OSCAR Bioenergy Joint Venture

Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1): *Forty-sixth Monthly EM&A Report*

1 March 2019 – 31 March 2019

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Meinhardt Infrastructure and Environment Limited

Organic Resources Recovery Centre, Phase I

Monthly EM&A Report

(1 March 2019 – 31 March 2019)

(June 2020)

Verified by: Helen Cochrane

Position: Independent Environmental Checker

Date: 26 June 2020

OSCAR Bioenergy Joint Venture

Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1): *Forty-sixth Monthly EM&A Report*

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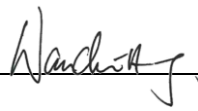
Reference 0279222

For and on behalf of ERM-Hong Kong, Limited

Approved by: Frank Wan

Signed: 

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Date: 18 May 2020

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EXECUTIVE SUMMARY

The construction works of ***No. EP/SP/61/10 Organic Resources Recovery Centre Phase 1 (the Project)*** commenced on 21 May 2015. This is the 46th monthly Environmental Monitoring and Audit (EM&A) report presenting the EM&A works carried out during the period from 1 to 31 March 2019 in accordance with the EM&A Manual. Substantial completion of the construction works was confirmed on 3 December 2018. In the meantime, the operation phase EM&A programme had commenced in March 2019.

Summary of Works undertaken during the Reporting Month

Works undertaken in the reporting month included:

- Operation of the Project, including organic waste reception, and operation of the pre-treatment facilities, anaerobic digesters, composting facilities, air pollution control systems, on-line emission monitoring system for the Centralised Air Pollution Control Unit (CAPCS), Co-generation Units (CHP)s and Ammonia Stripping Plant (ASP), and the wastewater treatment plant;

- Process fine-tune, including adjustment of the ASP with new treatment media, modification of Continuous Environmental Monitoring System (CEMS) and Supervisory Control and Data Acquisition System (SCADA) rectification and improvement works following equipment failures and the alteration of different operation modes and measures to adapt to the high variation of SSOW nature and sources; and

- Construction of the Visitor Centre.

Environmental Monitoring and Audit Progress

Air Quality Monitoring

Exceedances on odour from CAPCS, on dust, NOx and SO_2 from CHP and on CO, NOx, SO_2, VOCs and NH_3 from ASP were recorded on the on-line monitoring system. It should be noted that measurements recorded under abnormal operating conditions, e.g. start up and stopping of stacks, unstable operation, test runs and interference of sensor, are disregarded.

Exceedances in emission parameters of CAPCS, CHP and ASP were found to be a result of the breakdown of the automatic chemical dosing system of the air pollution control systems of the CAPCS, tripping of the circulation pump resulting in the incomplete desulphurisation of biogas which fed to the CHPs, and the combustion efficiency of the thermal combustion unit of the ASP was under further optimisation process.

The Contractor has implemented mitigation measures to control the exceedance (including the arrangement of the supplier of the dosing system for the CAPCS to repair the dosing system and manual dosing of chemical to the CAPCS until the problems of the automatic dosing system is expected to

be fixed in the next reporting period; adding an additional activated carbon filters to the biogas desulphurisation system to control the H_2S level in the biogas which fed to the CHP and the ASP; and tuning the thermal combustion unit of the ASP to optimise combustion efficiency and overall performance.

The Contractor is recommended to closely monitor the processes, including the chemical dosing system in the CAPCS, the desulphurisation process, and combustion of biogas in the ASP to avoid the reoccurrence of similar problems.

Odour Patrol

Odour patrol were conducted by representatives of the Contractor, the ER and Employer (EPD Project Team) on 1, 4, 8, 11, 13, 15, 18, 20, 22, 25, 27 and 29 March 2019. The Independent Odour Patrol Team, ALS Technichem (HK) Pty Ltd (ALS), has also joined the odour patrol on 1 March 2019. No Level 2 Odour Intensity was recorded during odour patrols.

Air samples were also collected at the CAPCS for olfactometry analysis at the laboratory on 10, 11, 19 and 27 December 2018 and 16 and 29 January 2019. The odour level of the samples collected on 10, 11, 19 and 27 December 2018 and 16 January 2019 have exceeded the odour limit. The cause of the exceedances recorded was due to the breakdown of the automatic chemical dosing system and the repairing time of the automatic chemical dosing system was longer than anticipated. The system was fixed and the odour concentration of the air sample taken on 29 January 2019 showed compliance with the odour limit.

An investigation of the cause of the exceedance has been carried out. The investigation report is shown in *Annex J*.

Water Quality

No non-compliance to the effluent discharge limit stipulated in the discharge licence issued by the EPD under the *Water Pollution Control Ordinance* was recorded during this reporting period.

Waste Management

Waste generated from the construction of the Project includes inert construction and demolition (C&D) materials (public fill) and non-inert C&D materials (construction wastes).

Inert C&D materials (public fill) include bricks, concrete, building debris, rubble and excavated spoil. In total, 190.40 tonnes of inert C&D material were generated from the construction of the Project.

Non-inert C&D materials (construction wastes) from the construction of this Project include metals, paper / cardboard packaging waste, plastics and other wastes such as general refuse. 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling

during the reporting period. 16.45 tonnes of general refuse was disposed of at the landfill.

0.00 L of chemical waste was collected by licenced waste collector from the construction of the Project.

Waste generated from the operation of the Project includes chemical waste, waste generated from pre-treatment process and general refuse.

1,200 L of chemical waste was collected by licenced waste collector from the operation of the Project.

477.08 tonnes of waste generated from pre-treatment process from the operation of the Project was disposed of at landfill. Among waste generated from pre-treatment process from the operation of the Project, 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling during the reporting period.

Around 1.50 tonnes of general refuse from the operation of the Project was disposed of at landfill. Among general refuse from the operation of the Project, 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling during the reporting period.

Findings of Environmental Site Audit

A summary of the monitoring activities undertaken in this reporting period is listed below:

- Joint Environmental Site Inspections 4 times
- Landscape & Visual Inspections 2 times

Four weekly joint environmental site inspections were carried out by the representatives of the Contractor and the ET. The IEC was also present at the joint inspection on 22 March 2019. The environmental control/ mitigation measures (related to air quality, water quality, waste (including land contamination prevention), hazard-to-life and landscape and visual) recommended in the approved EIA Report and the EM&A Manual were properly implemented by the Contractor during the reporting month.

Environmental Exceedance/Non-conformance/Compliant/Summons and Prosecution

Exceedances for the air emission limits for the CAPCS, CHP and ASP stacks were recorded during the reporting period.

No incident occurred during the reporting period.

No complaint/ summon/prosecution was received in this reporting period.

Future Key Issues

Activities to be undertaken in the next reporting month include:

- Operation of the Project.
- Contractor should resolve the technical issue related to the on-line monitoring of methane emission (hence the calculation of the NMVOC concentration) from the CHP stacks as soon as possible and undertake bi-weekly gas sampling and laboratory analysis of NMVOC when the on-line monitoring equipment for methane is not available.
- Implementation of further measures to control the air emission from the CAPCS, CHP and ASP.
- Continue construction of the Visitor Centre.

1 INTRODUCTION

ERM-Hong Kong, Limited (ERM) was appointed by OSCAR Bioenergy Joint Venture (the Contractor) as the Environmental Team (ET) to undertake the construction Environmental Monitoring and Audit (EM&A) programme for the ***Contract No. EP/SP/61/10 of Organic Waste Treatment Facilities Phase I,*** which the project name has been updated to ***Organic Resources Recovery Centre (Phase I) (the Project)*** since November 2017. ERM was also appointed by the Contractor to undertake the operation EM&A programme starting 1 March 2019.

1.1 PURPOSE OF THE REPORT

This is the 46th EM&A report which summarises the monitoring results and audit findings for the EM&A programme during the reporting period from **1** to **31 March 2019**.

1.2 STRUCTURE OF THE REPORT

The structure of the report is as follows:

Section 1: Introduction
It details the scope and structure of the report.

Section 2: Project Information
It summarises the background and scope of the Project, site description, project organisation and status of the Environmental Permits (EP)/licences.

Section 3: Environmental Monitoring and Audit Requirements
It summarises the environmental monitoring requirements including monitoring parameters, programmes, methodologies, frequency, locations, Action and Limit Levels, Event/Action Plans, as well as environmental audit requirements as recommended in the EM&A Manual and approved EIA report.

Section 4: Monitoring Results
It summarises monitoring results of the reporting period.

Section 5: Site Audit
It summarises the audit findings of the environmental as well as landscape and visual site audits undertaken within the reporting period.

Section 6: Environmental Non-conformance
It summarises any exceedance of environmental performance standard, environmental complaints and summons received within the reporting period.

Section 7: Further Key Issues

It summarises the impact forecast for the next reporting month.

Section 8: Conclusions

2 PROJECT INFORMATION

2.1 BACKGROUND

The Organic Resources Recovery Centre (ORRC) Phase I development (hereinafter referred to as "the Project") is to design, construct and operate a biological treatment facility with a capacity of about 200 tonnes per day and convert source-separated organic waste from commercial and industrial sectors (mostly food waste) into compost and biogas through proven biological treatment technologies. The location of the Project site is shown in *Annex A*.

The environmental acceptability of the construction and operation of the Project had been confirmed by findings of the associated Environmental Impact Assessment (EIA) Study completed in 2009. The Director of Environmental Protection (DEP) approved this EIA Report under the *Environmental Impact Assessment Ordinance* (EIAO) (Cap. 499) in February 2010 (Register No.: AEIAR-149/2010) (hereafter referred to as the approved EIA Report). Subsequent Report on Re-assessment on Environmental Implications and Report on Re-assessment on Hazard to Life Implications were completed in 2013, respectively.

An Environmental Permit (EP) (No. EP-395/2010) was issued by the DEP to the EPD (Project Team), the Permit Holder, on 21 June 2010 and varied on 18 March 2013 (No. EP-395/2010/A) and 21 May 2013 (No. EP-395/2010/B), respectively. The Design Build and Operate Contract for the ORRC Phase 1 (Contract No. EP/SP/61/10 Organic Resources Recovery Centre (Phase 1) (the Contract)) was awarded to SITA Waste Services Limited, ATAL Engineering Limited and Ros-Roca, Sociedad Anonima jointly trading as the OSCAR Bioenergy Joint Venture (OSCAR or the Contractor). A Further EP (No. FEP-01/395/2010/B) was issued by the DEP to the OSCAR on 16 February 2015. Variation to both EPs (Nos. EP-395/2010/B and FEP-01/395/2010/B) were made in December 2015. The latest EPs, Nos. EP-395/2010/C and FEP-01/395/2010/C, were issued by the DEP on 21 December 2015.

Under the requirements of Condition 5 of the EP (No. FEP-01/395/2010/C), an Environmental Monitoring and Audit (EM&A) programme as set out in the approved EM&A Manual (hereinafter referred to as EM&A Manual) is required to be implemented during the construction and operation of the Project. ERM-Hong Kong, Ltd (ERM) has been appointed by OSCAR as the Environmental Team (ET) for the construction phase EM&A programme and the Monitoring Team (MT) for the operation phase EM&A programme for the implementation of the EM&A programme in accordance with the requirements of the EP and the approved EM&A Manual.

The construction works commenced on 21 May 2015. The construction phase

EM&A programme was completed in end of March 2019 (1). The operation phase of the EM&A programme commenced on 1 March 2019.

2.2 GENERAL SITE DESCRIPTION

The Project Site is located at Siu Ho Wan in North Lantau with an area of about 2 hectares. The layout of the Project Site is illustrated in *Annex A*. The facility received and treated an average of 100 tonnes of source separated organic waste per day during the reporting month.

2.3 MAJOR ACTIVITIES UNDERTAKEN

A summary of the major activities undertaken in the reporting period is shown in *Table 2.1*. The site layout plan is shown in *Annex B*. The construction programme is shown in *Annex C*.

Table 2.1 Summary of Activities Undertaken in the Reporting Period

Activities Undertaken in the Reporting Period
• Systems being operated – waste reception, pre-treatment, CAPCS extraction, the digesters, the centrifuge, , the composting tunnels the desulphurisation, the emergency flare, the CHPs, the ASP and the biological waste water treatment plant (about 100-130 t/d SSOW input);
• Process fine-tune – adjustment of the ASP operational parameters with new treatment media, CEMS/SCADA modification and improvement work following equipment failures and the alteration of different operation modes and measures to adapt to the high variation of SSOW nature and sources; and
• Construction of the Visitor Centre.

2.4 PROJECT ORGANISATION AND MANAGEMENT STRUCTURE

The project organisation chart and contact details are shown in *Annex D*.

2.5 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the valid permits, licences, and/or notifications on environmental protection for this Project is presented in *Table 2.2*.

Table 2.2 Summary of Environmental Licensing, Notification and Permit Status

Permit/ Licences/ Notification	**Reference**	**Validity Period**	**Remarks**
Environmental Permit	FEP-01/395/2010/C	Throughout the Contract	Permit granted on 21 December 2015
Notification of Construction Works under the Air	Ref No. 386715	Throughout the Contract	-

(1) As some of the minor items are yet to be closed out in March 2019, the construction phase EM&A programme and Operation Phase EM&A programme were undertaking in parallel in March 2019.

Permit/ Licences/ Notification	Reference	Validity Period	Remarks
Pollution Control (Construction Dust) Regulation			
Effluent Discharge License	WT00024352-2016	3 June 2016 – 30 June 2021	Approved on 3 June 2016
Construction Noise Permit – P1&P2	GW-RW0538-18 (Superseded CNP GW-RW0229-18)	21 January 2019-20 July 2019	Approved on 31 December 2018
Construction Noise Permit – P5 (slope)	GW-RW0347-18 (superseded the GW-RW0107-18)	30 September 2018 – 29 March 2019	Approved on 15 August 2018
Chemical Waste Producer Registration	WPN 5213-961-O2231-01	Throughout the Contract	Approved on 29 April 2015
Chemical Waste Producer Registration	WPN 5213-961-O2231-02	Throughout the implementation of the Project	Approved on 10 November 2017
Waste Disposal Billing Account	Account number: 702310	Throughout the Contract	-

3 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

3.1 ENVIRONMENTAL MONITORING

The air quality (including odour) monitoring to be carried out during the commissioning and operation phase of the Project are described below. No monitoring for noise, waste, land contamination, hazard-to-life and landscape and visual are required during construction and operation phases of the Project. Although water quality monitoring is not required for the construction and operation phases under the EM&A programme, there are water quality monitoring requirement under the Water Discharge Licence of the plant under the *Water Pollution Control Ordinance* (WPCO). As part of this EM&A programme, the monitoring results will be reviewed to check the compliance with the WPCO requirements.

3.1.1 Air Quality

According to the EM&A Manual and EP requirements, stack monitoring are required during the commissioning and operation phase of the Project.

On-line monitoring (using continuous environmental monitoring system (CEMS) shall be carried out for the centralised air pollution unit (CAPCS), cogeneration units (CHP) and the ammonia stripping plant (ASP) during the commissioning and operation phase. The calibration certificate for the on-line monitoring equipment is provided in *Annex E.*

The monitoring data is transmitted instantaneously to EPD (Regional Office) by telemetry system.

When the on-line monitoring for certain parameter cannot be undertaken, monitoring will be carried out using the following methodology approved by the EPD.

Table 3.1 Sampling and Laboratory Analysis Methodology

Parameters	Method	Stacks to be Monitored
Gaseous and vaporous organic substances (including methane)	USEPA Method 18	• CAPCS • CHP • ASP
Particulate	USEPA Method 5	• CAPCS • CHP • ASP
Carbon monoxide (CO)	USEPA Method 10	• CHP • ASP
Nitrogen oxides (NO_x)	USEPA Method 7E	• CHP • ASP
Sulphur dioxide (SO_2);	USEPA Method 6	• CHP • ASP

Parameters	Method	Stacks to be Monitored
Hydrogen chloride (HCl)	USEPA Method 26A	• CHP • ASP
Hydrogen fluoride (HF)	USEPA Method 26A	• CHP • ASP
Oxygen (O_2);	USEPA Method 3A	• CAPCS • CHP • ASP
Velocity and Volumetric Flow	USEPA Method 2	• CAPCS • CHP • ASP
Ammonia (NH_3)	USEPA CTM 027	• ASP
Odour (including NH_3 and H_2S)	EN 13725	• CAPCS
Water vapour content (continuous measurement of the water vapour content should not be required if the sample exhaust gas is dried before the emissions are analysed)	USEPA Method 4	• CAPCS • CHP • ASP
Temperature	USEPA Method 4	• CAPCS • CHP • ASP

With reference to the EM&A Manual, the air emission of the stacks shall meet the following emission limits as presented in *Tables 3.2* to *3.5*.

Table 3.2 Emission Limit for CAPCS Stack

Parameter	Emission Level (mg/Nm³) [(a)]
VOCs (including methane)	680
Dust (or Total Suspended Particulates (TSP))	6
Odour (including NH_3 & H_2S)	220 [(b)]

Notes:
(a) Hourly average concentration
(b) The odour unit is OU/Nm^3

Table 3.3 Emission Limit for CHP Stack

Parameter	Maximum Emission Level (mg/Nm³) [(a)] [(b)]
Dust (or Total Suspended Particulates)	15
Carbon Monoxide	650
NO_x	300
SO_2	50
NMVOCs	150
VOCs (including methane) [(c)]	1,500
HCl	10
HF	1

Notes:
(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.
(b) Hourly average concentration
(c) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion

Parameter	Maximum Emission Level (mg/Nm^3) [(a) (b)]
process.	

Table 3.4 Emission Limit for ASP Stack

Parameter	Maximum Emission Level (mg/Nm^3) [(a) (b)]
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NOx	200
SO_2	50
VOCs (including methane) [(c)]	20
NH_3	35
HCl	10
HF	1

Notes:
(a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
(b) Hourly average concentration
(c) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

Table 3.5 Emission Limit for Standby Flaring Gas Unit [(1)]

Parameter	Maximum Emission level (mg/Nm^3) [(a) (b)]
Dust (or Total Suspended Particulates)	5
Carbon Monoxide	100
NO_x	200
SO_2	50
VOCs (including methane) [(c)]	20
HCl	10
HF	1

Notes:
(a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.
(b) Hourly average concentration
(c) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

3.1.2 Odour

To determine the effectiveness of the proposed odour mitigation measures and to ensure that the operation of the ORRC1 will not cause adverse odour impacts, odour monitoring of the CAPCS stack (see *Section 3.1.1*) and odour patrol will be carried out.

Odour sampling works shall be conducted weekly in the first month of the commissioning stage of the Project. The air samples at the CAPCS stack under full capacity of operation should be collected for olfactometry analysis.

(1) A standby facility. Only operate when the CHPs are not in operation or when the biogas generated exceeded the utilisation rate of the CHPs.

Odour patrol shall be conducted by independent trained personnel/ competent persons in summer months (i.e. from July to September) for the first two operational years of ORRC1 at monthly intervals along an odour patrol route at the Project Site boundary as shown in *Annex A*.

The perceived odour intensity is divided into 5 levels. *Table 3.6* describes the odour intensity for different levels.

Table 3.4 Odour Intensity Level

Level	Odour Intensity
0	Not detected. No odour perceived or an odour so weak that it cannot be easily characterised or described
1	Slight identifiable odour, and slight chance to have odour nuisance
2	Moderate identifiable odour, and moderate chance to have odour nuisance
3	Strong identifiable, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

Table 3.7 shows the action level and limit level to be used for odour patrol. Should any exceedance of the action and limit levels occurs, actions in accordance with the event and action plan in *Table 3.8* should be carried out.

Table 3.5 Action and Limit Levels for Odour Nuisance

Parameter	Action Level	Limit Level
Odour Nuisance (from odour patrol)	When one documented compliant is received [(a)], or Odour Intensity of 2 is measured from odour patrol.	Two or more documented complaints are received [(a)] within a week; or Odour intensity of 3 or above is measured from odour patrol.

Note:

(a) Once the complaint is received by the Project Proponent (EPD), the Project Proponent would investigate and verify the complaint whether it is related to the potential odour emission from the ORRC1 and its on-site wastewater treatment unit.

Table 3.6 Event and Action Plan for Odour Monitoring

Event	Action	
	Person-in-charge of Odour Monitoring	**Project Proponent [(a)]**
Action Level		

Exceedance of action level (Odour Patrol)	1. Identify source/reason of exceedance; 2. Repeat odour patrol to confirm finding.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 2. Rectify any unacceptable practice; 3. Implement more mitigation measures if necessary; 4. Inform Drainage Services Department (DSD) or the operator of the Siu Ho Wan Sewage Treatment Works (SHWSTW) if exceedance is considered to be caused by the operation of the SHWSTW. 5. Inform North Lantau Refuse Transfer Station (NLTS) operator if exceedance is considered to be caused by the operation of NLTS.
Exceedance of action level (Odour Complaints)	1. Identify source/reason of exceedance; 2. Carry out odour patrol to determinate odour intensity.	1. Carry out investigation and verify the complaint whether it is related to potential odour emission from the nearby SHWSTW; 2. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 3. Rectify any unacceptable practice; 4. Implement more mitigation measures if necessary; 5. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW. 6. Inform NLTS operator if exceedance is considered to be caused by the operation of NLTS.
Limit Level		
Exceedance of limit level	1. Identify source/reason of exceedance; 2. Inform EPD; 3. Repeat odour patrol to confirm findings; 4. Increase odour patrol frequency to bi-weekly; 5. Assess effectiveness of remedial action and keep EPD informed of the results; 6. If exceedance stops, cease additional odour patrol.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 week; 2. Rectify any unacceptable practice; 3. Formulate remedial actions; 4. Ensure remedial actions properly implemented; 5. If exceedance continues, consider what more/enhanced mitigation measures should be implemented; 6. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW.

Note:

(a) Project Proponent shall identify an implementation agent.

3.2 SITE AUDIT

Environmental mitigation measures (related to air quality, water quality, waste, land contamination, hazard-to-life, and landscape and visual) to be implemented during the construction and operation phase of the Project are recommended in the approved EIA Report and EM&A Manual and are summarised in *Annex F*. Weekly site audits for construction phase and monthly site audits for operation phase will be carried out to check the implementation of these measures.

3.2.1 Water Quality

Compliance audits are to be undertaken to ensure that a valid discharge licence has been issued by EPD prior to the discharge of effluent from the operation of the Project site. The audit shall be conducted to ensure that the effluent quality is in compliance with the discharge licence requirements. The effluent quality shall meet the discharge limits as described in *Table 3.9*.

Table 3.9 Discharge Limits for Effluent

Parameters	Discharge Limit (mg/L)
Flow Rate (m^3/day)	685
pH (pH units)	6-10 (a)
Suspended Solids	800
Biochemical Oxygen Demand (5 days, 20°)	800
Chemical Oxygen Demand	2,000
Oil & Grease	40
Total Nitrogen	200
Total Phosphorus	50
Surfactants (total)	25

Note:
(a) Range.

3.2.2 Landscape and Visual

In accordance with EM&A Manual, the landscape and visual mitigation measures shall be implemented. Bi-weekly landscape and visual audit during the construction phase is required to ensure that the design, implementation and maintenance of landscape and visual mitigation measures recommended in the approved EIA Report are fully achieved. The implementation status of the mitigation measures for construction phase is summarised in *Annex F*.

For operation phase, site inspection shall be conducted once a month for the first year of operation of the Project. All measures as stated in the implementation schedule of the EM&A Manual (see *Annex F*), including compensatory planting, undertaken by both the Contractor and the specialist Landscape Sub-Contractor during the first year of the operation phase shall be audited by a Registered Landscape Architect (RLA) to ensure compliance with

the intended aims of the measures and the effectiveness of the mitigation measures.

4 MONITORING RESULTS

4.1 AIR QUALITY

4.1.1 Commissioning Phase Monitoring

On 10, 11, 19 and 27 December 2018 and 16 and 29 January 2019, air samples were collected from the outlet of the CAPCS by ALS for measurement of the Odour Intensity by olfactometry analysis at the laboratory. The odour level of the odour samples collected from the CAPCS on 10, 11, 19 and 27 December 2018 and 16 January 2019 have exceeded the odour limit as shown in *Table 3.2*. No exceedance was found for the samples collected on 29 January 2019. The laboratory results are shown in *Annex I*. The cause of the exceedances recorded was due to the breakdown of the automatic chemical dosing system and the repairing of the automatic chemical dosing system was longer than anticipated. The system was fixed and the odour concentration of the air sample taken on 29 January 2019 showed compliance with the odour limit.

Investigation of the exceedances has been conducted. The investigation report is shown in *Annex J*.

Monitoring results of air quality parameters from stack emissions of the centralised air pollution control system, the ammonia stripping plant and the cogeneration units will be provided once available to show compliance with the monitoring requirements stated in the EM&A Manual (Rev. E) to support the termination of the construction phase EM&A programme.

4.1.2 Operation Phase Monitoring

The concentrations of concerned air pollutants emitted from the stacks of the CAPCS, CHP, and ASP during the reporting period are monitored on-line by the continuous environmental monitoring system (CEMS). During the reporting period, there is no need to operate the standby flare and therefore no monitoring of the flare stack was undertaken.

With reference to the emission limits shown in *Tables 3.2, 3.3* and *3.4*, the hourly average concentrations and the number of exceedances of the concerned air emissions monitored for the CAPCS, CHP and ASP during this reporting period are presented in *Tables 4.1* to *4.5*.

It should be noted that measurements recorded under abnormal operating conditions, e.g. start up and stopping of stacks, unstable operation, test runs and interference of sensor, are disregarded.

Table 4.1 Hourly Average of Parameters Recorded for CAPCS

Parameter	Range of Hourly Average Conc. (mg/Nm^3)	Emission Limit (mg/Nm^3)	Exceedance Identified	Remarks

Parameter	Range of Hourly Average Conc. (mg/Nm^3)	Emission Limit (mg/Nm^3)	Exceedance Identified	Remarks
VOCs (including methane) [a]	1 - 17	680	Nil	Nil
Dust (or TSP)	0	6	Nil	Nil
Odour (including NH_3 & H_2S)	0 – 2,138	220 [b]	Identified [c]	Breakdown of the automatic chemical dosing system of the CAPCS. Manual dosing of the chemical to the system was arranged. The defect will be rectified in the next reporting period.

Notes:

(a) On-line monitoring was not available during the reporting period. Alternative monitoring method as specified in the EM&A manual was used to measure VOCs.

(b) The odour unit is OU/Nm^3.

(c) Dates with exceedances on Odour (number of exceedances on the day) were identified on 8 (1), 10 (2), 11 (5), 12 (12), 13 (21), 14 (18), 15 (13), 16 (11), 17 (24), 18 (18), 19 (19), 20 (12), 21 (19), 22 (8), 25 (4), 27 (2), 28 (1), 29 (7), 30 (1) and 31 (2) March 2019.

Table 4.2 Hourly Average of Parameters Recorded for CHP 1

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [a]	Max. Emission Limit (mg/Nm^3)	Exceedance Identified	Remarks
Dust (or TSP)	0 – 2.5	15	Nil	Nil
Carbon Monoxide	0 – 459	650	Nil	Nil
NO_x	0 – 272	300	Nil	Nil
SO_2	0 – 202	50	Identified [c]	Desulphurisation system interruption.
NMVOCs	Not Available	150	Not Available [d]	Nil
VOCs (including methane) [b]	Not Available	1,500	Not Available [d]	Nil
HCl	0	10	Nil	Nil
HF	0 – 0.5	1	Nil	Nil

Notes:

(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.

(b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

(c) Dates with exceedances on SO_2 (number of exceedances on the day) were identified on 11 (3), 15 (1), 16 (2), 28 (5), 29 (1) and 31 (5) March 2019.

(d) Technical issue related to monitoring range of VOCs and methane sensors and the Contractor is solving the problem together with the equipment suppliers.

Table 4.3 Hourly Average of Parameters Recorded for CHP 2

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [(a)]	Max. Emission Limit (mg/Nm^3)	Exceedance Identified	Remarks
Dust (or TSP)	0 – 8	15	Nil	Nil
Carbon Monoxide	0 – 340	650	Nil	Nil
NO_x	0 – 271	300	Nil	Nil
SO_2	0 – 156	50	Identified [(c)]	Desulphurisation system interruption.
NMVOCs	Not Available	150	Not Available [(d)]	Nil
VOCs (including methane) [(b)]	Not Available	1,500	Not Available [(d)]	Nil
HCl	0	10	Nil	Nil
HF	0	1	Nil	Nil

Notes:

(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.

(b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

(c) Dates with exceedances on SO_2 (number of exceedances on the day) were identified on 1 (4), 2 (1), 3 (2), 4 (1), 5 (6), 6 (2), 9 (4), 12 (2), 13 (1), 14 (1), 16 (1), 17 (1), 18 (2), 19 (4), 20 (3), 23 (5), 25 (3) and 26 (4) March 2019.

(d) Technical issue related to monitoring range of VOCs and methane sensors and the Contractor is solving the problem together with the equipment suppliers.

Table 4.4 Hourly Average of Parameters Recorded for CHP 3

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [(a)]	Max. Emission Limit (mg/Nm^3)	Exceedances Identified	Remarks
Dust (or TSP)	0 – 3	15	Nil	Nil
Carbon Monoxide	0 – 351	650	Nil	Nil
NO_x	0 – 292	300	Nil	Nil
SO_2	0 – 129	50	Identified [(c)]	Desulphurisation system interruption.
NMVOCs	Not Available	150	Not Available [(d)]	Nil
VOCs (including methane) [(b)]	Not Available	1,500	Not Available [(d)]	Nil
HCl	0	10	Nil	Nil
HF	0 – 1	1	Nil	Nil

Notes:

(a) All values refer to an oxygen content in the exhaust gas of 6% and dry basis.

(b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

(c) Dates with exceedances on SO_2 (number of exceedances on the day) were identified on 10 (2), 13 (2), 14 (1), 15 (1), 27 (2), 29 (3) and 30 (1) March 2019.

(d) Technical issue related to monitoring range of VOCs and methane sensors and the Contractor is solving the problem together with the equipment suppliers.

Table 4.5 Hourly Average of Parameters Recorded for ASP

Parameter	Range of Hourly Average Conc. (mg/Nm^3) [a]	Max. Emission Limit (mg/Nm^3)	Exceedances Identified	Remarks
Dust (or TSP)	0 – 5	5	Nil	Nil
Carbon Monoxide	0 – 1,860	100	Identified [c]	Parameter emissions from ASP were affected by process optimisation.
NOx	0 – 1,159	200	Identified [d]	Parameter emissions from ASP were affected by process optimisation.
SO_2	0 – 135	50	Identified [e]	Desulphurisation system interruption.
VOCs (including methane) [b]	0 – 2,908	20	Identified [f]	Parameter emissions from ASP were affected by process optimisation.
NH_3	0 – 3,653	35	Identified [f]	Parameter emissions from ASP were affected by process optimisation.
HCl	0 – 3.5	10	Nil	Nil
HF	0 - 1	1	Nil	Nil

Notes:

(a) All values refer to an oxygen content in the exhaust gas of 11% and dry basis.

(b) The VOCs emission limit include methane as biogas is adopted as fuel in the combustion process.

(c) Dates with exceedances on CO (number of exceedances on the day) were identified on 12 (3), 13 (3), 16 (22), 17 (7), 18 (8), 19 (22), 20 (11), 21 (15), 22 (1), 24 (11), 25 (5), 26 (5) and 29 (1) March 2019.

(d) Dates with exceedances on NOx (number of exceedances on the day) were identified on 11 (6), 12 (2), 13 (1), 14 (2), 16 (1), 17 (2), 18 (5), 19 (4), 20 (1), 22 (4), 24 (4), 25 (1), 27 (7), 28 (5), 29 (3) and 31 (8) March 2019.

(e) Dates with exceedances on SO_2 (number of exceedances on the day) were identified on 9 (3), 14 (1), 16 (1), 19 (3), 20 (4), 25 91), 26 (4), 28 (2), 29 (1) and 31 (2) March 2019.

(f) Dates with exceedances on VOCs (including methane) (number of exceedances on the day) were identified on 16 (2), 18 (1), 19 (9), 20 (7), 21 (12), 22 (3), 24 (17), 25 (4), 26 (8), 28 (1) and 29 (15) March 2019.

(g) Dates with exceedances on NH_3 (number of exceedances on the day) were identified on 9 (15), 10 (12), 11 (8), 12 (4), 13 (4), 14 (13), 15 (2), 16 (24), 17 (20), 18 (17), 19 (20), 20 (4), 21 (15), 22 (3), 24 (18), 25 (5), 26 (9), 28 (3) and 29 (1) March 2019.

4.2 ODOUR

4.2.1 Commissioning Phase Monitoring

Odour patrols were conducted by representatives of the Contractor, the ER and Employer (EPD Project Team) on 1, 4, 8, 11, 13, 15, 18, 20, 22, 25, 27 and 29 March 2019. The Independent Odour Patrol Team, ALS Technichem (HK) Pty Ltd (ALS), has also joined the odour patrol on 1 March 2019. According to the EM&A Manual and EP requirements, it is considered an exceedance if

the odour intensity recorded by the panellists is Level 2 or above. During this reporting period, no Level 2 Odour Intensity was recorded. The odour patrol results are shown in *Annex I*.

4.2.2 Operation Phase Monitoring

No odour patrol was required to be conducted for this reporting period.

4.3 WATER QUALITY

4.3.1 Construction Phase Monitoring

No effluent was discharged from the construction activity in the reporting month, hence there was not necessary to carry out effluent discharge sampling for this reporting period.

4.3.2 Operation Phase Monitoring

Effluent discharge was sampled monthly from the Effluent Storage Tank as stipulated in the operation phase discharge licence. The results of the discharge sample is recorded in *Table 4.5*.

Table 4.6 Results of the Discharge Sample

Parameters	Discharged Effluent Concentration (mg/L)	Discharge Limit (mg/L)	Compliance with Discharge Limit
pH (pH units)	6.12 - 8.47	6-10 (a)	Yes
Suspended Solids (b)	34	800	Yes
Biochemical Oxygen Demand (5 days, 20°) (b)	35	800	Yes
Chemical Oxygen Demand (b)	888	2,000	Yes
Oil & Grease (b)	<5	40	Yes
Total Nitrogen (b)	76.5	200	Yes
Total Phosphorus (b)	25.1	50	Yes
Surfactants (total) (b)	<1.0	25	Yes

Notes:
(a) Daily Average.
(b) Effluent sample collected on 25 March 2019.

No exceedance of discharge limit was recorded during the reporting period.

4.4 WASTE MANAGEMENT

4.4.1 Construction Phase Monitoring

Wastes generated from this Project include inert construction and demolition (C&D) materials (public fill) and non-inert C&D materials (construction waste). Construction waste comprises general refuse, metals and paper/cardboard packaging materials. Metals generated from the construction of the Project are also grouped into construction waste as the materials were not disposed of with others at public fill. Reference has been

made to the Monthly Summary Waste Flow Table prepared by the Contractor (see *Annex G*). With reference to the relevant handling records and trip tickets of this Project, the quantities of different types of waste generated in the reporting month are summarised in *Table 4.7*.

Table 4.7 Quantities of Waste Generated from the Construction of the Project

Month / Year	Quantity			
	Total Inert C&D Materials Generated [a]	Non-inert C&D Materials [b]		
		C&D Materials Recycled [c]	C&D Waste Disposed of at Landfill [d]	Chemical Waste
March 2019	190.40 tonnes	0.00 kg	16.45 tonnes	0.00 L

Notes:

(a) Inert C&D materials (public fill) include bricks, concrete, building debris, rubble and excavated spoil. In total, 190.40 tonnes of inert C&D material were generated from the Project. The detailed waste flow is presented in *Annex G*.

(b) Non-inert C&D materials (construction wastes) include metals, paper / cardboard packaging waste, plastics and other wastes such as general refuse. Metals generated from the Project were grouped into construction wastes as the materials were not disposed of with others at the public fill.

(c) 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling during the reporting period.

(d) Construction wastes other than metals, paper/cardboard packaging, plastics and chemicals were disposed of at NENT Landfill by subcontractors.

4.4.2 Operation Phase Monitoring

Wastes generated from the operation of the Project include chemical waste, wastes generated from pre-treatment process and general refuse [1]. Reference has been made to the Monthly Summary Waste Flow Table prepared by the Contractor (see *Annex G*). With reference to the relevant handling records and trip tickets of this Project, the quantities of different types of waste generated from the operation of the Project in the reporting month are summarised in *Table 4.8*.

(1) Public fill and construction waste may only be generated during maintenance works when there are civil or structural works.

Table 4.8 Quantities of Waste Generated from the Operation of the Project

Month / Year	Chemical Waste	Waste Generated from Pre-treatment Process		General Refuse	
	Disposal of at CWTC	Disposed of at Landfill [a]	Recycled [b]	Disposed of at Landfill [a]	Recycled [c]
March 2019	1,200 L	477.08 tonnes	0.00 tonnes	1.50 tonnes [d]	0.00 kg

Notes:

(a) Waste generated from pre-treatment process and general refuse other than chemical waste and recyclables were disposed of at NENT landfill by sub-contractors.

(b) Among waste generated from pre-treatment process, 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling during the reporting period.

(c) Among general refuse, 0.00 kg of metals, 0.00 kg of papers/ cardboard packing and 0.00 kg of plastics were sent to recyclers for recycling during the reporting period.

(d) It was assumed that two 240-litre bins filled with 80% of general refuse were collected at each collection. The general refuse density was assumed to be around 0.15 kg/L.

5 SITE AUDIT

5.1 WEEKLY ENVIRONMENTAL SITE AUDIT

Joint site inspections were conducted by representatives of the Contractor and the ET on 8, 15, 22 and 28 March 2019 as required for the construction of the Project. The IEC was present at the joint inspection on 22 March 2019.

The audits checked the implementation of the recommended mitigation measures for air quality, landscape and visual, water quality, waste (land contamination) and hazard-to-life stated in the Implementation Schedule (see *Annex F*).

Follow-up actions resulting from the last site inspections were generally taken as reported by the Contractor.

Key observations during the reporting period are summarised as follows:

8 March 2019

- Chemical drums were observed near Building 2 and the contractor was advised to provide drip trays to the chemical drums or replace the drums to designed storage area according to the Code of Practice.

15 March 2019

- Chemical drums were observed near Building 2 and the contractor was advised to provide drip trays to the chemical drums or replace the drums to designed storage area according to the Code of Practice.

22 March 2019

- Chemical drums of less quantity were observed near Building 2 and the contractor was advised to provide drip trays to the remaining chemical drums or replace the remaining drums to designed storage area according to the Code of Practice.

28 March 2019

- Remaining chemical drums were observed near Building 2 and the contractor was advised to provide drip trays to the remaining chemical drums or replace the remaining drums to designed storage area according to the Code of Practice.

Other than the above observation, the Contractor has implemented environmental mitigation measures recommended in the approved EIA Report and EM&A Manual.

5.2 LANDSCAPE AND VISUAL AUDIT

Bi-weekly inspections of the landscape and visual mitigation measures for the

construction phase of the Project were performed on 8 and 22 March 2019. The inspection on 22 March 2019 also covered the monthly inspection of the landscape and visual mitigation measures for the operation phase of the Project.

It was confirmed that the necessary landscape and visual mitigation measures during the construction and operation phase as summarised in *Annex F* were generally implemented by the Contractor. No specific observation was found during site inspections on 8 and 22 March 2019. No non-compliance in relation to the landscape and visual mitigation measures was identified during the site audits in this reporting period and therefore no further actions are required. The ET/MT will keep track of the EM&A programme to check compliance with environmental requirements and the proper implementation of all necessary mitigation measures.

6 ENVIRONMENTAL NON-CONFORMANCE

6.1 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

Non-compliance of emission limits for CAPCS, CHP and ASP were recorded during the reporting period, respectively.

The Contractor has reviewed the organic waste treatment processes (i.e. waste reception, waste pre-treatment, anaerobic digesters, and composting processes) and found that they were operated normally during the reporting period. The Contractor has investigated air pollution control systems of the CAPCS, CHP and ASP and the combustion system for the CHP and the ASP and identified the following potential causes for the exceedance.

(a) There were breakdowns of the automatic chemical dosing system of the CAPCS. As a result, it could not effectively remove the odorous gases (e.g. NH_3 and H_2S) and caused exceedances of odour limits for the CAPCS;

(b) Tripping of the circulation pump resulting in the incompletion desulphurisation of biogas resulting in exceedances of SO_2 limits for CHP and ASP stacks; and

(c) The combustion efficiency of the thermal combustion unit of the ASP was affected during overall process fine tuning that causes exceedances of CO, NO_x, VOCs and NH_3.

For item (a), the Contractor has arranged manual dosing of the chemical to the system to minimise the exceedances in odour in the CAPCS.

For item (b), the Contractor has contacted the supplier of the chemical dosing system to carry out repairing works so that the system can function properly. Additional activated carbon filter was put on-line to minimise the incomplete desulphurisation of biogas.

For item (c), new setting on operational parameters were adjusted during this reporting period to adapt to the new packing media changed at the end of the last reporting period for better overall treatment performance. The Contractor will continue to tune the thermal combustion unit of the ASP in order to restore the combustion efficiency so that the concerned pollutants will be effectively destroyed.

The investigation report is presented in *Annex J*.

6.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

No complaint was received during the reporting period.

6.3 SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION

No summon/prosecution was received during the reporting period. The cumulative summons/prosecution log is shown in *Annex H*.

7 FUTURE KEY ISSUES

7.1 KEY ISSUES FOR THE COMING MONTH

Activities to be undertaken for the coming reporting period are:

- Operation of the Project.
- Contractor should resolve the technical issue related to the on-line monitoring of methane emission (hence the calculation of the NMVOC concentration) from the CHP stacks as soon as possible and undertake gas sampling and laboratory analysis of NMVOC at agreed interval when the on-line monitoring equipment for methane is not available.
- Implementation of further measures to control the air emission from the CAPCS, CHP and ASP.
- Continue construction of the Visitor Centre.

This EM&A Report presents the EM&A programme undertaken during the reporting period from **1** to **31 March 2019** in accordance with EM&A Manual (Version E) and requirements of EP (FEP-01/395/2010/C).

No air quality, noise and water quality monitoring is required under the construction EM&A requirements.

For the operation phase, a number of exceedances of the emission limits for stack monitoring (including CAPCS, CHP and ASP stacks) were recorded during the reporting period (see *Table 8.1*).

Table 8.1 Exceedances for Stack Emissions

Stack	Exceedances During the Reporting Period
Centralised Air Pollution Control Unit (CAPCS)	• Exceeded emission limit of Odour for most of the days (including 8, 10 to 22, 25 and 27 to 31 March 2019) in March
Cogeneration Unit (CHP)	• Exceeded emission limit of SO_2 on most of the days (including 1 to 6, 9 to 20, 23 and 25 to 31 March 2019) in March
Ammonia Stripping Plant (ASP)	• Exceeded emission limit of CO on most of the days (including 12, 13, 16 to 22, 24 to 27 and 29 March 2019) in March • Exceeded emission limit of NO_x most of the days (including 11 to 14, 17 to 20, 22, 24, 24 27 to 29 and 31 March 2019) in March • Exceeded emission limit of SO_2 on 9, 14, 16, 19, 20, 24 to 26, 28, 29 and 31 March 2019 • Exceeded emission limit of VOCs (including methane) on 16, 18, 19 to 22, 24 to 26, 28 and 29 March 2019 • Exceeded emission limit of NH_3 on 9 to 22, 24 to 26, 28 and 29 March 2019
Standby Flare Gas Unit	• NA (Not operated during the reporting period)

Exceedances in emission parameters of CAPCS, CHP and ASP were found to be a result of problems with the chemical dosing system of the air pollution control systems of the CAPCS, incomplete desulphurisation of biogas which fed to the CHPs, and the incomplete thermal combustion of the thermal combustion unit of the ASP.

The Contractor has implemented mitigation measures to control the exceedance (including the arrangement of supplier of the dosing system for the CAPCS to repair the dosing system and manual dosing of chemical to the CAPCS until the problems of the automatic dosing system is fixed; adding additional activated carbon filters to the biogas desulphurisation system to control the H_2S level in the biogas which fed to the CHP and the ASP; and tuning the thermal combustion unit of the ASP to optimise combustion efficiency and overall performance).

Odour patrols and monitoring were conducted in accordance to the EM&A requirements. No exceedance of odour intensity limit for all odour patrol events. Air samples were collected at the CAPCS for olfactometry analysis at the laboratory on 10, 11, 19 and 27 December 2018 and 16 and 29 January 2019. The odour level of the samples collected on 10, 11, 19 and 27 December 2018 and 16 January 2019 have exceeded the odour limit. An investigation of the cause of the exceedance has been carried out. The investigation report is shown in *Annex J*.

No non-compliance to the effluent discharge limit was recorded during this reporting period.

The environmental control /mitigation measures related to air quality, water quality, waste (including land contamination prevention), hazard-to-life and landscape and visual recommended in the approved EIA Report and the EM&A Manual were properly implemented by the Contractor during the reporting month.

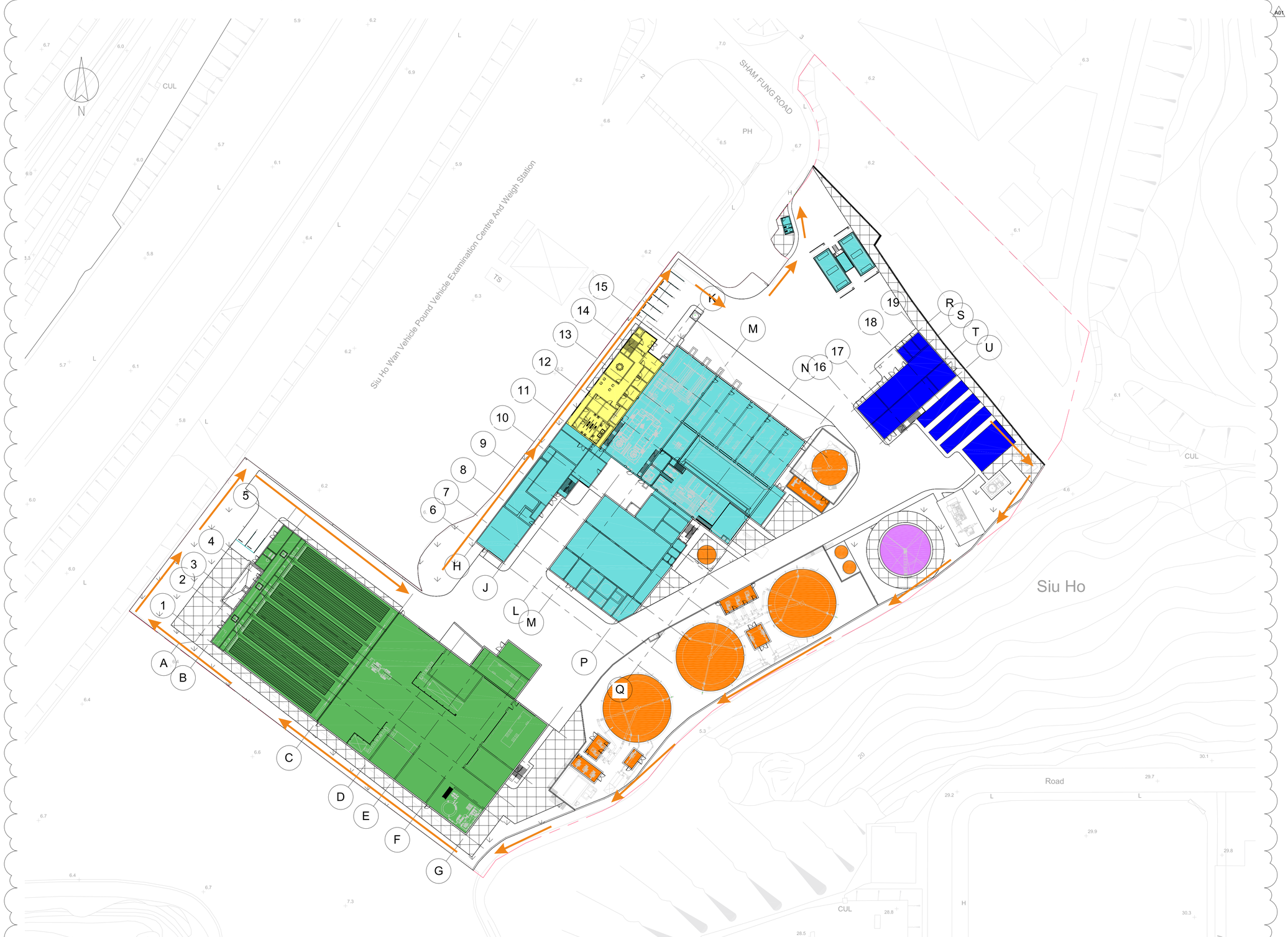
Bi-weekly landscape and visual monitoring was conducted in the reporting period. The necessary landscape and visual mitigation measures recommended in the approved EIA Report were generally implemented by the Contractor.

No incident occurred during reporting period.

No complaint/summon/prosecution was received.

Annex A

Project Layout



Key

Patrol Route

REV	DATE	BY	APP	DESCRIPTION
A01	05/03/15	CW	MB	IMTECH BACKGROUNDS UPDATED
A00	18/02/15	CW	MB	DRAFT ISSUE

CLIENT

ENVIRONMENTAL PROTECTION DEPARTMENT
GOVERNMENT OF THE HKSAR

CLIENT'S CONSULTANT

AECOM ASIA CO. LTD.

CONTRACTOR

OSCAR BIOENERGY JV

LEAD DESIGNER

ARUP
Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM

ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS

Meinhardt Infrastructure and Environment Limited
邁進基建環保工程顧問有限公司

PROJECT

ORGANIC WASTE TREATMENT FACILITIES
PHASE 1
EP/SP/61/10

STATUS

DRAFT ISSUE

DRAWING TITLE

SITE LAYOUT

DRAWN	CHECKED	APPROVED
CW	RS	DP

SCALE	DATE
1:500@A1 / 1:1000@A3	12/02/15

JOB NO.	DRAWING NO.	REV.
239956	DR-OAP-20-0-CA-1001	A01

0279222v.cdr

Annex B

Works Location

N

PROPOSED HOARDING TYPE 1

PROPOSED HOARDING TYPE 1

PROPOSED GATE

PROPOSED PEDESTRIAN GATE

PROPOSED PROJECT SIGNBOARD LOCATION

PROPOSED CONTAINER TOLIET

PROPOSED CONTAINER FOR WORKS

TEMPORARY CONTAINERS FOR MATERIAL STORAGE

EXITING FENCE WALL TO BE RETAINED

GUARD HOUSE

WORKER'S WELFARE AREA

TEMPORARY CONTAINERS FOR MATERIAL STORAGE

PROPOSED TEMP. SITE OFFICE

CONSTRUCTION WASTE WATER TREATMENT PLANT

Siu Ho Wan Vehicle Pound Vehicle Examination Centre And Weigh Station

Siu Ho Wan Road

Ø50 FROM WSD GOV. MAIN

RESERVED AREA FOR WSD

FROM CLP MAIN

TEMPORARY ELECTRICITY SUPPLY

SITE ENTRANCE FOR VEHICLE

VEHICLE WHEEL WASH

PROPOSED LOADING AND UNLOADING AREA

BY PUMP

FIXABLE DRAIN

CONTAINER FOR CHEMICAL STORAGE AND WASTE

300MM (W) U-CHNNEL

TEMPORARY PEDESTRIAN ROAD

PEDESTRIAN SEGREGATION PATH

DSD RESERVE

Ø500

Ø100

EXISTING TERMINAL MANHOLE (STORM DRAIN)

FIXABLE DRAIN

ACCESS PATH FOR DSD MAINTENANCE

CUL

PROPOSED COLLECTION PIT

FIXABLE DRAIN

BY PUMP

TEMPORARY SITE HAUL ROAD

FIXABLE DRAIN

BY PUMP

2ND ACCESS RETAIN FOR FUTURE SLOPE WORKS

Siu Ho

LOCATION / PEG B PLEASE REFER TO DLO'S SETOUT SKETCH GLA-IS585 for Orangic Waste Treatment Facilities, Phase I

TOWER CRANE LEG

LOCATION OF TOW CRANE FOOTING T.L. +4.68 MPD (8.5mX8.5mX2.25m THK.)

TEMPORARY GEN. SET

BY PUMP

FIXABLE DRAIN

TEMPORARY PEDESTRIAN ROAD

REBAR STORAGE AREA

EXISTING 300mm U-CHANNEL

FIXABLE DRAIN

BY PUMP

1ST ACCESS RETAIN FOR FUTURE SLOPE WORKS

LOCATION / PEG A PLEASE REFER TO DLO'S SETOUT SKETCH GLA-IS585 for Orangic Waste Treatment Facilities, Phase I

EXITING CHAIN-LINK FENCE TO BE RETAINED

Road

PROPOSED 3 m BUND WALL

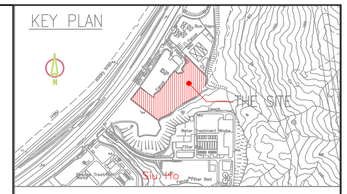
PROPOSED 6 m TYPE II SHEET PILE PLANKING WALL WITH 3 m EXTRUDED ABOVE GROUND THE ALIGNMENT IS TO BE 500MM FROM THE PROPOSED BUND WALL. FOR DETAIL PLEASE REFER TO DETAIL SECTION C-C

CUL

CW

Plot by : LeoLAM
Plot Time : 9/1/2016 7:26:29 PM

KEY PLAN



LEGEND

- SITE BOUNDARY
- PROPOSED HOARDING TYPE 1
- EXISTING CHAIN-LINK FENCE
- PROPOSED 6 m TYPE II SHEET PILE PLANKING WALL WITH 3 m EXTRUDED ABOVE GROUND
- EXISTING FENCE WALL
- DISCHARGE DRAINAGE
- 300mm(W) PROPOSED TEMP. CHANNEL
- 300mm(W) EXISTING U-CHANNEL
- 50/75mm FLEXIBLE DRAIN
- PROPOSED TEMP. CATCH PIT
- PORTABLE WATER PIPE
- TRAFFIC DIRECTION
- REBAR STORAGE AREA AND BENDING YARD
- GENERAL MATERIAL STORAGE AREA
- C & D MATERIAL STORAGE AREA
- VEHICLE WHEEL WASH
- WATER TREATMENT PLANT

REV	DATE	BY	APP	DESCRIPTION
J	01 SEP 2016	LL	JC	REVISED LAYOUT
I	27 APR 2016	LL	JC	REVISED LAYOUT
H	30 DEC 2015	LL	JC	REVISED LAYOUT
G	30 MAY 2015	LL	CL	REVISED LAYOUT

CLIENT

ENVIRONMENTAL PROTECTION DEPARTMENT
GOVERNMENT OF THE HKSAR

CLIENT'S CONSULTANT

AECOM
AECOM ASIA CO. LTD.

CONTRACTOR

SUEZ ATAL RosRoca
OSCAR Bioenergy Joint Venture

LEAD DESIGNER

ARUP
Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM

ERM
ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS

MEINHARDT
Meinhardt Infrastructure and Environment Limited
邁進基建環保工程顧問有限公司

PROJECT

ORGANIC WASTE TREATMENT FACILITIES
PHASE I
EP/SP/61/10

STATUS

ISSUED FOR COMMENT

DRAWING TITLE

GENERAL SITE LAYOUT PLAN AT PORTION 1

DRAWN	CHECKED	APPROVED
LL	JC	JC

SCALE	DATE
1:500@A1; 1:1000@A3	01 SEP 2016

JOB NO.	DRAWING NO.	REV.
P00424	DR-PSC-00-0-CN-1002	J

DR-PSC-00-0-CN-1002

Annex C

Construction Programme of the Project

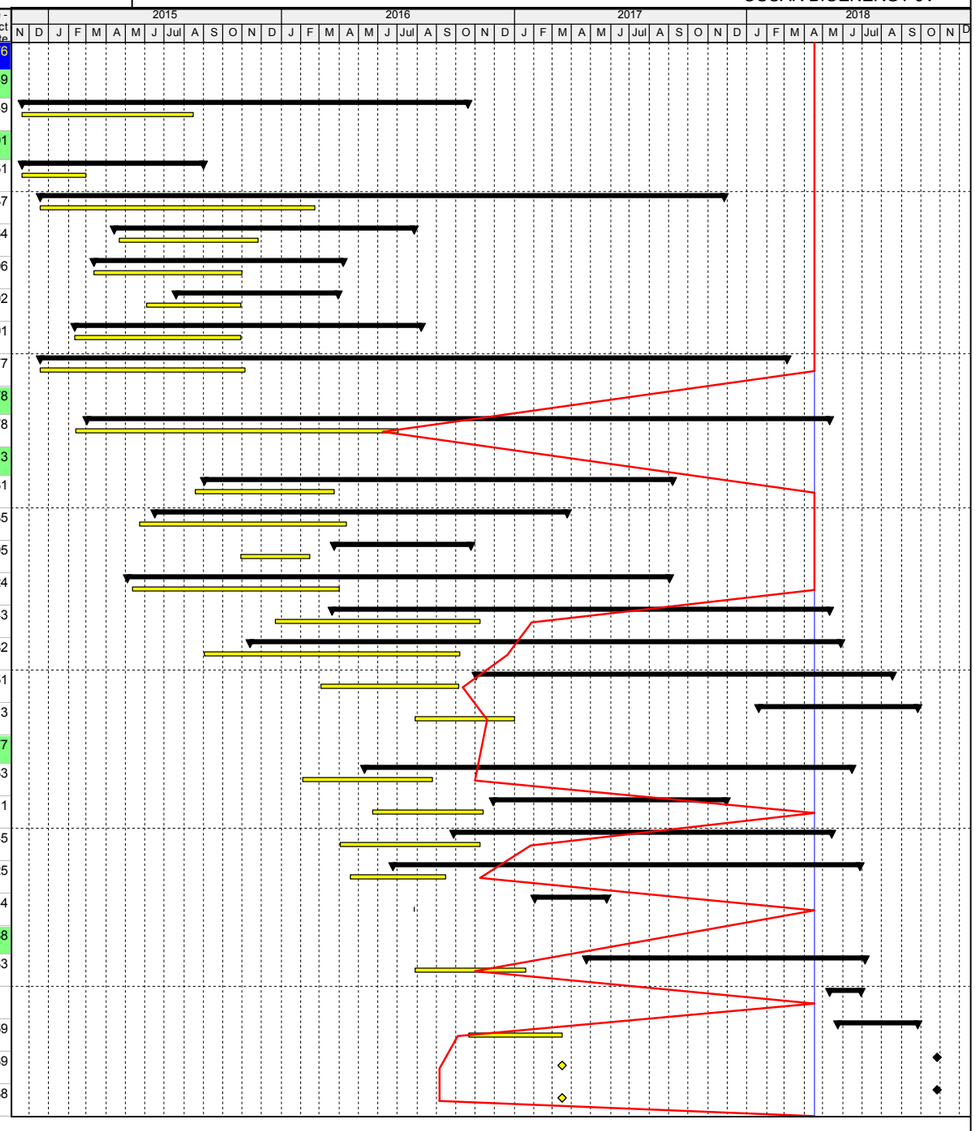
Environmental Protection Department
of the HKSAR

Contract No. EP/SP/61/10
Organic Resources Recovery Centre (Phase 1)

Executive Summary Programme Progress Updated on 17-Apr-18

OSCAR BIOENERGY JV

#	Activity ID	Activity Name	BL Project Duration	BL Project Start	BL Project Finish	Remaining Duration	Start	Finish	% Complete	Variance - BL Project Finish Date
1		***Contract No. EP/SP/61/10 - The Design & Construction Works***	688	20-Nov-14	17-Mar-17	159	20-Nov-14 A	27-Oct-18		-476
2		***Preliminary and Site Establishment***	217	20-Nov-14	15-Aug-15	0	20-Nov-14 A	19-Oct-16 A		-349
3	ESum110	Preliminary and Site Establishment	217	20-Nov-14	15-Aug-15	0	20-Nov-14 A	19-Oct-16 A	100%	-349
4		***Design***	372	20-Nov-14	23-Feb-16	0	20-Nov-14 A	05-Mar-18 A		-601
5	ESum120	Design Criteria and Design Preparation	80	20-Nov-14	27-Feb-15	0	20-Nov-14 A	01-Sep-15 A	100%	-151
6	ESum130	Detailed Design Submission (DDS) - General, Civil, ABWF and Landscape	289	19-Dec-14	23-Feb-16	0	18-Dec-14 A	27-Nov-17 A	100%	-437
7	ESum132	Detailed Design Submission (DDS) - Building 1	151	21-Apr-15	25-Nov-15	0	13-Apr-15 A	27-Jul-16 A	100%	-164
8	ESum134	Detailed Design Submission (DDS) - Building 2	158	12-Mar-15	30-Oct-15	0	12-Mar-15 A	07-Apr-16 A	100%	-106
9	ESum136	Detailed Design Submission (DDS) - Building 3	103	03-Jun-15	29-Oct-15	0	20-Jul-15 A	30-Mar-16 A	100%	-102
10	ESum138	Detailed Design Submission (DDS) - Auxilliary Buildings & Facilities	177	10-Feb-15	29-Oct-15	0	11-Feb-15 A	08-Aug-16 A	100%	-191
11	ESum140	Detailed Design Submission (DDS) - E&M and BS	216	18-Dec-14	04-Nov-15	0	18-Dec-14 A	05-Mar-18 A	100%	-577
12		***Procurement***	507	12-Feb-15	02-Jul-16	25	01-Mar-15 A	11-May-18		-678
13	ESum150	Procurement, Manufacturing, F.A.T., Shipment & Delivery of E&M Systems Equipment	507	12-Feb-15	02-Jul-16	25	01-Mar-15 A	11-May-18	99.94%	-678
14		***Construction***	489	13-May-15	31-Dec-16	135	04-May-15 A	26-Sep-18		-513
15	ESum160	Construction of Building #1 (Waste Receiving, Pre-treatment & Administration)	178	19-Aug-15	23-Mar-16	0	02-Sep-15 A	06-Sep-17 A	100%	-431
16	ESum170	Construction of Building #2 (Composting & Maturation, and Link Bridge)	262	23-May-15	11-Apr-16	0	16-Jun-15 A	24-Mar-17 A	100%	-285
17	ESum175	Construction of Building #3 (Energy Centre)	87	30-Oct-15	15-Feb-16	0	24-Mar-16 A	24-Oct-16 A	100%	-205
18	ESum180	Construction of Auxiliary Buildings & Facilities	263	13-May-15	31-Mar-16	0	04-May-15 A	02-Sep-17 A	100%	-424
19	ESum190	ABWF, Finishing and Fitting-out Works to Building #1, #2, #3 and Auxiliary Buildings & Facilities (excl. EEC)	259	23-Dec-15	08-Nov-16	21	21-Mar-16 A	11-May-18	97.1%	-443
20	ESum200	Sitewide, Boundary Wall and Roadworks	326	02-Sep-15	07-Oct-16	34	13-Nov-15 A	28-May-18	98.5%	-482
21	ESum210	Statutory and Utilities Works (excl. Lifting Platform)	148	04-Mar-16	06-Oct-16	102	02-Nov-16 A	17-Aug-18	99.4%	-551
22	ESum215	Green Roof and Landscaping	129	29-Jul-16	31-Dec-16	135	20-Jan-18 A	26-Sep-18	3%	-513
23		***E&M and Building Services Installation***	229	04-Feb-16	12-Nov-16	59	11-May-16 A	27-Jun-18		-477
24	ESum220	E&M Installation - Mechanical	164	04-Feb-16	25-Aug-16	50	11-May-16 A	15-Jun-18	99.6%	-533
25	ESum222	E&M Installation - Piping	144	24-May-16	12-Nov-16	0	28-Nov-16 A	30-Nov-17 A	100%	-311
26	ESum224	E&M Installation - Electrical, Instrumentation & Control	181	02-Apr-16	08-Nov-16	23	28-Sep-16 A	14-May-18	99.9%	-445
27	ESum226	Building Services Installation (excl. EEC)	125	18-Apr-16	14-Sep-16	59	24-Jun-16 A	27-Jun-18	86.9%	-525
28	ESum230	Energisation of Switchboards / MCC with SAT	1	28-Jul-16	28-Jul-16	0	02-Feb-17 A	26-May-17 A	100%	-244
29		***Testing & Commissioning and Completion*** *Note	232	29-Jul-16	17-Mar-17	193	24-Apr-17 A	30-Dec-18		-588
30	ESum240	Pre-Commissioning	144	29-Jul-16	19-Jan-17	81	24-Apr-17 A	06-Jul-18	61.2%	-533
31	ESum241	System Commissioning	0			50	11-May-18	29-Jun-18	0%	
32	ESum250	Process Commissioning, Performance & Acceptance Testing	119	22-Oct-16	16-Mar-17	127	23-May-18	26-Sep-18	0%	-559
33	KD100360	Completion of the Design and the Works including Testing and Commissioning (Extended Completion Date: 10-Jun-2017 noon)	0		16-Mar-17	0	1-May-18	15-Mar-19[a]	0%	-589
34	KD100380	Commencement of the Operation	0	17-Mar-17		0	4-Dec-18[b]		0%	-588

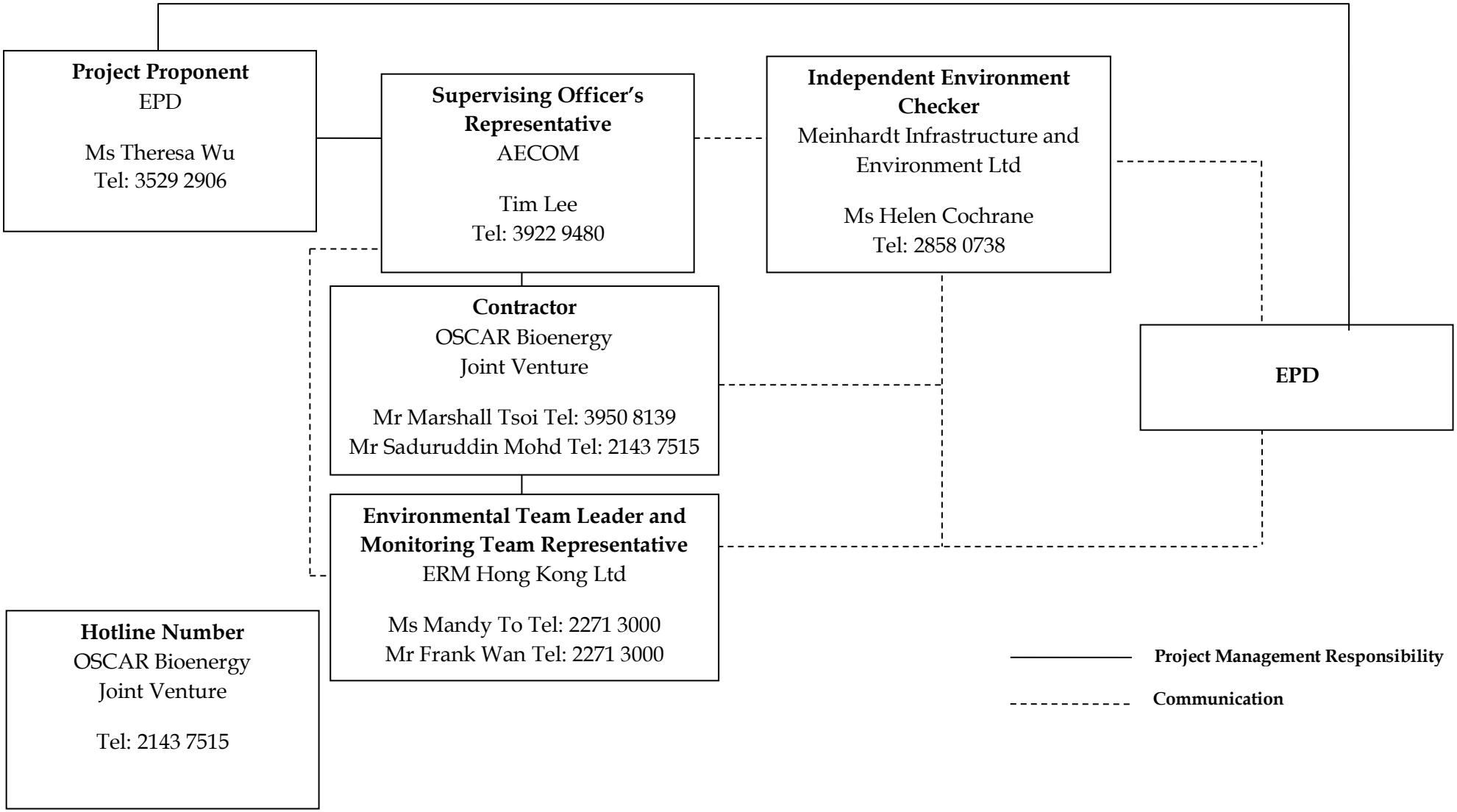


a: The T&C is in progress.
b: The confirmation for substantial completion has been dated to 3 December 2018.

Annex D

Project Organisation Chart with Contact Details

Project Organization (with contact details)



Annex E

Calibration Certification for the On-line Stack Monitoring System

Annex E1

Calibration Certification for the CEMS

(1)

Commissioning Check List 试运行检查项目表
MCS100FT

Customer data 客户资料

Customer: OSCAR Plant: OWTF

Location: SHW

1. Device data 设备资料

Device type 设备类型: MCS100FT (1)

Serial no. 序列号: 16070493

Sample probe type 取样探头类型: SFU

2. Plant data 电厂资料

Location 标签编号: Outside 室外 ☐ Under cover 有保护罩 ☐ Inside 室内 ☑

Orientation of the stack 取样点方向: Horizontal 水平 ☐ Vertical 垂直 ☑

Orientation of sample gas probe 取样探头方向: Horizontal 水平 ☑ Vertical 垂直 ☐

Pressure 压力 1010 hpa Gas temperature 烟气温度 410 °C

Plant operating status 电厂运行情况 Normal

3. Prerequisite 系统运行条件

	Y	N	Remarks 备注
3.1. Documentation + Delivery complete 文件+货物是否齐全	☑	☐	
3.2. Platform at measurement spot has suitable dimension? 测量点平台的尺寸是否合适?	☑	☐	
3.3. If this measurement location is under legal regulation, has it been acknowledged by an official body? 如果安装位置需要符合法律法规，此安装位置是否被官方认可?	☑	☐	
3.4. Customer specific data for parameterization available? 用户对系统参数的特殊要求是否可行?	☑	☐	
3.5. Cables, tubes and sample line installed but not connected? 电缆、管线和取样管线安装但没有连接?	☑	☐	
3.6. Compressed air station installed and compressed air available? 压缩空气站已安装并且压缩空气可以使用?	☑	☐	

4. **Preliminary work** 预备工作	Y	N	Remarks 备注
4.1. Mounting of flanges like described in the Operating Instruction? 法兰安装是否按照图纸?	☑	☐	
4.2. Check for damage 检查外部损伤	☑	☐	
4.3. Check ambient conditions 检查环境条件	☑	☐	
4.4. Check mounting conditions 检查安装条件	☑	☐	
4.5. Check cables / wires for correct installation 检查电缆/电线及其连接状况	☑	☐	
4.6. Check main power supply voltage 检查总供电电压	☑	☐	

5. **Periphery** 外部设备	Y	N	Remarks 备注
5.1. Check compressed air supply 检查压缩空气供应	☑	☐	
Inlet 入口(5 bar): 6 Bar			

6. **Sample probe** 取样探头	Y	N	Remarks 备注
6.1. Connect bundle of tubes and cables 管线和电缆的连接	☑	☐	
6.2. Install probe 探头安装	☑	☐	

7. MCS100FT	Y	N	Remarks 备注
7.1. Switch on analyzer and wait for warm up 打开分析仪并等待预热	☑	☐	
7.2. Check sample conditions 检查样气情况	☑	☐	
Flow rate 流量: 230 l/h			
7.3. Check zero conditions 检查零点情况	☑	☐	
Flow rate 流量: 160 l/h			
7.4. Perform zero point setting 零点设置	☑	☐	Test results within specification.
7.5. Perform span test 量程测试	☑	☐	
7.6. Parameterize the I/O Module 设置 I/O 模块参数	☑	☐	
7.7. Measured values are plausible 测量值是否合理	☑	☐	
7.8. Save device data 储存设备数据	☑	☐	
7.9. Complete Commissioning Sign-Off Sheet 完成试运行签署表	☑	☐	
7.10. Instruct the operator personnel 操作员培训 Hand over the maintenance manual and check lists 移交维护手册和检查表 - Measurement reading 读取测量值 - Perform customer maintenance 演示维护方法 - Read messages 读取信息	☑	☐	

8. Measured value

Index 编号	Source 信号源	Unit 单位	Range 范围		Reading (actual) 实际读数	Output value 产值
			Start 开始	End 结束		
1	HCL	mg/Nm^3	0	120	60.22ppm	60.22ppm
2	HF	mg/Nm^3	0	5	4.34ppm	4.34ppm
3	CO	mg/Nm^3	0	1000	128.21ppm	128.20ppm
4	NO	mg/Nm^3	0	500	122.01ppm	122.00ppm
5	NO_2	mg/Nm^3	0	200	98.81ppm	98.80ppm
6	NO_X	mg/Nm^3	0	500	412.11 mg/m³	412.12 mg/m³
7	SO_2	mg/Nm^3	0	300	83.21ppm	83.21ppm
8	CO_2	Vol o/o	0	25	20.01 o/o	20.01 o/o
9	H_2O	Vol o/o	0	40	32.02o/o	32.01 o/o
10	O_2	Vol o/o	0	21	20.95o/o	20.95o/o
11	TOC	mg/Nm^3	0	300	122.01ppm	122.01ppm
12	NH_3	mg/Nm^3	0	100	53.30ppm	53.31ppm
13	CH_4	mg/Nm^3	0	100	112.01ppm	112.01ppm
14						
15						

Remarks 备注

Name 签名

Date
日期: 25/7/2018

Engineer
工程师:

Plant personnel
用户代表:

(2)

Commissioning Check List 试运行检查项目表
MCS100FT

Customer data 客户资料

Customer: Oscar
Plant: OWTF
Location: SHW

1. Device data 设备资料

Device type 设备类型: MCS100FT (2)
Serial no. 序列号: 1607 0494
Sample probe type 取样探头类型: SFU

2. Plant data 电厂资料

Location 标签编号	Outside 室外 ☐	Under cover 有保护罩 ☐	Inside 室内 ☑
Orientation of the stack 取样点方向	Horizontal 水平 ☐	Vertical 垂直 ☑	
Orientation of sample gas probe 取样探头方向	Horizontal 水平 ☑	Vertical 垂直 ☐	

Pressure 压力 1010 hpa
Gas temperature 烟气温度 410 °C
Plant operating status 电厂运行情况 Normal

3. Prerequisite 系统运行条件

	Y	N	Remarks 备注
3.1. Documentation + Delivery complete 文件+货物是否齐全	☑	☐	
3.2. Platform at measurement spot has suitable dimension? 测量点平台的尺寸是否合适?	☑	☐	
3.3. If this measurement location is under legal regulation, has it been acknowledged by an official body? 如果安装位置需要符合法律法规，此安装位置是否被官方认可?	☑	☐	
3.4. Customer specific data for parameterization available? 用户对系统参数的特殊要求是否可行?	☑	☐	
3.5. Cables, tubes and sample line installed but not connected? 电缆、管线和取样管线安装但没有连接?	☑	☐	
3.6. Compressed air station installed and compressed air available? 压缩空气站已安装并且压缩空气可以使用?	☑	☐	

4. **Preliminary work** 预备工作	Y	N	Remarks 备注
4.1. Mounting of flanges like described in the Operating Instruction? 法兰安装是否按照图纸?	☑	☐	
4.2. Check for damage 检查外部损伤	☑	☐	
4.3. Check ambient conditions 检查环境条件	☑	☐	
4.4. Check mounting conditions 检查安装条件	☑	☐	
4.5. Check cables / wires for correct installation 检查电缆/电线及其连接状况	☑	☐	
4.6. Check main power supply voltage 检查总供电电压	☑	☐	

5. **Periphery** 外部设备	Y	N	Remarks 备注
5.1. Check compressed air supply 检查压缩空气供应	☑	☐	
Inlet 入口(5 bar): 6 Bar			

6. **Sample probe** 取样探头	Y	N	Remarks 备注
6.1. Connect bundle of tubes and cables 管线和电缆的连接	☑	☐	
6.2. Install probe 探头安装	☑	☐	

7. MCS100FT	Y	N	Remarks 备注
7.1. Switch on analyzer and wait for warm up 打开分析仪并等待预热	☑	☐	
7.2. Check sample conditions 检查样气情况	☑	☐	
Flow rate 流量: 240 l/h			
7.3. Check zero conditions 检查零点情况	☑	☐	
Flow rate 流量: 150 l/h			
7.4. Perform zero point setting 零点设置	☑	☐	
7.5. Perform span test 量程测试	☑	☐	Test results within specification.
7.6. Parameterize the I/O Module 设置 I/O 模块参数	☑	☐	
7.7. Measured values are plausible 测量值是否合理	☑	☐	
7.8. Save device data 储存设备数据	☑	☐	
7.9. Complete Commissioning Sign-Off Sheet 完成试运行签署表	☑	☐	
7.10. Instruct the operator personnel 操作员培训 Hand over the maintenance manual and check lists 移交维护手册和检查表 - Measurement reading 读取测量值 - Perform customer maintenance 演示维护方法 - Read messages 读取信息	☑	☐	

8. Measured value

Index 编号	Source 信号源	Unit 单位	Range 范围		Reading (actual) 实际读数	Output value 产值
			Start 开始	End 结束		
1	HCL	mg/Nm^3	0	120	60.21 ppm	60.21 ppm
2	HF	mg/Nm^3	0	5	4.32 ppm	4.32 ppm
3	CO	mg/Nm^3	0	1000	128.20 ppm	128.20 ppm
4	NO	mg/Nm^3	0	500	122.00 ppm	122.00 ppm
5	NO_2	mg/Nm^3	0	200	98.80 ppm	98.81 ppm
6	NO_X	mg/Nm^3	0	500	412.22 mg/Nm^3	412.21 mg/Nm^3
7	SO_2	mg/Nm^3	0	300	83.21 ppm	83.21 ppm
8	CO_2	Vol o/o	0	25	20.00 o/o	20.00 o/o
9	H_2O	Vol o/o	0	40	32.01 o/o	32.01 o/o
10	O_2	Vol o/o	0	21	20.95 o/o	20.95 o/o
11	TOC	mg/Nm^3	0	300	122.01 ppm	122.01 ppm
12	NH_3	mg/Nm^3	0	100	53.30 ppm	53.30 ppm
13	CH_4	mg/Nm^3	0	100	112.02 ppm	112.02 ppm
14						
15						

Remarks 备注

Date 日期: 25/7/2018

Engineer 工程师: Eddie Law

Name 签名

Plant personnel 用户代表:

Annex E2

Calibration Certification for the CAPCS

QM Zertifikat / QM certificate

Dusthunter SP30

SICK
Sensor Intelligence.

Identifikation / *identification*

Artikel Nr. / *Part No.:* **1089203** **DHSP30-T2V2FPNNNNNXXS**

Ident Nr. / *Ident no.:* 00116 Serien Nr. / *Serial no.:* **18168223**

Firmware Version / *Firmware version:* 01.02.06 (Feb 27 2018 11:37:54)
Bootloader Version / *Bootloader version:* 01.00.02
Hardware Revision / *Hardware version:* 1.2
Geräteausführung / *Device version:*
BUS-Adresse / *Bus address:* 1

Parameter / *Parameter*

Sensorantwortzeit / *Sensor response time* 60.0 sec.

Gebläse / *Blower:* installiert / *installed*

Messgrößen u. Koeffizienten / *Measuring variables and coefficients*

Streulichtfaktoren / *Scattered light coefficients:*

CC0 (abs.): -0.3800
CC1 (lin.): 0.6850
CC2 (square): 0.0000

Verstärkungsfaktor, Offset / *Gain factor, Offset:*

Gain 0: 10.0000 Offset 0: 0.00045

Faktoren Analogausgang / *Analog Output factors:*

CC0 (abs.): 2.00
CC1 (lin.): 170.85
CC2 (square): 0.00

Referenzgerät Streulicht DHSP100 Serien-Nr.:
Reference measuring device DHSP100 Serial no.:

SN: 00014 / 08518553

Spantest 70 Laser / *Span 70 Laser* 70.00 %

Relais 3: Wartung / Maintenance

Koeffizientensätze Messbereich 0 / *Coefficient Sets meas. range 0:*

Koeff. Satz 1 / *Coeff. set 1:*

CC 0 (abs.): 0.0000
CC 1 (lin.): 1.0000
CC 2 (square): 0.0000

Koeff. Satz 2 / *Coeff. set 2:*

CC 0 (abs.): 0.0000
CC 1 (lin.): 1.0000
CC 2 (square): 0.0000

Messbereich, Grenzwert / *Meas. range, limit:*

Messbereichsschalter / *Meas. range switch:* 0 (Software)

Messbereich Wert1 / *Meas. range low value:* 0.0 mg

Messbereich Wert2 / *Meas. range high value:* 75.0 mg

Grenzwert / *Limit value:* 50.0 mg

Gebläse Druck/*Blower Pressure:* 10.0 mbar

Modbus Schnittstelle / *Modbus interface:*

Protokoll / *protocol:* RTU
Adresse / *address:* 1
Baudrate / *baudrate:* 19200
Datenbits Parität Stopbits / *Databits parity stopbits:* 8 EVEN 1
Endian Codierung / *endian code:* NONE

Das Gerät mit der o.g. Serien-Nr. wurde überprüft und kalibriert nach den Qualitätsstandards der SICK-Gruppe basierend auf einem nach ISO9001 zertifizierten Qualitätssicherungssystem.

This device with the serial no. noted above has been tested and calibrated according to the quality standards of the SICK-Group, which are based on a ISO9001 certified Quality Assurance System.

Ottendorf-Okrilla, 16.04.2018

Unterschrift: / *Signature:*

Annex F

Implementation Schedule of Mitigation Measures

Annex F1

Implementation Schedule of Mitigation Measures for Construction Phase

Annex F1 Summary of Mitigation Measures Implementation Schedule for Construction Phase

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
Summary of Environmental Mitigation Measures in the EIA and EM&A Manual				
A. Air Quality				
3.73	2.5	<u>*Air Pollution Control (Construction Dust) Regulation & Good Site Practices*</u> • Use of regular watering, with complete coverage, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied to aggregate fines. • Open stockpiles should be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading points, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods. • Imposition of speed controls for vehicles on unpaved site roads. 8 kilometers per hour is the recommended limit. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed. • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system.	Construction Site / During Construction Period	√
B. Hazard to Life				
4.102	3.3	<u>*Construction Phase*</u> • The number of workers on site during construction stage should be kept at the same level as	Construction Site / During Construction Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		the assessment. • Construction works should be suspended when delivery of chlorine takes place. • 3m high fence should be constructed along the boundary facing the SHWWTW. • Emergency evacuation procedures should be formulated and the Contractor should ensure all workers on site should be familiar with these procedures as well as the route to escape in case of gas release incident. Relevant Departments, such as Fire Services Department (FSD), should be consulted during the development of Emergency procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available. • The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to construction workers in the event of chlorine gas release in the SHWWTW. • The Contractor should establish a communication channel with the SHWWTW operation personnel and FSD during construction stage. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW should advise the Contractor to inform construction workers to proceed with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency. • Introduction training should be provided to any staff before carryout construction works at the Project site. • Periodic drills should be coordinated and conducted to ensure all construction personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.		
C. Water Quality				
5.44	4.5	*Construction site run-off and general construction activities:* The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.	Construction Site / During Construction Period	√
5.45	4.5	*Excavation of Soil Materials* The construction programme should be properly planned to minimise soil excavation, if any, in rainy seasons. This prevents soil erosion from exposed soil surfaces. Any exposed soil surfaces should also be properly protected to minimise dust emission. In areas where a large amount of exposed soils exist, earth bunds or sand bags should be provided. Exposed stockpiles should be covered with tarpaulin or impervious sheets at all times. The stockpiles of materials should be	Construction Site / During Construction Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		placed at locations away from any stream courses so as to avoid releasing materials into the water bodies. Final surfaces of earthworks should be compacted and protected by permanent work.		
5.46	4.5	*Accidental spillage of chemicals:* Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	Construction Site / During Construction Period	√
5.47	4.5	Maintenance of vehicles and equipments involving activities with potential for leakage and spillage should only be undertaken within the areas which appropriately equipped to control these discharges.	Construction Site / During Construction Period	√
5.48	4.5	Oils and fuels should only be used and stored in designated areas which have pollution prevention facilities. All fuel tanks and storage areas should be sited on sealed areas in order to prevent spillage of fuels and solvents to the nearby watercourses. All waste oils and fuels should be collected in designated tanks prior to disposal.	Construction Site / During Construction Period	√
5.49	4.5	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: • Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. • Chemical waste containers should be suitably labeled, to notify and warn the personnel who are handling the wastes, to avoid accidents. • Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.	Construction Site / During Construction Period	<>
5.50	4.5	Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid entering to the nearby watercourses. Stockpiles of cement and other construction materials should be kept covered when not being used. Rubbish and litter from construction sites should also be collected to prevent spreading of rubbish and litter from the site area. It is recommended to clean the construction sites on a regular basis.	Construction Site / During Construction Period	√
5.51	4.5	*Sewage Effluent*	Work site/During the	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		The presence of construction workers generates sewage. It is recommended to provide sufficient chemical toilets in the works areas. The toilet facilities should be more than 30m from any watercourse. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis.	construction period	
5.52	4.5	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the project. Regular environmental audit on the construction site can provide an effective control of any malpractices and can achieve continual improvement of environmental performance on site.	Work Site / During Construction Period	√
5.53	4.5	*Nullah Decking* To minimize the potential water quality impacts from the nullah reconstruction works, the practices outlined below should be adopted where applicable: • The proposed works should be carried out within the dry season between October and March when the flow in the open nullah is low. • The use of less or smaller construction plants may be specified to reduce the disturbance to the nullah bed. • Temporary storage of materials (e.g. equipment, filling materials, chemicals and fuel) and temporary stockpile of construction materials should be located well away from the nullah and any water courses during carrying out of the construction works. • Stockpiling of construction materials and dusty materials should be covered and located away from the nullah any water courses. • Construction debris and spoil should be covered up and/or disposed of as soon as possible to avoid being washed into the nullah and nearby water receivers. • Construction activities, which generate large amount of wastewater, should be carried out in a distance away from the nullah, where practicable. • Construction effluent, site run-off and sewage should be properly collected and/or treated. • Any works site inside the nullah should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props to prevent adverse impact on the water quality. • Proper shoring may need to be erected in order to prevent soil/mud from slipping into the nullah and nearby watercourse. • Supervisory staff should be assigned to station	Work Site / During Construction Period	N/A
D. Waste Management				
6.41	5.4	*Good Site Practices*	Work Site / During	<>

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		Recommendations for good site practices during the construction phase would include: • Obtain relevant waste disposal permits from appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354) and subsidiary Regulations and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); • Provide staff training for proper waste management and chemical handling procedures; • Provide sufficient waste disposal points and regular waste collection; • Provide appropriate measures to minimize windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Carry out regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Separate chemical wastes for special handling and disposed of to licensed facility for treatment; and • Employ licensed waste collector to collect waste.	Construction Period	
6.42	5.5	*Waste Reduction Measures* Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: • Design foundation works that could minimise the amount of excavated material to be generated; • Provide training to workers on the importance of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling; • Sort out demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.); • Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; • Encourage the collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce; and • Plan and stock construction materials carefully to minimize the amount of waste to be generated and to avoid unnecessary generation of waste.	Work Site/During Design & Construction Period	√
6.44	5.7	*Excavated and C&D Materials* In order to minimise the impact resulting from collection and transportation of C&D material for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below: • A WMP, which becomes part of the Environmental Management Plan (EMP), should be prepared in accordance with ETWB TCW No.19/2005;	Work Site/During Design & Construction Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		• A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites) should be adopted for easy tracking; and • In order to monitor the disposal of excavated and C&D material at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to ETWB TCW No. 31/2004).		
6.45 – 6.46	5.8 – 5.9	An EMP should be prepared and implemented in accordance with ETWB TCW No. 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. The EMP should be submitted to the Supervising Officer (SO) and Supervising Officer's Representative (SOR) for approval. The EMP should be reviewed regularly and updated, preferably on a monthly basis. A system should be devised to work for on-site sorting of excavated and C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimize temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.	Work Site/During Design & Construction Period	√
6.47	5.10	*Chemical Waste* Should chemical wastes be produced at the construction site, the Contractor would be required to register with EPD as a Chemical Waste Producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste (such as explosive, flammable, oxidizing, irritant, toxic, harmful, or corrosive). The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the CWTC in Tsing Yi, or any other licensed facilities, in accordance with the Waste Disposal (Chemical Waste) General) Regulation.	Work Site / During Construction Period	√
6.48	5.11	*General Refuse* General refuse should be stored in enclosed bins or compaction units separated from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Work Site / During Construction Period	√
E. Landscape and Visual				
7.99 & Table 7.7	Table 6.1	Construction Phase Topsoil, where identified, should be stripped and stored for re-use in the construction of the	Work Site / During Construction Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		soft landscape works, where practical ・Compensatory tree planting should be provided to compensate for felled trees. - Compensation tree species shall be chosen from both indigenous and ornamental species - Compensatory tree planting quantities shall be as per DLO approved requirement. ・Control of night-time lighting ・Erection of decorative screen hoarding compatible with the surrounding setting		
F. Noise				
8.25	7.3	Good Site Practice: ・Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program; ・Mobile plant, if any, should be sited as far from noise sensitive receivers (NSRs) as possible; ・Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; ・Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and ・Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	Work site/During Design & Construction Stages	√

Remark:

√	Compliance of Mitigation Measures
<>	Compliance of Mitigation but need improvement
x	Non-compliance of Mitigation Measures
▲	Non-compliance of Mitigation Measures but rectified by OSCAR Bioenergy JV
Δ	Deficiency of Mitigation Measures but rectified by OSCAR Bioenergy JV
N/A	Not Applicable in Reporting Period

Annex F2

Implementation Schedule of Mitigation Measures for Operation Phase

Annex F2 Summary of Mitigation Measures Implementation Schedule for Operation Phase

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
Summary of Environmental Mitigation Measures in the EIA and EM&A Manual				
A. Air Quality				
3.78	2.7 & 2.13 – 2.19	*Air Pollution Control (Construction Dust) Regulation & Good Site Practices* • Commissioning tests shall be conducted to confirm the centralized air pollution control unit, the cogen units, the standby flaring unit and ASP against the design emission levels as stated in Tables 2.2 - 2.5. • Odour monitoring shall be conducted at the stack exhaust of the centralized air pollution control unit weekly in the first month of the commissioning stage.	OWTF Stacks/ During Commissioning Stage	√
3.78	2.7-2.12	*Air Pollution Control and Stack Monitoring* • Stack monitoring shall be installed for the centralized air pollution control unit, cogen units and ASP of OWTF to ensure that the air emissions from OWTF would meet the design emission limits as well as EPD criteria.	During Operation	√
3.78	2.20- 2.28	• Odour Patrol at site boundary of OWTF	OWTF Site Boundary/During Operation (The need to continue the odour patrol after the end of the 2-year monitoring period would depend on the monitoring results and should be agreed with EPD)	N/A
B. Hazard to Life				
4.103	3.4	*Operation Phase* • 3m high fence should be constructed along the boundary facing the SHWWTW • Emergency evacuation procedures should be formulated and the Contractor should ensure on site staff should be familiar with these procedures. Diagram showing the escape routes to a safe place should be posted in the site notice boards and at the entrance/exit of site. A copy of the latest version emergency procedures should be dispatched to Tung Chung Fire Station for reference once available. • The emergency procedures should specify means of providing a rapid and direct warning (e.g. Siren and Flashing Light) to personnel on site in the event of chlorine gas release in the SHWWTW. • The Contractor should establish a communication channel with the SHWWTW operation personnel and FSD. In case of any hazardous incidents in the treatment works, operation personnel of SHWWTW should advise the Contractor to inform personnel on site to proceed	Work Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		with emergency procedure. The Contractor should appoint a Liaison Officer to communicate with FSD Incident Commander on site in case of emergency. • Periodic drills should be coordinated and conducted to ensure all on site personnel are familiar with the emergency procedures. Upon completion of the drills, a review on every step taken should be conducted to identify area of improvement. Prior notice of periodic drills should be given to Station Commander of Tung Chung Fire Station. Joint operational exercise with FSD and SHWWTW is recommended.		
C. Water Quality				
5.44	4.5	<u>*Wastewater from Organic Waste Treatment Process*</u> The Project site will be equipped with an adequately sized wastewater treatment plant. A high rate type of active sludge system specifically designed for the removal of nitrogen components from the wastewater in combination with conversion of residual BOD and COD would be deployed. The wastewater treatment plant would also be incorporated with SHARON or annamox technology or equivalent to achieve high total overall nitrogen removal. Wastewater generated from the OWTF (including wastewater from dewatering process, leachate from waste reception area, condensate from biogas handling, wastewater from scrubber of air treatment system and any surplus water from truck washing facility) will be diverted to the wastewater treatment plant. Treated effluent will then be stored temporarily in order to be used as process water within the plants. The storage volume would be around 20 m3. Overflow from the tank will be discharged to foul sewers. The polluting parameters in effluent shall be in compliance with the requirements specified in the TM- DSS. The design, installation and operation of the wastewater treatment plant shall be licensed under the Waste Disposal Ordinance and subject to the effluent monitoring as required under the WPCO which is under the ambit of regional office (RO) of EPD. To ensure that wastewater can be adequately treated and effluent from treatment plant can meet the standards listed in TM- DSS, the following mitigation measure should be conducted. • Cleaning and maintenance of treatment facilities should be conducted on a regular basis to ensure that removal rate of each treatment facility would not be reduced. • Cleaning and maintenance of pipelines should be carried out on a regular basis to prevent block of pipeline and leaching of wastewater, and therefore prevent overflowed or leached wastewater discharging into nearby drainages and water streams. • Regular site inspection should be conducted to ensure that no wastewater can be directly discharged into nearby water streams.	Work Site / During Design & Operation Period	√
5.55	4.5	In the scrubber, spraying water should be re-circulated to minimize the need for external water. The spraying water would be collected at the bottom of the scrubber. Excess water would be discharged to the wastewater treatment plant as described in Section 5.54.	Work Site / During Design & Operation Period	√
5.56	4.5	The waste reception, treatment facilities and compost storages of OWTF should be located in	Work Site / During Design &	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		enclosed buildings to prevent generation of contaminated rain runoff. All surface runoff such as washed water generated in the treatment processes areas should be properly collected and diverted to the on-site wastewater treatment plant as described in Section 5.54.	Operation Period	
5.57	4.5	All drainage system for collection and transferring wastewater generated in the OWTF to the on-site wastewater treatment plant as described in Section 5.54 should be capable of preventing clogging and easy maintenance and cleaning.	Work Site / During Design & Operation Period	√
D. Waste Management				
6.50	5.12	*Good Site Practices* Good operational practices should be adopted to Minimize waste management impacts: • Obtain the necessary waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Chemical Waste) (General) Regulation and the Land (Miscellaneous Provision) Ordinance (Cap. 28); • Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site; • Use of a waste haulier licensed to collect specific category of waste; • A trip-ticket system should be included as one of the contractual requirements and implemented by the Environmental Team to monitor the disposal of solid wastes at public filling facilities and landfills, and to control fly tipping. Reference should be made to ETWB TCW No. 31/2004. • Training of site personnel in proper waste management and chemical waste handling procedures; • Separation of chemical wastes for special handling and appropriate treatment at a licensed facility; • Routine cleaning and maintenance programme for drainage systems, sumps and oil interceptors; • Provision of sufficient waste disposal points and regular collection for disposal; • Adoption of appropriate measures to minimize windblown litter and dust during transportation of waste, such as covering trucks or transporting wastes in enclosed containers; and • Implementation of a recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites).	During Operation Period	<>
6.51	5.13	*Waste Reduction Measures* Good management and control can prevent the generation of significant amounts of waste. It is recommended that the following good operational practices should be adopted to ensure waste reduction: • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal;	During Operation Period	<>

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		• Encourage collection of aluminum cans, plastic bottles and packaging material (e.g. carton boxes) and office paper by individual collectors. Separate labelled bins should be provided to help segregate this waste from other general refuse generated by the work force; and • Any unused chemicals or those with remaining functional capacity should be reused as far as practicable.		
6.52	5.14	*Wastes Generated from Pre-Treatment Process* Wastes generated from pre-treatment process should be recycled as far as possible. Wastes generated from pre- treatment process should also be separated from any chemical waste and stored in covered skips. The recyclables should be collected by licensed collectors, while the rest of the waste should be removed from the site on a daily basis to minimize odour, pest and litter impacts. Open burning must be strictly prohibited.	Pre-Treatment Process/ During Operation Period	<>
6.53-6.56	5.15-5.18	*Chemical Wastes* • Chemical waste generated from machinery maintenance and servicing should be managed in accordance with Code of Practice on the Packaging, Labelling and storage of Chemical Wastes under the provisions of Waste Disposal (Chemical Waste) (General) Regulation. The chemical waste should be collected by drum-type containers and removed by licensed chemical waste contractors. • Plant / equipment maintenance schedules should be planned in order to minimize the generation of chemical waste. • Non-recyclable chemical wastes and lubricants should be disposed of at appropriate facilities, such as CWTC. Copies or counterfoils from collection receipts issued by the licensed waste collector should be kept for recording purpose. • Recyclable chemical waste will be transported off-site for treatment by a licensed collector. The Contractor will need to register with EPD as a chemical waste producer. Where possible, chemical wastes (e.g. waste lubricants) would be recycled at appropriate facilities, such as Dunwell's oil re-refinery.	Whole Site / During Operation Period	√
6.57-6.58	5.19-5.20	General Refuse • Waste generated in offices should be reduced through segregation and collection of recyclables. To promote the recycling of wastes such as used paper, aluminum cans and plastic bottles, it is recommended that recycling bins should be clearly labelled and placed at locations with easy access. For the collection of recyclable materials, they should be collected by licensed collectors. • General refuse, other than segregated recyclable wastes, should be separated from any chemical waste and stored in covered skips. The general refuse should be removed from the site on a daily basis to minimize odour, pest and litter impacts. Also, open burning of refuse must be strictly prohibited.	Whole Site / During Operation Period	<>
E. Proposed Land Contamination Preventive Measures				

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
6.65	5.21 (i)	Fuel Oil Containers •Fuel oil should be stored in suitable containers. •All fuel oil containers should be securely closed. •Appropriate labels showing the name of fuel oil should be posted on the containers. •Drip trays should be provided for all containers.	Fuel Oil Storage Containers /During Operation Period	√
6.65	5.21 (ii)	Storage Area ・Distance between the fuel oil refuelling points and the fuel oil containers should be minimized. ・The storage area should be used for fuel oil storage only. ・No surface water drains or foul sewers should be connected to the storage area. ・The storage area should be enclosed by three sides by a wall and have an impermeable floor or surface.	Fuel Oil Storage Area /During Operation Period	√
6.65	5.21 (iii)	Fuel Oil Spillage Response An Oil Spill Response Plan should be prepared by the operator to document the appropriate response procedures for oil spillage incident in detail. General procedures to be taken in case of fuel oil spillage are presented below. • Training Training on oil spill response actions should be given to relevant staff. The training should cover the followings: - Tools & resources to combat oil spillage and fire, e.g. locations of oil spill handling equipment and firefighting equipment; - General methods to deal with oil spillage and fire incidents; - Procedures for emergency drills in the event of oil spills and fire; and - Regular drills should be carried out. • Communication Establish communication channel with the Fire Services Department (FSD) and EPD to report any oil spillage incident so that necessary assistance from relevant department could be quickly sought. • Response Procedure Any fuel oil spillage within the Project Site should be immediately reported to the Site Manager with necessary details including location, source, possible cause and extent of the spillage Site Manager should immediately attend to the spillage and initiate any appropriate action to confine and clean up the spillage. The response procedures should include the following: - Identify and isolate the source of spillage as soon as possible. - Contain the oil spillage and avoid infiltration into soil / groundwater and	Whole Site / During Operation Phase	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		discharge to storm water channels. - Remove the oil spillage. - Clean up the contaminated area. - If the oil spillage occurs during refuelling, the refuelling operation should immediately be stopped. - Recovered contaminated fuel oil and the associated material to remove the spilled oil should be considered as chemical waste. The handling and disposal procedures for chemical wastes are discussed in the following paragraphs.		
6.66	5.22 (i)	<u>Chemicals and Chemical Wastes Handling & Storage</u> • Chemicals and chemical wastes should only be stored in suitable containers in purpose-built areas. • The storage of chemical wastes should comply with the requirements of the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • The storage areas for chemicals and chemical wastes should have an impermeable floor or surface. The impermeable floor I surface should possess the following properties: - Not liable to chemically react with the materials and their containers to be stored. - Able to withstand normal loading and physical damage caused by container handling - The integrity and condition of the impermeable floor or surface should be inspected at regular intervals to ensure that it is satisfactorily maintained • For liquid chemicals and chemical wastes storage, the storage area should be bonded to contain at least 110% of the storage capacity of the largest containers or 20% of the total quantity of the chemicals/chemical wastes stored, whichever is the greater. • Storage container should be checked at regular intervals for their structural integrity and to ensure that the caps or fill points are tightly closed. • Chemical handling should be conducted by trained workers under supervision.	Whole Site / During Operation Period	<>
6.66	5.22 (ii)	<u>Chemicals and Chemical Wastes Spillage Response</u> A Chemicals and / or Chemical Wastes Spillage Response Plan should be prepared by the operator to document in detail the appropriate response procedures for chemicals or chemical wastes spillage incidents. General procedures to be undertaken in case of chemicals I chemical waste spillages are presented below • Training • Training on spill response actions should be given to relevant staff. The training should cover the followings:	Whole Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		- Tools & resources to handle spillage, e.g. locations of spill handling equipment; - General methods to deal with spillage; and - Procedures for emergency drills in the event of spills. • Communication Establish communication channel with Fire Services Department (FSD) and EPD to report the spillage incident so that necessary assistance from relevant department could be quickly sought. • Response Procedures Any spillage within OWTF site should be reported to the Site Manager. Site Manager shall attend to the spillage and initiate any appropriate actions needed to confine and clean up the spillage. The response procedures should include the followings: - Identify and isolate the source of spillage as soon as possible; - Contain the spillage and avoid infiltration into soil / groundwater and discharge to storm water channels (in case the spillage occurs at locations out of the designated storage areas); - Remove the spillage; the removal method / procedures documented in the Material Safety Data Sheet (MSDS) of the chemicals spilled should be observed; - Clean up the contaminated area (in case the spillage occurs at locations out of the designated storage areas); and - The waste arising from the cleanup operation should be considered as chemical wastes.		
6.67 - 6.69	5.23- 5.25	<u>Incident Record</u> • After any spillage, an incident report should be prepared by the Site Manager. The incident report should contain details of the incident including the cause of the incident, the material spilled and estimated spillage amount, and also the response actions undertaken. The incident record should be kept carefully and able to be retrieved when necessary. • The incident report should provide sufficient details for the evaluation of any environmental impacts due to the spillage and assessment of the effectiveness of measures taken. • In case any spillage or accidents results in significant land contamination, EPD should be informed immediately and the Project operator should be responsible for the cleanup of the affected area. The responses procedures described in Sections 6.65 - 6.66 of the EIA Report should be followed accordingly together with the land contamination assessment and remediation guidelines stipulated in the *Guidance*	Whole Site / During Operation Period	√

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location/ Timing	Status
		Manual for Use of Risk-based Remediation Goals for Contaminated Land Management and the *Guidance Note for Contaminated Land Assessment and Remediation*.		
F. Landscape and Visual				
7.98 & Table 7.8	Table 6.2	<u>Operation Phase</u> • Aesthetic design of the facade, including its colour theme, pattern, texture , materials, finishing and associated structures to harmonize with the surrounding settings • Grass / groundcover planting to soften the roof • Heavy standard tree planting to screen proposed associated structures • Grasscrete paving to soften the harshness of large paved surface areas wherever possible	Within Project Area / During Design & Operation Stages	√

Remark:
√ Compliance of Mitigation Measures
<> Compliance of Mitigation but need improvement
x Non-compliance of Mitigation Measures
▲ Non-compliance of Mitigation Measures but rectified by OSCAR Bioenergy JV
Δ Deficiency of Mitigation Measures but rectified by OSCAR Bioenergy JV
N/A Not Applicable in Reporting Period

Annex G

Waste Flow Table

Annex G1

Construction Phase Waste Flow Table

No. EP/SP/61/10 of Organic Resources Recovery Centre (Phase I)
Monthly Summary Waste Flow Table

Month	Actual Quantities of Inert C&D Materials Generated					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
May 2015	29.58	0.00	0.00	0.00	29.58	0.00	0.00	0.00	0.00	0.00
June 2015	2226.90	0.00	0.00	0.00	2226.90	0.00	0.00	0.00	0.00	9.66
July 2015	2832.27	0.00	0.00	0.00	2832.27	0.00	0.00	0.00	0.00	33.68
August 2015	6657.25	0.00	0.00	0.00	6657.25	0.00	20.00	0.00	0.00	55.06
September 2015	5467.05	0.00	0.00	0.00	5467.05	3480.00	0.00	0.00	0.00	83.81
October 2015	5419.04	0.00	0.00	0.00	5419.04	18710.00	0.00	0.00	0.00	20.45
November 2015	1375.26	0.00	0.00	0.00	1375.26	21610.00	0.00	0.00	0.00	17.38
December 2015	2199.56	75.28	0.00	0.00	2124.28	0.00	41.00	0.00	0.00	21.83
January 2016	4601.43	0.00	0.00	0.00	4601.43	18140.00	50.00	0.00	640.00	20.86
February 2016	4167.01	0.00	0.00	0.00	4167.01	510.00	79.00	0.00	0.00	16.57
March 2016	299.92	41.28	0.00	0.00	258.64	22320.00	75.00	0.00	0.00	22.69
April 2016	3186.37	98.37	0.00	0.00	3088.00	60690.00	77.00	0.00	255.00	37.63
May 2016	1612.33	63.41	0.00	0.00	1548.92	13490.00	35000.00	0.00	0.00	40.76
June 2016	1144.73	30.43	0.00	0.00	1114.30	14600.00	120.00	0.00	0.00	58.34
July 2016	662.76	0.00	0.00	0.00	662.76	13370.00	0.00	0.00	0.00	40.48
August 2016	391.88	0.00	0.00	0.00	391.88	18660.00	84.00	0.00	0.00	61.91
September 2016	324.35	0.00	0.00	0.00	324.35	56800.00	2780.00	0.00	0.00	138.25
October 2016	1561.82	39.00	0.00	0.00	1522.82	40000	9.30	0.00	700.00	114.47
November 2016	897.23	507.94	00.00	0.00	389.76	0.00	123.00	0.00	0.00	154.22
December 2016	2477.95	489.00	0.00	0.00	1988.95	2960.00	93.00	0.00	0.00	136.80
January 2017	2150.92	503.60	0.00	0.00	1647.32	31240.00	21051.00	3630.00	0.00	127.43

Month	Actual Quantities of Inert C&D Materials Generated					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
February 2017	553.80	440.00	0.00	0.00	113.80	14940.00	18820.00	2880.00	460.00	83.46
March 2017	665.93	460.00	0.00	0.00	205.93	11660.00	29370.00	4400.00	660.00	99.59
April 2017	553.41	220.00	0.00	0.00	333.41	8600.00	25610.00	520.00	700.00	81.83
May 2017	388.82	211.00	0.00	0.00	177.82	1090.00	64.00	0.00	0.00	109.10
June 2017	352.12	104.00	0.00	0.00	248.12	1800.00	16400.00	12030.00	700.00	70.58
July 2017	400.72	165.00	0.00	0.00	235.72	6500.00	12330.00	4690.00	0.00	52.20
August 2017	589.89	202.00	0.00	0.00	387.89	23330.00	27079.00	5220.00	700.00	69.52
September 2017	3347.18	1364.00	0.00	0.00	1983.18	33379.00	29426.00	3990.00	0.00	62.82
October 2017	2384.86	984.00	0.00	0.00	1400.86	11842.00	34071.00	5230.00	0.00	74.13
November 2017	797.42	384.18	0.00	0.00	413.24	20210.00	25225.00	4030.00	0.00	163.03
December 2017	106.32	51.00	0.00	0.00	55.32	17650.00	19520.00	3210.00	0.00	82.23
January 2018	283.65	125.83	0.00	0.00	157.82	12900.00	15600.00	12330.00	0.00	30.93
February 2018	122.31	55.70	0.00	0.00	66.61	10950.00	13260.00	6570.00	0.00	16.95
March 2018	217.06	99.80	0.00	0.00	117.26	12260.00	12120.00	5960.00	0.00	32.53
April 2018	1118.36	460.58	0.00	0.00	657.78	16320.00	12590.00	6280.00	0.00	33.90
May 2018	475.54	198.85	0.00	0.00	276.69	15230.00	11024.00	0.00	0.00	40.02
June 2018	684.10	256.50	0.00	0.00	427.60	14320.00	10260.00	2630.00	0.00	43.01
July 2018	93.99	42.00	0.00	0.00	51.99	11220.00	6200.00	0.00	0.00	59.77
August 2018	528.56	225.00	0.00	0.00	303.56	13620.00	33400.00	26760.00	0.00	44.50
September 2018	765.70	325.00	0.00	0.00	440.70	10600.00	4500.00	0.00	0.00	41.82
October 2018	0.00	0.00	0.00	0.00	0.00	0.00	2330.00	0.00	0.00	109.49
November 2018	77.71	0.00	0.00	0.00	77.71	0.00	0.00	0.00	0.00	30.18
December 2018	88.43	0.00	0.00	0.00	88.43	0.00	0.00	0.00	0.00	5.72
January 2019	21.13	0.00	0.00	0.00	21.13	0.00	0.00	0.00	1880.00	4.55

Month	Actual Quantities of Inert C&D Materials Generated					Actual Quantities of Non-inert C&D Materials (Construction Waste) Generated				
	Total Quantity Generated	Reused in the Contract	Reused in other Projects	Hard Rocks & Large Broken Concrete	Disposed as Public Fill	Metals (see Note 1)	Paper/ cardboard packaging (see Note 1)	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse (see Note 3)
	tonne	tonne	tonne	tonne	tonne	kilogram	kilogram	kilogram	Litre	tonne
February 2019	326.44	0.00	0.00	0.00	326.44	0.00	0.00	0.00	0.00	26.69
March 2019	190.4	0.00	0.00	0.00	190.40	0.00	0.00	0.00	0.00	16.45
Total	64836.84	8222.28	0.00	0.00	56614.56	605001.00	418801.30	110360.00	6695.00	2697.28

Notes: (1) Metal and paper/cardboard packaging were collected by recycler for recycling.
(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material collected by recycler for recycling.
(3) General refuse was disposed of at NENT by subcontractors.

Annex G2

Operation Phase Waste Flow Table

No. EP/SP/61/10 of Organic Resources Recovery Centre (Phase 1)
Monthly Summary Waste Flow Table

Month	Chemical Waste	Waste Generated from Pretreatment Process				General Refuse							
		Disposed of at Landfill (see Note 1)	Metals (see Note 2)	Paper/ cardboard packaging (see Note 2)	Plastics (see Note 3)	Disposed of at Landfill (see Note 1)		Metals (see Note 2)		Paper/ cardboard packaging (see Note 2)		Plastics (see Note 3)	
	Litre	tonne	kilogram	kilogram	kilogram	No. of collection	tonne	No. of collection	kilogram	No. of collection	kilogram	No. of collection	kilogram
March 2019	1,200	477.08	0.00	0.00	0.00	26	1.50	0	0	0	0	0	0
Total	1,200	477.08	0.00	0.00	0.00	26	1.50	0	0	0	0	0	0

Notes:

1. General refuse was disposed of at NENT by subcontractors.
2. Metal and paper/cardboard packaging were collected by recycler for recycling.
3. Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material collected by recycler for recycling.
4. It was assumed that two 240-litre bins filled with 80% of general refuse were collected at each collection. The general refuse density was assumed to be around 0.15 kg/L.

Annex H

Environmental Complaint, Environmental Summons and Persecution Log

Annex H Cumulative Complaint and Summons/Prosecutions Log

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
May 2015	0	0
June 2015	0	0
July 2015	0	0
August 2015	0	0
September 2015	0	0
October 2015	0	0
November 2015	0	0
December 2015	0	0
January 2016	0	0
February 2016	0	0
March 2016	0	0
April 2016	0	0
May 2016	0	0
June 2016	0	0
July 2016	0	0
August 2016	0	0
September 2016	0	0
October 2016	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
November 2016	0	0
December 2016	0	0
January 2017	0	0
February 2017	0	0
March 2017	0	0
April 2017	0	0
May 2017	0	0
June 2017	0	0
July 2017	0	0
August 2017	0	0
September 2017	0	0
October 2017	0	0
November 2017	0	0
December 2017	0	0
January 2018	0	0
February 2018	0	0
March 2018	0	0
April 2018	0	0
May 2018	0	0
June 2018	0	0

Reporting Month	Number of Complaints in Reporting Month	Number of Summons/Prosecutions in Reporting Month
July 2018	0	0
August 2018	0	0
September 2018	1	0
October 2018	0	0
November 2018	0	0
December 2018	0	0
January 2019	0	0
February 2019	0	0
March 2019	0	0
Overall Total	**1**	**0**

Annex I

Odour Monitoring Result

Annex I1

Odour Patrol Result

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	1 / 3 / 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol~~ /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (°C)	23.1
Average Relative Humidity (%)	77.8

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	10:37	0 / 1 / 2 / 3 / 4	P1:0 P2:1 Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 2	10:38	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 3	10:39	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 4	10:42	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 5	10:44	0 / (1) / 2 / 3 / 4	Grass	(Intermittent) / Continuous	Grass	
Location 6	10:46	0 / 1 / 2 / 3 / 4	P1:1 P2:0 Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 7	10:49	0 / 1 / 2 / 3 / 4	P1:1 P2:0 Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 8	10:51	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM		Edwin Wong	HO Tsz kin	Sarah HO
Signature	F/S	NA			Sarah
Date	1/3/2019		1/3/2019	1/3/2019	1/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	1 / 3 / 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol~~ /
Weather Condition	Sunny / Cloudy / Windy / Humid / Foggy /
Average Temperature (℃)	22.5
Average Relative Humidity (%)	80.2

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	17:05	0 / (1) / 2 / 3 / 4	Biogas	Intermittent / (Continuous)	Biogas Holder	
Location 2	17:06	0 / (1) / 2 / 3 / 4	Biogas	Intermittent / (Continuous)	Biogas Holder	
Location 3	17:07	0 / (1) / 2 / 3 / 4	Biogas	Intermittent / (Continuous)	Biogas Holder	
Location 4	17:09	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 5	17:11	0 / (1) / 2 / 3 / 4	Grass	Intermittent / (Continuous)	Grass	
Location 6	17:13	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 7	17:16	0 / (1) / 2 / 3 / 4	Biogas	Intermittent / (Continuous)	Biogas Holder	
Location 8	17:17	0 / 1 / 2 / 3 / 4	P1: 1 P2: 0 Rubbish	(Intermittent) / Continuous	Rubbish Truck	

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM		Edwin Wong	Ho Tsz kin	Sarah Ho
Signature	Fiona	NA	Ew		Sarah.
Date	1/3/2019		1-3-2019	1-3-2019	1/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	4 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	(Sunny) / Cloudy / Windy / Humid / Foggy /
Average Temperature (℃)	23.8
Average Relative Humidity (%)	66

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	11:07	0 / (0) / 2 / 3 / 4	Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 2	11:09	0 / (1) / 2 / 3 / 4	Biogas	Intermittent / (Continuous)	Biogas Holder	
Location 3	11:10	0 / (1) / 2 / 3 / 4	Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 4	11:13	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 5	11:15	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 6	11:19	0 / (1) / 2 / 3 / 4	Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 7	11:25	0 / (1) / 2 / 3 / 4	Diesel	Intermittent / (Continuous)	Machine	
Location 8	11:26	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	TESS CHAN				Sarah HO
Signature	Tess	NA	NA	NA	Sarah
Date	04 MAR 2019				4 / 3 / 2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	8 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (°C)	20.1
Average Relative Humidity (%)	71

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	10:09	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	10:11	0 / (1) / 2 / 3 / 4	Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 3	10:12	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 4	10:15	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	10:19	0 / (1) / 2 / 3 / 4	Grass	*Intermittent* / (Continuous)	Grass	
Location 6	10:22	0 / (1) / 2 / 3 / 4	Rubbish	(Intermittent) / Continuous	Unknown source	
Location 7	10:29	0 / (1) / 2 / 3 / 4	Engine	(Intermittent) / Continuous	Truck	
Location 8	10:31	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	Fiona LAM				Sarah HO
Signature	Fiona	NA	NA	NA	Sarah
Date	8/3/2019				8 / 3 / 2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	11 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	(Sunny) / Cloudy / Windy / Humid / Foggy /
Average Temperature (°C)	24.8
Average Relative Humidity (%)	50

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	14:03	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	14:06	0 / (1) / 2 / 3 / 4	Biogas (strong) wastewater	*Intermittent / Continuous*	Biogas Holder Desulphurization Unit area	
Location 3	14:07	0 / (1) / 2 / 3 / 4		*Intermittent / Continuous*		
Location 4	14:11	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	14:13	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 6	14:17	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 7	14:22	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 8	14:23	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM				~~[illegible]~~ Sarah Ho
Signature	Fiona	NA	NA	NA	Sarah
Date	11/3/2019				11/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	13 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	(Sunny) / Cloudy / Windy / Humid / Foggy /
Average Temperature (℃)	26.8
Average Relative Humidity (%)	50

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	13:31	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	13:33	0 / (1) / 2 / 3 / 4	Biogas	*Intermittent / Continuous*	Biogas Holder	
Location 3	13:34	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 4	13:36	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	13:38	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 6	13:41	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 7	13:44	0 / (1) / 2 / 3 / 4	oil	*Intermittent / Continuous*	Machine	
Location 8	13:46	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	TESS CHAN				Sarah HO
Signature		NA	NA	NA	Sarah
Date	13 MAR 2019				13/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	15 March 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol~~ /
Weather Condition	Sunny / Cloudy / Windy / Humid / Foggy /
Average Temperature (°C)	22.8
Average Relative Humidity (%)	29%

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	10:59	(0) / 1 / 2 / 3 / 4	—	~~Intermittent / Continuous~~		
Location 2	11:02	0 / (1) / 2 / 3 / 4	Biogas smell/plastic	Intermittent / Continuous	Biogas Hold PRV	—
Location 3	11:03	0 / (1) / 2 / 3 / 4	Biogas smell	Intermittent / Continuous	Vehicular Emission	—
Location 4	11:05	(0) / 1 / 2 / 3 / 4	—	Intermittent / Continuous		
Location 5	11:06	(0) / 1 / 2 / 3 / 4	—	Intermittent / Continuous		
Location 6	11:09	(0) / 1 / 2 / 3 / 4	—	Intermittent / Continuous		
Location 7	11:11	(0) / 1 / 2 / 3 / 4	—	Intermittent / Continuous		
Location 8	11:13	(0) / 1 / 2 / 3 / 4	—	Intermittent / Continuous		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	TEE CHAI				Patience CHAN
Signature					
Date	15 MAR 2019				15/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	18 Mar 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol~~ /
Weather Condition	Sunny / Cloudy / Windy / Humid / Foggy /
Average Temperature (°C)	26°C
Average Relative Humidity (%)	65%

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	14:14	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	14:15	0 / 1 / 2 / 3 / 4	Plastic Smell	~~Intermittent~~ / Continuous	PRV of Gas Holder	
Location 3	14:16	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 4	14:19	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	14:21	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 6	14:23	0 / 1 / 2 / 3 / 4	Soil Smell	~~Intermittent~~ / Continuous	Landscape works nearby at B2/B1	
Location 7	14:26	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 8	14:27	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	David Choi				Terence CHAN
Signature					
Date	18/3/2019				18/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	20 Mar 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol /~~
Weather Condition	Sunny / Cloudy / Windy / Humid / Foggy /
Average Temperature (°C)	25°C
Average Relative Humidity (%)	80%

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	11:05	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	11:07	0 / 1 / 2 / 3 / 4	Plastic smell	*Intermittent / Continuous*	PRV of Gasholder	-
Location 3	11:08	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 4	11:10	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	11:12	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 6	11:14	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 7	11:16	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 8	11:17	0 / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	Daniel Choi				Terence CHAN
Signature					
Date	20/3/2019				20/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	22 Mar 2019
Type of Patrol	Weekly Patrol / ~~Monthly Independent Patrol~~ /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (°C)	27°C
Average Relative Humidity (%)	85%

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	1:04	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 2	1:06	0 / (1) / 2 / 3 / 4	Plastic Smell	(Intermittent) / Continuous	PSV of Gas Holder	
Location 3	1:07	0 / (1) / 2 / 3 / 4	H_2S smell	(Intermittent) / Continuous	desulphur Analyser	
Location 4	1:10	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 5	1:12	0 / (1) / 2 / 3 / 4	Glass smell	(Intermittent) / Continuous	Landscape	
Location 6	1:16	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 7	1:17	0 / (1) / 2 / 3 / 4	Rubbish Smell	(Intermittent) / Continuous	Retreatment /	
Location 8	1:19	0 / (1) / 2 / 3 / 4	Rubbish Smell	(Intermittent) / Continuous	unknown	

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM				Terence CHAN
Signature	Fiona				
Date	22/3/2019				22/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	25 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (°C)	23.3
Average Relative Humidity (%)	70

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	11:06	0 / (1) / 2 / 3 / 4	Grass Smell	(Intermittent) / Continuous	Grass	
Location 2	11:08	0 / (1) / 2 / 3 / 4	Biogas	(Intermittent) / Continuous	Biogas Holder	
Location 3	11:10	0 / (1) / 2 / 3 / 4	H_2S	(Intermittent) / Continuous	Desulphurization Unit	
Location 4	11:13	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 5	11:16	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		
Location 6	11:18	0 / (1) / 2 / 3 / 4	Compost	(Intermittent) / Continuous	Composting Hall	
Location 7	11:22	0 / (1) / 2 / 3 / 4	Generator	Intermittent / Continuous	Electric Generator	
Location 8	11:25	(0) / 1 / 2 / 3 / 4		Intermittent / Continuous		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	Fiona LAM				Sarah HO
Signature	Fiona	NA	NA	NA	Sarah
Date	25/3/2019				25 / 3 / 2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	27 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (°C)	24.4
Average Relative Humidity (%)	69

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	10:05	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	10:07	0 / (1) / 2 / 3 / 4	Biogas	*Intermittent / (Continuous)*	Biogas Holder	
Location 3	10:08	0 / (1) / 2 / 3 / 4	Biogas	*(Intermittent) / Continuous*	Biogas Holder	
Location 4	10:11	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	10:14	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 6	10:16	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 7	10:18	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 8	10:19	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM				Sarah HO
Signature	Fiona	NA	NA	NA	Sarah.
Date	27/3/2019				27/3/2019

Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

Organic Resources Recovery Centre (Phase 1)
Odour Patrol Record Log Sheet

OSCAR BIOENERGY

Date	29 / 3 / 2019
Type of Patrol	(Weekly Patrol) / Monthly Independent Patrol /
Weather Condition	Sunny / (Cloudy) / Windy / Humid / Foggy /
Average Temperature (℃)	25.8
Average Relative Humidity (%)	80

Monitoring Location	Time	Odour Intensity	Odour Characteristics	Duration	Possible Source of Odour	Remark
Location 1	9:20	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 2	9:22	0 / (1) / 2 / 3 / 4	Biogas	*Intermittent / (Continuous)*	Biogas Holder	
Location 3	9:23	0 / (1) / 2 / 3 / 4	Biogas	*(Intermittent) / Continuous*	Biogas Holder	
Location 4	9:26	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 5	9:28	0 / (1) / 2 / 3 / 4	Grass	*(Intermittent) / Continuous*	Grass	
Location 6	9:30	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		
Location 7	9:33	0 / (1) / 2 / 3 / 4	Rubbish	*(Intermittent) / Continuous*	Inert Truck	
Location 8	9:35	(0) / 1 / 2 / 3 / 4		*Intermittent / Continuous*		

Remark

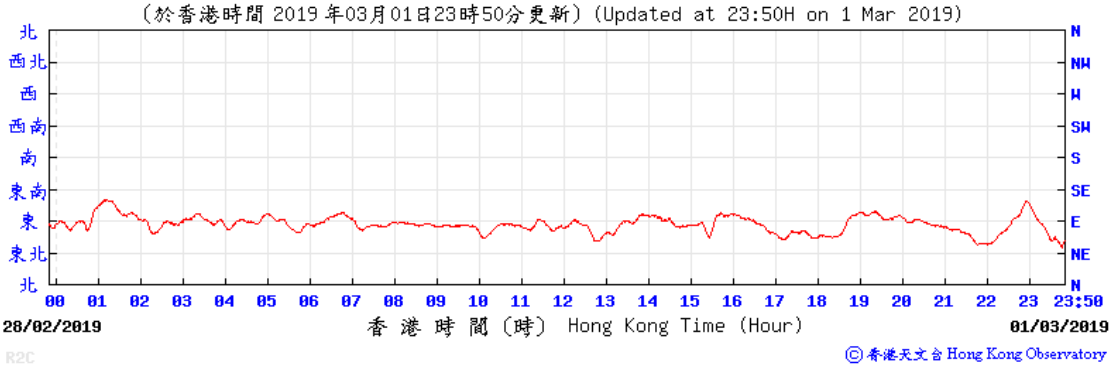
	EPD Representative	Employer Representative	Independent Odour Patrol Team	Independent Odour Patrol Team	OSCAR Bioenergy JV
Name	FIONA LAM				Sarah HO
Signature	FionA	NA	NA	NA	Sarah
Date	29/3/2019				29/3/2019

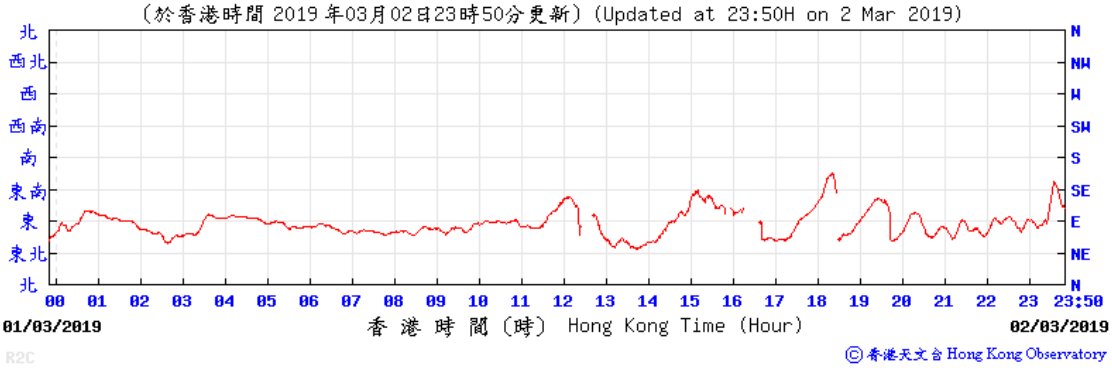
Example of Odour Characteristics	Example of Possible Source of Odour
Biogas / Compost / sewage /rotten-egg smell/ decayed vegetables/ Diesel / ammoniacal/ dischargeable odour/ putrefaction/ sharp/ pungent/ fish/ irritating/ fruit/ vinegar	*PRVs of Gas Holder / Sediment/ Water / SSOW Trucks Doors Opened / Stack emission / Sewage / food waste/ Pretreatment / Machine Operation / Material / others /*

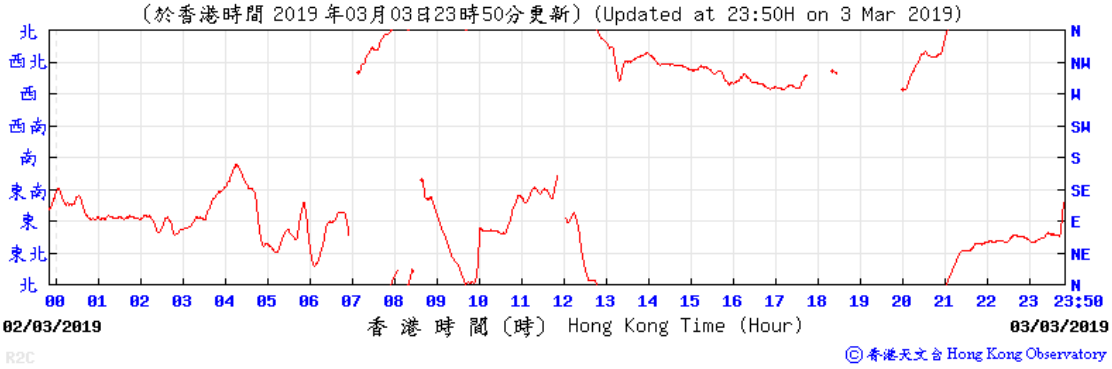
Annex I2

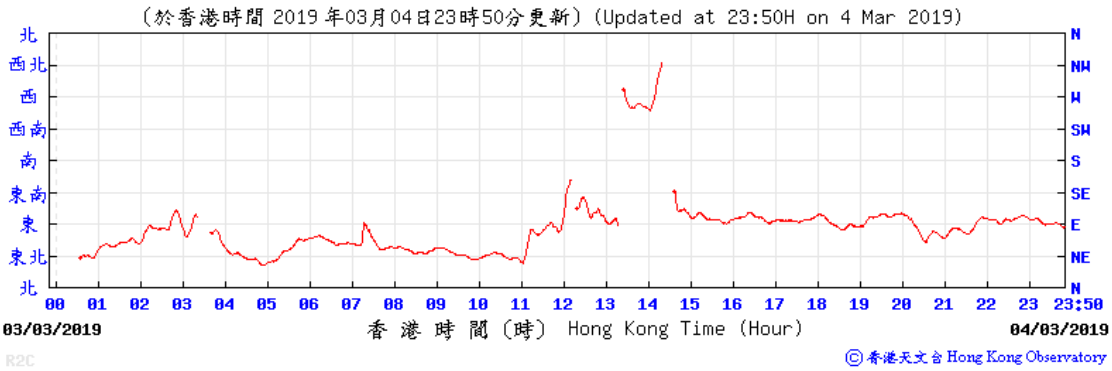
Local Wind Direction and Wind Speed

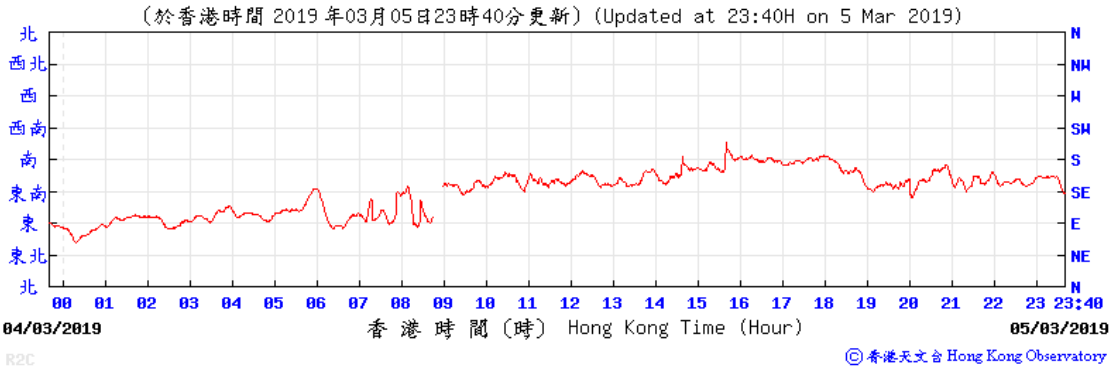
Wind Direction







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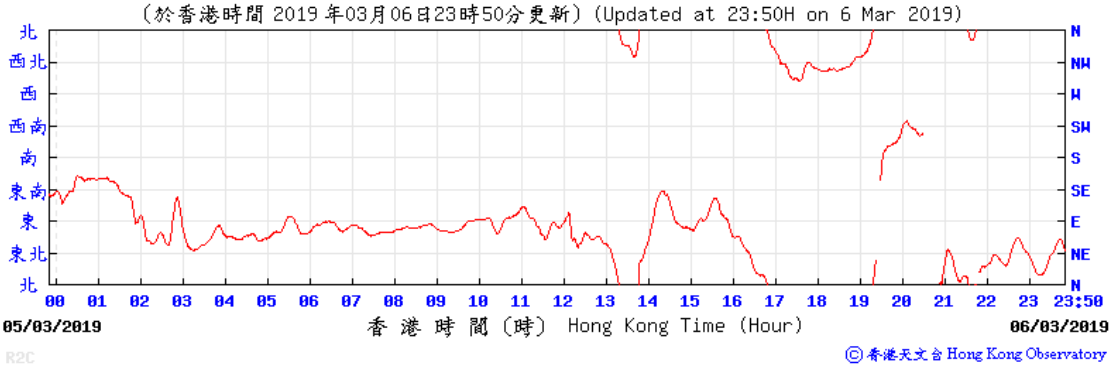
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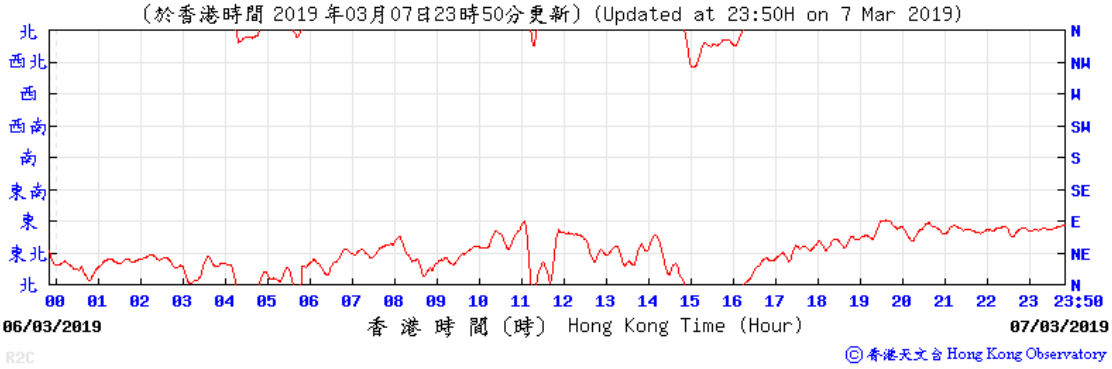
© 香港天文台 Hong Kong Observatory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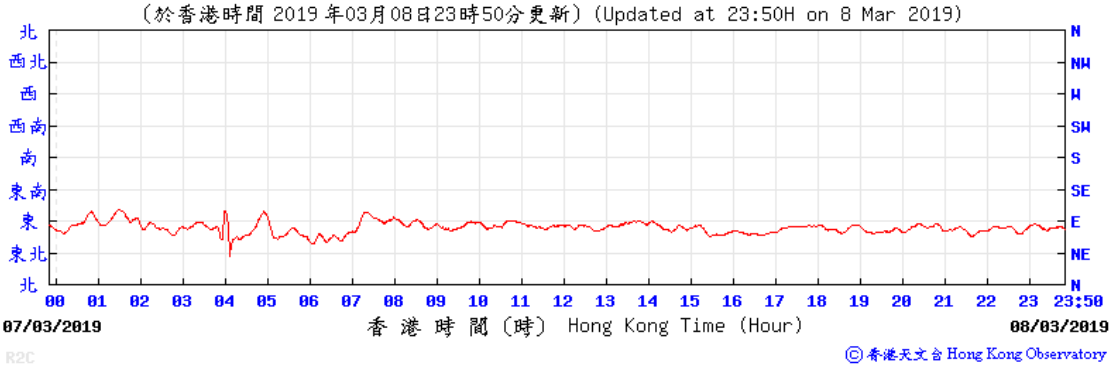
© 香港天文台 Hong Kong Observatory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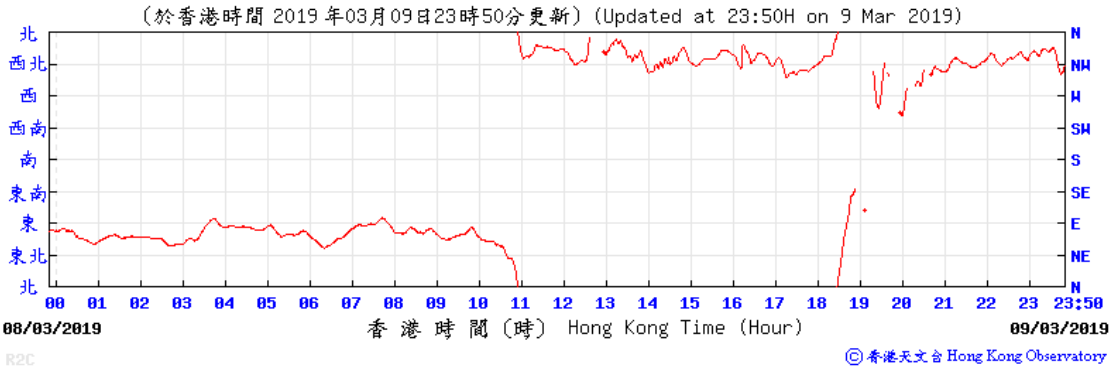
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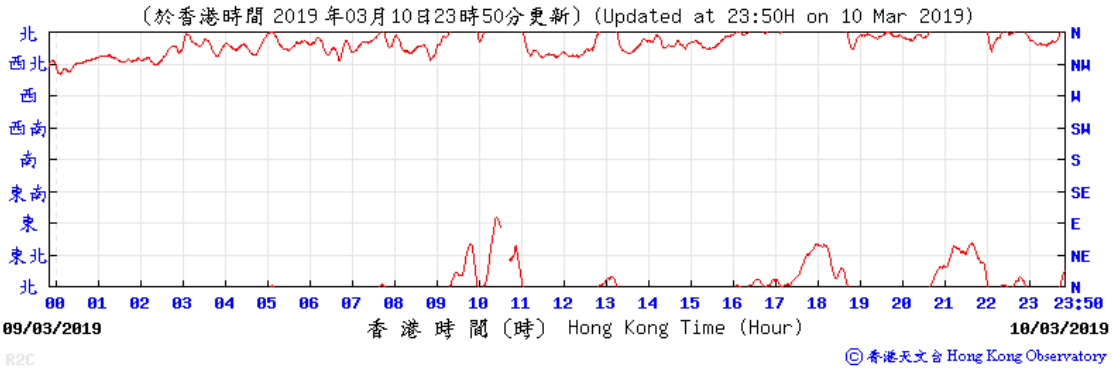
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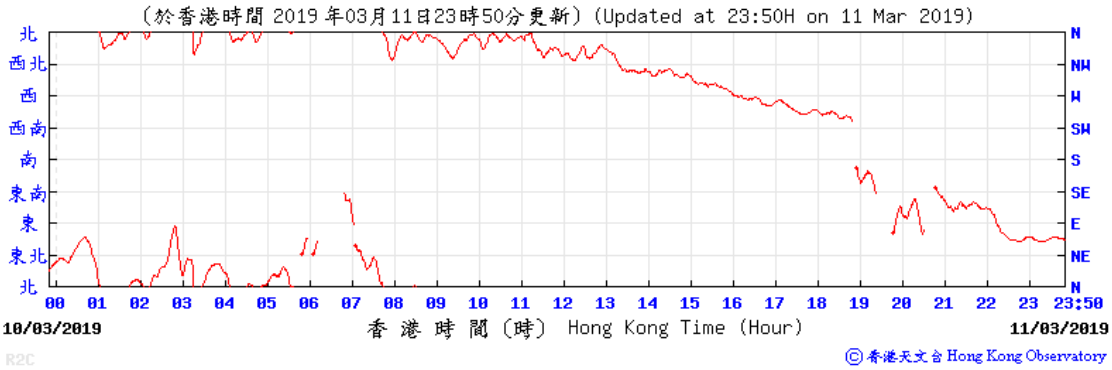
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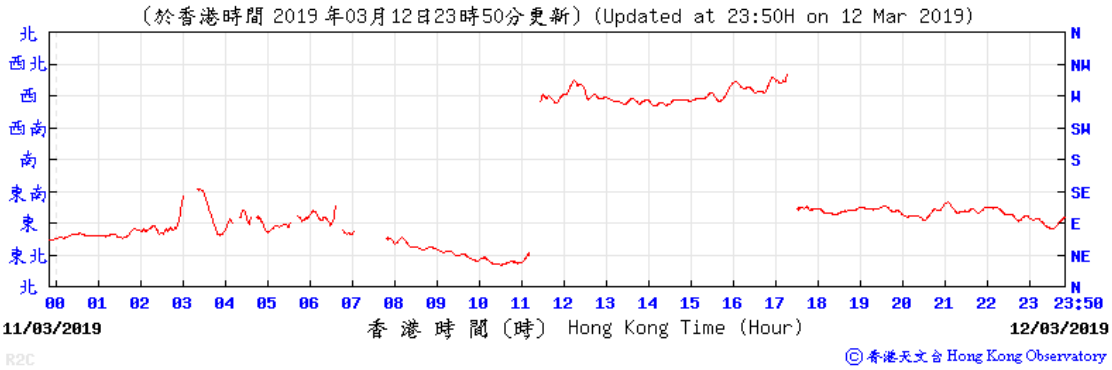
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12/03/2019
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(於香港時間 2019 年03月13日23時50分更新) (Updated at 23:50H on 13 Mar 2019)

12/03/2019 香 港 時 間 (時) Hong Kong Time (Hour) 13/03/2019

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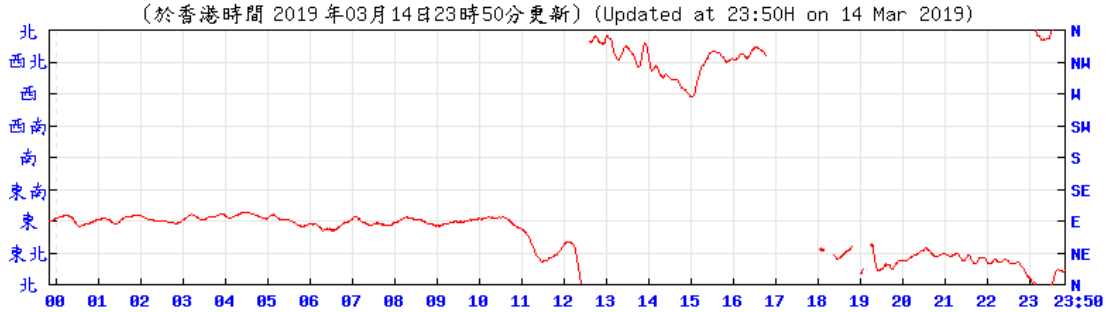

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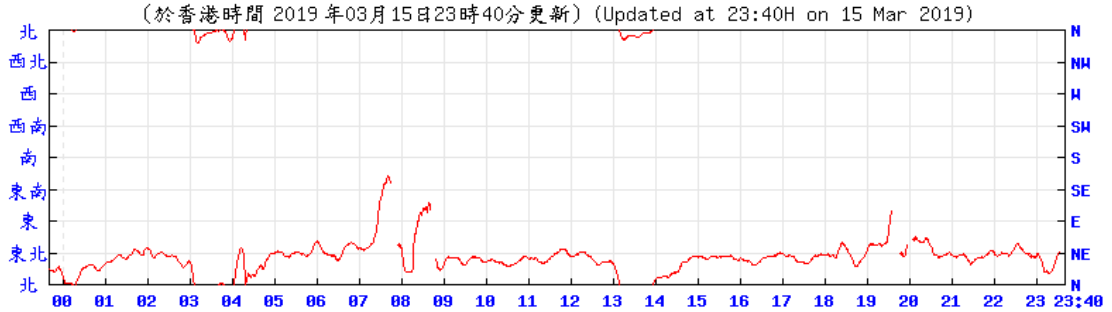

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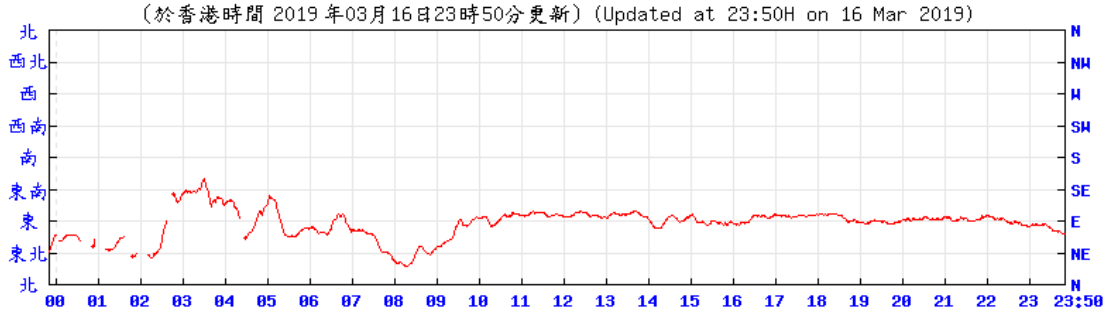

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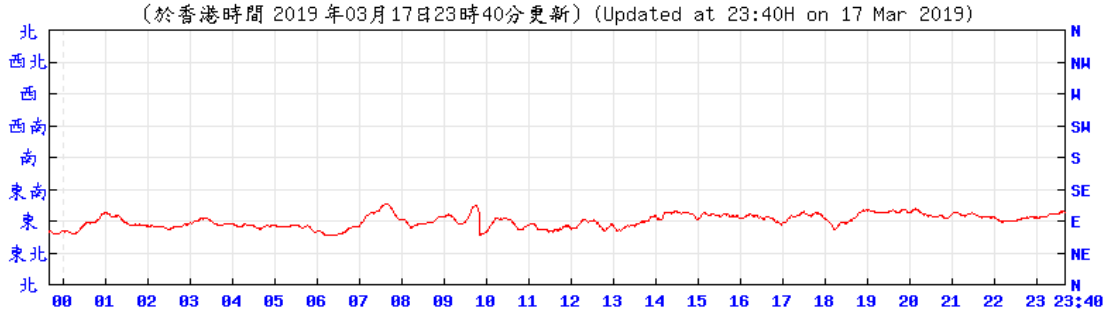

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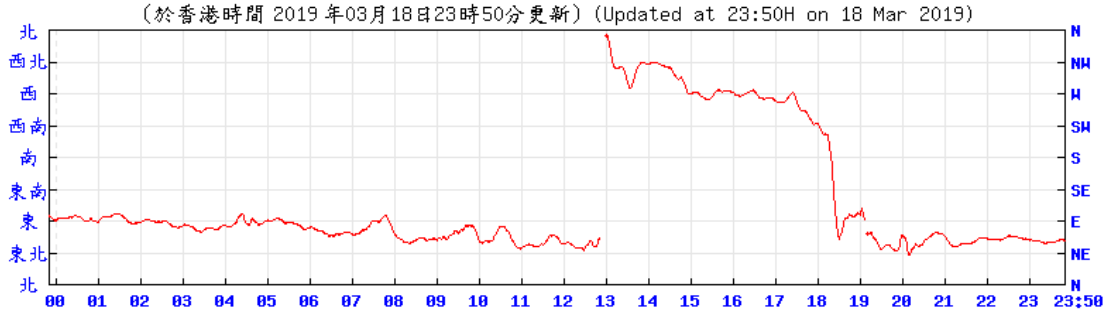

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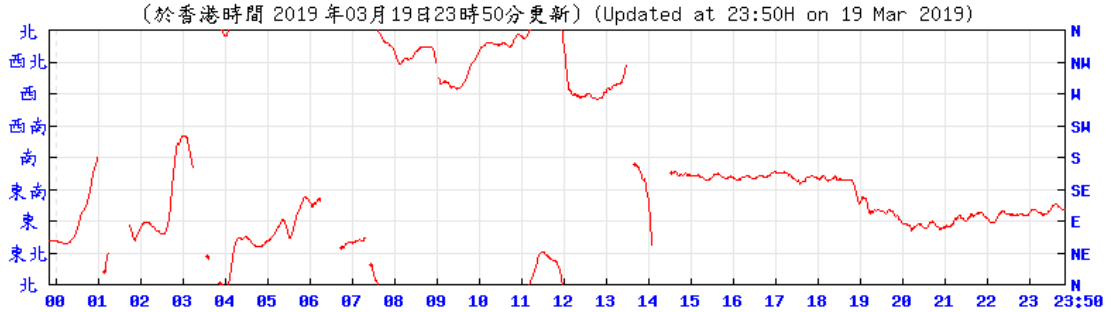

18/03/2019 香 港 時 間 (時) Hong Kong Time (Hour) 19/03/2019

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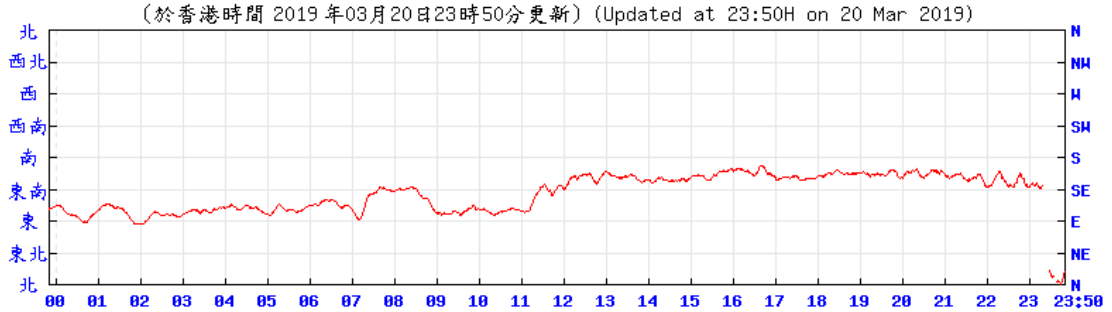

19/03/2019 香 港 時 間 (時) Hong Kong Time (Hour) 20/03/2019

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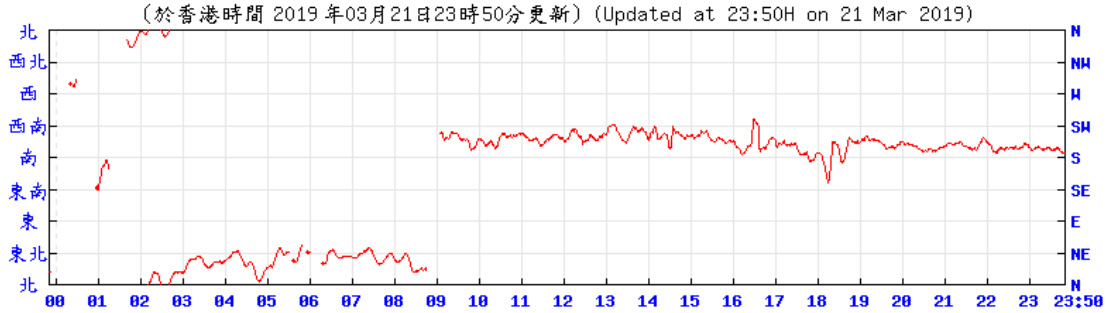

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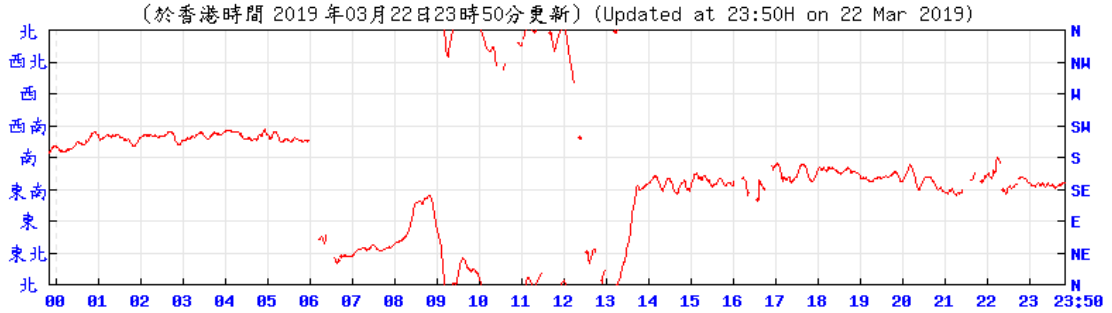

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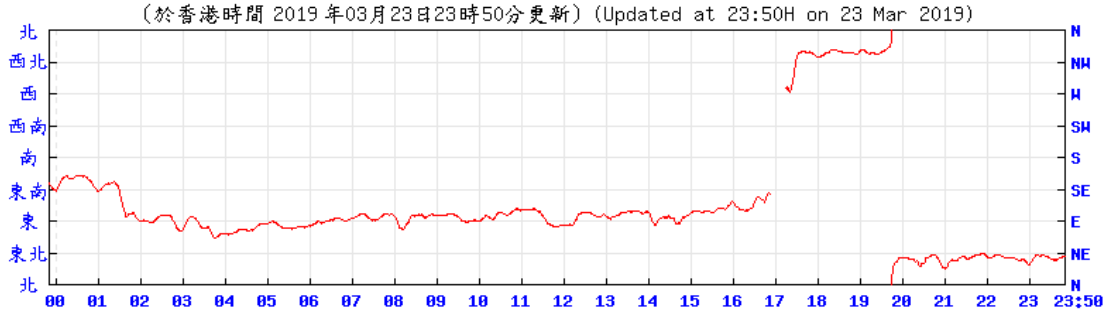

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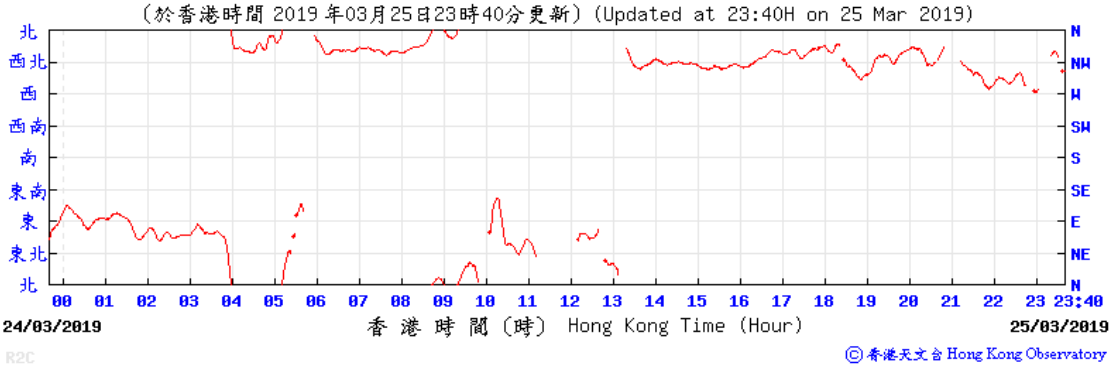

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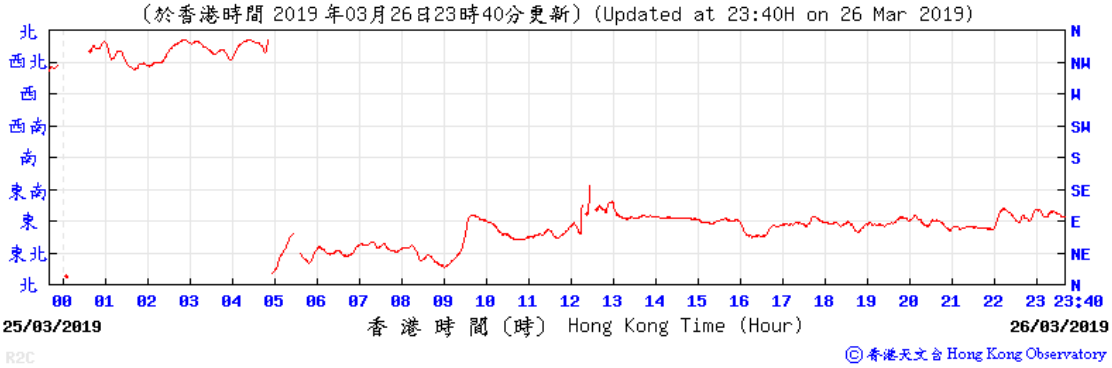

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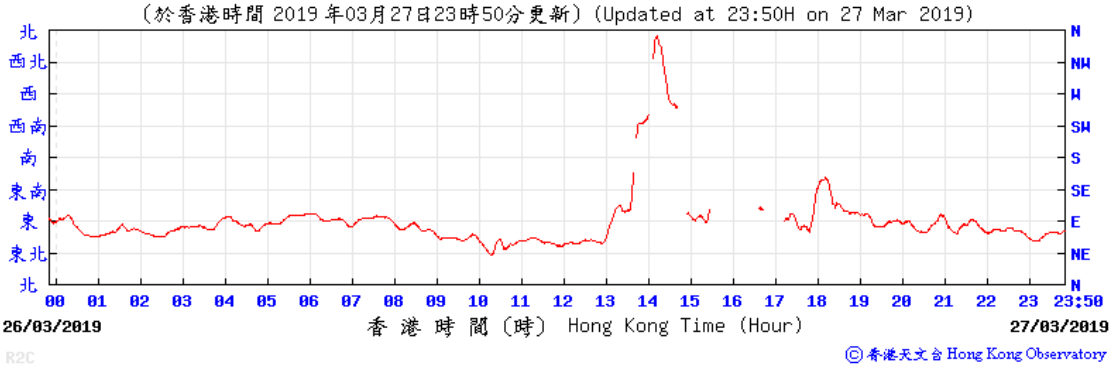

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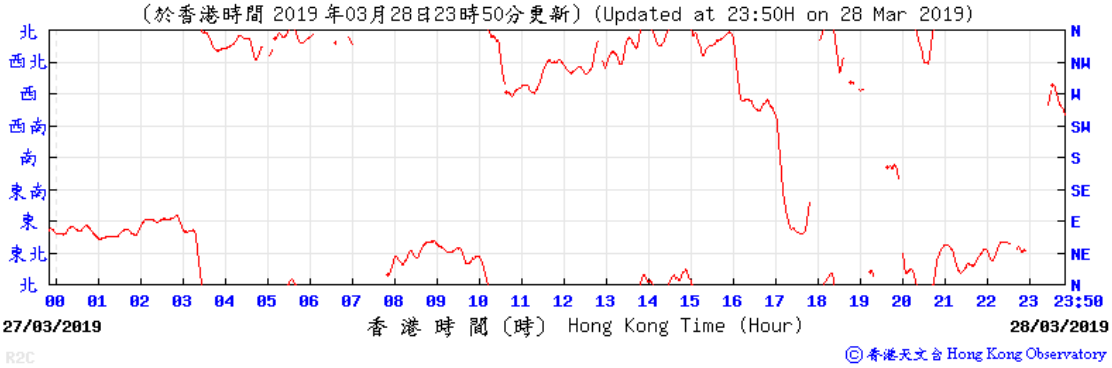

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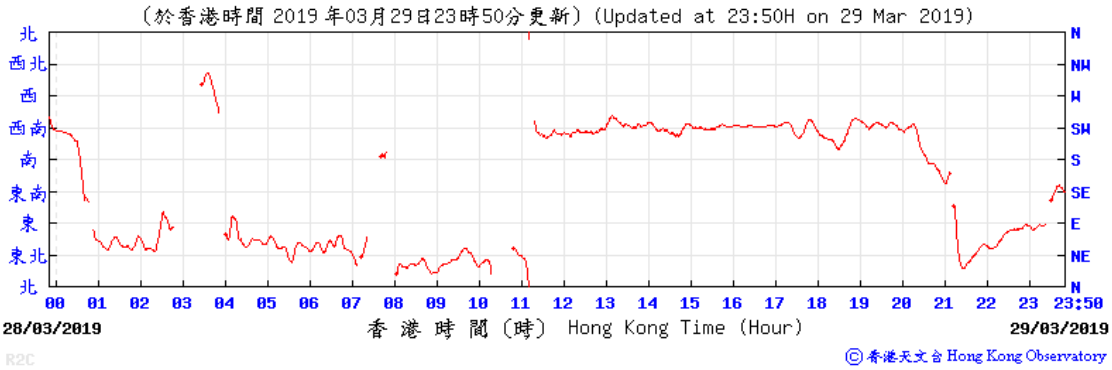
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28/03/2019
香 港 時 間 (時) Hong Kong Time (Hour)
29/03/2019
R2C
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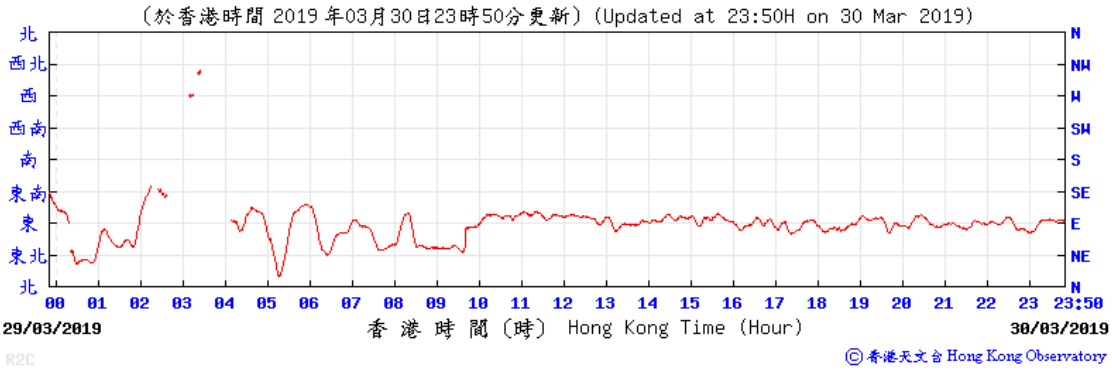
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29/03/2019
香 港 時 間 (時) Hong Kong Time (Hour)
30/03/2019
R2C
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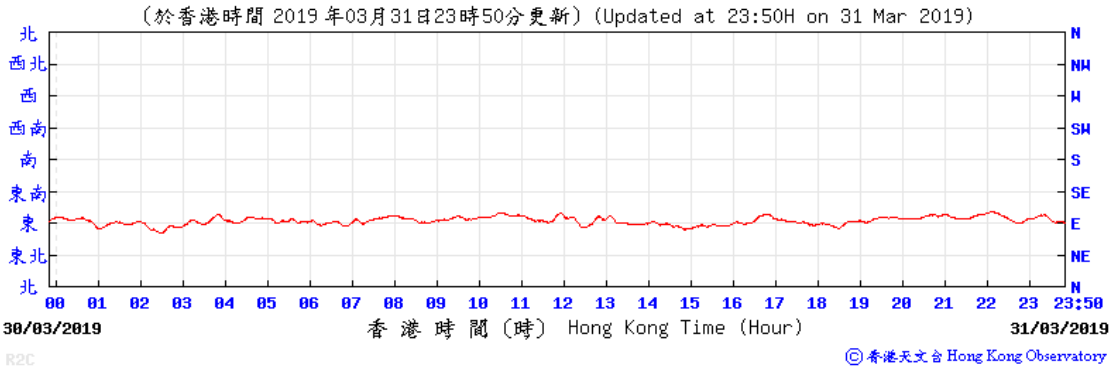
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30/03/2019
香 港 時 間 (時) Hong Kong Time (Hour)
31/03/2019
R2C
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Annex I3

Odour Sampling Result

ALS Technichem (HK) Pty Ltd
1/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1864017
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	10 December 2018
		DATE OF ISSUE:	14 December 2018
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 10th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1864017-001	CAPC Unit (Bypass AC Filter)	10-Dec-18	11:36-11:41	11	828	Decayed orange with minor bleach smell	1267.4	63,000,000
HK1864017-002	CAPC Unit (Bypass AC Filter)	10-Dec-18	11:41-11:46	11	886	Decayed orange with minor bleach smell	1267.4	67,400,000
HK1864017-003	Field Blank	10-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

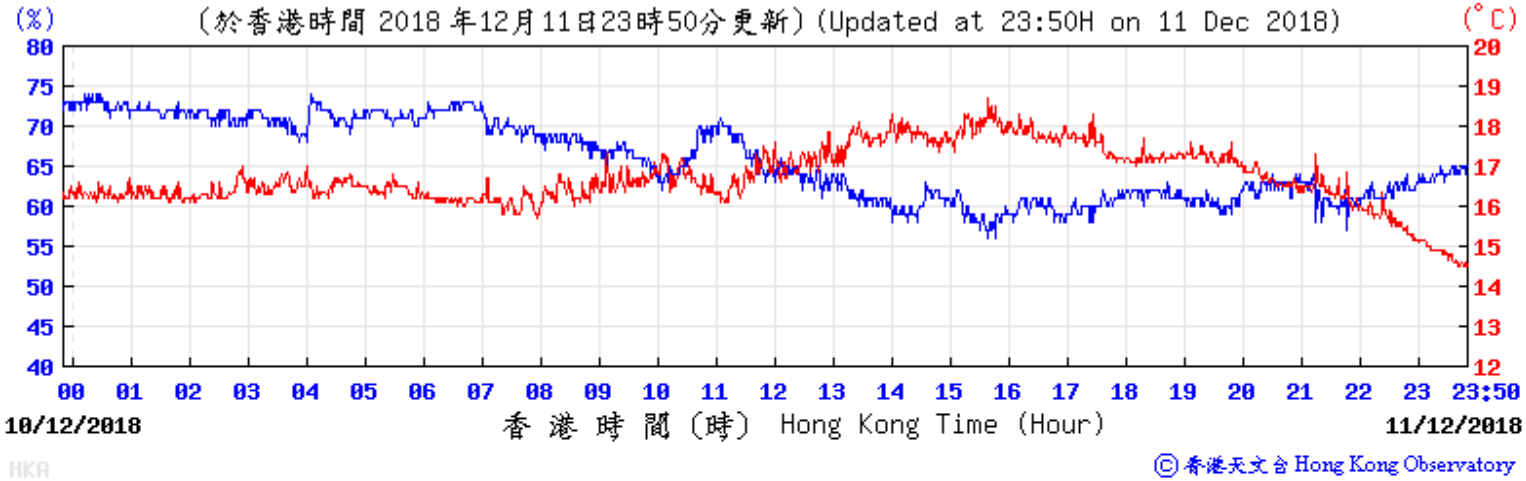
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	10-12-18	11:36 - 11:46	17.3	64.6	1019.4	0.7	320	NA	NA	No odour was smelled.	NA	Cloudy

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

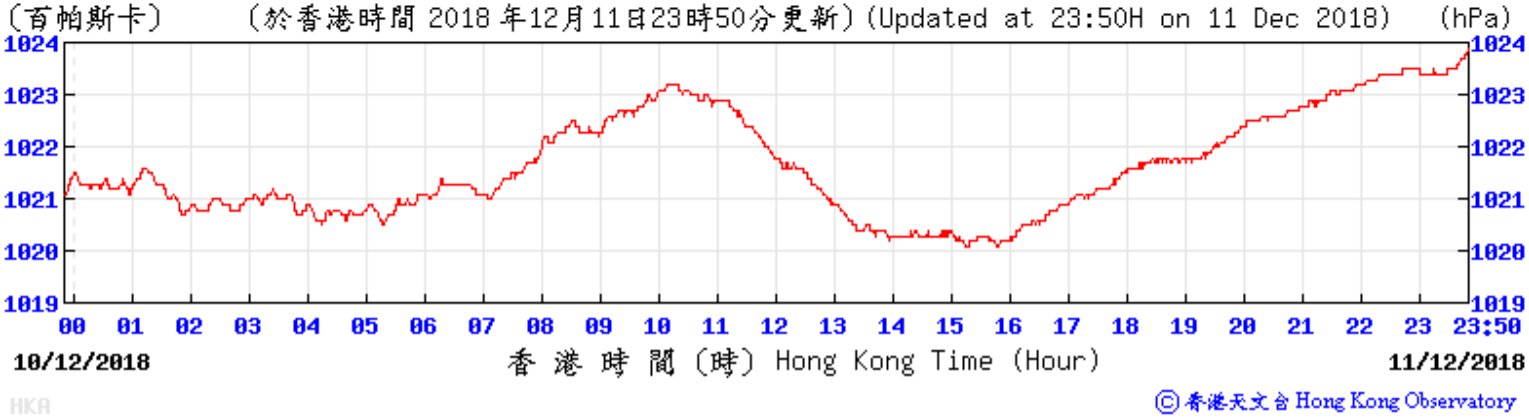
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

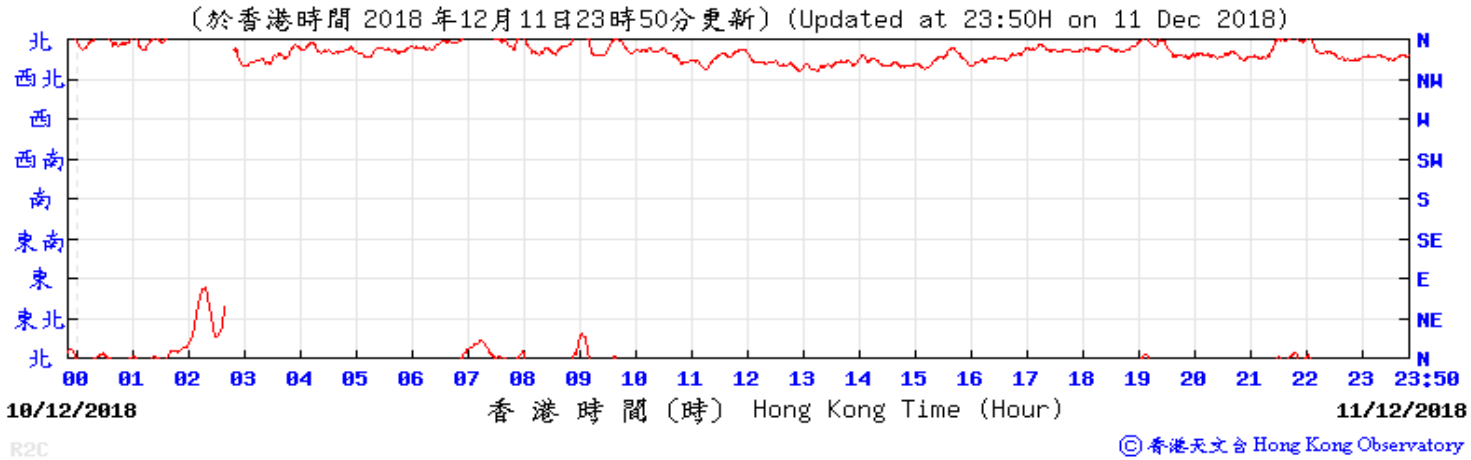
Tempearture/Humidity:



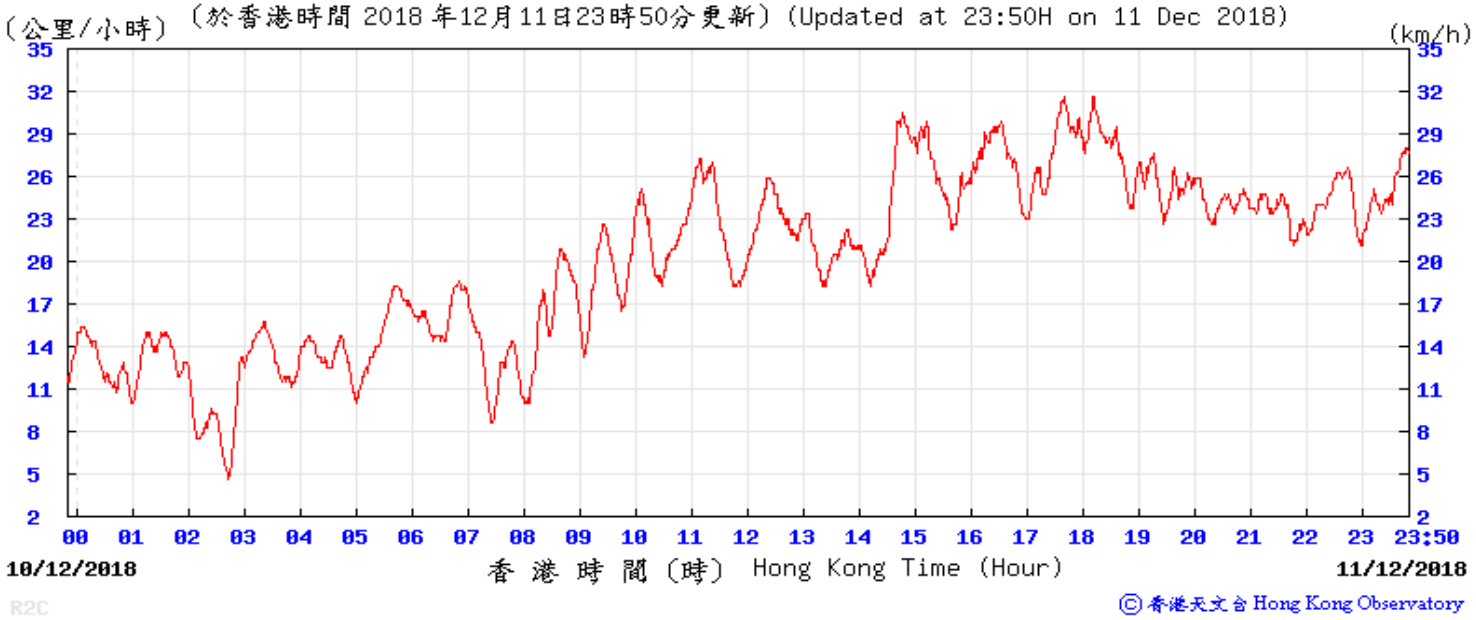
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1864595
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	10 December 2018
		DATE OF ISSUE:	14 December 2018
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 10th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1864595-001	CAPC Unit (With AC Filter)	10-Dec-18	11:56 – 12:02	11	773	Decayed orange	1156.5	53,600,000
HK1864595-002	CAPC Unit (With AC Filter)	10-Dec-18	12:02 – 12:07	11	674	Decayed orange	1156.5	46,800,000
HK1864595-003	Field Blank	10-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

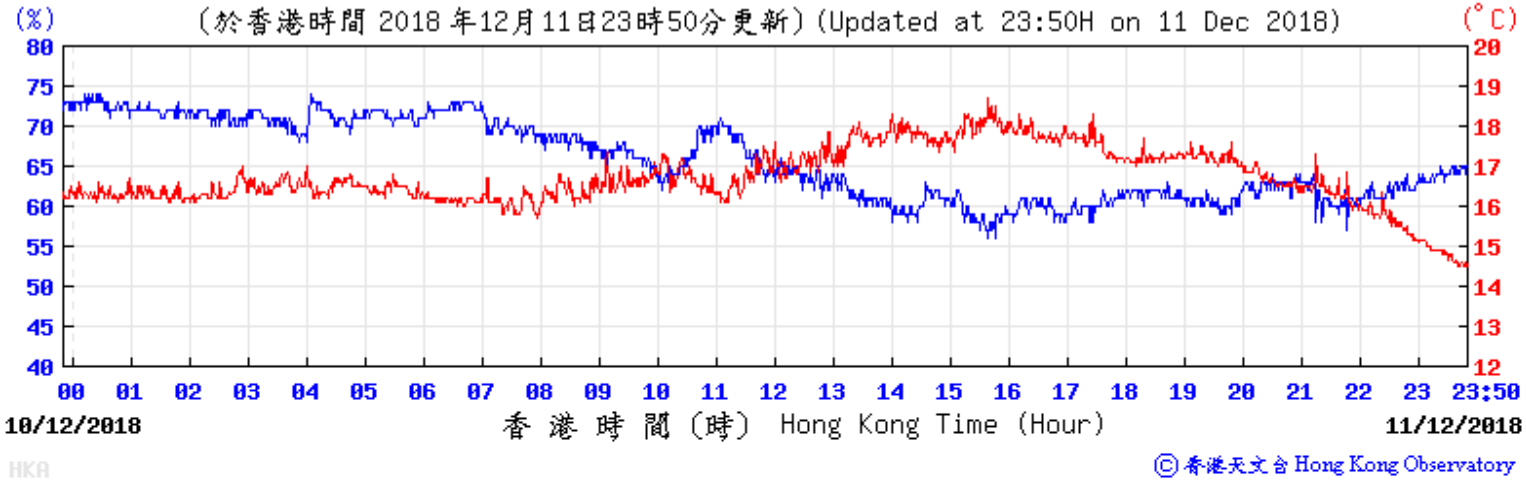
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	10-12-18	11:56 - 12:07	17.8	64.1	1019.4	0.8	291	NA	NA	No odour was smelled.	NA	Cloudy

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

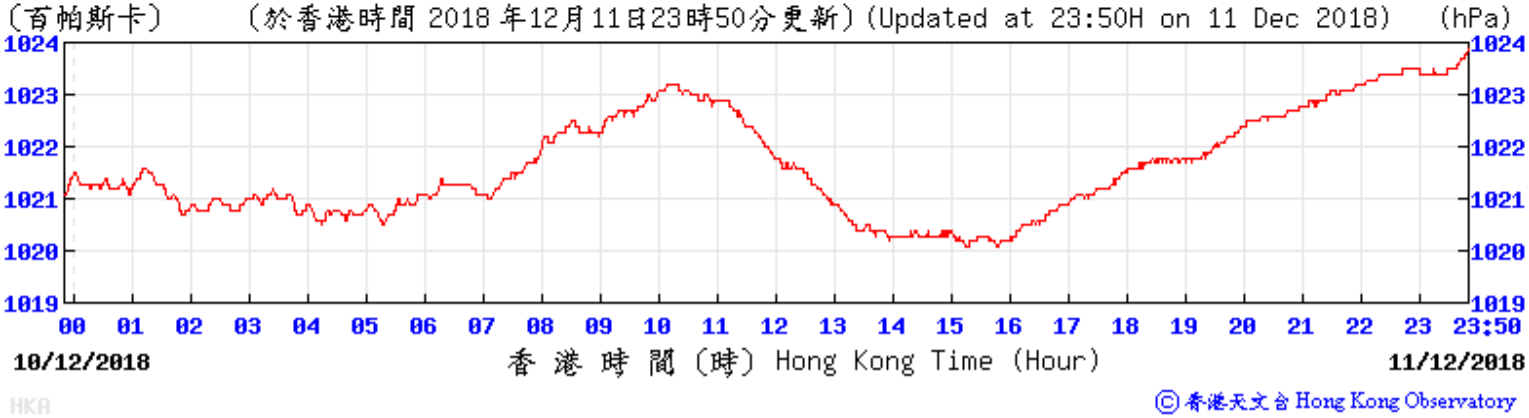
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

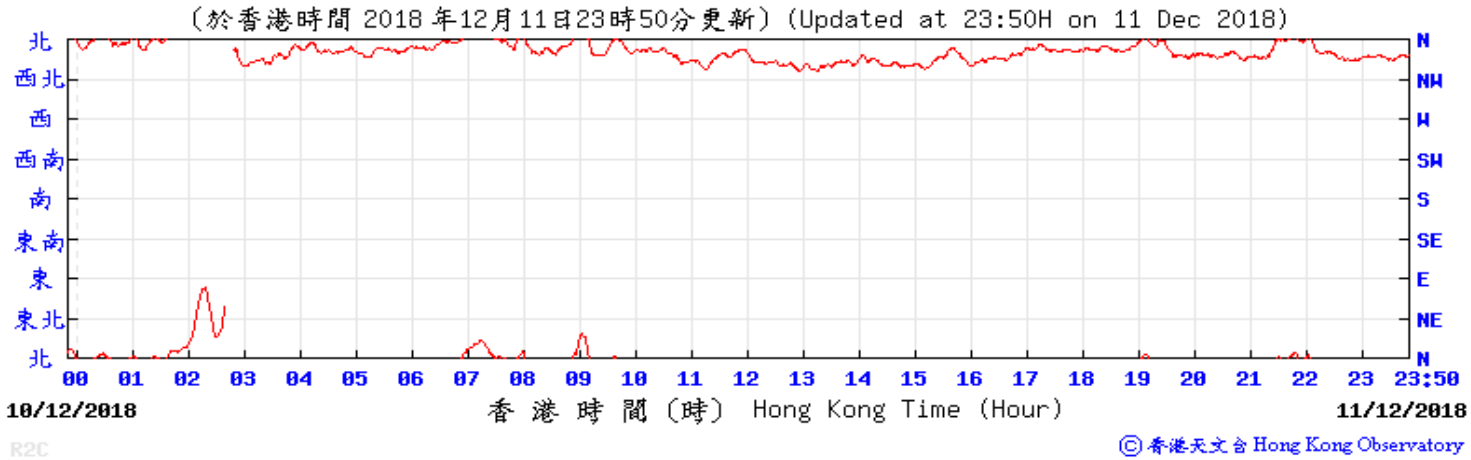
Tempearture/Humidity:



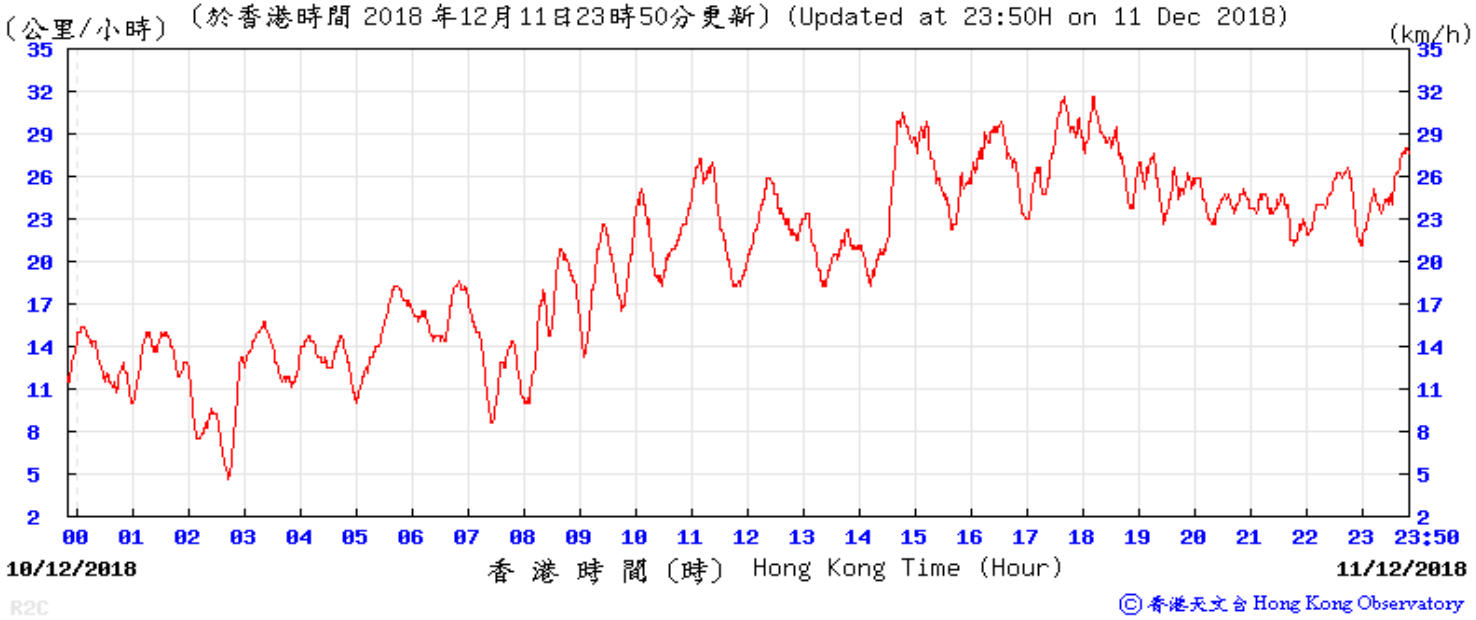
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
1/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1864596
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	11 December 2018
		DATE OF ISSUE:	14 December 2018
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 11th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1864596-001	CAPC Unit (Bypass AC Filter)	11-Dec-18	15:13 - 15:17	11	476	Decayed orange with minor bleach smell	1419	40,500,000
HK1864596-002	CAPC Unit (Bypass AC Filter)	11-Dec-18	15:19 - 15:23	11	510	Decayed orange with minor bleach smell	1419	43,400,000
HK1864596-003	Field Blank	11-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

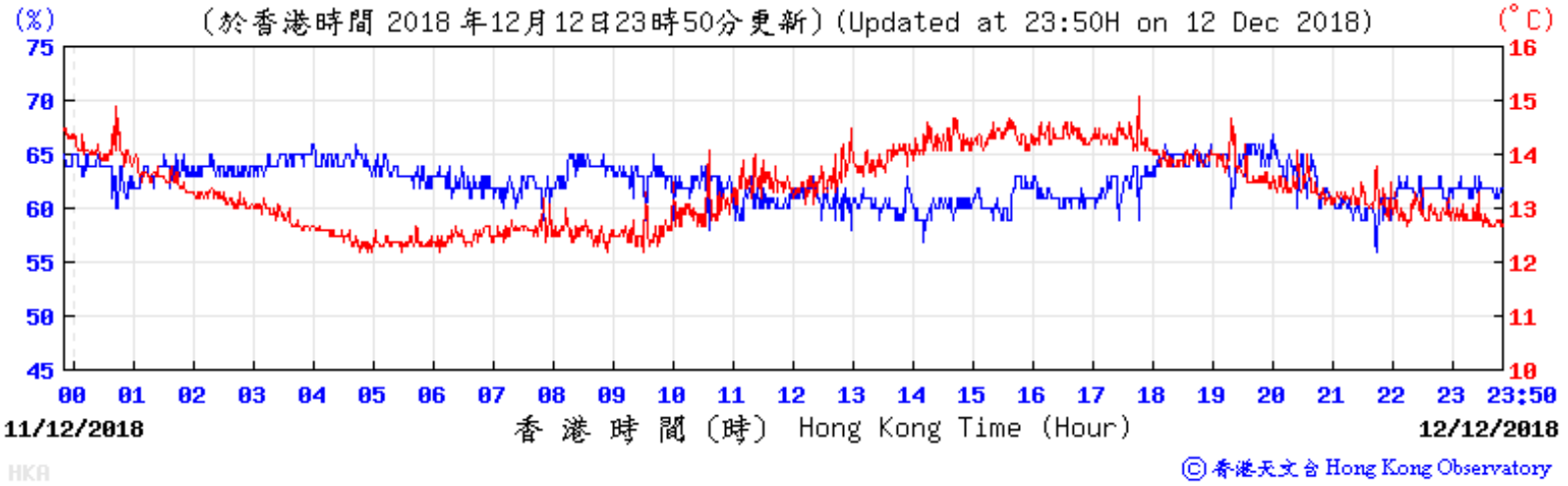
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	11-12-18	15:13 - 15:23	18.0	64.7	1017.6	3.0	321	NA	NA	No odour was smelled.	NA	Sunny

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

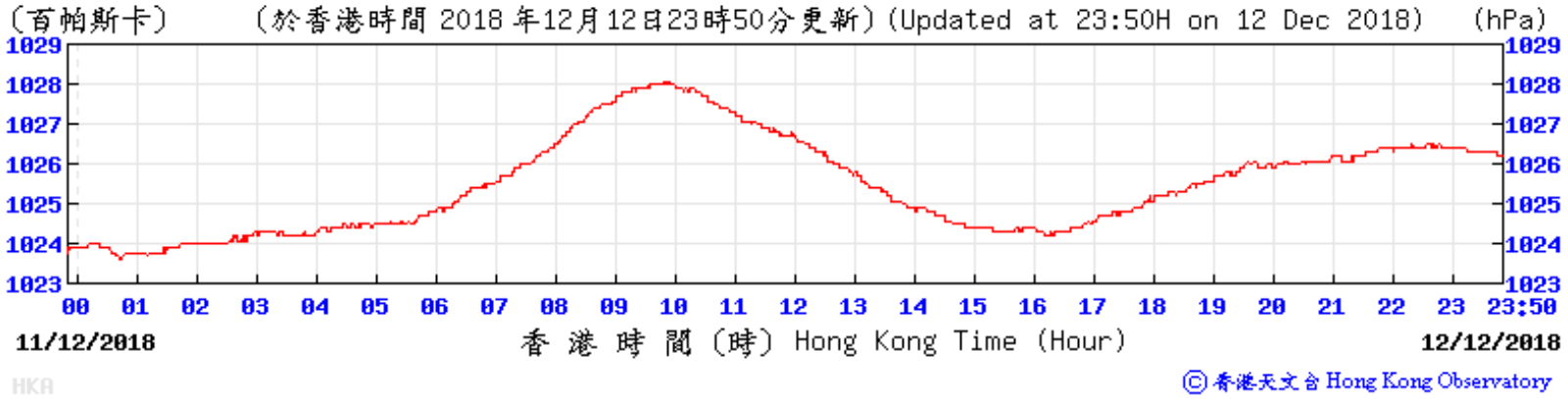
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

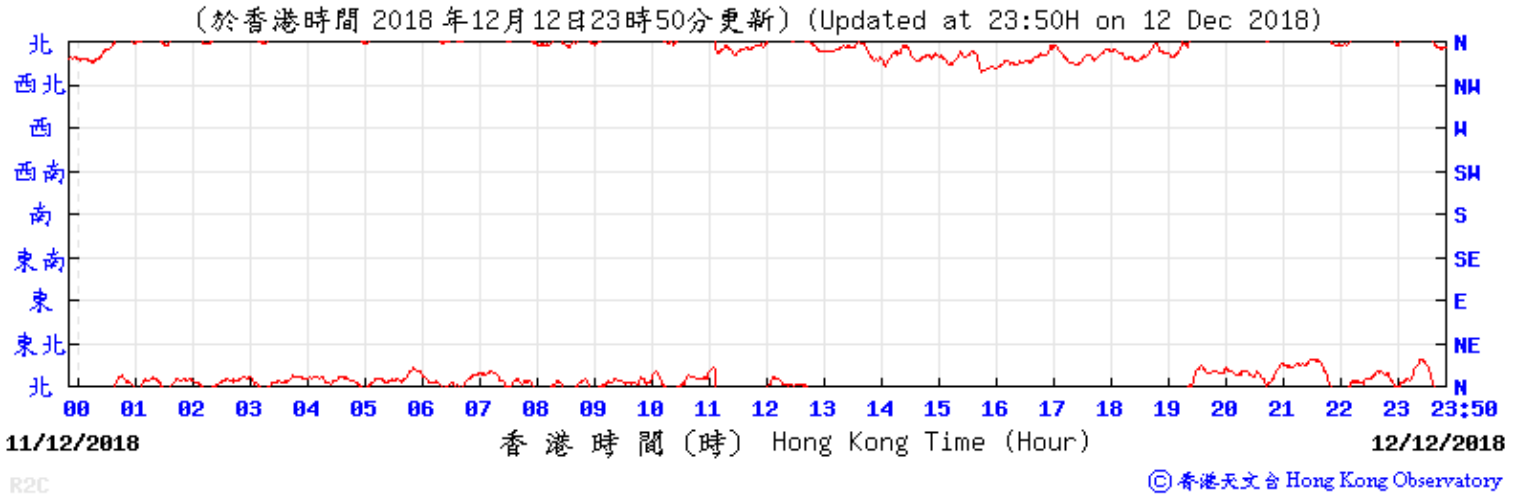
Tempearture/Humidity:



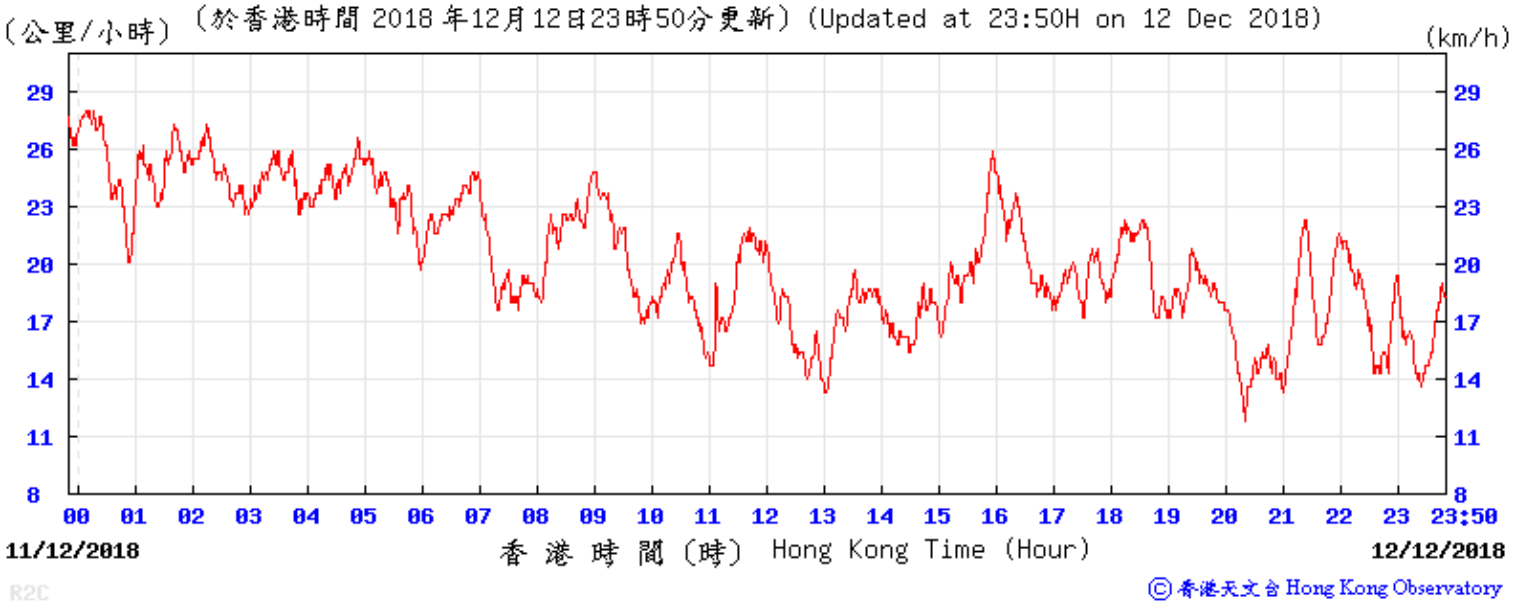
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 E +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1864597
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	11 December 2018
		DATE OF ISSUE:	14 December 2018
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 11th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1864597-001	CAPC Unit (With AC Filter)	11-Dec-18	15:34 - 15:38	11	414	Decayed orange	1390.1	34,500,000
HK1864597-002	CAPC Unit (With AC Filter)	11-Dec-18	15:38 - 15:43	11	443	Decayed orange	1390.1	37,000,000
HK1864597-003	Field Blank	11-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

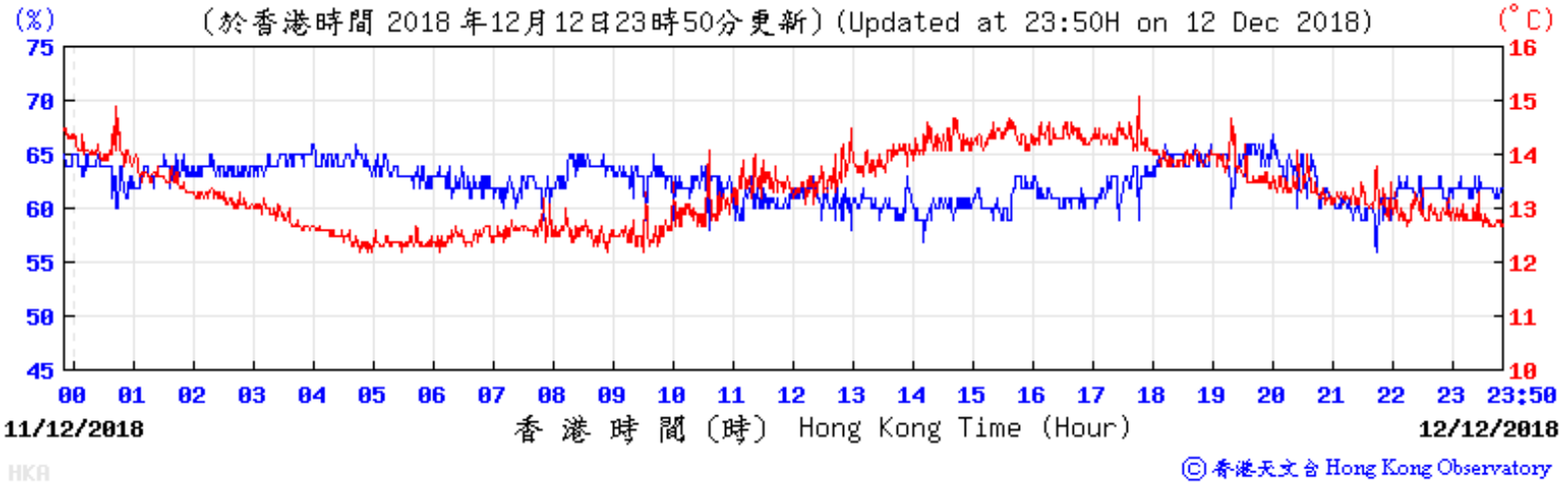
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	11-12-18	15:34 - 15:43	18.3	64.0	1017.6	2.5	281	NA	NA	No odour was smelled.	NA	Sunny

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

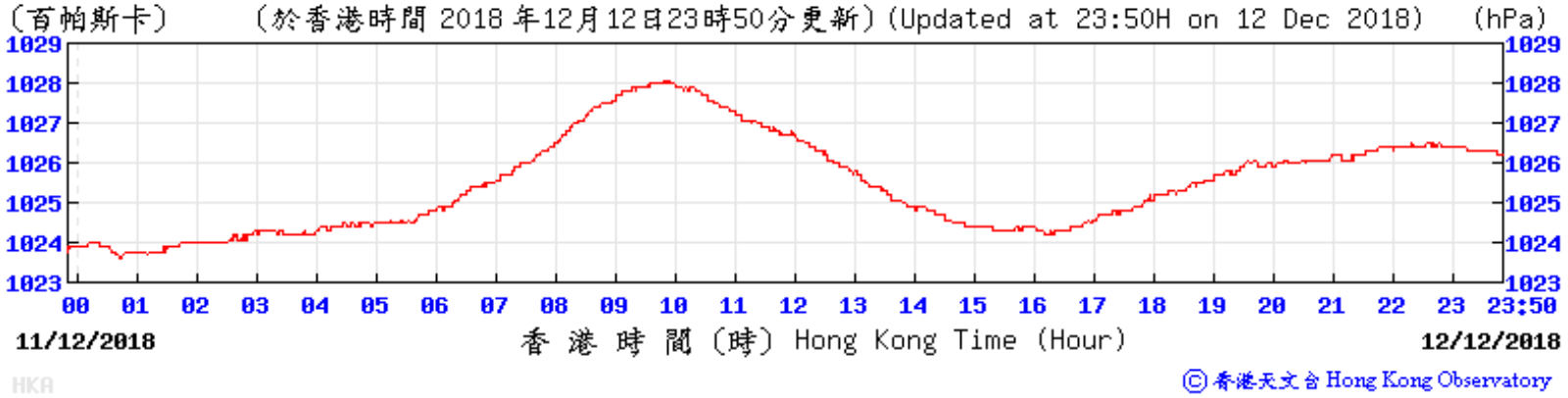
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

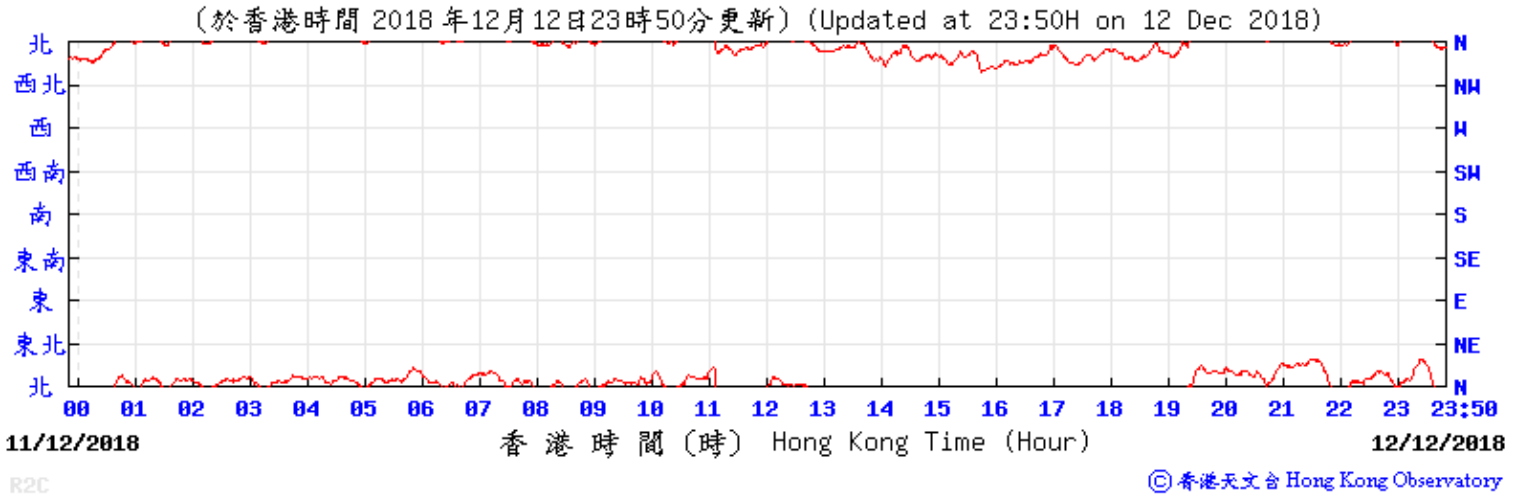
Tempearture/Humidity:



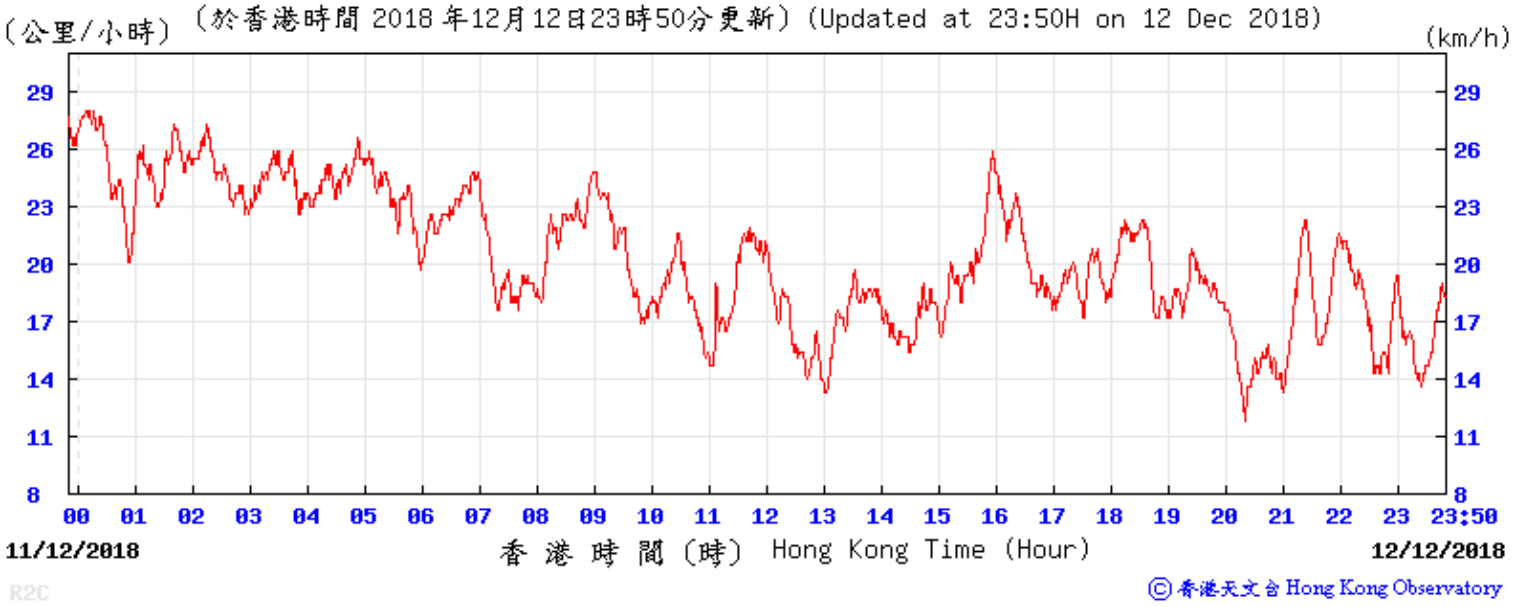
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1866002
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	19 December 2018
		DATE OF ISSUE:	2 January 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 19th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1866002-001	CAPC Unit (With AC Filter)	19-Dec-18	15:08 - 15:12	11	1164	Musty smell	1856.4	130,000,000
HK1866002-002	CAPC Unit (With AC Filter)	19-Dec-18	15:29 - 15:33	11	1016	Musty smell	1856.4	113,000,000
HK1866002-003	Field Blank	19-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

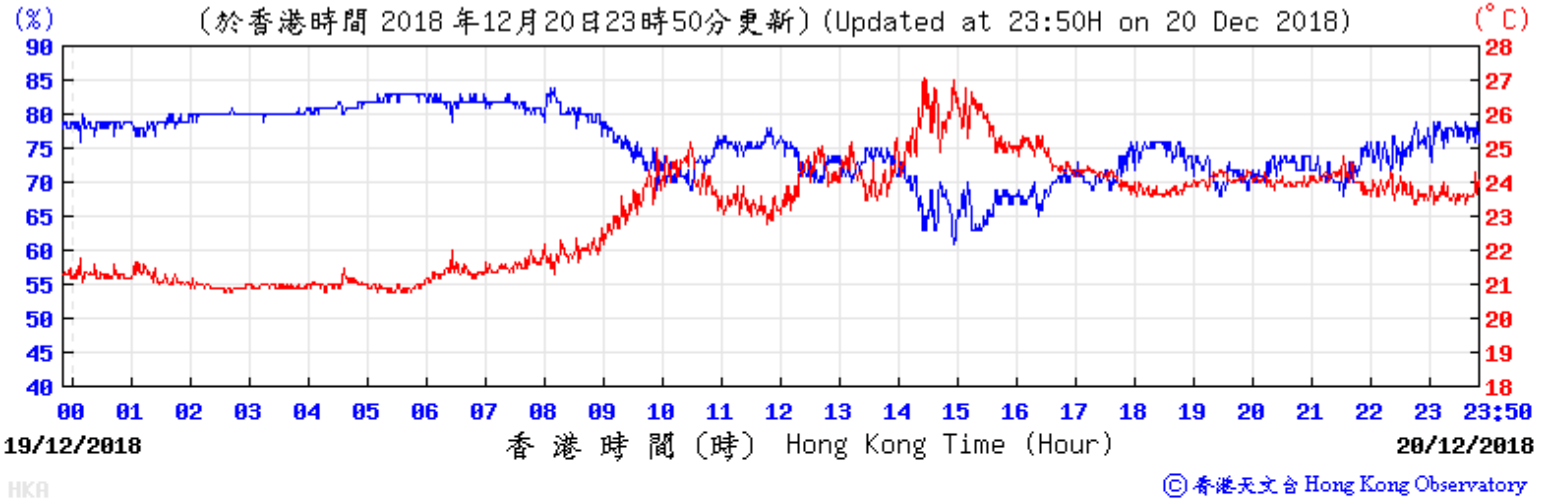
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	19-12-18	15:08 - 15:33	21.5	72.0	1014.9	3.6	335	Yes	Continuous	Bleaching with musty smell	From the Chimney	Cloudy

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

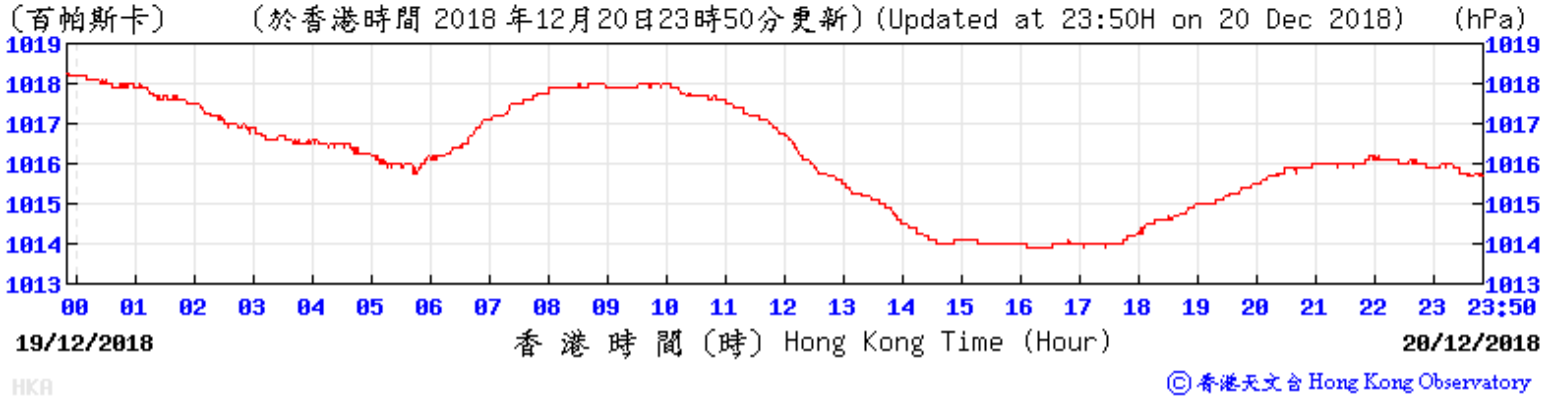
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

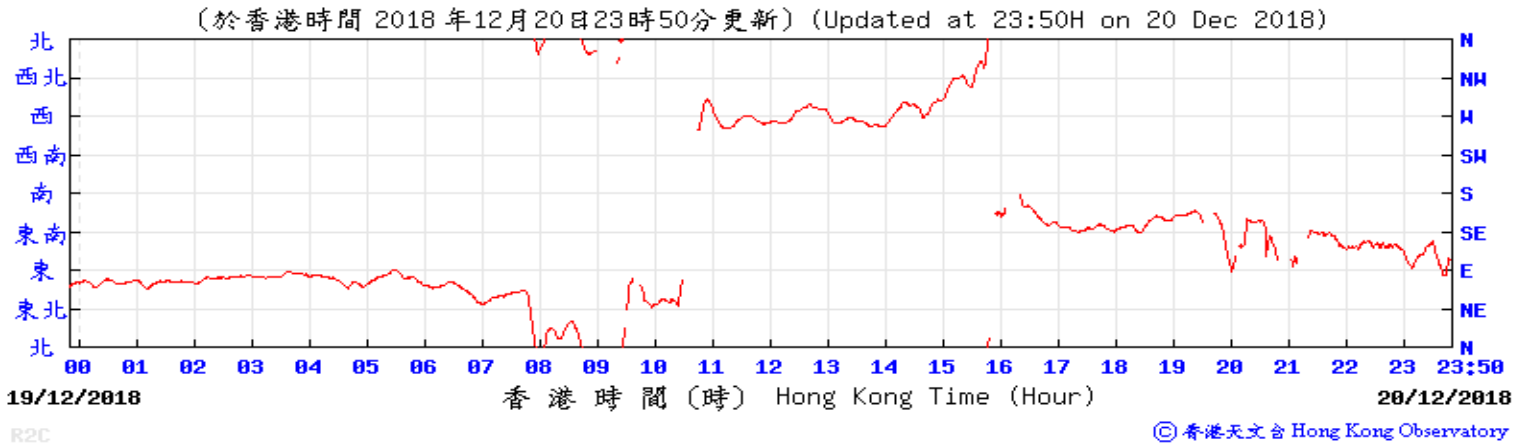
Tempearture/Humidity:



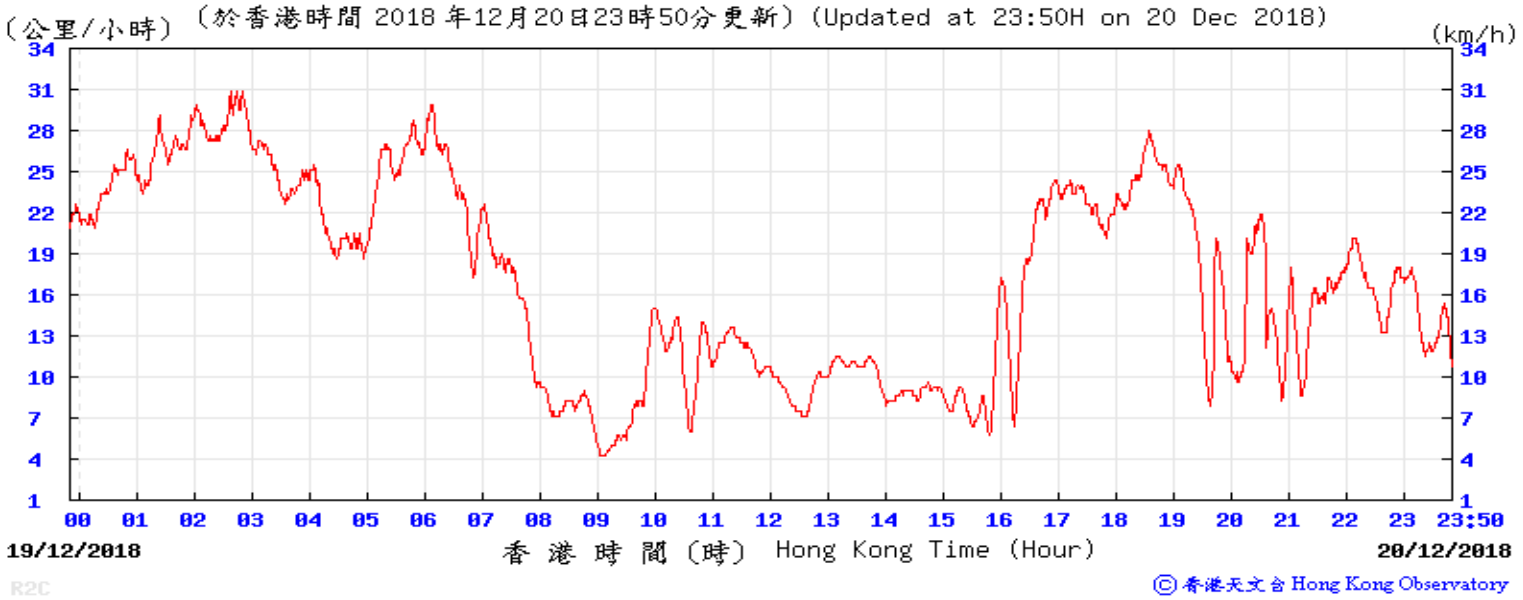
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1866721
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	27 December 2018
		DATE OF ISSUE:	2 January 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	5
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 27th December, 2018 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A3.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 OU_E/m^3 to 10^7 OU_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

1. Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (OU_E/Nm^3)	Odour Concentration (OU_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (OU_E/hr)
HK1866721-001	CAPC Unit (with AC Filter)	27-Dec-18	14:07 – 14:10	11	1026	Bleach with minor garbage smell	1871.6	115,000,000
HK1866721-002	CAPC Unit (with AC Filter)	27-Dec-18	14:11 – 14:14	11	1026	Bleach with minor garbage smell	1871.6	115,000,000
HK1866721-003	CAPC Unit (Bypass AC Filter)	27-Dec-18	14:45 – 14:48	11	1087	Bleach smell	2003.6	131,000,000
HK1866721-004	CAPC Unit (Bypass AC Filter)	27-Dec-18	14:49 – 14:53	11	1087	Bleach smell	2003.6	131,000,000
HK1866721-005	Field Blank	27-Dec-18	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

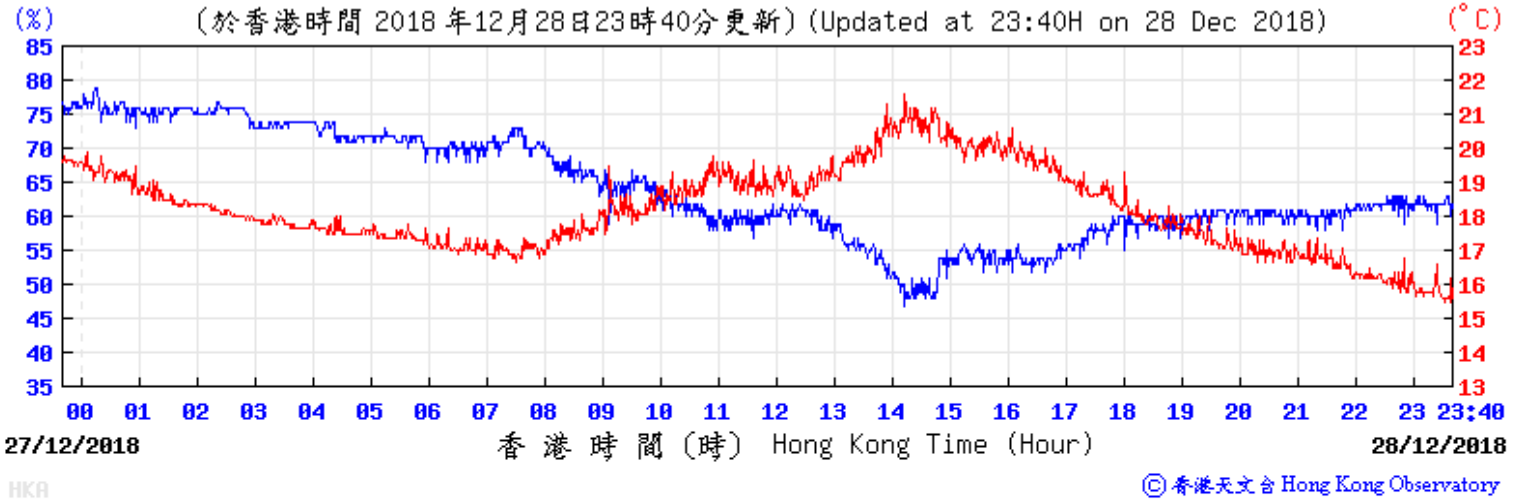
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	27-12-18	14:07 - 14:53	23.3	68.8	1012.5	0.8	320	NA	NA	No odour was detected.	NA	Sunny

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

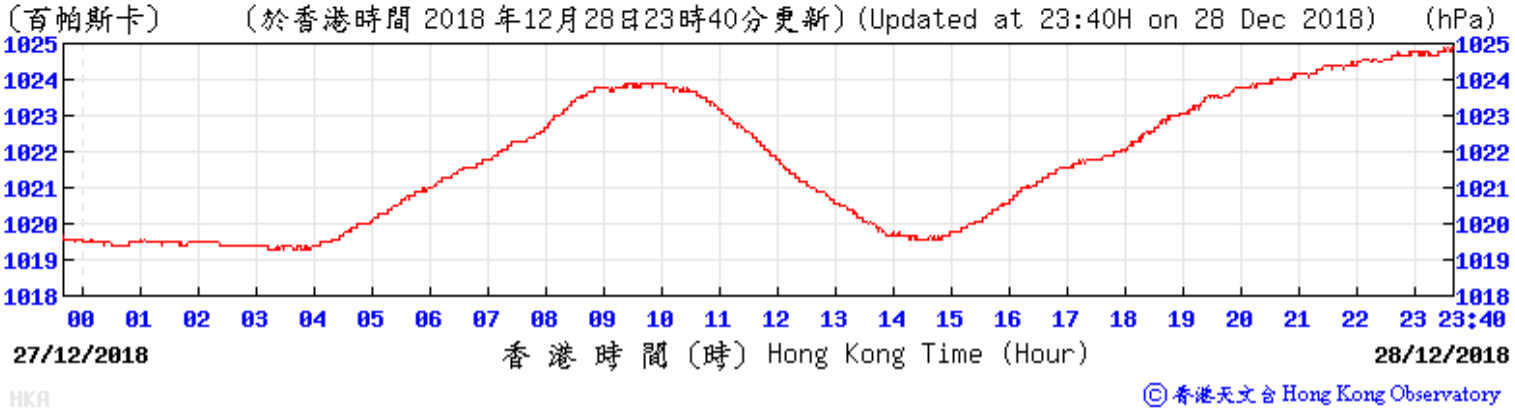
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION

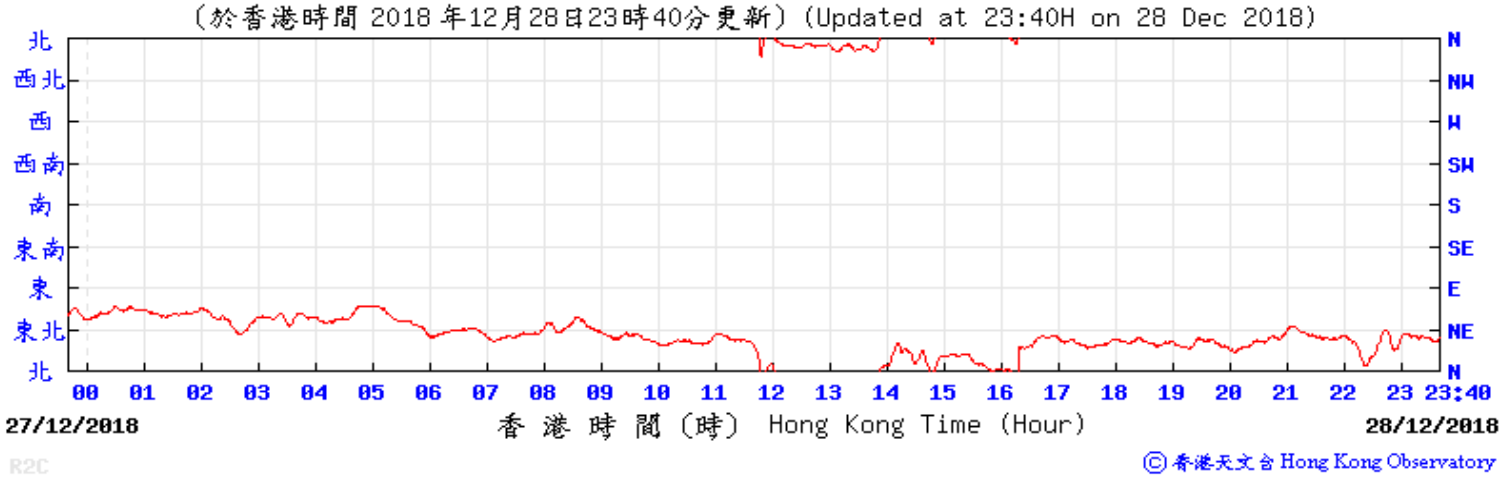
Tempearture/Humidity:



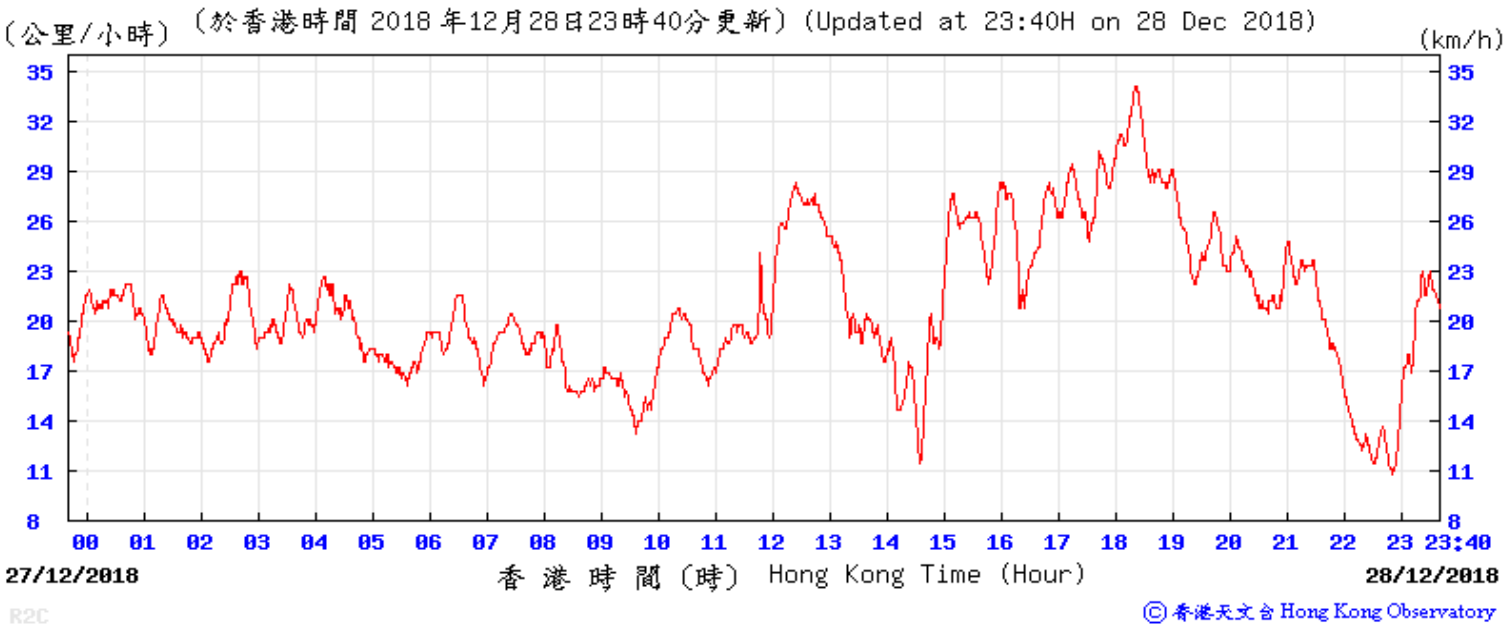
Pressure:



Wind Direction:



Wind Speed:



APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
T1/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1902606
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	16 January 2019
		DATE OF ISSUE:	30 January 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 16th January, 2019 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A2.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 ou_E/m^3 to 10^7 ou_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (ou_E/Nm^3)	Odour Concentration (ou_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (ou_E/hr)
HK1902606-001	CAPC Unit (Low ORP)	16-Jan-19	13:42 - 13:45	11	444	Bleaching smell	2289.2	61,000,000
HK1902606-002	CAPC Unit (Low ORP)	16-Jan-19	13:48 - 13:52	11	476	Bleaching smell	2289.2	65,000,000
HK1902606-003	Field Blank	16-Jan-19	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	16-1-19	13:42 - 13:52	18.6	70.0	1017.9	2.2	324	NA	NA	No odour was smelled.	NA	Cloudy

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

APPENDIX 2

A2. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1902870
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	16 January 2019
		DATE OF ISSUE:	30 January 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 16th January, 2019 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A2.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 ou_E/m^3 to 10^7 ou_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (ou_E/Nm^3)	Odour Concentration (ou_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (ou_E/hr)
HK1902870-001	CAPC Unit (High ORP)	16-Jan-19	15:54 - 15:57	11	546	Bleaching smell	2285.2	75,000,000
HK1902870-002	CAPC Unit (High ORP)	16-Jan-19	15:58 - 16:02	11	509	Bleaching smell	2285.2	70,000,000
HK1902870-003	Field Blank	16-Jan-19	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

A1. SITE CONDITIONS AND OBSERVATION

Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	16-1-19	15:54 - 16:02	17.8	63.9	1017.9	1.2	322	NA	NA	No odour was smelled.	NA	Cloudy

Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

APPENDIX 2

A2. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1904547
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	29 January 2019
		DATE OF ISSUE:	13 February 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 29th January, 2019 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A2.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 ou_E/m^3 to 10^7 ou_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (ou_E/Nm^3)	Odour Concentration (ou_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (ou_E/hr)
HK1904547-001	CAPC	29-Jan-19	14:00 - 14:04	11	116	Garbage smell with minor fishy smell	2552.4	17,800,000
HK1904547-002	CAPC	29-Jan-19	14:04 - 14:08	11	93	Garbage smell with minor fishy smell	2552.4	14,200,000
HK1904547-003	Field Blank	29-Jan-19	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

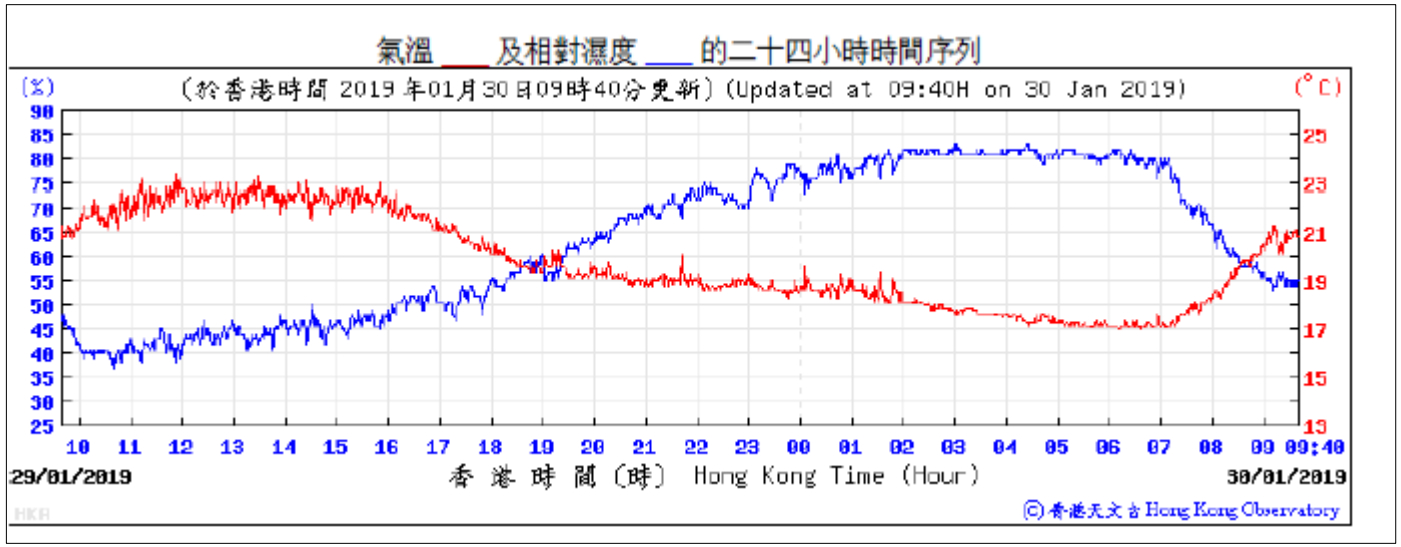
A1. SITE CONDITIONS AND OBSERVATION

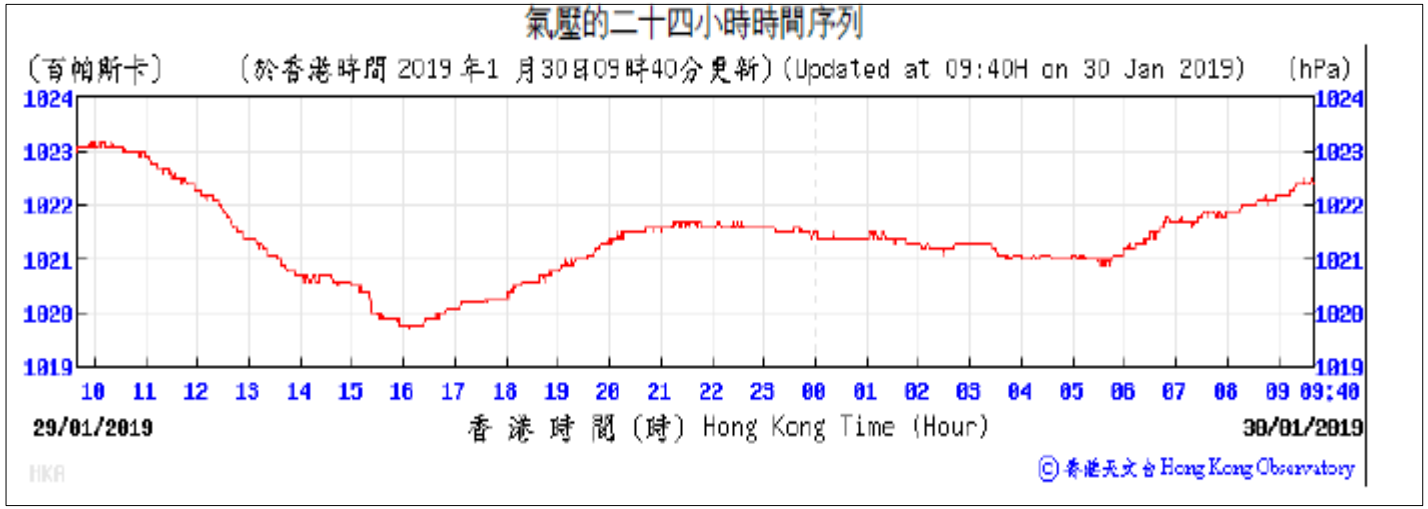
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	29-1-19	14:00 - 14:08	19.8	65.5	1018.6	4.8	328	NA	NA	No odour was smelled.	NA	Sunny

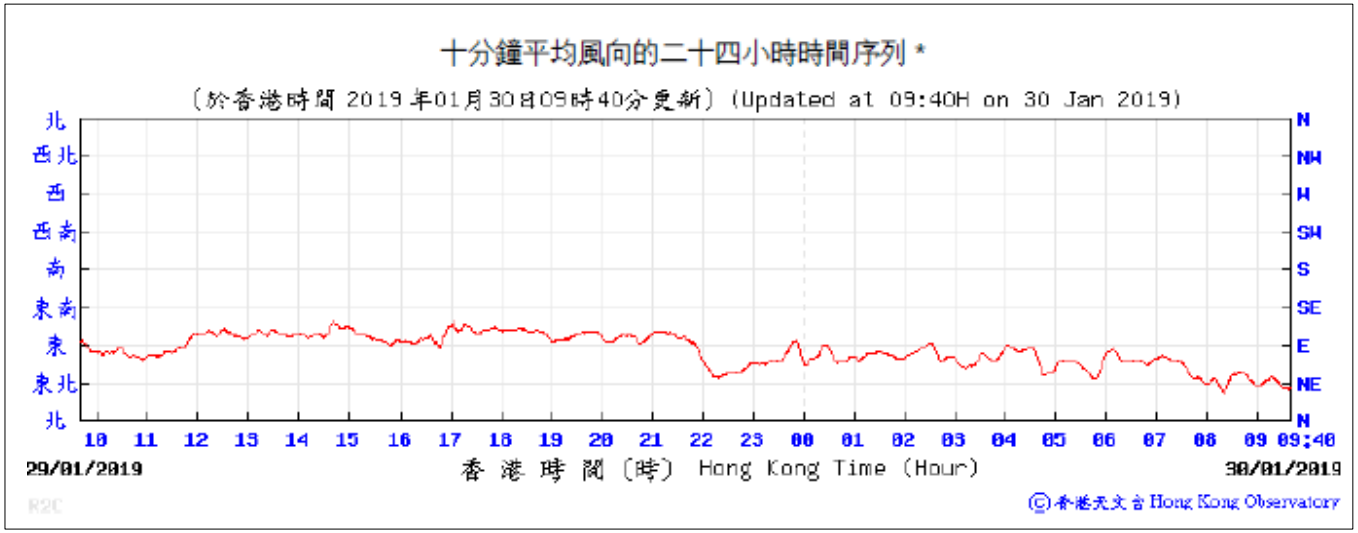
Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION






十分鐘平均風向的二十四小時時間序列 *
(於香港時間 2019 年01月30日09時40分更新) (Updated at 09:40H on 30 Jan 2019)
北
西北
西
西南
南
東南
東
東北
北
N
NW
W
SW
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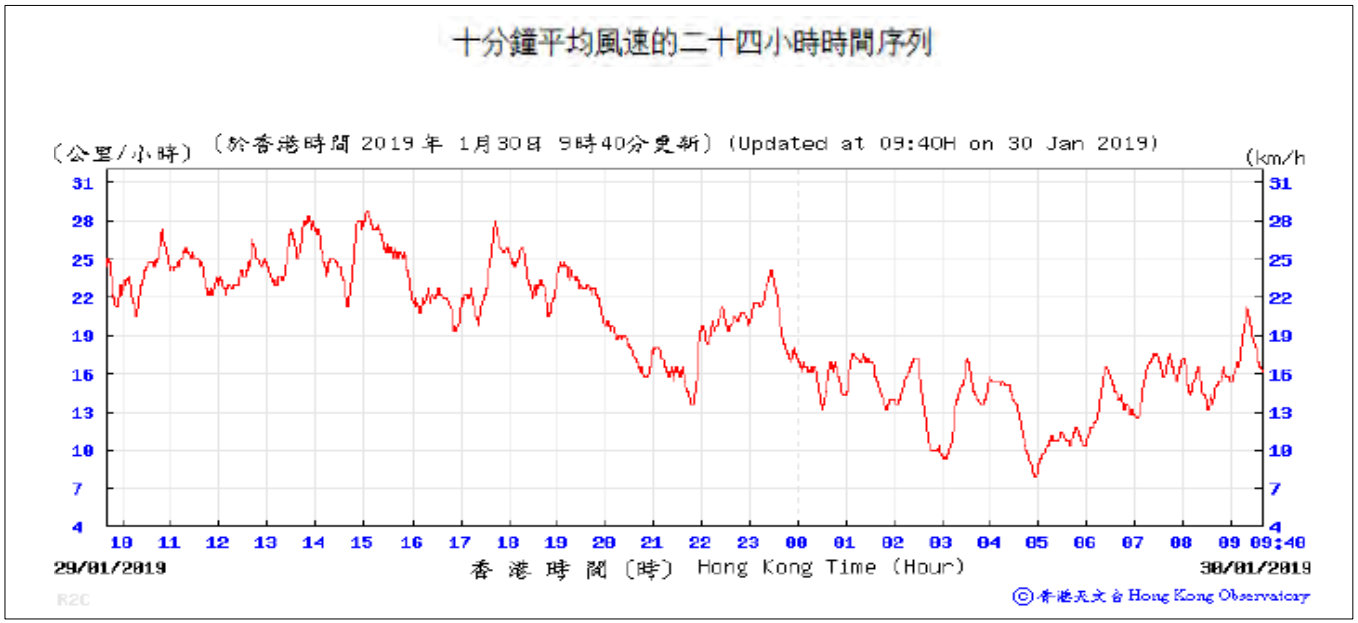
N
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 09:40
29/01/2019
香 港 時 間 (時) Hong Kong Time (Hour)
30/01/2019
©香港天文台 Hong Kong Observatory


十分鐘平均風速的二十四小時時間序列
(公里/小時) (於香港時間 2019 年 1月30日 9時40分更新) (Updated at 09:40H on 30 Jan 2019)
(km/h)
31
28
25
22
19
16
13
10
7
4
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 09:40
29/01/2019
香 港 時 間 (時) Hong Kong Time (Hour)
30/01/2019
©香港天文台 Hong Kong Observatory

APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

ALS Technichem (HK) Pty Ltd
T1/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T +852 2610 1044 F +852 2610 2021

CERTIFICATE OF ANALYSIS

CLIENT:	Oscar Bioenergy Joint Venture	WORK ORDER:	HK1904548
CONTACT:	Mr Edwin Wong		
ADDRESS:	No. 5, Sham Fung Road, Siu Ho Wan, North Lantau Island, NT, Hong Kong	LABORATORY:	Hong Kong
		SUB-BATCH:	0
		DATE RECEIVED:	29 January 2019
		DATE OF ISSUE:	13 February 2019
PROJECT:	Odour Monitoring for the Organic Resources Recovery Centre Phase 1 in Siu Ho Wan	SAMPLE TYPE:	Air
SITE:	Organic Resources Recovery Centre Phase 1 (ORRC1)	NO OF SAMPLES:	3
PO:	---		

COMMENTS

Air sample(s) were collected by ALS Technichem (HK) staff on 29th January, 2019 at the Organic Resources Recovery Centre Phase 1 (ORRC1) in Siu Ho Wan for Odour Monitoring.

The sample(s) were analysed and reported on an as received basis.

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Richard Fung
General Manager - Hong Kong

METHOD STATEMENT

A. Odour Concentration

1. Odour Sampling

Odour gas sample was collected by passive sampling technique. A Nalophan™ sampling bag was placed inside an air-tight sampler and then drawn to vacuum. Approximately 60 litre of gas sample was collected into the sampling bag for testing.

The odour sample was collected at the Organic Recovery Resources Centre Phase 1 (ORRC1) and sampling location was shown in Appendix A2.

2. Olfactometry Testing

Odour concentration was determined by a Forced-choice Dynamic Olfactometer in accordance with the European Standard Method (EN13725).

This European Standard specifies a method for the objective determination of the odour concentration of a gaseous sample using dynamic olfactometry with human assessors and the emission rate of odours emanating from point sources, area sources with outward flow and area sources without outward flow.

This European Standard is applicable to the measurement of odour concentration of pure substances, defined mixtures and undefined mixtures of gaseous odorants in air or nitrogen, using dynamic olfactometry with a panel of human assessors being the sensor.

The unit of measurement is the odour unit per cubic metre: OU_E/m^3. The odour concentration is measured by determining the dilution factor required to reach the detection threshold. The odour concentration at the detection threshold is by definition 1 OU_E/m^3. The odour concentration is then expressed in terms of multiples of the detection threshold. The range of measurement including pre-dilution prior to the olfactometry analysis is typically from 10^1 ou_E/m^3 to 10^7 ou_E/m^3.

Olfactometry Testing was performed by using the Scentroid™ SS600 Olfactometer. The testing was performed by at least five qualified panellists who have been selected through an n-butanol screening test.

All testing finished within 24 hours after sample receipt.

RESULT

Odour Concentration

Sample ID	Location	Sampling Date	Sampling Time	LOR (ou_E/Nm^3)	Odour Concentration (ou_E/Nm^3)	Characteristics of the odour detected of the gas sample	Volumetric Flow Rate (Nm^3/min)	Emission rate (ou_E/hr)
HK1904548-001	CAPC	29-Jan-19	15:03 - 15:07	11	93	Garbage smell with minor fishy smell	1961.5	10,900,000
HK1904548-002	CAPC	29-Jan-19	15:07 - 15:11	11	154	Garbage smell with minor fishy smell	1961.5	18,100,000
HK1904548-003	Field Blank	29-Jan-19	--	11	<11	--	--	--

Remark:
1. LOR denotes limit of reporting.
2. The collected sample volume of the gas bag is sufficient for olfactometry analysis.
3. Field Blank containing pure nitrogen gas was collected and filled by ALS staff.
4. The volumetric flow rate value for calculation of the emission rate was provided by the client.

APPENDIX 1

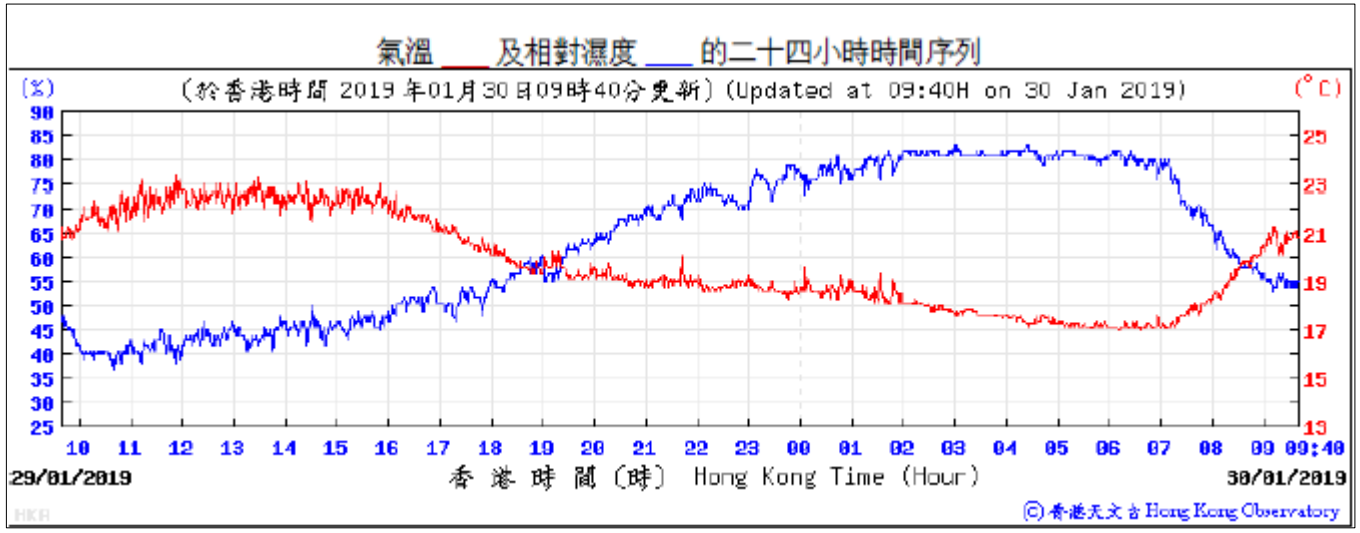
A1. SITE CONDITIONS AND OBSERVATION

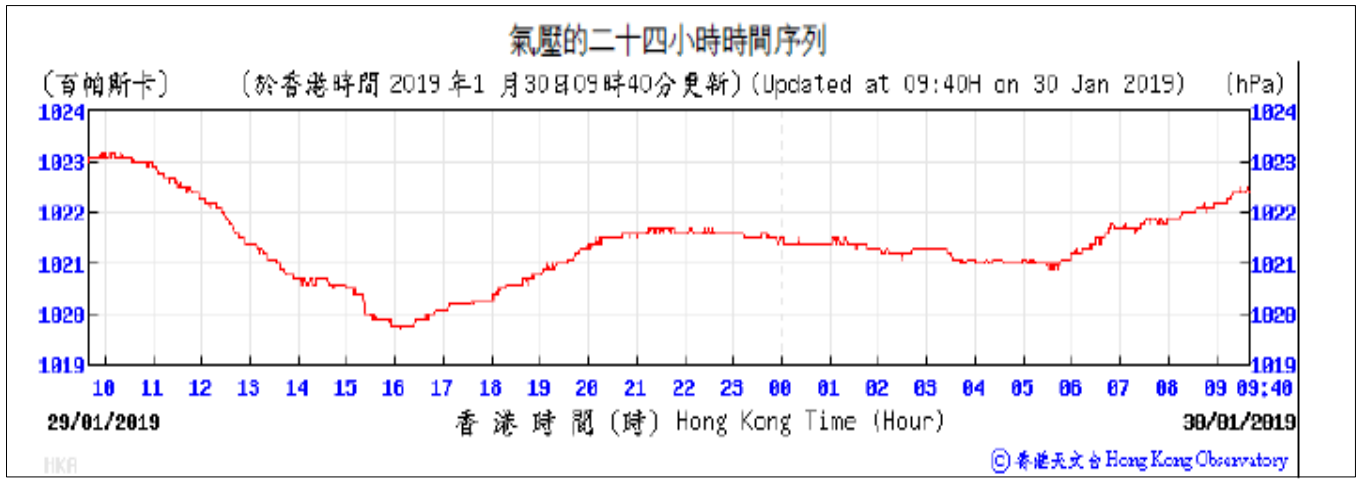
Location	Date	Time	Ambient Temperature (°C)	Relative Humidity (%)	Ambient Pressure (hPa)	Wind Speed (m/s)	Wind Direction (Degree)	Direction from Source[1]	Duration of Odour	On-Site Observation		Weather Condition
										Odour Nature	Possible Source	
CAPC Unit	29-1-19	15:03 - 15:11	19.9	66.5	1018.5	3.3	314	NA	NA	No odour was smelled.	NA	Sunny

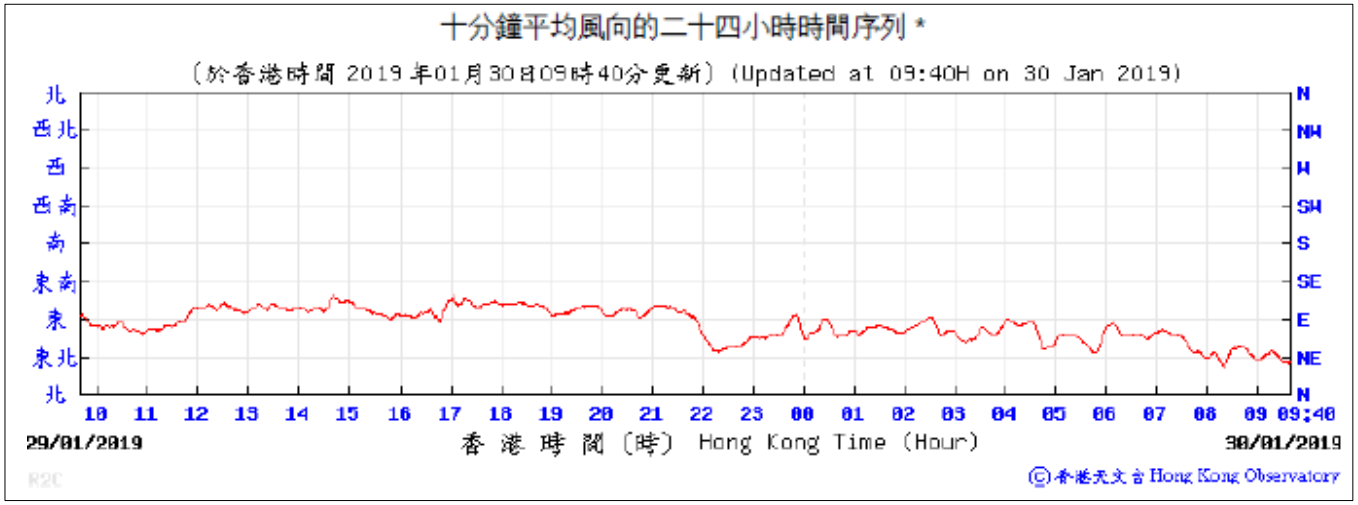
Note:
1. It was assumed that the exhaust of the CAPC Unit was from the odour source.

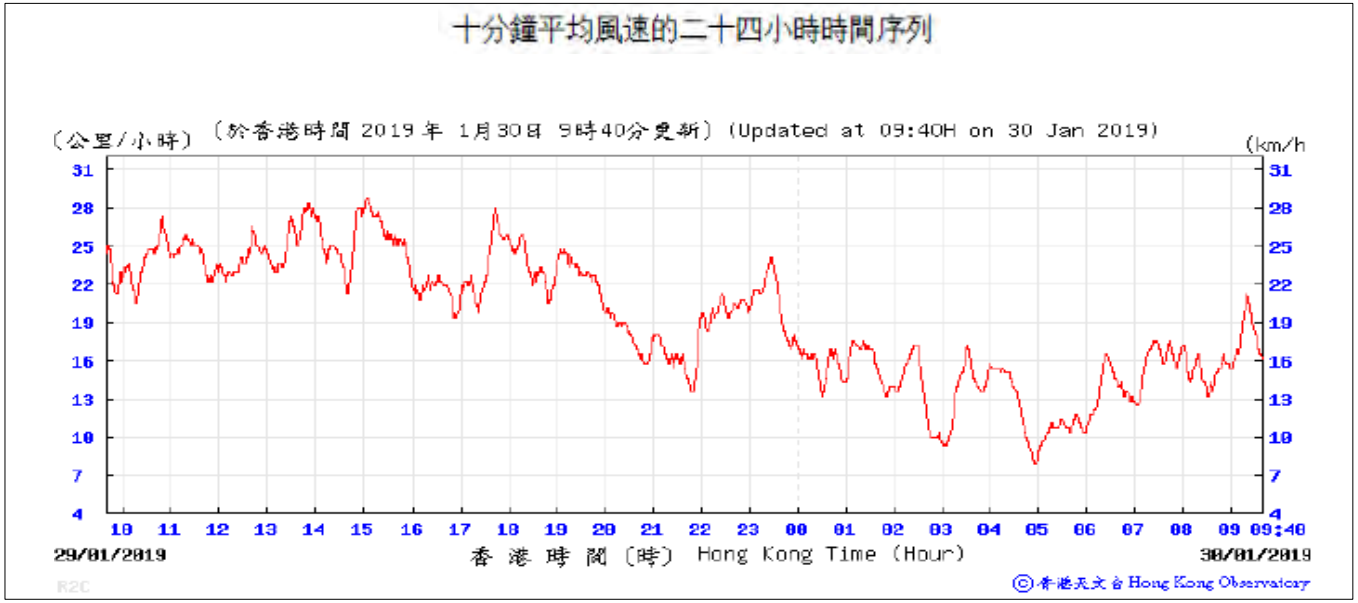
APPENDIX 2

A2. EXTRACT OF METEOROLOGICAL OBSERVATIONS FROM THE HONG KONG AIRPORT OBSERVATORY STATION






十分鐘平均風向的二十四小時時間序列 *
(於香港時間 2019 年01月30日09時40分更新) (Updated at 09:40H on 30 Jan 2019)
北
西北
西
西南
南
東南
東
東北
北
N
NW
W
SW
S
SE
E
NE
N
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 09:40
29/01/2019
香 港 時 間 (時) Hong Kong Time (Hour)
30/01/2019
©香港天文台 Hong Kong Observatory


十分鐘平均風速的二十四小時時間序列
(公里/小時) (於香港時間 2019 年 1月30日 9時40分更新) (Updated at 09:40H on 30 Jan 2019)
(km/h)
31
28
25
22
19
16
13
10
7
4
10 11 12 13 14 15 16 17 18 19 20 21 22 23 00 01 02 03 04 05 06 07 08 09 09:40
29/01/2019
香 港 時 間 (時) Hong Kong Time (Hour)
30/01/2019
©香港天文台 Hong Kong Observatory

APPENDIX 3

A3. PHOTO OF THE SAMPLING LOCATION

Annex I4

Action and Limit Levels for Odour Nuisance

Odour Intensity Level

Level	Odour Intensity
0	Not detected. No odour perceived or an odour so weak that it cannot be easily
1	Slight identifiable odour, and slight chance to have odour
2	Moderate identifiable odour, and moderate chance to have odour
3	Strong identifiable, likely to have odour nuisance
4	Extreme severe odour, and unacceptable odour level

Action and Limit Levels for Odour Nuisance

Parameter	Action Level	Limit Level
Odour Nuisance (from odour patrol)	When one documented compliant is received(1), or Odour Intensity of 2 is measured from odour patrol.	Two or more documented complaints are received(1) within a week; or Odour intensity of 3 or above is measured from odour patrol.

Note:

(1) Once the compliant is received by the Project Proponent (EPD), the Project Proponent would investigate and verify the complaint whether it is related to the potential odour emission from the OWTF and its on-site wastewater treatment unit.

Event and Action Plan for Odour Monitoring

EVENT	ACTION	
	Person-in-charge of Odour	**Project Proponent**[1]
ACTION LEVEL		
Exceedance of action level (Odour Patrol)	1. Identify source/reason of exceedance; 2. Repeat odour patrol to confirm finding.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 2. Rectify any unacceptable practice; 3. Implement more mitigation measures if necessary; 4. Inform DSD or the operator of the Siu Ho Wan Sewage Treatment Works (SHWSTW) if exceedance is considered to be caused by the operation of the SHWSTW. 5. Inform North Lantau Refuse Transfer Station (NLTS) operator if exceedance is considered to be caused by the operation of NLTS.

EVENT	ACTION	
	Person-in-charge of Odour	**Project Proponent**[(1)]
Exceedance of action level (Odour Complaints)	1. Identify source/reason of exceedance; 2. Carry out odour patrol to determinate odour intensity.	1. Carry out investigation and verify the complaint whether it is related to potential odour emission from the nearby SHWSTW; 2. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 weeks; 3. Rectify any unacceptable practice; 4. Implement more mitigation measures if necessary; 5. Inform DSD or the operator of the SHWSTW if exceedance is considered to be caused by the operation of the SHWSTW.

EVENT	ACTION	
	Person-in-charge of Odour	**Project Proponent**(1)
LIMIT LEVEL		
Exceedance of Limit level	1. Identify source/reason of exceedance; 2. Inform EPD; 3. Repeat odour patrol to confirm findings; 4. Increase odour patrol frequency to bi-weekly; 5. Assess effectiveness of remedial action and keep EPD informed of the results; 6. If exceedance stops, cease additional odour patrol.	1. Carry out investigation to identify the source/reason of exceedance. Investigation should be completed within 2 week; 2. Rectify any unacceptable practice; 3. Formulate remedial actions; 4. Ensure remedial actions properly implemented; 5. If exceedance continues, consider what more/enhanced mitigation measures should be implemented;

Note: (1) Project Proponent shall identify an implementation agent

Annex KJ

Investigation Report

Annex J1

Investigation Report – Odour Sampling Exceedances

Investigation Report of Odour Sampling Exceedances

Date	10, 11, 19 and 27 December 2018; 16 January 2019
Time	Sampling times were shown in **Appendix B.**
Monitoring Location	Centralized Air Pollution Control System (CAPCS) ((Detailed location and photos shown on the marked drawing DR-OAP-20-0-CA-1001 attached as **Appendix A**)
Weather	Fine
Parameter	Odour
Exceedance Description	1. On 10, 11, 19 and 27 December 2018 and 16 and 29 January 2019, air samples were collected from the outlet of the CAPCS by ALS for measurement of the odour concentration (in term of Odour Unit (OU) by olfactometry analysis at the laboratory. The EM&A Manual, has set an odour limit of 220 OU/Nm^3 for the CAPCS stack. The odour concentrations of the odour samples collected from the CAPCS on 10, 11, 19 and 27 December 2018; 16 January 2019 have exceeded the odour limits. The odour analysis results are shown in **Appendix B**. 2. According to the Contractor, the plant was operated normally. Odour emitting activities, including waste reception and pretreatment process, AD process, wastewater treatment plant, sludge dewatering and composting process were operating on the sampling days. The CAPCS was operating during the odour sampling periods. 3. The plant received an average of 100 tonnes of SSOW daily in the reporting period. 4. The Contractor reported that the chemical dosing system of the CAPCS have some problems resulting in a high concentration of odorous gases H_2S and NH_3 in the exhaust air, which led to exceedances of the odour limit. In addition, the Contractor reported that the prepared of the chemical dosing system took longer than anticipated resulting in a prolonged exceedances recorded during December 2018.
Action Taken / Action to be Taken	Once it was identified that there was a problem with the chemical dosing system, the Contractor added the chemical to the system manually to minimise the exceedences. The Contractor has also contacted the supplier of the chemical dosing system to carry out repairing work so that the system can function properly.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the operation of the chemical dosing system to avoid the reoccurrence of similar problem. The system is fixed and the odour concentration of the air sample taken on 29 January 2019 showed compliance with the odour limit.

Prepared by:	Bonia Leung, ET Representatives
Date	09-Apr-2019

Appendix A

Monitoring Location

REV	DATE	BY	APP	DESCRIPTION
A01	05/03/15	CW	MB	IMTECH BACKGROUNDS UPDATED
A00	18/02/15	CW	MB	DRAFT ISSUE

CLIENT

ENVIRONMENTAL PROTECTION DEPARTMENT
GOVERNMENT OF THE HKSAR

CLIENT'S CONSULTANT

AECOM ASIA CO. LTD.

CONTRACTOR

OSCAR BIOENERGY JV

LEAD DESIGNER

ARUP
Ove Arup & Partners Hong Kong Limited

ENVIRONMENTAL TEAM

ERM HONG KONG LIMITED

INDEPENDENT CONSULTANTS

Meinhardt Infrastructure and Environment Limited
邁進基建環保工程顧問有限公司

PROJECT

ORGANIC WASTE TREATMENT FACILITIES
PHASE 1
EP/SP/61/10

STATUS

DRAFT ISSUE

DRAWING TITLE

SITE LAYOUT

DRAWN	CHECKED	APPROVED
CW	RS	DP

SCALE	DATE
1:500@A1 / 1:1000@A3	12/02/15

JOB NO.	DRAWING NO.	REV.
239956	DR-OAP-20-0-CA-1001	A01

Appendix B

Odour Sampling Results Summary

Sampling Date	Sampling Time	Odour Concentration (OU /Nm^3)[Note]
10 Dec 2018	11:36-11:41	828
10 Dec 2018	11:41-11:46	886
10 Dec 2018	11:56-12:02	773
10 Dec 2018	12:02-12:07	674
11 Dec 2018	15:13-15:17	476
11 Dec 2018	15:19-15:23	510
11 Dec 2018	15:34-15:38	414
11 Dec 2018	15:38-15:43	443
19 Dec 2018	15:08-15:12	1164
19 Dec 2018	15:29-15:33	1016
27 Dec 2018	14:07-14:10	1026
27 Dec 2018	14:11-14:14	1026
27 Dec 2018	14:45-14:48	1087
27 Dec 2018	14:49-14:53	1087
16 Jan 2019	13:42-13:45	444
16 Jan 2019	13:48-13:52	476
16 Jan 2019	15:54-15:57	546
16 Jan 2019	15:58-16:02	509
29 Jan 2019	14:00-14:04	116
29 Jan 2019	14:04-14:08	93
29 Jan 2019	15:03-15:07	93
29 Jan 2019	15:03-15:07	154

Note: According to the EM&A Manual and EP requirements, it is considered an exceedance if the odour level is more than 220 OU/Nm^3.

Annex J2

Investigation Report – Stack Monitoring Exceedances

Investigation Report of CEMS Exceedances

Date	1 – 31 March 2019
Time	Continuous Monitoring throughout March 2019
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Centralised Air Pollution Control System (CAPCS), Cogeneration Units (CHP) and Ammonia Stripping Plan (ASP)
Exceedance Description	1. Continuous monitoring was carried out for CAPCS, CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version E) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including: • Odour in the CAPCS; • SO_2 in the CHP; and • CO, NO_x, SO_2, VOCs and NH_3 in the ASP. The detail monitoring results are shown in ***Annex G*** of the EM&A Report. 2. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally. 3. The exceedances of odour in CAPCS was due to problems in the chemical dosing system resulting in high concentrations of odorous gases H_2S and NH_3 in the exhaust air. 4. According to the Contractor, the SO_2 exceedances recorded in the CHP and ASP could be due to the tripping of the circulation pump resulting in incomplete desulphurisation of biogas in previous process. 5. The Contractor explained that the exceedances recorded in CO, NO_x, VOCs and NH_3 in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency. In addition, the Contractor reported that the tuning of the thermal combustion unit took longer than anticipated resulting in the many exceedances recorded during the reporting period.
Action Taken / Action to be Taken	• Once it was identified that there was a problem with the chemical dosing system, the Contractor added the chemicals to the system manually to minimise the exceedances. The Contractor has also contacted the supplier of the chemical dosing system to carry out

	repairing works so that the system can function properly. • The Contractor put on-line additional activated carbon filters to counter the incomplete desulphurisation process. • Tuning of the thermal combustion unit was carried out to optimise the combustion efficiency in order to remove the pollutants in the biogas.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the processes, including the chemical dosing system in the CAPCS, the desulphurisation process, and combustion of biogas in the ASP to avoid the reoccurrence of similar problems. MT will carry out follow-up audit regarding the progress next month.

Prepared by: Bonia Leung, MT Representative
Date 29-Apr-2019