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ENVIRONMENTAL MONITORING & AUDIT MONTHLY REPORT

June 2016

Client : SANG HING – KULY JOINT VENTURE

Contract Name : Castle Peak Road Trunk Sewer and Tuen Mun Village Sewerage (Sewage Pumping Station at Lok Chui Street near Castle Peak Villas)

Contract No. : DC/2014/01

EP No. : EP-068/2000/A

Title of Project : Sewage Pumping Stations at Tai Lam Chung Tsuen Luen On San Tsuen, Tai Lam Valley and Lok Chui Street near Castle Peak Villas under the scope of "Tuen Mun Sewerage – Eastern Coastal Sewerage Extension"

Report No. : 0367/15/ED/0509

Prepared by : Wingo H. W. So

Reviewed by : Cyrus C. Y. Lai

Certified by :

Colin K. L. Yung
Environmental Team Leader
MateriaLab Consultants Limited

8 July 2016

ANEWR

Drainage Services Department
42/F., Revenue Tower
5 Gloucester Road
Wan Chai
Hong Kong

Your reference:

Our reference: HKDSD202/50/103524

Date: 11 July 2016

Attention: Ms Cathleen Chan

BY EMAIL & POST
(email: fcchan02@dsd.gov.hk)

Dear Sirs

Agreement No.: PM 08/2014
Services for Independent Environmental Checker for
Construction of Lok Chui Street Sewage Pumping Station
Verification of Monthly EM&A Report (June 2016)

We refer to email of 8 July 2016 attaching a monthly EM&A Report (June 2016) for the captioned project prepared by the ET.

We have no comment and hereby verify the monthly EM&A Report in accordance with Clause 3.5 of the Environmental Permit no. EP-068/2000/A.

Please do not hesitate to contact the undersigned at 2618 2836 or Mr Nic Lam should you have any queries.

Yours faithfully
ANEWR CONSULTING LIMITED

Adi Lee
Independent Environmental Checker

LYMA/LHHN/csym

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ISO 9001 : 2008
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EXECUTIVE SUMMARY

i. This is the 4th Monthly Environmental Monitoring Audit (EM&A) Monthly Report, it presents the environmental monitoring and audit works for the period from 1 June 2016 to 30 June 2016.

Construction Activities for the Reporting Period

ii. During this reporting period, the principal work activities within the site included:
- Construction of lagging wall

Breaches of Action and Limit Levels for Air Quality

iii. No Action or Limit Level Exceedance of 1-hr TSP monitoring was recorded in the reporting period.

Breaches of Action and Limit Levels for Noise

iv. No exceedance was recorded at all monitoring stations in the reporting period.

Complaint, Notifications of Summons and Successful Prosecutions

v. No Action or Limit Level Exceedance of noise monitoring was recorded in the reporting period.

Reporting Change

vi. There was no reporting change required in the reporting period.

Future Key Issues

<u>Construction Activities for the Coming Reporting Period</u>

vii. During the coming reporting period, the principal work activities within the site included:
- Construction of Mini-pile

viii. Potential environmental impacts due to the construction activities, including air quality, noise, water quality, waste, landscape and visual, will be monitored or reviewed. The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirements. The recommended environmental mitigation measures shall be implemented on site and regular inspections as required will be carried out to ensure that the environmental conditions are acceptable.

1. INTRODUCTION

1.1 Background

1.1.1 Contract No. DC/2014/01 – Castle Peak Road Trunk Sewer and Tuen Mun Village Sewerage ("the Project") includes the construction of a sewage pumping station at Lok Chui Street near Castle Peak Villas as shown in **Figure 1**.

1.1.2 The environmental impact assessment (EIA) report (Tuen Mun Sewerage - Eastern Coastal Sewerage Extension) – EIA Report (Register No. AEIAR-034/2000) for the Project was approved by Environmental Protection Department (EPD) dated 7 June 2000. The EIA Report involves the construction of four sewage pumping stations at Tai Lam Chung Tsuen, Luen On San Tsuen, Tai Lam Valley and Lok Chui Street near Castle Peak Villas. The scope of this EM&A Manual focuses on the Sewage Pumping Station at Lok Chui Street near Castle Peak Villas in the EIA Report. The Project is designated under Schedule 2, section F3(b) and Q1 of the Environmental Impact Assessment Ordinance (EIAO). EPD subsequently issued the Environmental Permit (EP) EP- 068/2000 on 25 July 2000.

1.1.3 A Register of Change to Environmental Permit was submitted to EPD to register any change to the conditions in the EP for adoption of the latest design of the Pumping Station at Lok Chui Street and justify that the latest changes would not violate the conditions as stated in the approved EIA Report and EP based on the latest engineering design information. A Variation of Environmental Permit (VEP) EP-068/2000/A was issued on 10 April 2015 and it is the current permit for the Project.

1.1.4 The amended EP (EP-068/2000/A) is the current permit for the Project.

1.1.5 In accordance to EP-068/2000/A Condition 2.3 and 2.4, an updated EM&A Manual was duly certified by ETL and verified by IEC and submitted to EPD for approval on 18 January 2016.

1.1.6 The construction phase and EM&A programme of the Project commenced on 29 February 2016.

1.1.7 This is the 4th monthly EM&A Report which summaries the impact monitoring results and audit findings for the Project within the period from 1 June 2016 to 30 June 2016.

1.2 Project Organization

1.2.1 The Project Organization structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1**.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
Drainage Services Department, HKSAR (DSD)	Project Management	Ms. Cathleen Chan	2594 7296	2827 8526
Engineer/Engineer's Representative (AECOM)	Resident Engineer	Ms. Jacqueline Chan	3127 5103	2441 1755
	Senior Inspector of Works	Mr. Raymond Au	3127 5160	
Independent Environmental Checker (ANEWR)	Independent Environmental Checker	Mr. Adi Lee	2618 2836	3007 8648
Contractor (SKLV)	Site Agent	Mr. Alan Lo	2674 3888	2674 6688
	Environmental Officer	Mr. Calvin Lam		
Environmental Team (MCL)	Environmental Team Leader	Mr. Colin Yung	3565 4114	3565 4160

1.3 Construction Programme and Activities

1.3.1 The construction phase of the Project under the EP commenced on 29 February 2016.

1.3.2 The construction programme of the Project is shown in **Appendix A**.

1.4 Works undertaken during the month

1.4.1 During this reporting period, the principal work activities within the site included:

- Construction of lagging wall

1.4.2 Illustrations of works undertaken during the reporting period are shown in Table 1.2:

Table 1.2 Works undertaken Illustrations

Construction of lagging wall

1.5 Status of Environmental Licences, Notification and Permits

1.5.1 A summary of the relevant permits, licences and/or notifications on environmental protection for this Contract is presented in **Table 1.3**.

Table 1.3 Status of Environmental Licences, Notification and Permits

Permit / Direction / License	Ref No	Valid From	Valid Till
Environmental Permit	EP-068/2000/A	10/04/2015	N/A
Notification of Works Under APCO	391923	06/08/2015	N/A
Wastewater Discharge Licence	WT00022654-2015	23/10/2015	31/10/2020
Registration as a Chemical Waste Producer	5111-421-S3879-01	02/09/2015	N/A
Billing Account for Disposal of Construction Waste	7022922	06/08/2015	N/A

2. AIR QUALITY

2.1 Monitoring Requirement

2.1.1 In accordance with the updated EM&A Manual, for regular impact monitoring, the sampling frequency of at least once per week shall be strictly observed at designated monitoring stations for 1-hr TSP monitoring using the direct reading method.

2.2 Monitoring Equipment and Detection Limits

2.2.1 The impact air quality (1-hr TSP) monitoring was performed using the portable TSP Monitors (Sibata Model LD-3B).

2.2.2 **Table 2.1** summarizes the detail of monitoring equipment and detection limits:

Table 2.1 Air Quality Monitoring Equipment

Item	Equipment	Model Number	Serial Number	Measuring accuracy	Measuring range
1	Portable TSP Monitor	Sibata Model LD-3B	577229	±10% of calibrated particles	0.001 – 10.00mg/m^3
2			597324		

2.3 Monitoring Parameters, Frequency and Duration

2.3.1 **Table 2.2** summarizes the monitoring parameters, monitoring duration and frequencies of air quality monitoring.

Table 2.2 Monitoring Parameters, Frequency and Duration of Air Quality Monitoring

Parameter	Duration	Frequency
1-hr TSP	1 hour	At least 3 times in every 6 days

2.4 Monitoring Locations

2.4.1 In accordance with the updated EM&A Manual, two designated air quality monitoring stations, LC6a and LC9 are selected for the Project Area of constructing a sewage pumping station at Lok Chui Street near Castle Peak Villas as they are the representative air sensitive receivers located near to the Project site. All designated air quality monitoring stations listed in the updated EM&A Manual and the air quality monitoring stations are shown in **Table 2.3** and the monitoring locations are shown in **Figure 2**.

Table 2.3 Air Quality Monitoring Locations

Monitoring Station	Location
LC6a	The Castle Bay
LC9	Castle Peak Villas Block C

2.5 Monitoring Methodology and QA/QC Procedures

2.5.1 The measuring procedures of the 1-hr dust meter are in accordance with the Manufacturer's instruction Manual as follows:

- Pull up the air sampling inlet cover

- Change the Mode 0 to BG with once
- Push Start/Stop switch once
- Turn the knob to SENSI.ADJ and press it
- Push Start/Stop switch once
- Return the knob to the position MEASURE slowly
- Push the timer set switch to set measuring time
- Remove the cap and make a measurement

Maintenance / Calibration

2.5.2 The portable TSP Monitors should be calibrated at 1 year intervals, Current calibration certificates are given in **Appendix D**.

2.6 Results and Observations

2.6.1 The schedule of air quality monitoring and data recovery schedule in reporting period is provided in **Appendix E**.

2.6.2 The weather conditions during the monitoring are provided in **Appendix L**.

2.6.3 The monitoring data of 1-hr TSP are summarized in **Table 2.4**. Detailed monitoring data are presented in **Appendix F**.

Table2.4 Summary of 1-hr TSP Monitoring Results

Monitoring Station	Average ($\mu g/m^3$)	Range ($\mu g/ m^3$)	Action Level ($\mu g/ m^3$)	Limit Level ($\mu g/ m^3$)
LC6a	34	24-54	344	500
LC9	36	15-59	335	500

2.6.4 The adopted Action and Limit Levels for air quality impact monitoring are presented in **Appendix C**.

2.6.5 The Event and Action Plan for air quality is given in **Appendix J**.

2.6.6 No Action or Limit Level Exceedance of 1-hr TSP monitoring was recorded in the reporting period.

Other factor influencing the monitoring results

2.6.7 There were no other noticeable external factors generally affecting the monitoring results in this reporting period.

3. NOISE

3.1 Monitoring Requirement

3.1.1 In accordance with the updated EM&A Manual, Leq (30min) monitoring is conducted for at least once a week during the construction phase between 0700 and 1900 on normal weekdays at the designated monitoring locations.

3.2 Monitoring Equipment and Detection Limits

3.2.1 The sound level meter used in noise monitoring will comply with the International Electrotechnical Commission Publication (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum issued under the Noise Control Ordinance (NCO).

3.2.2 Sound level calibrator will be used for the on-site calibration of the meter. This calibrator complies with the IEC Publication 942 (1988) Class 1 and ANSI S1.40 - 1984. Noise measurements were only accepted to be valid if the calibration levels from before and after the measurement agree to within 1.0dB.

3.2.3 Measurements shall be recorded to the nearest 1dB(A). This noise monitors are programmed to measure A-weighted equivalent continuous sound pressure level at 30-minute intervals between 0700 and 1900 during the daytime. The noise measurement shall be carried out at each of the designated monitoring stations closest to the areas of active construction works once every week.

3.2.4 **Table 3.1** summarizes the detail of monitoring equipment and detection limits:

Table 3.1 Noise Monitoring Equipment

Item	Equipment	Model Number	Serial Number	Measuring accuracy	Measuring range
1	Integrating Sound Level Meter	Casella CEL-63X Series	3321823	N.A	20-140 dB
2	Calibrator	Casella CEL-120/1	5230758	±0.1dB	94/114 dB
3	Wind Speed Anemometer	Smart Sensor AR816+	N.A	±5%	0-30m/s

3.3 Monitoring Parameters and Frequency

3.3.1 **Table 3.2** presents the noise monitoring parameters and frequencies.

Table3.2 Monitoring Parameters and Frequencies of Noise Monitoring

Monitoring Stations	Parameter	Frequency and Period
LC6a & LC9	LAeq **(30min)** L10 and L90 will be recorded for reference	At each station at 0700-1900 hours on normal weekdays at a frequency of once a week

3.4 Monitoring Locations

3.4.1 Noise monitoring were conducted at two designated monitoring stations as described in **Table 3.3** and the monitoring locations are shown in **Figure 2**.

Table 3.3 Location of noise monitoring station

Monitoring Station	Location
LC6a[1]	The Castle Bay
LC9	Castle Peak Villas Block C

Note:
1. The measurement of sound level is carried out at the fence wall outside the building of the sensitive receiver, a correction should be made to the measured level during impact monitoring in order to represent the actual sound level at the sensitive receiver building façade (Block E6, The Castle Bay).

3.5 Monitoring Methodology and QA/QC Procedures

3.5.1 The monitoring procedures are as follows:

- Monitoring Stations:
  - LC6a: The monitoring station was set at a point 1m from the exterior of the sensitive receiver fence wall and set at a position 1.2m above the ground. Façade measurement is carried out for noise monitoring.
  - LC9: The monitoring station was set at the top of parapet wall of sensitive receivers building and the noise monitoring station is set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 5m above the ground.
- The battery condition was checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time was set as follows:
  - frequency weighting : A
  - time weighting : Fast
  - measurement time : Leq $_{(30min)}$ was used as the monitoring parameter for the time period between 0700 - 1900 hours on normal weekdays. For all other time periods, Leq $_{(5min)}$ was recorded.
- Prior to and after noise measurement, the meter was calibrated using the calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB, the measurement will be considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
- The wind speed at the monitoring station was checked with the portable wind meter. Noise monitoring should be cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

Maintenance / Calibration

3.5.2 Maintenance and Calibration procedures are as follows:

- The microphone head of the sound level meter and calibrator should be cleaned with a soft cloth at quarterly intervals.
- The sound level meter and calibrator should be calibrated annually by a HOKLAS laboratory.
- Relevant calibration certificates are provided in **Appendix D**.

3.6 Results and Observations

3.6.1 The schedule of noise monitoring and data recovery schedule in reporting period is provided in **Appendix E**.

3.6.2 The weather conditions during the monitoring period are provided in **Appendix L**.

3.6.3 The noise monitoring data are summarized in **Table 3.4**. Detailed monitoring data are presented in **Appendix G**.

Table 3.4 Summary of Noise Impact Monitoring Results

Monitoring Station	Leq (30min) Range, dB(A)		Leq (30min) Limit Level, dB(A)
	Measured	Corrected	
LC6a[1]	63-67	58-62	75
LC9	58-66	N.A	75

Note:
- Leq (30min) was measured at day-time (0700-1900) on normal weekdays.
- 1) A distance correction of -5dB(A) has been applied in monitoring data of LC6a according to baseline monitoring report (Appendix G).

3.6.4 The adopted Action and Limit Levels for noise impact monitoring are presented in **Appendix C**.

3.6.5 The Event and Action Plan for noise is given in **Appendix J**.

3.6.6 No Action or Limit Level Exceedance of noise monitoring was recorded in the reporting period.

Other factor influencing the monitoring results

3.6.7 There were no other noticeable external factors generally affecting the monitoring results in this reporting period.

4. LANDSCAPE AND VISUAL

4.1 Audit Requirements

4.1.1 In accordance with the updated EM&A Manual, the landscape and visual mitigation measures during the construction phase are audited by a Landscape Architect, as a member of the ET, on a regular basis to ensure compliance with the intended aims of the measures. Site inspections are undertaken at least once every two weeks throughout the construction period and once every two months during the operational phase to ensure compliance with the intended aims of the measures.

4.2 Results and Observations

4.2.1 Site audits were carried out to monitor and audit the implementation of landscape and visual mitigation measures. The summary of the site audits are given in **Appendix I**.

4.2.2 Should non-compliance of the landscape and visual impact occur, action in accordance to the event action plan presented in **Appendix J** shall be carried out.

4.2.3 No non-compliance of the landscape and visual impact was recorded in the reporting month.

5. ENVIRONMENTAL SITE INSPECTION AND AUDIT

5.1 Site Inspection

5.1.1 Weekly site inspections and bi-weekly landscape and visual impact inspections were carried out to monitor the implementation of proper environmental pollution control and mitigation measures for the Project.

5.1.2 In the reporting period, site inspections were carried out on 2, 8, 16, 23 and 30 June 2016 and the landscape and visual impact inspections were carried out on 8 and 23 June 2016.

5.1.3 The summary of the site audits are given in **Appendix I**.

6. Advice on the Solid and Liquid Waste Management status

6.1.1 The Contractor has been registered as a chemical waste producer for the Project. Construction and demolition (C&D) material sorting was carried out on site. Receptacles were available for general refuse collection.

6.1.2 As advised by the Contractor, 600m^3 of C&D waste was generated in the reporting month, of which, 600m^3 C&D waste was reused in the Contract. 1kg metals, 2.4kg paper/ cardboard packaging and 1m^3 general refuse were generated in the reporting period. Monthly summary of waste flow table is detailed in **Appendix M**.

7. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

7.1 Environmental Exceedance

7.1.1 No Action or Limit Level Exceedance of 1-hr TSP monitoring was recorded in the reporting period.

7.1.2 No Action or Limit Level Exceedance of noise monitoring was recorded in the reporting period.

7.2 Complaints, Notification of Summons and Successful Prosecution

7.2.1 No complaints, notification of summons or successful prosecutions were received in the reporting period.

7.2.2 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Appendix H.**

8. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

8.1 Implementation Status

8.1.1 The Contractor has implemented environmental mitigation measures and requirements as stated in the EIA Reports, the EP and the EM&A Manuals. The implementation status of the mitigation measures during the reporting period is summarized in **Appendix K**.

9. FUTURE KEY ISSUES

9.1 Construction Works for the Coming Month

9.1.1 During the coming reporting period, the principal work activities within the site included:

- Construction of Mini-pile

9.2 Key Issues for the Coming Month

9.2.1 Potential environmental impacts due to the construction activities, including air quality, noise, water quality, waste, landscape and visual, will be monitored or reviewed. The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement. The recommended environmental mitigation measures shall be implemented on site and regular inspections as required will be carried out to ensure that the environmental conditions are acceptable.

9.2.2 The anticipated impact of principal work activities within the site and the recommended mitigation measures are shown in **Appendix N**.

9.3 Monitoring Schedules for the Coming Months

9.3.1 The tentative schedules for environmental monitoring in the coming months are provided in **Appendix E**.

10. CONCLUSIONS

10.1.1 The construction phase and EM&A programme of the Project commenced on 29 February 2016.

10.1.2 No Action or Limit Level Exceedance of 1-hr TSP monitoring was recorded in the reporting period.

10.1.3 No Action or Limit Level Exceedance of noise monitoring was recorded in the reporting period.

10.1.4 In the reporting period, site inspections were carried out on 2, 8, 16, 23 and 30 June 2016 and the landscape and visual impact inspections were carried out on 8 and 23 June 2016.

10.1.5 No complaints, notification of summons or successful prosecutions were received in the reporting period.

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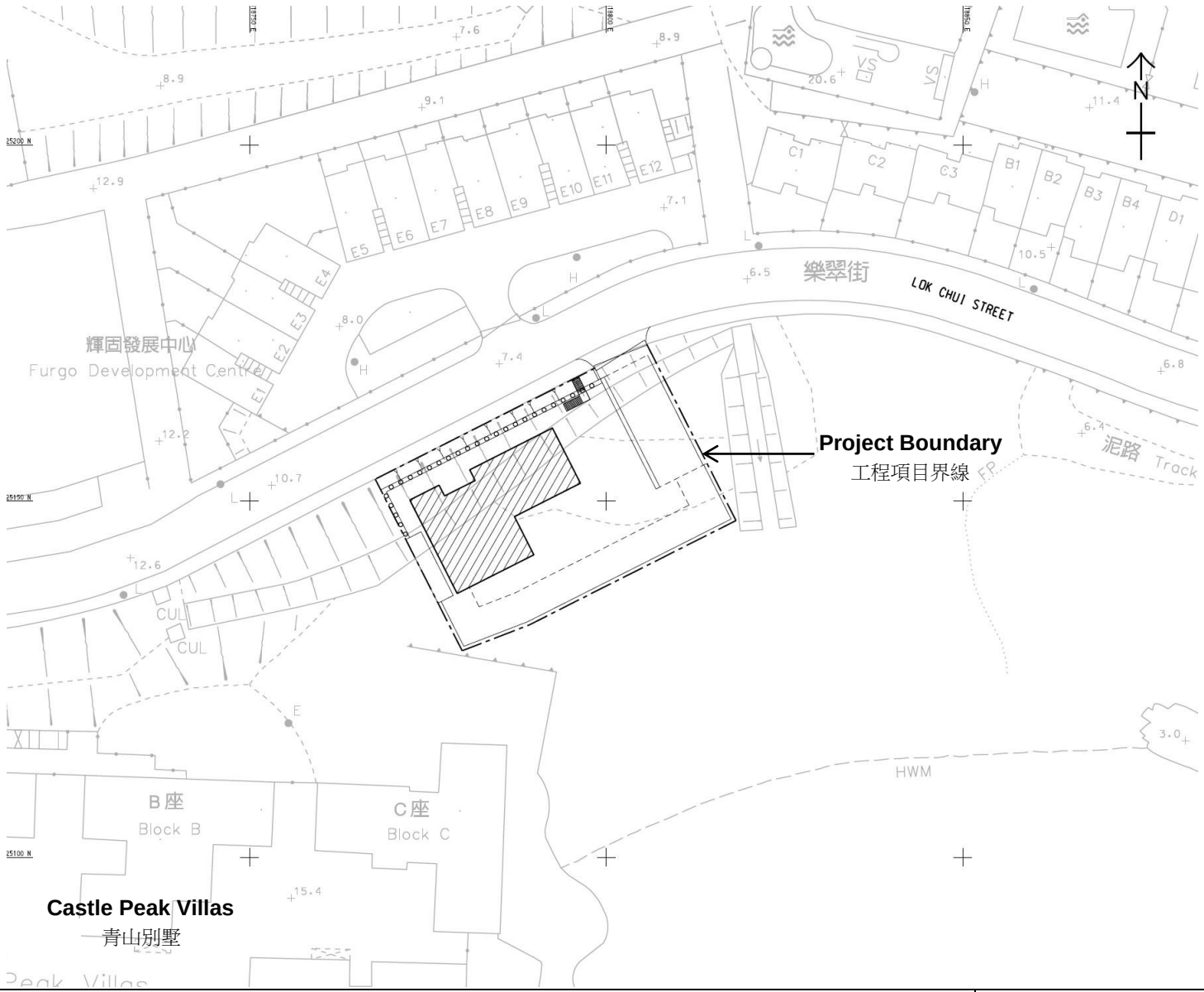
Figure 1

Project General Layout



Location of the Proposed Sewage Pumping Station at Lok Chui Street near Castle Peak Villas
位於樂翠街近青山別墅的擬建污水泵水站

Figure 1

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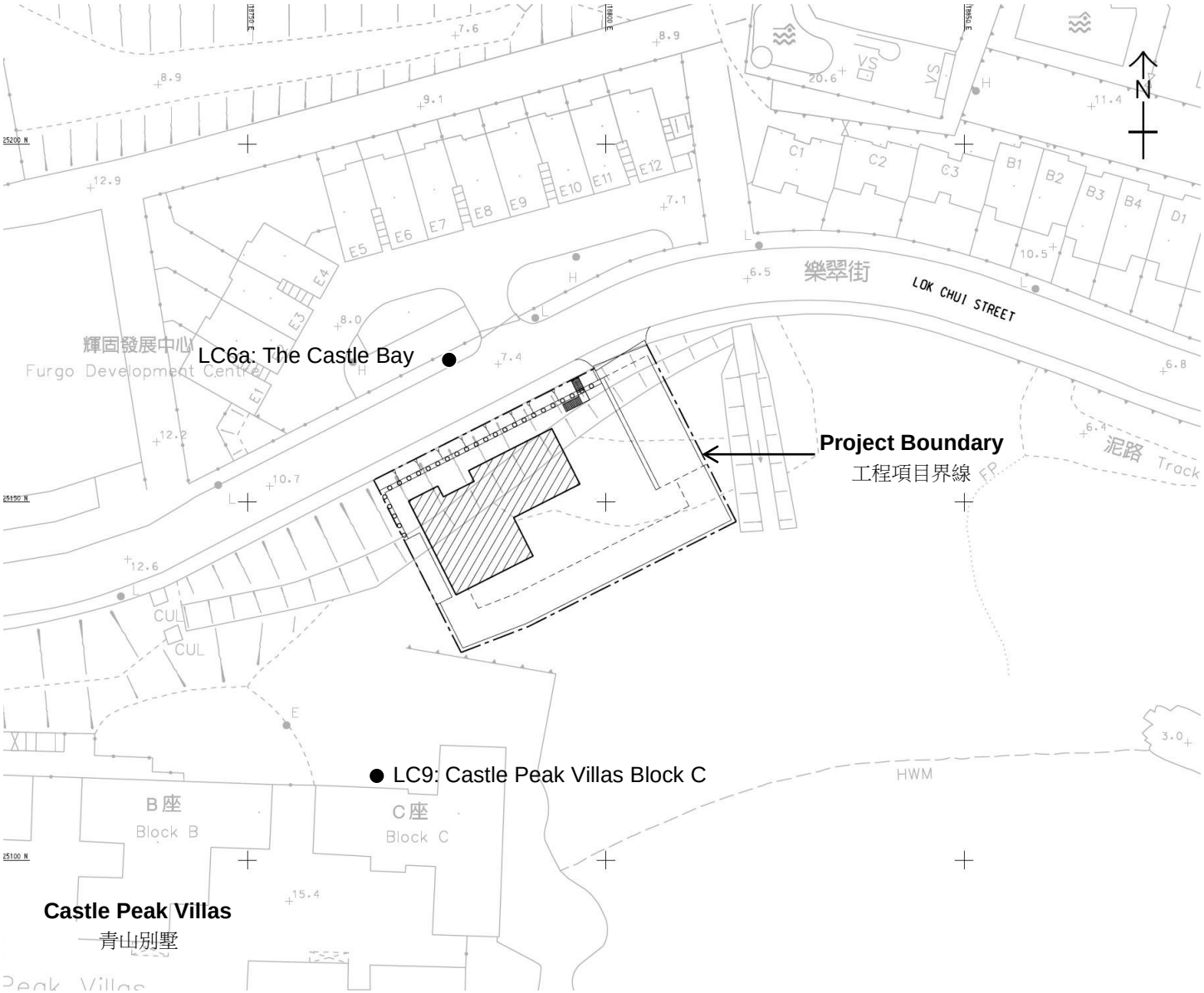
Figure 2

Air and Noise Monitoring Locations



Air and Noise Monitoring Locations

Figure 2

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LC6a: The Castle Bay	LC9: Castle Peak Villas Block C
	

Note:
1) LC6a: The air and noise monitoring station is set at a point 1m from the exterior of the sensitive receiver fence wall, and set at a position 1.2m above ground. Façade measurement will be carried out for noise monitoring.

2) LC9: The air monitoring station is set at the top of parapet wall of sensitive receivers building and the noise monitoring station is set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 5m above the ground.

Legend:
- Proposed Air Monitoring Location
- Proposed Noise Monitoring Location
- 1m from the exterior building façade

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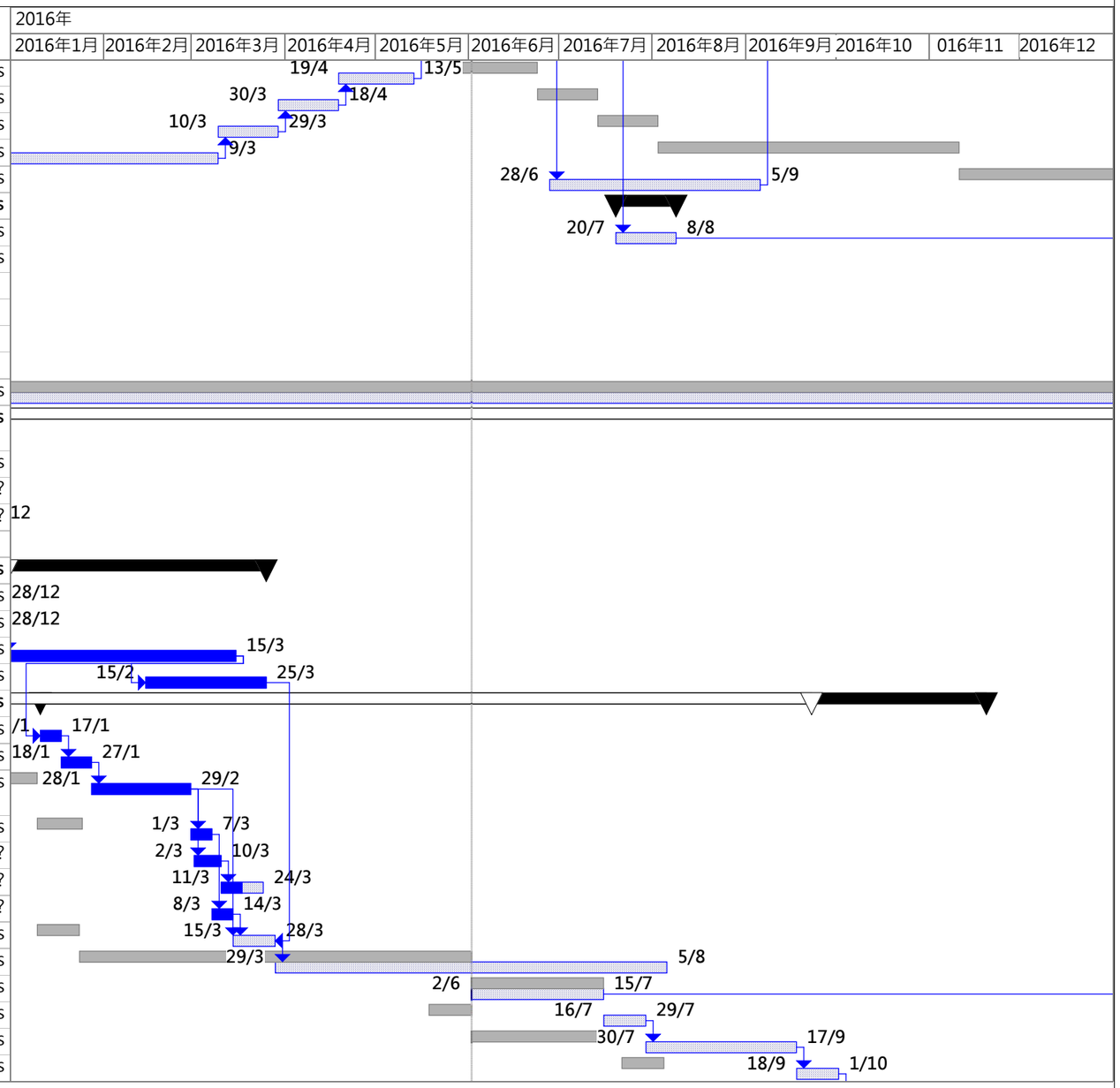
Appendix A

Construction Programme

Contractor : Sang Hing - Kuly Joint Venture

Contract no. DC/2014/01
Castle Peak Road Trunk Sewer and Tuen Mun Village Sewerage

識別碼	Task Name	工期	比較基準工期
977	From Manhole 1201 to Manhole 1203	25 days	25 days
978	From Manhole 2001 to Manhole 1203	20 days	20 days
979	From Manhole 1203 to Manhole 1110	20 days	20 days
980	From Manhole 1110 to Manhole 1118	100 days	100 days
981	From Manhole 1118 to Manhole 1122	70 days	70 days
982	**Siu Lam Road**	**20 days**	**20 days**
983	Connection From Manhole 0901 to 0721 after trenchless	20 days	20 days
984	Completion of Section 9C	0 days	0 days
985			
986			
987			
988			
989	Duration of Section 11A (include 41 days of Delayed Possession of Site)	970 days	929 days
990	**Section 11 A - Lok Chui Street Sewage Pumping Station**	**987 days?**	**929 days**
991	Portion 11 - Time of Possession of Site	131 days	90 days
992	Delayed Possession of Site	41 days?	0 days?
993	*Objection to commence of work by The Castle Bay*	21 days	0 days?
994			
995	**Preparation Work**	**98 days**	**74 days**
996	Initial Survey	10 days	30 days
997	Agree extend of Site clearance	10 days	30 days
998	earth excavation and site clearance	78 days	14 days
999	Hoarding	40 days	30 days
1000	**Mini-pile Foundation and Soldier Pile**	**314 days?**	**297 days**
1001	Mobilization of plant for predrilling works	7 days	7 days
1002	Construct settlement and piezometer for monitoring	10 days	10 days
1003	Predrilling works of mini-pile and soldier pile (longer drilling period due to additional length)	33 days	23 days
1004	Submission of predrilling report	7 days	15 days
1005	*Additional Predrilling*	9 days?	0 days?
1006	*Submission of additional report*	14 days	0 days?
1007	*Waiting for Revised design for soildier pile*	7 days	0 days?
1008	Mobilization of plant for 610mm soldier pile	14 days	14 days
1009	Construction of soldier pile (43 nos)	130 days	130 days
1010	Lagging wall and capping beam on soldier piles	44 days	95 days
1011	Mobilization of plant for mini-pile (64 nos)	14 days	14 days
1012	Drilling of mini-piles	50 days	50 days
1013	Installation of Rein-bar and Grouting	14 days	14 days



Project: Rolling Programme (Rev 0) -Revision on Feb 16
Date:15 March 2016

Task	Baseline Milestone	Rolled Up Baseline	Project Summary
Task Progress	Summary	Rolled Up Baseline Milestone	Group By Summary
Critical Task	Rolled Up Task	Rolled Up Progress	Deadline
Critical Task Progress	Rolled Up Critical Task	Split	
Baseline	Rolled Up Milestone	Baseline Split	
Milestone	Baseline Summary	External Tasks	

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Appendix B

Project Organization Chart

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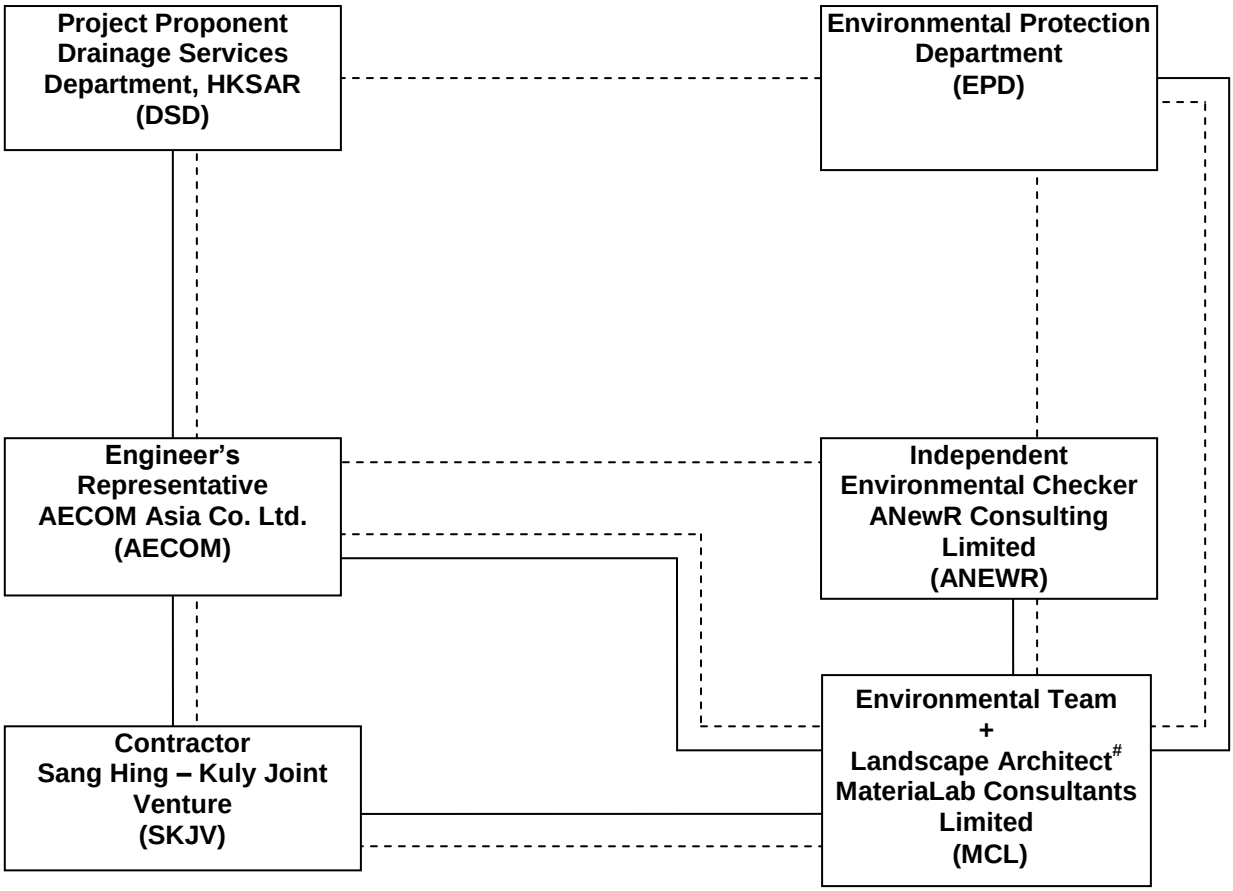

Remark:
The Landscape Architect with a minimum of 1-2years on site experience as a member of the ET to monitor and audit the landscaping installation works and landscape protection measures.

Legend:
Line of Reporting
Line of Communication

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Appendix C

Action and Limit Levels for Air Quality and Noise

Action and Limit Levels for Air Quality

Parameter	Monitoring Station	Action Level ($\mu g/m^3$)	Limit Level ($\mu g/ m^3$)
1-hr TSP ($\mu g/m^3$)	LC6a	344	500
	LC9	335	

Action and Limit Levels for Construction Noise

Time Period	Location	Action	Limit
0700-1900 hrs on normal weekdays	LC6a LC9	When one documented complaint is received	75* dB(A)

* reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

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Appendix D

Calibration Certificates of Monitoring Equipment

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MaterialLab

SIBATA

SIBATA SCIENTIFIC TECHNOLOGY LTD.
1-1-62, Nakane, Soka, Saitama, 340-0005 Japan
TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: October 29, 2015

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	577229
Sensitivity	:	0.001 mg/m3
Sensitivity Adjustment	:	550CPM
Scale Setting	:	July 7, 2015

We hereby certify that the avobe mentioned instrment has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Shintaro Okamura

Shintaro Okamura
Overseas Sales Division

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre,
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E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

Report no. : 940891CA152598(4)

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser Dust Monitor
Manufacturer	: SIBATA
Model No.	: LD-3B
Serial No.	: 577229
Specification Limit	: NA
Next Calibration Date	: 02-Dec-2016

Laboratory Information

Description	: Reference balance
Equipment ID.	: R-039-10
Date of Calibration	: 03-Dec-2015 Ambient Temperature : 22 °C
Calibration Location	: Calibration Lab. of MateriaLab
Method Used	: By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.1004	4325	72.08
0.0927	4126	68.77
0.1008	4316	71.93

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x UUT reading (CPM) where K = 0.001381
3. Correlation coefficient (r) : 0.9964

Checked by : _____ Date : 30/12/2015 Certified by : _____ Date : 02 JAN 2016

Kwok Chi Wa (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

GEN31/0914

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TEL : 048-933-1582 FAX : 048-933-1591

CALIBRATION CERTIFICATE

Date: October 29, 2015

Equipment Name	:	Digital Dust Indicator, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	597324
Sensitivity	:	0.001 mg/m3
Sensitivity Adjustment	:	613CPM
Scale Setting	:	September 10, 2015

We hereby certify that the avobe mentioned instrment has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Shintaro Okamura

Shintaro Okamura
Overseas Sales Division

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Report no. : 940891CA152598(6)

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser Dust Monitor
Manufacturer	: SIBATA
Model No.	: LD-3B
Serial No.	: 597324
Specification Limit	: NA
Next Calibration Date	: 02-Dec-2016

Laboratory Information

Description	: Reference balance
Equipment ID.	: R-039-10
Date of Calibration	: 03-Dec-2015 Ambient Temperature : 22 °C
Calibration Location	: Calibration Lab. of MateriaLab
Method Used	: By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.1004	4280	71.33
0.0927	4119	68.65
0.1008	4281	71.35

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x UUT reading (CPM) where K = 0.001390
3. Correlation coefficient (r) : 0.9992

Checked by : Date : 30/12/2015 Certified by : Date : 02 JAN 2016

CA-R-297 (22/07/2009)

Kwok Chi Wa (Assistant Manager)

** End of Report **

GEN01/0914

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Report no.: 940891CA152019(1)

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client : Fugro Technical Services Ltd.
Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	:	Sound Level Meter
Manufacturer	:	Casella (Model no. CEL-63X(meter), CEL-251(microphone), CEL-495(Preamplifier))
Serial No.	:	3321823 (meter), 2058 (microphone), 001598 (Preamplifier))
Next Calibration Date	:	14-Oct-2016
Specification Limit	:	EN 60651: 1994 Type 1

Laboratory Information

Description	:	B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)
Equipment ID.	:	R-108-1
Date of Calibration	:	15-Oct-2015 Ambient Temperature : 20 °C
Calibration Location	:	Calibration Laboratory of MateriaLab
Method Used	:	By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighing frequency response	4000Hz	0.6	2.0 to 0.0
	2000Hz	1.1	2.2 to 0.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-3.2	-2.2 to -4.2
	250Hz	-8.6	-7.6 to -9.6
	125Hz	-16.0	-15.1 to -17.1
	63Hz	-26.0	-24.7 to -27.7
	31.5Hz	-38.9	-37.9 to -40.9
Differential level linearity	94dB-104dB	0.0	± 0.4
	104dB-114dB	0.1	± 0.4

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighing is fast
4. The equipment does comply with EN 60651: 1994 Type 1 sound level meter for the above measurement.

Checked by : Date : 15/10/2015 Certified by : Date : 15 Oct, 2015
So Chi Kuen (Engineer)

CA-R-297 (22/07/2009)

** End of Report **

GEN01/0914

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Report no.: 940891CA160281

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Casella (Model no. CEL-120/1)
Serial No.	:	5230758
Next Calibration Date	:	05-Feb-2017
Specification Limit	:	±0.5dB

Laboratory Information

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-1
Date of Calibration :	06-Feb-2016	Ambient Temperature : 21 °C
Calibration Location :	Calibration Laboratory of MateriaLab	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	0.1 dB	±0.5dB
114dB	-0.1 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment does comply with the specification limit.

Checked by : _____ Date : 16-2-2016 Certified by : _____ Date : 15 FEB 2016

CA-R-297 (22/07/2009)

Kwok Chi Wa (Assistant Manager)

** End of Report **

GEN01/0914

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Appendix E

Environmental Monitoring and Data Recovery Schedule

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Project: **Sewage Pumping Stations at Tai Lam Chung Tsuen Luen On San Tsuen, Tai Lam Valley and Lok Chui Street near Castle Peak Villas under the scope of "Tuen Mun Sewerage – Eastern Coastal Sewerage Extension" – DC/2014/01**

Impact Monitoring Schedule (June 2016)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
			1	2 A & N Impact Monitoring	3	4
5	6	7	8 A & N Impact Monitoring	9	10	11
12	13	14 A & N Impact Monitoring	15	16	17	18
19	20 A & N Impact Monitoring	21	22	23	24	25 A & N Impact Monitoring
26	27	28	29	30 A & N Impact Monitoring		

Remarks
1. A: 1-hr TSP monitoring at LC6a and LC9.
2. N: Noise monitoring at LC6a and LC9.

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DATA RECOVERY SCHEDULE

Date	Air Quality Monitoring		Noise Monitoring	
	Monitoring Station* 1-hr TSP		Monitoring Station* $L_{Aeq\ (30min)}$	
	LC6a	LC9	LC6a	LC9
1				
2	√	√	√	√
3				
4				
5				
6				
7				
8	√	√	√	√
9				
10				
11				
12				
13				
14	√	√	√	√
15				
16				
17				
18				
19				
20	√	√	√	√
21				
22				
23				
24				
25	√	√	√	√
26				
27				
28				
29				
30	√	√	√	√
31				
% of R	100	100	100	100

* *Remark type of parameters*
% of R The percentage of Data Recovery is the actual monitoring over the scheduled monitoring

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Project: **Sewage Pumping Stations at Tai Lam Chung Tsuen Luen On San Tsuen, Tai Lam Valley and Lok Chui Street near Castle Peak Villas under the scope of "Tuen Mun Sewerage – Eastern Coastal Sewerage Extension" – DC/2014/01**

Tentative Impact Monitoring Schedule (July 2016)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
					1	2
3	4	5	6 A & N Impact Monitoring	7	8	9
10	11	12 A & N Impact Monitoring	13	14	15	16
17	18 A & N Impact Monitoring	19	20	21	22	23 A & N Impact Monitoring
24	25	26	27	28	29 A & N Impact Monitoring	30
31						

Remarks

3. A: 1-hr TSP monitoring at LC6a and LC9.
4. N: Noise monitoring at LC6a and LC9.
5. Actual monitoring schedule may be subjected to change due to any safety concern or adverse weather condition.

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Appendix F

Air Quality Monitoring Data and Graphical Presentations

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LC6a The Castle Bay

1-hour TSP (µg/m³)					
Date	**Start Time**	**1st hr**	**2nd hr**	**3rd hr**	**Weather**
02-Jun-16	11:20	38	34	31	Fine
08-Jun-16	08:32	28	36	36	Cloudy
14-Jun-16	09:19	32	27	24	Cloudy
20-Jun-16	08:45	29	27	35	Fine
25-Jun-16	08:54	52	54	50	Fine
30-Jun-16	09:30	26	29	31	Fine
	Average	34			
	Max	54			
	Min	24			

LC9 Castle Peak Villas Block C

1-hour TSP (µg/m³)					
Date	**Start Time**	**1st hr**	**2nd hr**	**3rd hr**	**Weather**
02-Jun-16	11:40	43	39	38	Fine
08-Jun-16	08:36	17	21	22	Cloudy
14-Jun-16	09:30	45	36	30	Cloudy
20-Jun-16	08:52	48	41	44	Fine
25-Jun-16	09:15	50	59	53	Fine
30-Jun-16	09:15	15	22	24	Fine
	Average	36			
	Max	59			
	Min	15			

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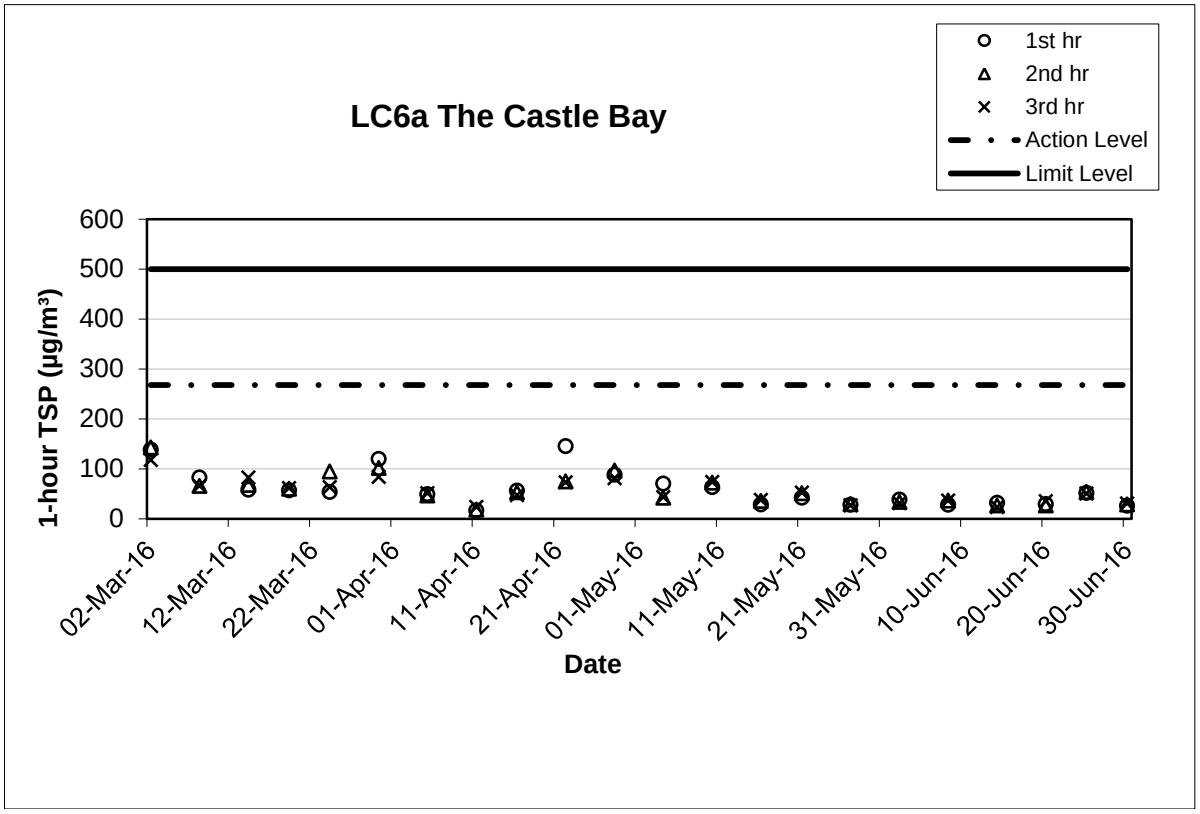

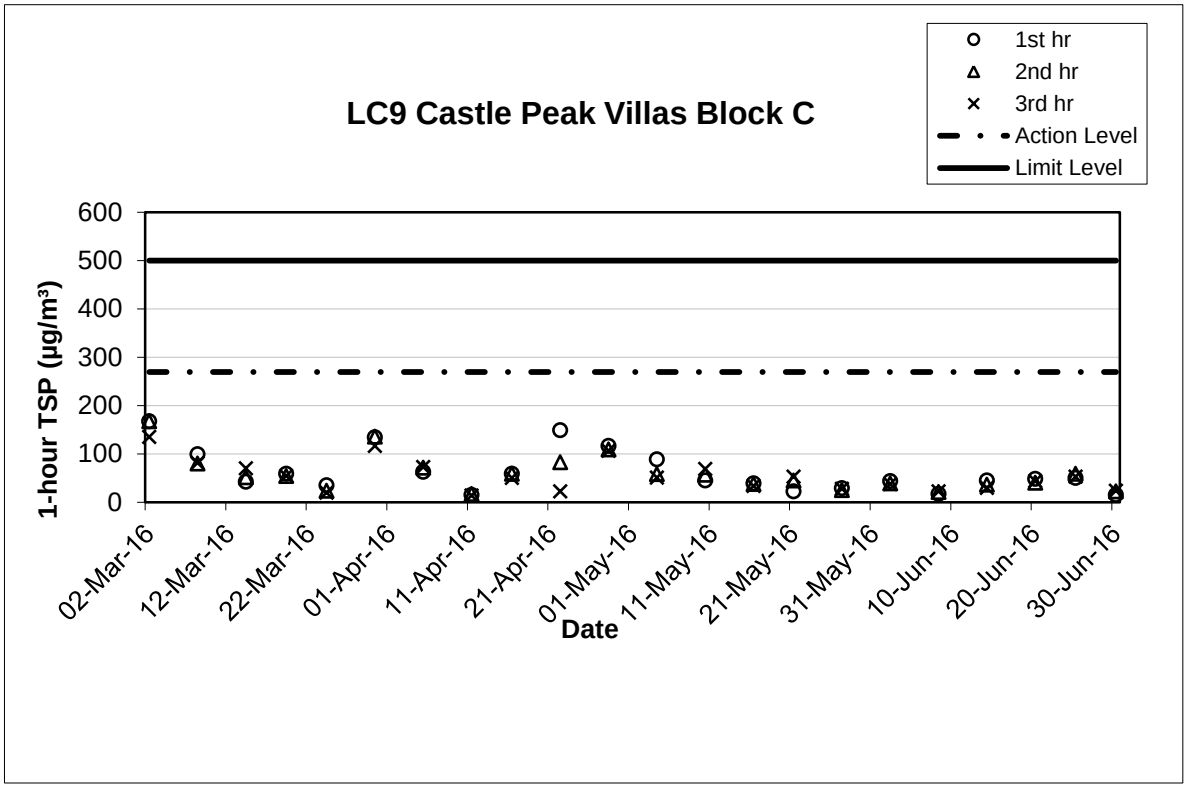

Note:

1) The QA/QC procedures and detection Limits refer to section 2.2 and 2.5.
2) The other factors influencing the monitoring results refer to section 2.7.

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Appendix G

Noise Monitoring Data and Graphical Presentations

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LC6a The Castle Bay

Date	Start Time	L_{eq} 30min dB(A)	Corrected L_{eq} 30min dB(A)[1]	L_{90} dB(A)	L_{10} dB(A)	Weather
02-Jun-16	11:25	64	59	59	66	Fine
08-Jun-16	09:32	64	59	60	66	Cloudy
14-Jun-16	08:54	63	58	58	65	Cloudy
20-Jun-16	09:30	67	62	62	69	Sunny
25-Jun-16	09:00	63	58	59	68	Fine
30-Jun-16	09:35	67	62	64	69	Fine

Note:
1) A distance correction of -5dB(A) has been applied in monitoring data of LC6a according to baseline monitoring report (Appendix G).

LC9 Castle Peak Villas Block C

Date	Start Time	L_{eq} 30min dB(A)	Corrected L_{eq} 30min dB(A)	L_{90} dB(A)	L_{10} dB(A)	Weather
02-Jun-16	12:05	59	N.A	56	61	Fine
08-Jun-16	08:40	61	N.A	58	63	Cloudy
14-Jun-16	09:31	58	N.A	56	61	Cloudy
20-Jun-16	08:52	61	N.A	58	63	Fine
25-Jun-16	09:36	66	N.A	62	68	Fine
30-Jun-16	09:02	63	N.A	61	65	Fine

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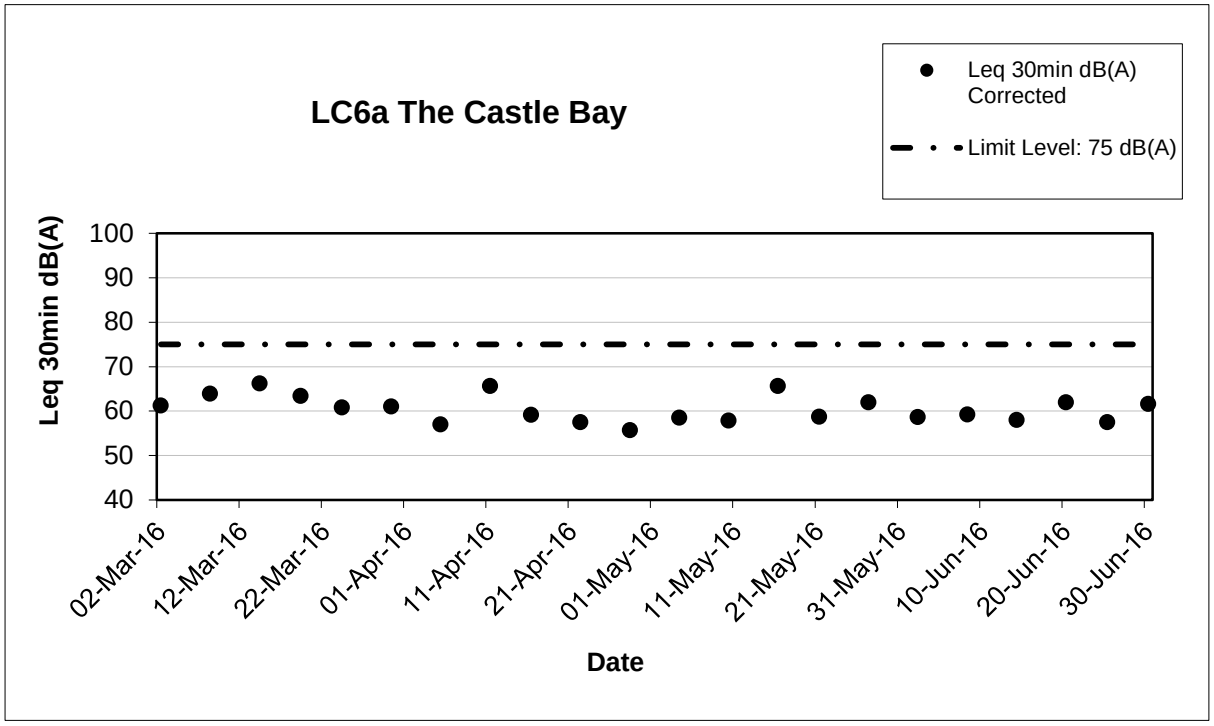

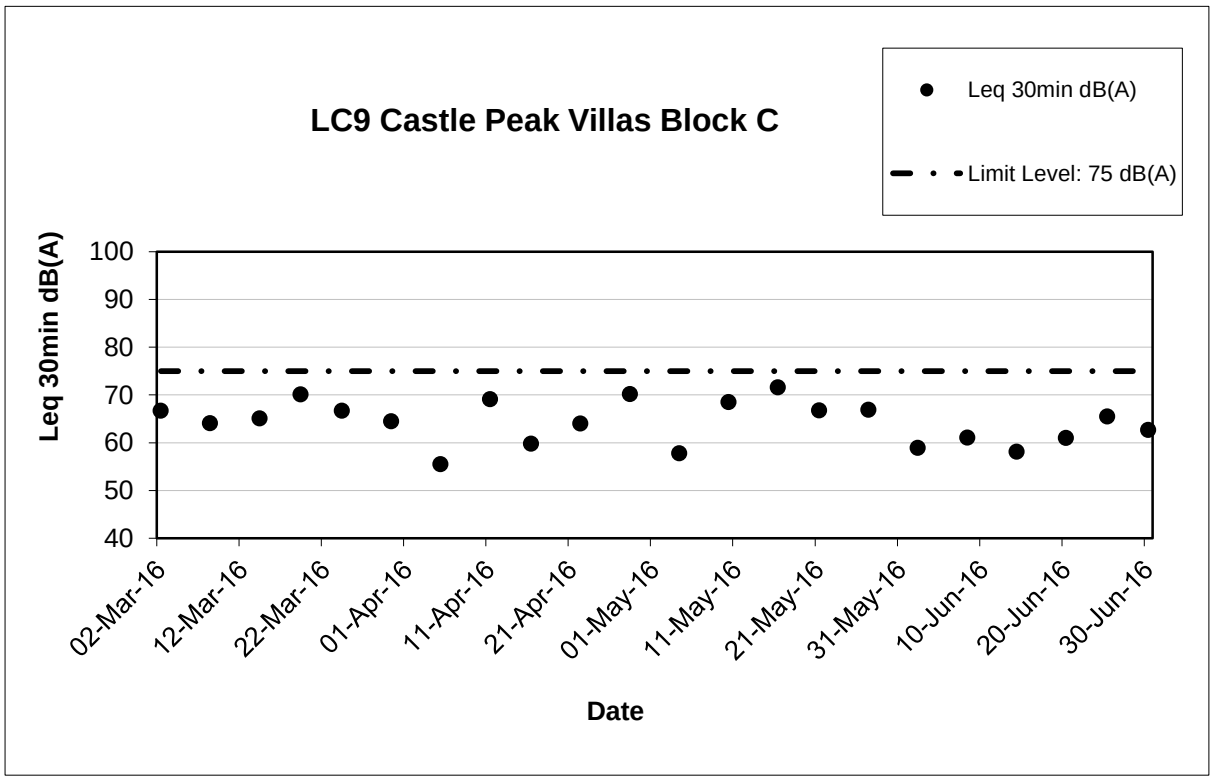

Note:

1) The QA/QC procedures and detection Limits refer to section 3.2 and 3.5.
2) The other factors influencing the monitoring results refer to section 3.7.

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Appendix H

Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

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Environmental Complaints Log

Complaint Log No.	Date of Receipt	Received From and Received By	Nature of Complaint	Date Investigated	Outcome	Date of Reply
Nil	-	-	-	-	-	-

Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

Cumulative Statistics on Notifications of Summons and Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Total	0	0	0

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Appendix I

Site Audit Summary

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Summary of Site Audit

Inspection Date	Observation/ Comment	Follow Up Action	Completion Date
16/06/2016	Stockpiled materials were observed onsite during construction work.	As a reminder, stockpiled materials should proper cover with tarpaulins after the construction work to prevent dust nuisance.	NA
23/06/2016	Off-site runoff is diverted into the site perimeter channel.	The Contractor should isolate the offsite runoff to the site to prevent cross contamination.	ASAP
30/06/2016	Protection fence are collapsed and storage materials are located near Tree No.T0480 (R).	The Contractor should remove the storage materials and repair the protection fence to prevent any damage to the existing trees.	07/07/2016
Landscape and Visual Impact Inspection			
08/06/2016	Tree bark has been ringed at tree base in LC-TC09 (R). The tree is probably dying if it is not dead. Some new leaves observed in LC-TC06 (R) and LC-TC07 (R)	Assessment by tree specialist should be conducted to assess the risk of falling during typhoon season. Tree fell application should be prepared if necessary.	ASAP
23/06/2016	Tree bark has been ringed at tree base in LC-TC09 (R). The tree is probably dying if it is not dead. Exotic *Mikania micrantha* started climbing on the trunk.	Assessment by tree specialist should be conducted to assess the risk of falling during typhoon season. Tree fell application should be prepared if necessary.	ASAP
	Health condition dropped in LC-TC03 (R), LC-TC04 (R) and LC-TC06, with 90% dieback or yellowing of existing weak canopy.	Assessment by tree specialist should be conducted to assess the risk of falling during typhoon season. Tree fell application should be prepared if necessary.	ASAP
	Protection fence of LC-TC03 (R) and LCTC04 (R) collapsed.	Promptly repair and erect the protection fence.	30/06/2016

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Appendix J

Events and Action Plans

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Event / Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	ER	Contractor
Action Level				
Exceedance for one sample.	• Identify the source. • Inform the IEC and the ER. • Repeat measurement to confirm finding. • Increase monitoring frequency to daily.	• Check monitoring data submitted by the ET. • Check Contractor's working method.	• Notify Contractor.	• Rectify any unacceptable practice. • Amend working methods if appropriate.
Exceedance for two or more consecutive samples.	• Identify the source. • Inform the IEC and the ER. • Repeat measurements to confirm findings. • Increase monitoring frequency to daily. • Discuss with the IEC and the Contractor on remedial actions required. • If exceedance continues, arrange meeting with the IEC and the ER. • If exceedance stops, cease additional monitoring.	• Check monitoring data submitted by the ET. • Check the Contractor's working method. • Discuss with the ET and the Contractor on possible remedial measures. • Advise the ER on the effectiveness of the proposed remedial measures. • Supervisor implementation of remedial measures.	• Confirm receipt of notification of failure in writing. • Notify the Contractor. • Ensure remedial measures properly implemented.	• Submit proposals for remedial actions to IEC within 3 working days of notification. • Implement the agreed proposals. • Amend proposal if appropriate.
Limit Level				
Exceedance for one sample.	• Identify the source. • Inform the ER and the DEP. • Repeat measurement to confirm finding. • Increase monitoring frequency to daily. • Assess effectiveness of Contractor's remedial actions and keep the IEC, the DEP and the ER informed of the results.	• Check monitoring data submitted by the ET. • Check Contractor's working method. • Discuss with the ET and the Contractor on possible remedial measures. • Advise the ER on the effectiveness of the proposed remedial measures. • Supervisor implementation of remedial measures.	• Confirm receipt of notification of failure in writing. • Notify the Contractor. • Ensure remedial measures are properly implemented.	• Take immediate action to avoid further exceedance. • Submit proposals for remedial actions to IEC within 3 working days of notification. • Implement the agreed proposals. • Amend proposal if appropriate.
Exceedance for two or more consecutive samples	• Notify the IEC, the ER, the DEP and the Contractor. • Identify the source. • Repeat measurements to confirm findings. • Increase monitoring frequency to daily. • Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. • Arrange meeting with the IEC and the ER to discuss the remedial actions to be taken. • Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the ER informed of the results. • If exceedance stops, cease additional monitoring.	• Discuss amongst the ER, ET and the Contractor on the potential remedial actions. • Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. • Supervise the implementation of remedial measures.	• Confirm receipt of notification of failure in writing. • Notify the Contractor. • In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. • Ensure remedial measures are properly implemented. • If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	• Take immediate action to avoid further exceedance. • Submit proposals for remedial actions to IEC within 3 working days of notification. • Implement the agreed proposals. • Resubmit proposals if problem still not under control. • Stop the relevant activity of works as determined by the ER until the exceedance is abated.

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Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	Contractor
Action Level	• Notify the IEC and the Contractor. • Carry out investigation. • Report the results of investigation to the IEC and the Contractor. • Discuss with the Contractor and formulate remedial measures. • Increase monitoring frequency to check mitigation effectiveness.	• Review the analysed results submitted by the ET. • Review the proposed remedial measures by the Contractor and advise the ER accordingly. • Supervise the implementation of remedial measures.	• Confirm receipt of notification of failure in writing. • Notify the Contractor. • Require the Contractor to propose remedial measures for the analysed noise problem. • Ensure remedial measures are properly implemented.	• Submit noise mitigation proposals to IEC • Implement noise mitigation proposals
Limit Level	• Notify the IEC, the ER, the DEP and the Contractor. • Identify the source. • Repeat measurement to confirm findings. • Increase monitoring frequency. • Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. • Inform the IEC, the ER and the DEP the causes & actions taken for the exceedances. • Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the ER informed of the results. • If exceedance stops, cease additional monitoring.	• Discuss amongst the ER, the ET and the Contractor on the potential remedial actions. • Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. • Supervise the implementation of remedial measures.	• Confirm receipt of notification of failure in writing. • Notify the Contractor. • Require the Contractor to propose remedial measures for the analysed noise problem. • Ensure remedial measures are properly implemented. • If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	• Take immediate action to avoid further exceedance. • Submit proposals for remedial actions to IEC within 3 working days of notification. • Implement the agreed proposals. • Resubmit proposals if problem still not under control. • Stop the relevant activity of works as determined by the ER until the exceedance is abated.

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Event / Action Plan for Landscape and Visual Impact

EVENT ACTION LEVEL	ACTION			
	ET	**IEC**	**ER**	**Contractor**
Design Check	• Check final design conforms to the requirements of EP and prepare report.	• Check report. • Recommend remedial design if necessary	• Undertake remedial design if necessary	
Nonconformity on one occasion	• Identify Source • Inform IEC and ER • Discuss remedial actions with IEC, ER and Contractor • Monitor remedial actions until rectification has been completed	• Check report • Check Contractor's working method • Discuss with ET and Contractor on possible remedial measures • Advise ER on effectiveness of proposed remedial measures. • Check implementation of remedial measures	• Notify Contractor • Ensure remedial measures are properly implemented	• Amend working methods • Rectify damage and undertake any necessary replacement
Repeated Nonconformity	• Identify Source • Inform IEC and ER • Increase monitoring frequency • Discuss remedial actions with IEC, ER and Contractor • Monitor remedial actions until rectification has been completed • If nonconformity stops, cease additional monitoring	• Check monitoring report • Check Contractor's working method • Discuss with ET and Contractor on possible remedial measures • Advise ER on effectiveness of proposed remedial measures • Supervise implementation of remedial measures	• Notify Contractor • Ensure remedial measures are properly implemented	• Amend working methods • Rectify damage and undertake any necessary replacement

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MateriaLab

Appendix K

Implementation Status of Environmental Mitigation Measures

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Air Quality

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
4.5	Undertake all air pollution measures to prevent dust nuisance as a result of and during construction activities.	All unpaved haul roads, bulldozed material, exposed site areas / Throughout construction period	Contractor	TMEIA	^
4.5	No debris or other materials shall be burnt on the works areas.	All areas / Throughout construction period	Contractor	TMEIA. Avoid smoke impacts and disturbance	^
4.5	Dust suppression measures shall be provided and to be submitted to and approved by the Engineer.	All areas / Throughout construction period	Contractor	TMEIA	^
4.5	Stockpiles of imported material kept on site shall be contained within hoardings, dampened and/or covered during dry and windy weather.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation	^
4.5	Material stockpiled along side trenches should be covered with tarpaulins whenever works are within village boundaries.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation / visual impacts	^
4.5	Water sprays shall be used during the delivery and handling of cement, sands aggregates and the like.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust generation	^
4.5	No batching of concrete should be carried out on site. Concrete should be used in ready mixed form and off loaded adjacent to designated works areas.	All areas / Throughout construction period	Contractor	TMEIA	^

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
4.5	Any vehicle used for moving cement, sands, aggregates and construction waste and the like shall have properly fitting side and tail boards. Materials shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / Throughout construction period	Contractor	TMEIA Avoid dust and spillage of material	^
4.5	No earth, mud, debris, dust and the like shall be deposited on public roads. Details of proposals for the wheel cleaning facilities shall be agreed with the Engineer. Such wheel washing facility shall be usable prior to any earthworks excavation activity on the Site.	All areas, particularly pumping station sites / Throughout construction period	Contractor	TMEIA Avoid spread/ deposition of mud	^
4.6.9	Pumping station vent shafts should be located away from sensitive receivers.	All pumping stations	DSD	TMEIA Avoid odour impacts	N/A
4.6.18	Use a covered container to store and transport the screenings from the pump house.	All pumping stations /operational phase	DSD	TMEIA Avoid odour impacts	N/A
4.6.18	Undertake the collection of the screenings and transfer to the covered container within the confines of the pump house.	All pumping stations / operational phase	DSD	TMEIA Avoid odour impacts	N/A
11.2.8	EM&A in the form of 1 hour total suspended particulates monitoring once per week	All sensitive representative receivers / Throughout construction period	Contractor	EM&A Manual	^

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Noise

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
5.7.1 & 5.8.1	Ensure silencers are installed on the exhaust pipes of the trucks, excavators, compactors, concrete lorry mixer, and cranes for all activities.	All areas / Throughout construction period	Contractor	TMEIA	^
5.7.1 & 5.8.1	Use of mufflers on the breakers for all activities.	All areas / Throughout construction period	Contractor	TMEIA	^
5.7.1 & 5.8.1	Use of temporary noise barriers for all activities at the pumping station sites and during main sewer construction. During main sewer construction, barriers should be used to screen the activities of mobile equipment including the crane and excavator.	All pumping stations and main sewer construction locations / Throughout construction period	Contractor	TMEIA	^
5.5.10	Use of temporary noise barriers for all activities in the villages, where there is at least a 5m clearance	Village sewer alignment / Throughout construction period	Contractor	TMEIA	^
5.8.6 & 5.9.6	Manual breaking of concrete, where the concrete is less than 50mm thick.	Sewer alignment construction / concrete breaking activities	Contractor	TMEIA	N/A
5.8.6 & 5.9.6	Use of alternative pavement removal methods/equipment (kick ripper), where the concrete is less than 100mm thick	Sewer alignment construction / concrete breaking activities	Contractor	TMEIA	N/A

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
5.8.6 & 5.9.6	Use of acoustic enclosure in place of a barrier where there is a 6m clearance.	Sewer alignment construction / Throughout construction period	Contractor	TMEIA	^
5.8.6 & 5.9.6	Scheduling the numbers and operating times of equipment, when noise levels cannot be reduced to within the standards by other means	Sewer alignment construction / Throughout construction period	Contractor	TMEIA	^
5.8.11	The construction activities should be carried out in the daytime period (08.00- 18.00) only and shall exclude Sundays and public holidays.	All areas	Contractor	TMEIA	^
5.8.11	Powered mechanical equipment shall not be used within 5m of an NSR without the permission of the Engineer	All areas / Throughout construction period	Contractor	TMEIA	^
5.8.11	Carry out good site practice to limit noise emission at source.	All areas / Throughout construction period	Contractor	TMEIA	^
5.8.11	Avoid simultaneous noisy activities.	All areas / Throughout construction period	Contractor	TMEIA	^
11.2.8	EM&A in the form of noise monitoring.	All representative receivers / Throughout construction period	Contractor	EM&A Manual	^

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Water Quality

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
6.4.3	Stockpiles of excavated material should be kept to a minimum and covered during times of heavy rainfall.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.4.10	Pass any trench dewatering through a portable sand/silt removal traps prior to discharge.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	When works are carried out during the rainy season exposed slopes, stockpiles should be covered with tarpaulin and temporary access roads protected with a layer of gravel or crushed stone.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	Surface run off should be discharged to storm drains via sand/silt removal traps.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	Channels, bunds or sand bags should be used to direct any storm water to the traps and perimeter channels should be constructed before the main works begin to prevent external run off from crossing the site.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	Silt removal structures, channels and manholes should be maintained to remove accumulated material, specifically at the onset and end of rainy periods.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
6.5.2	Trenches for the sewer main should be dug and backfilled in short sections to minimise the quantities of rain water which will need to be pumped from them and upslope bunding provided to prevent surface water from flowing into the trenches.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	Rainwater pumped from the trenches should be discharged to storm drains via sand/silt removal traps.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.2	Discharges to natural water courses should only take place when the effluent can be shown to comply with the relevant specified standards.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94 & Technical Memorandum on Standards for Effluent Discharged in Drainage and Sewerage Systems, Inland and Coastal Waters	^
6.5.3	All plant should be in proper working order and maintained such that there is no leakage of fuel or oil. Any waste oils should be collected in designated tanks prior to disposal off site.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
6.5.3	All mechanical plant maintenance and refuelling areas shall be sited on paved areas. All storm water run-off from these areas should be discharged via oil separators/petrol separators and sand/silt removal traps.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.4	Groundwater pumped out of excavations for the construction of pump sumps should only be discharged following removal of silt by sand/silt removal traps.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.5	Water from drilling of rock should be discharged following removal of silt by sand/silt removal traps.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.6	The wheels of all vehicles leaving the construction site should be washed before leaving the site to minimise the carry over of mud onto public roads. Wheel wash water should be recycled and only discharged following removal of silt by sand/silt removal traps.	All areas particularly pumping station sites / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.7	Run off from the roofs of site buildings should be conveyed in closed drains to the nearest surface water course to prevent the generation of excessive quantities of surface water run off carrying suspended solids.	Site Office areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.5.7	All spillages should be cleaned up immediately to prevent their downward migration into the groundwater.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
6.5.7	Sewage from toilets and any kitchens in the site facilities should be treated via a septic tank system or if this is not practicable chemical toilets should be provided and the waste from these together with 'grey water' removed from the site on a daily basis for disposal at an appropriate receiving point.	All areas / throughout construction period	Contractor	WPCO, TMEIA & ProPECC PN 1/94	^
6.6.2	Overflow bypasses to be used in emergency situations only and no effluent should be discharged during regular maintenance.	All pumping stations / Operation	DSD	WPCO, TMEIA	N/A
6.6.3 & 6.6.4	Supply pumping stations with stand-by pumps, emergency power supplies and telemetry system.	All Pumping Stations	DSD	WPCO, TMEIA & ProPECC PN 1/94	N/A
11.2.8	EM&A in the form of site supervision to ensure water quality protection measures are implemented.	All areas/ Throughout construction period	Contractor	EM&A	^

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Waste Management

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
7.12.1	The Contractor shall identify a coordinator for the management of waste. The coordinator shall prepare a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. The Waste Management Plan shall be prepared with reference to Works Branch Technical Circular (WBTC) No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material and issued to the DEP and CED to confirm the availability for C&D and public fill waste.	Plan to be prepared prior to the start of construction, Implementation throughout construction period / All areas	Contractor	TMEIA.Works Branch Technical Circular (WBTC) No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material	^
7.12.1	Stockpiled material should avoid vegetated areas where possible and covered by tarpaulins. Storage of material on site should be kept to a minimum.	All areas/ Throughout construction period	Contractor	TMEIA. Prevent windblown dust and/or surface run-off / avoid nuisance to local residents	^
7.12.1	Surplus material should be sorted on site into C&D waste and that suitable for public fill	All areas /throughout construction period	Contractor	TMEIA. Maximise reusable material	^
7.12.1	The contractor should provide a temporary storage area for general refuse during the construction phase which should be enclosed to avoid refuse being windblown and affected by rain. General refuse should be stored on site for a minimum period and disposed of at a licenced facility.	All areas / throughout construction period	Contractor	TMEIA	^

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EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
7.12.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage.	All areas / throughout construction period	Contractor	TMEIA	^
7.12.1	Suitable chemical waste storage areas shall be formed on the site for temporary storage pending collection. All chemical wastes shall be handled, stored, transported and disposed of in accordance with the relevant practices.	All areas / throughout construction period	Contractor	TMEIA/ Code of Practice on the Package, Labelling and Storage of Chemical Wastes and A Guide to the Chemical Waste Control Scheme	^
7.12.1	Nightsoil arising from chemical toilets and on site chemical treatment facilities shall be transported by a licensed contractor to government Sewage Treatment Works for disposal.	All areas / throughout construction period	Contractor	TMEIA/ Sanitation and Conservancy (Regional Council) By-laws	^
7.12.1	Any screenings and grit that are removed during maintenance shall be disposed of at a landfill site. The material shall be suitably contained and covered.	All areas / operational phase	DSD	TMEIA	N/A
11.2.8	EM&A in the form of supervision of waste management practices	All areas / throughout construction period	Contractor	EM&A	^

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Landscape and Visual

EIA Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Status in Construction Phase
10.8.5, 10.9.15, 10.10.6, 10.10.11, 10.10.20, 10.11.6	Use of a suitable colour scheme to the pump station building to match the design of the adjacent properties.	All pumping stations	DSD & Contractor	Reduce visual intrusion of pumping stations	N/A
10.8.5, 10.9.15, 10.10.11, 10.10.20, 10.11.6	Construction of boundary wall similar to the adjacent housing instead of standard chain link and barbed wire fence.	All pumping stations except Tai Lam Correctional Institution	DSD & Contractor	Screen pumping stations	N/A
10.8.5, 10.9.15, 10.10.11, 10.10.20, 10.11.6	Planting of trees and shrubs to the boundary of the pumping station compound.	All pumping stations except Tai Lam Correctional Institution	DSD & Contractor	Screen pumping stations	N/A
10.8.6	Minimise damage to the rootball of the tree east of the pumping station site.	East of Castle Peak Villas pumping station/ During excavation	DSD and Contractor		^
11.2.8	EM&A in the form of site supervision of protection measures for trees and landscaping and compensatory planting establishment during the construction and operational phases respectively	All areas	Contractor	EM&A	^

Remarks: ^ Compliance of mitigation measure
* Recommendation was made during site audit but improved/ rectified by the Contractor
N/A Not Applicable at this stage as no such site activities were conducted in the reporting month

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Appendix L

Weather and Meteorological Conditions during Monitoring Period

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Date	Mean Pressure (hPa)	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
June 2016						
1	1007.8	32.8	30.1	28.6	73	0.0
2	1006.0	33.0	30.3	28.7	58	0.0
3	1006.5	32.4	30.3	29.0	77	Trace
4	1007.9	33.8	28.7	24.7	75	12.4
5	1008.8	30.4	26.9	25.0	87	7.6
6	1008.8	29.1	26.2	24.8	80	77.6
7	1008.1	30.7	28.1	26.3	75	0.4
8	1006.3	30.0	27.1	24.1	85	46.5
9	1005.7	31.7	28.2	26.6	79	Trace
10	1005.7	31.1	27.9	26.6	80	9.1
11	1005.9	27.8	26.6	25.4	85	85.5
12	1005.7	29.2	27.1	25.4	96	28.2
13	1005.0	31.5	29.7	28.5	90	0.1
14	1004.2	31.7	30.2	29.2	88	Trace
15	1005.3	32.0	30.3	29.3	86	0.6
16	1006.7	31.4	29.4	28.2	88	2.8
17	1008.2	32.1	29.4	26.7	85	2.5
18	1010.5	30.8	29.3	27.7	81	13.1
19	1010.3	34.2	30.1	27.8	41	0.0
20	1008.5	34.4	30.8	28.6	59	Trace
21	1009.3	33.7	30.6	28.7	51	0.0
22	1009.5	33.7	30.5	28.5	32	0.0
23	1008.4	34.1	30.4	28.4	20	0.0
24	1008.1	35.2	31.0	28.8	38	0.0
25	1008.9	35.5	31.4	28.9	74	0.0
26	1009.1	35.1	31.3	29.4	75	Trace
27	1007.5	35.1	31.1	28.6	78	1.7
28	1007.5	32.3	29.1	26.3	85	37.1
29	1010.0	33.3	29.0	27.5	87	20.4
30	1008.9	35.5	31.4	28.9	74	0.0

Source: Hong Kong Observatory – Hong Kong Observatory

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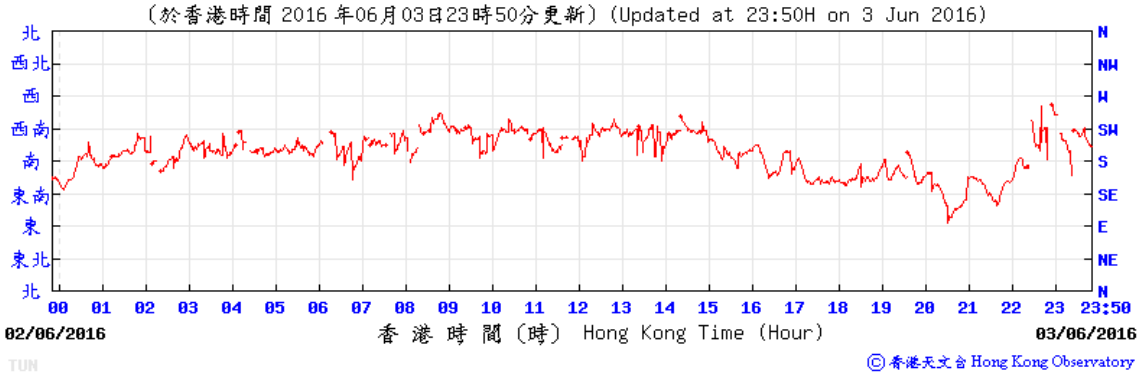
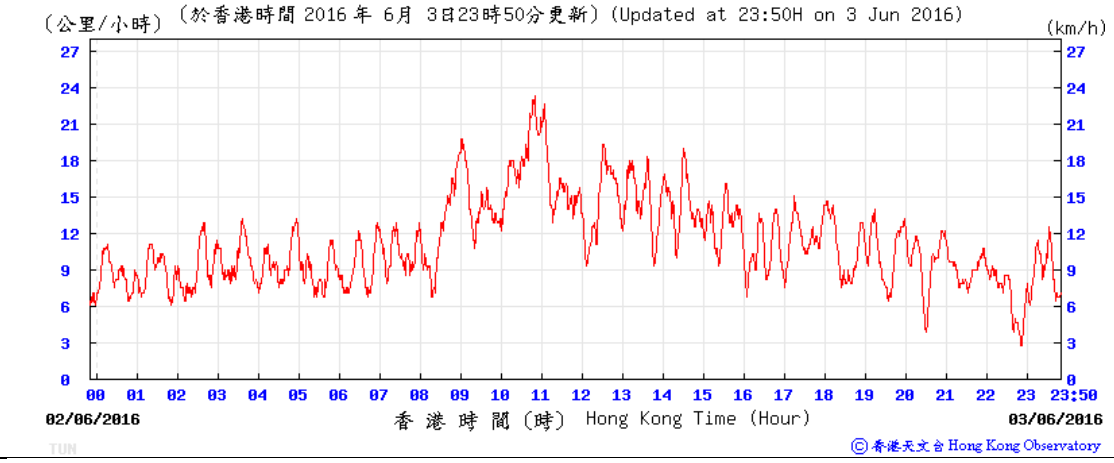
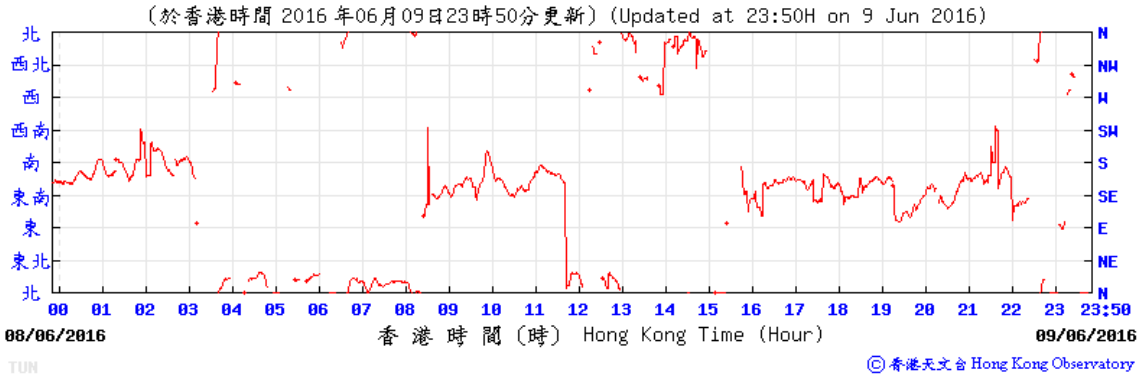
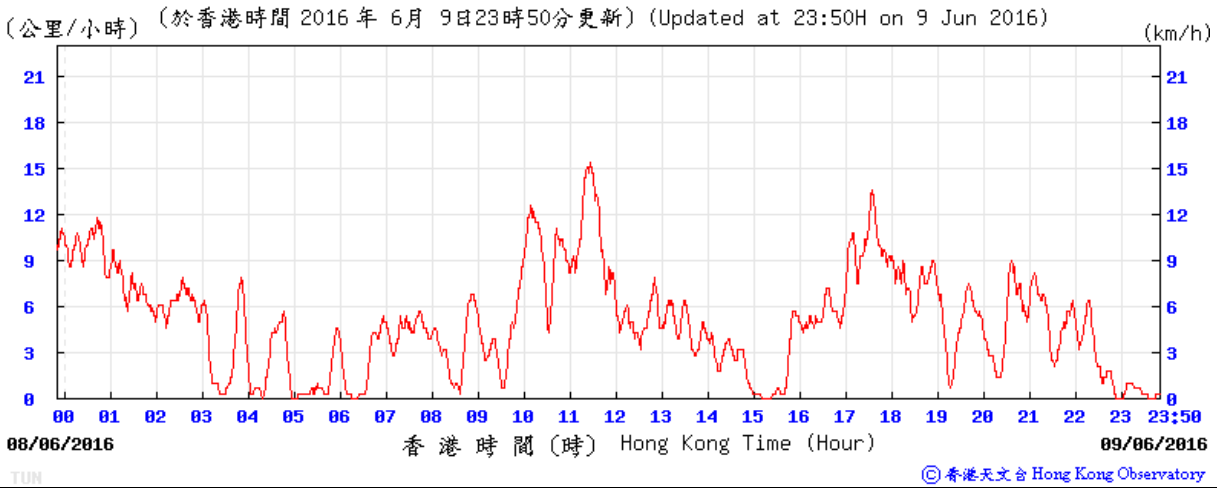
Wind Direction and Wind Speed Data by Hong Kong Observatory – Tuen Mun









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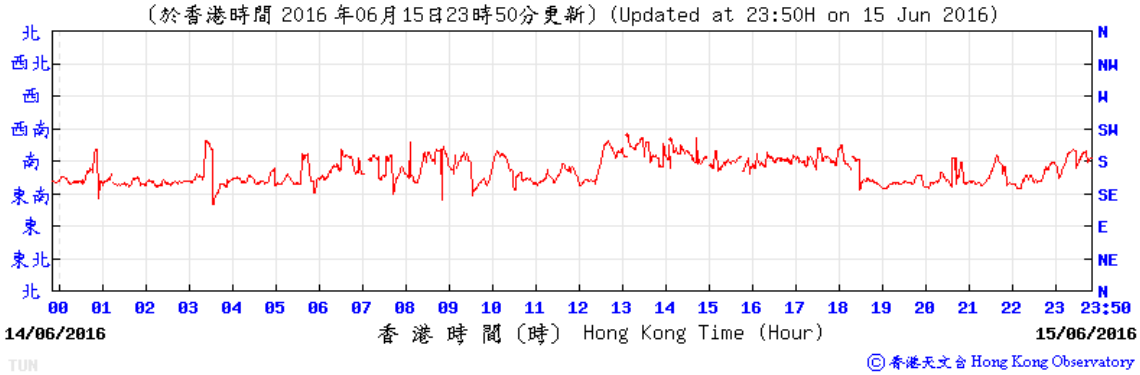

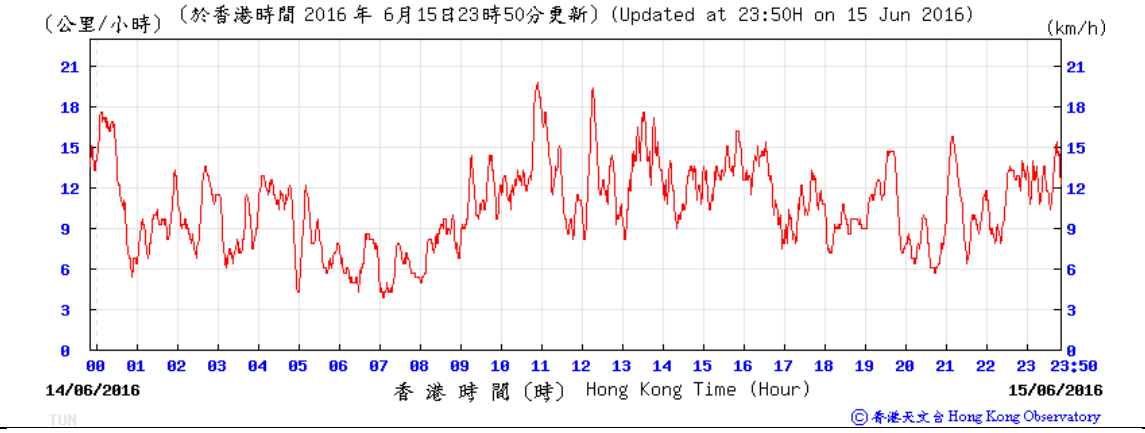

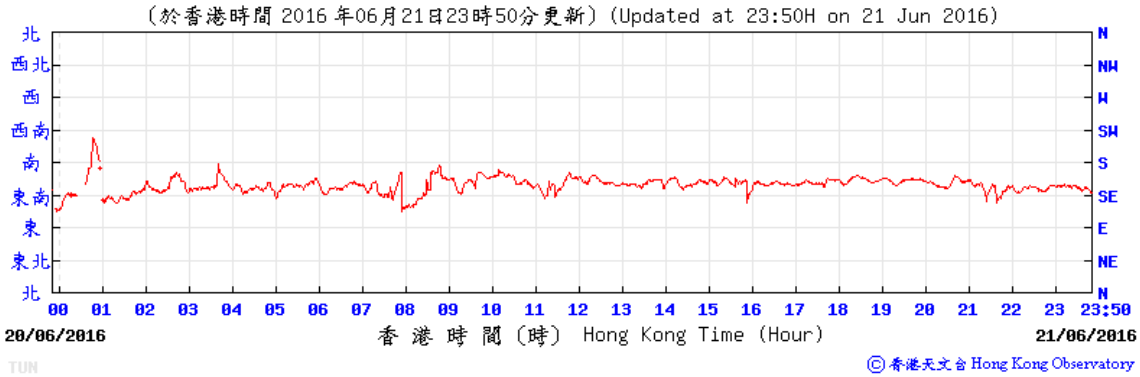

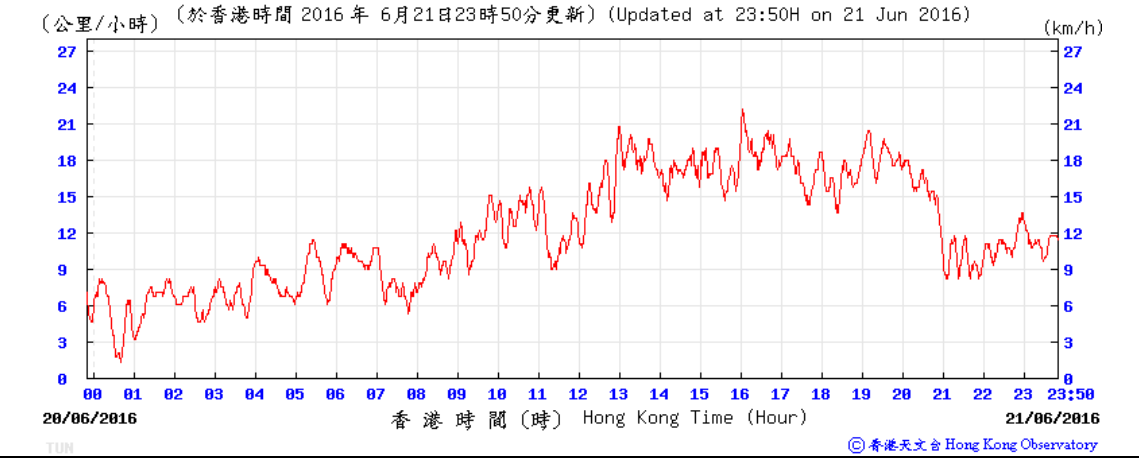

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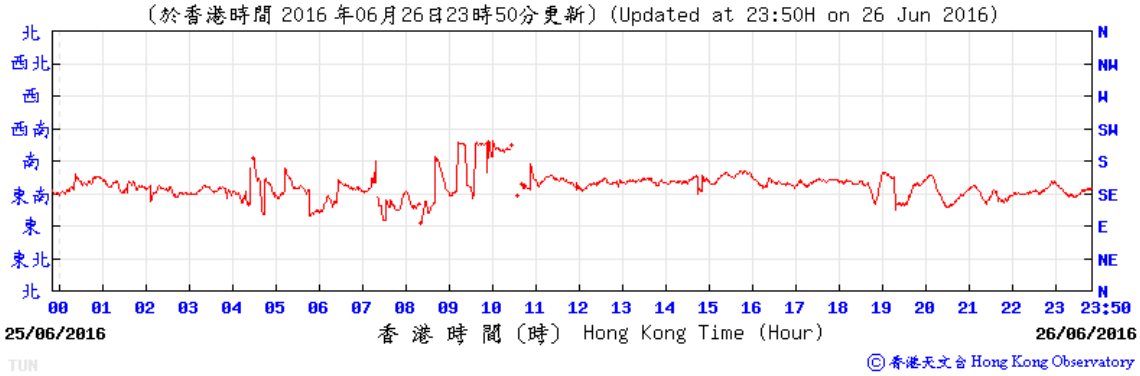

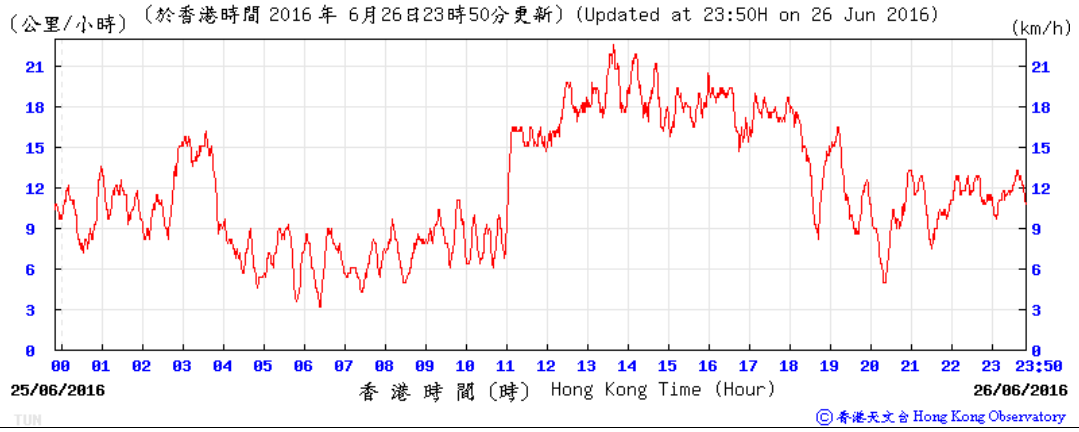

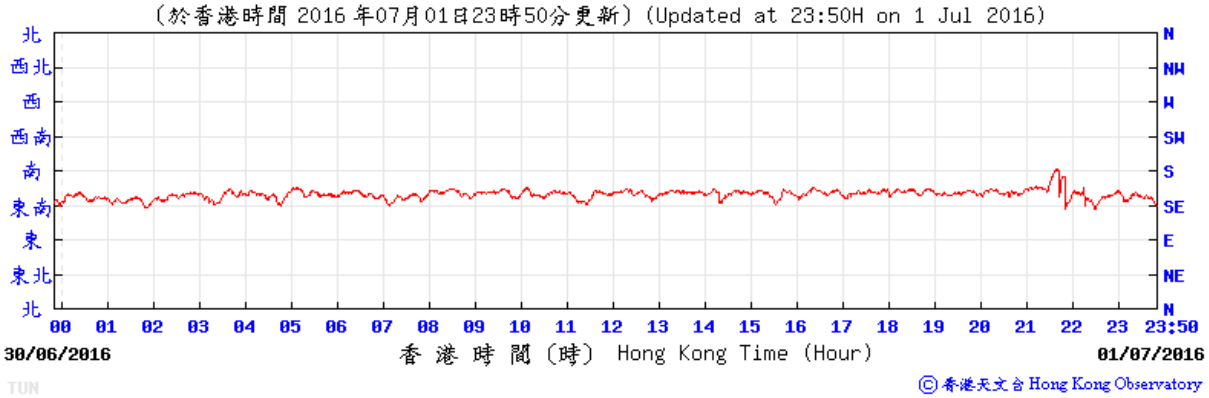

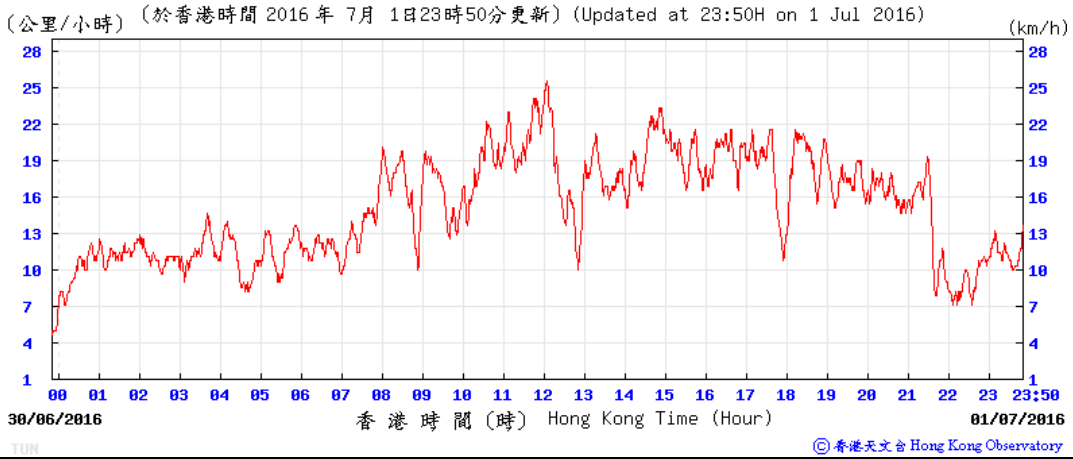

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Appendix M

Monthly Summary of Waste Flow Table

Name of Department: DSD

Contract No.: DC/2014/01

Monthly Summary Waste Flow Table for _06/16_ (MM/YY)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
Jan 2016	-	-	-	-	-	-	-	-	-	-	-
Feb 2016	-	-	-	-	-	-	-	-	-	-	-
Mar 2016	0.100	-	0.100	-	-	-	-	-	-	-	0.001
Apr 2016	0.005	-	-	-	-	0.005	-	-	-	-	0.001
May 2016	0.000	-	-	-	-	-	0.001	-	-	-	0.001
Jun 2016	0.600	0.600	0.600	-	-	-	0.001	0.0024	-	-	0.001
Jul 2016											
Aug 2016											
Sept 2016											
Oct 2016											
Nov 2016											
Dec 2016											
Total	0.705	0.600	0.700	-	-	0.005	0.002	0.0024	-	-	0.004

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
27	10	8	1	1	0	2	1	1	1	2

Notes:

(1) The performance targets are given in ETWB Technical Circular PS Clause 6(14).

(2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material

(4) *The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m3. (ETWB Technical Circular PS Clause 5(4)(b) refers). [Delete Note (4) and the table above on the forecast, where inapplicable].

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MaterialLab

Appendix N

Proactive Environmental Protection Proforma

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Reporting Period	Construction Works	Anticipated Impacts	Recommended Mitigation Measures
29/02/2016 - 31/03/2016	Hoarding Erection Pre-Drilling Earth Excavation Plant Mobilization	Dust, Noise and water quality impact.	• Sufficient watering of the works site with active dust emitting activities. • Properly cover the stockpiles. • Scheduling of noisy construction activities if necessary to avoid persistent noisy operation. • Regular maintenance of machines. • Use of acoustic barriers if necessary. • Provision of appropriate desilting/sedimentation devices provided on site for treatment before discharge. • Regular check and maintenance of desilting/sedimentation devices. • Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.
01/04/2016 - 30/04/2016 01/05/2016 - 31/05/2016	Soldier pile work	Noise and water quality impact	• Shield the piling rig to avoid spreading of slurry during boring. • Regular maintenance of machines. • Use of acoustic barriers if necessary. • Provision of appropriate desilting/sedimentation devices provided on site for treatment before discharge. • Regular check and maintenance of desilting/sedimentation devices. • Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.
01/06/2016 - 30/06/2016	Construction of lagging wall	Dust, Noise impact and waste management.	• Water sprays shall be used during the delivery and handling of dusty materials. • Carry out good site practice to limit noise emission at source. • Avoid simultaneous noisy activities. • Surplus material should be sorted on site into C&D waste and that suitable for public fill. • Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.

01/07/2016 - 31/07/2016	Construction of Mini-pile	Dust, Noise and water quality impact.	• Sufficient watering of the works site with active dust emitting activities. • Scheduling of noisy construction activities if necessary to avoid persistent noisy operation. • Regular maintenance of machines. • Use of acoustic barriers if necessary. • Provision of appropriate desilting/sedimentation devices provided on site for treatment before discharge. • Regular check and maintenance of desilting/sedimentation devices. • Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.