



Our ref.: LES/J2019-02/CS/L018  
Date : 23 May 2019

Environmental Protection Department  
Environmental Assessment Division  
Metro Assessment Group (43)

By Hand

27th floor, Southorn Centre,  
130 Hennessy Road,  
Wan Chai, Hong Kong

**Attn: Ms. Eva LAU (Env Protection Offr (Metro Assessment)43)**

Dear Ms. LAU,

**Contract No. DC/2018/05  
Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and  
Access Tunnel Construction**

**Proposal for Using Direct Reading Dust Meter for Construction Phase Air Monitoring**

**Submission under the Requirement of EM&A Manual**

We refer to the comments from your email dated on 22 May 2019 regarding the captioned, we submit herewith 4 hard copies and 3 electronic copies of proposal with the following items for your approval.

1. Proposal for using direct reading dust meter for construction phase air monitoring;
2. Response to comments
3. Letter from the Independent Environmental Checker showing they have no further comment on this proposal.

Should you have any queries, please contact the undersigned at 9108 0531.

Yours faithfully,  
For and On Behalf Of  
**Lam Environmental Services Limited**

Derek Lo  
Environmental Team Leader

Encl.

c.c.	DSD	Mr. Kenneth	Email w/e
	AECOM (CRE Office)	Mr. Simon Leung	Email w/e
	Mott MacDonald Hong Kong Limited	Mr. Brandon Wong	Email w/e

Environmental Protection Department  
EIAO Register Office  
27/F, Southorn Centre  
130 Hennessy Road  
Wanchai, Hong Kong

Attn: Ms. Eva Lau

**Your Reference**

**Our Reference**

EC/TC/BW/bw/T407129/  
Correspondence/L016

3/F Mapletree Bay Point  
348 Kwun Tong Road  
Kowloon  
Hong Kong

T +852 2828 5757  
F +852 2827 1823  
mottmac.hk

**Sha Tin Cavern Sewage Treatment Works**

**Environmental Permit No. EP-533/2017**

**Contract No. DC/2018/05 Relocation of Sha Tin Sewage Treatment Works to  
Caverns – Site Preparation and Access Tunnel Construction**

**Proposal to use Direct Reading Dust Meter for Construction Phase 1-hour TSP  
Impact Air Quality Monitoring**

23 May 2019

**By Hand**

Dear Madam,

I refer to the letter dated 23 May 2019 (ref: LES/J2019-02/CS/L018) from the Environmental Team Leader regarding his proposal to use direct reading dust meter for construction phase 1-hour TSP impact air quality monitoring, pursuant to Sections 2.2.2.2 and 2.2.2.5 of the EM&A Manual for the captioned Project.

I have no comment on the captioned proposal and hereby verify it as conforming to the information and recommendations contained in the EM&A Manual, in accordance with Condition 3.1 of Environmental Permit No. EP-533/2017 and Section 2.2.1.5 of the EM&A Manual.

Should you have any queries regarding the captioned or require any further information, please contact the undersigned at 2828 5875.

Yours faithfully  
for MOTT MACDONALD HONG KONG LIMITED



Brandon Wong  
Independent Environmental Checker  
T +852 2828 5875  
Brandon.Wong@mottmac.com

Encl.

c.c. DSD  
AECOM Asia Co. Ltd.  
Lam Environmental Services Limited

Mr. Kenneth Poon  
Mr. Simon Leung  
Mr. Derek Lo

By Email  
By Email  
By Email



**CONTRACT NO. SPW 25/2018**

**ENVIRONMENTAL TEAM FOR  
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO  
CAVERNS – SITE PREPARATION  
AND ACCESS TUNNEL CONSTRUCTION**

**UNDER ENVIRONMENTAL PERMIT NO. EP-533/2017**

**PROPOSAL FOR**  
**USING DIRECT READING DUST METER FOR CONSTRUCTION PHASE**  
**AIR MONITORING**

**CLIENTS:**

**Drainage Services Department**

**PREPARED BY:**

**Lam Environmental Services Limited**

11/F Centre Point  
181-185 Gloucester Road  
Wanchai, H.K.

Telephone: (852) 2882-3939  
Facsimile: (852) 2882-3331  
E-mail: [info@lamenviro.com](mailto:info@lamenviro.com)  
Website: <http://www.lamenviro.com>

**CERTIFIED BY:**

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Derek Lo  
Environmental Team Leader

**DATE:**

**23 May 2019**



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**1 Introduction**

**1.1 Background**

1.1.1. Lam Environmental Services Limited has been commissioned by Drainage Services Department to undertake the Environmental Monitoring and Audit works for Contract No. SPW 25/2018 Environmental Team for Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction, i.e. Contract No. DC/2018/05.

1.1.2. According to EM&A Manual Section 2.2.1.5, 1-hour TSP levels should be measured by following the standard method as set out in High Volume Sampling Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the US Environmental Protection Agency (USEPA) (hereinafter referred to as “High Volume Sampler (HVS) method”). Upon approval of EPD and IEC, an alternative sampling method of using direct reading methods which are capable of producing comparable results as that by the high volume sampling method can be used to indicate short event impacts.

1.1.3. This proposal comprised of the monitoring method proposed as per EM&A manual Section S2.2.1.5 for seeking approval of EPD and IEC, the alternative sampling method of using direct reading methods for which the monitoring result is comparable with the high volume sampling method can be used for the impact air monitoring.

**1.2 Proposed Monitoring Equipment**

1.2.1. With reference to S1.2.5 of Appendix D2 of the General Technical Requirements of Environmental Monitoring Guidelines for Development Projects in Hong Kong, If the ET Leader proposes to use a direct reading dust meter to measure 1-hr TSP levels, he shall submit sufficient information to the IC(E) to prove that the instrument is capable of achieving a comparable result as that the HVS and may be used for the 1-hr sampling. The instrument shall also be calibrated regularly, and the 1-hr sampling shall be determined periodically by HVS to check the validity and accuracy of the results measured by direct reading method.

1.2.2. The 1-hour TSP air quality monitoring is proposed to be performed by using portable direct reading dust meters at the air quality monitoring stations of AM1, AM2, AM3(A), AM4 and AM5 which stated in Project EM&A Manual and baseline monitoring report. The monitoring stations are listed and shown in **Table 1.1** and **Figure 1.1**.

**Table 1.1 Air Monitoring Stations**

Monitoring Station ID	Monitoring Location	Level (in terms of no. of floor)
AM1	Ah Kung Kok Fishermen Village	G/F
AM2	Block H, Kam Tai Court	Roof



AM3(A)	Kowloon City Baptist Church Hay Nien Primary School	G/F (tentative)
AM4	Wellborn Kindergarten	G/F
AM5	The Neighbourhood Advice-Action Council Harmony Manor	Roof

- 1.2.3. The portable direct reading dust meters was calibrated at 1-year interval (For Met One AEROCET 831) or 2-years interval (For Met One BT-645) based on the requirement of manufacturer.
- 1.2.4. The portable direct reading dust meters was checked with standard equipment, High volume Sampler (HVS) at 1-year interval to ensure the accuracy and validity. The accuracy and validity checking of portable direct reading dust meters will be carried out in order to determine the conversion factor between the portable direct reading dust meters and HVS. The accuracy and validity checking is to be considered as very strong correlation and valid if the calculated correlation coefficient (r) between 0.80-1.0 (Evans, 1996).
- 1.2.5. The brand and model of the equipment to be used for this project are given in **Table 1.2**.

**Table 1.2 Air Quality Monitoring Equipment**

Equipment	Brand and model	Series Number
Portable direct reading dust meter	Met One BT- 645	R22584
		R22586
		X19295
		X19296
		X19297
		X19298
		X19299
	Met One AEROCET 831	W14016
		W15448
		W16848

- 1.2.6. The proposed portable direct reading dust meters operating principal are summarized as follow (Detail refers to Appendix A):
- Operating Principal of Met One BT-645: The Met One Instruments, Inc. model BT-645 is a type of nephelometer which measures real-time airborne TSP particulate concentration levels using the principle of forward laser light scatter. Sample air is drawn into the BT-645 and through the laser optical module, where the particulate in the sample air stream scatters the laser light through reflective and refractive properties. This scattered light is collected onto a photodiode detector at a near-forward angle, and the resulting electronic signal is processed to determine a continuous, real-time measurement of airborne particulate mass concentrations.



- Operating Particle of Met One AEROCET 831: The AEROCET 831 counts and sizes particles then uses proprietary algorithm to convert count data to mass measurements ( $\mu\text{g}/\text{m}^3$ ). Fundamentally, the AEROCET 831 calculates a volume for each detected particle then assigns a standard density for the conversion assigns.
- 1.2.7. The proposed portable direct reading dust meters was adopted in EM&A project such as EDO/01/2017 Environmental Team for Development of Anderson Road Quarry Site Road improvement works and were approved by IEC and EPD.
- 1.2.8. The proposed validity and accuracy checking method was adopted in EM&A project such as EDO/01/2017 Environmental Team for Development of Anderson Road Quarry Site Road improvement works and was approved by IEC and EPD.
- 1.2.9. The specification, a sample of calibration certificate and certificate of comparison check with High Volume Sampler of the proposed air quality monitoring equipment listed in Table 1 are attached in Appendix A and Appendix B.

### **1.3 Monitoring Methodology**

#### **1.3.1. Measuring Procedures**

- (a) Check the calibration period of portable direct reading dust meter prior to monitoring (The direct reading dust meter was calibrated at 1-year interval (For Met One AEROCET 831) or 2-years interval (For Met One BT-645) and checked with High Volume Sampler at 1-year interval.
- (b) Record the site condition near / around the monitoring stations.
- (c) Install the portable direct reading dust meter to the monitoring location.
- (d) Slide the power switch to turn the power on.
- (e) Check of portable direct reading dust meter to ensure the equipment operation in normal condition.
- (f) Select the period of measurement to 60mins.
- (g) Check and set the correct time.
- (h) Select the appropriate unit display for the equipment.
- (i) Slide the power switch to turn the power off when the monitoring period ended (3 times 1 hour TSP monitoring per day).
- (j) Uninstall the portable direct reading dust meter
- (k) Collected the sampled data for analysis.

Remark: Procedures (c) to (h) may be different subject to the brands and models of portable direct reading dust

#### **1.3.2. Maintenance and Calibration**



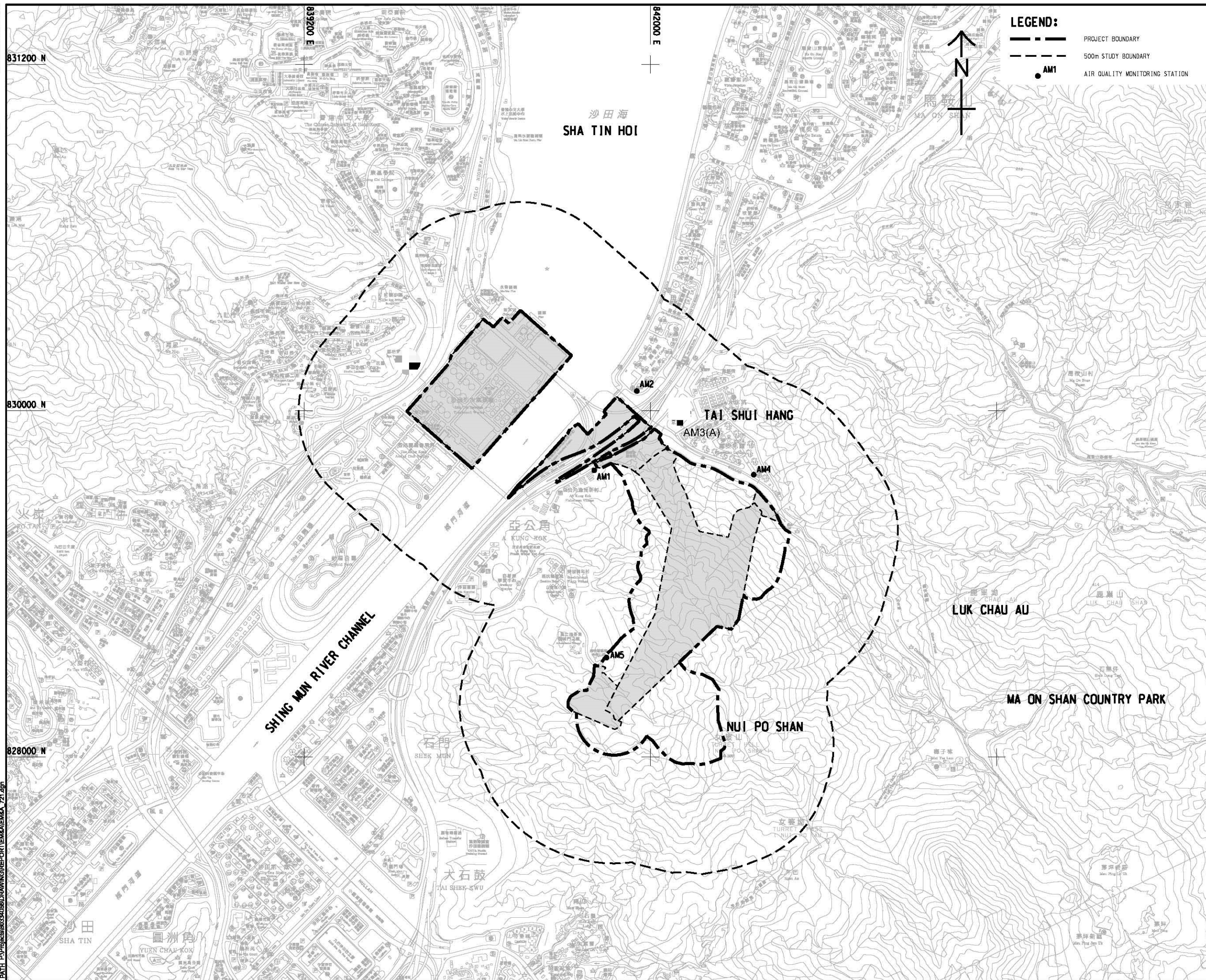
- (a) The Portable direct reading dust meter was calibrated at 1-year interval (For Met One AEROCET 831) or 2-years interval (For Met One BT-645) based on the requirement of manufacturer.
- (b) Accuracy and validity checking of Portable direct reading dust meter will be carried out at 1-year interval in order to determine the conversion factor between the direct reading dust meter and the standard equipment, HVS.





Figure 1.1 Air Quality Monitoring Stations

Pld File BY: WONGKWK\_27052016  
 PATH: F:\PROJECTS\60334056\DRAWING\REPORT\EM&A\_2.1.dwg  
 ISO A1 841mm x 594mm  
 Approved:  
 Checked:  
 Designer:  
 Project Management Initials:



**AECOM**

**PROJECT**  
 項目  
**RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION**

**CLIENT**  
 業主  
 渠務署  
 Drainage Services Department

**CONSULTANT**  
 土庫顧問公司  
 AECOM Asia Company Ltd.  
 www.aecom.com

**SUB-CONSULTANTS**  
 分判土庫顧問公司

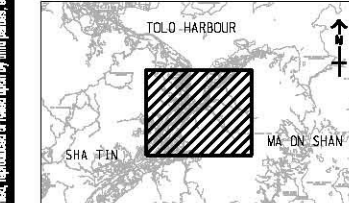
**ISSUE/REVISION**  
 修訂

IR	DATE	DESCRIPTION	CHK.

**STATUS**  
 階段

**SCALE**  
 比例  
 A3 1:16000

**DIMENSION UNIT**  
 尺寸單位  
 METRES



**PROJECT NO.**  
 項目編號  
 60334056

**CONTRACT NO.**  
 合約編號  
 CE 30/2014 (DS)

**SHEET TITLE**  
 圖紙名稱  
**LOCATION OF AIR QUALITY MONITORING STATION DURING CONSTRUCTION PHASE**

**SHEET NUMBER**  
 圖紙編號  
 60334056/EM&A/2.01

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**Lam Environmental Services Limited**

Contract No. SPW 25/2018  
Environmental Team for Relocation of Sha Tin  
Sewage Treatment Works to Caverns –  
Site Preparation and Access Tunnel Construction

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Appendix A      Specification of equipment



# BT-645 Portable Dust Monitor

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The **BT-645** Portable Dust Monitor has been designed to continuously measure and record particulate information for indoor work place and public place environments.



## Key Features:

- 'Real Time' monitoring
- Simple operation
- Rugged design
- Built-in Datalogger
- Purge air system
- Low power consumption

## Optical Sensor

A laser optical sensor is used to detect and measure particulate concentrations up to 100 milligrams per cubic meter. The continuous flow optical sensor is combined with purge air to ensure accurate measurements in adverse environments.

## Rugged Design

The optical sensor, matched electronics and backlit display, are enclosed in a rugged metal enclosure to protect the instrument from normal daily use.

## Data Storage

The internal datalogger will store over 5,000 samples. Sample history events can be viewed on the display or downloaded to a computer using Comet software.

## Battery Operation

The internal battery pack provides over 10 hours of continuous operation. Battery recharge time is approximately 2.5 hours.

## Optional Inlets

The standard unit is supplied with a TSP inlet. Optional sampling inlets are available for PM2.5, PM4 and PM10.

## Applications:

- Public and Workplace Monitoring
- Industrial / Occupational Hygiene
- Indoor Air Quality

Note: Not recommended for continuous outdoor use.

# BT-645 Portable Dust Monitor

## Measurements & Specifications

**OPERATING PRINCIPLE** Forward light scatter laser nephelometer

### PERFORMANCE

Concentration Range 0 to 100 mg/m<sup>3</sup> (0 to 100,000 µg/m<sup>3</sup>)  
Sensitivity 1 µg/m<sup>3</sup>  
Accuracy 5% traceable to standard with 0.6 µm PSL  
Measuring Time 1, 5, 10, 15, 30 and 60 minutes  
Flow Rate 2 LPM

Note: Measurement accuracy requires use of appropriate K-factor for the material being measured.

### ELECTRICAL

Light Source Laser diode, 5 mW, 670 nm  
Power 14.8V Li-ion (Lithium Ion) battery pack  
Battery Life Over 10 hours continuous operation  
AC Adapter/Charger Li-ion battery charger, 100 – 240 VAC, 50/60Hz to 16.8 V @ 1.8 A  
Communications RS-232, USB  
Data Storage Over 5,000 samples

### INTERFACE

Display 4 X 20 LCD  
Keyboard 6-key membrane type

### PHYSICAL

Size Height = 4.25" (10.8 cm)  
Width = 7.44" (18.9 cm)  
Thickness = 3.25" (5.4 cm)  
Weight 3.7 lbs (1.7 kg)

### ENVIRONMENTAL

Operating Temperature 0°C to +50°C  
Relative Humidity 90% (non-condensing)  
Storage Temperature -20°C to +60°C

### ACCESSORIES

Supplied User Manual  
USB Cable  
Communications Software (Comet)  
AC Adapter / Battery Charger

Optional PM2.5 Sharp Cut Cyclone (SCC-112)  
PM10 Sharp Cut Cyclone (SCC-110)  
Custom Serial Cable (PN 3228)



BT-645 w/SCC-112 PM2.5 Sharp Cut Cyclone

REV SEPT 2014

# AEROCET 831 Aerosol Mass Monitor

Small - Reliable - Affordable

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## Key Features:

### Five Mass Ranges

(PM1, PM2.5, PM4, PM10 and TSP)

A mass monitor that simultaneously provides five important mass ranges in one minute.

### Handheld Operation

Survey the environment with this extremely portable, size selective mass monitor. This small lightweight instrument is only 28 ounces and is the perfect survey tool for a wide range of applications.

### Simple Operation

Only two front-panel buttons accompany the multifunction rotary scroll wheel to provide simple and efficient operation. Just press and rotate to scroll through the menu driven platform.

### Sample History

View sample history easily on the display or export data via the USB port using the included software. Unit stores up to 2500 sample events. USB interface provides quick data download and field firmware upgrades.

### Battery Powered

24 hours of typical intermittent operation and up to 8 hours of continuous use. Recharge time is only 2.5 hours. The included AC charger / adapter operates the counter even when the batter pack is discharged.



Figure 1 – AEROCET 831 with optional protective boot

## Applications:

- Indoor Air Quality
- Industrial / Occupational Hygiene
- HVAC Applications

Note: Not recommended for continuous outdoor use.  
Avoid sampling in rainy or foggy conditions.

# AEROCET 831 Aerosol Mass Monitor

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## Specifications:

### Operating Principle

Particle count to mass conversion

### Features

Sample Duration	1 minute
Sample Modes	Manual and Continuous
Data storage	2,500 records
Display	2-line by 16-character LCD
Controls	2 button keypad with rotary dial

### Performance

PM Ranges	PM1, PM2.5, PM4 and PM10
Concentration Range	0 – 1,000 $\mu\text{g}/\text{m}^3$
Resolution	0.1 $\mu\text{g}/\text{m}^3$ (display / serial output)
Sensitivity	High = 0.3 $\mu\text{m}$ , Low = 0.5 $\mu\text{m}$
Accuracy	$\pm 10\%$ to calibration aerosol
Flow rate	0.1 CFM (2.83 lpm)

### Electrical

Light Source	Laser Diode, 780 nm, 40 mW typical
AC Adapter/Charger	AC to DC module, 100 – 240 VAC to 8.4 VDC
Battery Type	Li-ion rechargeable Battery
Battery Operating Time	8 hours continuous operation. Up to 24 hours intermittent operation.
Battery Recharge Time	2.5 hours typical
Communication	USB Mini B Type

### Physical

Size	Height: 6.25" (15.9 cm) Width: 3.63" (9.22 cm) Thickness: 2.00" (5.08 cm)
Weight	1.74 lbs – 28 ounces – (0.79 kg)

### Environmental

Operating Temperature	0° C to +50° C
Storage Temperature	-20° C to +60° C

### Accessories

Supplied	Battery charger / adapter
	USB Cable
	Operation manual
	Comet software
Optional	Carrying Case (PN 8517)
	Protective Boot (PN 80450)
	Zero Filter Kit (PN 80846)
	Flow Meter Kit (PN 80530)

REV JUNE 2014



1600 Washington Blvd. • Grants Pass, OR 97526 • 541.471.7111 • [www.metone.com](http://www.metone.com)  
[sales@metone.com](mailto:sales@metone.com)



**Lam Environmental Services Limited**

Contract No. SPW 25/2018  
Environmental Team for Relocation of Sha Tin  
Sewage Treatment Works to Caverns –  
Site Preparation and Access Tunnel Construction

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Appendix B      Sample of equipment calibration certification





**Met One Instruments, Inc.**  
 1600 NW Washington Blvd, Grants Pass, OR  
 TEL (541) 471-7111 Fax (541) 471-7116

# Certificate of Calibration

*BT-645*

*Particulate Monitor*

*Recommended calibration interval is 24 months from first day of use.*

<b>Unit Info</b>	<b>Model:</b>	<u>BT-645</u>	<b>81865</b>	<b>Firmware Rev:</b>	<u>1.1.0</u>
	<b>Serial Number:</b>	<u>R22584</u>		<b>81113</b>	<u>0.2.4</u>
	<b>Calibrated By:</b>	<u>Kevin Ricks</u>	<i>AT21</i>	<b>Cal. Date:</b>	<u>01/18/2019</u>
	<b>Quality Inspector:</b>	<u><i>AT25</i></u>		<b>Date:</b>	<u>JAN 21 2019</u>
	<b>Calibration Hz/<math>\mu</math>g/m<sup>3</sup>:</b>	<u>9.50</u>			

<b>Final Test</b>	<b>Flow (2.0 L/M):</b>		Pass	<b>Ambient T (C)</b>	<u>22</u>
	<b>Serial Communication:</b>		Pass	<b>RH, %</b>	<u>34</u>
	<b>BT-645 Conc.:</b>	<u>350.93</u>	<b>Standard Conc:</b>	<u>353.81</u>	

<b>Calibration Standards</b>				
Standards	Manufacturer	Model	SN	Cal Due
RMS Multimeter	Fluke	289 Multimeter	23740018	5/03/2019
RH & TEMPERATURE	Met One Instruments	083E-1-6	R20313	9/18/2019
Primary Flow Meter	BIOS	Defender-510	1033419	3/28/2019
Digital Dust Indicator	SIBATA	LD-3B	476795	5/18/2019

*The standards used for this calibration have accuracy equal to or greater than the instrument tested. These standards are on record and traceable to NIST to the extent allowed by the institute's calibration facility. Unless otherwise stated, all instruments are calibrated to meet the manufacturer's published specifications. The Calibration system complies with MIL-STD-45662A.*



Portable Dust Meter Performance Check Record

Portable Dust Meter

Type : Particulate Monitor
Manufacturer : MET ONE INSTRUMENTS
Model Number : BT-645
Serial Number : R22584
Performance Check Date : 27-Feb-19

Standard Equipment

Type : High Volume Sampler
Manufacturer : TISCH
Model Number : TE-5170
Equipment Number : HVS018
Last Calibration Date : 4-Dec-18

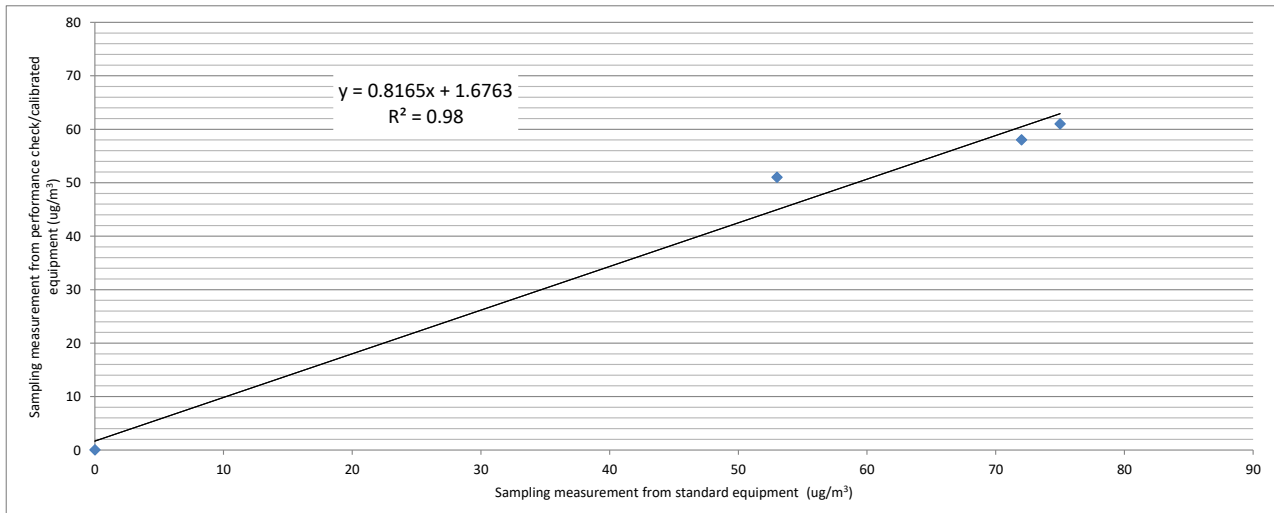
Portable Dust Meter Performance Check Results

Table with 6 columns: Trial no. in 1-hr period, Time, Mean Pressure (hPa), Mean Temp (°C), Concentration in ug/m³ (Standard equipment) (Y - Axis), Concentration in ug/m³ (Performance Check / Calibrated equipment) (X - Axis). Rows include Zero Check and trials 1, 2, 3.

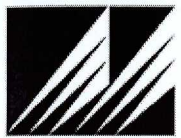
\* Filter paper weighting was conducted by HOKLAS accredited laboratory.

Linear Regression of Y on X

Slope (K- factor) : 1.3000
Correlation Coefficient : 0.9900
Validity of Performance Check / Calibration Record : 27/2/2020



Operator: Henry Lau Date: 27-Feb-19
Checked by: Chan Ka Chun Date: 4-Mar-19



1600 Washington Blvd  
 Grants Pass, OR 97526  
 (541) 471-7111  
 (541) 471-7116 (Fax)  
 Service@metone.com

# Calibration Certificate

Met One  
 Instruments

The calibration results on this report certify that this instrument complies with the product specifications at the time of calibration. Calibration was performed according to accepted industry methods using equipment, procedures, and standards that are traceable to NIST and ISO.

Recommended calibration interval is 12 months from the first day of use.

Instrument Model# Aerocet 831

Instrument Serial# W15449

Date of Calibration 10/4/2018

Sensor # 16439

Darleen Best *AT7*

*AT25*

Calibration Technician

Quality Check

Temperature 23 °C

Relative Humidity 36.5 %

Test Procedure: **Aerocet 831-6100**

PSL Size (µm)	Test Results	Test Spec.	Lot# NIST	Expiration
0.3	Pass	± 10%	183039	03/31/2020
0.5	Pass	± 10%	180556	02/28/2020
1.0	Pass	± 10%	169240	5/31/2019
2.5	Pass	± 10%	REF	NA
4.0	Pass	± 10%	REF	NA
5.0	Pass	± 10%	REF	NA
7.0	Pass	± 10%	REF	NA
10.0	Pass	± 10%	REF	NA

Standards	Model	SN	Cal Due
Particle Counter	GT-526	M1760	10/9/2018
Flowmeter	DCL-M	103751	1/29/2019
DMM	289	27720071	6/29/2019
RH/TEMP SENSOR	083E-1-6	R20313	9/18/2019

*This calibration certificate shall not be reproduced except in full, without the written approval of Met One Instruments Inc.*


**REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION**

**REPORT NO.** : HK1811054  
**PROJECT NAME** : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
**DATE OF ISSUE** : 24/10/2018  
**CUSTOMER** : LAM ENVIRONMENTAL SERVICES LTD  
**ADDRESS** : 11/F, CENTRE POINT, 181-185 GLOUCESTER ROAD, WAN CHAI, HONG KONG


**REPORT NO.** : HK1811054  
**PROJECT ITEM NO.** : HK1811054-01  
**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**  
**TYPE** : AEROSOL MASS MONITOR  
**MANUFACTURER** : MET ONE INSTRUMENTS  
**MODEL NO.** : AEROCET - 831  
**SERIAL NO.** : W15449  
**EQUIPMENT NO.** : ---  
**RECEIPT DATE** : 18/10/2018  
**PERFORMANCE CHECK / CALIBRATION DATE** : 23/10/2018

**PERFORMANCE CHECK / CALIBRATION Information**

CODE	Calibration Parameter	Method Procedure	Reference Method
Dust PC/CAL	Performance Check / Calibration of Dust Meter	CAL003	General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK

- Notes :
1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory

  
 \_\_\_\_\_  
 Wong Po Yan Pauline  
 (Assistant Laboratory Manager)

Issue Date: 24/10/2018





**REPORT OF PERFORMANCE CHECK / CALIBRATION**

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER  
 DATE OF ISSUE : 24/10/2018  
 REPORT NO. : HK1811054

**PERFORMANCE CHECK / CALIBRATED EQUIPMENT**

TYPE : AEROSOL MASS MONITOR  
 MANUFACTURER : MET ONE INSTRUMENTS  
 MODEL NO. : AEROCET - 831  
 SERIAL NO. : W15449  
 EQUIPMENT NO. : ---  
 PERFORMANCE CHECK / CALIBRATION DATE : 23/10/2018

**STANDARD EQUIPMENT**

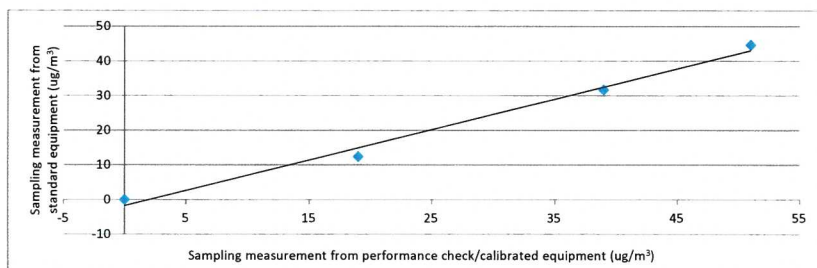
TYPE : HIGH VOLUME AIR SAMPLER  
 MANUFACTURER : TISCH  
 MODEL NO. : TE-5170  
 EQUIPMENT REF NO. : PTL\_HV002  
 LAST CALIBRATION DATE : 25/7/2018

**EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:**

Trial no. in 1-hr period	Time	Mean Temp (°C)	Mean Pressure (hPa)	Concentration in ug/m <sup>3</sup> (Standard equipment) (Y - Axis)	Concentration in ug/m <sup>3</sup> (Performance Check / Calibrated equipment) (X - Axis)
Zero Check <sup>1</sup>	23/10/2018,9:05:00 AM	25.3	1017	0	0
1	23/10/2018,10:20:00 AM	25.3	1017	45	51
2	23/10/2018,11:22:00 AM	25.3	1017	32	39
3	23/10/2018,12:29:00 PM	25.3	1017	12	19

**Linear Regression of Y on X**

Slope (K- factor) : 0.8800  
 Correlation Coefficient : 0.9945  
 Validity of Performance Check / Calibration Record : 23/10/2019



- Notes :
1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
  2. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
  3. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature:  Date: 23/10/2018

Checked by: Wong Po Yan, Pauline Signature:  Date: 24/10/2018

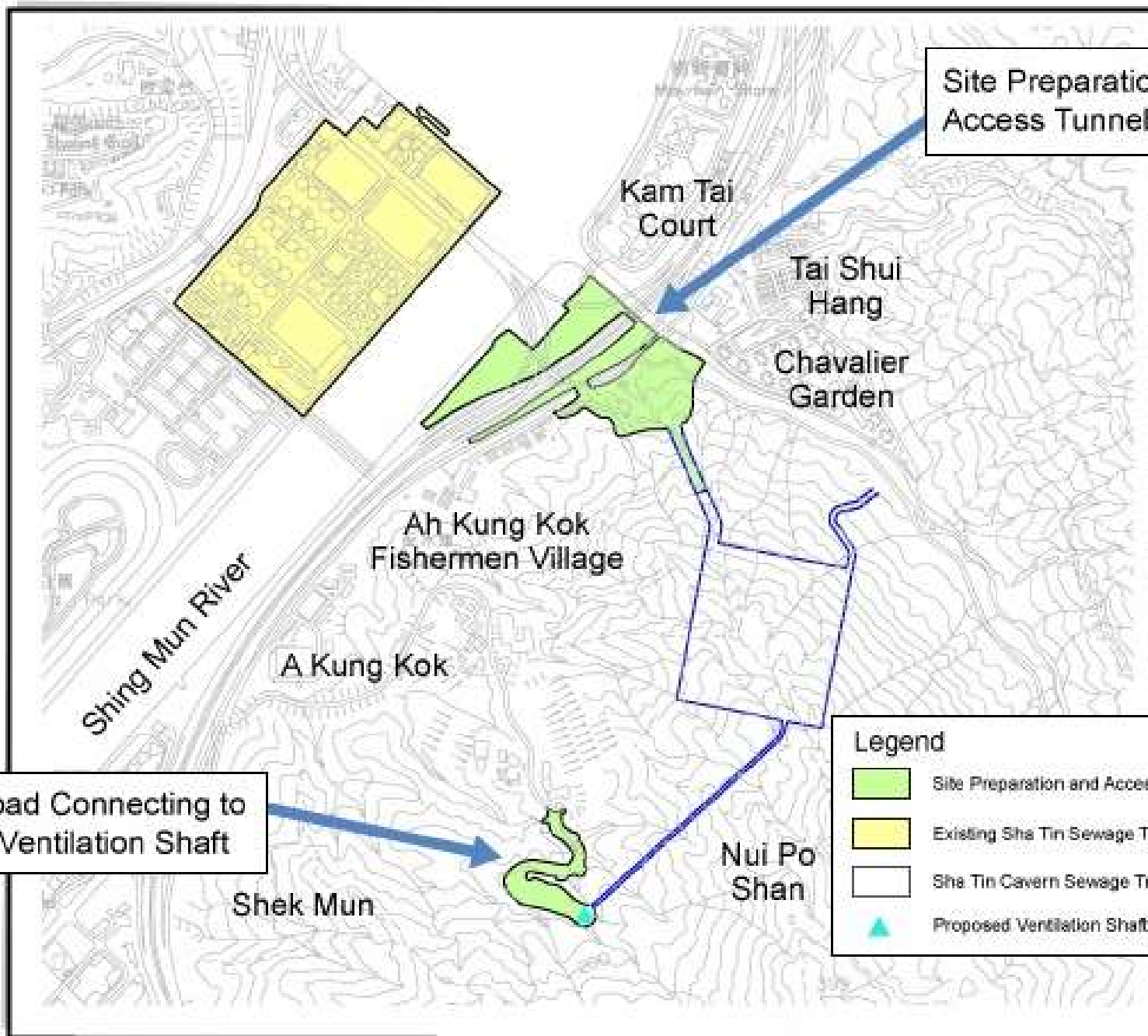


**Lam Environmental Services Limited**

Contract No. SPW 25/2018  
Environmental Team for Relocation of Sha Tin  
Sewage Treatment Works to Caverns –  
Site Preparation and Access Tunnel Construction

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Appendix C    Project layout plan



Site Preparation and Access Tunnel

Kam Tai Court

Tai Shui Hang

Chavalier Garden

Ah Kung Kok Fishermen Village

Shing Mun River

A Kung Kok

Legend

- Site Preparation and Access Tunnel Construction (399DS-1)
- Existing Sha Tin Sewage Treatment Works
- Sha Tin Cavern Sewage Treatment Works - Main Works
- Proposed Ventilation Shaft

Access Road Connecting to Proposed Ventilation Shaft

Shek Mun

Nui Po Shan