereinafter known as the “Project”) is implemented by the Ocean Park Corporation at its existing site of Ocean Park and Nam Long Shan, Aberdeen. The Project involves both reconstruction/modification of existing facilities and expansion of the Park, and therefore under Environmental Permit, EP-249/2006/B.
- 1.2 The construction works of the project consists of various contracts. Details of the contracts, which are required to perform the EM&A programme, are shown in **Table 1.1** below.

**Table 1.1 Details of the Contracts**

Contract No.	Contract Title	Contractor	Construction Commencement	Construction Completion
CI-05	Site Formation, Funicular Tunnel and Miscellaneous Works	Dragages-Bouygues JV	12 March 2007	June 2009
CS-01	Vet Hospital	Kaden – ATAL JV	26 March 2007	October 2008
CW-02	Astounding Asia	W. Hing Construction Co. Ltd.	1 August 2007	February 2010
CI-07	Entry Plaza, Aqua City and Grand Aquarium	Leighton Construction (Asia) Limited	15 August 2008	January 2011
CS-02	Rainforest	W. Hing Construction Co. Ltd.	11 May 2009	April 2011
CS-03	Thrill Mountain & Polar Adventure	Kaden – ATAL JV	2 November 2009	Ongoing

- 1.3 The contractors will conduct environmental monitoring and audits during the construction stage and produce contract specific monthly & quarterly EM&A reports. The RSS would prepare a combined quarterly EM&A for the whole project. This is the combined quarterly EM&A Report including the IEC audit findings for CS03 EM&A Works together with the Environmental Monitoring for the Park’s Operation and the Symbio Show. This report presents the results of EM&A works conducted in the reporting quarter from 26 December 2011 to 25 March 2012 for construction works and in the reporting month of 27 November 2011 – 26 February 2012, for Operational Monitoring.

### Project Organization and Contacts of Key Management

- 1.4 An organization structure and the line of communication were set up for the Project between the Project Proponent, Project Manager’s Representative (PMR), Independent Environmental Checker (IEC), the Contractor and the Environmental Team (ET). The project organization and contact details of key management are shown in **Figure 1.1** and **Appendix A** respectively.

### Construction Activities during the Reporting Quarter

- 1.5 Construction Activities had ceased for the following contracts.
- Waterfront (CI-05) – Construction Phase had ceased in early June 2009
  - Vet Hospital (CS-01) – Construction Phase had ceased in mid October 2008
  - Astounding Asia (CW-02) – Construction Phase had ceased in mid February 2010
  - Entry Plaza, Aqua City and Grand Aquarium (CI-07) - Construction Phase had ceased in January 2011

- Rainforest (CS02) - Construction Phase had ceased in April 2011

1.6 The site activities during the reporting quarter are summarized in **Table 1.2**. The status of Construction permits is provided in **Appendix B**.

**Table 1.2 Summary of Works undertaken in the Reporting Quarter**

Thrill Mountain and Polar Adventure (CS03)

Item	Work Activity	Month		
		Jan 12	Feb 12	Mar 12
1	Finishing & fitting out works at Tuxedos Restaurant of South Pole	√	√	√
2	Finishing works of Bobsled Station superstructure	√	√	√
3	Installation of Bobsled ride	√	√	√
4	Wet trade at Bobsled Station	√		
5	Finishing works at Floorless Coaster Station	√		
6	Defect works at Thrill Mountain	√		
7	Carry out wall finishing works for PA Building	√	√	√
8	Install all the ceiling area & E&M services		√	√
9	Apply wall painting & Timber door in P.A Building		√	√
10	Install kitchen equipment & lavatory sanitary		√	√
11	Install Wall Stone Tile		√	√
12	Install glass doors, balustrade & Walls in P A Building			√
13	Installation of theme works at PA Building	√	√	√
14	Disposal of existing Stockpile	√	√	√

Layout plans of the Project are provided in Figure 1.2 (CS-03 Thrill Mountain and Polar Adventure).

1.7 The status of submissions until 25 March 2012 as specified in the Environmental Permit No. EP-249/2006/B is presented in Table 1.3.

**Table 1.3 Status of Environmental Submissions**

EP-249/2006/B Condition	Submission	Revision	Status
<b>Contract CI05</b>			
1.12	Notification of Commencement Date of construction stage	Dated 14 February 2007	Submitted to EPD on 15 February 2007
2.3	Management Organization	Dated 15 December 2006	Submitted to the EPD on 29 December 2006.
2.4	Construction Programme	2 Dated 14 February 2007	Submitted to the EPD on 15 February 2007

EP-249/2006/B Condition	Submission	Revision	Status
2.13	Drainage Proposal	A2 Dated 26 April 2007	Placed in EIAO Register Office for public information on 30 May 2007
2.14	Silt Curtain Proposal	B Dated 30 January 2007	Placed in EIAO Register Office for public information on 1 March 2007
2.18	As-built Drawing for Enhancement Works for Pond 35	A Dated 17 July 2007	Placed in EIAO Register Office for public information on 7 August 2007
2.20a	Transplantation Proposal for Uncommon Plant Species	D Dated 27 August 2007	Placed in EIAO Register Office for public information on 25 September 2007
2.20b	Detailed Compensatory Planting As-built Drawing	A Dated 4 October 2007	Placed in EIAO Register Office for public information on 30 October 2007
2.21	Waste Management Plan	D Dated 27 August 2007	Placed in EIAO Register Office for public information on 25 September 2007
3.3	Baseline Air Quality and Noise Monitoring Report	B Dated 28 February 2007	Submitted to the EPD on 5 March 2007
3.3	Baseline Coral Survey Report	A Dated 13 June 2007	Submitted to the EPD on 18 June 2007
<b>All Contract (including CW02, CI07, CS02 &amp; CS03)</b>			
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for October to December 2009	A Dated	Submitted to the EPD on 22 February 2010
3.4	Monthly EM&A Report for January 2010	A Dated 1 March 2010	Submitted to the EPD on 5 March 2010
3.4	Monthly EM&A Report for February 2010	A Dated 17 March 2010	Submitted to the EPD on 22 March 2010
3.4	Monthly EM&A Report for March 2010	A Dated 21 March 2010	Submitted to the EPD on 26 March 2010
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for January to March 2010	A Dated 23 April 2010	Submitted to the EPD on 28 April and re-submit on 17 May 2010
3.4	Monthly EM&A Report for April 2010	A Dated 31 May 2010	Submitted to the EPD on 3 June 2010
3.4	Monthly EM&A Report for May 2010	A Dated 21 June 2010	Submitted to the EPD on 22 June 2010
3.4	Monthly EM&A Report for June 2010	A Dated 14 July 2010	Submitted to the EPD on 15 July 2010
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for April to June 2010	A Dated 16 July 2010	Submitted to the EPD on 16 July 2010
3.4	Monthly EM&A Report for July 2010	A Dated 11 August 2010	Submitted to the EPD on 13 August 2010

EP-249/2006/B Condition	Submission	Revision	Status
3.4	Monthly EM&A Report for August 2010	A Dated 9 September 2010	Submitted to the EPD on 13 September 2010
3.4	Monthly EM&A Report for September 2010	A Dated 11 October 2010	Submitted to the EPD on 13 October 2010
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for July to September 2010	A Dated 11 October 2010	Submitted to the EPD on 13 October 2010
3.4	Monthly EM&A Report for October 2010	A Dated 10 November 2010	Submitted to the EPD on 10 November 2010
3.4	Monthly EM&A Report for November 2010	A Dated 14 December 2010	Submitted to the EPD on 14 December 2010
3.4	Monthly EM&A Report for December 2010	A Dated 24 February 2011	Submitted to the EPD on 24 February 2011
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for October to December 2010	A Dated 16 March 2011	Submitted to the EPD on 17 March 2011
3.4	Monthly EM&A Report for January 2011	A Dated 4 March 2011	Submitted to the EPD on 4 March 2011
3.4	Monthly EM&A Report for February 2011	A Dated 4 April 2011	Submitted to the EPD on 4 April 2011
3.4	Monthly EM&A Report for March 2011	A Dated 28 April 2011	Submitted to the EPD on 28 April 2011
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for January to March 2011	A Dated 16 March 2011	Submitted to the EPD on 17 March 2011
3.4	Monthly EM&A Report for April 2011	A Dated 25 May 2011	Submitted to the EPD on 25 May 2011
3.4	Monthly EM&A Report for May 2011	A Dated 22 May 2011	Submitted to the EPD on 22 May 2011
3.4	Monthly EM&A Report for June 2011	A Dated 1 August 2011	Submitted to the EPD on 1 August 2011
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for July to September 2011	A Dated 1 November 2011	Submitted to the EPD on 1 November 2011
3.4	Monthly EM&A Report for October 2011	A Dated 1 December 2011	Submitted to the EPD on 1 December 2011
3.4	Monthly EM&A Report for November 2011	A Dated 21 December 2011	Submitted to the EPD on 21 December 2011
3.4	Monthly EM&A Report for December 2011	A Dated 16 December 2011	Submitted to the EPD on 7 February 2012
3.1 and under Section 13.14 of EM&A Manual	Quarterly EM&A Report for October to December 2011	A Dated 7 February 2012	Submitted to the EPD on 7 February 2012

EP-249/2006/B Condition	Submission	Revision	Status
3.4	Monthly EM&A Report for January 2012	A Dated 17 February 2012	Submitted to the EPD on 21 February 2012
3.4	Monthly EM&A Report for February 2012	A Dated 22 March 2012	Submitted to the EPD on 22 March 2012
3.4	Monthly EM&A Report for March 2012	A Dated 17 April 2012	Submitted to the EPD on 23 April 2012
<b>CityBus Limited</b>			
2.5	Written Notice on Completion of Total Petroleum Hydrocarbon (TPH) Contaminated Soil Disposal	Dated 17 January 2007	Submitted to the EPD on 22 January 2007
2.6	Written Notice on Completion of Solidification Treatment of Heavy Metals Contaminated Soil	Dated 17 January 2007	Submitted to the EPD on 22 January 2007.
2.8	As-built Remediation Plan	Dated 14 March 2007	Submitted to the EPD on 16 March 2007
<b>Hong Kong School of Motoring Ltd.</b>			
2.10	Confirmation letter to confirm that land contamination remediation works within HKSM has been completed	Dated 13 April 2007	Submitted to EPD on 13 April 2007.
<b>Environmental Permit Conditions</b>			
2.24	Glare Impact Assessment Report	Dated 9 June 2010	Submitted to EPD on 11 June 2010.
2.25	Noise Review Study Report	Dated 14 October 2010	Submitted to EPD on 19 October 2010.
2.29	Air Quality Sampling Plan	Dated 14 October 2010	Submitted to EPD on 25 November 2010.
2.31	Air Quality Monitoring Programme	Dated 13 April 2011	Submitted to EPD on 28 April 2011
2.31	Trial PSEM Displays - Air Quality Monitoring Report	Dated 28 January 2011	Submitted to EPD on 28 January 2011
2.31	Use of PSEM for Two Shows - Air Quality Sampling Plan	Dated 21 November 2011	Submitted to EPD on 21 November 2011
2.31	Trial PSEM Displays - Preliminary Air Quality Monitoring Results	Dated 14 December 2011	Submitted to EPD on 14 December 2011
2.29	Trial Two PSEM Displays – Air Quality Monitoring Report	Dated 5 February 2012	Submitted to EPD on 7 February 2012
2.16	Shrubland Compensatory Proposal	Dated 14 February 2012	Submitted to EPD on 27 February 2012

## 2. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

### Monitoring Parameters and Locations

#### Construction Works

- 2.1 Under EP-249/2006/B condition 3.2, impact environmental monitoring, including sampling, measurements and necessary remedial action should be conducted in accordance with the requirements of the EM&A Manual, which has been updated to include operational monitoring or the Ocean Park Symbio Show.
- 2.2 Contract CS03 at the Summit for the Thrill Mountain and Polar Adventure is still underway. However, other than ongoing Coral Survey, no construction monitoring will be undertaken for those works, only auditing works. The audits will continue to be carried out by the Contractors ET and OPC's ET and verified by the IEC.

#### Coral

- 2.3 The locations of the coral monitoring stations are presented in the table below and as shown in the **Figure 1.3**.

Coral Impact Monitoring Stations	Identity/Description
Site 1	Seaside near the Lowland
Site 2 to Site 5	Around Headland
Control Station	Between Near Round Island and Chung Hom Kok

#### Ocean Park Symbio Show

- 2.4 Operational Stage Monitoring for Ocean Park Symbio Show commenced on the 27 January 2011.
- 2.5 Air Quality monitoring was conducted monthly at the agreed designated air quality monitoring station (AQMS) located at locations as presented in **Table 2.1** below and as indicated in **Figure 1.4**:

AQMS ID	Location	Sampling Height (m above ground)
AM1	Rooftop of Administrative Building (former Staff Quarter) in Ocean Park	10
AM2	Landscape Storage Area in Ocean Park	3
AM3	Rooftop of Main Medical Block of Graham Hospital	20

**Table 2.1 - Location of Air Quality Monitoring Stations**

- 2.6 One 24-hr average RSP sample was collected on each scheduled day for monitoring by a High Volume Sampler (HVS) following the USEPA method, EPA IO-2.1. Calibration of the equipment has followed the requirements set out in EPA IO-2.1.
- 2.7 Noise monitoring was conducted at five designated noise monitoring locations in accordance with the approved EM&A Manual. Alternative noise monitoring had been proposed because of accessibility problem, as set out in **Table 2.2** below and in **Figure 1.5**.

Monitoring Noise Monitoring Stations	Description	Location	With or without Façade Correction
AON1	Open Area adjacent to Police Training School	1.2m above street level	Without façade correction
AON2	Old canteen building, Ocean Park	1.2m above street level	With façade correction
AON3	Woodgreen Estate	1.2m above street level near the entrance gate	Without façade correction
AON4	Manly Villa	1.2m above street level near the entrance	With façade correction
AON5	Hau Yuen	1.2m above street level outside boundary wall	With façade correction

**Table 2.2 - Location of Noise Monitoring Stations**

- 2.8 Six consecutive measurements of LAeq, 5 min reading were carried out to calculate the LAeq, 30 min noise level during the Lagoon Show.
- 2.9 Six consecutive measurements of LAeq, 5 min reading were carried out to calculate the LAeq, 30 min noise level before the lagoon night show, ie during daily operation of the Ocean Park without the Lagoon Show.
- 2.10 Three consecutive measurements of LAeq, 5 min reading were carried out to calculate the LAeq, 15 min noise level after the lagoon night show, ie without operation of the Ocean Park to establish the background noise levels.
- 2.11 Any significant influencing factors on the measured noise levels were taken into account in accordance with standard acoustical principles and practices. The corrected noise level due to the lagoon night show and the operation of Ocean Park was computed based on the background noise level and measured noise level.

#### **Monitoring Methodology and Calibration Details**

- 2.12 All monitoring works were conducted and monitoring equipment was regularly calibrated in accordance with the EM&A Manual. The calibration certificates were provided in the Monthly EM&A report.

#### **Environmental Quality Performance Limits (Action and Limit Levels)**

- 2.13 The environmental quality performance limits, i.e. Action and Limit levels (AL Levels) were derived from the baseline monitoring results and/or other approaches as detailed in the EM&A Manual. Should the measured environmental quality parameters exceed the AL Levels, the respective action plans would be implemented.

#### **Environmental Mitigation Measures**

- 2.14 Relevant mitigation measures as recommended in the Project EIA Report had been stipulated in the EM&A Manual and EMIS for the Contractor to adopt.

### 3. MONITORING RESULTS

#### Construction Monitoring Results

- 3.1 Construction monitoring has been completed in January 2011 and no construction monitoring has taken place in the reporting quarter.

#### Terrestrial Ecology

- 3.2 The monitoring of transplanted plants at the receptor has been completed in August 2008.

#### Marine Ecology

- 3.3 The 9th coral monitoring survey, after the Coral Re-tagging exercise in November 2009, was conducted on 5 February 2012. The monitoring survey showed that the change in level of sedimentation on the tagged colonies was minor and all tagged corals were in good condition and healthy in all the 5 monitoring Sites and the Control Site C. Neither Action nor Limit levels of sedimentation, bleaching or mortality was exceeded. The table of results are shown in **Appendix C**.

#### Operational Stage Monitoring for Ocean Park Symbio Show - Air Quality

- 3.4 For Air Quality Monitoring, 24-hr average Respirable Suspended Particulates (RSP) monitoring was conducted at a designated monitoring stations AM1, AM2 and AM3 13 – 14 Dec 2011, 21-22 Jan 2012, and 4 Feb 2012 as detailed in **Table 3.1** below.
- 3.5 Due to mechanical failure of the High Volume Sampler (HVS), no 24-hour average RSP concentrations were monitored at AM1, AM2 and AM3, in the reporting period of 26 October 2011 to 25 November 2011. Results from the monitoring subsequently carried out on 28-29 Nov 2011, November 2011, which were not able to be reported in the previous quarterly report, are provided below.
- 3.6 No exceedance of A/L Level was reported during the monitoring period. The graphical presentation of the monitoring results is provided in **Appendix D**.

Monitoring Location	Monitoring Date	24-hr RSP Concentration ( $\mu\text{gm}^{-3}$ )	Action/Limit Level ( $\mu\text{gm}^{-3}$ )
AM1 (Rooftop of Administrative Building (Old Staff Quarters in Ocean Park))	28-29 Nov 2011	31	180
	13-14 Dec 2011	78	180
	21-22 Jan 2012	40	180
	4 Feb 2012	33	180
AM2 (Landscape Storage Area)	28-29 Nov 2011	33	180
	13-14 Dec 2011	77	180
	21-22 Jan 2012	38	180
	4 Feb 2012	31	180
AM3 (Rooftop of the Main Medical Block of Graham Hospital)	28-29 Nov 2011	33	180
	13-14 Dec 2011	87	180
	21-22 Jan 2012	43	180
	4 Feb 2012	32	180

**Table 3.1 - Air Quality Monitoring Results**

### Operational Stage Monitoring for Ocean Park Symbio Show - Noise

- 3.7 Noise Monitoring results indicated that the background corrected Lagoon Night Show Noise Levels have complied with the Limit Levels at all of the monitoring stations during all except one of the monitoring dates. The graphical presentation of the monitoring results is provided in **Appendix E**.
- 3.8 Noise Monitoring results indicated that the background corrected Noise Levels have complied with the Limit Levels at most of the monitoring stations during most of the monitoring dates.
- 3.9 Noise exceedances in the background corrected noise levels were recorded at AON1 (Open Area adjacent to Police Training School), due to high background noise from visitors and traffic, at AON3 (Woodgreen Estate) and AON5 (Hau Yuen) due to the traffic noise from Shouson Hill Road and and at AON4 (Manly Villa) due to insect noise.

**Table 3.2 - Summary of Daily Operational Noise Exceedance during this Reporting Period**

Date	Noise Monitoring Station	Measured Noise Level, dB(A)		Daily Operational Noise Level, (Background Corrected) <sup>(a)</sup> , Leq (30 min) dB(A)	Limit Level Leq (30 min) dB(A)
		Daily Operational Noise Level Leq (30 min) dB(A)	Background Noise Level, Leq (15 min) dB(A)		
27 Nov 2011 (Public Holiday)	AON3	65.2 <sup>(b)</sup>	63.7	59.9 <sup>(c)</sup>	55
29 Nov 2011 (Weekday)	AON1	66.1	64.3	64.2	60
4 Dec 2011 (Public Holiday)	AON1	69.9 68.5 <sup>(b)</sup>	68.0 68.0	68.4 62.1 <sup>(c)</sup>	60 60
6 Dec 2011 (Weekday)	AON1 AON3 AON4	63.3 65.2 <sup>(b)</sup> 60.0	61.5 63.9 56.6	61.6 69.3 <sup>(c)</sup> 57.3	60 55 55
11 Dec 2011 (Public Holiday)	AON3	64.8	61.3	62.2	55
13 Dec 2011 (Weekday)	AON5	60.6	58.3	56.8	55
18 Dec 2011 Public Holiday)	AON1	66.3	65.0	63.1	60
20 Dec 2011 (Weekday)	AON1	63.9 <sup>(b)</sup>	62.5	61.4 <sup>(c)</sup>	60
25 Dec 2011 (Public holiday)	AON3	62.9	61.9	56.2	55
28 Dec 2011 (Weekday)	AON1	65.9	64.5	63.2	60
1 Jan 2012 (Public Holiday)	AON1	67.0	66.1	62.7	60
3 Jan 2012 (Weekday)	AON3	65.0 65.1 <sup>(b)</sup>	64.0 64.0	57.9 58.2 <sup>(c)</sup>	55 55
8 Jan 2012 (Public Holiday)	AON1	68.0 <sup>(b)</sup>	67.2	63.2 <sup>(c)</sup>	60
10 Jan 2012 (Weekday)	AON5	61.5	58.0	59.0	55
15 Jan 2012 (Public Holiday)	AON1 AON3	72.3 66.3 <sup>(b)</sup>	68.4 65.5	73.0 58.6 <sup>(c)</sup>	60 55
17 Jan 2012 (Weekday)	AON5	60.2	58.0	56.3	55

Date	Noise Monitoring Station	Measured Noise Level, dB(A)		Daily Operational Noise Level, (Background Corrected) <sup>(a)</sup> , Leq (30 min) dB(A)	Limit Level Leq (30 min) dB(A)
		Daily Operational Noise Level Leq (30 min) dB(A)	Background Noise Level, Leq (15 min) dB(A)		
26 Jan 2012 (Weekday)	AON1	64.9	63.9	61.0	60
29 Jan 2012 (Public Holiday)	AON1	67.9	67.1	63.2	60
31 Jan 2012 (Weekday)	AON1	64.9	63.0	63.4	60
5 Feb 2012 (Public Holiday)	AON3	64.7 <sup>(b)</sup>	63.7	57.8 <sup>(c)</sup>	55
	AON5	59.3	55.7	56.7	55
7 Feb 2012 (Weekday)	AON5	59.4	57.0	55.6	55
12 Feb 2012 (Public Holiday)	AON5	59.2	56.0	56.4	55
14 Feb 2012 (Weekday)	AON1	62.9	60.4	62.4	60
	AON3	65.2	64.2	58.2	55
19 Feb 2012 (Public Holiday)	AON3	62.4	60.9	56.9	55
		62.8 <sup>(b)</sup>	60.9	58.1 <sup>(c)</sup>	55
21 Feb 2012 (Weekday)	AON3	64.2	63.5	56.0	55
26 Feb 2012 (Public Holiday)	AON3	63.1 <sup>(b)</sup>	61.9	57.1 <sup>(c)</sup>	55

Note:

- (a) The Background corrected Noise Levels were either measured in front of a façade or with façade correction of 3dB(A).
- (b) Lagoon Night Show Level
- (c) Lagoon Night Show Noise level (Background corrected)

#### 4. AUDIT RESULTS FOR CONSTRUCTION PHASE

##### Implementation Status of Environmental Mitigation Measures

4.1 This was the Twentieth quarter of Ocean Park Master Redevelopment Project including Contract CS02 and CS03. The major activities were summarized in Table 1.2. The Contractor and sub-Contractor had implemented most of the mitigation measures to minimize the environmental impacts due to construction activities. Regarding a few minor observations as noted during ET's site inspections, the Contractor and sub-Contractor rectified all the problems and no major environmental impact was induced.

4.2 IEC's audits were carried on monthly basis (i.e. on 17 January 2012, 21 February 2012 and 20 March 2012). No non-compliance was issued for CS03. Observations details were provided in the Monthly EM&A report.

4.3 The updated implementation status of environmental mitigation measures (EMIS) is given in **Appendix G**.

*CI05 (Construction phase had ceased in early-June 2009)*

*CS01 (Construction phase had ceased in mid-October 2008)*

*CW02 (Construction phase had ceased in mid-February 2010)*

*CI07 (Construction phase had ceased in January 2011)*

*CS02 (Construction phase had ceased in April 2011)*

#### 4.4 CS03

##### 4.4.1 January 2012

- (a) The Contractor was recommended to ensure that mortar mixing works were carried out with enclosure with the top and three sides enclosed.
- (b) A stockpile of excavated material which is idled was not covered.
- (c) Over 20 cement bags were not fully covered

##### 4.4.2 February 2012

- (a) Some piles of over 20 cement bags were not fully covered. The Contractor was reminded to fully cover any piles of over 20 cement bags on-site with tarpaulin sheets.
- (b) General refuse were scattered around the site.
- (c) Washing of concrete mixer truck at a non-designated area was observed.

##### 4.4.3 March 2012

- (a) Stockpiles of C&D materials were not covered with tarpaulin sheets to suppress dust.
- (b) Concrete mixing was carried out with top covered only
- (c) Over 20 cement bags were not fully covered with tarpaulin sheets.
- (d) General refuse and construction waste were scattered around the site.

**Status of Environmental Licensing and Permitting**

- 4.7 Environmental licenses and permits including Environmental Permit for the Project, construction noise permits, chemical waste producer and effluent discharge license were in place and valid during the reporting quarter.

**Advice on Materials Management Status**

- 4.8 Table 4.1 summarises the estimated amounts of different types of materials generated from the Project during the reporting quarter as below:

Materials Type	Estimated Amount			Disposal Locations
	Jan 12	Feb 12	Mar 12	
C&D waste	104.40 tonnes	240.70 tonnes	444.40 tonnes	SENT Landfill
	--	--	--	TKOSF
Excavated Material (mainly soil)	343.50 tonnes	179.90 tonnes	480.60 tonnes	CWPFBP
	--	--	--	TKOFB
Chemical waste	nil	nil	nil	Collected by licensed collector
General waste	--	--	--	Collected by licensed collector

**Table 4.1 Estimated Amounts of Different Types of Materials Generation from January 2012 to March 2012.**

**5. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)**

**Summary of Exceedances – Construction Phase**

- 5.1 As there was no exceedance during the reporting quarter, no further action was required.

**Summary of Exceedances – Operational Phase**

- 5.2 For Air Quality Monitoring, no exceedance was reported during the reporting period January to March 2012.
- 5.3 Noise Monitoring results indicated that the background corrected Lagoon Night Show Noise Levels have complied with the Limit Levels at most of the monitoring stations during most of the monitoring dates.
- 5.3 The background corrected Noise Levels have complied with the Limit Levels at most of the monitoring stations during most of the monitoring dates. Noise exceedances were recorded at AON1 (Open Area adjacent to Police Training School), due to high background noise from visitors and traffic, at AON3 (Woodgreen Estate) and AON5 (Hau Yuen) due to the traffic noise from Shouson Hill Road and at AON4 (Manly Villa) due to insect noise.

**6. ENVIRONMENTAL COMPLAINTS**

**Complaints Log**

- 6.1 No complaints were received during the reporting period.

**Complaints Handling Procedure**

- 6.2 All complaints will be handled in accordance with the EM&A Manual. The complaint handling procedure and the complaint log are provided in Appendix F.

**7. NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

- 7.1 No summon or prosecution related to environmental issues was made against the Project within the reporting quarter.

## 8. COMMENTS, CONCLUSIONS AND RECOMMENDATIONS

- 8.1 During this quarter, no complaints were received.
- 8.2 No summons and prosecutions related to environmental issues were made against the Project in the reporting quarter.
- 8.3 The implemented EM&A programme ensured that any environmental impacts to the receivers would be readily detected and timely actions could be taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental acceptability of the Project. Weekly site inspections ensured that the EIA recommendations were effectively implemented.
- 8.4 Following the completion of one year's monitoring, a justification paper has been presented for the termination of the Air Quality (RSP) and Noise monitoring programmes for the operation of the Lagoon night shows. Approval has been received on 13 February 2012.

### Construction Phase

- 8.5 On completion of the works and opening of the Entry Plaza, Aqua City and Grand Aquarium to the public on 27 January 2011, the construction works under CI07 have been completed, and, as advised to EPD on 1 April 2011 (PD/PW/GOV/151/006107), no further construction monitoring for noise and air quality would be carried out.
- 8.6 In the reporting quarter, no terrestrial ecology monitoring was conducted. According to the requirement in the EM&A Manual, the last two terrestrial ecology monitoring had been completed in August 2008.
- 8.7 In the reporting quarter, one coral monitoring was conducted and the results showed that there was no exceedance of Action and Limit Levels.

### Operational Phase

- 8.8 For the operational phase, daily operational noise and lagoon night show noise monitoring was carried out at five designated monitoring stations during this reporting period. Noise exceedances were recorded at each of the five stations due to various circumstances.
- 8.9 Noise monitoring at the same stations using the same frequency and approach will be continued during the first year of the operation of the open-air night show.
- 8.10 Due to mechanical failure of the High Volume Sampler (HVS), no 24-hour average RSP concentrations were monitored at the three AQ monitoring stations in the reporting period of 26 October 2011 to 25 November 2011. Results from the monitoring subsequently carried out on 28-29 November 2011, November 2011, which were not reported in the previous quarterly report, were found to be within the AQO.
- 8.11 No exceedance of A/L Level was reported during the monitoring period covered under this report.

## **Appendix A**

#### APPENDIX A – CONTACTS OF KEY ENVIRONMENTAL PERSONNEL

Company	Contact Person	Position	Telephone No.
Ocean Park Corporation Operations	Frankie Hau	Senior Environmental Health & Safety Manager	39232639
Ocean Park Corporation Construction	Lindsay Pickles	Environmental Team Leader	29103109
Ocean Park Corporation Master Redevelopment Project	Arthur Wong	Project Manager Representative (PMR)	2552 1285
Mott MacDonald Hong Kong Ltd	Dr. Anne Kerr	Independent Environmental Checker	28285757
Kaden – ATEL JV (for Contract CS03)	Winson Chung	Contractor's Asst. ETL	93261588

## **Appendix B**

## Appendix B - Licenses and Permits

### Permits & Licences

#### CS03 (KAJV)

Permit number	Starting Date	Expired Date	Location	Status
<b>Construction Noise Permit</b>				
GW-RS1128-11	9-Dec-11	31-May-12	Construction Noise Permit for Top of Nam Long Shan Rd., Ocean Park, 180 Wong Chuk Hang, Hong Kong	Valid
<b>Notification of Construction Work under APCO</b>				
311433	N/A	N/A	Thrill Mountain & Polar Adventure	Notified
<b>Effluent Discharge License</b>				
WT00005926-2010	N/A	N/A	Thrill Mountain & Polar Adventure	Valid
<b>Registration as Chemical Waste Producer</b>				
WPN5213-176-K2880-02	26 Nov 09	N/A	Form Oil, Lubricant oil, paint, solvent & diesel	Registered
<b>Construction Waste Disposal Billing Account with EPD</b>				
7009695	N/A	N.A	Thrill Mountain & Polar Adventure	Issued

## **Appendix C**



**Table 3.2 Sites 1 to 5 and Control Site C – Percentage and thickness of Sedimentation, Bleaching and Mortality of the Re-tagged Coral Colonies in Coral Re-tagging Exercise and Baseline Data Collection (November 2009) and the Present Monitoring Survey (November 2011). “▲” and “▼” indicate increased and decreased in percentage, respectively, when compared with the coral re-tagging exercise and baseline data collected in November 2009.**

**Site 1**

Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)			
			21 Nov 09 (baseline)	Aug 2011	Nov 2011	Nov 2011	Aug 2011	Nov 2011	Feb 2012	21 Nov 09 (baseline)	Aug 2011	Nov 2011
A1	<i>Platygyra carnosus</i>	1200	0.0	0.0	0.0	0	0	0	0	0	0	0
A2	<i>Favites abdita</i>	400	5.1	0.0▼	2.1▼	3.1▼	0	0	0	2	2	2
A3	<i>Plesiastrea versipora</i>	600	0.0	0.0▼	0.0	0.0	0	0	0	0	0	0
A4	<i>Leptastrea purpurea</i>	6200	0.0	5.1▲	5.1▲	4.1▲	0	0	0	0	0	0
A5	<i>Platygyra carnosus</i>	3200	1.1	0.0▼	0.0▼	0.0▼	0	0	0	0	0	0
A6	<i>Platygyra carnosus</i>	2600	0.0	0.0	0.0	0.0	0	0	0	0	0	0
A7	<i>Favia speciosa</i>	500	2.1	0.0▼	0.0▼	2.1	0	0	0	5	5	5
A8	<i>Platygyra carnosus</i>	1500	2.1	0.0▼	0.0▼	2.1	0	0	0	0	0	0
*A9R	<i>Leptastrea purpurea</i>	1500	4.1	-	8.0	8.0	-	-	-	-	-	0
*A10R	<i>Platygyra carnosus</i>	2250	0.0	-	5.0	5.0	-	-	-	-	-	2

\*Notes: A9R and A10R are re-tagged coral colonies as A9 and A10 were damaged by anchoring or typhoon events, and not suitable for monitoring purpose.

**Site 2**

Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)			
			29 Nov 09 (baseline)	Aug 2011	Nov 2011	Nov 2011	Aug 2011	Nov 2011	Feb 2012	29 Nov 09 (baseline)	Aug 2011	Nov 2011
B1	<i>Platygyra carnosus</i>	1300	2.1	0.0▼	0.0▼	0.0▼	0	0	0	0	0	0
B2	<i>Plesiastrea versipora</i>	650	4.1	0.0▼	0.0▼	0.0▼	0	0	0	0	0	0
B3	<i>Psammocora superficialis</i>	4400	5.1	10.1▲	5.1	5.1	0	0	0	3	3	3
B4	<i>Favia speciosa</i>	800	0.0	5.1▲	0.0	0.0	0	0	0	2	2	2
B5	<i>Plesiastrea versipora</i>	1000	2.1	2.1	2.1	2.1	0	0	0	2	2	2
B6	<i>Platygyra carnosus</i>	1500	0.0	0.0	0.0	0.0	0	0	0	0	0	0
B7	<i>Hydrophora exesa</i>	1600	1.1	0.0▼	0.0▼	0.0▼	0	0	0	0	0	0
B8	<i>Plesiastrea versipora</i>	1300	0.0	0.0	0.0	0.0	0	0	0	0	0	0
B9	<i>Favia speciosa</i>	450	1.1	5.1▲	1.1	1.1	0	0	0	2	2	2
B10	<i>Psammocora superficialis</i>	400	0.0	0.0	0.0	0.0	0	0	0	0	0	0



Lam Environmental Services Limited

Ocean Park Corporation Master  
Redevelopment Project  
Contract No. CS-03  
Thrill Mountain and Polar Adventure

Site 3

Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)			
			28 Nov 09 (baseline)	Aug 2011	Nov 2011	28 Nov 09 (baseline)	Aug 2011	Nov 2011	28 Nov 09 (baseline)	Aug 2011	Nov 2011	
C1	<i>Porites sp</i>	100	2,1	4,1▲	5,1▲	2,1	0	0	0	3	3	3
C2	<i>Porites sp</i>	210	3,1	5,1▲	3,1	3,1	0	0	0	5	5	5
C3	<i>Goniopora stutchburyi</i>	410	5,1	0,0▼	0,0▼	0,0▼	0	0	0	7	7	7
C4	<i>Pavona decussata</i>	240	4,1	4,1	2,1▼	2,1▼	0	0	0	0	0	0
C5	<i>Pavona decussata</i>	210	3,1	5,1▲	0,0▼	0,0▼	0	0	0	1	1	1
C6	<i>Pavona decussata</i>	200	3,1	5,1▲	0,0▼	0,0▼	0	0	0	0	0	0
C7	<i>Montipora pelitiformis</i>	960	3,1	3,1	3,1	3,1	0	0	0	0	0	0
C8	<i>Goniopora stutchburyi</i>	140	1,1	5,1▲	1,1	1,1	0	0	0	0	0	0
C9	<i>Porites sp</i>	300	3,1	3,1	3,1	3,1	0	0	0	0	0	0
C10	<i>Cyphastrea serailia</i>	600	4,1	4,1	2,1▼	4,1	0	0	0	0	0	0

Site 4

Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)			
			28 Nov 09 (baseline)	Aug 2011	Nov 2011	28 Nov 09 (baseline)	Aug 2011	Nov 2011	28 Nov 09 (baseline)	Aug 2011	Nov 2011	
E1	<i>Goniopora stutchburyi</i>	290	5,1	5,1	0,0▼	5,1	0	0	0	0	0	0
E2	<i>Coccinaria sp.</i>	620	0,0	5,1▲	0,0	0,0	0	0	0	0	0	0
E3	<i>Goniopora stutchburyi</i>	300	4,1	5,1▲	0,0▼	4,1	0	0	0	3	3	3
E4	<i>Goniopora stutchburyi</i>	130	3,1	3,1	0,0▼	0,0▼	0	0	0	0	0	0
E5	<i>Goniopora stutchburyi</i>	460	6,1	5,1▼	3,1▼	3,1▼	0	0	0	4	4	4
E6	<i>Goniopora stutchburyi</i>	380	10,1	5,1▼	5,1▼	5,1▼	0	0	0	8	8	8
E7	<i>Goniopora stutchburyi</i>	120	3,1	0,0▼	0,0▼	3,1	0	0	0	0	0	0
E8	<i>Goniopora stutchburyi</i>	230	4,1	4,1	4,1	4,1	0	0	0	2	2	2
E9	<i>Goniopora stutchburyi</i>	170	3,1	3,1	3,1	3,1	0	0	0	0	0	0
E10	<i>Goniopora stutchburyi</i>	540	7,1	5,1▼	5,1▼	5,1▼	0	0	0	3	3	3



**Lam Environmental Services Limited**

Ocean Park Corporation Master  
Redevelopment Project  
Contract No. CS-03  
Thrill Mountain and Polar Adventure

**Site 5**

Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)			
			29 Nov 09 (baseline)	Aug 2011	Nov 2011	Nov 2011	29 Nov 09 (baseline)	Aug 2011	Nov 2011	29 Nov 09 (baseline)	Aug 2011	Nov 2011
D1	<i>Psammodora</i> sp.	800	6, 1	2, 1▼	0, 0▼	5, 1▼	0	0	0	3	3	3
D2	<i>Montipora peliiformis</i>	600	4, 1	1, 1▼	1, 1▼	4, 1	0	0	0	0	0	0
D3	<i>Goniopora stuechburii</i>	450	2, 1	0, 0▼	0, 0▼	2, 1	0	0	0	0	0	0
D4	<i>Cyphastrea serailia</i>	100	3, 1	3, 1	3, 1	3, 1	0	0	0	0	0	0
D5	<i>Montipora cf. turgescens</i>	320	4, 1	5, 1▲	4, 1	4, 1	0	0	0	0	0	0
D6	<i>Montipora peliiformis</i>	480	10, 1	5, 1▼	5, 1▼	5, 1▼	0	0	0	20	20	20
D7	<i>Montipora peliiformis</i>	500	8, 1	8, 1	8, 1	8, 1	0	0	0	2	2	2
D8	<i>Montipora peliiformis</i>	410	6, 1	10, 1▲	6, 1	6, 1	0	0	0	0	0	0
D9	<i>Montipora peliiformis</i>	200	5, 1	10, 1▲	5, 1	5, 1	0	0	0	5	5	5
D10	<i>Goniopora stuechburii</i>	510	7, 1	5, 1▼	5, 1▼	5, 1▼	0	0	0	5	5	5

**Control Site C**

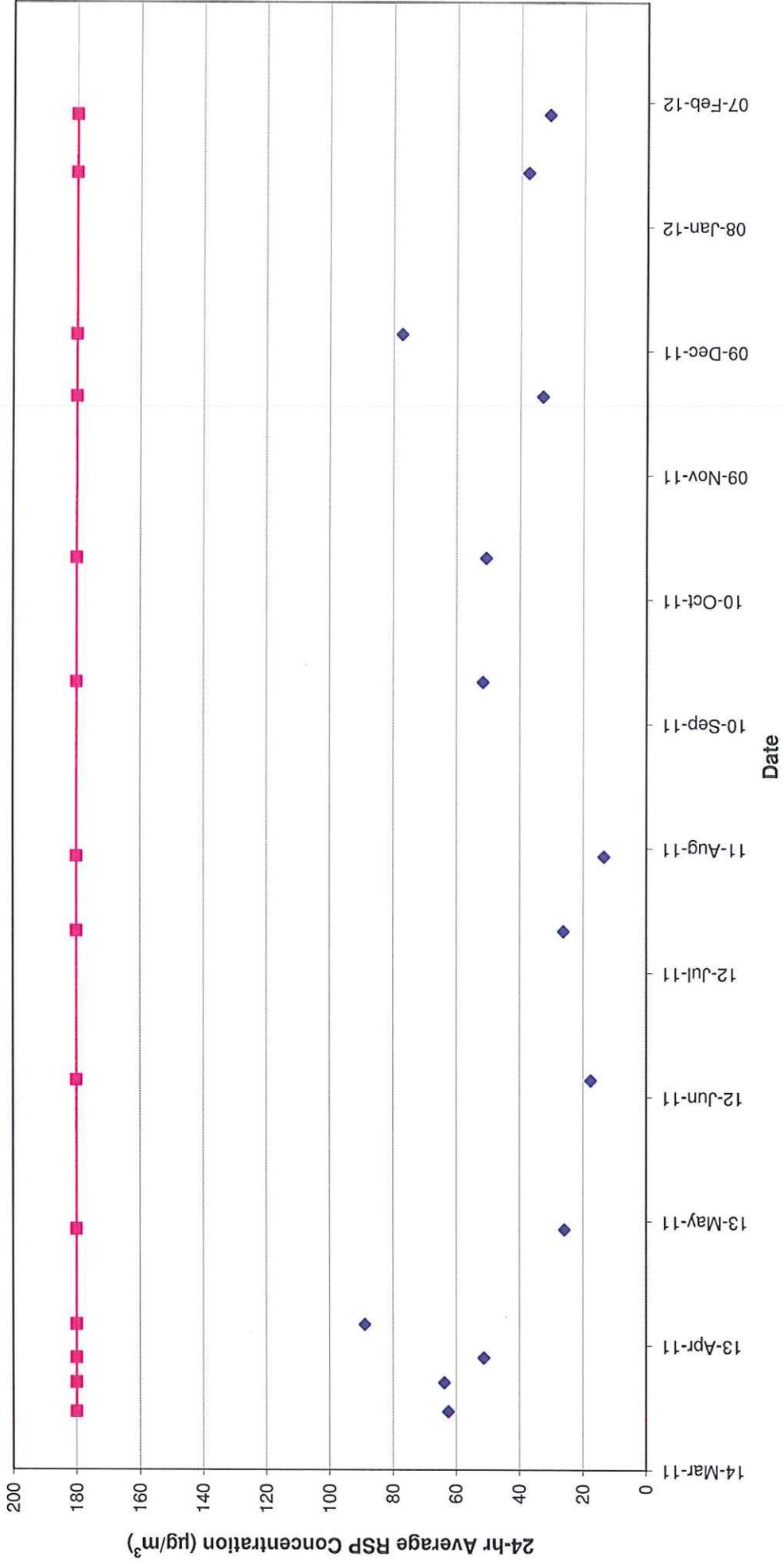
Code	Coral Species	Area (cm <sup>2</sup> )	Sedimentation (% , mm)			Bleaching (%)			Mortality (%)				
			21 Nov 09 (baseline)	Aug 2011	Nov 2011	Feb 2012	21 Nov 09 (baseline)	Aug 2011	Nov 2011	Feb 2012	21 Nov 09 (baseline)	Aug 2011	Nov 2011
F1	<i>Goniastrea aspera</i>	450	2, 1	2, 1	0, 0▼	0, 0▼	0	0	0	0	0	0	0
F2	<i>Favites pentagona</i>	2100	2, 1	2, 1	2, 1	2, 1	0	0	0	2	2	2	2
F3	<i>Favites pentagona</i>	1000	0, 0	5, 1▲	0, 0	0, 0	0	0	0	5	5	5	5
F4	<i>Porites sp</i>	1300	2, 1	2, 1	2, 1	2, 1	0	0	0	0	0	0	0
F5	<i>Cyphastrea serailii</i>	2100	0, 0	10, 1▲	10, 1▲	0, 0	0	0	0	0	0	0	0
F6	<i>Porites sp</i>	2100	5, 1	2, 1▼	5, 1	5, 1	0	0	0	2	2	2	2
F7	<i>Plesiastrea versipora</i>	3000	2, 1	4, 1▲	2, 1	2, 1	0	0	0	0	0	0	0
F8	<i>Favites pentagona</i>	680	0, 0	2, 1▲	0, 0	0, 0	0	0	0	0	0	0	0
F9	<i>Favites pentagona</i>	2600	0, 0	4, 1▲	4, 1▲	4, 1▲	0	0	0	0	0	0	0
F10	<i>Favia rotumana</i>	600	0, 0	1, 1▲	0, 0	0, 0	0	0	0	0	0	0	0

## **Appendix D**



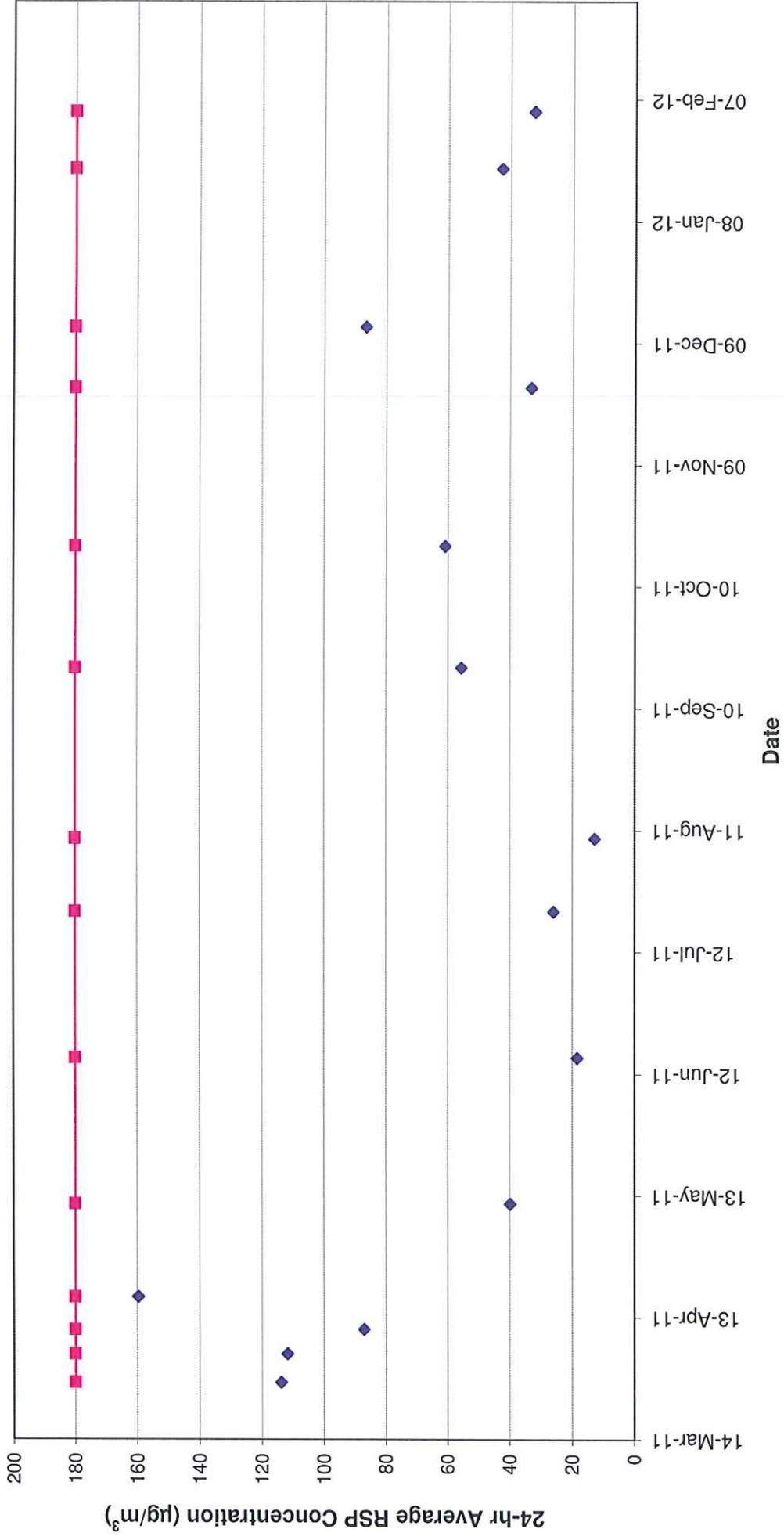
Annex A3

Measured 24-hr Average RSP Concentration  
AM 2 - Landscape Storage Area in Ocean Park

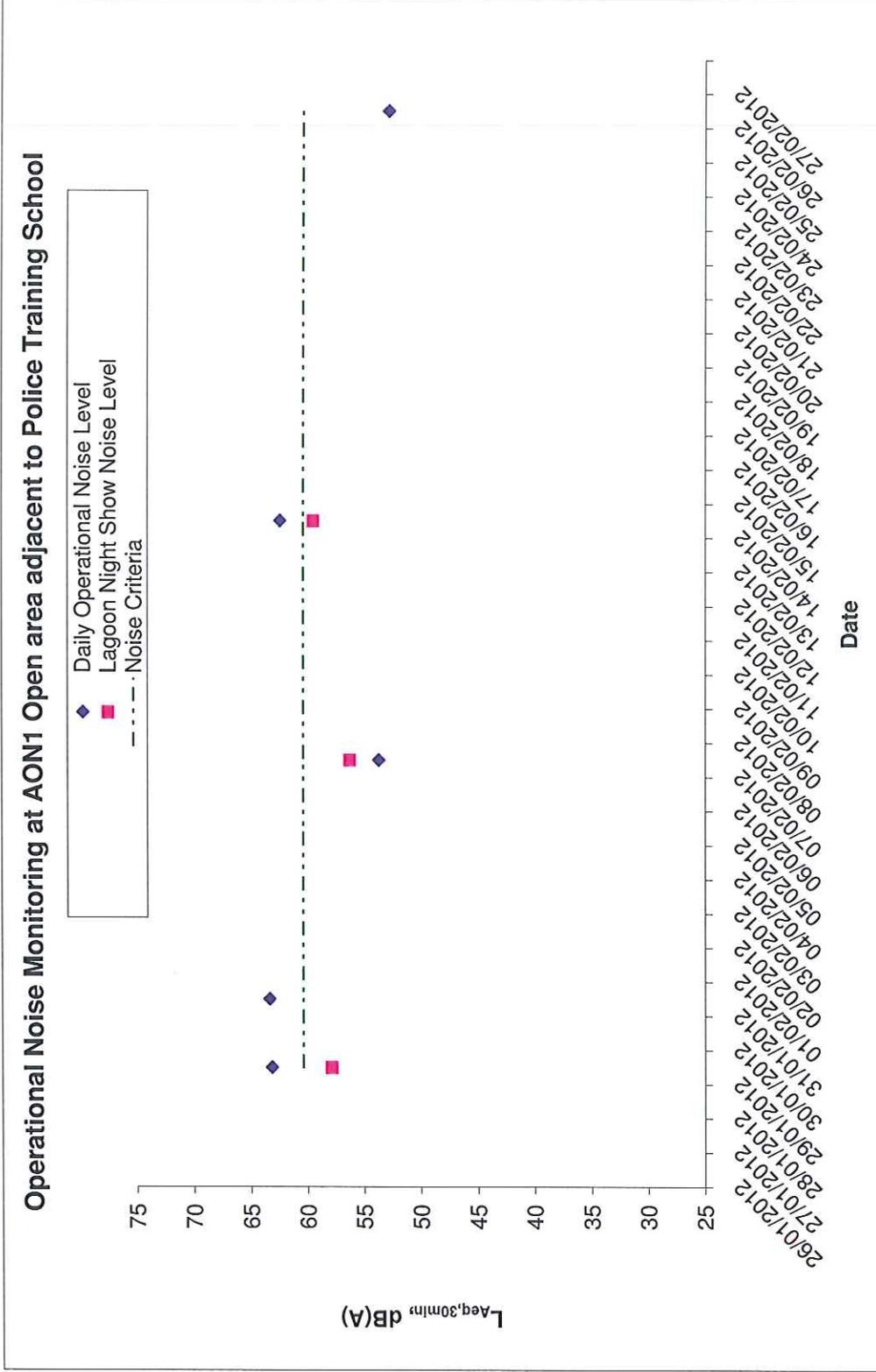


Annex A3

Measured 24-hr Average RSP Concentration  
AM3 - Rooftop of Main Medical Block of Graham Hospital

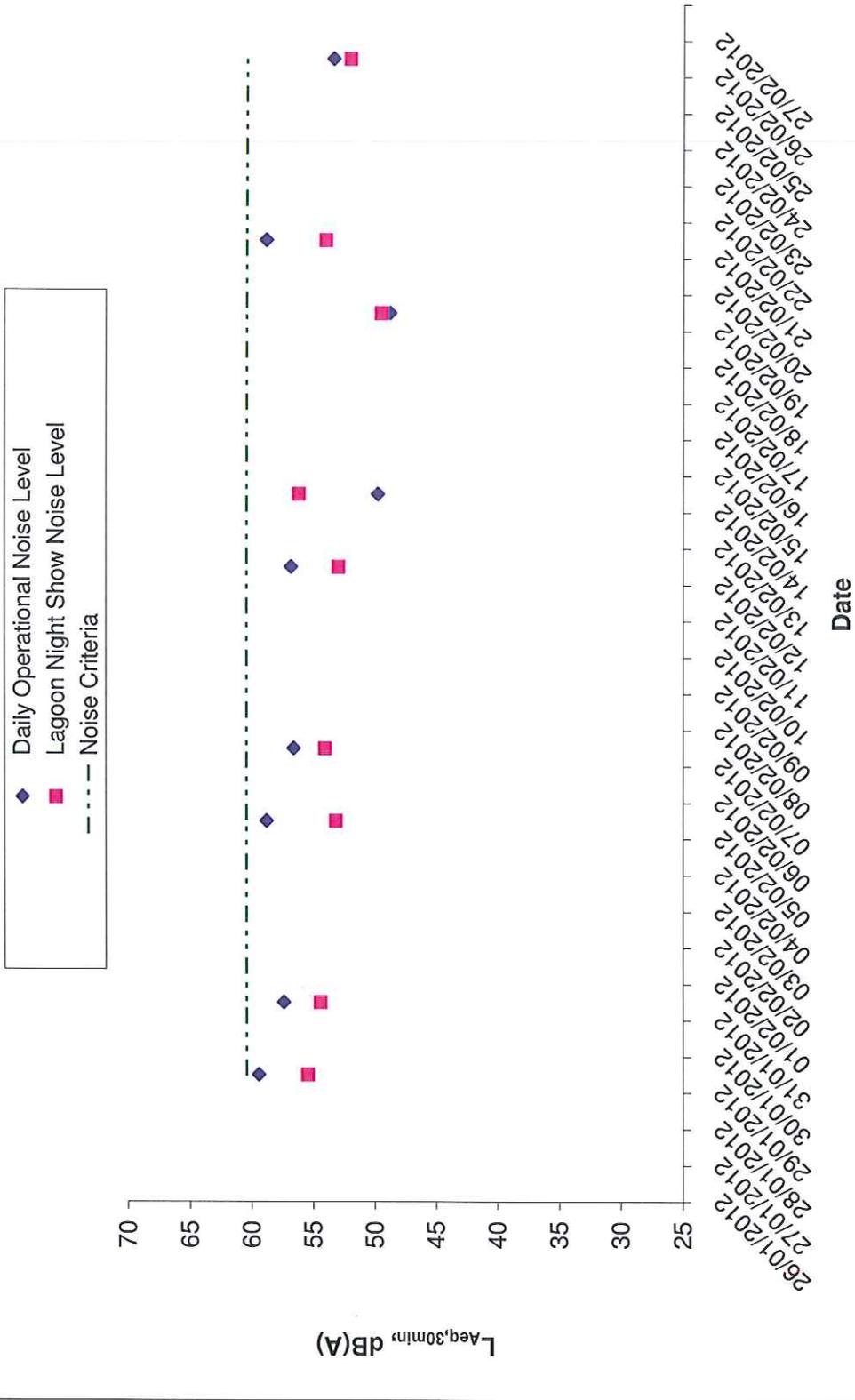


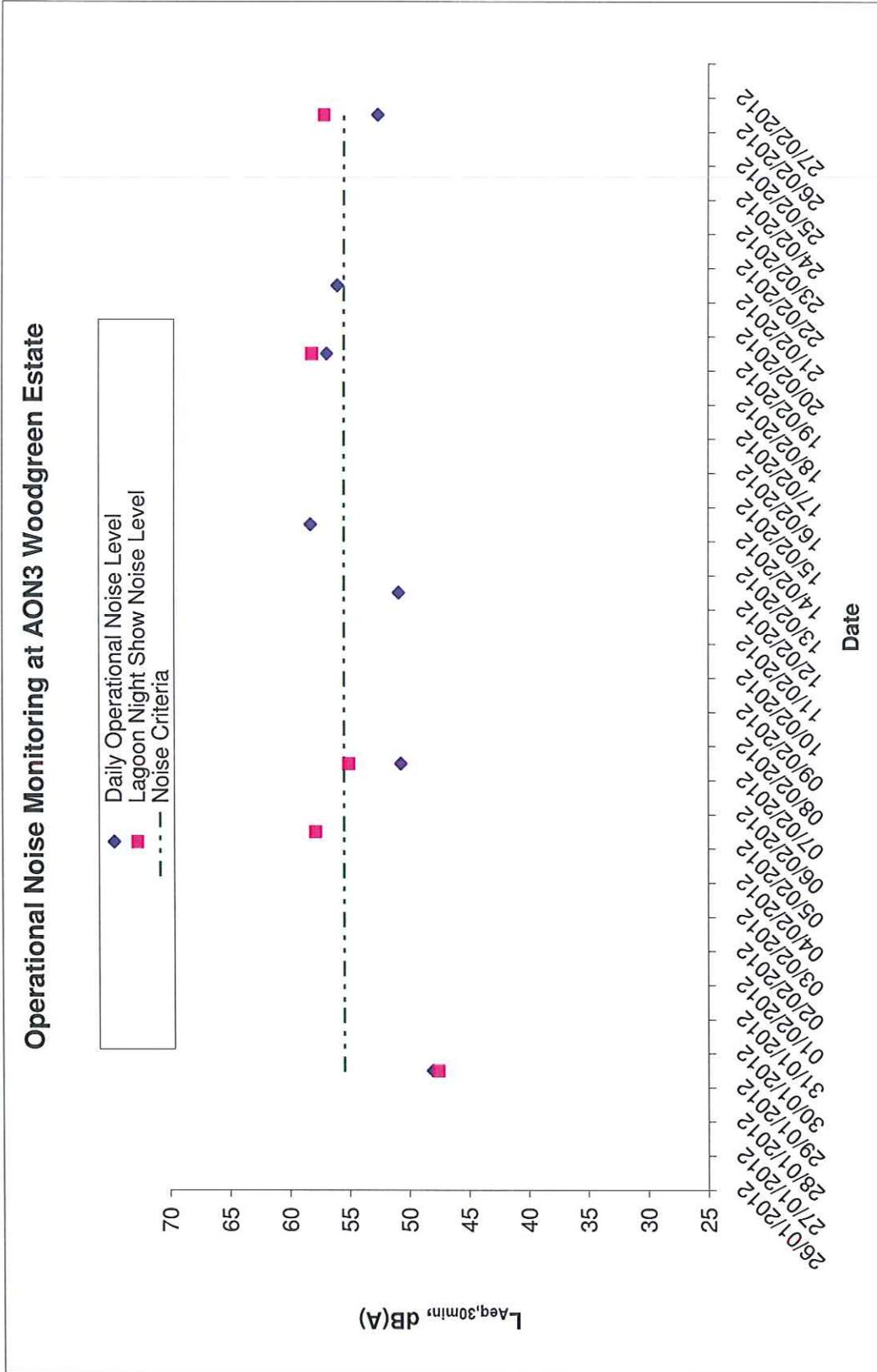
## **Appendix E**



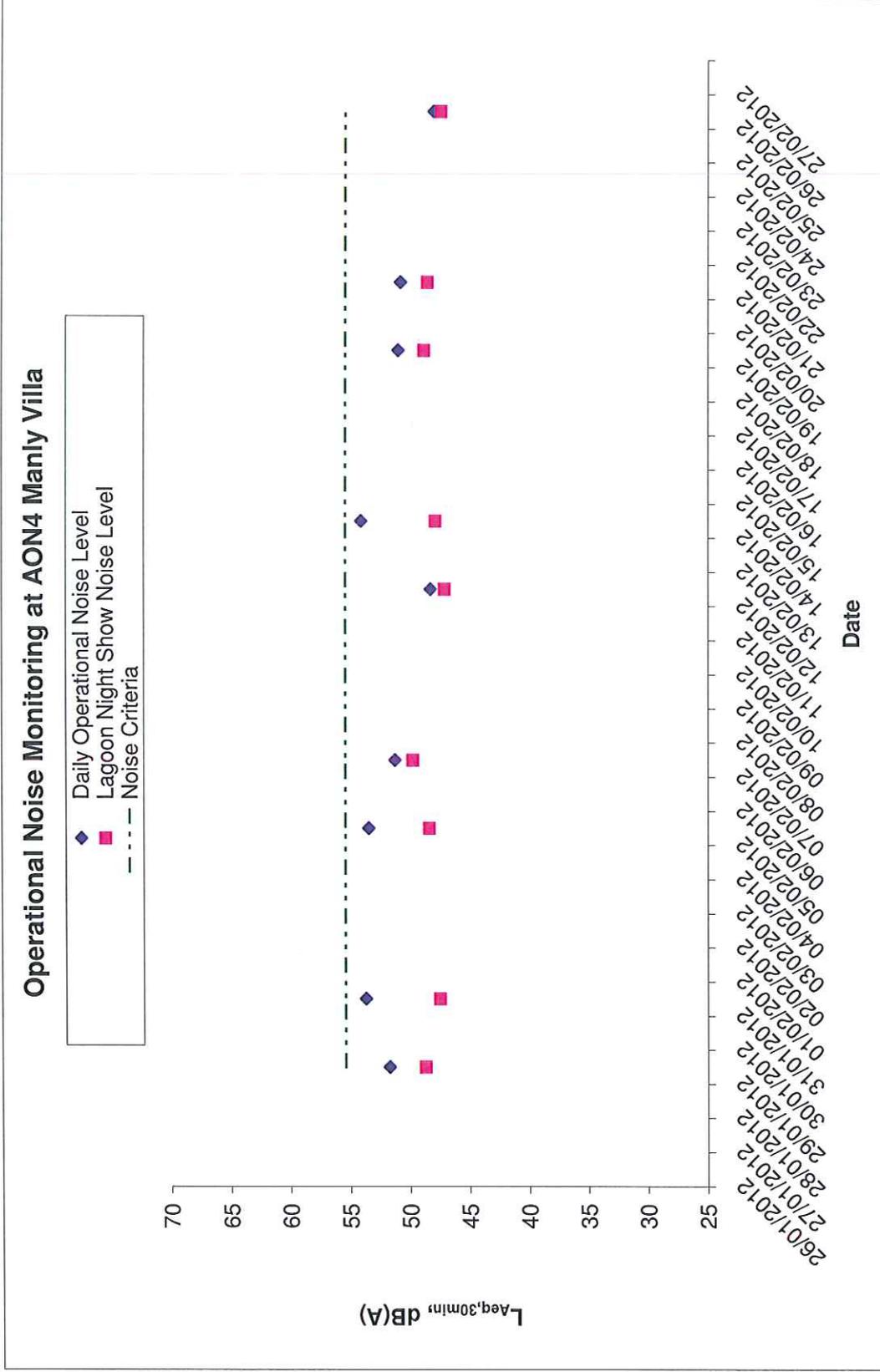
**Note:** The exceedances were due to the high level of background noise from visitors and traffic.

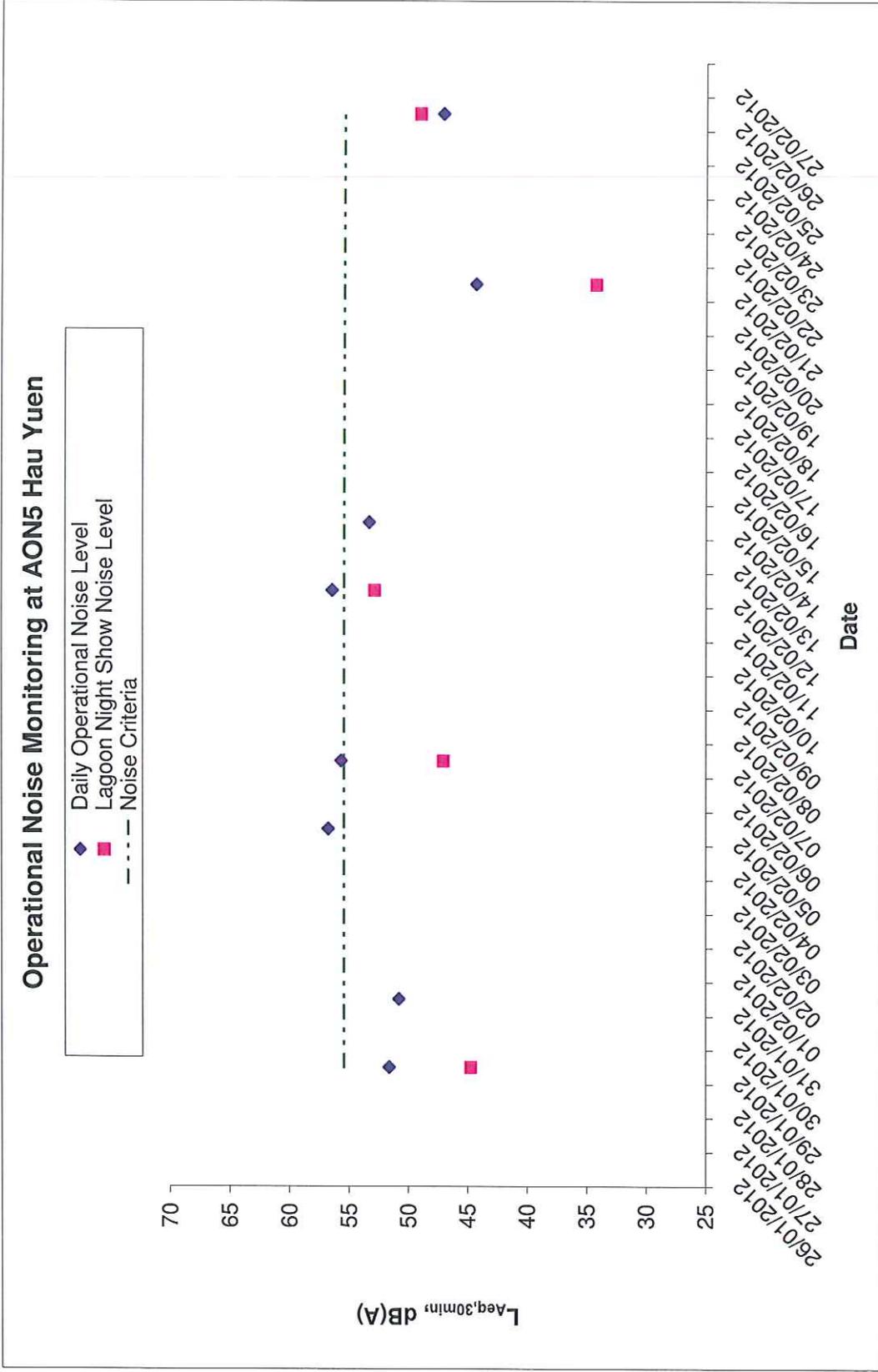
### Operational Noise Monitoring at AON2 Old Canteen Building





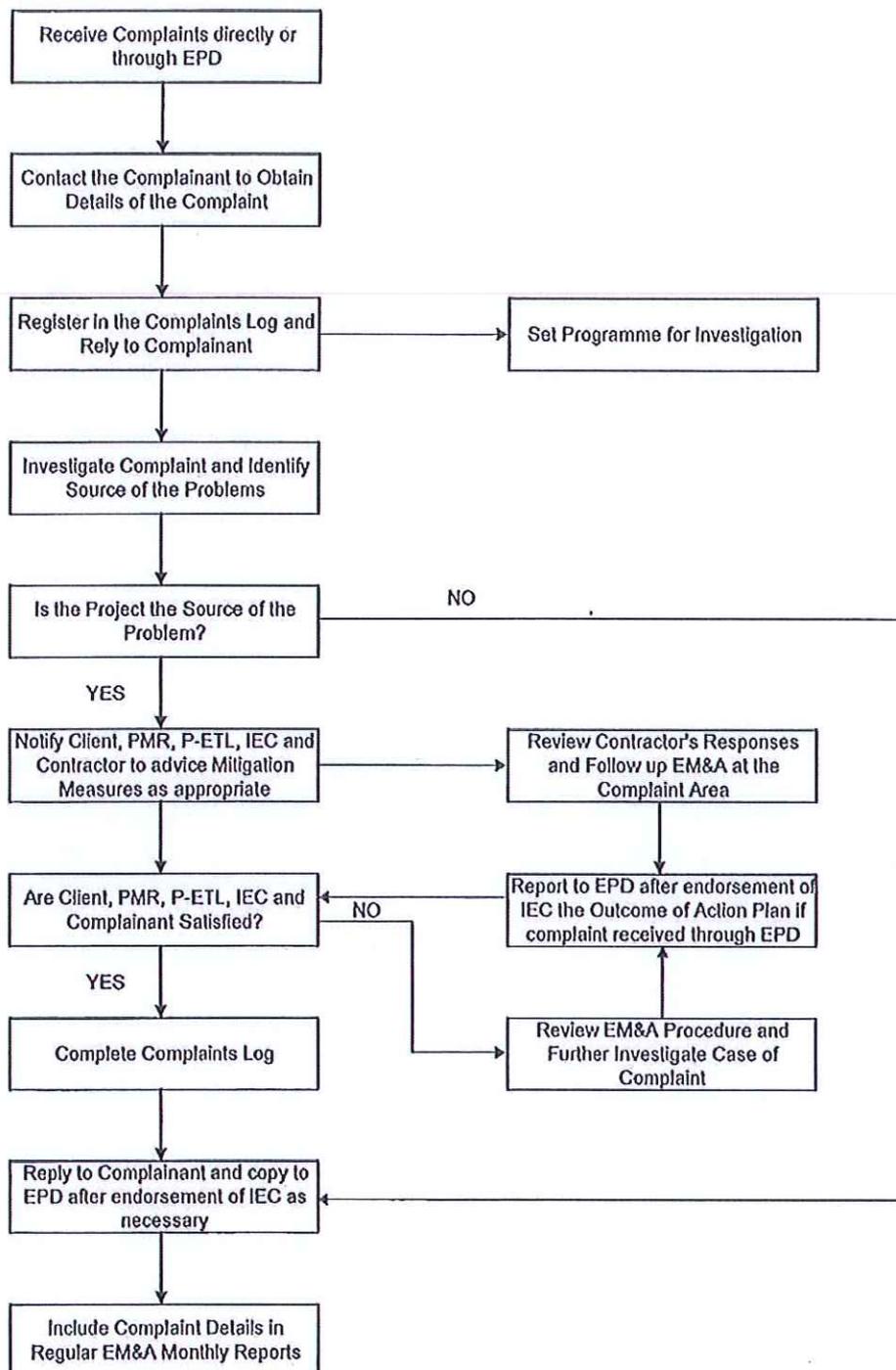
**Note:** The exceedances were due to the traffic noise from Shouson Hill Road.





**Note:** The exceedances were due to the traffic noise from Shouson Hill Road.

## **Appendix F**





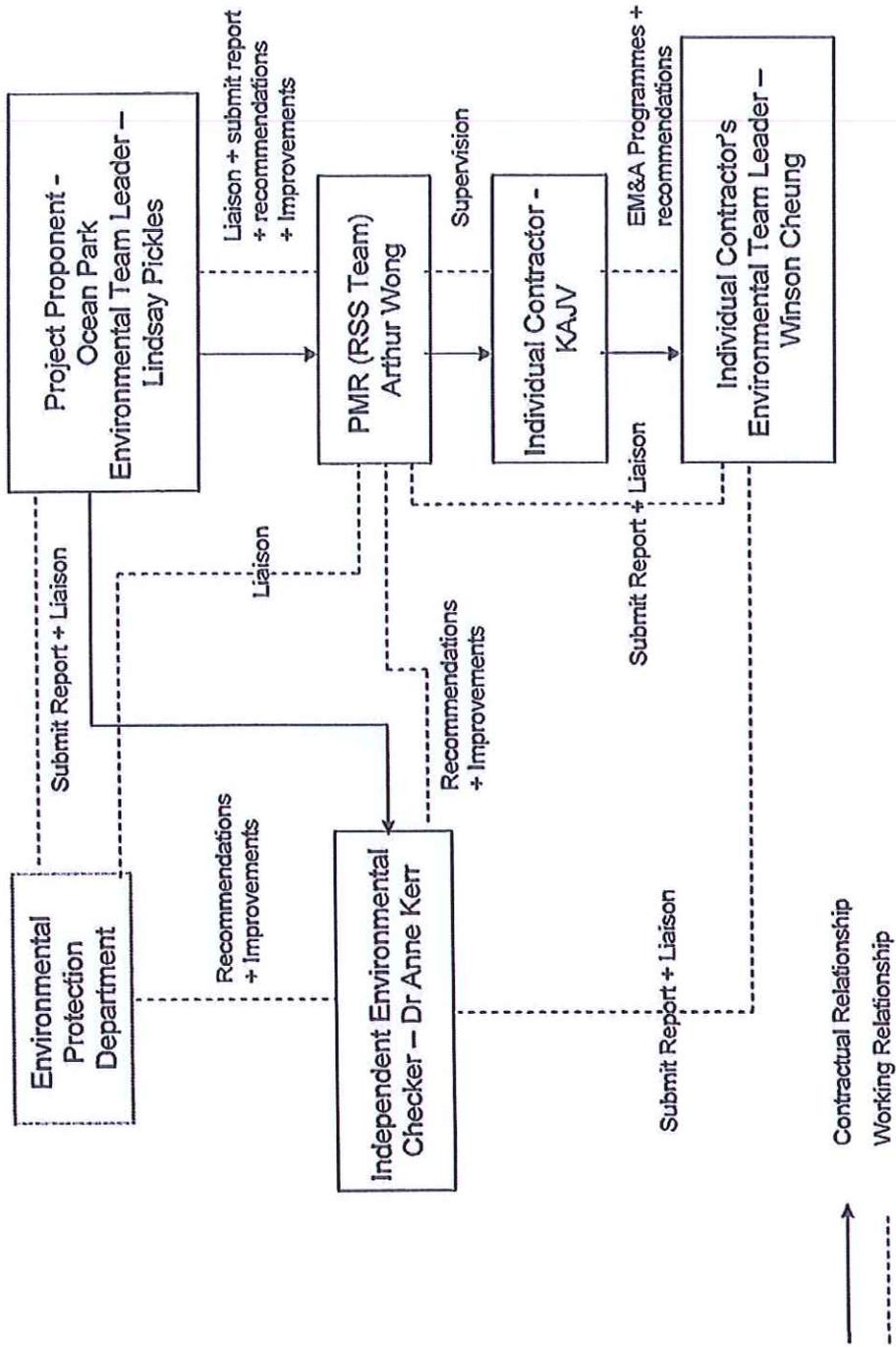
Ocean Park Master Redevelopment Project  
Quarterly EM&A Report from January 2012 to March 2012

Ocean Park Master Redevelopment Project  
Contract No. CS03 - Thrill Mountain & Polar Adventure  
Quarterly EM&A Report – January, February and March 2012

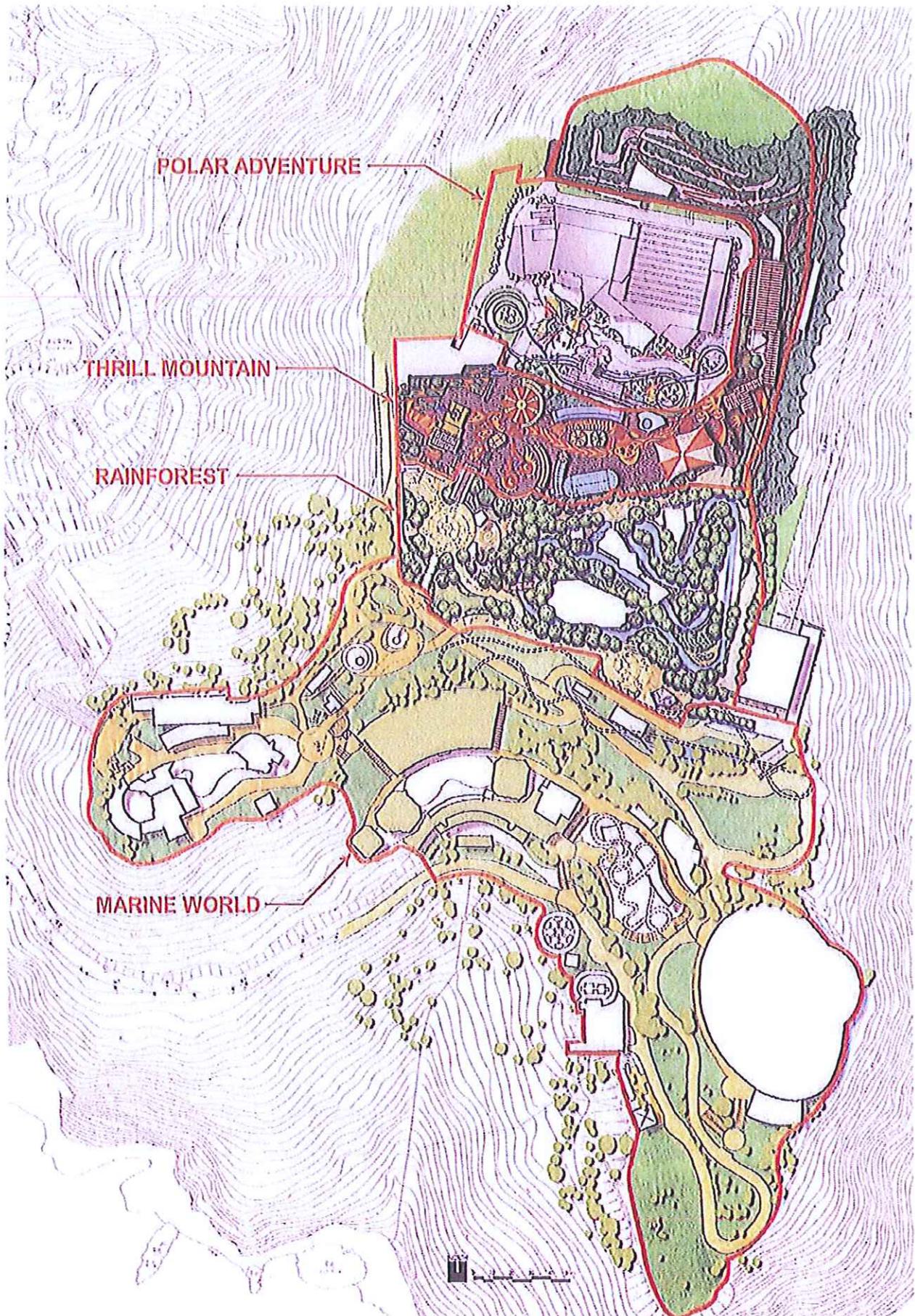
There was no Complaint Record Register during these three months

**Figure 1.1**

Figure 1.1 – Management Organisation



**Figure 1.2**



POLAR ADVENTURE

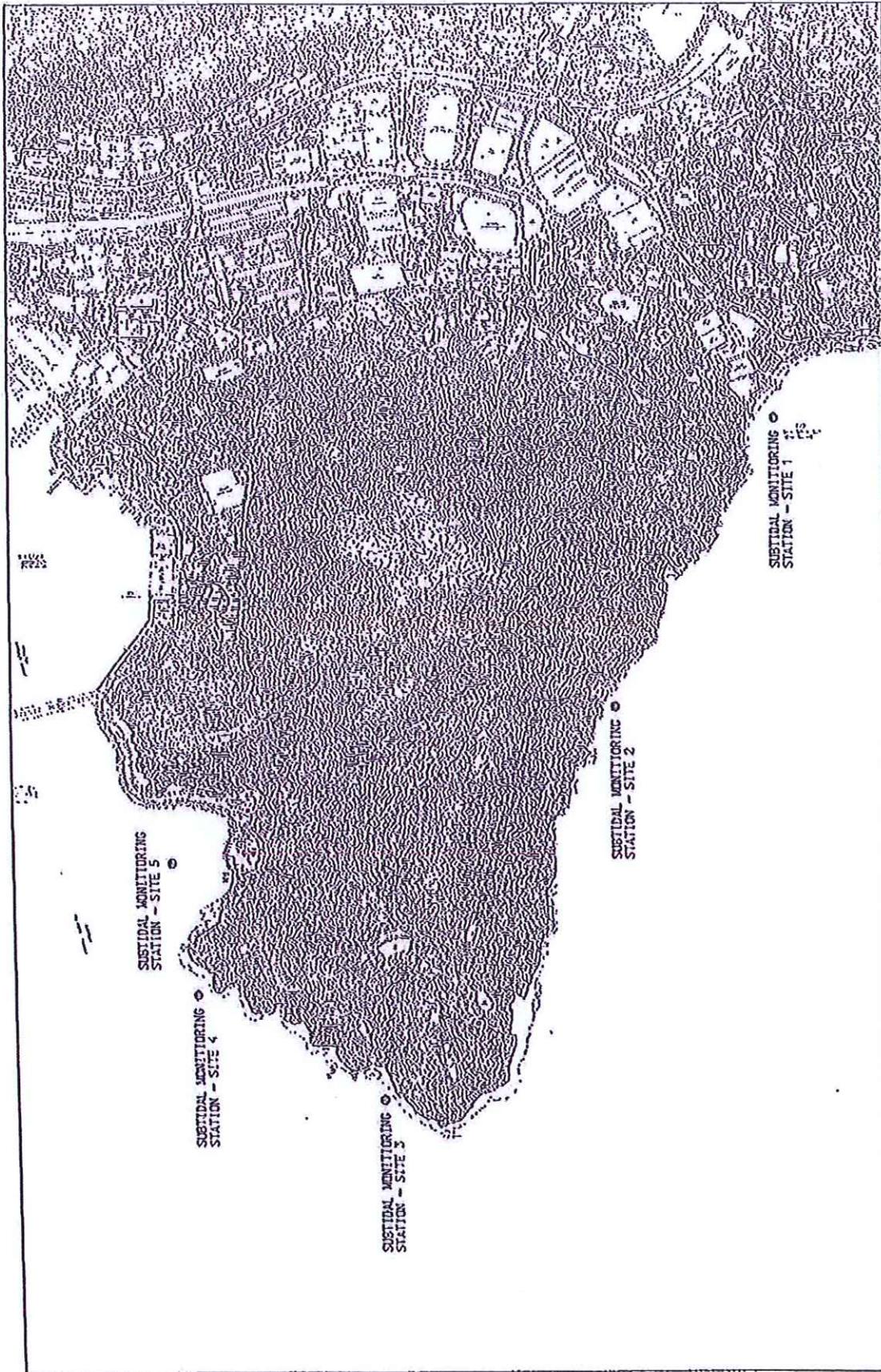
THRILL MOUNTAIN

RAINFOREST

MARINE WORLD



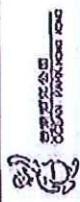
**Figure 1.3**



PROJECT TITLE	OCEAN PARK REDEVELOPMENT
DATE	1. 1. 1988
SCALE	1:1000
PROJECT NO.	1031/1032/1033/1034
REV.	A

FIGURE 5-1  
LOCATIONS OF  
SUBTIDAL MONITORING STATION

OCEAN PARK REDEVELOPMENT  
COURTESY OF THE  
CALIFORNIA COAST GUARD  
AND MARITIME WILDLIFE



DATE	1. 1. 1988
BY	J. L. ...
CHECKED BY	...
APPROVED BY	...
SCALE	1:1000
PROJECT NO.	1031/1032/1033/1034
REV.	A

**Figure 1.4**

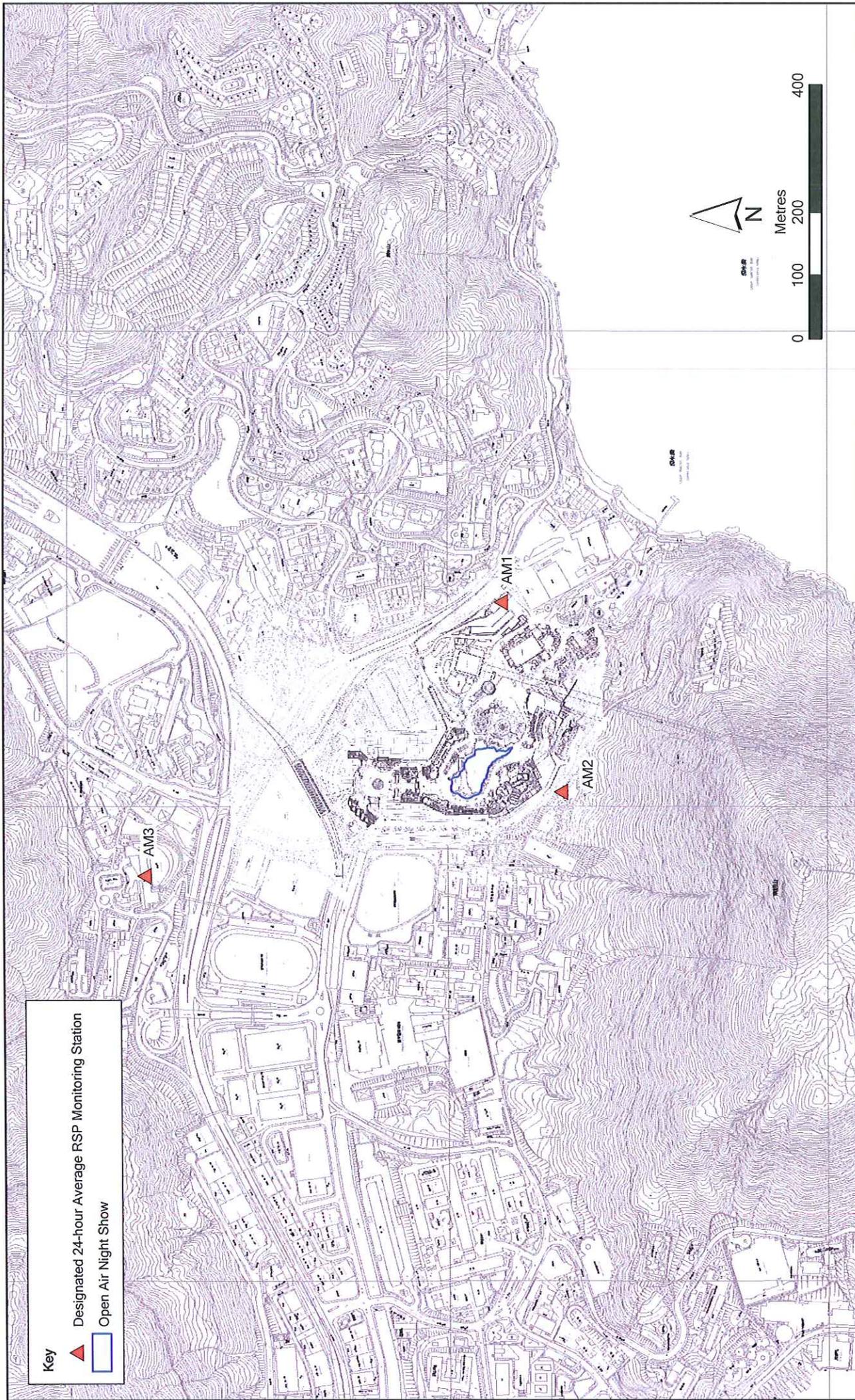


Figure 2.1

Designated 24-hour Average RSP Monitoring Stations during Operation of Open Air Night Show

**Figure 1.5**

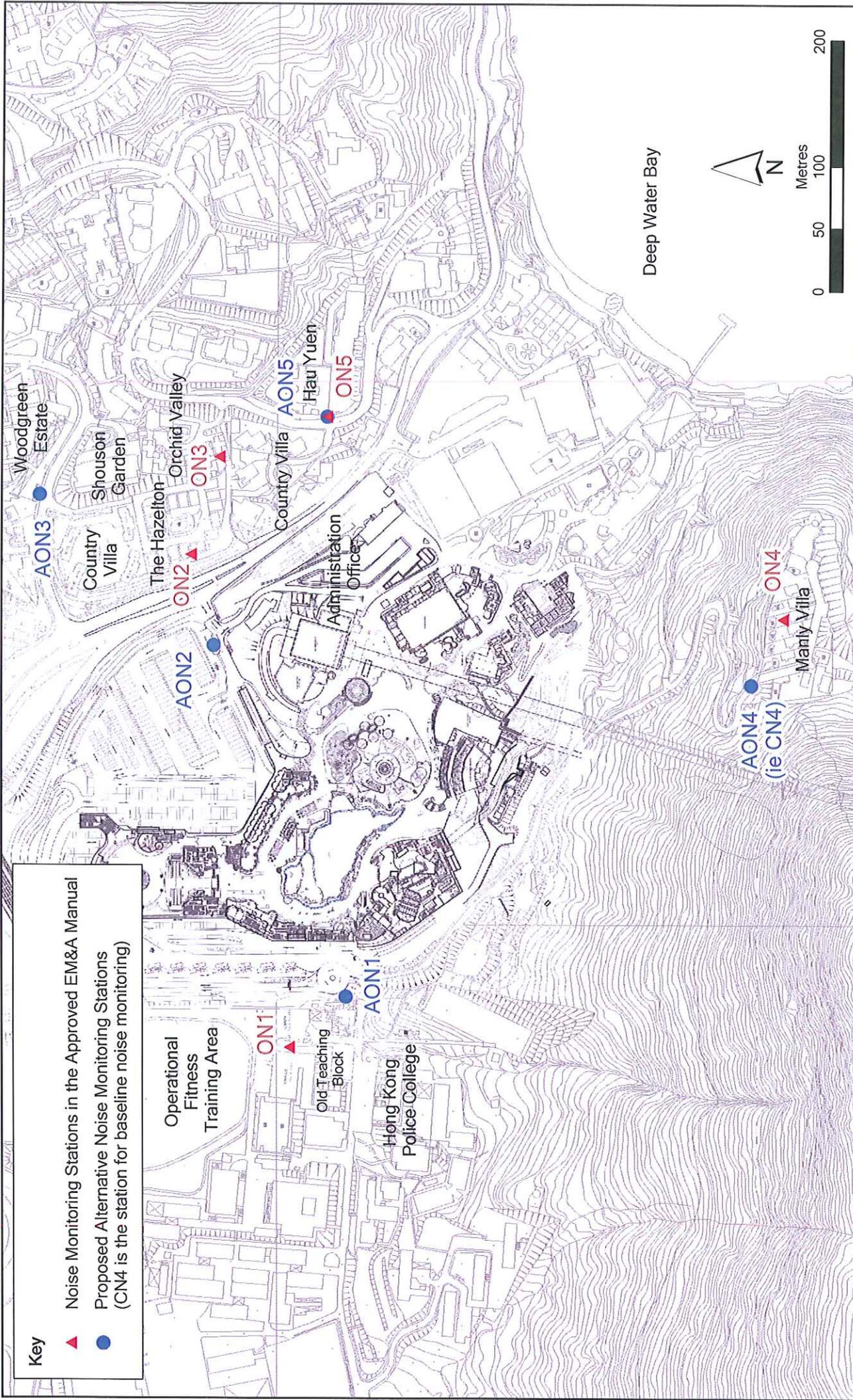


Figure 3.1

Proposed Noise Monitoring Stations in the Approved EM&A Manual and Proposed Alternative Noise Monitoring Stations