



Updated Open-air Lagoon Show with Pyrotechnic Effects

Air Quality Sampling Plan

PREPARED FOR



Ocean Park Corporation

DATE

6 June 2024

REFERENCE

0540005



DOCUMENT DETAILS

The details entered below are automatically shown on the cover and the main page footer. PLEASE NOTE: This table must NOT be removed from this document.

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Environmental Permit No. EP-249/2006/D
Ocean Park Master Redevelopment Project
Environmental Team Leader Certification


Reference Document/Plan

Document/ Plan to be Certified/ Verified :	Air Quality Sampling Plan
Date of Report:	6 June 2024

Reference EP Condition

Environmental Permit Condition:	2.39
The PSEM displays as part of the open-air lagoon show in Aqua City shall be designed and operated in accordance with the VEP Application Document (VEP-326/2010). If there are any changes proposed to the PSEM displays, such as scale, frequency and/or design of the PSEM display including the chemical content, launch location and launch height of PSEM, the Permit Holder shall, prior to implementing any such changes, deposit with the Director an air quality sampling plan and carry out air samplings according to the requirements as set out in Condition 2.38 above.	

ETL Certification

I hereby certify that the above referenced document/ plan complies with the above referenced condition of EP-249/2006/D.	
	
Ms Mandy To Environmental Team Leader	Date: 11 June 2024

Our ref: 0540005_ETL Certification Cert_AQSP_20240611.docx

Ocean Park Master Redevelopment Project

Environmental Permit No. EP-249/2006/D - Condition 2.39

**Updated Open-air Lagoon Show with Pyrotechnic Effects
Air Quality Sampling Plan**

Submitted by ERM-Hong Kong, Limited dated 06-06-2024

This is to verify that

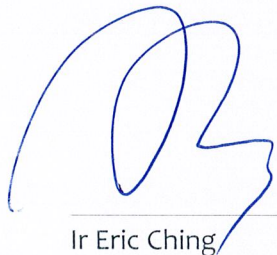
**Updated Open-air Lagoon Show with Pyrotechnic Effects
Air Quality Sampling Plan**

Submitted by ERM-Hong Kong, Limited

dated 06-06-2024

Has been verified by the undersigned.

Signed



Ir Eric Ching
Independent Environmental Checker (IEC)
Retained by Ocean Park Corporation
pursuant to Environmental Permit No. EP-249/2006/D

Date

11 June 2024

SIGNATURE PAGE

Updated Open-air Lagoon Show with Pyrotechnic Effects

Air Quality Sampling Plan

0540005



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CLIENT: Ocean Park Corporation

PROJECT NO: 0540005

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1. INTRODUCTION

1.1 BACKGROUND

The potential air quality impact of the Ocean Park Master Redevelopment Plan (MRP) has been assessed and presented in the *Environmental Impact Assessment Report for Repositioning and Long Term Operation Plan of Ocean Park* (AEIAR-101/2006) (hereinafter referred to as the approved EIA Report), and an Environmental Permit (EP), number EP-249/2006, for the MRP was granted on 28 July 2006. The EP was varied subsequently with the latest version, number EP-249/2006/D, issued by the Environmental Protection Department (EPD) on 2 July 2014.

The EP holder, Ocean Park Corporation (OPC), is proposed to continue to perform the open-air lagoon night show, namely Soul of the Ocean (SOTO), on 6 July 2024. There is a change in the number of uses of the Pyrotechnic Special Effects Material (PSEM) displays.

According to Condition 2.39 to the current EP (i.e. EP-249/2006/D), OPC shall, prior to implementing any changes, deposit with the Director of Environmental Protection (DEP) an air quality sampling plan (AQSP) and carry out air samplings according to the requirements as set out in Condition 2.38 to the current EP.

1.2 PURPOSE OF THE AQSP

ERM-Hong Kong, Limited (ERM) has been appointed by the OPC to prepare the AQSP. The objective of this AQSP is to fulfil the submission requirements for Condition 2.39 to the current EP for mitigating air quality impacts. This AQSP details the air quality monitoring before and during the trial PSEM displays.

1.3 STRUCTURE OF THE REPORT

Following this introductory section, the remainder of this AQSP is set out as follows:

- Section 2 - Air Quality Sampling Locations;
- Section 3 - Monitoring Methodology;
- Section 4 - Results and Reporting; and
- Section 5 – Contingency Plan.

2. AIR QUALITY SAMPLING LOCATIONS

2.1 SAMPLING LOCATIONS

It is proposed to carry out the air quality monitoring at four (4) air quality monitoring stations (AQMS). The list of the AQMS is provided in **Table 2.1** below. The figures of the AQMS are presented in **Figures 2.1** to **2.5**.

TABLE 2.1 AIR QUALITY MONITORING STATIONS

AQMS ID	AQMS Location	Sampling Height (mAG)
AMA1a	Rooftop of Shops in Ocean Park (North-west of the lagoon)	10
AMA2	Rooftop of Coral Building in Ocean Park	10

AQMS ID	AQMS Location	Sampling Height (mAG)
AMA3	Rooftop of Explorer R in Ocean Park	10
AMA4a	Rooftop of Hong Kong Ocean Park Marriott Hotel	25

Notes:

- (a) Due to the visit restriction of AMA1 Graham Hospital, AMA1a is proposed which is in the vicinity of the lagoon.
- (b) AMA2 to AMA3 are the AQMS in the air quality monitoring for trial displays in December 2010.
- (c) AMA4a is a new air sensitive receiver in the vicinity of the lagoon since October 2018.

3. MONITORING METHODOLOGY

3.1 MONITORING PARAMETERS AND MONITORING CRITERIA

The parameters of the air quality monitoring are as follows:

- Respirable Suspended Particulates (RSP);
- Metals (i.e. Aluminium (Al), Barium (Ba), Calcium (Ca), Copper (Cu), Iron (Fe), Magnesium (Mg) and Titanium (Ti)); and
- Odour.

The sampling and testing method and the number of samples for the above parameters are listed in **Table 3.1**. Calibration of the equipment set out in the sampling method in **Table 3.1** will be conducted before the measurement starts.

TABLE 3.1 SAMPLING METHOD AND NUMBER OF SAMPLES

Monitoring Parameters	Monitoring Frequency	Sampling and Testing Method	Monitoring Locations	Number of Baseline Samples	Number of Samples During Trial Displays
RSP	24-hour	EPA IO-2.1	AMA1a, AMA2, AMA3, AMA4a	4	4
Metals (Al, Ba, Cu, Ca, Fe, Mg, Ti) ^(a)	24-hour	EPA IO-3.1 & IO-3.5		4	4
Odour	1-hour	US NIOSH P&CAM Method	AMA1a, AMA4a	2	2

Note: (a) 24-hour RSP filter samples will be extracted for metal analysis for all events.

3.2 MONITORING PERIOD AND MONITORING FREQUENCY

Two (2) sampling periods, which are before the trial displays, and during the trial displays, will be established. The trial displays are proposed to start at 19:00hrs on 18 June 2024.

RSP will be measured for 24 hours before the trial displays (i.e. no PSEM displays) to obtain the RSP background level. The impact of 24-hour RSP levels during the trial displays will be measured starting from 6 hours before the trial displays (i.e. 13:00hrs, 18 June 2024). In addition, the sample of metals (i.e. Al, Ba, Cu, Ca, Fe, Mg, Ti) will also be collected from the RSP filter sample.

For odour measurement, two (2) samples (i.e. for baseline monitoring and impact monitoring) will be collected over a 1-hour period in each sampling period (i.e. before the trial displays,

and during the trial displays) at monitoring locations AMA1a and AMA4a. The baseline sampling will be conducted from 17:00hrs to 18:00hrs on 18 June 2024. The impact monitoring sampling (i.e. during the trial displays) will be started at least 10 minutes before the trial displays start.

General weather information, such as air temperature, relative humidity, wind speed and wind direction measured at Wong Chuk Hang Weather Station operated by the Hong Kong Observatory on the measurement date will be provided as reference.

4. RESULTS AND REPORTING

4.1 MONITORING REPORT

The *Monitoring Report* will describe the above monitoring requirements and weather data and present the monitoring results. The laboratory analysis reports will be appended to the *Monitoring Report*.

The monitoring results during trial displays will be compared with the baseline monitoring results. Monitored data measured at the relevant EPD'S AQMSs will also be referenced in the *Monitoring Report*.

5. CONTINGENCY PLAN

Should the impact monitoring results of any of the parameters stated in **Table 3.1** exceed the relevant AQOs or acute reference exposure levels, notice of exceedance will be issued to the ET Leader, IEC and OPC. Investigations will be taken, and if the exceedance is confirmed due to the trial displays, it is proposed to carry out additional trial displays and re-measure the parameters which show exceedance to confirm the exceedance. The monitoring method and period will follow that described in **Section 3**.

Should the re-measurements show exceedance and confirm that it is due to the trial displays, ET Leader, IEC and OPC will be notified and OPC will review the chemical composition or content of the PSEM and/or design of the PSEM displays. Monitoring of all parameters will be performed during the adjusted trial displays. Should the measurements still show exceedances after reviewing the chemical composition or content of the PSEM and /or design of the PSEM displays, OPC should consider a reduction in scale and/or frequency of the PSEM displays.

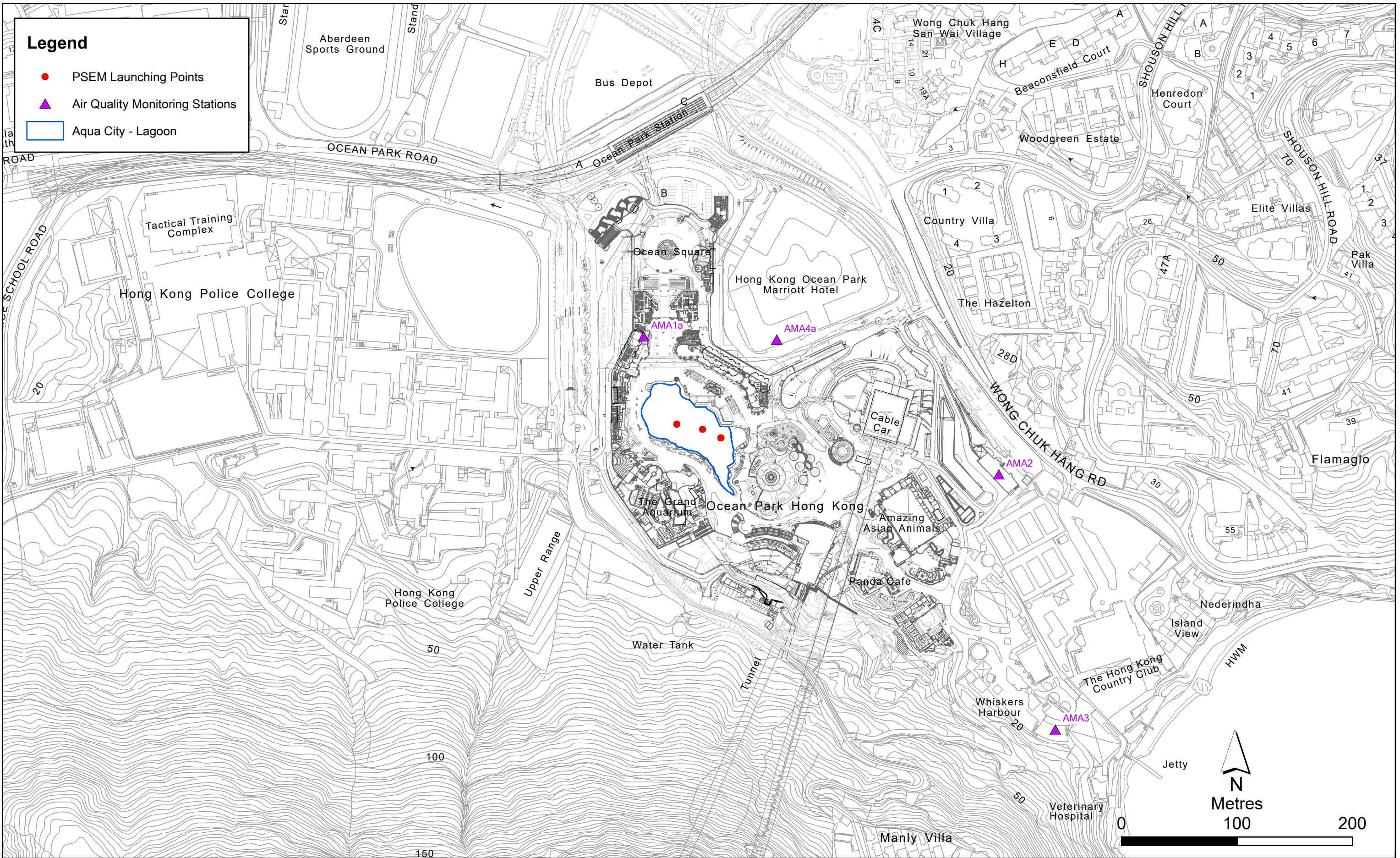


Figure 2.1

Locations of Air Quality Monitoring Stations



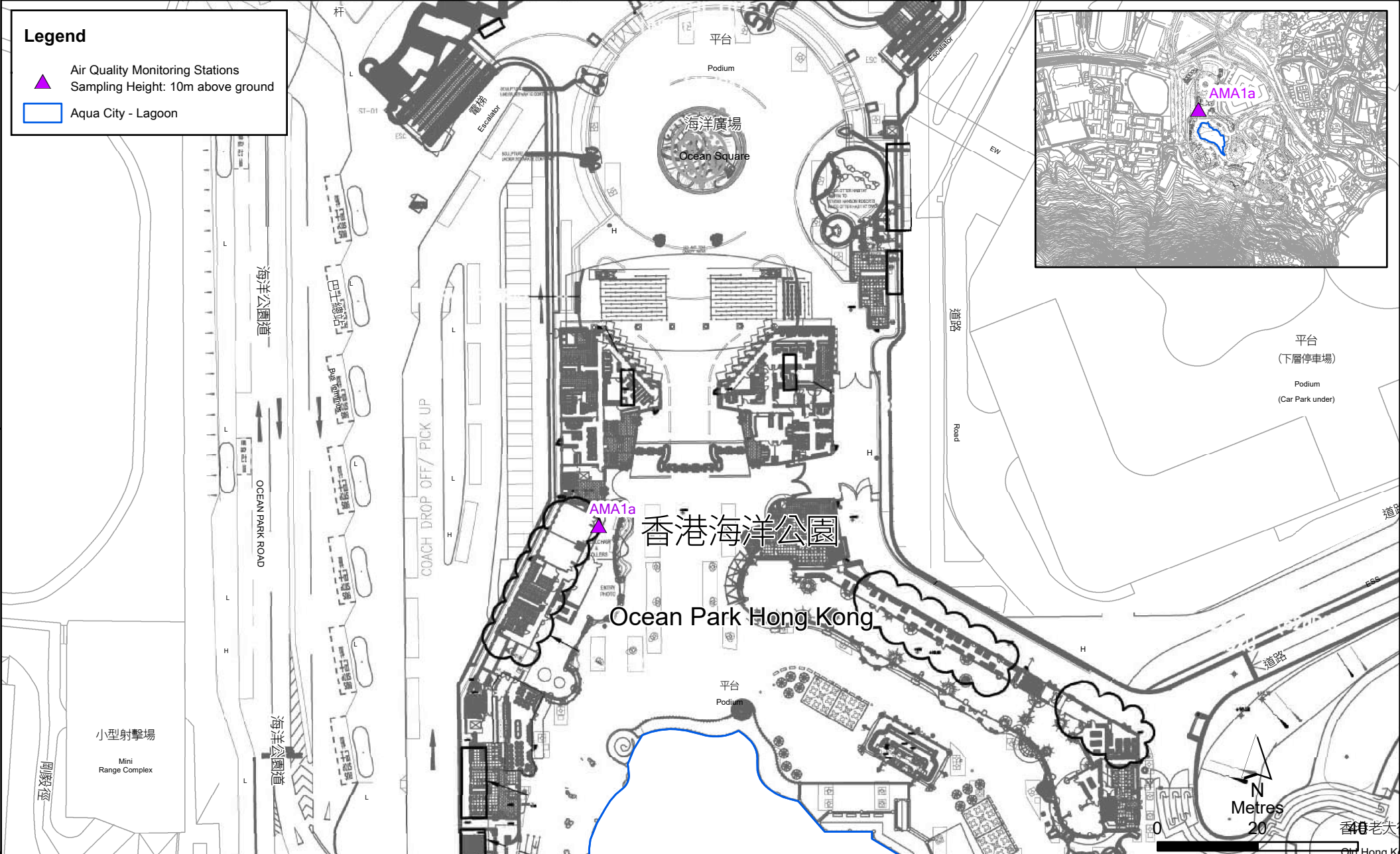


Figure 2.2

Location of Air Quality Monitoring Station AMA1a

Scale: 1:1000



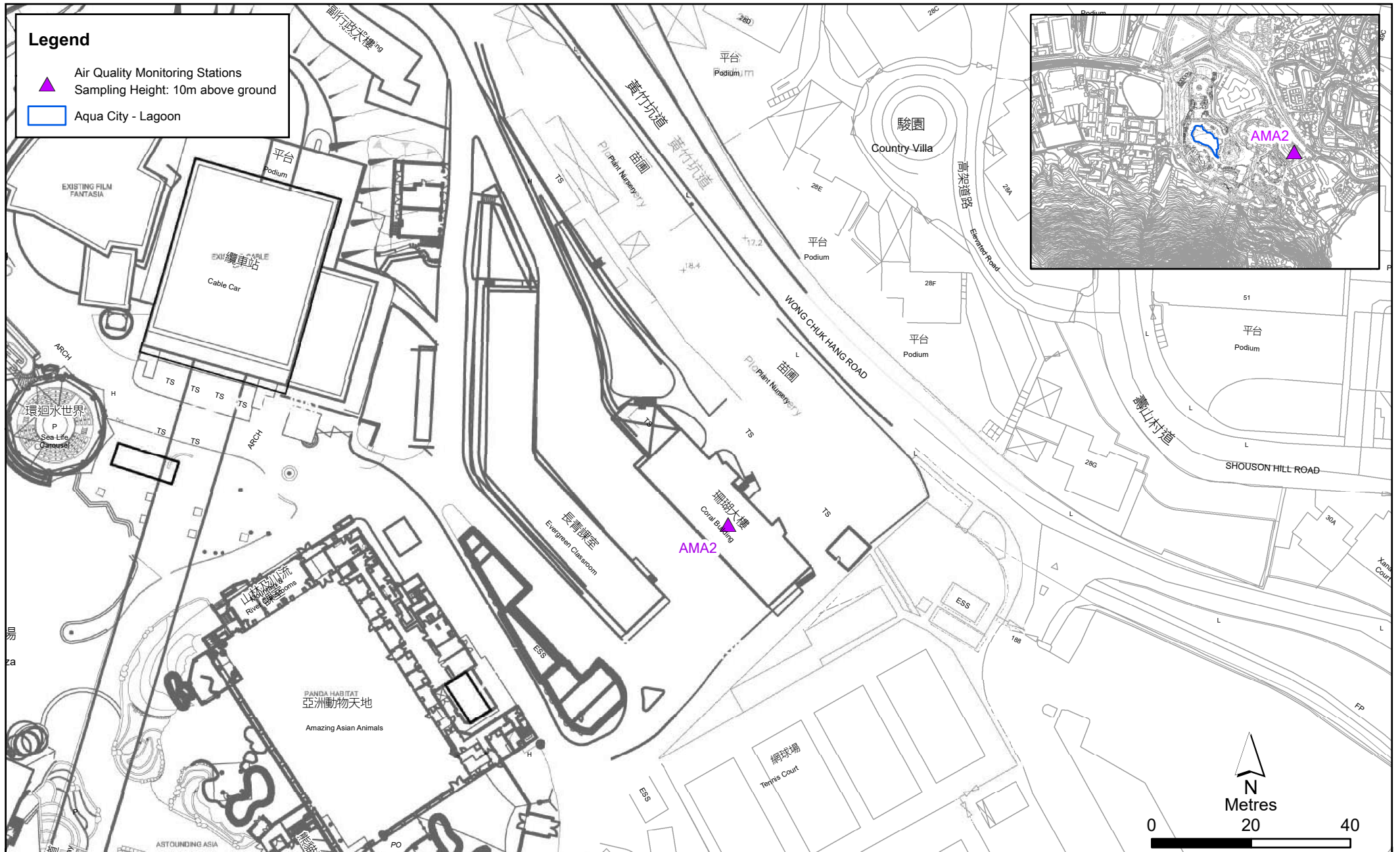


Figure 2.3

Location of Air Quality Monitoring Station AMA2

Scale: 1:1000





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