Issue No.: Issue 1
Issue Date: January 2020
Project No.: 1616

EcoPark Operation

Annual Environmental Monitoring & Audit Report 2019

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399

www.asecg.com

Prepared By:

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Issue No.: Issue 1
Issue Date: January 2020
Project No.: 1616

EcoPark Operation

Annual Environmental Monitoring & Audit Report 2019

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399

www.asecg.com

Prepared By:

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Certified by:

James W. H. WONG
Environmental Team Leader

Verified by:

Sam P. S. TSOI
Independent Environmental Checker

Approved:

Gary C. W. TAM
Principal Environmental Protection Officer
Environmental Protection Department

Allied Environmental Consultants Limited
Member of AEC Group (HKEX Stock Code: 8320.HK)
27/F, Overseas Trust Bank Building, 160 Gloucester Road, Wan Chai, Hong Kong

沛然環境評估工程顧問有限公司
沛然環保集團成員（港交所股份代號：8320.HK）
香港灣仔告士打道 160 號海外信託銀行大廈 27 樓

Issue No.: Issue 1
Issue Date: January 2020
Project No.: 1616

EcoPark Operation

Annual Environmental Monitoring & Audit Report 2019

27/F, Overseas Trust Bank Building
160 Gloucester Road
Wan Chai
Hong Kong
T: +852 2815 7028
F: +852 2815 5399

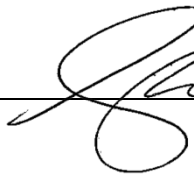
www.asecg.com

Prepared By:

Allied Environmental Consultants Limited

COMMERCIAL-IN-CONFIDENCE

Author: Various

Checked: 

Grace M. H. KWOK
BEng(Hons) MHKIEIA MHKIOA MIAIA MRAPA MISWA BEAM Pro LEED Fellow BREEAM AP FFHKIQEP CAP HKGBC Faculty

Approved: 

James W. H. WONG
BSc MSc PhD CEng MIMechE MHKIQEP MHKIEIA MIOA MHKIOA MIOE MCIBSE FHKAAST RPE REA MASOS MICTA CTBUH MSLL BEAM Pro GB Faculty

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

General

EcoPark is a key element in the Government's waste management policy that aims at promoting the local recycling industry by providing long-term land at affordable rents, thereby encouraging investment in advanced technology and value-added recycling processes. EcoPark is being developed in two phases in Tuen Mun Area 38 as shown in ***Figure 1.1***. The contract for the management of EcoPark – Contract No. *EP/SP/71/13 Provision of Management Services for EcoPark 2014* was awarded to Urban Property Management Limited (UPML) by Environmental Protection Department (EPD) effective from 30th October 2014 and completed on 29th October 2018. UPML continues with another 4-year management service of EcoPark under a new contract – Contract No. *EP/SP/102/17 Provision of Management Services for EcoPark 2018* effective from 30th October 2018.

UPML, the "Operator" of EcoPark, have appointed Allied Environmental Consultants Ltd. (AEC) as the Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) works for the operation of EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit (EP) (EP-226/2005/F).

This is the thirteenth (13th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2019.

In 2019, there were twelve tenants in EcoPark Phase 1 and Phase 2, one operator of the Lot T7 in EcoPark Phase 1, and WEEE.PARK in EcoPark Phase 2. Eight tenants, namely Champway, HK Biomass, HP Telford, South China, Chung Yue, K.Wah, E. Tech and On Fat Lung, have commenced full recycling activities within their lots.

Food Waste Management Group (FWMG) of EPD has taken possession of Lot T7 since November 2018, and initially Lot T7 was used for temporary storage of wood chip and waste trees handling. After machinery testing, FWMG has started full operation since October 2019. Hong Kong Battery Recycling Centre Ltd. (HKBRC) in Lots P9 & P10 completed plant construction for 1st Phase of its plant in May 2019 and underwent machinery testing on 16th Sep 2019 and 24th Sep 2019. Baguio has carried out construction works in 2019, but without any site operation. Rocsky has conducted pre-construction works in Lots P1, P5 and P6 & P7 in the fourth quarter of 2019, but without any site operation.

Tenancy of Shiu Wing ended on the 15th June 2019 and the corresponding lots (i.e. Lots T2 & T3) have been taken over by a new tenant, 3R, on 16th June 2019. Ground investigation works were completed at Lots T2 & T3 on 27th Sep 2019, but no site operation has been conducted since then.

Throughout the reporting year, monthly site inspections and monthly random site inspections were conducted by the ET and the IEC respectively, while quarterly joint site inspection was carried out by the Operator, the IEC and the ET. Observations and recommendations were made during site inspections.

Throughput of Materials / Waste Generated

The throughputs of WEEE.PARK, the operator of Lot T7, and the eight active tenants in the reporting year are summarised below. Please note that product output plus waste disposal does not necessarily equal the waste input, due to material losses during processing and material retained within the lots.

Material Type	Waste Input (tonnes)	Product Output [4] (tonnes)	Waste Disposed [4] (tonnes)
Waste Organic Food	7,845	6,839	1,347
Waste Ferrous Metals	138,092	135,331	862
Waste Wood	2,109	1,176	-
Waste Electronics	26,198	23,386	2,730
Waste Plastics	3,327	2,922	-
Construction Waste	3,775	73,390	169
Waste Glass	2,767		
Waste Rubber Tyres	943	721	-

Notes:

1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
5) "-" in the column of waste disposal denotes zero quantity; while "n/a" denotes unavailable information.

Exceedances of Any Measured Action / Limit Levels

The northern part of EcoPark is located within the 250m Landfill Gas (LFG) Consultation Zone of Siu Lang Shui Landfill. LFG monitoring was carried out quarterly at five locations (three in Phase 1 and two in Phase 2) in the reporting year. The LFG monitoring in Phase 2 (EP2-1 and EP2-2) was commenced in January 2011.

In the reporting year, LFG monitoring was undertaken on 19th March, 17th June, 18th September, 23rd December and 30th December 2019 at five locations (three in Phase 1 and two in Phase 2). Owing to equipment problem, the monitoring at station EP1-2 could not be conducted on 23rd December 2019 and postponed to 30th December 2019. Exceedance of Action Level was recorded and is summarised in the table below.

Date	Station ID	Parameter	Recorded Level	Action Level	Limit Level	Status
19th March 2019	EP2-1	Carbon Dioxide (% v/v)	0.6%	> 0.5%	> 1.5%	Exceedance of Action Level
17th June 2019	EP2-2	Carbon Dioxide (% v/v)	0.6%	> 0.5%	> 1.5%	Exceedance of Action Level

Ventilation enhancement was carried out immediately in both exceedance events, in accordance with the Event Action Plan for LFG specified in Table 6.1 of the EM&A Manual to restore the concentration of CO_2 to non-exceedance level. No apparent source of CO_2 generation was observed

during the investigations of both exceedance events. With reference to similar exceedance events occurred previously, it is suspected that organic matters entered the underground chambers/ pipes during rainy events (e.g. in previous weeks before measurements) and accumulated inside the underground utilities, where microbial activity occurred and eventually increased CO_2 generation within the chamber/ pipes during the decomposition of organic matter. Since no methane was detected in corresponding stations in both events and no exceedance was recorded at other stations, there was no indication of the migration of LFG from Siu Lang Shui Landfill. As confirmed by the Operator, no underground work was being carried out within EcoPark. Based on the above findings, the exceedance of CO_2 is not anticipated to impose any adverse impact on staffs/workers/environment in EcoPark. Nonetheless, the Operator continued to implement the cleaning programme of underground utilities for wet season.

Summary of Complaints, Summons and Prosecutions

No complaint or notifications of summons related to recycling activities was received in the reporting year.

A successful prosecution was referred by the Project Proponent on 14th February 2019 regarding the improper storage of printed circuit board (PCB) at E. Tech recorded on 8th August 2018. Most of the prosecuted items are considered due to insufficient awareness of proper chemical waste handling procedures. The tenant was reminded to strengthen the staff awareness on the procedures and requirements of chemical waste handling, as well as deliver the treated WEEE to downstream recycler at timely manner as far as practicable.

Reporting Changes

There is no change in the reporting year.

Future Key Issues

No key issues are anticipated in the next reporting year.

Conclusions of Annual Review

In terms of interpretation of EM&A data, the outcome of quarterly monitoring is considered as sufficient and effective according to *Section 8.7.11* of the EIA Report and *Section 6.4.4* of the EM&A Manual.

In terms of the environmental acceptability of EcoPark, no critical environmental deficiencies were identified at various tenants' lots in EcoPark in the reporting year. Therefore, the operation of EcoPark in environmental terms is considered as acceptable in general.

In terms of the practicality and effectiveness of the EIA process and the EM&A programme, the mitigation measures proposed in the EIA Study are effective and efficient. The use of the Process Review mechanism to assess incoming processes, processes not assessed in the EIA, or processes with greater throughputs than EIA assumption, is considered to work well and is fully in accordance with the EP conditions, the recommendations of EIA and the requirements of the EM&A programme.

1 PROJECT BACKGROUND

1.1 Project Overview

1.1.1 In the document "A Policy Framework for the Management of Municipal Solid Waste (2005 –2014)", the government set out a comprehensive policy to support the recycling industry. This included allocating suitable land, encouraging research and development, introducing environmental legislation and providing effective support measures. In May 2013, the Environment Bureau launched "Hong Kong Blueprint for Sustainable Use of Resources 2013 – 2022", which promised continuing support for the recycling industry.

1.1.2 EcoPark was developed to support the local recycling industry by providing long-term land at affordable rents, thereby encouraging investment in advanced technology and value-added recycling processes.

1.1.3 EcoPark, as shown in ***Figure 1.1***, has been developed in Tuen Mun Area 38 in two phases (Phase 1 and Phase 2) under Contract *EP/SP/52/06 Development of EcoPark in Tuen Mun Area 38*, which was awarded to Kaden Construction Ltd by the Environmental Protection Department (EPD) in June 2006. Phase 1 construction was completed in July 2009 and Phase 2 construction was completed in November 2010.

1.1.4 The contract for the management of EcoPark – Contract No. *EP/SP/71/13 Provision of Management Services for EcoPark 2018* was awarded to Urban Property Management Limited (UPML) by Environmental Protection Department (EPD) effective from 30th October 2018.

1.1.5 UPML, the "Operator" of EcoPark, has appointed Allied Environmental Consultants Ltd. (AEC) as the Environmental Team (ET) to carry out the Environmental Monitoring and Audit (EM&A) works for the operation of EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit. Ove Arup & Partners Hong Kong Ltd. (Arup) was appointed by the EPD as the Independent Environmental Checker (IEC). The ET and the IEC carry out the EM&A works for EcoPark as required by the EM&A Manual and in accordance with the conditions of the Environmental Permit (EP).

1.2 Operation Programme

1.2.1 By the end of the reporting year, there were twelve tenants in EcoPark, one operator of WEEE.PARK, and one operator of Lot T7 comprising:

- Eight active tenants (Champway, HK Biomass, HP Telford, South China, Chung Yue, K.Wah, E. Tech and On Fat Lung) who have carried out full recycling operations;
- Food Waste Management Group (FWMG) of EPD has taken possession of Lot T7 since November 2018, and initially Lot T7 was used for temporary storage of wood chip and waste trees handling. After machinery testing, FWMG has started full operation since October 2019;
- HKBRC in Lots P9 & P10 completed plant construction for 1st Phase of its plant in May 2019 and underwent machinery testing on 16th Sep 2019 and 24th Sep 2019;
- Baguio has carried out construction works including ground investigation, hoarding works, foundation works and building works in 2019, but without any site operation;
- Rocsky has conducted pre-construction works in Lots P1, P5 and P6 & P7 in the fourth quarter of 2019, but without any site operation, and;
- Tenancy of Shiu Wing ended on the 15th June 2019 and the corresponding lots (i.e. Lot T2 & T3) have been taken over by a new tenant, 3R, on 16th June 2019. Ground investigation works were completed on 27th Sep 2019, but has yet to carry out any site operation.

1.3 Project Organization and Contact Personnel

1.3.1 Key personnel and contact particulars are summarised in ***Table 1.1***.

Table 1.1 EM&A Personnel Contact Details

Position	Name	Email Address	Phone No.
Project Proponent – EPD			
Principal EPO	Mr. Gary C. W. Tam	garytam@epd.gov.hk	3690 7860
Operator – UPML			
Project Manager	Ms. Raindy YIP	raindy.py.yip@urban.com.hk	2212 5900
Park Manager	Ms. May WU	may.sm.wu@urban.com.hk	2212 5920
IEC – Ove Arup			
IEC	Mr. Sam TSOI	sam.tsoi@arup.com	2268 3208
ET – AEC			
ET Leader	Ir. Dr. James WONG	jw@aechk.com	2815 7028

1.3.2 The organisational structure and lines of communication for the operation of EcoPark with respect to environmental management is given in ***Figure 1.2*** and ***Figure 1.3*** respectively.

Figure 1.1 Location of EcoPark in Tuen Mun Area 38

Figure 1.2 Organization Chart of UPML

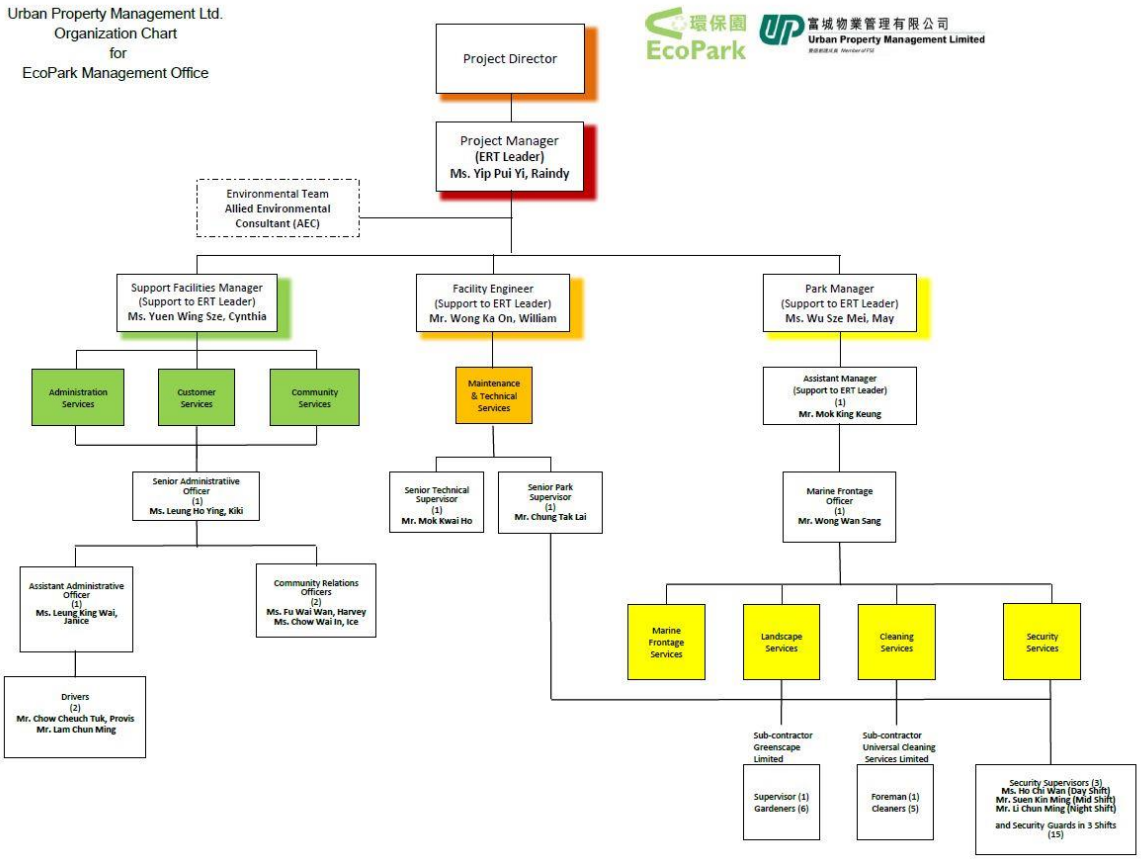
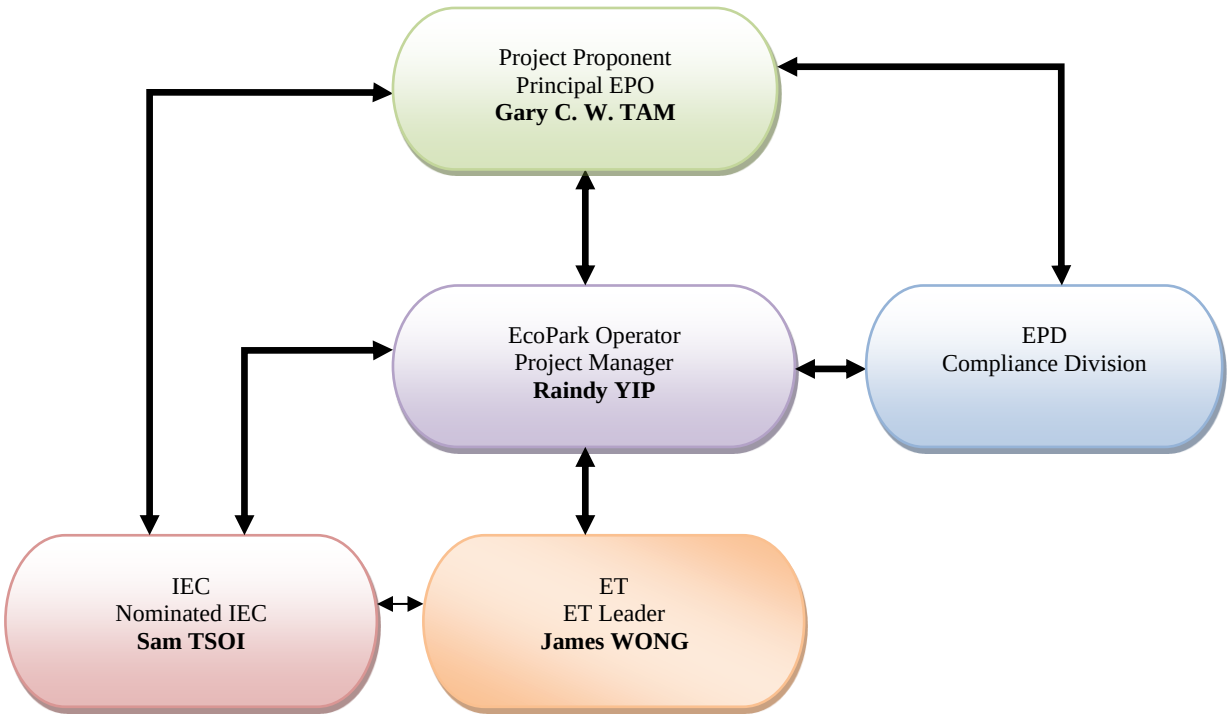


Figure 1.3 Organization Chart of EM&A Works (Operation)



2 SUMMARY OF EM&A REQUIREMENT

2.1 Monitoring Parameters

2.1.1 Landfill Gas (LFG) is required to be monitored quarterly at service voids and utility boxes within EcoPark because the northern part of EcoPark lies within the 250m LFG Consultation Zone for Siu Lang Shui Landfill, which is located to the north of EcoPark.

2.1.2 Operational LFG monitoring has been carried out in Phase 1 after completion of construction in July 2009, commencing in the August to October 2009 quarter. In Phase 2, monitoring has been carried out after completion of construction in November 2010, commencing in the November 2010 to January 2011 quarter.

2.1.3 The location for LFG monitoring was not specified in the EM&A Manual since the final design of EcoPark was not available when the EM&A Manual was approved. Therefore, during a joint site inspection on 27th July 2009, three monitoring locations were identified and agreed as suitable monitoring locations by the former ET (SMEC Asia Ltd.), IEC (Atkins China Ltd.) and the Operator (Serco Guardian Joint Venture). Subsequently, two more monitoring locations in Phase 2 were proposed by the former ET Leader and agreed by the IEC and Operator via email in January 2011. These five monitoring locations are listed in ***Table 2.1*** and shown in ***Figure 2.1***.

Table 2.1 Operation Phase LFG Monitoring Locations in EcoPark

Monitoring Station ID	Type	Locations
EP1-1	LFG vent pipe	Inside the landscaping area of Administration Building
EP1-2	Service void	PCCW below-ground chamber outside Lot T1
EP1-3	Service void	HGC Broadband below-ground chamber outside Lot T3
EP2-1	Service void	HGC Broadband below-ground chamber outside Lot P1
EP2-2	Service void	HGC Broadband below-ground chamber outside Lot P3

2.1.4 Routine LFG monitoring has been carried out on a quarterly basis. Should EPD alert the Operator that high LFG levels have been detected during monthly monitoring under the Siu Lang Shui Landfill restoration contract, the Operator may be required to increase LFG monitoring to monthly until such time EPD informs the Operator that quarterly monitoring can be resumed. To-date, no detection of high LFG levels under Siu Lang Shui Landfill restoration contract was received from EPD.

2.2 Environmental Quality Performance Limits and EAP

2.2.1 The Action/Limit Levels and Event Action Plan (EAP) for LFG are shown in ***Table 2.2*** below. These refer to LFG detected in excavations, utilities and any enclosed on-site areas. No other A/L Levels or EAPs are specified in the EM&A Manual for the operation phase EM&A.

Table 2.2 Action Levels, Limit Levels and Event and Action Plan for LFG

Parameter	Level	Action
Oxygen (O_2)	Action Level <19% O_2	• Ventilate trench/void to restore O_2 to >19%
	Limit Level <18% O_2	• Stop works • Evacuate personnel/prohibit entry • Increase ventilation to restore O_2 to >19%
Methane (CH_4)	Action Level >10% LEL	• Post "No Smoking" signs • Prohibit hot works • Increase ventilation to restore CH_4 to <10% LEL
	Limit Level >20% LEL	• Stop works • Evacuate personnel/prohibit entry • Increase ventilation to restore CH_4 to <10% LEL
Carbon Dioxide (CO_2)	Action Level >0.5% CO_2	• Ventilate to restore CO_2 to <0.5%
	Limit Level >1.5% CO_2	• Stop works • Evacuate personnel/prohibit entry • Increase ventilation to restore CO_2 to <0.5%

2.3 Environmental Audit of Non-Monitored Parameters

2.3.1 Site inspections provide a direct means to trigger and enforce the environmental protection and pollution control measures specified in the Environmental Impact Assessment (EIA) Report. To examine operational practice, site inspections are to be undertaken by the ET once per month. The monthly inspection shall join with the random site inspection by the IEC where possible. A joint inspection by ET and IEC will be carried out at least once per quarter. Ad hoc site inspections are also carried out if significant environmental problems are identified. In addition, inspections may be required subsequent to receipt of environmental complaint, or as part of the investigation work, as specified in the EAP.

2.3.2 The following parameters are required to be audited as part of the operation phase EM&A program:

- Air Quality
- Water Quality
- Waste Management
- Land Contamination

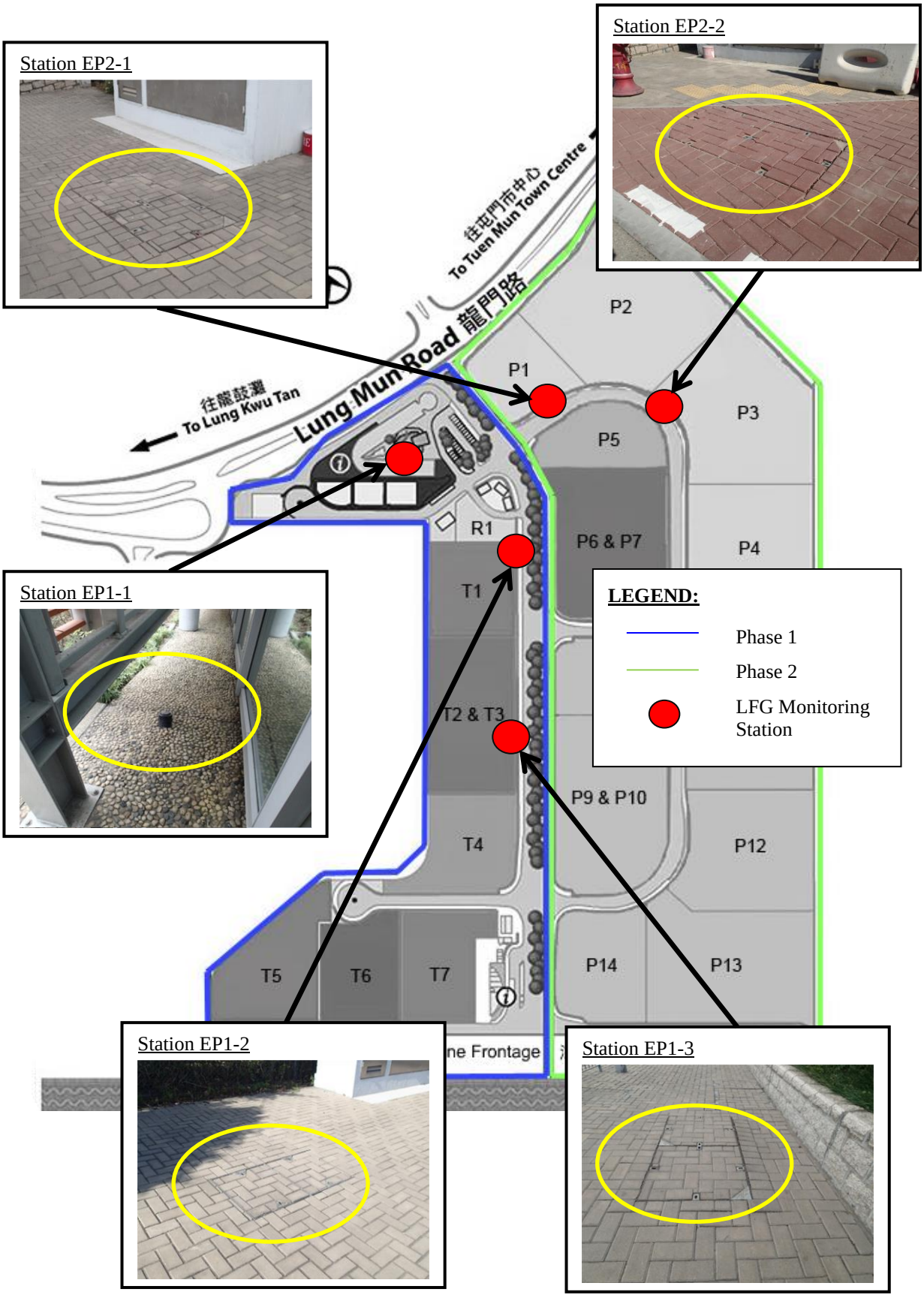
2.4 Environmental Mitigation Measures

2.4.1 Environmental mitigation measures applicable to the operation phase EM&A as stated in the Implementation Schedule are summarised in ***Appendix 1.***

2.5 Environmental Requirements in Tenancy Agreements

2.5.1 Environmental requirements specified in tenancy agreements are provided in ***Appendix 2.***

Figure 2.1 LFG Monitoring Locations within EcoPark



3 OPERATION STATUS

3.1 General

3.1.1 The location of lots within EcoPark, the tenancy numbers and tenant names are shown in ***Figure 3.1.*** A summary of waste throughputs is provided in *Section 3.14.* Brief descriptions of the active tenants are provided from *Section 3.2* to *3.13*.

3.1.2 In the reporting year:

- HKBRC has completed plant construction for 1st Phase of its plant in May 2019 and underwent machinery testing on 16th Sep 2019 and 24th Sep 2019;
- Baguio has carried out construction works including ground investigation, hoarding works, foundation works and building works in 2019, but without any site operation;
- Rocsky has conducted pre-construction works in Lots P1, P5 and P6 & P7 in the fourth quarter of 2019, but without any site operation, and;
- Tenancy of Shiu Wing ended on the 15th June 2019 and the corresponding lots (i.e. Lot T2 & T3) have been taken over by a new tenant, 3R, on 16th June 2019. Ground investigation works were completed on 27th Sep 2019, but has yet to carry out any site operation.

3.2 Champway Technology Limited

- **Lot No.:** T5 (Phase 1)
- **Lot Size:** Approx. 6,000m^2
- **Activity:** Recycling of Organic Waste (Waste Cooking Oil)
- **Recycling Process:** Turn waste cooking oil into biodiesel by extraction, neutralisation, separation and distillation

3.2.1 In view of the issuance of new effluent discharge licence by the Authority in the first quarter of 2019, the tenant has resumed the discharge of treated industrial effluent arising from biodiesel production into foul sewer. Bi-monthly samplings for effluent arising from producing biodiesel have been conducted to comply with the requirement of effluent discharge licence.

3.3 Hong Kong Biomass (Wood) Collect and Recycle Company Limited

- **Lot No.:** T4 (Phase 1)
- **Lot Size:** Approx. 5,000m^2
- **Activity:** Recycling of Waste Woods
- **Recycling Process:** Recycle waste woods to wood fuel pellets. Ferrous metals will be separated by magnets.

3.3.1 Recycling of waste metal was carried out in the reporting year.

3.4 HP Telford Envirotech Group Limited

- **Lot No.:** T1 (Phase 1)
- **Lot Size:** Approx. 5,000m^2
- **Activity:** Recycling of Waste Plastics
- **Recycling Process:** Sorting, shredding and baling of waste plastic

3.4.1 Recycling of waste plastics was carried out in the reporting year.

3.5 Chung Yue Steel Group Company Limited

- **Lot No. :** P13 (Phase 2)
- **Lot Size:** Approx. 100,000m^2
- **Activity:** Recycling of Waste Metals
- **Recycling Process:** Turn waste metals into non-ferrous scrap, light ferrous scrap and heavy ferrous scrap by sorting, baling and shearing.

3.5.1 Recycling of waste metals was carried out in the reporting year.

3.6 K. Wah Construction Products Ltd.

- **Lot No. :** P11 (Phase 2)
- **Lot Size:** Approx. 10,000m^2
- **Activity:** Recycling of Waste Construction Materials/Waste Glass
- **Recycling Process:** Waste construction materials and waste glass will be crushed and delivered to the concrete mixing plant for blending and poured into block machine for casting. The blocks will then be cured, washed and packaged

3.6.1 Recycling of waste construction materials and waste glasses were carried out in the reporting year.

3.7 South China Reborn Resources (Zhongshan) Company Ltd.

- **Lot No.:** P12 (Phase 2)
- **Lot Size:** Approx. 9,000 m^2
- **Activity:** Recycling of Organic Waste (Food Waste)
- **Recycling Process:** Food waste will be segregated. The recyclable portion will undergo deodorisation, dewatering, shredding, fermentation and drying to produce high protein animal feed for livestock farming and aquaculture..

3.7.1 Recycling of food waste was carried out in the reporting year. Also, the tenant adopted "tankered away" approach for handling of industrial effluent arising from the recycling of food waste instead of discharging into foul sewer.

3.8 WEEE.PARK

- **Lot No.:** P2, P3, P4 (Phase 2)
- **Lot Size:** Approx. 30,000 m^2
- **Activity:** Recycling of WEEE
- **Recycling Process:** Four major types of WEEE (i.e. refrigerator and freezers, air conditioners, e-scrap, TV and computer screens) will be recycled. The recycling. processes include separation of insulation/backlighting/plastics/various metals, recovery of screen/monitor stand/refrigerant/oil/hazardous materials, and shredding of casing.

3.8.1 WEEE recycling was carried out in the reporting year.

3.9 On Fat Lung Innovative Resources Ltd.

- **Lot No.:** P8 (Phase 2)
- **Lot Size:** Approx. 4,400 m^2
- **Activity:** Recycling of Waste Rubber Tyres and WEEE
- **Recycling Process:** Waste rubber tyres will be shredded into rubber powder and processed to form rubber bricks. WEEE will be dismantled/shredded and recovered for reusable components.

3.9.1 Recycling of waste rubber tyres was carried out in the reporting year.

3.10 Food Waste Management Group (FWMG) of EPD

- **Lot No.:** T7 (Phase 1)
- **Lot Size:** Approx. 4,000 m^2
- **Activity:** Temporary storage of wood chip and waste trees handling
- **Recycling Process:** Bulk reduction of waste tree by mechanical shearing and chipping.

3.10.1 Food Waste Management Group (FWMG) of EPD has taken possession of Lot T7 since November 2018, and initially Lot T7 was used for temporary storage of wood chip and waste trees handling. After machinery testing, FWMG has started full operation since October 2019. Recycling of food waste was carried out in this reporting year.

3.11 E. Tech Management (HK) Limited

- **Lot No.:** P14 (Phase 2)
- **Lot Size:** Approx. 5,000 m^2
- **Activity:** Recycling of WEEE
- **Recycling Process:** CRT, computer/electronics, white goods and florescent lamps will be recycled. The recycling processes include testing and dismantling of components, repair of refurbished equipment, sorting for reusable components and shredding for scrap.

3.11.1 Recycling of WEEE was carried out in this reporting year.

3.12 Throughput Statistics

3.12.1 For the active recyclers, most of the incoming waste materials and outgoing products were delivered by land transportation, except for the metals from Chung Yue were delivered by both marine and land transportation.

3.12.2 The throughputs of WEEE.PARK, operator of the Lot T7 and the eight active tenants in the reporting year are summarised in ***Table 3.1***. Please note that product output plus waste disposal does not necessarily equal the waste input, due to material losses during processing and material retained within the lot.

Table 3.1 Throughput Statistics for the Reporting Year

Material Type	Waste Input (tonnes)	Product Output [(4)] (tonnes)	Waste Disposed [(4)] (tonnes)
Waste Organic Food	7,845	6,839	1,347
Waste Ferrous Metals	138,092	135,331	862
Waste Wood	2,109	1,176	-
Waste Electronics	26,198	23,386	2,730
Waste Plastics	3,327	2,922	-
Construction Waste	3,775	73,390	169
Waste Glass	2,767		
Waste Rubber Tyres	943	721	-

Notes:

1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
5) "-" in the column of waste disposal denotes zero quantity; while "n/a" denotes unavailable information.

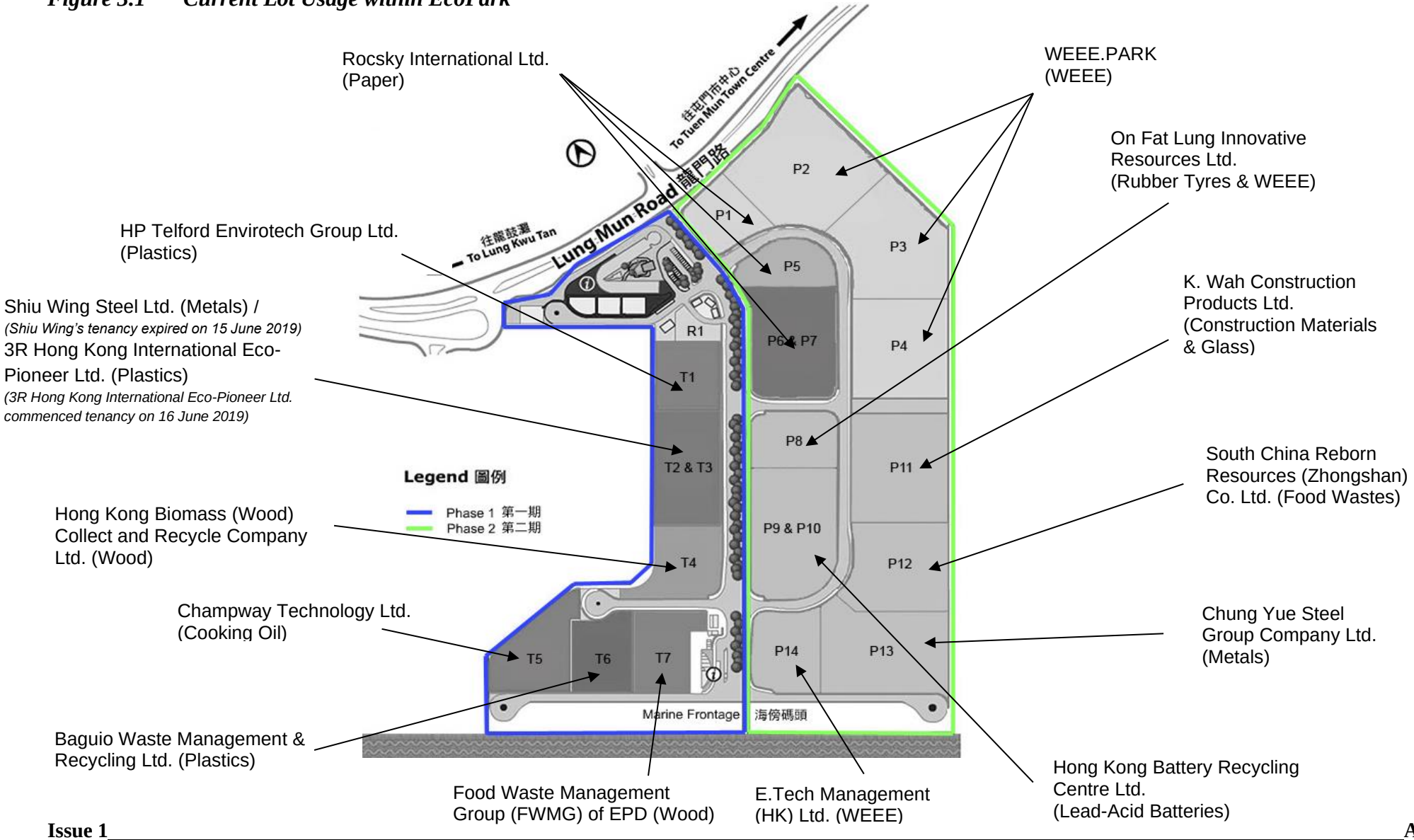
3.12.3 Detailed throughput figures of the reporting year are provided in ***Appendix 3.1***. Updated throughput figures of the previous year are provided in ***Appendix 3.2***.

3.13 Process Review

3.13.1 Process Review, and maybe Design Audit (DA) where required, had been conducted for each recycling process to be operated within EcoPark to confirm its compliance with the findings and recommendations of the EIA report and the conditions of the EP.

3.13.2 Since 2008, twenty four process reviews and three DAs had been approved. Among those, sixteen process reviews and three DAs are related to the current recycling processes in EcoPark as of December 2019. The process review for Food Waste Management Group (FWMG) of EPD was approved in the second quarter of 2019. Full set of the completed PRCs and DAs are submitted separately to relevant authorities in EPD.

Figure 3.1 Current Lot Usage within EcoPark



4 IMPLEMENTATION STATUS OF ENVIRONMENTAL PROTECTION MEASURES

4.1.1 Environmental mitigation measures applicable to the operation phase EM&A as stated in the implementation schedule are summarised in ***Appendix 1***. Environmental requirements specified in tenancy agreements are summarised in ***Appendix 2***.

4.1.2 By the end of the reporting year, WEEE.PARK, Lot T7 (FWMG of EPD) and eight tenants (Champway, HK Biomass, HP Telford, K. Wah, E. Tech, Chung Yue, South China and On Fat Lung) were under full operation.

4.1.3 Appropriate environmental protection measures are in place at all lots.

5 MONITORING RESULTS

5.1 Monitoring Date, Time, Frequency and Duration

5.1.1 As described in *Section 2.1*, operational LFG monitoring is conducted quarterly at five monitoring locations, three in Phase 1 and two in Phase 2. LFG monitoring was carried out on 19th March, 17th June, 18th September, 23rd December and 30th December 2019 in this reporting year. Owing to equipment problem, the monitoring at station EP1-2 could not be conducted on 23rd December 2019 and postponed to 30th December 2019. Monitoring details are shown ***Table 5.1*** below.

Table 5.1 Sampling Schedule for LFG Monitoring

Station ID	Sampling Date	Time	Duration	Ambient Air Temp.	Weather
EP1-1	19th March 2019	09:30	2 minutes	24°C	Sunny
EP1-2		09:45	2 minutes	24°C	Sunny
EP1-3		09:40	2 minutes	24°C	Sunny
EP2-1		09:50	2 minutes	24°C	Sunny
EP2-2		09:55	2 minutes	24°C	Sunny
EP1-1	17th June 2019	09:43	2 minutes	29°C	Fine
EP1-2		10:05	2 minutes	29°C	Fine
EP1-3		10:00	2 minutes	29°C	Fine
EP2-1		09:48	2 minutes	29°C	Fine
EP2-2		09:51	2 minutes	29°C	Fine
EP1-1	18th September 2019	09:25	2 minutes	29°C	Fine
EP1-2		09:45	2 minutes	29°C	Fine
EP1-3		09:40	2 minutes	29°C	Fine
EP2-1		09:30	2 minutes	29°C	Fine
EP2-2		09:35	2 minutes	29°C	Fine
EP1-1	23rd December 2019	09:43	2 minutes	20°C	Fine
EP1-3		10:03	2 minutes	20°C	Sunny
EP2-1		09:50	2 minutes	20°C	Fine
EP2-2		09:55	2 minutes	20°C	Fine
EP1-2	30th December 2019	10:02	2 minutes	21°C	Fine

5.2 Monitoring Methodology, Parameters and Equipment

5.2.1 The LFG monitoring requirement and methodology are stipulated in *Section 6* of the EM&A Manual. The LFG monitoring parameters and their measurement ranges are detailed in ***Table 5.2*** below.

Table 5.2 Parameters and Measurement Ranges for LFG Monitoring

Parameters	**Measurement Ranges**
Methane (CH_4)	0 – 100% LEL & 0-100% v/v
Oxygen (O_2)	0 – 25% v/v
Carbon Dioxide (CO_2)	0 – 100% v/v
Barometric Pressure	mBar (absolute)

5.2.2 LFG monitoring shall be carried out using intrinsically-safe, portable multi-gas monitoring instruments. The gas monitoring equipment shall:

1. Where possible, comply with BS 6020 and be approved by BASEEFA as intrinsically safe, suitable for use in a Zone 2 are to BS 5345;
2. Be capable of continuous monitoring of methane, oxygen and carbon dioxide;
3. Be capable of continuous barometric pressure and gas pressure measurements;
4. Normally operate in diffusion mode unless required for spot sampling, when it should be capable of operating by means of an aspirator or pump;
5. Have low battery, fault and over range indication incorporated;
6. Store monitoring data, and shall be capable of being down-loaded directly to a PC; and
7. Measure in the following ranges:
   - Methane 0 – 100% LEL & 0 - 100% v/v
   - Oxygen 0 – 25% v/v
   - Carbon dioxide 0 – 100% v/v
   - Barometric pressure mBar (absolute)

5.2.3 The monitoring equipment shall alarm (both audibly and visually) in the event that the concentrations of the following are exceeded:

1. Methane: rise to 10% LEL;
2. Oxygen: fall to 18% by volume; and
3. Carbon monoxide: maximum short term (1-hour) exposure of 300ppm with long term average (8-hours) not to exceed 50ppm.

5.3 Results and Graphical Plots of Monitoring Parameters

5.3.1 One InfraRed Gas Analyser Model GA5000 (serial number G501982) was used for LFG measurements. The gas analyser is calibrated every 6 months. The calibration records of the monitoring equipment were provided in the quarterly EM&A reports.

5.3.2 LFG monitoring results are summarised in ***Table 5.3*** and compared with the Action and Limit Levels tabulated in ***Table 2.2***. Graphical plots of the monitoring results are also provided in ***Appendix 4***.

Table 5.3 LFG Monitoring Results

Station ID	Sampling Date	Monitoring Results				
		CH_4 (% v/v)	CH_4 (% LEL)	O_2 (% v/v)	CO_2 (% v/v)	Barometric Pressure (mBar)
EP1-1	19th March 2019	0.0	0	20.5	0.2	1020
EP1-2		0.0	0	20.4	< 0.1	1020
EP1-3		0.0	0	20.6	< 0.1	1020
EP2-1		0.0	0	19.9	0.6	1020
EP2-2		0.0	0	20.4	< 0.1	1020
EP1-1	17th June 2019	0.1	2	20.0	0.5	1010
EP1-2		0.0	0	19.6	< 0.1	1010
EP1-3		0.0	0	19.7	< 0.1	1010
EP2-1		0.1	2	20.3	< 0.1	1010
EP2-2		0.0	0	19.3	0.6	1010
EP1-1	18th September 2019	0.1	2	20.5	< 0.1	1015
EP1-2		0.0	0	19.9	< 0.1	1015
EP1-3		0.0	0	19.9	< 0.1	1015
EP2-1		0.1	2	20.0	0.3	1015
EP2-2		0.0	0	20.0	< 0.1	1015
EP1-1	23rd December 2019	0.2	4	19.7	< 0.1	1021
EP1-3		0.1	2	19.9	< 0.1	1021
EP2-1		0.2	4	19.9	< 0.1	1021
EP2-2		0.2	4	19.5	0.2	1021
EP1-2	30th December 2019	0.2	4	19.9	< 0.1	1023

5.3.3 Exceedances of Action Level were recorded at Station EP2-1 and Station EP2-2 on the 19th March 2019 and 17th June 2019 in the reporting year respectively. The status of exceedance are summarised in ***Table 5.4***.

Table 5.4 Summary of LFG Monitoring Exceedance

Date	Station ID	Parameter	Recorded Level	Status
19th March 2019	EP2-1	CO_2 (% v/v)	0.6%	Exceedance of Action Level
17th June 2019	EP2-2	CO_2 (% v/v)	0.6%	Exceedance of Action Level

5.4 Follow-up Actions for Monitoring Exceedance

5.4.1 Upon the records of exceedance on 19th March 2019 and 17th June 2019, investigations were carried out immediately with representatives from the Operator and IEC. No apparent source of CO_2 generation was observed during the investigations. With reference to similar exceedance events occurred previously, it is suspected that organic matters entered the underground chambers/ pipes during rainy events (e.g. in previous weeks before measurements) and accumulated inside the underground utilities, where microbial activity occurred and eventually increased CO_2 generation within the chamber/ pipes during the decomposition of organic matter. Since no methane was detected in corresponding stations in both events and no exceedance was recorded at other stations, there was no indication of the migration of LFG from Siu Lang Shui Landfill. As confirmed by the Operator, no underground work was being carried out within EcoPark. Based on the above findings, the exceedance of CO_2 is not anticipated to impose any adverse impact on staffs/workers/environment in EcoPark. Nonetheless, the Operator continued to implement the cleaning programme of underground utilities for wet season.

5.4.2 In accordance with the Event Action Plan for LFG specified in ***Table 2.2***, ventilation enhancement was carried out to restore the concentration of CO_2. Additional LFG measurements were carried out inside the underground chamber on 19th March 2019 and 17th June 2019 after the ventilation enhancement to review the condition and no exceedance was recorded as summarised below:

Date	Station ID	Parameter	Recorded Level	Action Level	Limit Level	Status
19th March 2019	EP2-1	CO_2 (% v/v)	< 0.1%	> 0.5%	> 1.5%	No exceedance
17th June 2019	EP2-2	CO_2 (% v/v)	< 0.1%	> 0.5%	> 1.5%	No exceedance

5.4.3 No exceedance of any parameter was recorded at other monitoring stations and no CH_4 was recorded at any monitoring station. There is no indication of the migration of LFG from Siu Lang Shui Landfill.

5.4.4 As advised by the Operator, no underground work was being carried out within EcoPark. Based on the above findings, the exceedance of CO_2 should not impose any adverse impact on staffs/workers/environment in EcoPark..

5.4.5 The concentration of Carbon Dioxide at EP2-1 and EP2-2 returned to a non-exceedance level during the monitoring on 17th June 2019 and 18th September 2019 respectively.

6 SUMMARY OF ENVIRONMENTAL AUDIT

6.1 General

6.1.1 In the reporting year, WEEE.PARK, the operator of the Lot T7, and eight active tenants were under full operation. As such, specific site inspections were only carried out at the lot of WEEE.PARK and the eight tenants. For the lots of those tenants not currently in operation, general site inspections were conducted.

6.1.2 Environmental audits were conducted on a monthly basis based on the approved site inspection checklist. The completed audit checklists were provided in the quarterly EM&A Reports.

6.1.3 In the "status" column of the following tables, an observation will be indicated as "Closed" if it was resolved during the reporting period and no further follow-up is needed. If the observation is not resolved in the reporting period and would be followed-up in the next reporting period, it will be indicated as "Outstanding".

6.2 Outstanding Observations recorded in 2017 and 2018

6.2.1 Outstanding audit observations are summarised in ***Table 6.1***.

Table 6.1 Environmental Audit Findings in 2017 and 2018

Date	Tenant	Item	Status
17th February 2017	HKBRC (General Inspection)	The tenant of HKBRC was requested to provide hoarding of not less than 2.4m where site boundary adjoins road or service lane according to Clause 13(c) of the Schedule of Air Pollution Control (Construction Dust) Regulation.	As the plant construction of HKBRC for 1st Phase was completed in May 2019, this item is no longer applicable. **(Closed)**
15th March 2017	Champway	The temporary storage area for containers was not provided with permeation-proof floor. As advised by the tenant, the area was used as temporary storage and the containers would be gradually removed from the concerned area.	As observed during the site inspection on 29th April 2019, the concrete paving work for providing permeation-proof floor was completed. **(Closed)**
30th November 2017	HKBRC (General Inspection)	Open stockpile of dusty materials was observed in the lot of HKBRC.	As the plant construction of HKBRC for 1st Phase was completed in May 2019, this item is no longer applicable. **(Closed)**

Date	Tenant	Item	Status
19th April 2018	HKBRC	During site inspection on 19th April 2018, no wastewater treatment facility was provided for collection of construction wastewater in the lot of HKBRC.	As the plant construction of HKBRC for 1st Phase was completed in May 2019, this item is no longer applicable. **(Closed)**
20th November 2018	K. Wah	A chemical waste container was observed without cover and proper label in the chemical waste storage area on 20th November 2018.	As observed during the site inspection on 23rd Jan 2019, covered containers and proper labels were observed in the chemical waste storage area. (**Closed**)
13th December 2018	South China	Oil leakage was observed underneath a trailer and enters the stormwater drainage channel at the Eastern Lot Boundary on 13th December 2018.	As observed during the site inspection on 23rd January 2019, the tenant had cleared part of the leaked oil stain and provided impervious sheeting underneath the trailer to prevent further potential leakage. The clean- up of the oil stain was completed and no further leaking from trailer was observed during the following inspection on 19th February 2019. **(Closed)**

6.3 January 2019

6.3.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 23rd January 2019. IEC random site audit was also carried out on 23rd January 2019. Audit observations are summarised in ***Table 6.2***.

Table 6.2 Environmental Audit Findings in January 2019

Tenant	Item	Status
E.Tech	The signage of Chemical Waste Storage Area does not meet the requirements stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	As observed during the site inspection on 19th February 2019, the tenant has rectified the signage which complies with the requirement. **(Closed)**

6.4 February 2019

6.4.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 19th February 2019. Audit observations are summarised in ***Table 6.3***.

Table 6.3 Environmental Audit Findings in February 2019

Tenant	Item	Status
No new critical issue was identified.		

6.5 March 2019

6.5.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 19th March 2019, while IEC random site audit was carried out on 19th March 2019. Audit observation is summarised in ***Table 6.4***.

Table 6.4 Environmental Audit Findings in March 2019

Tenant	Item	Status
Champway	Leakage of grease from the grease waste filtration system was observed during inspection. The leaked materials were contained within the works area without overflowing into the perimeter drainage.	As observed during the site inspection on 29th April 2019, the tenant has cleared the leaked grease under the filter press system. **(Closed)**
Champway	No labelling is provided to the chemical waste and chemical waste storage area, which should also be provided with adequate ventilation.	As observed on 23rd December 2019, a proper signage for the relocated chemical waste storage area at the northern part of the lot was provided by the tenant. However, one of the chemical waste labels was not securely attached. The tenant should rectify the label on the chemical container. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
E.Tech	The signage of Chemical Waste Storage Area does not meet the requirements stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	As observed on 29th April 2019, the tenant has provided proper signage for the Chemical Waste Storage Area. **(Closed)**
On Fat Lung	Rubbish was observed in the perimeter drain along the Southwestern boundary of the lot.	As observed on 29th April 2019, rubbish in the perimeter drain along the southwestern boundary of the lot had been cleared by the tenant. **(Closed)**
South China	Suspected leaked oil was observed in the stormwater manhole at the southeast corner of the lot.	As observed on 29th April 2019, the tenant has cleared the suspected leaked oil. No abnormality was observed in the stormwater manhole at the southeast corner of the lot. **(Closed)**

6.6 April 2019

6.6.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 29th April 2019. IEC random site audit was also carried out on 29th April 2019. Audit observations are summarised in ***Table 6.5***.

Table 6.5 Environmental Audit Findings in April 2019

Tenant	Item	Status
On Fat Lung	Stockpile of earth material was exposed.	As observed on 23th May 2019, the stockpile of earth material was provided with tarpaulin to prevent potential dust generation. **(Closed)**

6.7 May 2019

6.7.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 23rd May 2019. Audit observations are summarised in ***Table 6.6***.

Table 6.6 Environmental Audit Findings in May 2019

Tenant	Item	Status
South China	Oil stain was observed underneath a trailer at the Eastern Lot Boundary and leaked into the perimeter drain.	As observed on 20th August 2019, the oil mixture that contained with the tarpaulin beneath the trailer at the eastern lot boundary was cleaned up. **(Closed)**

6.8 June 2019

6.8.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 17th June 2019. IEC random site audit was also carried out on 17th June 2019. Audit observations are summarised in ***Table 6.7***.

Table 6.7 Environmental Audit Findings in June 2019

Tenant	Item	Status
No new critical issue was identified.		

6.9 July 2019

6.9.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 24th July 2019. IEC random site audit was also carried out on 24th July 2019. Audit observations are summarised in ***Table 6.8***.

Table 6.8 Environmental Audit Findings in July 2019

Tenant	Item	Status
Champway	No chemical waste label is provided on one of the chemical waste containers which stored at the chemical waste storage area.	As observed on 23rd December 2019, a proper signage for the relocated chemical waste storage area at the northern part of the lot was provided by the tenant. However, one of the chemical waste labels was not securely attached. The tenant should rectify the label on the chemical container. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
E. Tech	The signage of the chemical waste storage area near the entrance was removed.	As observed on 18th September 2019, chemical signage for the chemical waste storage area was observed securely attached. **(Closed)**
K.Wah	Stockpiles of concrete block and earth materials are exposed and located on top of a stormwater drainage channel.	As observed on 23rd December 2019, open stockpiles were observed without covering of tarpaulin. The status will be followed up in the next inspection in January 2020. **(Outstanding)**

6.10 August 2019

6.10.1 Joint environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 20th August 2019. Audit observations are summarised in ***Table 6.9***.

Table 6.9 Environmental Audit Findings in August 2019

Tenant	Item	Status
No new critical issue was identified.		

6.11 September 2019

6.11.1 Environmental audits of WEEE.PARK, active tenants and general EcoPark condition were carried out by the ET and the Operator on 18th September 2019. IEC random site audit was also carried out on 18th September 2019. Audit observations are summarised in ***Table 6.10***.

Table 6.10 Environmental Audit Findings in September 2019

Tenant	Item	Status
Champway	Oil spillage was observed under the filter press system.	As observed on 23rd December 2019, oil spillage was cleaned up under and next to the filter press system by the tenant. The containers of the filter press were observed in a right position. **(Closed)**

6.12 October 2019

6.12.1 Environmental audits of WEEE.PARK, the operator of the Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 22nd October 2019. IEC random site audit was also carried out on 22nd October 2019. Audit observations are summarised in ***Table 6.11***.

Table 6.11 Environmental Audit Findings in October 2019

Tenant	Item	Status
Champway	Equipment materials and chemical containers were observed accumulated at the exhaust of carbon filter.	As observed on 23rd December 2019, equipment materials and chemical containers were removed at the exhaust of carbon filter. The remaining material was the activated carbon for replacement propose. **(Closed)**
Champway	General refuse was observed in the perimeter drain next to the exhaust of carbon filter.	General refuse was observed in the perimeter drain next to the exhaust of carbon filter during the inspection on 23rd December 2019. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
Champway	Milky discharge was observed in the stormwater drain at the entrance area.	Milky discharge and oil mixture were observed in the stormwater drain at the entrance area during the inspection on 23rd December 2019. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
Champway	Grease was observed accumulated at the storage tank area.	No grease was observed adjacent to the filter press system during the inspection on 23rd December 2019. Nevertheless, the tenant was reminded to provide sufficient measures, e.g. seal up the barriers with concrete, to prevent any potential surface runoff entering into the perimeter drain. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
Champway	Oil spillage was observed beneath the chemical containers opposite to the chemical waste storage area.	As observed on 19th November 2019, oil spillage was removed beneath the chemical containers opposite to the chemical waste storage area. **(Closed)**
Champway	The bi-monthly sampling record of effluent discharge for September 2019 was outstanding while the results for effluent sampling in October 2019 was presented during ET's inspection.	The renewed discharge licence was provided by tenant and was observed during the inspection on 23rd December 2019. The upcoming bi-monthly sampling results will be reviewed in next site inspection in January 2020. **(Outstanding)**
HP Telford	Shredded plastic was found at the operational area.	As observed on 19th November 2019, the housekeeping condition was generally improved. **(Closed)**

Tenant	Item	Status
K. Wah	Oil stain was observed nearby the open storage area at the eastern part of the lot.	As observed on 19th November 2019, the oil stain nearby the open storage area at the eastern part of the lot was cleaned. **(Closed)**
On Fat Lung	Dusty stockpiles was not entirely covered.	As observed on 19th November 2019, dusty stockpiles was covered. **(Closed)**
On Fat Lung	Chemical containers were observed without provision of drip tray.	As observed on 19th November 2019, chemical containers were removed by the tenant. **(Closed)**

6.13 November 2019

6.13.1 Joint environmental audits of WEEE.PARK, the operator of the Lot T7, active tenants and general EcoPark condition were carried out by the ET, the Operator and the IEC on 19th November 2019. Audit observations are summarised in ***Table 6.12***.

Table 6.12 Environmental Audit Findings in November 2019

Tenant	Item	Status
Champway	The quarterly report for Aug - Oct 2019 as required from the SP licence was outstanding. Chemical spillage from glycerine storage tank was observed on 20th November 2018.	As observed on 23rd December 2019, the quarterly report for August - October 2019 as required from the SP licence was provided by the tenant. **(Closed)**
Champway	Oil spillage was found in adjacent to the chemical waste storage area owing to machinery repairment.	As observed on 23rd December 2019, oil spillage was found in adjacent to the chemical waste storage area owing to machinery repairment. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
Chung Yue	A truck with transported materials was observed without covering.	As observed on 23rd December2019, truck loaded to a level within the side and tail boards. Nevertheless, materials transported on truck should be properly covered. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
E.Tech	Improper signage for Chemical Waste Storage Area was observed and could not meet the requirements as stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.	As observed on 23rd December 2019, improper signage for one of the chemical waste storage areas was observed and could not meet the requirements as stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. The status will be reviewed in next inspection in January 2020. **(Outstanding)**

Tenant	Item	Status
K. Wah	An oil drum was observed without a cover and drip tray.	As observed on 23rd December 2019, the drum was no longer observed with oil inside and used as storage of materials. No sign of oil leakage was observed. **(Closed)**
K. Wah	Some of the chemical waste containers which stored in the chemical waste storage area was observed without chemical waste labels.	As observed on 23rd December 2019, some of the chemical waste containers which had been stored in the chemical waste storage area were observed without chemical waste labels. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
South China	Scum was observed in the stormwater drain.	As observed on 23rd December 2019, milky discharge and oil mixture was observed in the stormwater drain. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
WEEE.PARK	Some of the chemical waste containers which stored in the chemical waste storage area was observed without chemical waste labels.	As observed on 23rd December 2019, some of the chemical waste containers which has been stored in the chemical waste storage area were observed without chemical waste labels. The status will be reviewed in next inspection in January 2020. **(Outstanding)**

6.14 December 2019

6.14.1 Environmental audits of WEEE.PARK, the operator of the Lot T7, active tenants and general EcoPark condition were carried out by the ET and the Operator on 23rd December 2019. IEC random site audit was also carried out on 23rd December 2019. Audit observations are summarised in ***Table 6.13***.

Table 6.13 Environmental Audit Findings in December 2019

Tenant	Item	Status
Champway	Oil spillage was observed adjacent to the cooling tower.	The tenant has cleaned up the oil spillage on the same day. The status will be reviewed in next inspection in January 2020. **(Outstanding)**
Champway	Oil stain was found at the vehicular access.	The status will be reviewed in next inspection in January 2020. **(Outstanding)**
K. Wah	Chemical containers were found above the perimeter drain near the site entrance.	The status will be reviewed in next inspection in January 2020. **(Outstanding)**
South China	Scum was observed in the perimeter drain.	The status will be reviewed in next inspection in January 2020. **(Outstanding)**
On Fat Lung	Dusty stockpile was not entirely covered.	The status will be reviewed in next inspection in January 2020. **(Outstanding)**

7 ENVIRONMENTAL COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTION

7.1 Summary of Summons and Prosecutions

7.1.1 No complaint, or notifications of summons related to recycling activities was received in the reporting year.

7.1.2 A successful prosecution was referred by the Project Proponent on 14th February 2019 regarding the improper storage of printed circuit board (PCB) at E. Tech recorded on 8th August 2018.

7.1.3 During the monthly joint site audit conducted by the Operator, the ET and the IEC on 24th August 2018, no spillage of chemical waste or malpractice of chemical waste handling was recorded at E. Tech.

7.1.4 While no major environmental deficiency was recorded at E. Tech during the monthly site audits from July to December 2018, an observation was recorded during the monthly site audit on 23rd January 2019 regarding the improper signage of chemical waste storage area, which had been rectified by E. Tech as observed during the follow-up site audit on 19th February 2019. No other observation on chemical waste handling was observed at E. Tech during the monthly site audit on 19th February 2019.

7.1.5 While most of the prosecuted items are considered due to insufficient awareness of proper chemical waste handling procedures, improper storage of chemical waste containers may be caused by the lack of storage space and accumulation of the treated WEEE. The tenant was reminded to strengthen the staff awareness on the procedures and requirements of chemical waste handling, as well as deliver the treated WEEE to downstream recycler at timely manner as far as practicable.

7.1.6 The implementation status of the environmental measures, in particular the measures that are related to chemical waste handling (i.e. waste management, prevention of contaminated land, etc.), will continue to be audited at all tenants' lots during future site audits following the recommended measures stipulated in the Environmental Mitigation Implementation Schedule (EMIS) of EcoPark.

7.2 Follow-up on Previous Environmental Complaint

Wastewater Treatment at South China received on 26th October 2016

7.2.1 The tenant had installed flow meters at various points of the wastewater treatment system, e.g. incoming pipe for the storage tank at 3/F, the outgoing pipe of the treatment tank for recycling, the wastewater collection pipes for washing area at G/F, etc. The flow data was recorded to monitor the quantity of wastewater generated from different areas. During this reporting year, no discharge of wastewater was recorded based on the flow data record inspected.

7.2.2 As verbally informed by the tenant, the expired discharge licence would not be renewed and the upgrade of the WTP would not be carried out. The wastewater would continually be collected and transported to designated treatment facility by a licenced collector.

8 ANNUAL REVIEW

8.1 Interpretation of EM&A Data

8.1.1 Landfill gas (LFG) is the only parameter that is required to be monitored in the operation phase EM&A programme. Quarterly LFG monitoring has been carried out by the ET since 2009 following the completion of Phase 1 construction of EcoPark. Although exceedance of action level was recorded in the reporting year, it is believed that the exceedance of CO_2 was caused by the accumulation of organic matters in underground chambers and the associated decomposition of the organic matter. No exceedance of methane was recorded at any monitoring location and there was no indication of the migration of LFG from SLSL. Therefore, the EM&A data is consistent with the assessment result in the EIA Report that the potential risk associated with LFG hazard remains low.

8.2 Environmental Acceptability of EcoPark

8.2.1 In the reporting year, WEEE.PARK, the operator of the Lot T7, and eight tenants (Champway, HP Telford, Hong Kong Biomass, Chung Yue, K.Wah, South China, E.Tech and On Fat Lung) have carried out recycling activities. With reference to *Section 6*, no critical environmental impacts were continuously identified at tenants' lots in EcoPark in the reporting year. The operation of EcoPark in environmental terms is therefore considered as acceptable in general.

8.3 Monitoring Methodology

8.3.1 Quarterly LFG monitoring has been carried out since October 2009. Exceedance of action level was recorded in the reporting year. The monitoring methodology is considered as effective to detect the change of potential LFG hazard and trigger associated actions. Given that no detection of methane was recorded in EcoPark and the LFG levels in EcoPark had returned to non-exceedance levels, quarterly monitoring of LFG is considered as sufficient. The frequency of LFG monitoring may increase upon detection of high LFG levels under the Siu Lang Shui Landfill restoration contract in accordance with *Section 8.7.11* of the EIA Report and *Section 6.4.4* of the EM&A Manual.

8.4 Practicality and Effectiveness of EIA Process and EM&A Programme

8.4.1 The use of Process Review mechanism to assess incoming processes, processes not assessed in the EIA, or processes with greater throughputs than assumed in the EIA, is considered to work well and is in accordance with the recommendations of the EIA, the requirements of the EM&A programme and the EP conditions.

8.4.2 The EM&A programme has been fully utilised throughout the reporting year and is practical and effective to monitor the operation status of tenants. The mitigation measures proposed in the EIA Study are effective and efficient.

9 CONCLUSIONS

9.1.1 This is the thirteenth (13th) annual EM&A report prepared for the operation phase of EcoPark and covers the calendar year of 2019. The tenants' recycling activities are audited on a monthly basis and the results are summarised in this report.

9.1.2 In the reporting year, there were twelve tenants in EcoPark Phase 1 and Phase 2, one operator of WEEE.PRAK in EcoPark Phase 2, and an operator of Lot T7. Eight active tenants (Champway, HK Biomass, HP Telford, South China, Chung Yue, K.Wah, E. Tech and On Fat Lung), have commenced full recycling activities within their lots.

9.1.3 Food Waste Management Group (FWMG) of EPD has taken possession of Lot T7 since November 2018, and initially Lot T7 was used for temporary storage of wood chip and waste trees handling. After machinery testing, FWMG has started full operation since October 2019. Hong Kong Battery Recycling Centre Ltd. (HKBRC) in Lots P9 & P10 completed plant construction for 1st Phase of its plant in May 2019 and underwent machinery testing on 16th Sep 2019 and 24th Sep 2019. Baguio has carried out construction works in 2019, but without any site operation. Rocsky has conducted pre-construction works in Lots P1, P5 and P6 & P7 in the fourth quarter of 2019, but without any site operation.

9.1.4 Tenancy of Shiu Wing ended on the 15th June 2019 and the corresponding lots (i.e. Lot T2 & T3) have been taken over by a new tenant, 3R, on 16th June 2019. Ground investigation works were completed at Lots T2 & T3 on 27th Sep 2019, but no site operation had been conducted since then..

9.1.5 Throughout the reporting year, the ET has conducted monthly site inspections while the IEC has carried out full site inspection on quarterly basis and random site audits on monthly basis, and some general observations have been made. The approved checklist has been used in the monthly site inspections for various tenants.

9.1.6 The throughputs of WEEE.PARK, the operator of the Lot T7 and the eight active tenants in the reporting year are summarised in ***Table 9.1***. Please note that product output plus waste disposal do not necessarily equal the waste input, due to material losses during processing and material retained within the lots.

Table 9.1 Throughput Statistics for the Reporting Year

Material Type	**Waste Input (tonnes)**	**Product Output [(4)] (tonnes)**	**Waste Disposed [(4)] (tonnes)**
Waste Organic Food	7,845	6,839	1,347
Waste Ferrous Metals	138,092	135,331	862
Waste Wood	2,109	1,176	-
Waste Electronics	26,198	23,386	2,730
Waste Plastics	3,327	2,922	-
Construction Waste	3,775	73,390	169
Waste Glass	2,767		
Waste Rubber Tyres	943	721	-

Notes:

1) The throughput data presented above is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined.
5) "-" in the column of waste disposal denotes zero quantity; while "n/a" denotes unavailable information.

9.1.7 LFG monitoring was undertaken on 19th March, 17th June, 18th September, 23rd December and 30th December 2019 at five locations (three in Phase 1 and two in Phase 2). Owing to equipment problem, the monitoring at station EP1-2 could not be conducted on 23rd December 2019 and postponed to 30th December 2019. Exceedance of Action Level was recorded and is summarised in ***Table 9.2***.

Table 9.2 Summary of LFG Exceedance in the Reporting Year

Date	Station ID	Parameter	Recorded Level	Action Level	Limit Level	Status
19th March 2019	EP2-1	Carbon Dioxide (% v/v)	0.6%	> 0.5%	> 1.5%	Exceedance of Action Level
17th June 2019	EP2-2	Carbon Dioxide (% v/v)	0.6%	> 0.5%	> 1.5%	Exceedance of Action Level

9.1.8 Ventilation enhancement was carried out immediately in both exceedance events, in accordance with the Event Action Plan for LFG specified in Table 6.1 of the EM&A Manual to restore the concentration of CO_2 to non-exceedance level. No apparent source of CO_2 generation was observed during the investigations of both exceedance events. With reference to similar exceedance events occurred previously, it is suspected that organic matters entered the underground chambers/ pipes during rainy events (e.g. in previous weeks before measurements) and accumulated inside the underground utilities, where microbial activity occurred and eventually increased CO_2 generation within the chamber/ pipes during the decomposition of organic matter. Since no methane was detected in corresponding stations in both events and no exceedance was recorded at other stations, there was no indication of the migration of LFG from Siu Lang Shui Landfill. As confirmed by the Operator, no underground work was being carried out within EcoPark. Based on the above findings, the exceedance of CO_2 is not anticipated to impose any adverse impact on staffs/workers/environment in EcoPark. Nonetheless, the Operator continued to implement the cleaning programme of underground utilities for wet season.

9.1.9 The quarterly monitoring of LFG is considered as sufficient and effective in accordance with *Section 6.4.4* of the EM&A Manual.

9.1.10 No complaint or notifications of summons related to recycling activities was received in the reporting year.

9.1.11 A successful prosecution was referred by the Project Proponent on 14th February 2019 regarding the improper storage of printed circuit board (PCB) at E. Tech recorded on 8th August 2018. Most of the prosecuted items are considered due to insufficient awareness of proper chemical waste handling procedures. The tenant was reminded to strengthen the staff awareness on the procedures and requirements of chemical waste handling, as well as deliver the treated WEEE to downstream recycler at timely manner as far as practicable.

9.1.12 No critical environmental impacts were continuously identified at tenants' lots in EcoPark in the reporting year. The operation of EcoPark in environmental terms is considered as acceptable in general.

9.1.13 The EM&A programme has been fully utilised throughout the reporting year and is practical and effective to monitor the operation status of tenants. The mitigation measures proposed in the EIA Study are effective and efficient.

Appendix 1

Environmental Mitigation Measures
(from the Implementation Schedule)

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
General					
5.5.23 to 5.5.25, 10.2.24 & 10.2.37	4.2.5 to 4.2.8	The Operator shall develop and implement an Emergency Response Plan (ERP) that lists the procedures to be followed in case of fire, fuel or chemical spillage or other emergency within the EcoPark.	Throughout the duration of the operation.	Operator	
12.2	7.2	No process shall be allowed to operate within EcoPark without approval from WFBU. Approval will be based on the ten-step Process Review, which may include a Design Audit if deemed to be necessary.	Throughout the duration of the operation.	ET IEC Project Proponent	
	8.1.2	All reports (including Process Review Checklists and any Design Audits) shall be prepared and certified by the ET, verified by the IEC and approved by the Project Proponent.	Throughout the duration of construction works until construction is substantially completed. Throughout the duration of the operation.	ET IEC Project Proponent	
12.3	7.3	The Operator shall prepare and implement an Environmental Management Plan (EMP) to define mechanisms for achieving the environmental requirements specified in the EIA, EP and in statutory regulations.	Throughout the duration of the operation.	Operator	
Air Quality					
13.2		The Operator shall ensure that EcoPark "base case" assumptions for air quality shown in Table 13.1 of the Final EIA Report are met by tenants, as a whole.	Throughout the duration of the operation.	Operator	Table 13.1 of the Final EIA Report
Water Quality					
5.4.11 & 5.6.7		To minimise the chance of accidental spillage during loading and unloading, and thereby reduce marine water quality impacts, well established cargo handling guidelines should be followed.	Adjacent to EcoPark marine frontage when loading or unloading goods.	Operator Operators of bulk carriers	*Sections 5* & *6* of IMO Code of Practice for the Safe Loading/ Unloading of Bulk Carriers

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
5.5.19		Contaminated water collected in the surface drainage systems shall be treated at the WTF or other appropriate treatment facility.	Within EcoPark throughout the life of the facility.	Operator	
5.5.23 to 5.5.25	4.2.5 to 4.2.7	An Emergency Response Plan (ERP) will be formulated to address various accident scenarios. The ERP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) under the operation EM&A programme.	Within EcoPark throughout the life of the facility.	Operator	
5.6.4		For uncovered areas where recovery process identified as causing potentially high level of contamination are located, stop-logs will be installed in the perimeter drainage system to isolate contamination.	Within EcoPark throughout the life of the facility.	Operator	
	4.2.2	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC	
Waste Management					
6.8.7	5.2.4	The Operator should register with EPD as a chemical waste producer.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation
6.8.16		The dust collected by any air pollution control equipment installed by tenants must be tested to ensure compliance for landfill disposal.	Within EcoPark throughout the life of the facility.	Operator	Practice Note for disposal of dusty waste at landfills & Admission Ticket System
6.8.18 & 6.8.22	5.2.4	Sludge will be disposed of at WENT landfill, or at any future dedicated sludge treatment facility. Sludge will be collected by a Licensed collector at regular intervals, as determined by the operation of the WTF.	Within EcoPark throughout the life of the facility.	Operator	

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
6.8.21	5.2.4	Chemical wastes shall be stored in appropriate containers in a covered area. "No Smoking" signs will be clearly displayed to prevent accidental ignition of flammable materials. Drip trays capable of storing 110% of the volume of the largest container will be used to mitigate possible leakage.	Within EcoPark throughout the life of the facility.	Operator	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes
	5.2.3 & 5.2.5	The ET should develop an audit checklist, with the agreement of the IEC, to ensure that each mitigation measure is implemented when appropriate and operated correctly when implemented.	Within EcoPark throughout the life of the facility.	ET with IEC	
6.8.7	5.2.4	The Operator should register with EPD as a chemical waste producer.	Within EcoPark throughout the life of the facility.	Operator	Waste Disposal (Chemical Waste) (General) Regulation
Prevention of Contaminated Land					
7.3.1	5.3.2	Any spillages of contaminating material shall be cleaned up immediately through the use of an absorbent. Any such used material should then be considered chemical waste and disposed of appropriately.	Within EcoPark throughout the life of the facility.	Operator	
7.3.3		Any areas within the lot to be used for recycling processes shall be concrete paved before recycling activities commence.	Within EcoPark throughout the life of the facility.	Operator	
7.3.5	5.3.2	During operation, the greatest risk of land contamination will come from storage of chemical wastes, therefore the measures should be followed : • All chemical storage areas shall be provided with locks and be sited on sealed areas. The storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil and chemicals from contaminating the ground. • Chemical wastes will be collected, stored and disposed of in	Within EcoPark throughout the life of the facility.	Operator	

EIA Ref.	EM&A Ref.	Environmental Protection Measures Identified in the Implementation Schedule that are Applicable to the Operation Phase of EcoPark	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Relevant Legislation and Guidelines
		accordance with the Regulation. Disposal of other construction waste will be undertaken by licensed contractors in accordance with applicable statutory requirements in the WDO. • Chemical wastes shall be handled according to the relevant code of practice. Spent chemicals shall be stored and collected by an approved operator for disposal at a licensed facility in accordance with the relevant regulation.			
Landfill Gas					
8.7.10 & 8.7.11	6.1.2	• Alert workers and visitors of possible LFG hazards • Prohibit smoking and open fires on site • Conduct regular (quarterly) LFG monitoring at mobile offices, equipment stores, etc.	Within EcoPark throughout the life of the facility.	Operator	
	6.4.3	Following construction, routine monthly monitoring may be required at service voids and utility boxes. The monitoring requirement and specific locations of monitoring points shall be established based on the findings of the monitoring carried out during construction (i.e. if no LFG is detected during construction then no routine monitoring is required). The need for continued monitoring shall, however, be reviewed through discussion with EPD.	Within EcoPark throughout the life of the facility.	Operator	
Hazard to Life					
10.4.3		Building height limit within EcoPark shall be applied to structures within which people may work at elevated levels.	Within EcoPark throughout the life of the facility.	Operator	EIA Report Table 10.2
Landscape and Visual					
9.4.4		It recommended that this commonality be promoted throughout EcoPark by the Operator and adopted by tenants, if practicable.	Within EcoPark throughout the life of the facility.	Operator	

Appendix 2

Environmental Requirements in Tenancy Agreements

Appendix 2.1

Environmental Requirements in Tenancy Agreements
(Shiu Wing)

GENERAL ENVIRONMENTAL RESPONSIBILITIES

9.1 The Tenant shall at its own cost(s) comply with and shall ensure that the Premises is used, designed, constructed, operated and maintained in accordance with:-

(a) All relevant Ordinances, by-laws, regulations, statutory technical memorandums, codes of practice, rules, non-statutory guidance notes, schemes and abatement notices for the time being in force in Hong Kong including those relating to the environment and governing the control of any form of pollution (see specific Ordinances mentioned hereinbelow) and licensing requirements under relevant Ordinances and regulations.

(b) All information, mitigation measures, prohibitions, restrictions, recommendations and requirements under the Environmental Impact Assessment Report for Development of an EcoPark in Tuen Mun Area 38 with Appendices, i.e. the EIA Report (Register No.: AEIAR-086/2005) dated April 2005, the Final EM&A Manual dated April 2005, the application documents including all attachments (Application No. AEP-226/2005) and other relevant documents in the Register (or in any other places, any internet websites or by any other means as specified by the Director), including the prohibitions and mitigation measures for processes in Table 14.1 and the material throughputs, processes and remarks in Table B.1 of the EIA Report (in so far as applicable).

(c) All information, conditions, submissions, mitigation measures, orders, notices, requirements, prohibitions, restrictions and time limits under the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including updated information about the Permit, any amended permit and any further permit) and all mitigation measures recommended and to be recommended in submissions that shall be deposited with or approved by the Director as a result of permit conditions contained in the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including updated information about the Permit, any amended permit and any further permit). The Tenant shall refer to, inter alia, Conditions 4.1 to 4.14 (and Annexes A and B) and Conditions 3.7 and 3.8 (and Figures 2 and 3) of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding measures to mitigate air quality impact, measures to mitigate hazard to life impact, measures to prevent land contamination, measures to mitigate landfill gas hazard, maintenance of landscape and visual measures (see also hereinbelow regarding Condition 5 of the Environmental Permit and specified Ordinances).

(d) All information, conditions, submissions, mitigation measures, orders, notices and requirements under on going surveillance and monitoring activities during all stages of the Project and during the tenancy under the Tenancy Agreement (e.g. any additional mitigation measures recommended and to be recommended under the Process Review and Design Audit (carried out and to be carried out in accordance with the EM&A Manual) for various environmental impacts including, but not limited to,

noise pollution, air quality, hazard to life, landfill gas hazard, landscape and visual measures, waste management and land contamination).

(e) All recommendations referred to in the documents of the EIAO Register which are not expressly referred to in Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 and any amended Environmental Permit (unless expressly excluded or impliedly amended in the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 and any amended Environmental Permit).

9.2 Further to Condition Nos. 6 and 8 hereinabove, the Tenant shall at its own cost provide relevant environmental monitoring data, information, documents and assistance to the Director and/or the Environmental Protection Department and shall permit authorised representatives of the Environmental Protection Department to access, inspect, take samples and monitor the Premises and operations for the Process Review and the Design Audit carried out and/or to be carried out pursuant to Conditions 4.1 and 5 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (and any updated Permit, amended permit and further permit).

9.3 If the Tenant's operations (i.e. activities and facilities for recovery and/or recycling and/or reprocessing) are not covered by the EIA Report and/or deviate from the development parameters mentioned in inter alia the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including the parameters at Annex A) and/or any environmental licence (e.g. the Water Treatment Facility ("WTF") Discharge Licence), and if additional mitigation measures are not available or are not effective in the opinion of the Director, to ensure compliance with the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit) and the relevant environmental licence(s), the Tenant shall comply with any modified parameters and/or the Tenant shall immediately modify its operations in such a way that the findings and requirements of the EIA Report, the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit) and the environmental licence(s) are complied with and shall immediately cease to continue the offending part of the operations or activity in question.

9.4 The Tenant shall at its own cost(s) apply for, obtain, renew, maintain and comply with all the relevant licences related to compliance with all relevant Ordinances, by-laws, regulations, statutory technical memorandums, codes of practice, rules, non-statutory guidance notes, schemes, abatement notices and the environmental permits for the time being in force in Hong Kong (including those relating to the environment and governing the control of any form of pollution). The Tenant shall obtain, renew and comply with all the said licences within the relevant time limits (in any event, within one (1) calendar month of the date of signing and/or execution of the Tenancy Agreement), shall comply with all abatement notices, orders, directions and requests of the relevant authorities and public officers and shall be responsible for paying all relevant fees, costs, fines and penalties.

9.5 The Tenant shall not do anything or omit to do anything which would cause, contribute to or involve a breach or potential breach by the Director relating to any of the matters mentioned in Conditions 9.1 to 9.4 hereinabove (and other Conditions hereinbelow).

9.6 The Tenant shall fully indemnify the Government and/or the Director for any fees, costs, damages, expenses, fines, penalties, losses and claims arising (a) out of any breach of any of the matters mentioned in inter alia Conditions 9.1 to 9.4 hereinabove (and other Conditions hereinbelow) or (b) from the use of the Premises or (c) out of any works carried out at any time during the term to or at the Premises or (d) out of anything now or during the term attached to or projecting from the Premises or (e) from any neglect or default by the Tenant or by its respective servants or agents or by any express licensee of the Tenant.

SPECIFIC ENVIRONMENTAL RESPONSIBILITIES

Air Pollution

10. Save with an appropriate exemption under the Air Pollution Control Ordinance (Cap. 311 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation, the Tenant shall not install or permit or suffer to be installed upon the Premises or any part thereof or any building(s) or structure(s) or part of any building(s) or structure(s) erected or to be erected thereon any furnace, oven, chimney or flue or any other combustion equipment or use or permit or suffer to be used any fuel or any method or process of manufacture or treatment that might in any circumstance result in, cause or contribute to the discharge or emission of any pollutant or any noxious, harmful or corrosive matter, whether it be in the form of gas, smoke, liquid, solid or otherwise (including but not limited to air pollutant as defined in Section 2 of the Air Pollution Control Ordinance (Cap. 311 of the Laws of Hong Kong)), which exists or which is imminent, without the prior written approval of the Director.

11. No alteration to the installation and method of manufacture shall be made without the prior written consent of the Director. In any event, the Tenant shall at its own cost(s) comply with, inter alia, Conditions 4.2 to 4.7 and Annex A of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding design, installation and operation of chimney, location of fresh air intakes and use of ultra-low sulphur or other cleaner fuel(s) as agreed by the Director (and the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate air quality impact), good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Noise Pollution

12. The Tenant shall take all necessary measures as may be required by and to the satisfaction of the Director to ensure that the operation of all plant and equipment, installed or used on the Premises or in any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon, will not result, not cause and/or will not contribute any noise (which exists or which is imminent) which disturbs or annoys the residents or occupiers of any adjoining or neighbouring lot or lots or premises, or causes and/or contributes to

disturbance to the general public under the Noise Control Ordinance (Cap. 400 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation.

13. The decision of the Director as to whether any such plant and equipment are causing disturbance or annoyance as aforesaid shall be final and binding on the Tenant.

Waste Management

14. The Tenant shall not permit, allow or suffer any fuel or chemical and any sewage, waste water or effluent containing sand, cement, silt or any suspended or dissolved material to flow, escape or run from the Premises onto any adjoining land or allow any waste matter which does not form part of the recovery and/or recycling and/or reprocessing operation or is not part of the final product of such operation to be deposited, kept, held or stored anywhere within the Premises and other areas of EcoPark. The Tenant shall at its own cost(s) have all such matters and all waste arising from recycling activities, chemical waste arising from maintenance of plant and equipment, sewage sludge (from WTF) and general daily waste from the operation removed from the Premises or any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon in a proper manner to the satisfaction of the Director.

15. In any event, the Tenant shall at its own cost(s) comply with, inter alia, Conditions 4.11 and 4.12 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding paving all areas of the Premises with concrete/using concrete hardstanding and siting all fuel tanks and chemical storage areas on the specified sealed areas, respectively (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to prevent land contamination). The Tenant shall at its own cost(s) comply with relevant provisions of the Waste Disposal Ordinance (Cap.354 of the Laws of Hong Kong) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Water Pollution

16. In the event that the Tenant produces, generates, permits, causes, allows or suffers any discharge which is subject to control under the Water Pollution Control Ordinance (Cap. 358 of the Laws of Hong Kong) any regulations made thereunder and any amending legislation, and is not covered by a WTF Discharge Licence issued under the Water Pollution Control Ordinance (Cap. 358 of the Laws of Hong Kong) the Tenant shall apply to the Director for a licence and comply with the terms and conditions stipulated in the licence and the WTF Discharge Licence at the Tenant's own cost(s). Otherwise, the Tenant is not allowed to discharge directly or indirectly or to produce, generate, permit, cause, allow or suffer any discharge into any public sewer, storm-water drain, channel, stream-course, sea or any area inside or outside the Premises any trade effluent or foul or contaminated water or cooling or hot water. Subject to the said licence from the Director and WTF Discharge Licence, the Tenant shall at its own cost(s) separate, collect, discharge and send all process or industrial wastewater to the WTF for treatment to the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence.

17. Subject to obtaining advance written approval of the Director, the Tenant shall at its own cost(s) provide, install, operate and maintain its own waste water pre-treatment plants within the Premises if such process or industrial wastewater could not meet the influent limits / exceeds the maximum influent criteria of the WTF (in accordance with paragraph 7.2.9 of the Final E&MA Manual). The Tenant shall at its own cost(s) separate, collect, discharge and send all domestic wastewater (i.e. other than process or industrial wastewater) to the Pillar Point Sewage Treatment Works directly for treatment or other treatment works specified in the licence.

18. In any event, the Tenant shall prevent any spilled materials from entering the surface water drainage system and prevent contamination of the sea at its own cost(s) by, inter alia, providing, installing, operating and maintaining stop-logs or interceptors in the surface water drainage system and at the marine frontage area, respectively, or as required by the licence. The Tenant shall at its own cost comply with relevant provisions of the Dumping at Sea Ordinance (Cap 466 of the Laws of Hong Kong) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Hazard to Life Impact

19. To mitigate hazard to life impact, the Tenant shall comply with, inter alia, Conditions 4.8 to 4.10 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact) and shall not:-

(a) Bring, keep, store or transport chlorine within the Premises and other areas of EcoPark;

(b) Bring, keep, store, locate or transport dangerous goods, substances and fuels supporting combustion including oxygen, acetylene, hydrogen peroxide, rubber tyres and diesel within 10 metres from the boundary of the site of EcoPark; and

(c) Exceed the building height restrictions for buildings on the Premises which are on/near the western boundary of the site of EcoPark as mentioned in Annex B to the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 (including any updated Permit, amended permit and further permit).

Landfill Gas Hazard

20. To mitigate landfill gas hazard, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.13 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding raising clear of the ground all buildings and enclosed structures as specified in inter alia Condition 3.7 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact).

Landscape and Visual Impacts

21. To mitigate landscape and visual impacts, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.14 of the Environmental Permit No. EP-226/2005 as amended by the Variation of Environmental Permit – Application No.VEP-221/2006 regarding maintaining landscape, planting, treatment and mitigation measures as specified in inter alia Condition 3.8 and Figure 3 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate landscape and visual impacts).

Appendix 2.2

Environmental Requirements in Tenancy Agreements
(All Tenants except Shiu Wing)

Compliance of Environmental Legislation

5. The Tenant shall comply with and observe all Ordinances, by-laws, regulations and rules for the time being in force in Hong Kong governing the control of any form of pollution, including air, noise, water and waste pollution, and for the protection of the environment.

Air Pollution

6. Save with an appropriate exemption under the Air Pollution Control Ordinance (Cap. 311) any regulations made thereunder and any amending legislation, the Tenant shall not install or permit or suffer to be installed upon the Premises or any part thereof or any building(s) or structure(s) or part of any building(s) or structure(s) erected or to be erected thereon any furnace, oven, chimney or flue or any other combustion equipment or use or permit or suffer to be used any fuel or any method or process of manufacture or treatment that might in any circumstance result in, cause or contribute to the discharge or emission of any pollutant or any noxious, harmful or corrosive matter, whether it be in the form of gas, smoke, liquid, solid or otherwise (including but not limited to air pollutant as defined in Section 2 of the Air Pollution Control Ordinance

(Cap. 311), which exists or which is imminent, without the prior written approval of the Director.

Water Pollution

7. (a) In the event that the Tenant produces, generates, permits, causes, allows or suffers any discharge which is subject to control under the Water Pollution Control Ordinance (Cap. 358) any regulations made thereunder and any amending legislation, the Tenant shall apply to the Director for a licence and comply with the terms and conditions stipulated in the licence at the Tenant's own cost(s). Otherwise, the Tenant is not allowed to discharge directly or indirectly or to produce, generate, permit, cause, allow or suffer any discharge into any public sewer, storm-water drain, channel, stream-course, sea or any area inside or outside the Premises any trade effluent or foul or contaminated water or cooling or hot water. Subject to the said licence from the Director, the Tenant shall at its own cost(s) separate, collect, and discharge all process or industrial wastewater which comply with the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence.

(b) Subject to obtaining advance written approval of the Director, the Tenant shall at its own cost(s) provide, install, operate and maintain its own waste water pre-treatment plants within the Premises if such process or industrial wastewater could not meet the standard required for discharge into a sewer leading to the sewage treatment works at Pillar Point or other treatment works specified in the licence. The Tenant shall at its own cost(s) separate, collect, discharge and send all domestic wastewater (i.e. other than process or industrial wastewater) to the Pillar Point Sewage Treatment Works directly for treatment or other treatment works specified in the licence.

(c) In any event, the Tenant shall prevent any spilled materials from entering the surface water drainage system and prevent contamination of the sea at its own cost(s) by, inter alia, providing, installing, operating and maintaining stop-logs or interceptors in the surface water drainage system and at the marine frontage area, respectively, or as required by the licence. The Tenant shall at its own cost comply with relevant provisions of the Dumping at Sea Ordinance (Cap. 466) good practices and relevant provisions of the EIA Report and Final EM&A Manual.

Waste Management

8. (a) The Tenant shall at its own cost(s) comply with relevant provisions of the Waste Disposal Ordinance (Cap. 354).

(b) The Tenant shall not permit, allow or suffer any fuel or chemical and any sewage, waste water or effluent containing sand, cement, silt or any suspended or dissolved material to flow, escape or run from the Premises onto any adjoining land or allow any waste matter which does not form part of the recovery and/or recycling and/or reprocessing operation or is not part of the final product of such operation to be deposited, kept, held or stored anywhere within the Premises and other areas of EcoPark. The Tenant shall at its own cost(s) have all such matters and all materials arising from recycling activities, chemical materials arising from maintenance of plant and equipment, sewage sludge (from wastewater treatment facilities, if any) and general daily waste from the operation removed from the Premises or any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon in a proper manner to the satisfaction of the Landlord and/or the Director.

Noise Pollution

9. (a) The Tenant shall take all necessary measures as may be required by and to the satisfaction of the Landlord and/or the Director to ensure that the operation of all plant and equipment, installed or used on the Premises or in any building(s) or structure(s) or any part of any building(s) or structure(s) erected or to be erected thereon, will not result, not cause and/or will not contribute any noise (which exists or which is imminent) which disturbs or annoys the residents or occupiers of any adjoining or neighbouring lot or lots or premises, or causes and/or contributes to disturbance to the general public under the Noise Control Ordinance (Cap. 400) any regulations made thereunder and any amending legislation.

(b) The decision of the Landlord or the Director as to whether any such plant and equipment are causing disturbance or annoyance as aforesaid shall be final and binding on the Tenant.

Landfill Gas Hazard

10. To mitigate landfill gas hazard, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.13 of the Environmental Permit No. EP-226/2005/A regarding raising clear of the ground all buildings and enclosed structures as specified in inter alia

Condition 3.7 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact).

EcoPark Being Within the 250m Consultation Zone of Siu Lang Shui Landfill

11. (a) The Tenant acknowledges that the EcoPark is within the 250m Consultation Zone of the Siu Lang Shui Landfill and that the Premises may be affected by problems associated with migrating landfill gas and undertakes to provide suitable precautionary or protection measures at his own expense to control these potential hazards.

(b) The Tenant shall ensure all personnel entering the Premises and all visitors to the Premises are aware of the potential hazards of the landfill gas by posting suitable warning notices of the potential hazards at his own expense.

(c) All buildings and enclosed structures, including temporary offices, temporary stores and the administration building, within the 250m Consultation Zone of the Siu Lang Shui Landfill shall be provided with the following measure(s):

(i) buildings shall be raised clear of the ground with a clear separation distance (as measured from the highest point on the ground surface to the underside of the lowest floor joist) of at least 500mm; or

(ii) a low-gas permeability membrane shall be applied to the surface of any wall or floor slab that rests on or is below ground. A gravel-fill vent system shall be provided such that passive venting is achieved around the perimeter of the structure. In addition, other building materials, such as dense well-compacted concrete or steel shuttering which provide a measure of resistance to gas permeation, shall be used to achieve gas protection.

(d) The Tenant shall ensure that the electrical equipment used on the Premises shall be intrinsically safe. Welding, flame-cutting or other hot works shall be confined to the open areas of the Premises and shall be at least 15m away from any ground-level confined space.

(e) No drilling, trenching and excavation shall be allowed on the Premises. During any construction work, the Tenant shall observe the guidelines recommended in Chapter 8 of the "Landfill Gas Hazard Assessment Guidance Note" published by the Department of Environmental Protection. In particular, no smoking, naked

flames and all other sources of ignition shall be allowed within 15m of any ground-level confined space.

Hazard to Life Impact

12. To mitigate hazard to life impact, the Tenant shall comply with, inter alia, Conditions 4.8 to 4.10 of the Environmental Permit No. EP-226/2005/A (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate hazard to life impact) and shall not:-

    (a) bring, keep, store or transport chlorine within the Premises and other areas of EcoPark;

    (b) bring, keep, store, locate or transport dangerous goods, substances and fuels supporting combustion including oxygen, acetylene, hydrogen peroxide, rubber tyres and diesel within 10 metres from the boundary of the site of EcoPark; and

    (c) exceed the building height restrictions for buildings on the Premises which are on/near the western boundary of the site of EcoPark as mentioned in Annex B to the Environmental Permit No. EP-226/2005/A (including any updated Permit, amended permit and further permit).

Landscape and Visual Impacts

13. To mitigate landscape and visual impacts, the Tenant shall at its own cost(s) comply with, inter alia, Condition 4.14 of the Environmental Permit No. EP-226/2005/A regarding maintaining landscape, planting, treatment and mitigation measures as specified in inter alia Condition 3.8 and Figure 3 (and comply with the conditions of any updated Permit, amended permit and further permit regarding measures to mitigate landscape and visual impacts).

Environmental Permits Relating to EcoPark

14. The Tenant hereby declares, confirms and acknowledges that it is fully aware that, pursuant to the Environmental Impact Assessment Ordinance (Cap.499), the Director has the right to grant, amend or revoke environmental permit(s) or to grant further or amended environmental permit(s) relating to the lots comprising the EcoPark and any other lots but that such right may be challenged by third parties on justifiable grounds. The Tenant hereby undertakes to waive all its rights and remedies for any loss, damages, cost and expenses whatsoever which it may sustain and/or incur directly or

indirectly as a result of the grant, amendment or revocation of the environmental permit(s) or the consequential grant of further or amended environmental permit(s), including but not limited to any right to terminate this Lease and/or to make any claim against the Landlord and/or the Director for any compensation whatsoever.

Appendix 3

Material and Waste Throughputs

Appendix 3.1

Material and Waste Throughputs of the Reporting Year

Table A3.1-1 Recycling of Waste Organic Food

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	557	473	91
February 2019	465	477	69
March 2019	619	693	68
April 2019	699	607	57
May 2019	731	544	132
June 2019	750	653	73
July 2019	762	649	72
August 2019	802	689	584
September 2019	757*	654*	59*
October 2019	828*	776*	74*
November 2019	723*	616*	57*
December 2019	153*	7*	10*
Total	**7,845**	**6,839**	**1,347**

Table A3.1-2 Recycling of Waste Ferrous Metal

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	15,208	11,597	89
February 2019	7,133	11,245	67
March 2019	13,754	12,324	68
April 2019	11,553	14,385	73
May 2019	12,791	11,005	72
June 2019	11,570	7,865	68
July 2019	11,842	15,424	74
August 2019	12,168	9,071	69
September 2019	10,309	7,180	65
October 2019	12,104	15,590	72
November 2019	10,834	7,950	73
December 2019	8,827*	11,695*	74*
Total	**138,092**	**135,331**	**862**

Table A3.1-3 Recycling of Waste Wood

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	223	353	-
February 2019	261	11	-
March 2019	504	27	-
April 2019	111	272	-
May 2019	109	119	-
June 2019	252	125	-
July 2019	106	130	-
August 2019	76	13	-
September 2019	128	1	-
October 2019	89	47	-
November 2019	109	21	-
December 2019	141*	58*	-*
Total	**2,109**	**1,176**	**-**

Table A3.1-4 Recycling of Waste Electronics

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	2,185	2,031	239
February 2019	1,737	1,544	176
March 2019	2,327	2,134	208
April 2019	2,190	1,974	215
May 2019	2,506	2,308	260
June 2019	2,372	2,144	101
July 2019	2,391	2,199	284
August 2019	2,439	2,180	305
September 2019	2,332	2,025	247
October 2019	2,180	1,894	245
November 2019	1,864*	1,685*	213*
December 2019	1,674*	1,267*	236*
Total	**26,198**	**23,386**	**2,730**

Table A3.1-5 Recycling of Waste Plastic

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	288	239	-
February 2019	214	200	-
March 2019	290	107	-
April 2019	203	37	-
May 2019	385	326	-
June 2019	356	278	-
July 2019	413	410	-
August 2019	241	278	-
September 2019	367	437	-
October 2019	363	390	-
November 2019	209	221	-
December 2019	n/a	n/a	n/a
Total	**3,327**	**2,922**	-

Table A3.1-6 Recycling of Waste Glass and Construction Waste

Date	Waste Input (tonnes)		Product Output (tonnes)	Waste Disposal (tonnes)
	Construction Waste	Glass		
January 2019	147	24	6,998	3
February 2019	-	28	4,724	8
March 2019	131	205	6,952	97
April 2019	799	324	6,981	3
May 2019	515	284	6,460	16
June 2019	230	130	6,095	3
July 2019	242	223	6,062	4*
August 2019	85	283	7,530	0*
September 2019	75	339	6,415	6
October 2019	-	340	5,198	9
November 2019	327	423	4,810	5
December 2019	1,224*	164*	5,165*	15*
Total	**3,775**	**2,767**	**73,390**	**169**

Table A3.1-7 Recycling of Waste Rubber Tyres

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2019	75	47	-
February 2019	61	52	-
March 2019	62	70	-
April 2019	104	72	-
May 2019	104	50	-
June 2019	110	90	-
July 2019	88	42	-
August 2019	76	48	-
September 2019	61	56	-
October 2019	-*	-*	-*
November 2019	108*	100*	-*
December 2019	94*	94*	-*
Total	**943**	**721**	**-**

Notes:

1) The throughput data presented in ***Tables A3.1-1*** to ***A3.1-7*** has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined in ***Table A3.1-6***.
5) "-" in the column of waste disposal denotes zero quantity; while "n/a" denotes unavailable information.
6) The throughput data marked with "*" have been revised with updated data since submission of corresponding quarterly EM&A reports.

Appendix 3.2

Updates of Material and Waste Throughputs of the Previous Reporting Year

Table A3.2-1 Recycling of Waste Organic Food

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
May 2018	889	353	458
June 2018	852	312	332
July 2018	954	470	356
August 2018	852	525	327
September 2018	517	377	135
October 2018	532	521	100
November 2018	606	479	173
December 2018	632	519	136

Table A3.2-2 Recycling of Waste Ferrous Metal

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
April 2018	14,330	11,842	67
August 2018	16,628	16,642	54
October 2018	16,736	13,606	64
November 2018	16,024	17,388	79
December 2018	15,439	14,144	64

Table A3.2-3 Recycling of Waste Wood

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
March 2018	63	217	-
September 2018	101	150	-
November 2018	374	56	-
December 2018	440	216	-

Table A3.2-4 Recycling of Waste Electronics

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
January 2018	339	319	58
March 2018	606	575	81
April 2018	687	638	74
May 2018	838	998	137
July 2018	1,032	879	101
August 2018	1,349	1,191	162
September 2018	1,452	1,053	263
October 2018	1,932	1,717	266
November 2018	1,733	1,544	223
December 2018	1,635	1,444	177

Table A3.2-5 Recycling of Waste Plastic

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
December 2018	279	254	-

Table A3.2-6 Recycling of Waste Glass and Construction Waste

Date	Waste Input (tonnes)		Product Output (tonnes)	Waste Disposal (tonnes)
	Construction Waste	Glass		
December 2018	406	33	4,786	10

Table A3.2-7 Recycling of Waste Rubber Tyres

Date	Waste Input (tonnes)	Product Output (tonnes)	Waste Disposal (tonnes)
September 2018	42	33	-
October 2018	46	28	-
November 2018	51	42	-
December 2018	38	30	-

Notes:

1) The throughput data in ***Tables A3.2-1*** to ***A3.2-6*** supersede the same batch of the throughput data in previous Annual Environmental Monitoring & Audit Report. The presented data is the best available data and has been rounded off to the nearest whole tonne for presentation. Unavailable data will be reported in the next EM&A report.
2) The total product output may not be the same as the waste input due to processing of materials that were received before the reporting year and were stored within the lots.
3) Waste disposal refers to the disposal of general refuse (i.e. packaging) and/or chemical waste.
4) Since the recycling of waste glass and construction waste is combined to produce concrete block at K.Wah, the product output and waste disposal from both processes are combined in ***Table A3.2-6***.

Appendix 4

Graphical Plots of LFG Monitoring

Landfill Gas Monitoring Results

Monitoring Station ID	Monitoring Locations	Weather Conditions	Temperature (°C)	Start Time	End Time	Measurement Results					Action Level			Limit Level			Remarks
						Methane		Oxygen	Carbon Dioxide	Barometric Pressure	Methane	Oxygen	Carbon Dioxide	Methane	Oxygen	Carbon Dioxide	
						% v/v	% LEL	% v/v	% v/v	mBar (absolute)	% LEL	% v/v	% v/v	% LEL	% v/v	% v/v	
19 March 2019																	
EP1-1	Inside the landscaping area of Administration Building	Sunny	24	9:30	9:32	0.0	0	20.5	0.2	1020	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		24	9:45	9:47	0.0	0	20.4	< 0.1	1020							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		24	9:40	9:42	0.0	0	20.6	< 0.1	1020							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		24	9:50	9:52	0.0	0	19.9	0.6	1020							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		24	9:55	9:57	0.0	0	20.4	< 0.1	1020							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		24	10:05	10:07	0.0	0	20.6	< 0.1	1020							Re-measurement after the initial measurement to confirm the rectification of CO_2 exceedance to non-exceedance level after ventilation enhancement
17 June 2019																	
EP1-1	Inside the landscaping area of Administration Building	Fine	29	9:43	9:45	0.1	2	20.0	0.5	1010	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		29	10:05	10:07	0.0	0	19.6	< 0.1	1010							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		29	10:00	10:02	0.0	0	19.7	< 0.1	1010							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		29	9:48	9:50	0.1	2	20.3	< 0.1	1010							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		29	9:51	9:53	0.0	0	19.3	0.6	1010							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		29	9:55	9:57	0.0	0	19.9	< 0.1	1010							Re-measurement after the initial measurement to confirm the rectification of CO_2 exceedance to non-exceedance level after ventilation enhancement
18 September 2019																	
EP1-1	Inside the landscaping area of Administration Building	Fine	29	9:25	9:27	0.1	2	20.5	< 0.1	1015	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-2	PCCW below-ground chamber outside Lot T1		29	9:45	9:47	0.0	0	19.9	< 0.1	1015							Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3		29	9:40	9:42	0.0	0	19.9	< 0.1	1015							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1		29	9:30	9:32	0.1	2	20.0	0.3	1015							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3		29	9:35	9:37	0.0	0	20.0	< 0.1	1015							Nil
23 December 2019																	
EP1-1	Inside the landscaping area of Administration Building	Fine	20	9:43	9:45	0.2	4	19.7	< 0.1	1021	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil
EP1-3	HGC Broadband below-ground chamber outside Lot T3	Sunny	20	10:03	10:05	0.1	2	19.9	< 0.1	1021							Nil
EP2-1	HGC Broadband below-ground chamber outside Lot P1	Fine	20	9:50	9:52	0.2	4	19.9	< 0.1	1021							Nil
EP2-2	HGC Broadband below-ground chamber outside Lot P3	Fine	20	9:55	9:57	0.2	4	19.5	0.2	1021							Nil
30 December 2019																	
EP1-2	PCCW below-ground chamber outside Lot T1	Fine	21	10:02	10:04	0.2	4	19.9	< 0.1	1023	> 10	< 19	> 0.5	> 20	< 18	> 1.5	Nil

Notes:

(1) Underlined figure indicates an exceedance of Action Level

(2) Shaded area indicates an exceedance of Limit Level

EP1-1

Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
19 Mar 2019	0	10	20	20.5	19	18	0.2	0.5	1.5	1020
17 Jun 2019	2	10	20	20.0	19	18	0.5	0.5	1.5	1010
18 Sep 2019	2	10	20	20.5	19	18	< 0.1	0.5	1.5	1015
23 Dec 2019	4	10	20	19.7	19	18	< 0.1	0.5	1.5	1021

EP1-2

Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
19 Mar 2019	0	10	20	20.4	19	18	< 0.1	0.5	1.5	1020
17 Jun 2019	0	10	20	19.6	19	18	< 0.1	0.5	1.5	1010
18 Sep 2019	0	10	20	19.9	19	18	< 0.1	0.5	1.5	1015
30 Dec 2019	4	10	20	19.9	19	18	< 0.1	0.5	1.5	1023

EP1-3

Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
19 Mar 2019	0	10	20	20.6	19	18	< 0.1	0.5	1.5	1020
17 Jun 2019	0	10	20	19.7	19	18	< 0.1	0.5	1.5	1010
18 Sep 2019	0	10	20	19.9	19	18	< 0.1	0.5	1.5	1015
23 Dec 2019	2	10	20	19.9	19	18	< 0.1	0.5	1.5	1021

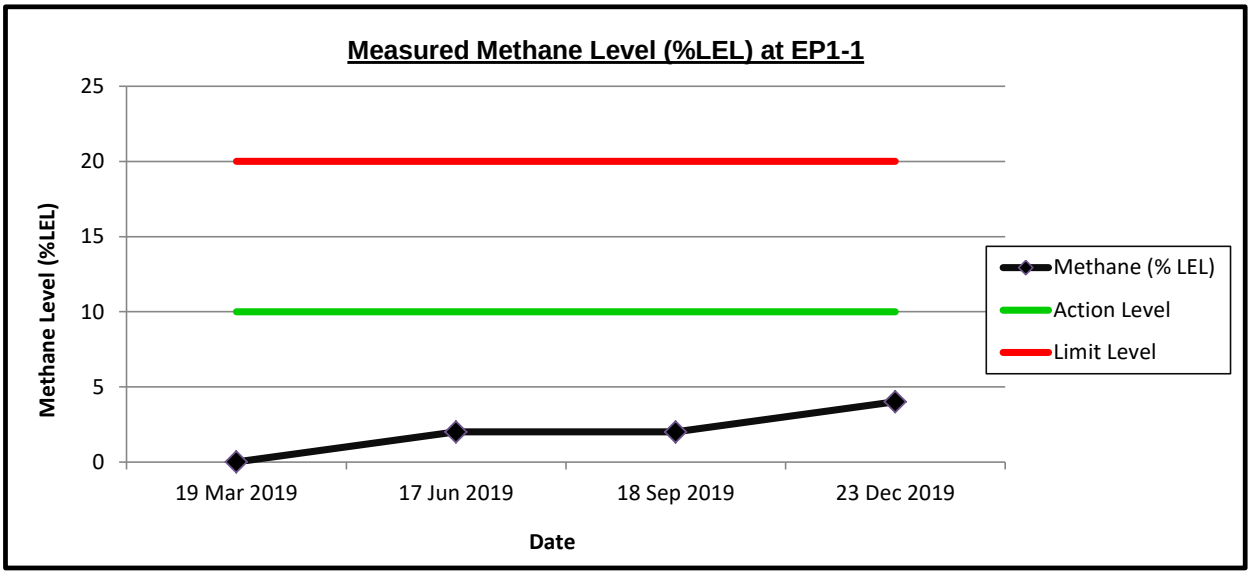
EP2-1

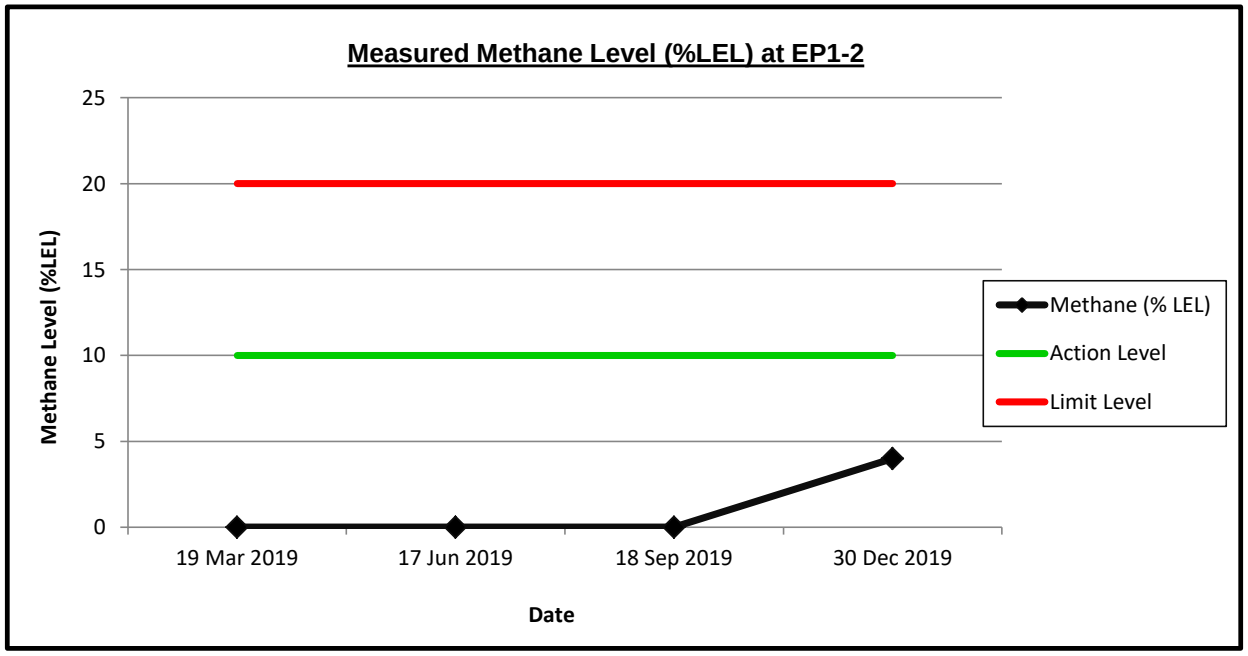
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
19 Mar 2019	0	10	20	19.9	19	18	0.6	0.5	1.5	1020
19 Mar 2019*	0	10	20	20.6	19	18	< 0.1	0.5	1.5	1020
17 Jun 2019	2	10	20	20.3	19	18	< 0.1	0.5	1.5	1010
18 Sep 2019	2	10	20	20.0	19	18	0.3	0.5	1.5	1015
23 Dec 2019	4	10	20	19.9	19	18	< 0.1	0.5	1.5	1021

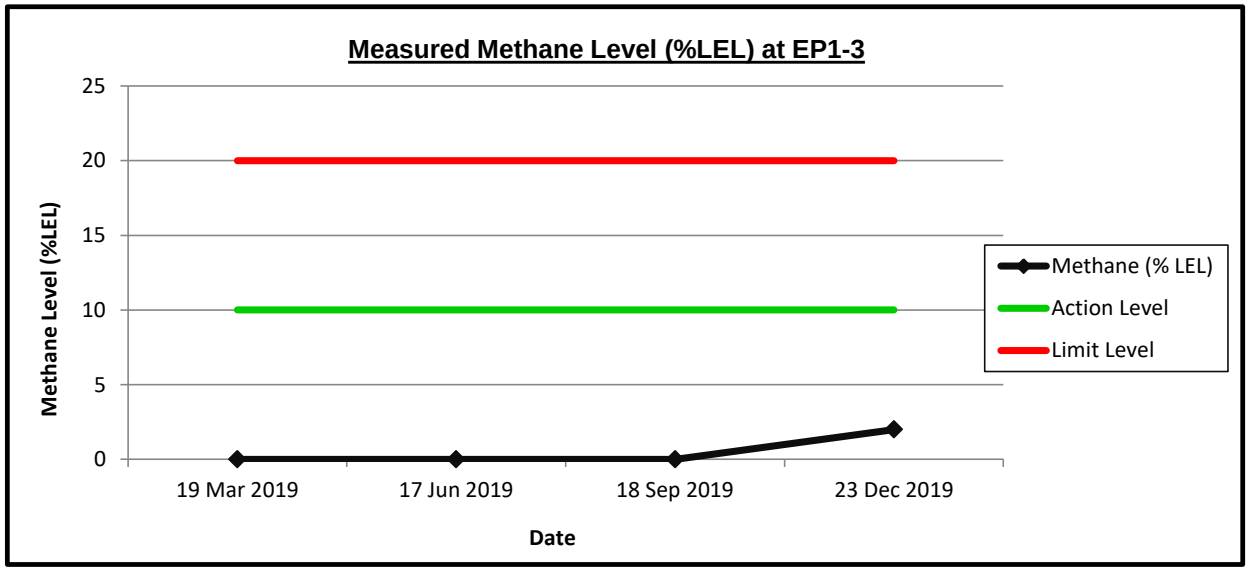
EP2-2

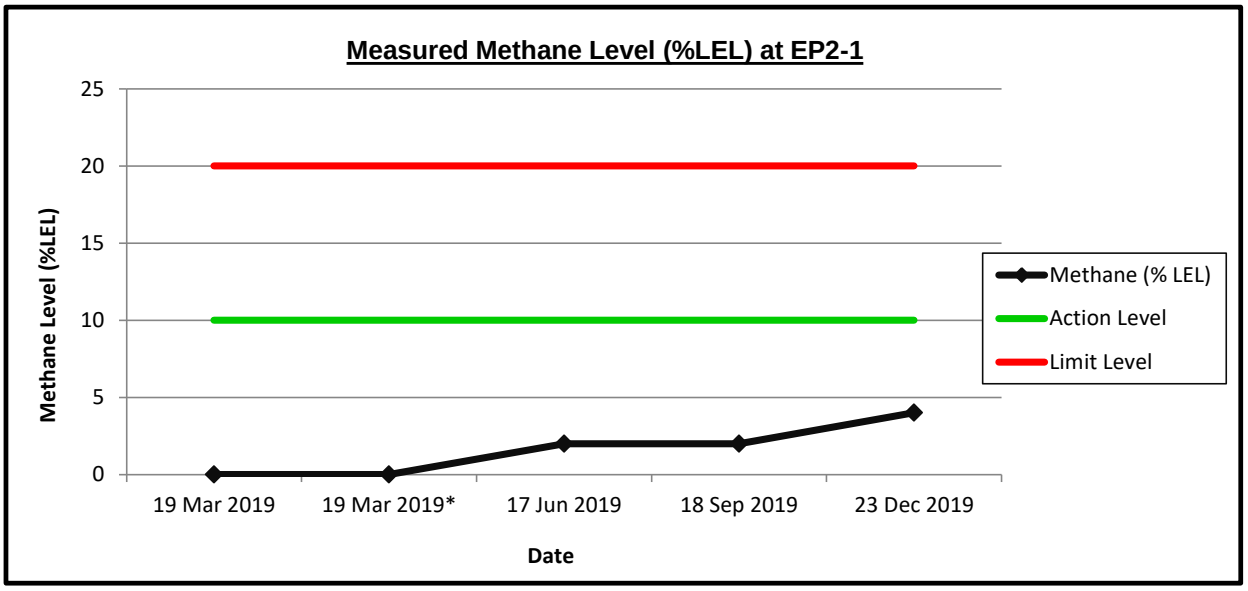
Date	Methane (% LEL)			Oxygen (% v/v)			Carbon Dioxide (% v/v)			Barometric Pressure (mBar)
	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement	Action Level	Limit Level	Measurement
19 Mar 2019	0	10	20	20.4	19	18	< 0.1	0.5	1.5	1020
17 Jun 2019	0	10	20	19.3	19	18	0.6	0.5	1.5	1010
17 Jun 2019*	0	10	20	19.9	19	18	< 0.1	0.5	1.5	1010
18 Sep 2019	0	10	20	20.0	19	18	< 0.1	0.5	1.5	1015
23 Dec 2019	4	10	20	19.5	19	18	0.2	0.5	1.5	1021

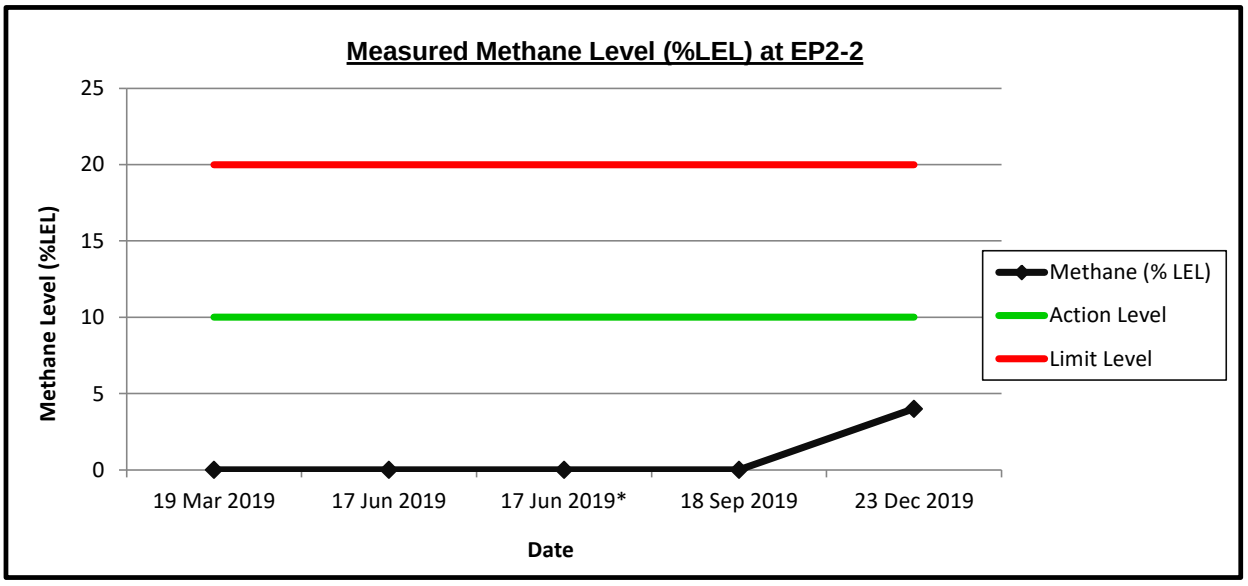
* Re-measurement was carried out after the initial measurement to confirm the rectification of exceedance after ventilation enhancement.


Measured Methane Level (%LEL) at EP1-1
Methane Level (%LEL)
25
20
15
10
5
0
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Methane (% LEL)
Action Level
Limit Level

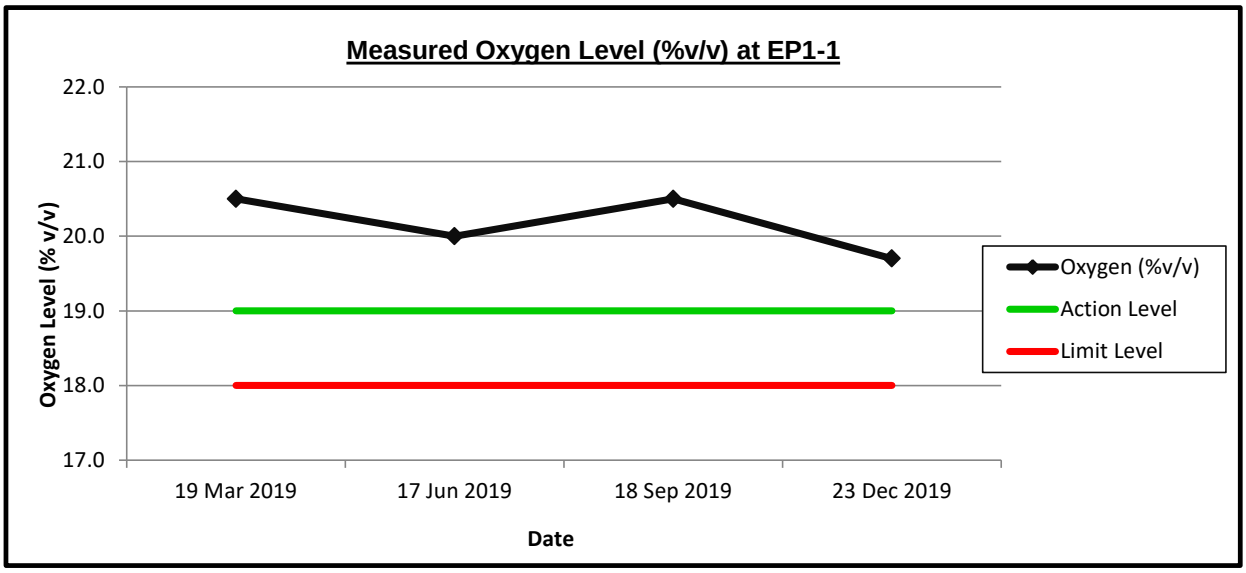

Measured Methane Level (%LEL) at EP1-2
Methane Level (%LEL)
25
20
15
10
5
0
19 Mar 2019
17 Jun 2019
18 Sep 2019
30 Dec 2019
Date
Methane (% LEL)
Action Level
Limit Level

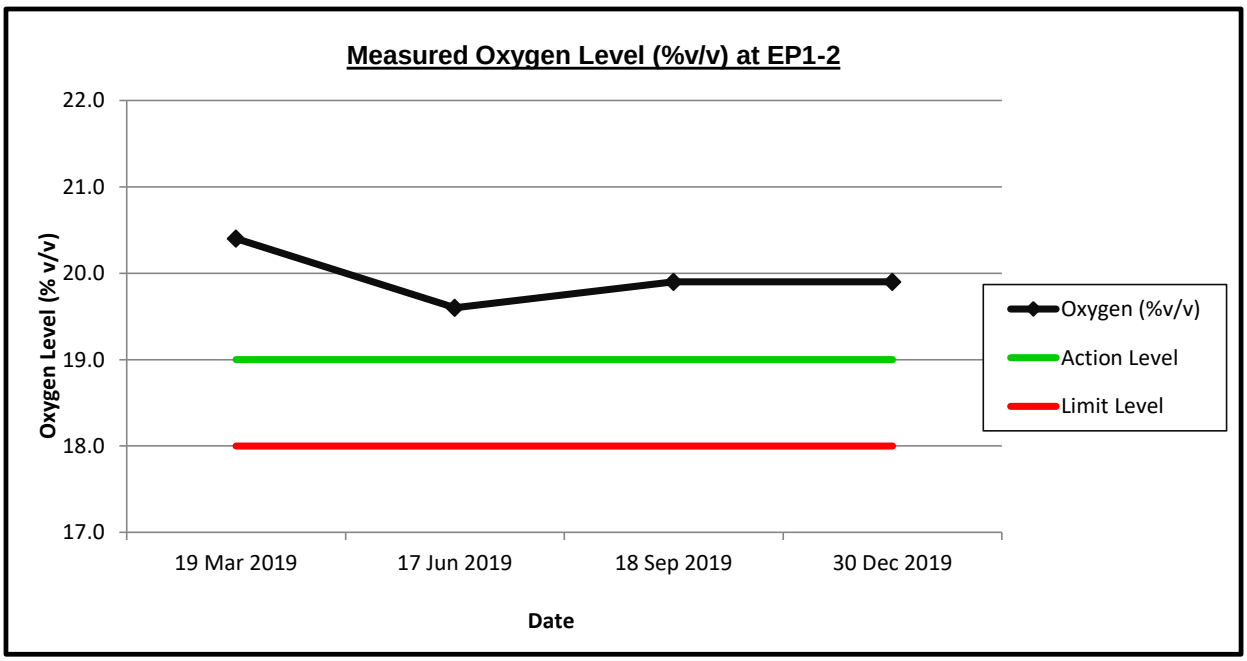

Measured Methane Level (%LEL) at EP1-3
Methane Level (%LEL)
25
20
15
10
5
0
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Methane (% LEL)
Action Level
Limit Level

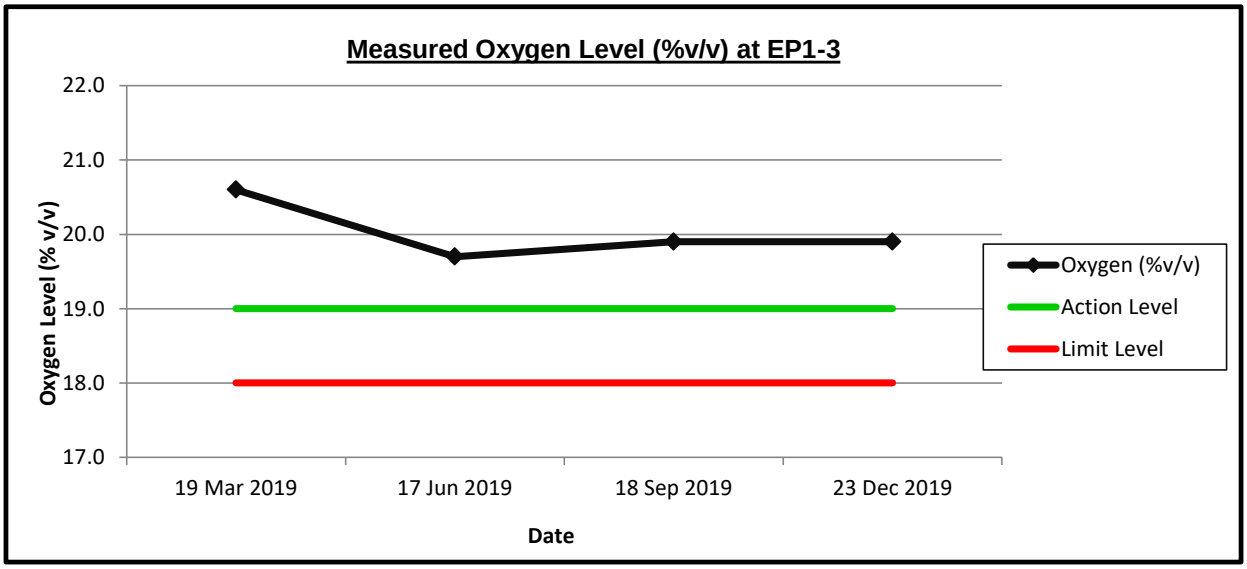


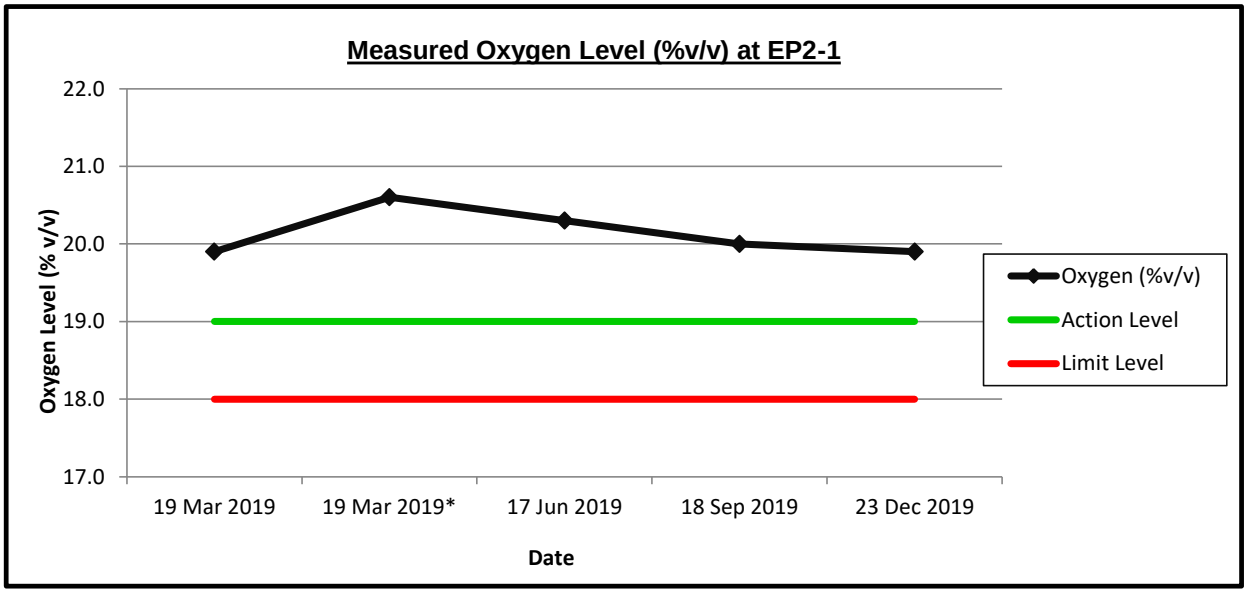


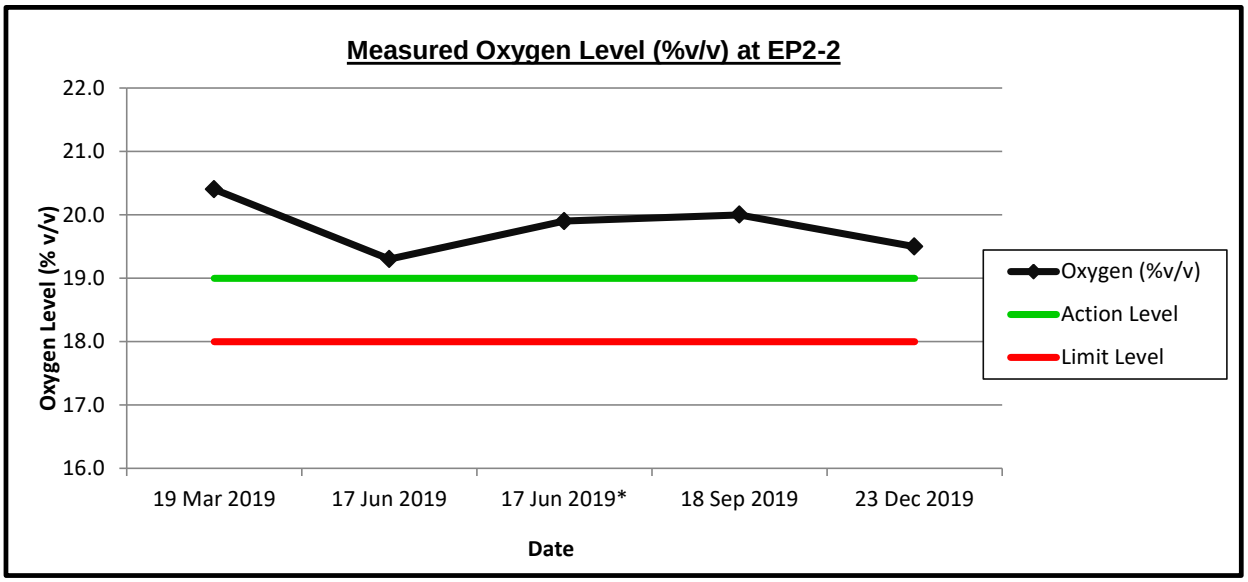
* Re-measurement was carried out after the initial measurement to confirm the rectification of exceedance after ventilation enhancement.


Measured Oxygen Level (%v/v) at EP1-1
22.0
21.0
20.0
19.0
18.0
17.0
Oxygen Level (% v/v)
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Oxygen (%v/v)
Action Level
Limit Level

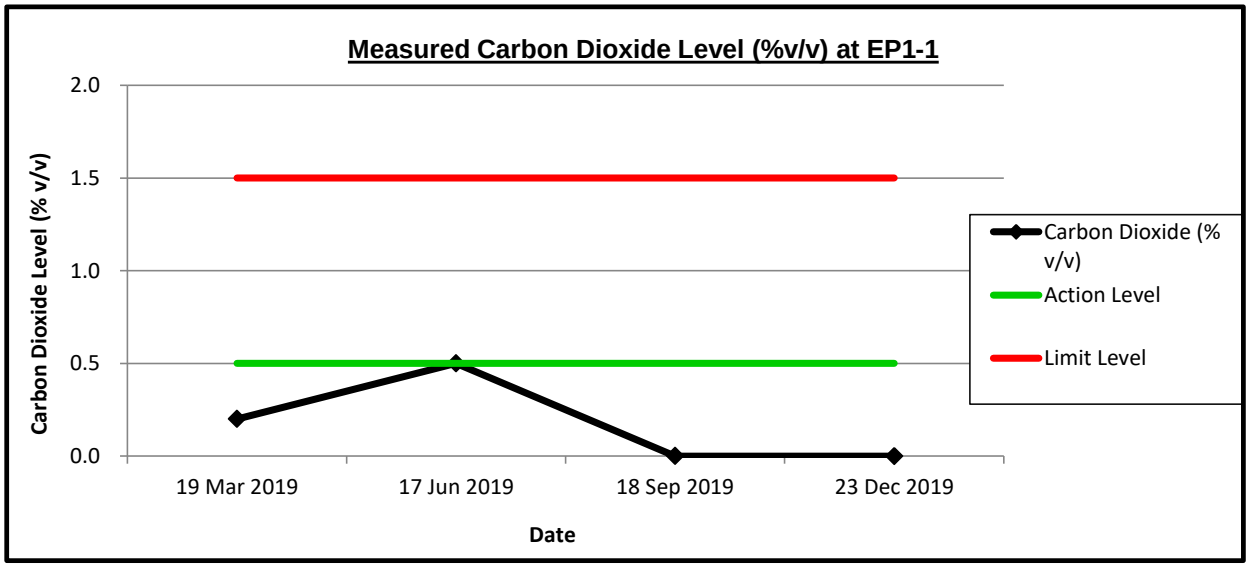

Measured Oxygen Level (%v/v) at EP1-2
22.0
21.0
20.0
19.0
18.0
17.0
Oxygen Level (% v/v)
19 Mar 2019
17 Jun 2019
18 Sep 2019
30 Dec 2019
Date
Oxygen (%v/v)
Action Level
Limit Level

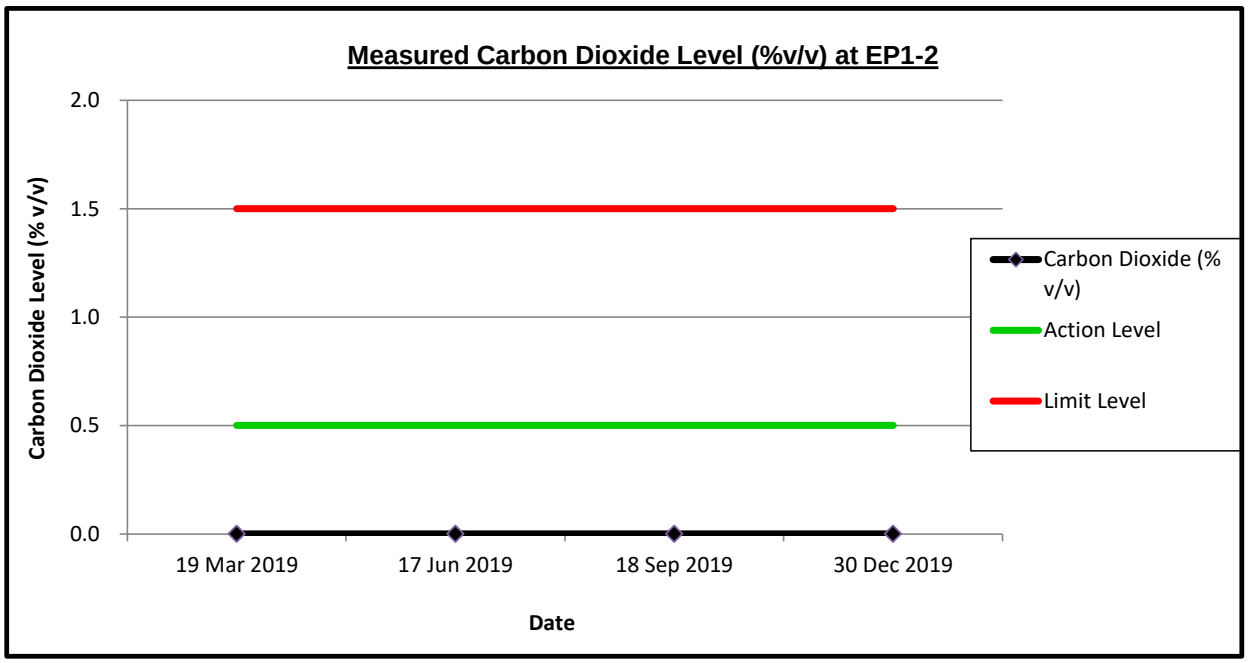

Measured Oxygen Level (%v/v) at EP1-3
22.0
21.0
20.0
19.0
18.0
17.0
Oxygen Level (% v/v)
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Oxygen (%v/v)
Action Level
Limit Level

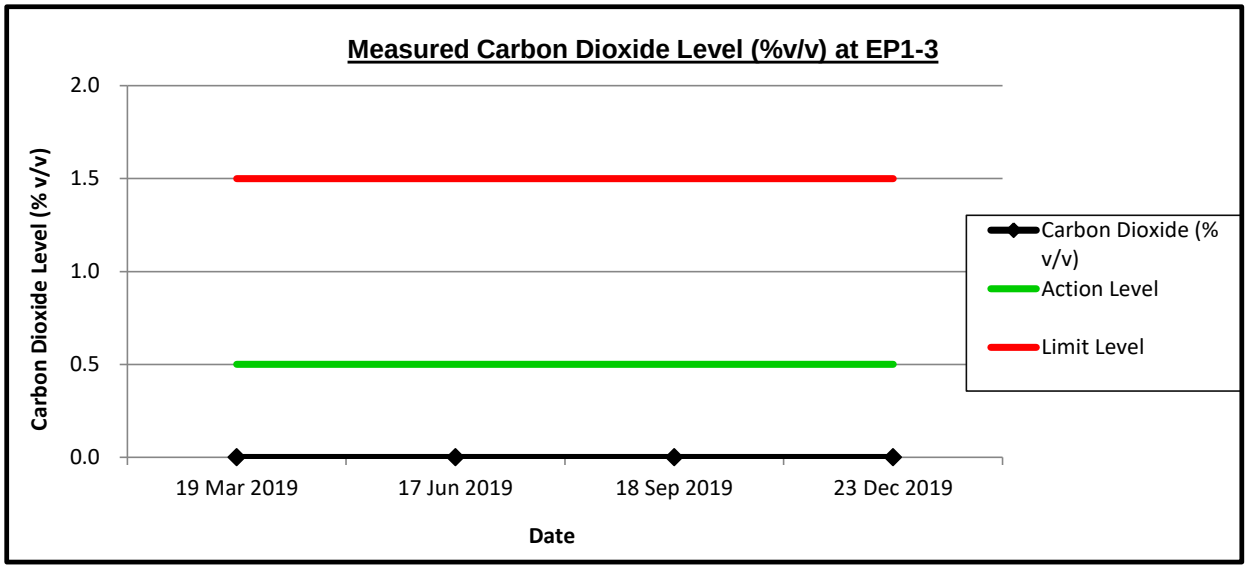


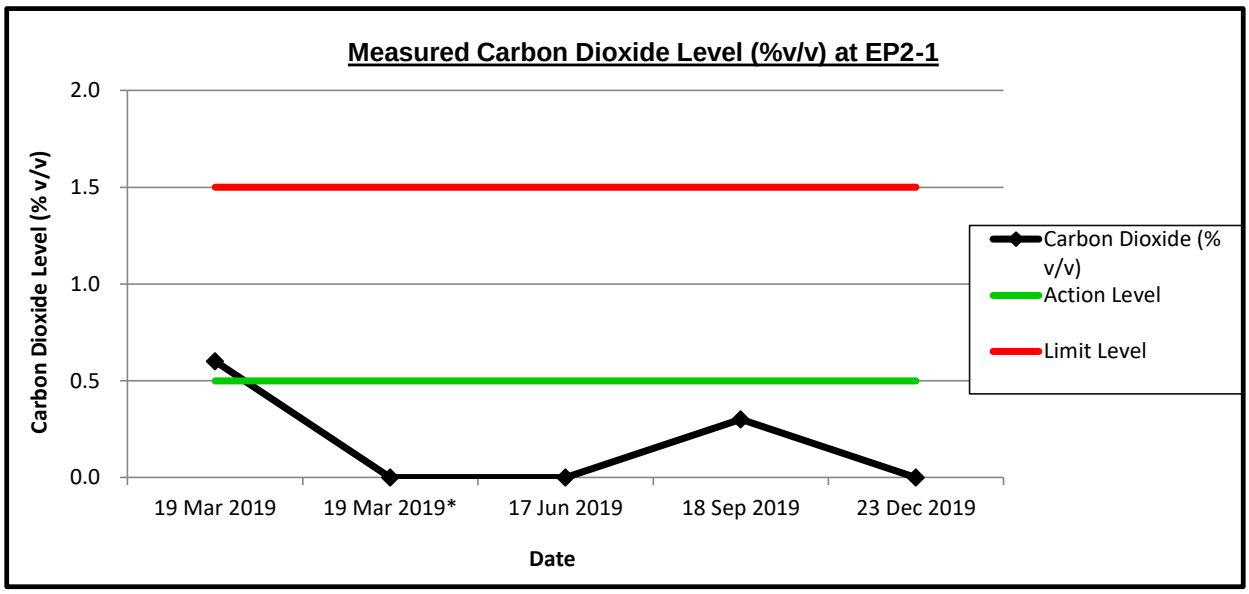


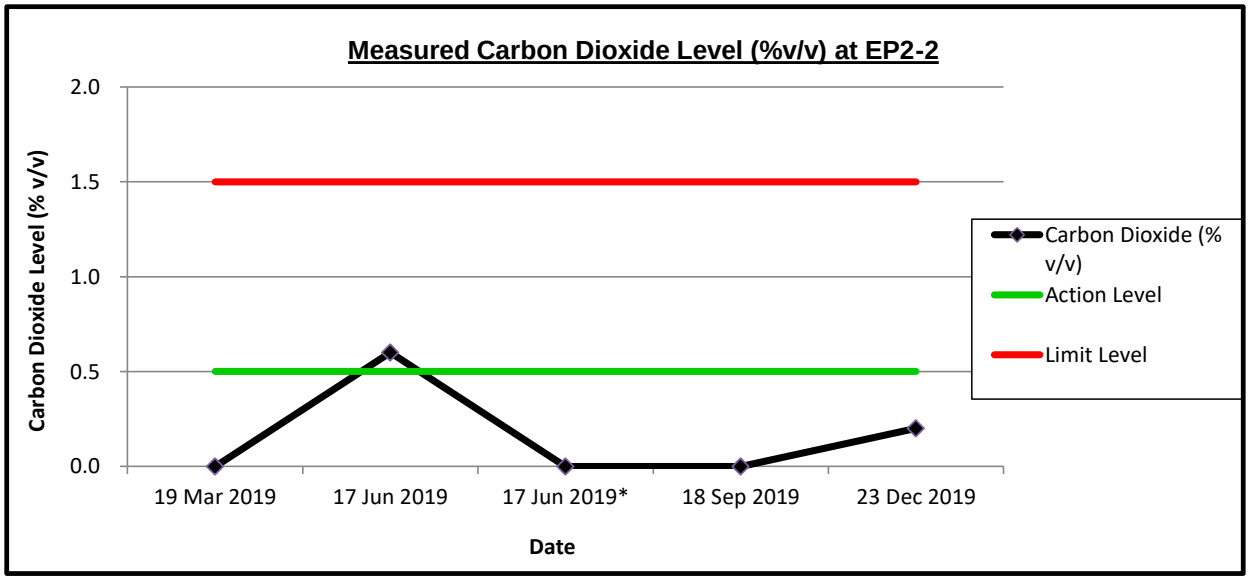
* Re-measurement was carried out after the initial measurement to confirm the rectification of exceedance after ventilation enhancement.


Measured Carbon Dioxide Level (%v/v) at EP1-1
Carbon Dioxide Level (% v/v)
2.0
1.5
1.0
0.5
0.0
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Carbon Dioxide (% v/v)
Action Level
Limit Level


Measured Carbon Dioxide Level (%v/v) at EP1-2
Carbon Dioxide Level (% v/v)
2.0
1.5
1.0
0.5
0.0
19 Mar 2019
17 Jun 2019
18 Sep 2019
30 Dec 2019
Date
Carbon Dioxide (% v/v)
Action Level
Limit Level

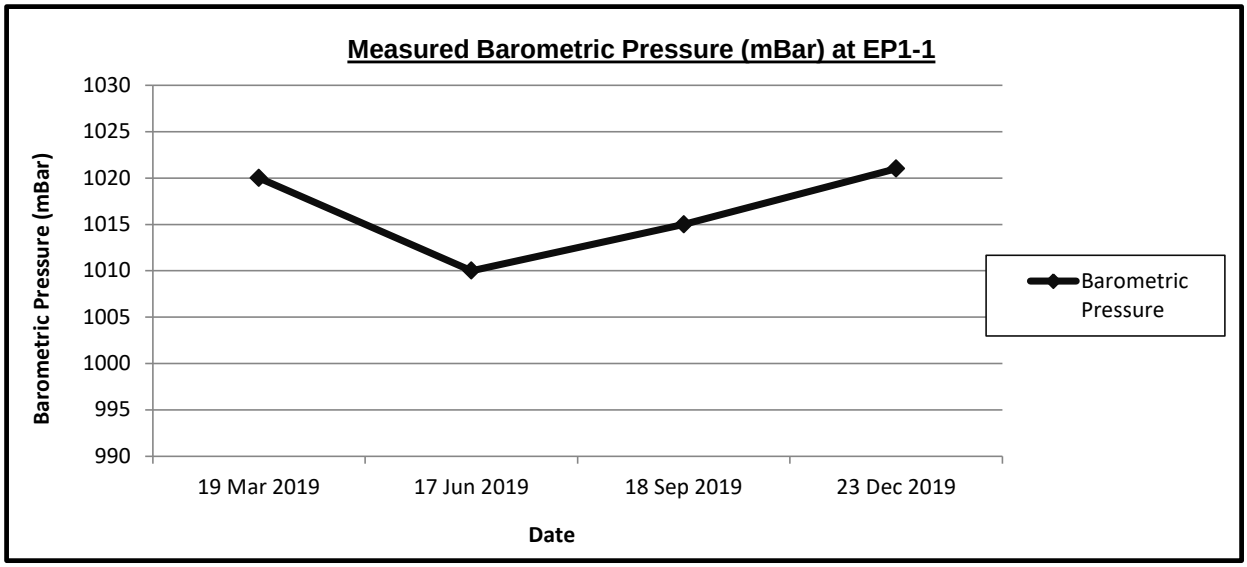

Measured Carbon Dioxide Level (%v/v) at EP1-3
Carbon Dioxide Level (% v/v)
2.0
1.5
1.0
0.5
0.0
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Carbon Dioxide (% v/v)
Action Level
Limit Level

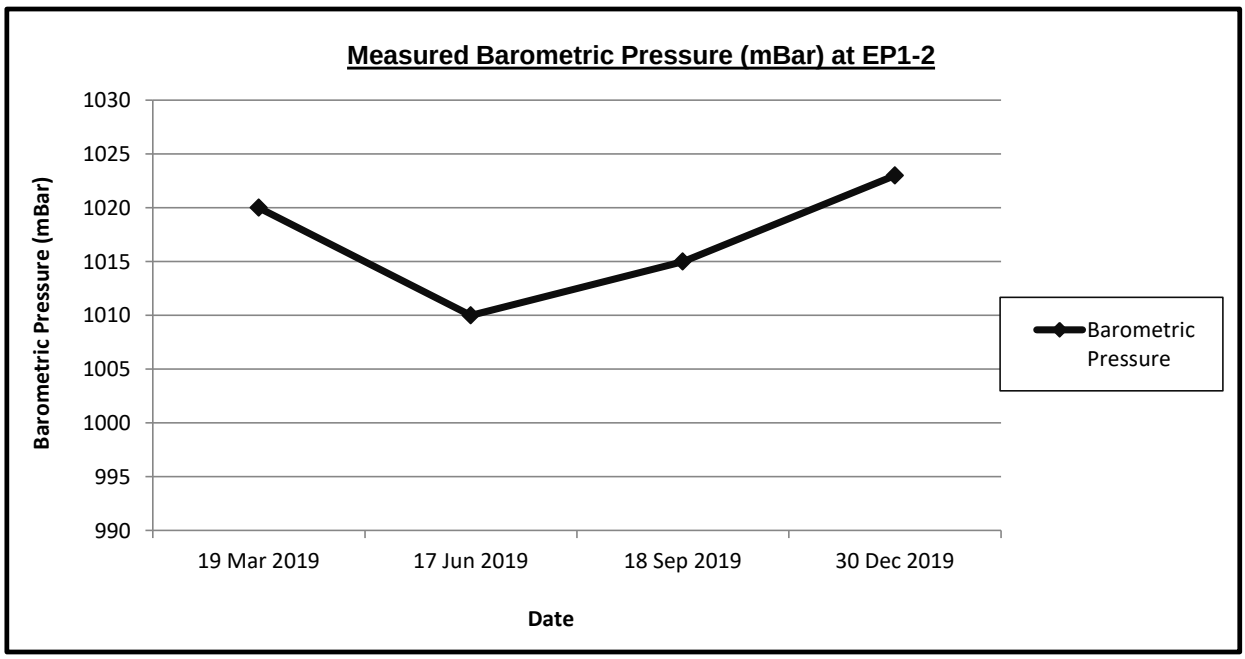


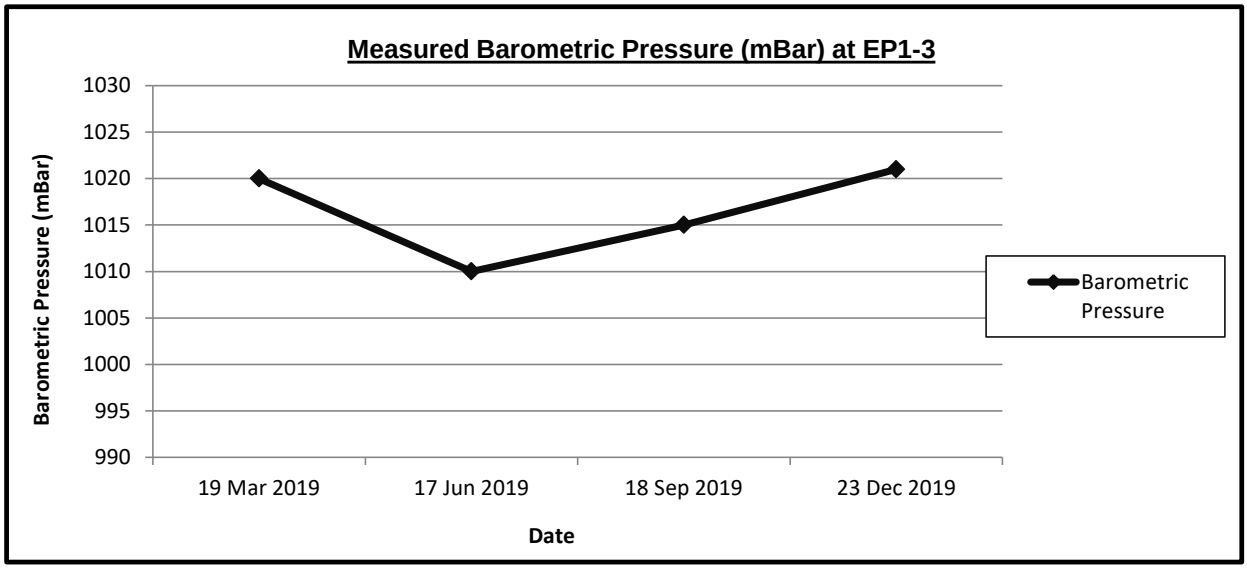


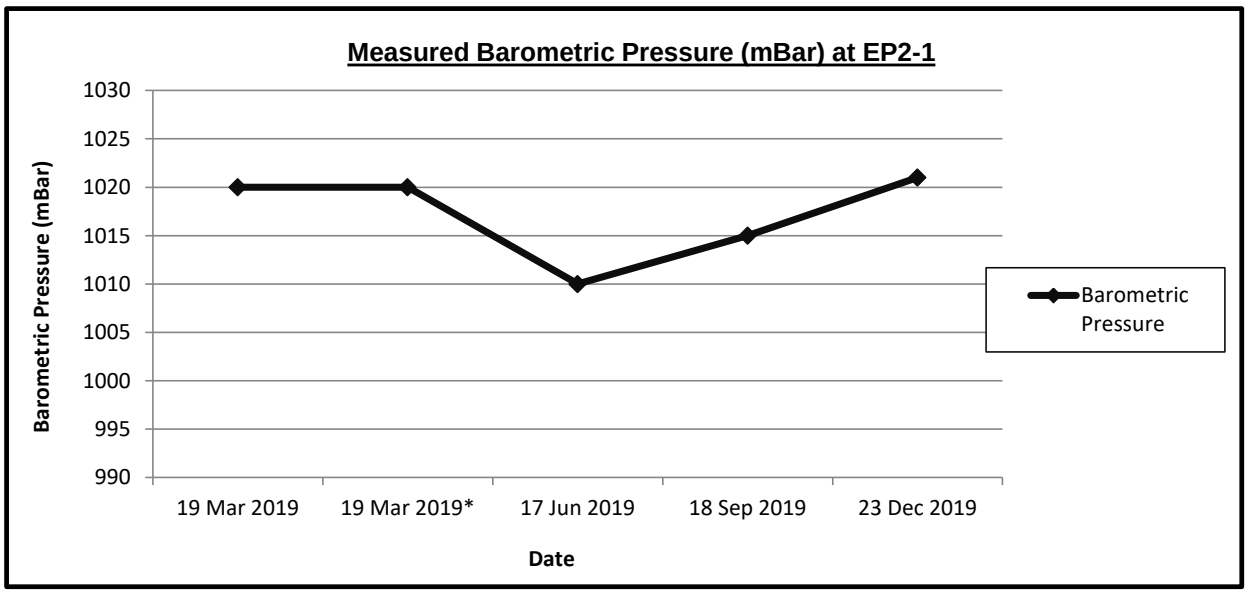
* Re-measurement was carried out after the initial measurement to confirm the rectification of exceedance after ventilation enhancement.

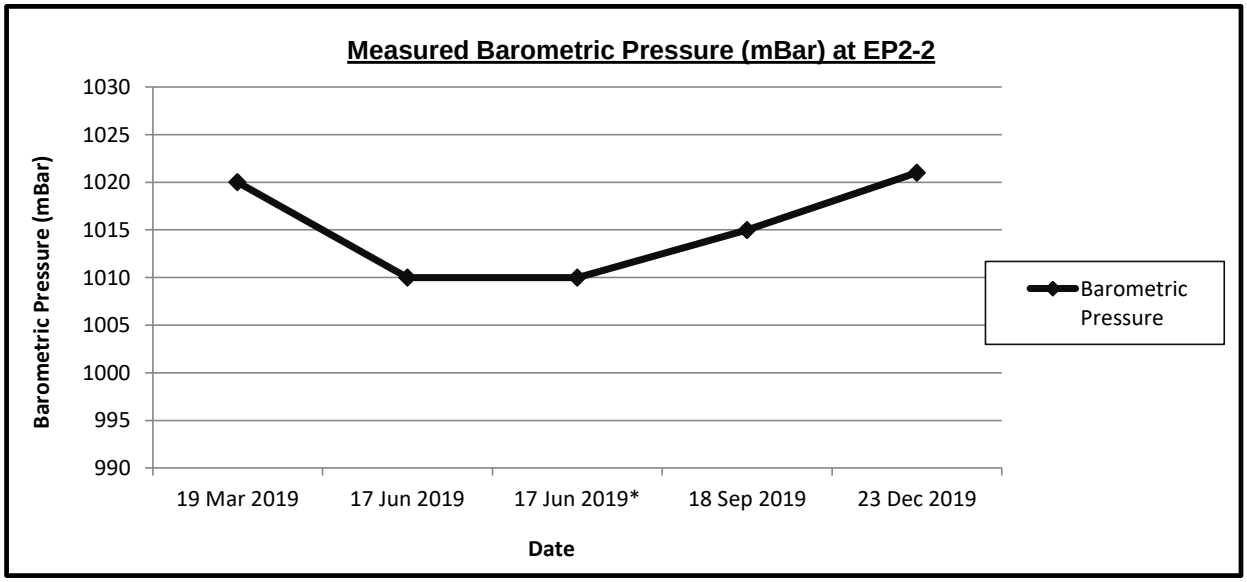
Remark: All <0.1%v/v for carbon dioxide is regarded as 0.0%v/v in graphical presentation


Measured Barometric Pressure (mBar) at EP1-1
Barometric Pressure (mBar)
1030
1025
1020
1015
1010
1005
1000
995
990
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Barometric Pressure


Measured Barometric Pressure (mBar) at EP1-2
Barometric Pressure (mBar)
1030
1025
1020
1015
1010
1005
1000
995
990
19 Mar 2019
17 Jun 2019
18 Sep 2019
30 Dec 2019
Date
Barometric Pressure


Measured Barometric Pressure (mBar) at EP1-3
Barometric Pressure (mBar)
1030
1025
1020
1015
1010
1005
1000
995
990
19 Mar 2019
17 Jun 2019
18 Sep 2019
23 Dec 2019
Date
Barometric Pressure





* Re-measurement was carried out after the initial measurement to confirm the rectification of exceedance after ventilation enhancement.