



翠谷工程有限公司
Green Valley Landfill, Limited

South East New Territories (SENT) Landfill Extension

Monthly Environmental Monitoring & Audit Report No.46

for October 2022

November 2022

ERM

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South East New Territories (SENT) Landfill Extension

Environmental Certification Sheet EP-308/2008/B and FEP-01/308/2008/B


Reference Document/Plan

Document/Plan to be Certified/Verified:	Monthly Environmental Monitoring & Audit Report No.46 for October 2022 for South East New Territories (SENT) Landfill Extension
Date of Report:	9 November 2022


Reference EP Condition

EP Condition:	Condition No. 3.4
Four hard copies and one electronic copy of monthly EM&A Report shall be submitted to the Director within 10 working days after the end of the reporting month. The EM&A Reports shall include a summary of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit Levels). The submissions shall be verified by the IEC. Additional copies of the submission shall be provided to the Director upon request by the Director.	

ET Certification

I hereby certify that the above referenced document/plan complies with the above referenced condition of EP-308/2008/B and FEP-01/308/2008/B.	
Frank Wan, Environmental Team Leader: (ERM Hong-Kong, Limited)	 Date: 9 November 2022

IEC Verification

I hereby verify that the above referenced document/plan complies with the above referenced condition of EP-308/2008/B and FEP-01/308/2008/B.	
Claudine Lee, Independent Environmental Checker: (Meinhardt Infrastructure and Environment Limited)	 Date: 11 November 2022

South East New Territories (SENT) Landfill Extension

Monthly Environmental Monitoring & Audit Report for October 2022

Environmental Resources Management

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Client: Green Valley Landfill Ltd.		Project No: 0465169			
Summary: This document presents the Monthly EM&A Report No.46 for October 2022 for <i>South East New Territories (SENT) Landfill Extension</i>		Date: 9 November 2022			
		Approved by:  Frank Wan Partner			
0	Monthly EM&A Report No.46 (for October 2022)	AL	FW	FW	9 Nov 2022
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p> 			

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EXECUTIVE SUMMARY

The SENT Landfill Extension (SENTX) forms an integral part in the Strategic Plan in maintaining the continuity of landfill capacity in the Hong Kong for the cost-effective and environmentally satisfactory disposal of waste. ERM-Hong Kong, Limited (ERM) is commissioned to undertake the role of Environmental Team (ET) for the construction, operation/ restoration and aftercare of SENTX Project (“the Project”) in accordance with the requirements specified in the Environmental Permit (EP), updated Environmental Monitoring and Audit (EM&A) Manual, the approved Environmental Impact Assessment (EIA) Report of the Project taking account of the latest design and other relevant statutory requirements. The construction (not including works related to site clearance and preparation) and operation of the Project commenced on 2 January 2019 and 21 November 2021, respectively.

This Monthly EM&A report presents the EM&A works carried out during the period from 1 to 31 October 2022 for the Project in accordance with the updated EM&A Manual.

Exceedance of Action and Limit Levels for Air Quality

One exceedance of the Limit Level for landfill gas flare stack emission (SO₂) was recorded for air quality monitoring in the reporting period. The landfill gas flare stack emission (SO₂) exceedance on 14 October 2022 is under investigation.

Exceedance of Action and Limit Levels for Noise

No exceedance of Action and Limit Levels for operation/ restoration phase noise monitoring was recorded in the reporting period.

Exceedance of Action and Limit Levels for Water Quality

Three exceedances of the Limit Level for Leachate Level were recorded for water quality impact monitoring in the reporting period. The leachate level exceedances at Pump Station No. 4X from 1 October to 3 October 2022 are under investigation.

Exceedance of Action and Limit Levels for Landfill Gas

One exceedance of the Limit Level for perimeter landfill gas monitoring was recorded in the reporting period. The perimeter landfill gas exceedance at LFG13 on 3 October 2022 is under investigation.

Environmental Complaints, Summons and Prosecutions

There were no complaints, notification of summons or prosecution recorded in the reporting period.

Reporting Change

There was no reporting change in the reporting period.

Future Key Issues

Potential environmental impacts arising from the upcoming construction/ operational activities in the next reporting period of November 2022 are mainly associated with dust emission from the exposed area and loading and unloading operation of dusty materials.

The SENT Landfill Extension (SENTX) forms an integral part in the Strategic Plan in maintaining the continuity of landfill capacity in the Hong Kong for the cost-effective and environmentally satisfactory disposal of waste. The *Environmental Impact Assessment (EIA) Report* and the associated *Environmental Monitoring and Audit (EM&A) Manual* for the construction, operation, restoration and aftercare of the SENTX (hereafter referred to as “the Project”) have been approved under the *Environmental Impact Assessment Ordinance (EIAO)* in May 2008 (Register No.: AEIAR-117/2008) (hereafter referred to as the approved EIA Report) and an Environmental Permit (EP-308/2008) (EP) was granted by the Director of Environmental Protection (DEP) on 5 August 2008.

Since then, applications for Variation of an Environmental Permit (No. VEP-531/2017) were submitted to EPD and the Variation of Environmental Permits (EP-308/2008/A and EP-308/2008/B) were granted on 6 January 2012 and 20 January 2017, respectively, as the Hong Kong SAR Government has decided to reduce the scale of the design scheme of SENTX assessed in the approved EIA Report and SENTX will only receive construction waste. In May 2018, a Further Environmental Permit (FEP) (FEP-01/308/2008/B) was granted to the SENTX’s contractor, Green Valley Landfill, Limited (GVL).

ERM-Hong Kong, Limited (ERM) and Meinhardt Infrastructure and Environment Limited (Meinhardt) are commissioned to undertake the roles of Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake the EM&A activities for the Project in accordance with the requirements specified in the EP, updated EM&A Manual ⁽¹⁾, approved EIA Report ⁽²⁾ taking account of the latest design and other relevant statutory requirements.

The SENTX is a piggyback landfill, occupying the southern part of the existing SENT Landfill (including its infrastructure area) and 13 ha of Tseung Kwan O (TKO) Area 137. A layout plan of the SENTX is shown in *Figure 1.1*. Under the latest design, the SENTX has a net void capacity of about 6.5 Mm³ and provides an additional lifespan of about 6 years, commencing operation upon exhaustion of the SENT Landfill. The SENTX will receive construction waste only.

(1) ERM (2018). South East New Territories (SENT) Landfill Extension: Environmental Monitoring & Audit Manual

(2) ERM (2007). South East New Territories (SENT) Landfill Extension - Feasibility Study: Environmental Impact Assessment Report

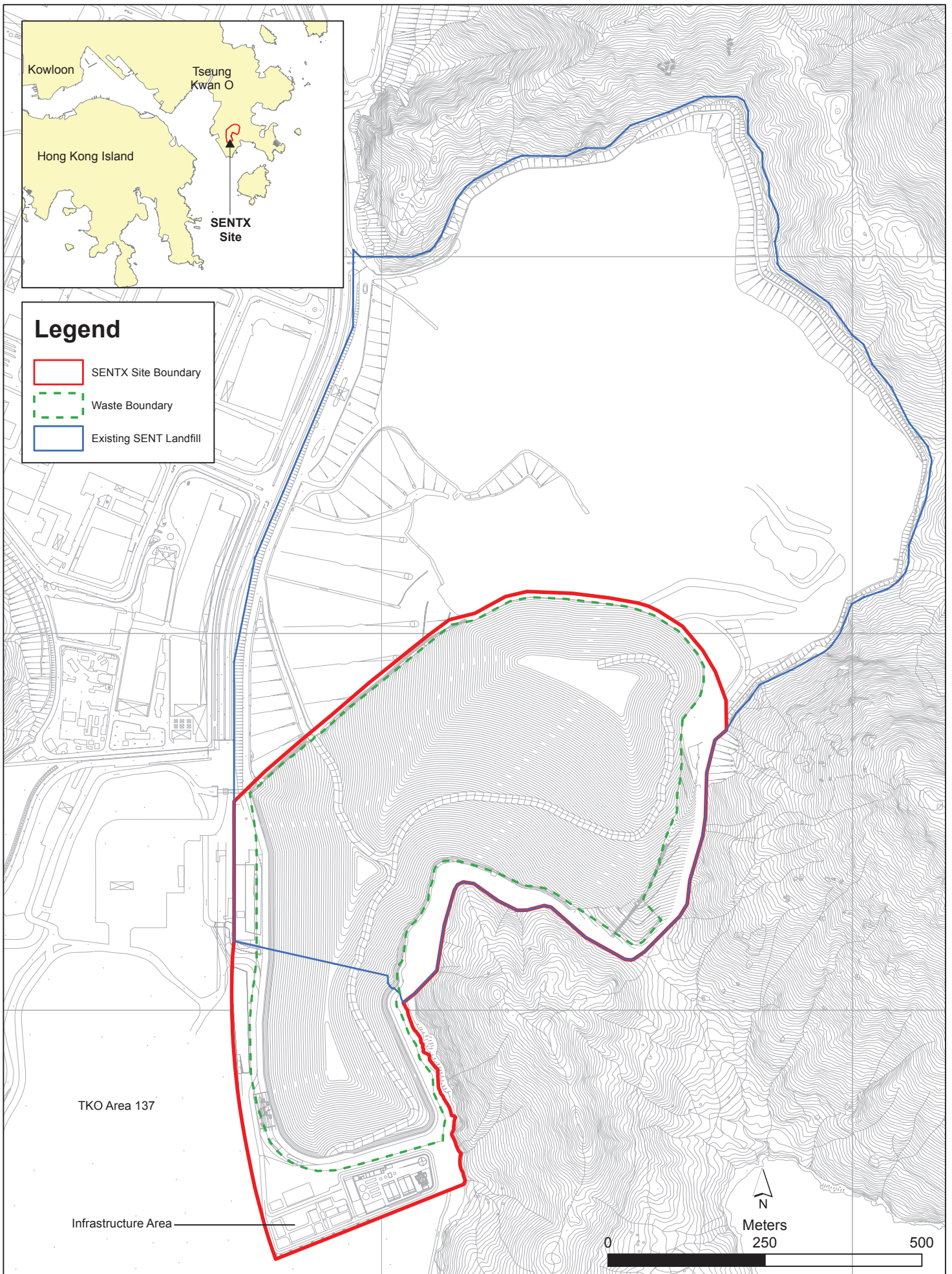


Figure 1.1

Layout Plan of SENTX

File: T:\GIS\CONTRACT\0354924\Mxd\0354924_Layout_Plan_of_SENTX.mxd
 Date: 5/9/2018

The key implementation milestones of the Project are indicatively summarised in *Table 1.1*. The construction works and operation of the Project commenced on 2 January 2019 and 21 November 2021, respectively.

Table 1.1 *Estimated Key Dates of Implementation Programme*

Key Stage of the Project	Indicative Date
Start construction	2 January 2019
Commissioning of new infrastructure facilities	2020
Demolition of existing infrastructure facilities	2021
Start waste intake at SENTX	21 November 2021
Estimated exhaustion date of SENTX	2027
End of aftercare for SENTX	2057

The major construction works of the SENTX includes:

- Site formation at the TKO Area 137 and the existing infrastructure area at SENT Landfill;
- Construction of surface and groundwater drainage systems;
- Construction of the leachate containment and collection systems;
- Construction of new leachate and landfill gas treatment facilities, site offices, maintenance yards at the new infrastructure area;
- Construction of new pipelines to transfer the leachate and landfill gas collected from the existing SENT Landfill to the treatment facilities at the new infrastructure area;
- Construction of the site access and new waste reception facilities; and
- Demolition of the facilities at the existing SENT Landfill infrastructure area.

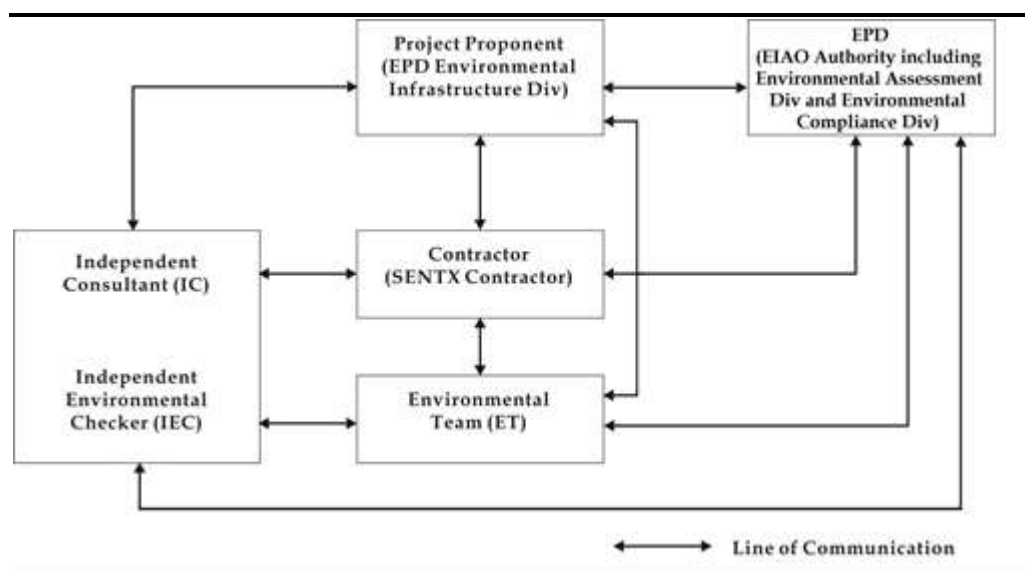
1.3 *SCOPE OF THE EM&A REPORT*

This is the Monthly EM&A Report for the Project which summarises the key findings of the EM&A programme during the reporting period from 1 to 31 October 2022 for the construction and operation works.

1.4 *PROJECT ORGANISATION*

The organisation structure of the Project is presented in *Figure 1.2*.

Figure 1.2 Organisation Chart



Contact details of the key personnel are summarised in *Table 1.2* below.

Table 1.2 Contact Information of Key Personnel

Party	Position	Name	Telephone
Contractor (Green Valley Landfill Limited)	Project Manager	Carl Lai	2706 8829
Environmental Team (ET) (ERM-Hong Kong, Limited)	ET Leader	Frank Wan	2271 3152
Independent Environmental Checker (IEC) (Meinhardt Infrastructure and Environment Limited)	IEC	Claudine Lee	2859 5409

1.5 SUMMARY OF CONSTRUCTION WORKS

The programme of the construction is shown in *Annex A*. As informed by the Contractor, the major works carried out in this reporting period include:

- Rectification of defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP), infrastructure area and waste reception area;
- Installation of roof planter at infrastructure area;
- Rectification of defects for underground utilities and pipe;
- Construction of Cell 4X and SENT tie in area and rock wall;
- Demolition of existing DP3 channel;
- Tree removal at Cell 4X and SENT tie in area;
- Deployment of liner at Cell 4X and SENT tie in area;

- Maintenance and improvement of temporary surface water drainage; and
- Rectification of utilities installation along Western bund of Cell 4X.

The implementation schedule of the mitigation measured recommended in the Updated EM&A Manual is presented in *Annex B*.

1.6 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

The status for all environmental aspects are presented in *Table 1.3*. The EM&A requirements remained unchanged during the reporting period.

Table 1.3 *Summary of Status for the Environmental Aspects under the Updated EM&A Manual*

Parameters	Status
Air Quality	
Baseline Monitoring	The results of baseline air quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Noise	
Baseline Monitoring	The results of baseline noise monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Water Quality	
Baseline Monitoring	The results of baseline surface water quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Landfill Gas	
Impact Monitoring	On-going
Waste Management	
Waste Monitoring	On-going
Landscape and Visual	
Baseline Monitoring	The results of baseline landscape and visual monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Operation Phase Audit	On-going
Site Environmental Audit	
Regular Site Inspection	On-going
Complaint Hotline and Email Channel	On-going
Environmental Log Book	On-going

Taking into account the operation works, impact monitoring of air quality, noise, water quality, landfill gas and waste management were carried out in the reporting period. The impact monitoring schedule of air quality, noise, water quality and landfill gas monitoring are provided in *Annex C*.

The EM&A programme also involved environmental site inspections and related auditing conducted by the ET for checking the implementation of the required environmental mitigation measures recommended in the approved EIA Report and relevant EP submissions. To promote the environmental awareness and enhance the environmental performance of the contractors, environmental trainings and regular environmental management meetings were conducted during the reporting period, which are summarised as below:

- One environmental management meeting was held with the Contractor, ER, ET, IEC and EPD on 20 October 2022; and
- Environmental toolbox trainings on Good Vehicle Maintenance Practices and Mosquito Prevention were provided on 5 October and 19 October 2022 respectively by the Contractor to the workers.

1.7 STATUS OF STATUTORY ENVIRONMENTAL COMPLIANCE WITH THE ENVIRONMENTAL PERMIT

The status of statutory environmental compliance with the EP conditions under the EIAO, submission status under the EP and implementation status of mitigation measures are presented in *Table 1.4*.

Table 1.4 *Status of Submissions required under the EP and Implementation Status of Mitigation Measures*

EP Condition	Submission / Implementation Status	Status
2.3	Management Organisation of Main Construction Companies	Submitted and accepted by EPD.
2.4	Setting up of Community Liaison Group	Community Liaison Group was set up.
2.5	Submission of Detailed Landfill Gas Hazard Assessment Report	Submitted and accepted by EPD on 10 January 2019.
2.6	Submission of Restoration and Ecological Enhancement Plan	Submitted to EPD on 28 June 2019.
2.7	Setting up of Trial Nursery	Trial Nursery works was commenced on 28 August 2019.
2.8	Advance Screen Planting	Advance Screen Planting works were completed on 28 June 2019.
2.9	Provision of Multi-layer Composite Liner System	Under implementation.

1.8 STATUS OF OTHER STATUTORY ENVIRONMENTAL REQUIREMENTS

The environmental licenses and permits (including EP, *Water Pollution Control Ordinance* (WPCO) discharge license, registration as a chemical waste producer, and construction noise permit) that are valid in the reporting period are presented in *Table 1.5*. No non-compliance with environmental statutory requirements was identified.

Table 1.5 **Status of Statutory Environmental Requirements**

Description	Ref No.	Status
Environmental Permit	EP-308/2008	Granted on 5 August 2008
Variation of Environmental Permit	EP-308/2008/A	Granted on 6 January 2012
	EP-308/2008/B	Granted on 20 January 2017
Further Environmental Permit	FEP-01/308/2008/B	Granted on 16 May 2018
Water Discharge License under WPCO (Permit Holder: GVL)	Licence No.: WT00041447-2022	Validity from 17 June 2022 to 30 June 2024
Billing Account for Disposal of Construction Waste	Chit Account Number: 5001692	Approved on 28 December 2005
Registration as a Chemical Waste Producer (Permit Holder: GVL)	5296-839-G2228-01	Issued on 31 December 2015
Construction Noise Permit (Permit Holder: GVL)	GW-RE0956-22	Validity from 23 September 2022 to 14 March 2023

The EM&A programme for the Project required environmental monitoring for air quality, noise, water quality and landfill gas as well as environmental site inspections for air quality, noise, water quality, landfill gas, waste management, and landscape and visual impacts. The EM&A requirements and related findings for each component are summarised in the following sections.

2.1 AIR QUALITY MONITORING

2.1.1 Dust Monitoring

Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project, impact dust monitoring (in term of Total Suspended Particulates (TSP)) was carried out at the four designated locations along the site boundary (i.e. AM1, AM2, AM3 and AM4) during the operation/restoration phase, at a 6-day interval.

The Action and Limit Levels of the dust monitoring is provided in *Table 2.1* below.

Table 2.1 *Action and Limit Levels for 24-hour TSP*

Monitoring Station	Action Level	Limit Level
AM1 - SENTX Site Boundary (North)		
AM2 - SENTX Site Boundary (West, near DP3)	260 $\mu\text{g m}^{-3}$	260 $\mu\text{g m}^{-3}$
AM3 - SENTX Site Boundary (West, near RC15)		
AM4 - SENTX Site Boundary (West, near EPD building)		

High volume air samplers (HVSs) in compliance with the specifications listed under Section 3.2.2 of the updated EM&A Manual were used to measure 24-hour TSP levels at the dust monitoring stations. The HVSs were calibrated upon installation and thereafter at bi-monthly intervals to check the validity and accuracy of the results.

The equipment used in the impact dust monitoring programme and monitoring locations are summarised in *Table 2.2* and illustrated in *Figure 2.1*, respectively. Copies of the calibration certificates for the equipment are presented in *Annex D1*.

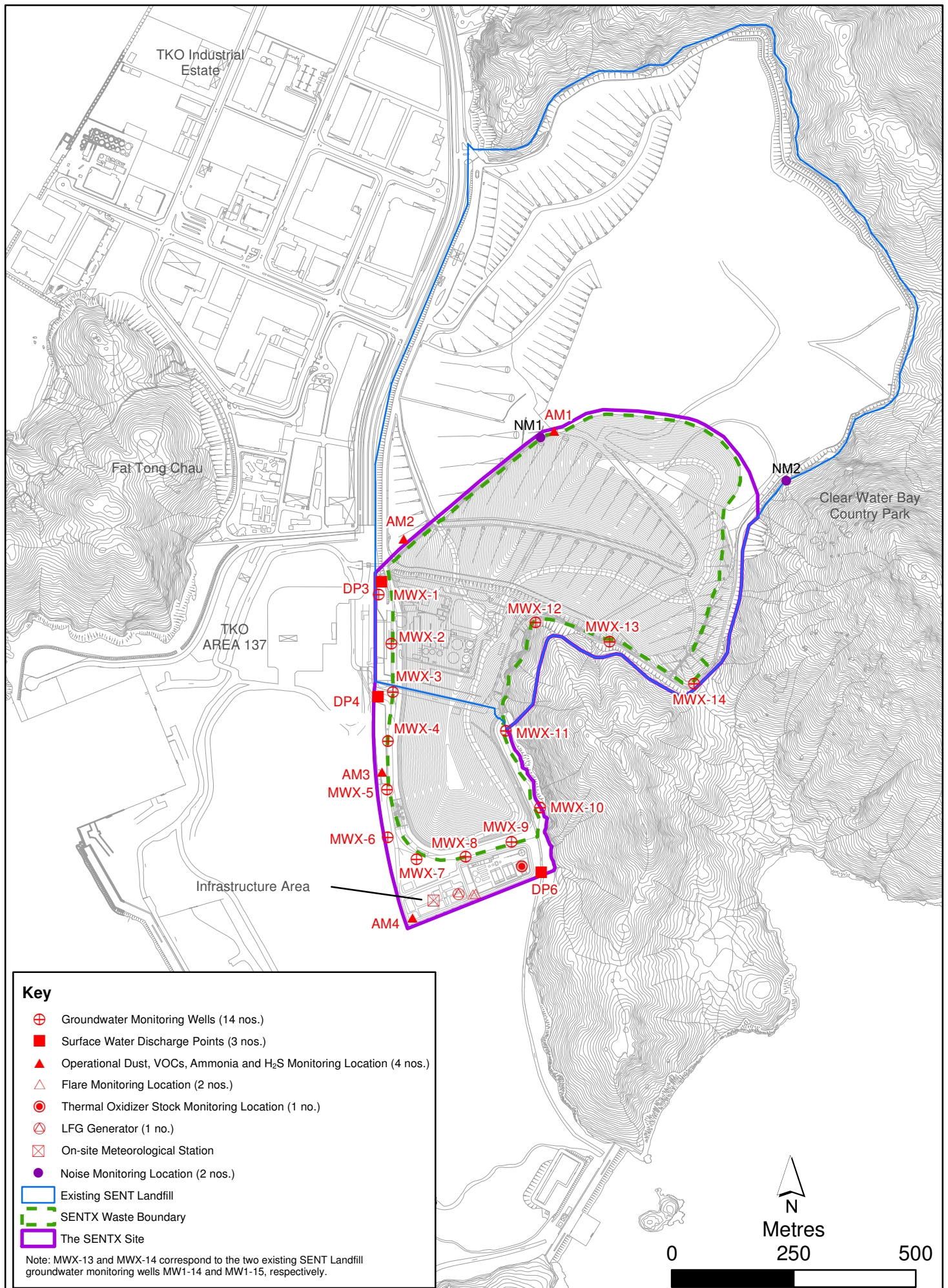


Figure 2.1

Environmental Monitoring Locations

Table 2.2 *Dust Monitoring Details*

Monitoring Station	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
AM1	SENTX Site Boundary (North)	24-hour TSP	Once every 6 days	3, 9, 15, 21, 27 October 2022	Tisch TE-5170 (S/N: 1190)
AM2	SENTX Site Boundary (West, near DP3)				Tisch TE-5170 (S/N: 1047)
AM3	SENTX Site Boundary (West, near RC15)				Tisch TE-5170 (S/N: 1258)
AM4	SENTX Site Boundary (West, near EPD building)				Tisch TE-5170 (S/N: 1101)

Monitoring Schedule for the Reporting Month

The schedule for dust monitoring during the reporting period is provided in *Annex C*.

Results and Observations

The monitoring results for 24-hour TSP are summarised in *Table 2.3*. The detailed monitoring results and the graphical presentation of the 24-hour TSP results at each monitoring location are provided in *Annex D2*.

Table 2.3 *Summary of 24-hour TSP Monitoring Results in the Reporting Period*

Monitoring Station	Average 24-hr TSP Concentration ($\mu\text{g m}^{-3}$) (Range in bracket)	Action Level ($\mu\text{g/m}^3$)	Limit Level ($\mu\text{g/m}^3$)
AM1 - SENTX Site Boundary (North)	93 (64 - 136)	260	260
AM2 - SENTX Site Boundary (West, near DP3)	87 (71 - 126)	260	260
AM3 - SENTX Site Boundary (West, near RC15)	134 (111 - 194)	260	260
AM4 - SENTX Site Boundary (West, near EPD building)	118 (66 - 243)	260	260

The major dust sources in the reporting period included fugitive dust emission from exposed area in SENTX, as well as nearby operations of the SENT Landfill and the TKO Area 137 Fill Bank.

All the 24-hour TSP results were below the Action and Limit Levels at the monitoring locations in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex D3*.

Meteorological Data

Meteorological data obtained from the SENTX on-site meteorological monitoring station was used for the dust monitoring and is shown in *Annex D4*. It is considered that meteorological data obtained at the on-site meteorological monitoring station is representative of the Project area and could be used for the operation/restoration phase dust monitoring programme for the Project.

2.1.2 Odour Monitoring

Monitoring Requirements

According to the updated EM&A Manual of the Project, odour patrol was carried out along the site boundary during the operation/ restoration phase.

During the first month of operation, daily odour patrol (3 times per day) was conducted jointly by the ET and the IEC. The odour intensity detected was based on that determined by the IEC. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC three times per week. During these patrols, the odour intensity detected was based on that determined by the independent third party.

Reduction of odour monitoring frequency from Period 1 (daily, three times per day) to Period 2 (weekly) was approved by EPD on 4 February 2022. Weekly odour patrol was conducted jointly by the ET and the IEC from 10 February 2022. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC once every two weeks.

Reduction of odour monitoring frequency from Period 2 (weekly) to Period 3 (monthly) was approved by EPD on 2 June 2022. Monthly odour patrol was conducted jointly by the ET and the IEC from 28 June 2022. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC quarterly.

The Action and Limit Levels for odour patrol is provided in *Table 2.4* below.

Table 2.4 Action and Limit Levels for Odour Patrol

Parameter	Action Level	Limit Level
Perceived odour intensity and odour complaints	<ul style="list-style-type: none">• Odour intensity \geq Class 2 recorded; or• One documented complaint received	<ul style="list-style-type: none">• Odour intensity \geq Class 3 recorded on 2 consecutive patrol ^{(a) (b)}
Notes:		
(a) i.e. either Class 3-strong or Class 4-extreme odour intensity.		
(b) The exceedances of the odour intensity do not need to be recorded at the same location.		

Odour patrol was conducted by trained personnel/ competent persons with a specific sensitivity to a reference odour (i.e. on reference materials n-butanol with the concentration of 50ppm in nitrogen (v/v)) in compliance with Section 3.7.2 of the updated EM&A Manual patrolling and sniffing along the SENTX Site boundary to detect any odour.

The odour monitoring programme and patrol route are summarised in *Table 2.5* and illustrated in *Figure 2.2* respectively. Copies of the certificates of the qualified odour panelist are presented in *Annex D5*.

Table 2.5 *Odour Monitoring Details*

Patrol Locations	Parameters	Patrol Frequency ^(a)	Monitoring Dates
Patrol along the SENTX Site Boundary (Checkpoints OP1 - OP17)	Odour Intensity (see <i>Table 2.6</i>)	<p><u>Period 1 - First month of operation</u> Daily, three times a day in the morning, afternoon and evening/ night (between 18:00 and 22:00 hrs) conducted by the ET and the IEC</p> <p>Three times per week on different days conducted by an independent third party together with the ET and IEC ^(b)</p> <p><u>Period 2 - Three months following period 1 ^(c)</u> Weekly conducted by the ET and the IEC</p> <p>Once every two weeks conducted by an independent third party together with the ET and IEC ^(b)</p> <p><u>Period 3 - Throughout operation following period 2 ^(c)</u> Monthly conducted by the ET and the IEC</p> <p>Quarterly conducted by an independent third party together with the ET and IEC ^(b)</p>	<p><u>Conducted by ET & IEC:</u> 13 October 2022</p> <p><u>Conducted by an independent third party, ET & IEC:</u> -</p>
Notes:			
(a) Reduction of monitoring frequency will be subject to the monitoring results to demonstrate environmentally acceptable performance.			
(b) Patrol shall be scheduled so that they are carried out together with the patrols to be carried out jointly by the ET and the IEC.			
(c) Commencement of each period will be justified by the ET Leader and verified by the IEC and will be subject to agreement with the EPD (EIAO Authority) and Project Proponent.			

Table 2.6 *Odour Intensity Level*

Class	Odour Intensity	Description
0	Not Detected	No odour perceived or an odour so weak that it cannot be easily characterised or described.
1	Slight	Identified odour, slight

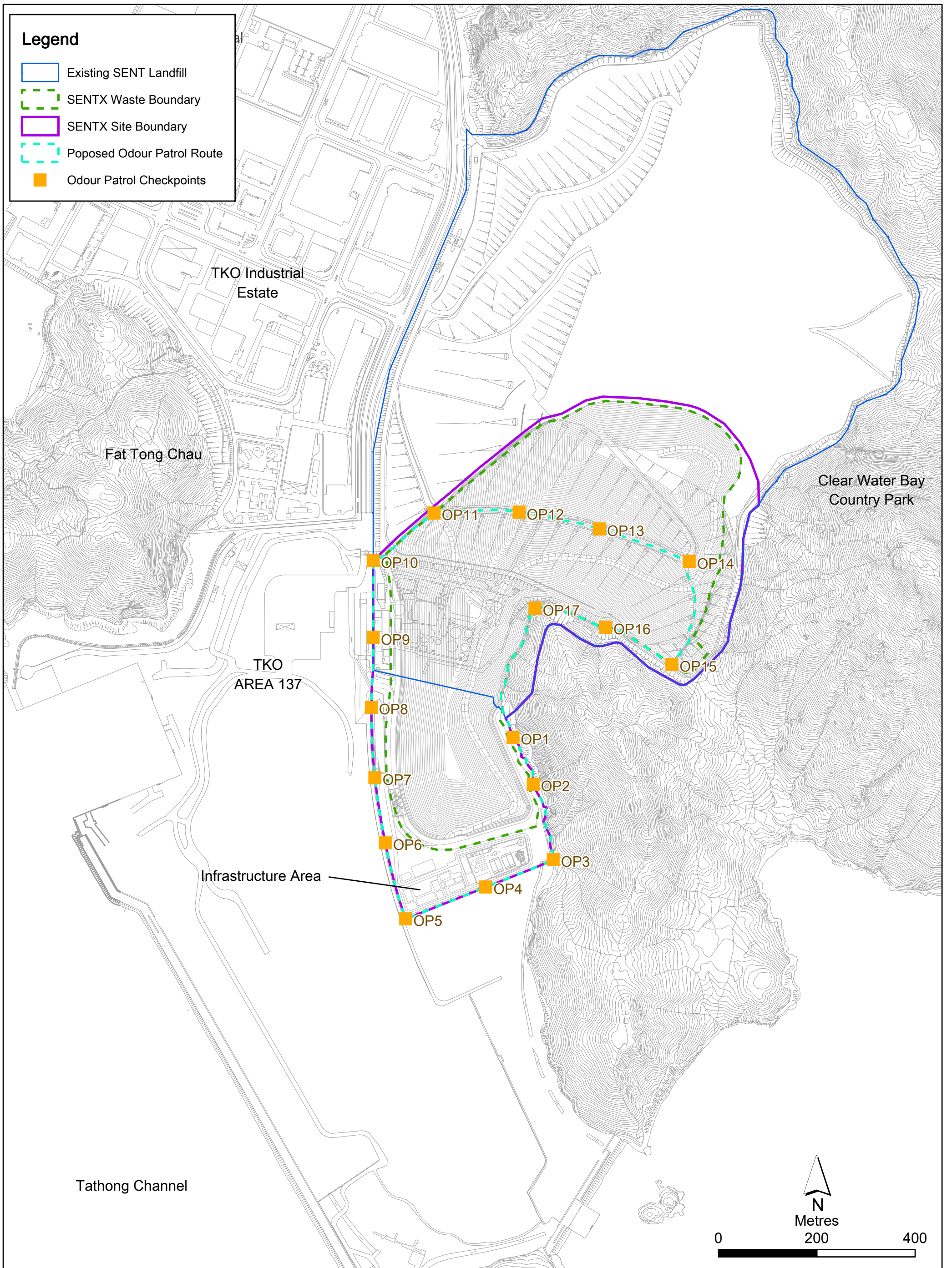


Figure 2.2

Odour Patrol Route for
Operation/ Restoration Phase Odour Monitoring

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Date: 18/8/2022

Environmental
Resources
Management



Class	Odour Intensity	Description
2	Moderate	Identified odour, moderate
3	Strong	Identified odour, strong
4	Extreme	Severe odour

Monitoring Schedule for the Reporting Month

The schedule for odour patrol during the reporting period is provided in *Annex C*.

Results and Observations

The odour monitoring results are summarised and provided in *Table 2.7* and *Annex D6*, respectively.

Table 2.7 *Summary of Odour Monitoring Results in the Reporting Period*

Odour Checkpoints	Odour Intensity Class (Range)	Action Level	Limit Level
OP1	0	Odour intensity \geq Class 2 recorded	Odour intensity \geq Class 3 recorded on 2 consecutive patrol
OP2	0		
OP3	0		
OP4	0		
OP5	0		
OP6	0		
OP7	0		
OP8	0		
OP9	0		
OP10	0		
OP11	0		
OP12	0		
OP13	0		
OP14	0		
OP15	0		
OP16	0		
OP17	0		

All the odour monitoring results were below the Action and Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex D3*.

2.1.3 *Thermal Oxidiser, Landfill Gas Flare and Landfill Gas Generator Stack Emission Monitoring*

Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project, the performance of the thermal oxidiser, landfill gas flare and landfill gas generator was monitored when they are in operation. Gas samples were collected from the stack of the thermal oxidizer, landfill gas flare and landfill gas generator for

laboratory analysis for NO₂, CO, SO₂, Benzene and Vinyl chloride and in-situ analysis for exhaust gas velocity at monthly interval for October 2022. The operating conditions of the thermal oxidiser, landfill gas flare and landfill gas generator were also monitored continuously.

The Limit Levels for stack emission of the thermal oxidiser, landfill gas flare and landfill gas generator are provided in *Tables 2.8 – 2.10* below.

Table 2.8 *Limit Levels for Stack Emission of the Thermal Oxidiser*

Parameters	Limit Level
NO ₂	1.58 gs ⁻¹
CO	0.53 gs ⁻¹
SO ₂	0.07 gs ⁻¹
Benzene	3.01 x 10 ⁻² gs ⁻¹
Vinyl chloride	2.23 x 10 ⁻³ gs ⁻¹
Gas combustion temperature	850°C (minimum)
Exhaust gas exit temperature	443K (minimum) ^(a)
Exhaust gas velocity	7.5 ms ⁻¹ (minimum) ^(a)

Note:
(a) Level under full load condition.

Table 2.9 *Limit Levels for Stack Emission of the Landfill Gas Flare*

Parameters	Limit Level
NO ₂	0.97 gs ⁻¹
CO	2.43 gs ⁻¹
SO ₂	0.22 gs ⁻¹
Benzene	4.14 x 10 ⁻⁴ gs ⁻¹
Vinyl Chloride	2.60 x 10 ⁻⁴ gs ⁻¹
Gas combustion temperature	815°C (minimum)
Exhaust gas exit temperature	923 K (minimum) ^(a)
Exhaust gas velocity	9.0 m s ⁻¹ (minimum) ^(a)

Note:
(a) Level under full load condition.

Table 2.10 *Limit Levels for Stack Emission of the Landfill Gas Generator*

Parameters	Limit Level
NO ₂	1.91 gs ⁻¹
CO	2.48 gs ⁻¹
SO ₂	0.528 gs ⁻¹
Benzene	2.47 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	1.88 x 10 ⁻⁵ gs ⁻¹
Gas combustion temperature	450°C (minimum)
Exhaust gas exit temperature	723K (minimum) ^(a)
Exhaust gas velocity	30.0 ms ⁻¹ (minimum) ^(a)

Note:
(a) Level under full load condition.

Gas samples were collected from the centroid of the stack with stainless steel sampling probe, into inert sample containers (i.e. Canister and Tedlar Bag) and transferred to ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066) laboratory within 24 hours of collection for direct analysis on a gas chromatography within 48 hours after collection. The flue gas velocity of the gas stream at the exhaust of thermal oxidize was determined by S-Pitot tube during the emission sampling.

The stack emission monitoring programme and monitoring locations are summarised in *Table 2.11* and illustrated in *Figure 2.1*, respectively.

Table 2.11 *Thermal Oxidiser, Landfill Gas Flare and Landfill Gas Generator Stack Emission Monitoring Details*

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Thermal Oxidiser	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	17 October 2022
	<ul style="list-style-type: none"> • NO₂ • CO • SO₂ • Benzene • Vinyl chloride 		
	In-situ analysis for		
	<ul style="list-style-type: none"> • Exhaust gas velocity 		
Stack of Landfill Gas Flare	Laboratory analysis for	Quarterly for the 1 st year of operation ^(b)	-
	<ul style="list-style-type: none"> • Non-methane organic compounds 	Quarterly	-
	Laboratory analysis for	Continuously	1 – 31 October 2022
Stack of Landfill Gas Flare	<ul style="list-style-type: none"> • Ammonia • Gas combustion temperature • Exhaust temperature • Exhaust gas velocity ^(a) 		
	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	14 October 2022
	<ul style="list-style-type: none"> • NO₂ • CO • SO₂ • Benzene • Vinyl chloride 		
	In-situ analysis for		
<ul style="list-style-type: none"> • Exhaust gas velocity 			
Stack of Landfill Gas Flare	Laboratory analysis for	Quarterly for the 1 st year of operation ^(b)	-
	<ul style="list-style-type: none"> • Non-methane organic compounds 	Continuously	1 – 31 October 2022
	<ul style="list-style-type: none"> • Gas combustion temperature • Exhaust temperature • Exhaust gas velocity ^(a) 		

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Landfill Gas Generator	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	14 October 2022
	<ul style="list-style-type: none"> • NO₂ • CO • SO₂ • Benzene • Vinyl chloride 		
	In-situ analysis for		
	<ul style="list-style-type: none"> • Exhaust gas velocity 	Quarterly for the 1 st year of operation ^(b)	-
	Laboratory analysis for		
	<ul style="list-style-type: none"> • Non-methane organic compounds 		
	<ul style="list-style-type: none"> • Exhaust temperature 	Continuously	1 – 31 October 2022
	<ul style="list-style-type: none"> • Exhaust gas velocity ^(a) 		

Notes:

- (a) The exhaust gas velocity is calculated based on the cross-section area of the stack and continuous monitored gas flow and combustion temperature data.
- (b) The monitoring results will be reviewed towards the end of the first year of operation to determine if monitoring of this parameter can be terminated upon agreement by the EIAO Authority, IEC and Project Proponent.

Monitoring Schedule for the Reporting Month

The schedule for thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring during the reporting period is provided in *Annex C*.

Results and Observations

The thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring results and detailed continuous monitoring results are summarised in *Tables 2.12 - 2.14* and provided in *Annex D7*, respectively.

Table 2.12 *Summary of Thermal Oxidiser Stack Emission Monitoring in the Reporting Period*

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	0.39 gs ⁻¹	1.58 gs ⁻¹
CO	<0.01 gs ⁻¹	0.53 gs ⁻¹
SO ₂	0.04 gs ⁻¹	0.07 gs ⁻¹
Benzene	<2 x 10 ⁻⁴ gs ⁻¹	3.01 x 10 ⁻² gs ⁻¹
Vinyl chloride	<1.3 x 10 ⁻⁴ gs ⁻¹	2.23 x 10 ⁻³ gs ⁻¹
Gas combustion temperature	926°C (901°C - 937°C)	850°C (minimum)
Exhaust gas exit temperature	1,248K (1,147K - 1,593K)	443K (minimum) ^(a)
Exhaust gas velocity	11.9 ms ⁻¹ ^(b)	7.5 ms ⁻¹ (minimum) ^(a)

Notes:

- (a) Level under full load condition.
- (b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring. The limit level was not applicable as the stack was not operated under full load condition.

Table 2.13 Summary of Landfill Gas Flare Stack Emission Monitoring in the Reporting Period

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	0.013 gs ⁻¹	0.97 gs ⁻¹
CO	<0.01 gs ⁻¹	2.43 gs ⁻¹
SO ₂	0.26 gs ⁻¹	0.22 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹	4.14 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.8 x 10 ⁻⁵ gs ⁻¹	2.60 x 10 ⁻⁴ gs ⁻¹
Gas combustion temperature	Flare 1: 908°C (820°C - 990°C) Flare 2: 872°C (820°C - 910°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,060K (988K - 1,183K) Flare 2: 1,076K (993K - 1,133K)	923 K (minimum) ^(a)
Exhaust gas velocity	6.5 ms ⁻¹ ^(b)	9.0 m s ⁻¹ (minimum) ^(a)

Note:

(a) Level under full load condition.

(b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring. The limit level was not applicable as the stack was not operated under full load condition.

Table 2.14 Summary of Landfill Gas Generator Stack Emission Monitoring in the Reporting Period

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	0.08 gs ⁻¹	1.91 gs ⁻¹
CO	0.56 gs ⁻¹	2.48 gs ⁻¹
SO ₂	0.006 gs ⁻¹	0.528 gs ⁻¹
Benzene	<1.12 x 10 ⁻⁴ gs ⁻¹	2.47 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.7 x 10 ⁻⁶ gs ⁻¹	1.88 x 10 ⁻⁵ gs ⁻¹
Exhaust gas exit temperature	ENGA: 866K (851K - 893K) ENGB : 860K (847K - 867K)	723K (minimum) ^(a)
Exhaust gas velocity	10.3 ms ⁻¹ ^(b)	30.0 ms ⁻¹ (minimum) ^(a)

Note:

(a) Level under full load condition.

(b) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring. The limit level was not applicable as the stack was not operated under full load condition.

Limit Levels exceedance was recorded for landfill gas flare stack emission (SO₂) in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex D3* were undertaken. The landfill gas flare stack emission (SO₂) exceedance on 14 October 2022 is under investigation.

The Contractor was reminded to implement all relevant mitigation measures for the construction and operation works and maintain good site practice. The ET will keep track on the monitoring data and ensure Contractor's compliance of the environmental requirements.

2.2 NOISE MONITORING

2.2.1 Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project, impact noise monitoring was conducted weekly at the monitoring location (i.e. NM1) to obtain one set of 30-minute measurement between 07:00 and 19:00 hours on normal weekdays.

The Action and Limit Levels for operational noise of the Project are provided in *Table 2.15* below.

Table 2.15 *Action and Limit Levels for Operational Noise*

Time Period	Action Level (a)	Limit Level (b)
07:00 – 19:00 hrs on all days	When one documented complaint is received from any one of the noise sensitive receivers (NSRs)	65 dB(A) at NSRs (c)
19:00 – 23:00 hrs on all days		65 dB(A) at NSRs (c)
23:00 – 07:00 hrs on all days	75 dB(A) recorded at the monitoring station	55 dB(A) at NSRs (c)

Notes:

- (a) 75dB(A) along and at about 100m from the SENTX site boundary was set as the Action Level.
- (b) Limits specified in the GW-TM and IND-TM for construction and operational noise, respectively.
- (c) Limit Level only apply to operational noise without road traffic and construction activities noise.

Noise monitoring was performed by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066) using sound level meter at the designated monitoring station NM1 (see *Figure 2.1*) in accordance with the requirements stipulated in the updated EM&A Manual. Acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. Details of the deployed equipment are provided in *Table 2.16*. Copies of the calibration certificates for the equipment are presented in *Annex E1*.

Table 2.16 Noise Monitoring Details

Monitoring Station ⁽¹⁾	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
NM1	SENTX Site Boundary (North)	L _{eq} (30 min) measurement between 07:00 and 19:00 hours on normal weekdays (Monday to Saturday)	Once per week for 30 mins during operation of the Project	5, 10, 17, 24 October 2022	Sound Level Meter: Rion NL-52 (S/N: 00809405) Rion NL-52 (S/N: 00142581) Acoustic Calibrator: Rion NC-74 (S/N: 34657231) B&K 4231 (S&N: 2713428)

2.2.2 Monitoring Schedule for the Reporting Month

The schedule for noise monitoring during the reporting period is provided in *Annex C*.

2.2.3 Results and Observations

A total of 4 impact noise monitoring events were scheduled during the reporting period. Results for noise monitoring are summarised in *Table 2.17*. The monitoring results and the graphical presentation of the data are provided in *Annex E2*.

Table 2.17 Summary of Operation Noise Monitoring Results in the Reporting Period

Monitoring Station	Measured Noise Level L _{eq} (30 min), dB(A)		
	Average	Range	Action and Limit Level
NM1	51.8	51.0 - 53.3	75

Major noise sources identified during the noise monitoring included noise from operations of the SENTX and the TKO Area 137 Fill Bank, aircrafts and insects.

No Action and Limit Levels exceedance was recorded for operation noise monitoring in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex E3*.

2.3 WATER QUALITY MONITORING

2.3.1 Surface Water Quality Monitoring

Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project, impact surface water quality monitoring was carried out at the three designated surface water discharge points (i.e. DP3, DP4 and DP6) at monthly intervals during operation/ restoration phase to ensure that the SENTX will not cause adverse water quality impact. Suspension of impact surface water quality monitoring at DP3 was approved under the Baseline Monitoring Report by EPD on 24 July 2019 until the actual commencement of construction works affecting DP3 in 2022.

The parameters as listed in *Table 2.19* were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the surface water quality impact monitoring are provided in *Table 2.18*.

Table 2.18 *Limit Levels for Surface Water Quality*

Parameters	Limit Level
DP4 & DP6	
Ammoniacal-nitrogen	> 7.1 mg/L
COD	> 30 mg/L
SS	> 20 mg/L
Notes:	
The limit levels specified for other parameters in <i>Table 10a of the Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters</i> shall also be followed.	

The locations of the monitoring stations for the Project are shown in *Figure 2.1*. All *in situ* monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the surface water quality monitoring programme. Calibration for a DO meter was carried out before measurement according to the instruction manual of the equipment model. Details of the equipment used in the impact surface water quality monitoring works are provided in *Table 2.19*. Copies of the calibration certificates for the equipment are presented in *Annex F1*.

Table 2.19 Impact Surface Water Quality Monitoring Details

Monitoring Station	Location	Frequency	Monitoring Dates	Parameter	Equipment	
DP4	Surface water discharge point DP4	Monthly	24 October 2022	<ul style="list-style-type: none"> • pH • Electrical conductivity (EC) • DO • SS • COD • BOD₅ • TOC • Ammoniacal -nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • TKN • TN • Phosphate • Sulphate • Sulphide • Carbonate • Oil & Grease 	<ul style="list-style-type: none"> • Bicarbonate • Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron 	YSI Professional DSS (S/N: 17B100758)
DP6	Surface water discharge point DP6					

Notes:

- (a) Impact surface water quality monitoring at DP3 was suspended from the monitoring event on 25 July 2019 until the actual commencement of construction works affecting DP3 in 2022.

Monitoring Schedule for the Reporting Month

The schedule for surface water quality monitoring during the reporting period is provided in *Annex C*.

Results and Observations

One regular monitoring event for impact surface water quality monitoring was scheduled at all designated monitoring stations during the reporting period. However, sampling could not be carried out on 24 October 2022 due to insufficient flow. Details of impact water quality monitoring event are provided in *Annex F2*.

No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex F3*.

2.3.2 Leachate Monitoring

Monitoring Requirements and Equipment

According to the updated EM&A Manual, continuous monitoring of leachate level and daily monitoring of effluent quality were carried out during the operation/ restoration phase.

Reduction of effluent monitoring frequency (dry season) (from daily to monthly) was approved by EPD on 22 March 2022. Monthly effluent quality monitoring (dry season) shall be conducted from 23 March 2022. The reduction of effluent monitoring frequency (wet season) (from daily to monthly) was approved by EPD on 2 August 2022. Monthly effluent quality monitoring (wet season) shall be conducted from 3 August 2022.

Temperature, pH and volume of the effluent discharged from the leachate treatment plant were measured in-situ whereas the parameters as listed in *Table 2.20* were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the leachate monitoring are provided in *Table 2.20*.

Table 2.20 *Limit Levels for Leachate Levels and Effluent Quality*

Parameters	Limit Level
Leachate Levels	
Leachate levels above the basal liner	1 m above the primary liner of the leachate containment system
Effluent Quality	
Temperature	> 43 °C
pH Value	6 - 10
Volume Discharged	>2,000 m ³
Suspended Solids (SS)	> 800 mg/L
Phosphate	> 25 mg/L
Sulphate	> 800 mg/L
Total Inorganic Nitrogen ^(a)	> 100 mg/L
Biochemical Oxygen Demand (BOD)	> 800 mg/L
Chemical Oxygen Demand (COD)	> 2,000 mg/L
Oil & Grease	> 20 mg/L
Boron	> 7,000 µg/L
Iron	> 5 mg/L
Cadmium	> 1 µg/L
Chromium	> 300 µg/L
Copper	> 1,000 µg/L
Nickel	> 700 µg/L
Zinc	> 700 µg/L
Note:	
(a) Total Inorganic Nitrogen include Ammoniacal-nitrogen, Nitrite-nitrogen and Nitrate-nitrogen.	

All *in situ* monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the leachate quality monitoring programme. Details of the equipment used are provided in *Table 2.21*. Copies of the calibration certificates for the equipment are presented in *Annex F4*.

Table 2.21 Leachate Levels and Effluent Quality Monitoring Details

Location	Frequency	Parameter	Monitoring Dates	Equipment
Leachate levels above the basal liner	Continuous	Leachate Levels	1 – 31 October 2022	Pairs of pressure transducers
Effluent discharged from LTP	Daily for the first 3 months upon full operation of the LTP at wet season (Apr to Sep) and dry season (Oct to Mar), respectively and reduce to monthly thereafter subject to the monitoring results of the first 3 months for each season and agreement with the EIAO Authority, IEC and IC. ^(a)	<i>On-site Measurements:</i> <ul style="list-style-type: none"> • Volume • pH • Temperature <i>Laboratory analysis:</i> <ul style="list-style-type: none"> • Suspended Solids • COD • BOD₅ • TOC • Ammoniacal-nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • Total Nitrogen • Sulphate • Phosphate • Oil & Grease • Alkalinity • Chloride • Calcium • Potassium • Magnesium • Iron • Zinc • Copper • Chromium • Nickel • Cadmium • Boron 	7 October 2022	TOA HM-30P (S/N: 790332)

Note:

(a) Reduction of monitoring frequency will be subject to the monitoring results to demonstrate environmentally acceptable performance.

Monitoring Schedule for the Reporting Month

The schedule for leachate monitoring during the reporting period is provided in *Annex C*.

Results and Observations

The leachate levels and effluent quality monitoring results are summarised in *Table 2.22* and *Table 2.23*, respectively. The detailed monitoring results are provided in *Annex F5* and *Annex F6*, respectively.

Table 2.22 Summary of Leachate Levels in the Reporting Period

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	70 (62 - 77)	> 178
Meter No. X-2	82 (64 - 88)	
Average	76 (64 - 83)	
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	73 (62 - 86)	> 180
Meter No. X-4	78 (66 - 90)	
Average	75 (64 - 88)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	66 (50 - 70)	> 175
Meter No. X-6	66 (62 - 70)	
Average	66 (58 - 70)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	79 (48 - 215)	> 186
Meter No. X-8	81 (52 - 213)	
Average	80 (50 - 214)	

Table 2.23 Summary of Effluent Quality Monitoring Results in the Reporting Period

Parameters		Monitoring Results	Limit Level
Effluent Discharged from LTP			
Temperature	°C	35.3	> 43 °C
pH Value	pH unit	8.2	6 - 10
Volume Discharged	m ³	1,124	>2,000 m ³
Suspended Solids (SS)	mg/L	49	> 800 mg/L
Phosphate	mg/L	2.45	> 25 mg/L
Sulphate	mg/L	385	> 800 mg/L
Total Inorganic Nitrogen ^(a)	mg/L	65.91	> 100 mg/L
BOD	mg/L	8	> 800 mg/L
COD	mg/L	484	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	3400	> 7,000 µg/L
Iron	mg/L	0.73	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	74	> 300 µg/L
Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	74	> 700 µg/L
Zinc	µg/L	100	> 700 µg/L

Note:

(a) Total Inorganic Nitrogen include Ammoniacal-nitrogen, Nitrite-nitrogen and Nitrate-nitrogen.

Limit Levels exceedance was recorded for leachate level monitoring in the reporting period and actions in accordance with the Event and Action Plan

presented in *Annex F3* were undertaken. The leachate level exceedances at Pump Station No. 4X from 1 to 3 October 2022 are under investigation.

All effluent quality monitoring results were below the Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex F3*.

The Contractor was reminded to implement all relevant mitigation measures for the construction and operation works and maintain good site practice. The ET will keep track on the monitoring data and ensure Contractor's compliance of the environmental requirements.

2.3.3 *Groundwater Monitoring*

Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project with incorporation of the proposed updates under the Amendment Summary approved by EPD on 15 June 2020, groundwater monitoring was carried out at 14 perimeter groundwater monitoring wells (including 3 up-gradient wells and 11 down-gradient wells) (i.e. MWX-1 to MWX-14) to monitor the groundwater quality and level of the perimeter groundwater monitoring wells at monthly interval.

The Limit Levels for groundwater quality is provided in *Table 2.24* below.

Table 2.24 *Limit Levels for Groundwater Quality*

Location	Limit Levels	
	Ammoniacal-nitrogen (mg L ⁻¹)	COD (mg L ⁻¹)
MWX-1	5.00	30
MWX-2	5.00	30
MWX-3	5.00	30
MWX-4	7.63	36
MWX-5	5.00	30
MWX-6	5.00	46
MWX-7	6.55	36
MWX-8	15.85	50
MWX-9	7.30	71
MWX-10	5.00	30
MWX-11	5.00	30
MWX-12	5.00	30
MWX-13	5.00	30
MWX-14	5.00	30

A bladder pump with Teflon sampling tube and adjustable discharge rates was used for purging and taking of groundwater sample from the monitoring wells. Filtered groundwater samples were collected by connecting a disposable in-line filter system to the tubing of the sampling pump, prior to

storage and analysis by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

A portable dip meter with 5mm accuracy was used for measurement of groundwater level at each well. The dip meter has an audio indicator of the water level and was checked before use.

The measurements of pH and electrical conductivity (EC) were undertaken *in situ*. *In situ* monitoring instruments in compliance with the specifications listed under Section 4.3.2 of the updated EM&A Manual were used to undertake the groundwater quality monitoring for the Project.

Details of the equipment used and the monitoring locations are summarised in *Table 2.25* and illustrated in *Figure 2.1*, respectively. Copies of the calibration certificates for the equipment are presented in *Annex F7*.

Table 2.25 *Groundwater Monitoring Details*

Monitoring Location	Frequency	Parameter		Monitoring Dates	Equipment
All groundwater monitoring wells (MWX-1 to MWX-14)	Monthly	<ul style="list-style-type: none"> • Water level • pH • EC • COD • BOD5 • TOC • Ammoniacal -nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • TKN • TN • Sulphate • Sulphide • Carbonate • Bicarbonate • Phosphate 	<ul style="list-style-type: none"> • Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron 	10, 11 October 2022	YSI Professional DSS (S/N: 15H103928)

Monitoring Schedule for the Reporting Month

The schedule for surface water quality monitoring during the reporting period is provided in *Annex C*.

Results and Observations

The groundwater quality monitoring results and detailed monitoring results are summarised in *Table 2.26* and provided in *Annex F8*, respectively.

Table 2.26 Summary of Groundwater Monitoring Results in the Reporting Period

Location	Ammoniacal-nitrogen (mg L ⁻¹)		COD (mg L ⁻¹)	
	Monitoring Results	Limit Levels	Monitoring Results	Limit Levels
MWX-1	1.23	5.00	12	30
MWX-2	0.02	5.00	4	30
MWX-3	1.47	5.00	14	30
MWX-4	2.49	7.63	19	36
MWX-5	1.28	5.00	22	30
MWX-6	3.1	5.00	39	46
MWX-7	5.23	6.55	22	36
MWX-8	4.97	15.85	34	50
MWX-9	0.43	7.30	27	71
MWX-10	<0.01	5.00	8	30
MWX-11	<0.01	5.00	4	30
MWX-12	<0.01	5.00	4	30
MWX-13	<0.01	5.00	4	30
MWX-14	<0.01	5.00	3	30

All the groundwater monitoring results were below the Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex F3*.

2.4 LANDFILL GAS MONITORING

2.4.1 Monitoring Requirements

According to the updated EM&A Manual of the Project, landfill gas monitoring was carried out at the perimeter of the waste boundary (monitoring wells), area between the SENTX Site boundary and the waste boundary (surface emission), occupied on-site building, service voids, utilities pit and manholes in the vicinity of the SENTX (build-up of landfill gas) during the operation/restoration phase.

The Limit Levels for landfill gas monitoring is provided in *Table 2.27* below.

Table 2.27 Limit Levels for Landfill Gas Constituents

Parameters	Monitoring Location	Limit Level (% (v/v))	
Perimeter Landfill Gas Monitoring Wells (a)			
Methane & Carbon Dioxide		Methane	Carbon Dioxide
	LFG1	1.0	3.2
	LFG2	1.0	4.3
	LFG3	1.0	6.3
	LFG4	1.0	7.0
	LFG5	1.0	3.4
	LFG6	1.0	9.1
	LFG7	1.0	1.5
	LFG8	12.6	2.4
	LFG9	2.5	1.7
LFG10	3.5	1.6	

Parameters	Monitoring Location	Limit Level (% (v/v))	
	LFG11	3.0	2.0
	LFG12	13.2	1.5
	LFG13	22.5	2.7
	LFG14	5.2	1.8
	LFG15	18.2	2.0
	LFG16	1.0	2.0
	LFG17	17.8	2.4
	LFG18	2.3	2.1
	LFG19	6.3	3.1
	LFG20	1.0	4.6
	LFG21	1.0	4.8
	LFG22	1.0	4.0
	LFG23	1.0	10.3
	LFG24	1.0	4.7
	GP1	1.0	10.6
	GP2 (shallow)	1.0	11.4
	GP2 (deep)	1.0	10.4
	GP3 (shallow)	1.0	6.9
	GP3 (deep)	1.0	5.6
	GP4 (shallow)	1.0	11.6
	GP4 (deep)	1.0	7.7
	GP5 (shallow)	1.0	10.8
	GP5 (deep)	1.0	7.5
	GP6	1.0	8.4
	GP7	1.0	4.5
	GP12	1.0	2.3
	GP15	1.0	2.2
	P7	1.0	2.5
	P8	1.0	1.7
	P9	1.0	2.7

Service Voids, Utilities Pits and Manholes

Methane (or flammable gas)	Service voids, utilities pits and manholes	1% by volume
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Permanent Gas Monitoring System

Methane (or flammable gas)	Permanent Gas Monitoring System	1% by volume (20% LEL)
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Notes:

- (a) Limit Levels established based on the pre-operation phase baseline and additional landfill gas monitoring results in the Pre-operation Baseline Monitoring Report.

Gas analysers in compliance with the specifications listed under Section 5.4.1 of the updated EM&A Manual were used to monitor the gas parameters at the landfill gas monitoring wells, service voids, utilities pits and manholes. The gas analyser was calibrated by a laboratory accredited under HOKLAS at yearly intervals and checked before use to ensure the validity and accuracy of the results. A portable dip meter was used to monitor the water level in the monitoring wells.

Permanent gas monitoring systems with pre-set alarm levels for methane at 20% lower explosive limit (LEL, equivalent to 1% methane gas (v/v)) were installed and operated in all occupied on-site buildings at SENTX. A central control panel is equipped to alert site personnel when the gas concentration at any detector reaches the alarm level.

The equipment used in the landfill gas monitoring programme is summarised in *Table 2.28*. The landfill gas monitoring locations for perimeter landfill gas monitoring wells and service voids, utilities and manholes along the Site boundary are illustrated in *Figure 2.3*, and *Annex G1*, respectively. Copies of the calibration certificates for the equipment are presented in *Annex G2*.

Table 2.28 *Landfill Gas Monitoring Details*

Monitoring Location	Frequency	Parameter	Monitoring Dates	Equipment
Perimeter landfill gas monitoring wells (LFG1 to LFG24, P7 to P9, GP1 to GP7, GP12 and GP15)	Monthly	<ul style="list-style-type: none"> • Methane • Carbon dioxide • Oxygen • Atmospheric pressure 	3 October 2022	GA5000 (S/N: G507306)
Service voids, utilities and manholes along the Site boundary and within the SENTX Site (UU1 to UU28)	Monthly	<ul style="list-style-type: none"> • Methane • Carbon dioxide • Oxygen 	5 October 2022	GA5000 (S/N: G507306)
Permanent gas monitoring system in all occupied on-site buildings	Continuous	<ul style="list-style-type: none"> • Methane (or flammable gas) by permanent gas monitoring system 	1 - 31 October 2022	Permanent gas monitoring system

2.4.2 *Monitoring Schedule for the Reporting Month*

The schedule for landfill gas monitoring during the reporting period is provided in *Annex C*.

2.4.3 *Results and Observations*

The landfill gas monitoring results are summarised and provided in *Tables 2.29 - 2.30* and *Annex G3*, respectively.

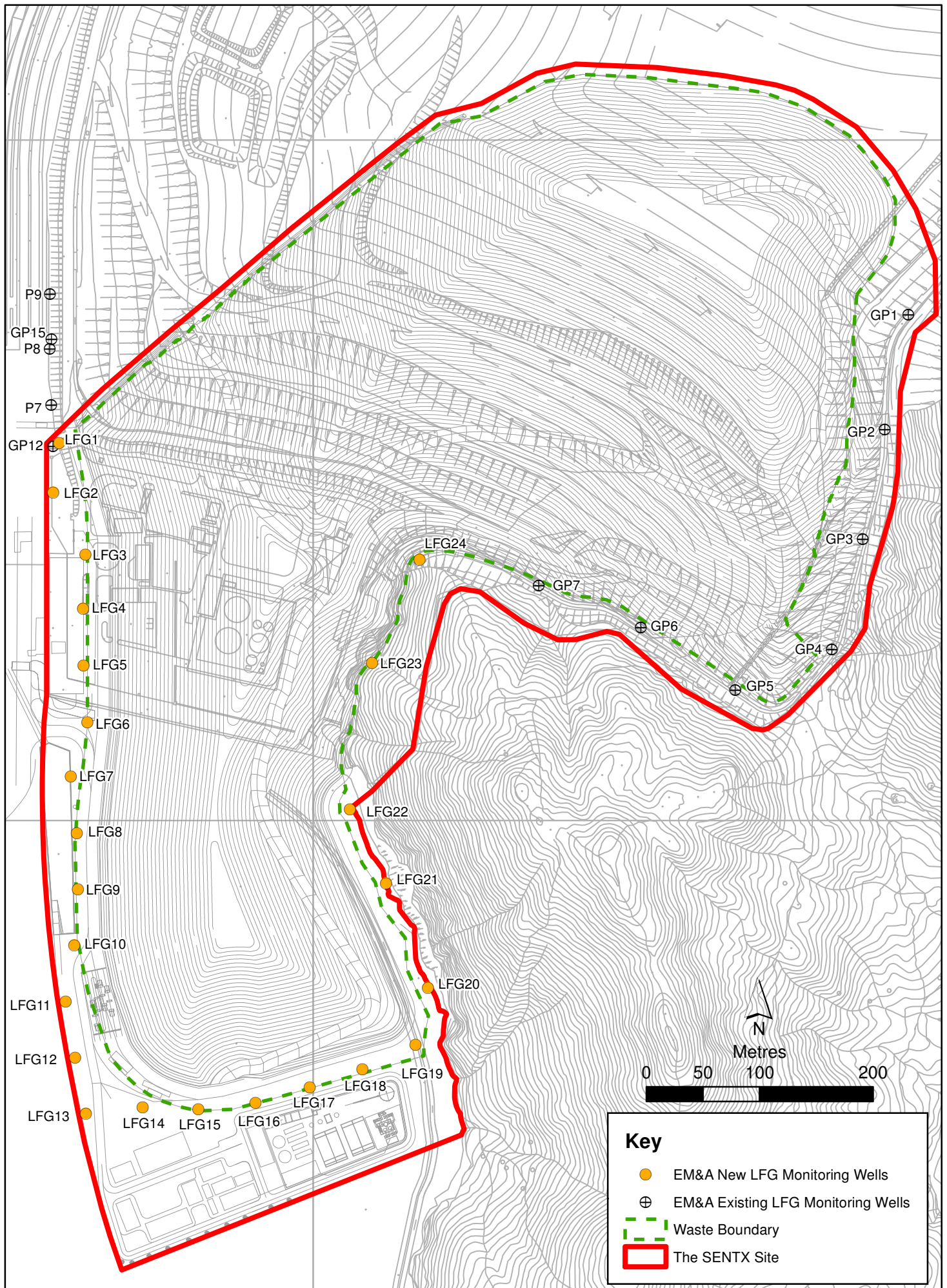


Figure 2.3

Location of Landfill Gas Monitoring Wells

Table 2.29 Summary of Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells in the Reporting Period

Location	Methane (% (v/v))		Carbon Dioxide (% (v/v))	
	Monitoring Results	Limit Levels (a)	Monitoring Results	Limit Levels (a)
LFG1	0.0	1.0	1.0	3.2
LFG2	0.0	1.0	2.1	4.3
LFG3	0.0	1.0	1.8	6.3
LFG4	0.0	1.0	0.0	7.0
LFG5	0.0	1.0	0.2	3.4
LFG6	0.0	1.0	0.9	9.1
LFG7	0.0	1.0	0.0	1.5
LFG8	0.0	12.6	0.0	2.4
LFG9	0.0	2.5	0.2	1.7
LFG10	0.0	3.5	0.0	1.6
LFG11	0.0	3.0	0.2	2.0
LFG12	0.0	13.2	0.0	1.5
LFG13	24.1	22.5	0.0	2.7
LFG14	0.0	5.2	0.1	1.8
LFG15	0.0	18.2	0.0	2.0
LFG16	0.0	1.0	0.0	2.0
LFG17	0.0	17.8	0.0	2.4
LFG18	0.0	2.3	0.0	2.1
LFG19	0.0	6.3	0.0	3.1
LFG20	0.0	1.0	0.0	4.6
LFG21	0.0	1.0	0.0	4.8
LFG22	0.0	1.0	0.0	4.0
LFG23	0.0	1.0	4.0	10.3
LFG24	0.0	1.0	0.0	4.7
GP1	0.0	1.0	7.1	10.6
GP2 (shallow)		Unmeasurable due to broken probe		
GP2 (deep)		Unmeasurable due to broken probe		
GP3 (shallow)	0.0	0.0	0.4	6.9
GP3 (deep)	0.0	0.0	0.1	5.6
GP4 (shallow)	0.0	0.0	0.2	11.6
GP4 (deep)	0.0	0.0	0.1	7.7
GP5 (shallow)	0.0	0.0	7.6	10.8
GP5 (deep)	0.0	0.0	0.0	7.5
GP6	0.0	0.0	6.0	8.4
GP7	0.0	0.0	0.3	4.5
GP12	0.0	0.1	0.1	2.3
GP15	0.0	0.2	0.0	2.2
P7	0.0	0.1	0.0	2.5
P8	0.0	0.2	0.0	1.7
P9	0.0	0.2	0.0	2.7

Notes:

(a) Limit Levels established based on the pre-operation phase baseline and additional landfill gas monitoring results in the Pre-operation Baseline Monitoring Report.

Table 2.30 *Summary of Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes in the Reporting Period*

Location	Methane (% (v/v))	
	Monitoring Results	Limit Levels
UU01	0.0	1.0
UU02	0.0	1.0
UU03	0.0	1.0
UU04	0.0	1.0
UU05	0.0	1.0
UU06	0.0	1.0
UU07	0.1	1.0
UU08	0.0	1.0
UU09	0.0	1.0
UU10	0.0	1.0
UU11	0.0	1.0
UU12	Voided due to latest site programme and on-going operation work	1.0
UU13	0.0	1.0
UU14	0.0	1.0
UU15	0.0	1.0
UU16	0.0	1.0
UU17	Voided due to latest site programme and on-going operation work	1.0
UU18	0.0	1.0
UU19	0.1	1.0
UU20	0.0	1.0
UU21	0.0	1.0
UU22	0.0	1.0
UU23	0.0	1.0
UU24	0.0	1.0
UU25	0.0	1.0
UU26	0.0	1.0
UU27	0.0	1.0
UU28	0.0	1.0

The alarm of the permanent gas monitoring systems with pre-set levels for methane at 20% lower explosive limit (LEL, equivalent to 1% methane gas (v/v)) was not triggered at all occupied on-site buildings at SENTX in October 2022.

Limit Levels exceedance was recorded for perimeter landfill gas monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex G4* were undertaken. The perimeter landfill gas exceedance at LFG13 on 3 October 2022 is under investigation.

The Contractor was reminded to implement all relevant mitigation measures for the construction and operation works and maintain good site practice. The ET will keep track on the monitoring data and ensure Contractor's compliance of the environmental requirements.

2.5 LANDSCAPE AND VISUAL MONITORING

2.5.1 Monitoring Requirements

According to the updated EM&A Manual of the Project, the monthly landscape and visual audit was conducted on 27 October 2022 to monitor the implementation of the landscape and visual mitigation measures during operation/ restoration phase.

All relevant environmental mitigation measures listed in the approved EIA Report and the updated EM&A Manual and their implementation status are summarised in *Annex B*.

2.5.2 Results and Observations

The Contractor has implemented environmental mitigation measures as stated in the approved EIA Report and the EM&A Manual.

Regarding the landscape and visual audit, the Contractor was reminded to maintain the advance screen planting works regularly to ensure effective screening of views of project works from the High Junk Peak Trail.

2.6 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis with the Contractor, IEC and ER to monitor the implementation of proper environmental pollution control and mitigation measures under the Project. In the reporting period, 4 site inspections were carried out on 6, 13, 20 and 27 October 2022.

Key observations during the site inspections are summarised in *Table 2.31*.

Table 2.31 *Key Observations Identified during the Site Inspection in this Reporting Month*

Inspection Date	Environmental Observations and Recommendations
6 October 2022	<ul style="list-style-type: none">• The contractor shall remove the general refuse accumulated at the surface channel near Paul Y area to ensure it is functioning properly at all times.• The contractor shall remove the deposited silt accumulated at the surface channel near sump house 3 to ensure it is functioning properly at all times.
10 October 2022	<ul style="list-style-type: none">• The contractor shall remove the general refuse accumulated near Paul Y area to maintain site cleanliness.

Inspection Date	Environmental Observations and Recommendations
20 October 2022	<ul style="list-style-type: none"> The contractor shall cover the stockpile of dusty materials by impervious sheeting near LTP to minimize dust impact issue. The contractor shall cover the exposed soil area near buttress wall area to reduce the contamination of runoff and erosion. The contractor shall refill flocculent agent in Wetsep at DP4 to ensure it is functioning properly at all times. The contractor shall remove the oil spillage near town gas plant and handle the clean-up materials as chemical waste. The contractor shall remove the general refuse accumulated at the channel leading to DP3, DP3 sediment pit, x10C channel and near Paul Y area to maintain site cleanliness.
27 October 2022	<ul style="list-style-type: none"> The contractor shall remove the general refuse accumulated at the x10C channel to ensure it is functioning properly at all times.

The Contractor has rectified all observations identified during environmental site inspections in the reporting period. Key environmental deficiencies identified and the corresponding rectification actions are presented in *Table 2.32*.

Table 2.32 *Summary of Environmental Deficiencies Identified and Corresponding Rectification Actions*

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
Surface Water		
Intercepting channels & drainage system	<ul style="list-style-type: none"> Reviewed drainage plan. 	<ul style="list-style-type: none"> Addition of channels. Expedite the construction of permanent sediment trap and discharge culverts.
DP channels (design & regular silt removal)	<ul style="list-style-type: none"> Carried out regular maintenance and cleaning of channels. DP4 channel: Area near the channel was paved with concrete and a bund was built. DP6 channel: Gravel piles on the channel were covered with concrete which serve as blocks for running water and to divide the channel into several sections. A pump was placed in the water zone in the upstream section to pump water to the Wetsep for treatment prior to the discharge to the last section before the weir plate. DP6: Pipes through the gravel piles between different channel sections were covered with geotextiles to block debris and silt. 	N.A.

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
Stockpiles & exposed soil	<ul style="list-style-type: none"> Installed silt fencing near surface water channel along DP6 channel. 	<ul style="list-style-type: none"> Improve soil covering. Compaction and cover for stockpiles and soil slopes.
Wetsep (treatment capacity & number)	<ul style="list-style-type: none"> Reviewed Wetsep capacity. Chemicals dosage of the Wetsep was increased to enhance the efficiency. 	<ul style="list-style-type: none"> Install additional Wetsep.
Backflow / ponding during heavy rainfall	<ul style="list-style-type: none"> Raised with EPD (LDG) and CEDD. 	N.A.

2.7

WASTE MANAGEMENT STATUS

The Contractor has registered as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

As informed by the Contractor, waste generated during this reporting period include mainly Yard waste and Chemical waste. Reference has been made to the waste flow table prepared by the Contractor. The quantities of different types of wastes and imported fill materials are summarised in *Table 2.33*.

Table 2.33 *Quantities of Different Waste Generated and Imported Fill Materials*

Month/ Year	Inert C&D Materials (^a in '000m ³)	Imported Fill (in '000kg)		Inert Construction Waste Re- used (in '000m ³)	Non-inert Construction Waste (^c) (in '000m ³)	Recyclable Materials (^d) (in '000kg)	Yard Waste (in '000kg)		Chemical Wastes (in '000kg)
		Rock	Soil				Y Park	SENT	
1 - 31 Oct 22	0	0	0	0	0.001	0	6.930	82.000	0.800

Notes:

- Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill. Density assumption: 1.6 (kg/L) for public fill.
- Imported fill refers to materials generated from other project for on-site reuse.
- Non-inert construction wastes include general refuse disposed at landfill. Density assumption: 0.9 (kg/L) for general refuse.
- Recyclable materials include metals, paper, cardboard, plastics and others.

2.8

IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

A summary of the Environmental Mitigation Implementation Schedule is presented in *Annex B*. The necessary mitigation measures were implemented properly for the Project.

2.9 *SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT*

The operation/ restoration phase noise monitoring results complied with the Action and Limit Levels in the reporting period. One exceedance of the Limit Level for landfill gas flare stack emission, three exceedances of the Limit Level for leachate level monitoring and one exceedance of the Limit Level for perimeter landfill gas monitoring were recorded in the reporting period. The landfill gas flare stack emission (SO₂) exceedance on 14 October 2022, leachate level exceedances at Pump Station No. 4 from 1 to 3 October 2022 and perimeter landfill gas exceedance at LFG13 on 3 October 2022 are under investigation.

Cumulative statistics on exceedances is provided in *Annex H*.

2.10 *SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS*

There were no complaints, notification of summons or prosecution recorded in the reporting period.

Statistics on complaints, notifications of summons, successful prosecutions are summarised in *Annex H*.

3 ***FUTURE KEY ISSUES***

3.1 ***CONSTRUCTION PROGRAMME FOR THE COMING MONTH***

As informed by the Contractor, the major works for the Project in November 2022 will be:

- E&M defects rectification for waste reception area, including weighbridge, vehicle washing facilities, wheel wash bay and guard house;
- E&M defects rectification for infrastructure buildings;
- Remaining civil work for Diesel Fuel Tank such as concrete staircase, handrails, pedestrian pavement in the proximity and canopy installation; and
- Landscaping work.

3.2 ***KEY ISSUES FOR THE COMING MONTH***

Potential environmental impacts arising from the above upcoming construction activities in the next reporting period of November 2022 mainly associated with dust emission from the exposed area and loading and unloading operation of dusty materials. The ET will keep track on the construction and operation works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

3.3 ***MONITORING SCHEDULE FOR THE COMING MONTH***

The tentative schedule for environmental monitoring in November 2022 are provided in *Annex I*.

This EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 to 31 October 2022 in accordance with the updated EM&A Manual and the requirements of the Environmental Permit (EP-308/2008/B).

Air quality (24-hour TSP, odour, thermal oxidiser, landfill gas flare, landfill gas generator stack emission), noise, water quality (surface water, leachate and groundwater) and landfill gas monitoring were carried out in the reporting period. Results for air quality (24-hour TSP, odour, thermal oxidiser and landfill gas generator stack emission), noise and water quality monitoring (surface water, groundwater) complied with the Action and Limit Levels in the reporting period. One exceedance of the Limit Level for landfill gas flare stack emission, three exceedances of the Limit Level for leachate level monitoring and one exceedance of the Limit Level for perimeter landfill gas monitoring were recorded in the reporting period.

Environmental site inspections were carried out during the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site inspections.

There were no complaints, notification of summons or prosecution recorded in the reporting period.

The ET will keep track on the construction and operation/restoration works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Annex A

Work Programme

WBS Path	Activity	Activity Name	Dur	Start	Finish	Phase	Predecessor Details	Successor Details	2018		2019		2020		2021		2022		2023		
									Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
332	SA2.5	Construction (Initial Works)	1163	12-Apr-18	07-Jun-21	756															
333	SA2.5.02	Advance Works & Site Establishment	1148	12-Apr-18	02-Jun-21	35															
334	SA2.5.02.01	Site Establishment & Mobilization	333	12-Apr-18	15-May-19	820															
335	5.02.01	52-1000 Site Mobilization for Parts X1 & X2	30	31-Dec-18	20-Jan-19	820															
336	5.02.01	52-1100 Site Mobilization for Parts X3, X4 & X5	30	12-Apr-18	11-May-18	1063															
337	5.02.01	52-1200 Temporary Office for Employer / ERI/C	60	10-Oct-18	08-Dec-18	0															
338	5.02.01	52-1300 Hoarding and Fencing Works	40	30-Jan-19	10-Mar-19	820															
339	SA2.5.02.02	Site Survey & Investigation Works for Parts X1 & X2	50	31-Dec-18	18-Feb-19	840															
340	5.02.02	52-1400 Condition Survey	25	31-Dec-18	24-Jan-19	840															
341	5.02.02	52-1500 Topographic Survey	20	31-Dec-18	19-Jan-19	845															
342	5.02.02	52-1600 Site Inspection, Review of Condition Survey Report	25	25-Jan-19	18-Feb-19	840															
343	SA2.5.02.03	Site Survey & Investigation Works for Parts X3, X4 & X5	58	12-Apr-18	31-May-18	1103															
344	5.02.03	52-1700 Condition Survey	25	12-Apr-18	06-May-18	1103															
345	5.02.03	52-1800 Topographic Survey	20	12-Apr-18	01-May-18	1108															
346	5.02.03	52-1900 Site Inspection, Review of Condition Survey Report	25	07-May-18	31-May-18	1103															
347	SA2.5.02.04	Environmental Monitoring	975	02-Oct-18	02-Jun-21	35															
348	5.02.04	52-2000 Installation of Monitoring Stations & Waits (SP & DVI)	120	02-Oct-18	20-Jan-19	0															
349	5.02.04	52-2100 Installation of Monitoring Stations & Waits (SP & DVI) on Butress Wall	120	02-Oct-18	20-Jan-19	0															
350	5.02.04	52-2200 Conduct Baseline Monitoring for Construction (one month)	30	01-Dec-18	30-Dec-18	0															
351	5.02.04	52-2300 Conduct Baseline Monitoring for Operation (one year)	365	03-Jun-20	02-Jun-21	35															
352	SA2.5.03	Civil Engineering Works	748	13-Jan-19	29-Jan-21	834															
353	SA2.5.03.01	Butress Wall	475	03-Apr-19	03-Jun-20	43															
354	5.03.01	53-1000 Section w/d, SENT	300	13-Apr-19	06-Feb-20	96															
355	5.03.01	53-1100 Characterise SENT Landfill Gas Pipe	45	07-Feb-20	23-Mar-20	96															
356	5.03.01	53-1200 Section at Cell 4	400	02-Mar-19	04-Apr-20	83															
357	5.03.01	53-1300 Install Landfill Gas Pipe on Butress Wall	75	05-Apr-20	18-Jun-20	83															
358	SA2.5.03.01	Landfill Cell 1	503	13-Jan-19	29-May-20	214															
359	5.03.01	53-1400 Earth bund (Eastern)	90	04-Aug-19	01-Nov-19	9															
360	5.03.01	53-1500 Earth bund (Southern)	90	26-Apr-19	24-Jul-19	314															
361	5.03.01	53-1600 Earth bund (Western)	90	13-Jan-19	12-Apr-19	417															
362	5.03.01	53-1700 Interfill bund (Cell 1G)	75	13-Jan-19	28-Mar-19	432															
363	5.03.01	53-1800 Site Formation	90	13-Jan-19	12-Apr-19	217															
364	5.03.01	53-1900 Pump Station (PS#1X)	45	13-Apr-19	27-May-19	507															
365	5.03.01	53-2000 Lining Works	135	02-Nov-19	15-Mar-20	214															
366	5.03.01	53-2100 Protective Store Laying & Leachate Collection Pipe	75	16-Mar-20	29-May-20	214															
367	5.03.01	53-2200 Install Leachate Force Main	75	25-Jul-19	07-Oct-19	449															
368	5.03.01	53-2300 Install Landfill Gas Pipe on earth bund	55	03-Nov-19	26-Dec-19	258															
369	5.03.01	53-2400 Leachate Pipe Connection (Cell 1 to LTP)	30	09-Mar-20	07-Apr-20	266															
370	SA2.5.03.01	Landfill Cell 4	30	09-Jul-20	07-Aug-20	144															
371	5.03.01	53-2500 Provide Temporary Leachate Pipe on Cell 4 Area	30	09-Jul-20	07-Aug-20	144															
372	SA2.5.03.02	Drainage - Surface Run-Off	740	16-Jan-19	31-May-21	859															
373	5.03.02	53-2600 Construct Cut-Off Channel 12A	60	16-Jan-19	13-Mar-19	9															
374	5.03.02	53-2700 Construct Cut-Off Channel 12A to DP6	20	17-Mar-19	05-Apr-19	9															
375	5.03.02	53-2800 Diversion from Existing Trapezoidal Channel into Channel 12A	20	06-Apr-19	25-Apr-19	9															
376	5.03.02	53-2900 Removal of Existing Trapezoidal Channel along Eastern Bund	30	26-Apr-19	25-May-19	9															
377	5.03.02	53-3000 Cut-Off Channel 04 Diversion to Cut-Off Channel 11-2	45	16-Jan-19	01-Mar-19	83															
378	5.03.02	53-3100 Cut-Off Channel XS on Butress Wall, Cell 4, Cell 3	90	05-Apr-20	03-Jul-20	289															
379	5.03.02	53-3200 Temporary Diversion Cut-Off Channel XS to 12A	20	04-Jul-20	23-Jul-20	289															
380	5.03.02	53-3300 Culvert XS (5m long) & Perm Connection of Cut-Off Channel XS	30	26-Dec-20	24-Jan-21	134															
381	5.03.02	53-3400 Construct Perimeter Channel XS on Eastern Bund & Southern Bund of Cell 1	50	02-Nov-19	21-Dec-19	249															
382	5.03.02	53-3500 Construct Perimeter Channel XS on Eastern Bund of Cell 2	50	20-Feb-20	08-Apr-20	189															
383	5.03.02	53-3600 Construct Perimeter Channel XS Eastern Bund of Cell 3	50	06-Jun-20	26-Jul-20	129															
384	5.03.02	53-3700 Culvert XS (25m long) at Cell 1 Southern Bund	75	25-Jul-19	07-Oct-19	1314															
385	5.03.02	53-3800 Perimeter Channel (OSB) at Cell 1 Southern & Western Bund	45	25-Jul-19	07-Sep-19	1344															
386	5.03.02	53-3900 Drop Inlet & Culvert (XS) - 21m long	180	29-Jul-20	24-Jan-21	129															
387	5.03.02	53-4000 Sediment Trap (ST)	180	29-Jul-20	24-Jan-21	129															
388	5.03.02	53-4100 Dual Culvert 14m long (connect to DP4)	180	29-Jul-20	24-Jan-21	129															
389	SA2.5.03.02	Drainage - Groundwater	200	26-May-19	11-Dec-19	269															
390	5.03.02	53-4200 Construct Groundwater Collection Pipe along Cells X1 & X2 Eastern Bund	70	26-May-19	02-Aug-19	9															
391	5.03.02	53-4300 Construct Groundwater Collection Pipe along Cell X3 Eastern Bund	50	04-Aug-19	22-Sep-19	159															
392	5.03.02	53-4400 Construct Groundwater Collection Pipe along Interfill Bund X2/X3	50	25-Sep-19	14-Nov-19	209															
393	5.03.02	53-4500 Construct Manhole MH-X1	30	13-Nov-19	11-Dec-19	209															
394	SA2.5.03.03	Utilities - Distribution within New Infrastructure Area	391	11-Aug-19	04-Sep-20	276															
395	5.03.03	53-4600 Power Supply HV Works (Transformer & HV switchgear)	5	30-Jun-20	04-Jul-20	0															
396	5.03.03	53-4700 Power Distribution, LV Power Supply works	2	05-Jul-20	06-Jul-20	0															
397	5.03.03	53-4800 Sewerage (Collection to LTP)	60	07-Jul-20	04-Sep-20	271															
398	5.03.03	53-4900 Sewerage (Discharge to Site Boundary)	60	07-Jul-20	04-Sep-20	271															
399	5.03.03	53-5000 Lighting Provision	30	07-Jul-20	05-Aug-20	6															
400	5.03.03	53-5100 Fire Services	115	02-Mar-20	04-Jul-20	2															
401	5.03.03	53-5200 Construct Firewater (Fresh & Salt)	110	03-Mar-20	04-Jul-20	338															
402	5.03.03	53-5300 Telecom & Network	45	11-Aug-19	24-Sep-19	622															
403	5.03.03	53-5400 Gas Network (LFG to LTP)	15	22-Jun-20	06-Jul-20	176															
404	SA2.5.03.04	Utilities - Works Associated with Utilities Undertakes	703	27-Feb-19																	

Table with columns: WBS Path, Activity, Activity Name, Dur, Start, Finish, Total, Predecessor Details, Successor Details, and a Gantt chart grid showing project schedule from Q1 2018 to Q1 2023. Activities include engineering works, landfill cell construction, drainage, and landscaping.

Remaining Work (Green bar)
Critical Remaining Work (Red bar)
Milestone (Diamond symbol)



Table with columns: Date, Revision, Checked, Approved. Includes revision history for SA2-SENTX-W-PB-ZZ-001 Rev. 01 and Rev. 02 (Detailed).

Annex B

Environmental Mitigation Implementation Schedule

Annex B Environmental Mitigation Implementation Schedule

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
<i>Air Quality – Construction Phase</i>											
4.8.1	AQ1	<u>Blasting</u> <ul style="list-style-type: none"> The area within 30m of the blasting area will be wetted prior to blasting. Blasting will not be carried out when the strong wind signal or tropical cyclone warning signal No. 3 or higher is hoisted, unless this is with the express prior permission of the Commissioner of Mines. loose material and stones in the Site will be removed prior to the blast operation During blasting, blast nets, screens and other protective covers will be used to prevent the projection of flying fragments and material resulting from blasting 	To minimise potential dust nuisance	Blasting area and 30m of blasting area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Blasting is not required in the latest landfill design
4.8.1	AQ2	<u>Rock Drilling</u> <ul style="list-style-type: none"> Watering will be carried out at the rock drilling activities to avoid fugitive dust emissions. 	To minimise potential dust nuisance	Rock drilling area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Rock drilling is not required in the latest landfill design
4.8.1	AQ3	<u>Site Access Road</u>	To minimise	Main haul	SENTX		✓			<i>Air Pollution Control</i>	Implemented

(1) D=Design; C=Construction; O/R=Operation/Restoration; A=Aftercare

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						D	C	O/R	A		
		<ul style="list-style-type: none"> The main haul road will be kept clear of dusty materials or sprayed with water. The main haul road will be paved with aggregate or gravel. Vehicle speed will be limited to 10kph. 	potential dust nuisance	road	Contractor					(Construction Dust) Regulations	
4.8.1	AQ4	<u>Stockpiling of Dusty Materials</u> <ul style="list-style-type: none"> Any stockpile of dusty materials will be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides or sprayed with water so as to ensure that the entire surface is wet. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations	Deficiency of mitigation measures but rectified by the Contractor
										HKAQO and EIAO-TM Annex 4	
4.8.1	AQ5	<u>Loading, unloading or transfer of dusty materials</u> <ul style="list-style-type: none"> All dusty materials will be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty material wet. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations	Implemented
										HKAQO and EIAO-TM Annex 4	
4.8.1	AQ6	<u>Site Boundary and Entrance</u> <ul style="list-style-type: none"> Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of height not less than 2.4m from ground level will be provided along the entire length of that portion of the site boundary except for the site entrance or exit. 	To minimise potential dust nuisance	Site boundary and entrance	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations	Not applicable
										HKAQO and EIAO-TM Annex 4	
4.8.1	AQ7	<u>Excavation Works</u>	To minimise	All	SENTX	✓				Air Pollution Control	Implemented

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						D	C	O/R	A		
		<ul style="list-style-type: none"> Working area of any excavation or earth moving operation will be sprayed with water immediately before, during and immediately after the operation so as to ensure that the entire surface is wet. 	potential dust nuisance	construction works area	Contractor					(Construction Dust) Regulations HKAQO and EIAO-TM Annex 4	
4.8.1	AQ8	<u>Building Demolition</u> <ul style="list-style-type: none"> The area where the demolition works are planned to take place will be sprayed with water immediately prior to, during and immediately after the demolition activities. Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads or street. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor			✓		Air Pollution Control (Construction Dust) Regulations HKAQO and EIAO-TM Annex 4	Implemented
4.8.1	AQ9	<u>Construction of the Superstructure of Building</u> <ul style="list-style-type: none"> Effective dust screens, sheeting or netting will be provided to enclose the scaffolding from the ground level up to the highest level of the scaffolding. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor			✓		Air Pollution Control (Construction Dust) Regulations HKAQO and EIAO-TM Annex 4	Implemented
4.8.1	AQ10	Should a stone crushing plant be needed on site, the control measures recommended in the <i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i> should be implemented.	To minimise potential dust nuisance	Stone crushing plant/ construction phase	SENTX Contractor			✓		<i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i>	Not applicable. Stone crushing plant is not required in the latest landfill design

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						D	C	O/R	A		
4.8.1	AQ11	Good site practices such as regular maintenance and checking of the diesel powered mechanical equipment will be adopted to avoid any black smoke emissions and to minimize gaseous emissions.	To minimise potential dust nuisance	All construction works area	SENTX Contractor	✓				<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.10.1	AQ12	Dust monitoring once every 6 days	Ensure the dust generated from the project meets the air quality requirement	At monitoring locations shown in <i>Figure 3.2a</i>	SENTX Contractor	✓				<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
<i>Air Quality – Operation, Restoration and Aftercare Phases</i>											
4.8.2	AQ13	<u>Odour</u> • Enclosing the weighbridge area	To minimise odour nuisance	Weighbridge area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, enclosing the weighbridge area is not necessary
4.8.2	AQ14	• Providing a vehicle washing facility before the exit of SENTX and providing sufficient signage to remind RCV drivers to pass through the facility before leaving SENTX	To minimise odour nuisance	Vehicle washing facility	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ15	• Reminding the RCV drivers to empty the liquor collection sump and close the valve	To minimise odour nuisance	Tipping face	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste

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						D	C	O/R	A		
		before leaving the tipping face									only, which is relatively dry, the amount of liquor generated is expected to minimal
4.8.2	AQ16	<ul style="list-style-type: none"> Washing down the area where spillage of RCV liquor is discovered promptly 	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ17	<ul style="list-style-type: none"> Reminding operators to properly maintain their RCVs and ensure that liquor does not leak from the vehicles 	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ18	<ul style="list-style-type: none"> Installation of landfill gas control system to enhance collection of landfill gas from the waste mass and hence minimise odour associated with fugitive landfill gas emissions 	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓	✓	✓		<i>EIAO-TM Annex 4</i>	Implemented

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						D	C	O/R	A		
4.8.2	AQ19	<ul style="list-style-type: none"> Progressive restoration of the areas which reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent landfill gas extraction system 	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓	✓	✓	<i>EIAO-TM Annex 4</i>	Implemented	
4.8.2	AQ20	<ul style="list-style-type: none"> Installing deodorizers along the site boundary adjacent to the ASRs 	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor		✓	✓	<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary.	
4.8.2	AQ21	<ul style="list-style-type: none"> Erecting a vertical barrier, wall or structure softened by planting rows of trees/shrubs or landscape feature along the site boundary, particularly in the areas near the ASRs 	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor	✓	✓	✓	<i>EIAO-TM Annex 4</i>	Implemented	
4.8.2 and SENTX latest design	AQ22	<ul style="list-style-type: none"> Maintaining the size of the active tipping face not greater than 1,200 m² 	To minimise odour nuisance	Active tipping face	SENTX Contractor		✓		<i>EIAO-TM Annex 4</i>	Implemented	
4.8.2	AQ23	<ul style="list-style-type: none"> Promptly covering the MSW with soil or selected inert materials to control odour emissions 	To minimise odour nuisance	Active tipping face	SENTX Contractor		✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not receive MSW.	

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						D	C	O/R	A		
4.8.2	AQ24	<ul style="list-style-type: none"> Maintaining the size of the special waste trench not greater than 6m (l) × 2.5m (w) 	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not have any special waste trench.
4.8.2 and SENTX latest design	AQ25	<ul style="list-style-type: none"> Covering daily covered area with a tarpaulin sheet or 300mm of soil after the landfill operating hours 	To minimise odour nuisance	Daily covered area	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ26	<ul style="list-style-type: none"> Covering special waste trench with 600 mm of soil and an impervious liner after 5 pm 	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not have any special waste trench.
4.8.2	AQ27	<ul style="list-style-type: none"> Covering the non-active tipping face with 600mm of soil and an impermeable liner (on top of the intermediate cover), which will not only control odour emissions from landfilled waste but also enhance landfill gas extraction by the landfill gas extraction system 	To minimise odour nuisance	Intermediate cover	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ28	<ul style="list-style-type: none"> Applying deodorizers or odour suppression agents to control odour emissions from the active tipping face and special waste trench, if any, through spraying or fogging equipment 	To minimise odour nuisance	Active tipping face and special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary.

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						D	C	O/R	A		
											Moreover, SENTX will not have any special waste trench.
4.8.2	AQ29	<ul style="list-style-type: none"> Providing a mobile cover with retractable or suitable opening to cover up the opening of the special waste trench except during waste deposition and a suitable odour removal unit. The mobile cover should be equipped with powered extraction and suitable odour removal unit for purifying the trapped gas inside the trench before release into the atmosphere 	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not have any special waste trench.
4.8.2 and SENTX latest design	AQ30	<ul style="list-style-type: none"> Providing a thermal oxidizer for the leachate treatment plant 	To minimise odour nuisance as a result of breakdown of thermal oxidizer	Leachate treatment plant	SENTX Contractor	✓	✓	✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2 and SENTX latest design	AQ31	<ul style="list-style-type: none"> Enclosing all the leachate storage and treatment tanks (except for the Sequential Batch Reactor (SBR) or Membrane Bioreactor (MBR) tanks) and diverting the exhaust air from these tanks to a thermal oxidizer or flare to avoid potential odour emissions from the LTP 	To minimise odour nuisance	Leachate treatment plant	SENTX Contractor	✓	✓	✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ32	<ul style="list-style-type: none"> Rescheduling of waste filling activities on-site by avoiding waste filling activities 	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive

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						D	C	O/R	A		
		carrying out at the northern area of the site in the summer months between July to November									construction waste only which is significantly less odorous, rescheduling of waste filling activities is not necessary.
4.8.2 and SENTX latest design	AQ33	<u>Dust, Gaseous Emission and LFG including Volatile Organic Compounds (VOCs)</u> • Keeping the main haul road to the waste filling area wet by regular watering ;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ34	• Compacting the exposed daily and intermediate covered areas well to avoid fugitive dust emission;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ35	• Limiting the vehicle speed within SENTX site boundary;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ36	• Providing vehicle washing bay to avoid vehicles carrying dust to public roads;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ37	• Switching off the engine when the diesel-driven equipment is idling;	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ38	• Maintaining the construction equipment properly to avoid any black smoke	To minimise gaseous	SENTX Site	SENTX Contractor			✓	✓	-	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		emissions;	emissions								
4.8.2	AQ39	Providing sufficient underground landfill gas collection system to capture the landfill gas generated as much as possible; and	To minimise gaseous emissions, including LFG and VOCs	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 4	Implemented
4.8.2	AQ40	Periodic inspections of the final cover should be undertaken to ensure that the capping layer is in good conditions at all times.	To minimise gaseous emissions, including LFG and VOCs	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 4	Implemented
4.10.2	AQ41	Monitoring of ambient TSP once every 6 days	Ensure the dust emission from the project meets the dust requirement	At monitoring locations shown in Figure 11.3a	SENTX Contractor			✓	✓	HKAQO and EIAO-TM Annex 4	Implemented
4.10.2	AQ42	Monitoring of ambient VOCs, ammonia and H ₂ S, quarterly	Ensure the gaseous emission from the project meets the air quality requirement	At monitoring locations shown in Figure 11.3a	SENTX Contractor			✓	✓	Odour thresholds or 1% of Occupational Exposure Limit (OEL) as stipulated in the "UK Health and Safety Executive (HSE) EH 40/05 Occupational Exposure Limits", whichever is lower.	Implemented

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						D	C	O/R	A		
4.10.2 and SENTX latest design	AQ43	Monitoring of parameters for thermal oxidizer, flares and generator in accordance with requirements stated in Tables 3.4a, 3.5a and 3.6a of the EM&A Manual respectively.	Ensure the gaseous emission from the project meets the air quality requirement	At the flares and thermal oxidizer stacks when they are in operation	SENTX Contractor	✓	✓	(1)	Emission Limits specified in Contract	Implemented	
4.10.2	AQ44	To confirm design assumption of ammonia, it is recommended that the ammonia concentration in the flue gas of the thermal oxidiser be monitored during the commissioning stage of the thermal oxidiser. If required, an emission standard will be set for ammonia for the thermal oxidiser based on the monitoring results. If no ammonia is detected in the flue gas during the decommissioning stage, the monitoring of ammonia in the flue gas of the thermal oxidiser could be discontinued.	Ensure the gaseous emission from the project meets the air quality requirement	At the thermal oxidizer stack during commissioning . If ammonia is detected during commissioning stage, the monitoring will continue.	SENTX Contractor	✓			Emission Limits determined during commissioning stage	Implemented	
4.10.2 and SENTX latest design	AQ45	Odour patrol in accordance with requirements stated in Table 3.7a of the EM&A Manual.	Ensure the odour emission from the project meets the odour requirement	Along SENTX Site boundary	SENTX Contractor	✓			<i>EIAO-TM Annex 4</i>	Implemented	
4.10.2	AQ46	Monitoring of meteorological station, continuously	Collect site specific	At meteorological	SENTX Contractor	✓	✓	✓	-	Implemented	

(1) For LFG flare and LFG generator only.

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						D	C	O/R	A		
			meteorological data	station shown in <i>Figure 11.3a</i>							
Noise – Construction Phase											
5.7.1	N1	<p>Adopt good site practice listed below:</p> <ul style="list-style-type: none"> Only well-maintained plant will be operated on-site and plant should be serviced regularly during the construction program; Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program; Mobile plant, if any, will be sited as far from NSRs as possible; Machines and plant (such as trucks) that may be in intermittent use will be shut down between work periods or should be throttled down to a minimum; Plant known to emit noise strongly in one direction will, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site 	To minimise potential construction noise nuisance.	All construction works area	SENTX Contractor			✓		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented

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						D	C	O/R	A		
		construction activities.									
5.8	N2	Weekly noise monitoring	Ensure noise generated from the project meets the criteria	At monitoring locations shown in Figure 6.4a	SENTX Contractor		✓			Noise Control Ordinance (NCO) and EIAO-TM Annex 5	Implemented
Noise - Operation/Restoration Phase											
5.7.2	N3	Adopt good site practice listed below: <ul style="list-style-type: none"> Choose quieter PME; Include noise levels specification when ordering new plant items; Locate fixed plant items or noise emission points away from the NSRs as far as practicable; Locate noisy machines in completely enclosed plant rooms or buildings; and Develop and implement a regularly scheduled plant maintenance programme so that plant items are properly operated and serviced. The programme should be implemented by properly trained personnel. 	To minimise potential operational noise nuisance.	Within the SENTX Site	SENTX Contractor		✓			Noise Control Ordinance (NCO) and EIAO-TM Annex 5	Implemented
									-		Implemented
									-		Implemented
									-		Implemented
5.8	N4	Weekly noise monitoring	Ensure noise generated from	At monitoring locations	SENTX Contractor		✓			Noise Control Ordinance (NCO) and EIAO-TM	Implemented

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						D	C	O/R	A		
			the project meets the criteria	shown in Figure 6.4a					Annex 5		
Water Quality – Construction Phase											
6.8.1	WQ1	<u>Construction Runoff</u> • Exposed soil areas will be minimised to reduce the contamination of runoff and erosion.	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 EIAO-TM Annex 6	Deficiency of mitigation measures but rectified by the Contractor
6.8.1	WQ2	• Perimeter channels will be constructed in advance of site formation works and earthworks and intercepting channels will be provided for example along the edge of excavation.	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor	✓	✓			ProPECC PN 1/94 Water Pollution Control Ordinance (WPCO) EIAO-TM Annex 6	Implemented
6.8.1	WQ3	• Silt removal facilities, channels and manholes will be maintained and the deposited silt and grit should be removed regularly to ensure they are functioning properly at all times.	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Deficiency of mitigation measures but rectified by the Contractor
6.8.1	WQ4	• Temporary covers such as tarpaulin will also be provided to minimise the generation of high SS runoff.	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓			ProPECC PN 1/94 WPCO	Implemented

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						D	C	O/R	A		
6.8.1	WQ5	<ul style="list-style-type: none"> The surface runoff contained any oil and grease will pass through the oil interceptors. 	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor	✓				ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Implemented
6.8.1	WQ6	<ul style="list-style-type: none"> All sewer and drains will be sealed to prevent building debris, soil etc from entering public sewers/drains before commencing any demolition works 	To minimise potential water quality impacts arising from the demolition works	Infrastructure area at existing SENT Landfill	SENTX Contractor	✓				ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Not applicable
6.8.1	WQ7	<ul style="list-style-type: none"> During the excavation works for the twin drainage tunnels, the recycle water for cooling the cutter head of the TBM will be conveyed to the sedimentation tanks for treatment and most of the treated water will be reused, where applicable and as much as possible, in the boring operations. 	To minimise potential water quality impacts arising from the tunnel works	Tunnel boring sites	SENTX Contractor	✓				ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Not applicable. Excavation of drainage tunnels is not required in the latest landfill design.
6.8.1	WQ8	<ul style="list-style-type: none"> The fuel and waste lubricant oil from the on-site maintenance of machinery and equipment will be collected by a licensed chemical waste collector. 	To minimise potential water quality impacts arising from improper handling of fuel and oil	SENTX Site	SENTX Contractor	✓				ProPECC PN 1/94 WPCO Waste Disposal Ordinance (WDO)	Implemented
6.8.1	WQ9	<ul style="list-style-type: none"> Implementation of excavation schedules, lining and covering of excavated stockpiles 	To minimise contaminated stormwater runoff from the	All construction works	SENTX Contractor	✓				ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Implemented

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						D	C	O/R	A		
				SENTX Site							
6.13	WQ10	<ul style="list-style-type: none"> Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&A Manual. 	To minimise potential water quality impacts on surface water arising from the construction works	SENTX Site	SENTX Contractor		✓			WPCO Water-TM	Implemented
6.8.2	WQ11	<u>Sewage Effluents</u> <ul style="list-style-type: none"> Sufficient chemical toilets will be provided for the construction workforce. 	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO	Implemented
6.8.2	WQ12	<ul style="list-style-type: none"> Untreated sewage will not be allowed to discharge into the surrounding water body. 	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO WDO	Implemented
6.8.2	WQ13	<ul style="list-style-type: none"> A licensed waste collector will be employed to clean the chemical toilets on a regular basis. 	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO WDO	Implemented
Water Quality – Operation/Restoration and Aftercare Phases											
6.9.1	WQ14	<u>Surface Water Management</u> <ul style="list-style-type: none"> Inspections of the drainage system, sand 	To minimise	SENTX Site	SENTX		✓			WPCO Technical Memorandum	Implemented

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						D	C	O/R	A		
		traps, settlement ponds and surface water channels will be performed regularly to identify areas necessary for maintenance, cleaning or repair.	potential water quality impacts on surface water arising from the landfill operations.		Contractor					<i>Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM)</i> <i>EIAO-TM Annex 6</i>	
6.9.1	WQ15	<ul style="list-style-type: none"> Regular maintenance and replacement, if required, of the HDPE liner will be conducted to prevent degradation from affecting the performance of the capping system. 	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
6.9.1	WQ16	<ul style="list-style-type: none"> Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&A Manual. 	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i>	Implemented
6.9.2 and SENTX latest design	WQ17	<p><u>Groundwater Management</u></p> <ul style="list-style-type: none"> The groundwater management facilities including the groundwater monitoring wells will be inspected regularly during routine groundwater monitoring programme. 	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented

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						D	C	O/R	A		
6.9.2	WQ18	<ul style="list-style-type: none"> Monitoring of groundwater water quality will be conducted on a regular basis as stated in the EM&A Manual. 	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented	
SENTX latest design	WQ19	<u>Sewage</u> <ul style="list-style-type: none"> All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available. 	To ensure proper handling of sewage	SENTX Site	SENTX Contractor	✓	✓	-		Implemented	
6.9.3	WQ20	<u>Leachate Management</u> <ul style="list-style-type: none"> The leachate pump houses and related ancillary equipment will be inspected regularly and repairs, if necessary. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate pump houses and related ancillary equipment	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented	
6.9.3	WQ21	<ul style="list-style-type: none"> For equipment such as pumps that require routine scheduled maintenance, the maintenance will be performed following manufacturer's recommended frequency. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate pumps	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i>	Implemented	

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						D	C	O/R	A		
6.9.3	WQ22	<ul style="list-style-type: none"> Preventive maintenance will be implemented so that the possibility for forced shutdown during wet season will be kept to minimal. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented	
6.9.3	WQ23	<ul style="list-style-type: none"> Emergency procedures or a contingency plan will be established when the LTP is malfunctioned. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented	
6.9.3 and SENTX latest design	WQ24	<ul style="list-style-type: none"> There will be sufficient redundancy in the system to handle the leachate flow even if one treatment train is down for maintenance. The leachate may be required to temporarily store within the landfill if the leachate storage lagoon are full and leachate cannot be transported to the LTP for treatment. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented	
6.13	WQ25	<ul style="list-style-type: none"> Monitor the quality of effluent discharged from the LTP 	To ensure discharge quality comply with WPCO requirement	Leachate treatment plant discharge point	SENTX Contractor	✓	✓		WPCO <i>Water-TM</i>	Implemented	

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						D	C	O/R	A		
6.10.1	WQ26	<u>Potential Leakage of Leachate</u> • Regular groundwater quality monitoring will be carried out to monitor the performance of the leachate containment system.	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	SENTX Site	SENTX Contractor	✓	✓		WPCO Water-TM	Implemented	
6.10.1	WQ27	• Maintenance and replacement of the capping system should be carried out, if necessary, to prevent control infiltration and leachate seepage from any damaged cap.	To minimise potential water quality impacts on surrounding water bodies arising from the leachate leakage.	SENTX Site	SENTX Contractor	✓	✓		WPCO Water-TM EIAO-TM Annex 6	Implemented	
6.10.1	WQ28	• Maintaining control of the leachate level through extraction	To minimise potential water quality impacts on surrounding water bodies arising from surface breakout of leachate.	SENTX Site	SENTX Contractor	✓	✓		WPCO Water-TM EIAO-TM Annex 6	Implemented	
Waste Management - Construction Phase											
7.6.1	WM1	All the necessary waste disposal permits are obtained prior to the commencement of construction work.	To ensure compliance with relevant statutory	Before construction works	SENTX Contractor	✓	✓		WDO	Implemented	

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						D	C	O/R	A		
			requirements	commence							
7.6.1	WM2	<p><u>Management of Waste Disposal</u></p> <p>The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be transferred to the Government waste disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor.</p> <p>A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.</p>	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor			✓		WDO <i>Waste Disposal (Charges for Disposal of Construction Waste) Regulation;</i> <i>Works Bureau Technical Circular No.31/2004;</i> <i>and</i> <i>Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)</i>	Implemented
7.6.1	WM3	<p><u>Measures for the Reduction of Construction Waste Generation</u></p> <p>Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-</p>	To reduce construction waste generation	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Implemented

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						D	C	O/R	A		
		inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.									
7.6.1	WM4	<u>Chemical Waste</u> The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor		✓			WDO <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented
7.6.1	WM5	<u>Sewage</u> An adequate number of portable toilets will be provided at the site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a specialist contractor.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor		✓			WDO <i>EIAO-TM Annex 7</i>	Implemented
7.6.1 and SENTX latest design	WM6	<u>General Refuse</u> General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to a transfer station or other landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts. Recycling bins will be provided at strategic locations to facilitate recovery of aluminium	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor		✓			WDO <i>EIAO-TM Annex 7</i>	Deficiency of mitigation measures but rectified by the Contractor

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						D	C	O/R	A		
		can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.									
7.6.1	WM7	<u>Staff Training</u> At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓				Implemented
7.8	WM8	<u>Environmental Monitoring & Audit Requirements</u> Weekly audits of the waste management practices will be carried out during the construction phase. The audits examine all aspects of waste management including waste generation, storage, recycling, transport and disposal.	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓		WDO		Implemented
Waste Management - Operation/Restoration Phase											
7.6.2 and SENTX latest design	WM9	<u>Sludge</u> In case off-site disposal is required, the Contractor will ensure that sludge generated from the LTP will be delivered in closed container to other waste disposal facility e.g. other landfills or a sludge treatment facility, for proper disposal on a daily basis.	To ensure proper handling of sludge	SENTX Site	SENTX Contractor		✓		WDO EIAO-TM Annex 7		Implemented

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						D	C	O/R	A		
7.6.2	WM10	<u>Chemical Waste</u> The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i> <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented
7.6.2	WM11	<u>Sewage</u> All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Moved to mitigation measure under water quality WQ19. It is a measure for water quality rather than waste management.
7.6.2 and SENTX latest design	WM12	<u>General Refuse</u> General refuse will be stored in enclosed bins and disposed of at other landfills or transfer station on a daily basis to reduce odour, pest and litter impacts. Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Implemented
Landfill Gas Hazards - Design and Construction Phase											
8.6.2 and	LFG1	Precautionary measures to be adopted by the	To protect	All	SENTX			✓		<i>Paragraphs 8.3 to 8.49 of</i>	Implemented

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						D	C	O/R	A		
SENTX latest design		contractors at the Project site and the adjacent development site within the landfill consultation zone are outlined in Paragraphs 8.3 to 8.49 of EPD's <i>Landfill Gas Hazard Assessment Guidance Notes (the Guidance Note)</i> . Those precautionary measures applicable to the SENTX will be confirmed in the detailed Qualitative Landfill Gas Hazard Assessment to be submitted by the contractor.	workers from landfill gas risk	construction works area	Contractor					<i>EPD's Landfill Gas Hazards Assessment Guidance Note</i> <i>EIAO-TM Annex 7</i>	
8.6.2	LFG2	Monitoring will be undertaken when construction works are carried out in confined space within the consultation zone with reference to the monitoring requirements and procedures specified in Paragraphs 8.23 to 8.28 of EPD's <i>Guidance Note</i> will be followed. In the event of the trigger levels being exceeded, it is recommended that a person, such as the Safety Officer, is nominated, with deputies, to be responsible for dealing with any emergency which may occur due to landfill gas. In an emergency situation, the nominated person, or his deputies, shall have the necessary authority and shall ensure that the confined space is evacuated and the necessary works implemented for reducing the concentrations of gas. The appropriate organisations shall be contact.	To protect workers from landfill gas risk	Confined space within the construction works area	SENTX Contractor		✓			<i>EIAO-TM Annex 7</i>	Implemented
8.6.3	LFG4	Implementation of engineering measures according to Contract Specification	To protect workers from	SENTX Site	SENTX Contractor	✓	✓	✓	✓	<i>EIAO-TM Annex 7</i>	Implemented

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						D	C	O/R	A		
		requirements. These measures will include the placement of liner and installation of landfill gas management system to contain, manage and control landfill gas.	landfill gas risk								
8.6.3	LFG5	Engineering measures to significant engineering measures will be required in the design of the SENTX to protect the staff working in the infrastructure area. These measures include a combination of passive and active systems (examples are recommended in EPD's <i>Guidance Notes</i>). Landfill gas monitoring boreholes will be installed at the edge of the waste slope between the waste and the new infrastructure area to monitor the migration of landfill gas, if any.	To protect workers from landfill gas risk	Infrastructure Area	SENTX Contractor	✓	✓		<i>EPD's Landfill Gas Hazards Assessment Guidance Note</i> <i>EIAO-TM Annex 7</i>	Implemented	
Landfill Gas Hazards - Operation, Restoration and Aftercare Phases											
8.6.4	LFG7	To train and ensure staff to take appropriate precautions at all times when entering enclosed spaces or plant rooms. Undertake regular monitoring of landfill gas at the perimeter boreholes to detect if there are any signs of off-site landfill gas migration. Prepare and implement emergency plan in case off-site landfill gas migration is detected. A permanent gas monitoring system with alarm will be installed and operated in all occupied on-site buildings.	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor			✓	✓	<i>Landfill Gas Hazards Assessment Guidance Note</i>	Implemented

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						D	C	O/R	A		
8.7 and SENTX latest design	LFG8	<u>Environmental Monitoring & Audit Requirements</u> Undertake regular monitoring of landfill gas within the SENTX and along the SENTX boundary as required by the Contract Specification.	To protect workers from landfill gas risk	Within the SENTX and along the SENTX boundary	SENTX Contractor		✓	✓		Implemented	
<i>Landfill Gas Hazards Assessment Guidance Note</i>											
Ecology - Construction Phase											
9.10.2	EC1	Measures to control construction runoff: <ul style="list-style-type: none"> Exposed soil areas will be minimised to reduce the contamination of runoff and erosion; To prevent stormwater runoff from washing across exposed soil surfaces, perimeter channels will be constructed in advance of site formation works and earthworks and intercepting channels will be provided for example along the edge of excavation; Silt removal facilities, channels and manholes will be maintained and the deposited silt and grit will be removed regularly to ensure they are functioning properly at all times; 	To minimise potential water quality impacts affecting ecological resources	All construction works area	SENTX Contractor		✓		<i>EIAO-TM Annex 16</i> <i>ProPECC PN 1/94</i> <i>Water Pollution Control Ordinance (WPCO)</i> <i>EIAO-TM Annex 6</i>	Implemented	
									-	Implemented	
									-	Implemented	

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						D	C	O/R	A			
		<ul style="list-style-type: none"> Temporary covers such as tarpaulin will also be provided to minimise the generation of high suspended solids runoff; The surface runoff contained any oil and grease will pass through the oil interceptors; and, Control measures, including implementation of excavation schedules, lining and covering of excavated stockpiles will be implemented to minimise contaminated stormwater run-off from the SENTX site. 								-	Implemented	
										-	Implemented	
										-	Implemented	
9.10.2 and SENTX latest design	EC2	<u>Good Construction Practice:</u>										
		<ul style="list-style-type: none"> Fences along the boundary of the SENTX Site will be erected before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas. The work site boundaries will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas. 	To minimise potential ecological impacts arising from the Project	SENTX Site	SENTX Contractor					✓	EIAO-TM Annex 16	Implemented
Ecology - Operation, Restoration and Aftercare Phases												
9.10.2	EC3	<u>Measures for Controlling Leakage of Landfill Leachate</u>										Implemented

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						D	C	O/R	A		
9.10.2	EC4	Leachate will be contained within the SENTX Site by the proposed impermeable leachate containment system and collected by the installation of drainage system to prevent potential migration of leachate to habitats in the vicinity.	To minimise potential water quality impact affecting the ecological resources	SENTX Site	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 16</i> <i>WPCO</i> <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
		<u>Measures for Controlling Migration of Landfill Gas</u> Disturbance to habitat in the vicinity and associated wildlife due to migration of landfill gas will be prevented by proper management of the landfill gas generated from the SENTX. Ignition fires will be prohibited to occur within the boundary of the SENTX Site. Surface emission and off-site migration of landfill gas will be regularly monitored.	To minimise potential landfill gas migration affecting ecological resources	SENTX Site	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 16</i>	
9.10.3 and SENTX latest design	EC5	The following compensation planting is recommended as the mitigation measures for the habitat affected due to the SENTX: <ul style="list-style-type: none">Provision of 6 ha of mixed woodland planting to compensate the loss of shrubland; andProvision of a mosaic of grassland and shrubland in the remaining areas of the SENTX Site. Compensatory planting and restoration of the SENTX can be implemented progressively according to the filling plan of SENTX.	Compensation of habitat loss due to the Project	SENTX Site	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 16</i>	Implemented

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9.10.3	EC6	The mixture of grassland, shrubland and woodland habitats are recommended to diversify the habitats for supporting various wildlife in particular butterflies, birds and herpetofauna and blend into the existing undisturbed ecological environment.	To diversify habitats	SENTX Site	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 16</i>	Implemented
9.10.3	EC7	Indigenous plant species of shallow root system, softwood in nature and adaptive to sea shore habitat are recommended to be used in the restoration plan, which can establish well in coastal area with exposure to strong wind and salt spray, with sand soil base. Taking consideration of the relative poor substrate and the difficulties of establishment of some native trees in Hong Kong, it is recommended to include approximately 20% of non-native tree species in the compensatory woodland. The non-native tree species can serve as a nurse species to facilitate the establishment of the native tree species, especially the shading, and it can be replaced by established native tree species progressively. Plant species can also make reference to food plants of butterfly species (in particularly butterfly species of conservation interests recorded within the CWBCP).	To enhance ecological value of the habitats	SENTX Site	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 16</i>	Implemented
9.10.3	EC8	It is also recommended that a trial nursery for native plant species be set up to fine tune the planting matrix and management intensity of the recommended indigenous tree species for	To select the most suitable indigenous tree species for the	SENTX Site	SENTX Contractor	✓	✓	✓		<i>EIAO-TM Annex 16</i>	Implemented

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						D	C	O/R	A		
		the restoration of the SENTX. It should be noted that native shrubs and tree species had been used for restoration of the existing SENT Landfill, native plant species that could not successfully be established on the existing SENT Landfill should be reviewed before the preparation of the compensatory planting list. Special care and intensive management of native plant should be implemented in order to ensure proper establishment of the native plants.	SENTX								
9.12.1	EC9	<u>Environmental Monitoring & Audit Requirements</u> The implementation of the ecological mitigation measures should be checked as part of the environmental monitoring and audit procedures during the construction period.	To ensure that adverse ecological impacts are prevented	SENTX	SENTX Contractor	✓	✓	✓	EIAO-TM Annex 16	Implemented	
Landscape and Visual – Construction Phase											
10.6.5	LV1	CM1 - The construction area and area allowed for the contractor's office, leachate treatment plant and laboratory areas will be minimised to a practical minimum, to avoid impacts on adjacent landscape.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor	✓			EIAO-TM Annex 18 and ETWBC 3/2006	Implemented	
10.6.5	LV2	CM2 - Topsoil, where identified, will be stripped and stored for re-use in the construction of the soft landscape works, where practical. The Contract Specification	To minimise the landscape and visual impacts	All construction works area	SENTX Contractor	✓			EIAO-TM Annex 18	Not applicable	

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		will include storage and reuse of topsoil as appropriate.									
10.6.5	LV3	CM3 - All existing trees at the edges of the landfill will be carefully protected during construction. Detailed Tree Protection Specification will be provided in the Contract Specification. Under this Specification, the Contractor will be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in Contractor's works areas.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor		✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Not applicable
10.6.5	LV4	CM4 - Trees unavoidably affected by the works will be transplanted, where necessary and practical. A detailed Tree Transplanting Specification will be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods will be allowed in the project programme.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented
10.6.5 and SENTX latest design	LV5	CM5 - Within 3 months of taking possession of the SENTX Site, the Contractor will plant advance screen planting of native species at Light Standard size at 1.5m centres along the High Junk Peak Trail so as to screen views of the Works from the trail. Tree planting locations will be agreed with AFCD. Works will be completed within 9 months of taking possession of the SENTX Site.	To minimise the landscape and visual impacts	At High Junk Peak Hiking Trail	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5	LV6	CM6 - The Contractor's office, leachate treatment plant and laboratory will be given an aesthetic treatment in earth tones to reduce their visual impact and albedo and blend them into the surrounding landscape.	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18</i>	Implemented
10.6.5	LV7	CM7 - The Contractor's office, leachate treatment plant and laboratory will be surrounded by a minimum of 5m wide and 0.75m high earth bund on the west and south sides planted with a dense screen of tree and shrub vegetation. Additional tree planting will be provided in unused spaces with thin infrastructure site, along access roads and in and around car parks. This will be supplemented with shrub planting, where appropriate.	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18 and ETWBC 7/2002</i>	Not applicable
10.6.5	LV8	CM8 - Planting trials will be carried out in an on-site nursery prior to implementation of the first phase of restoration to establish the best planting matrix and management intensity of the recommended plant materials for the restoration.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 18</i>	Implemented
11.4.1 and SENTX latest design	LV9	During the preparation of the detailed landscape design plan, the design submission will be audited against the recommendation proposed in the <i>ER Report</i> by the Registered Landscape Architect from the ET.	To ensure the implementation of mitigation measures proposed in this EIA Report	SENTX Site	SENTX Contractor/ET	✓	✓			<i>EIAO-TM Annex 18</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
<i>Landscape and Visual – Operation/Restoration Phase</i>											
10.6.5 and SENTX latest design	LV10	OM1 - Landfill materials will be covered with general fill material or tarpaulin sheet on a daily basis to reduce visual impact.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5 and SENTX latest design	LV11	OM2 - Filling and restoration will be phased during the course of operations in a minimum of 4 phases, the restoration of each phase to commence immediately on the completion of filling in that phase.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV12	OM3 - Catch fences will be erected at the perimeter of the waste boundary, to ensure that all waste stays within the site and is not blown into surrounding areas.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV13	OM4 - All night-time lighting will be reduced to a practical minimum both in terms of number of units and lux level and will be hooded and directional.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
11.4.2 and SENTX latest design	LV14	The condition of the restoration plantation will be audited at monthly intervals by a Registered Landscape Architect from the ET.	To check the restoration plantation	SENTX Site	SENTX Contractor/ET			✓		EIAO-TM Annex 18	Implemented

Annex C

Monitoring Schedule for This Reporting Period

**South East New Territories (SENT) Landfill Extension
EM&A Impact Monitoring Schedule during Operation/ Restoration Phase**

October 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 Dust Monitoring Perimeter LFG Monitoring	4	5 Service Void LFG Monitoring Noise Monitoring	6	7 Leachate Monitoring	8
9 Dust Monitoring	10 Noise Monitoring Groundwater Monitoring	11 Groundwater Monitoring	12	13 Odour Monitoring	14 Stack Monitoring	15 Dust Monitoring
16	17 Stack Monitoring Noise Monitoring	18	19	20	21 Dust Monitoring	22
23	24 Noise Monitoring Surface Water Monitoring	25	26	27 Dust Monitoring	28	29
30	31					

Annex D

Air Quality

Annex D1

Calibration Certificates for
Dust Monitoring
Equipment

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID : AM1	Date of Calibration: 17-Sep-22
Name and Model: TISCH HVS Model TE-5170	Next Calibration Date: 17-Nov-22
	Operator: Dixon Chan

CONDITIONS

Sea Level Pressure (hPa)	1006	Corrected Pressure (mm Hg)	754.5
Temperature (°C)	31.1	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.50	5.50	11.0	1.641	57	55.65	Slope = 41.4005 Intercept = -11.1763 Corr. coeff. = 0.9978
13	4.30	4.30	8.6	1.452	51	49.80	
10	3.40	3.40	6.8	1.292	44	42.96	
7	2.20	2.20	4.4	1.040	33	32.22	
5	1.40	1.40	2.8	0.830	23	22.46	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)] - b)$$

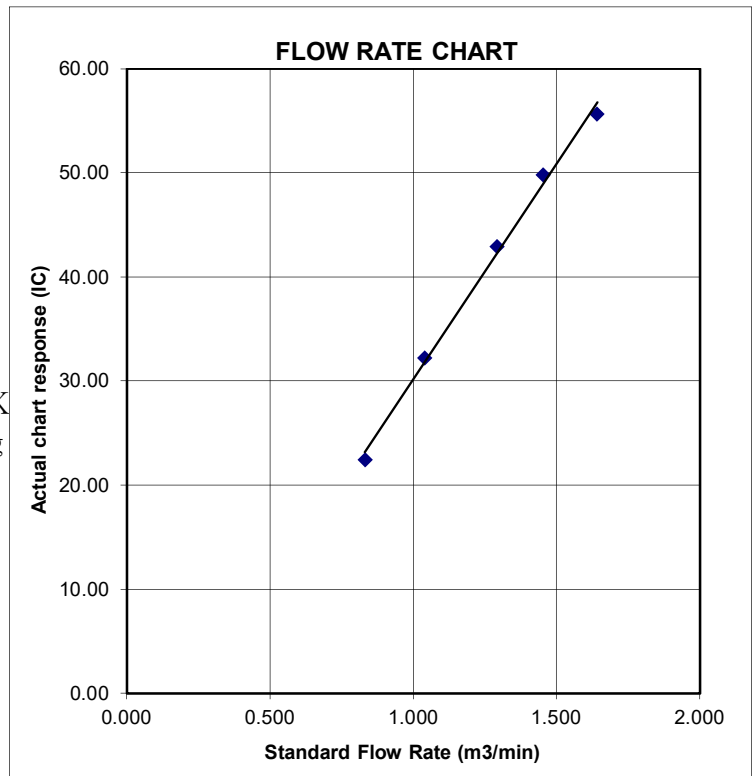
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID : AM2	Date of Calibration: 17-Sep-22
Name and Model: TISCH HVS Model TE-5170	Next Calibration Date: 17-Nov-22
	Operator: Dixon Chan

CONDITIONS

Sea Level Pressure (hPa) 1006	Corrected Pressure (mm Hg) 754.5
Temperature (°C) 31.1	Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 1.99838
Model-> 5025A	Qstd Intercept -> -0.00903
Serial # -> 1612	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.00	6.00	12.0	1.714	54	52.72	Slope = 31.6608 Intercept = -2.0650 Corr. coeff. = 0.9949		
13	5.00	5.00	10.0	1.565	47	45.89			
10	3.60	3.60	7.2	1.329	42	41.01			
7	2.40	2.40	4.8	1.086	34	33.20			
5	1.40	1.40	2.8	0.830	24	23.43			

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

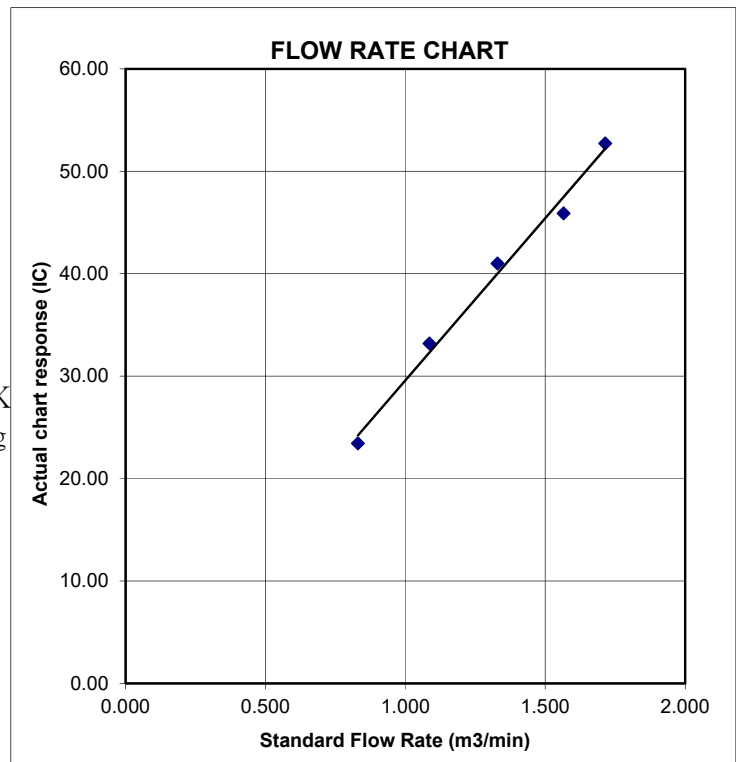
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID : AM3	Date of Calibration: 17-Sep-22
Name and Model: TISCH HVS Model TE-5170	Next Calibration Date: 17-Nov-22
	Operator: Dixon Chan

CONDITIONS

Sea Level Pressure (hPa) 1006	Corrected Pressure (mm Hg) 754.5
Temperature (°C) 31.1	Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 1.99838
Model-> 5025A	Qstd Intercept -> -0.00903
Serial # -> 1612	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.50	5.50	11.0	1.641	50	48.82	Slope = 36.0371 Intercept = -10.4602 Corr. coeff. = 0.9965
13	4.30	4.30	8.6	1.452	43	41.98	
10	3.50	3.50	7.0	1.310	38	37.10	
7	2.20	2.20	4.4	1.040	26	25.39	
5	1.40	1.40	2.8	0.830	21	20.50	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

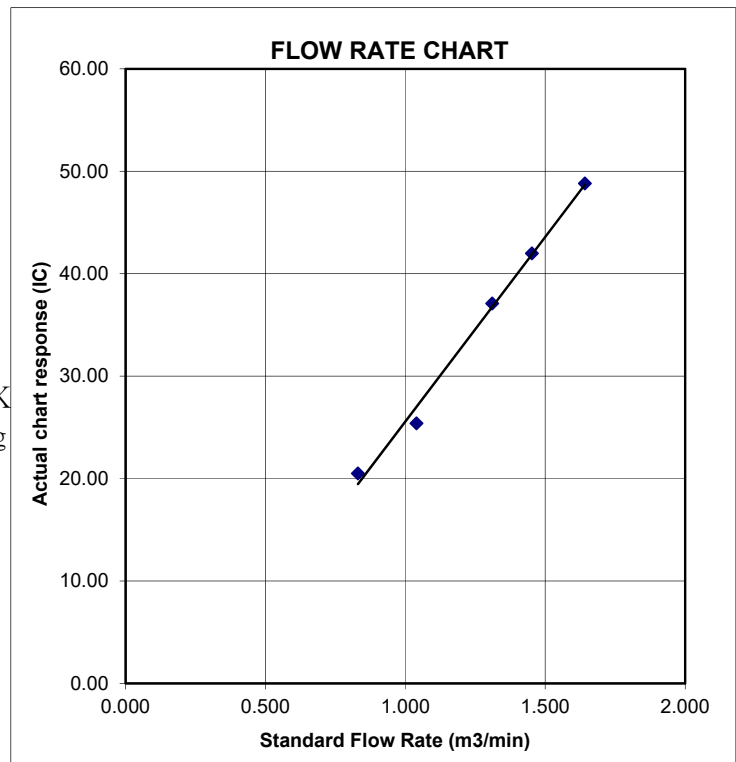
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location ID : AM4	Date of Calibration: 17-Sep-22
Name and Model: TISCH HVS Model TE-5170	Next Calibration Date: 17-Nov-22
	Operator: Dixon Chan

CONDITIONS

Sea Level Pressure (hPa) 1006	Corrected Pressure (mm Hg) 754.5
Temperature (°C) 31.1	Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 1.99838
Model-> 5025A	Qstd Intercept -> -0.00903
Serial # -> 1612	

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.60	5.60	11.2	1.656	51	49.80	Slope = 28.7101 Intercept = 2.2328 Corr. coeff. = 0.9981
13	4.60	4.60	9.2	1.502	46	44.91	
10	3.30	3.30	6.6	1.273	40	39.06	
7	2.10	2.10	4.2	1.016	33	32.22	
5	1.40	1.40	2.8	0.830	26	25.39	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K

Pstd = actual pressure during calibration (mm Hg

For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

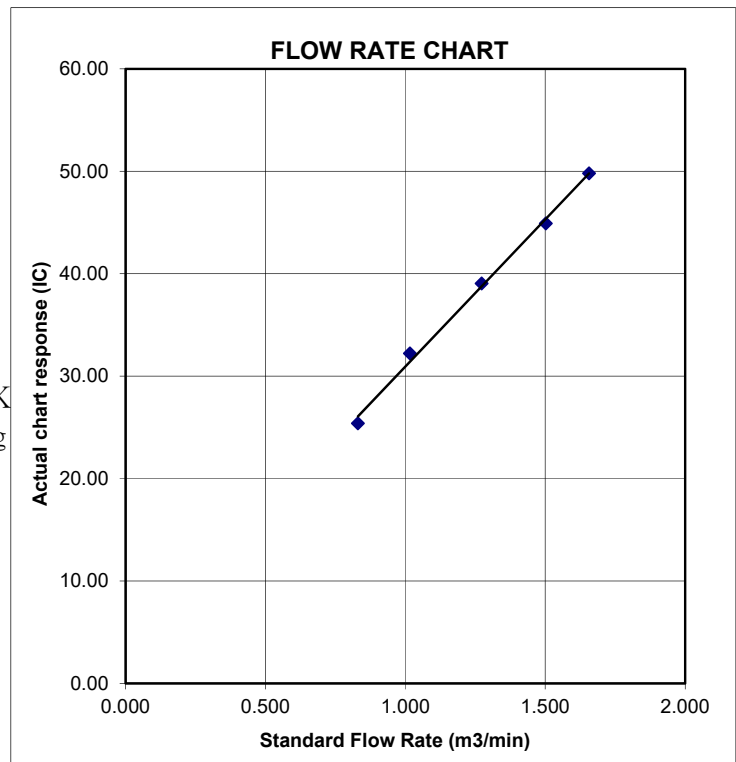
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Annex D2

24-hour TSP Monitoring Results

Table D2.1 24-hour TSP Monitoring Results at AM1

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ($\mu\text{g}/\text{m}^3$)
3 Oct 22	9:00	4 Oct 22	9:51	Sunny	64
9 Oct 22	9:00	10 Oct 22	9:07	Sunny	78
15 Oct 22	9:00	16 Oct 22	9:09	Sunny	98
21 Oct 22	9:00	22 Oct 22	9:12	Sunny	91
27 Oct 22	9:00	28 Oct 22	9:13	Sunny	136
Average					93
Min					64
Max					136

Figure D2.1 Graphical Presentation for 24-hr TSP Monitoring at AM1

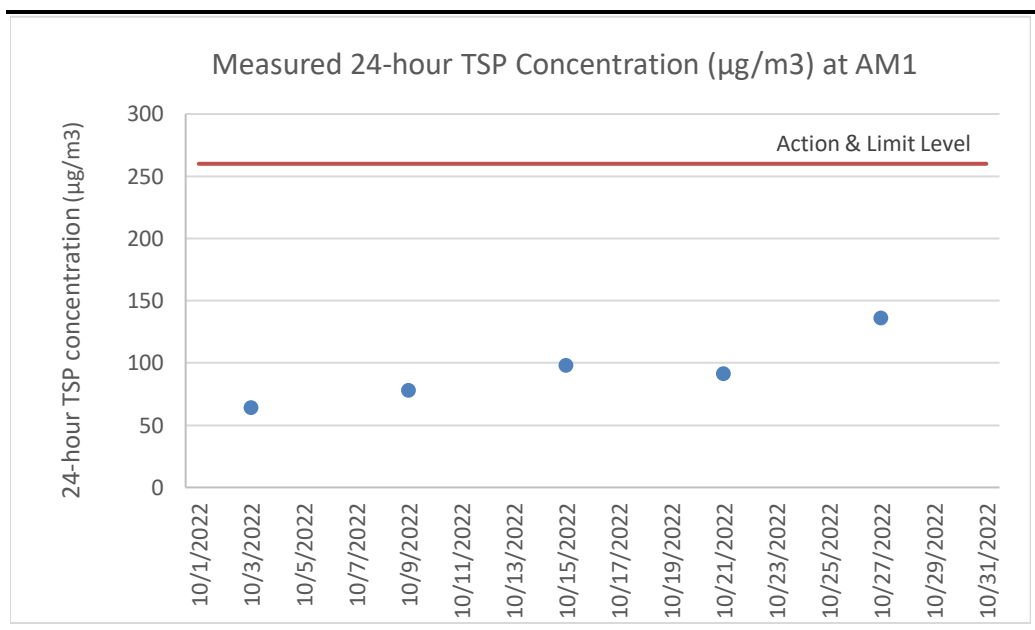


Table D2.2 24-hour TSP Monitoring Results at AM2

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ($\mu\text{g}/\text{m}^3$)
3 Oct 22	9:00	4 Oct 22	8:59	Sunny	76
9 Oct 22	9:00	10 Oct 22	8:59	Sunny	75
15 Oct 22	9:00	16 Oct 22	8:59	Sunny	89
21 Oct 22	9:00	22 Oct 22	9:01	Sunny	71
27 Oct 22	9:00	28 Oct 22	9:02	Sunny	126
Average					87
Min					71
Max					126

Figure D2.2 Graphical Presentation for 24-hr TSP Monitoring at AM2

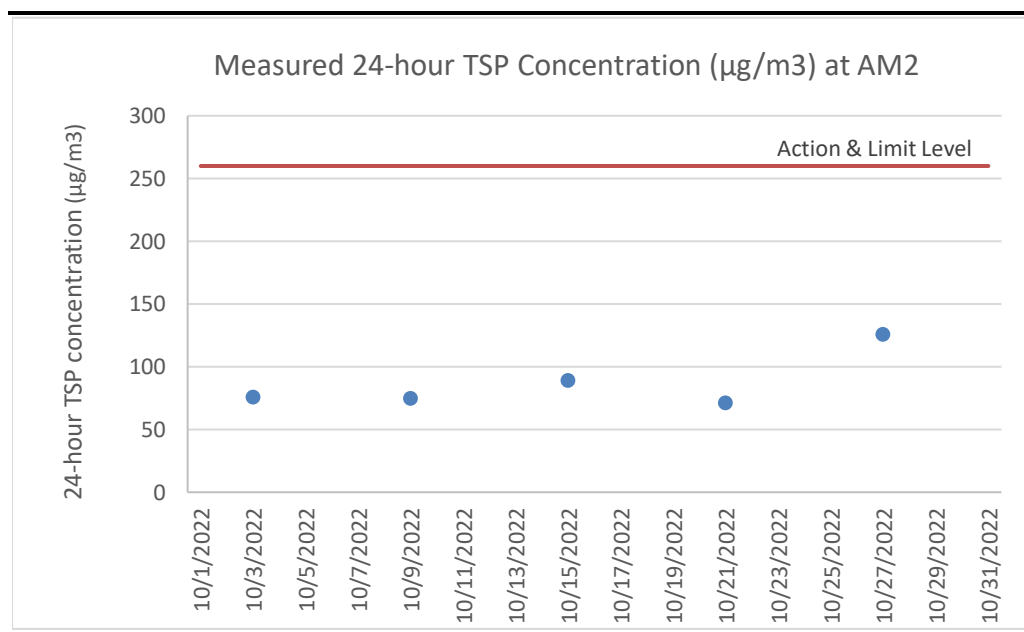


Table D2.3 24-hour TSP Monitoring Results at AM3

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ($\mu\text{g}/\text{m}^3$)
3 Oct 22	9:00	4 Oct 22	9:32	Sunny	111
9 Oct 22	9:00	10 Oct 22	9:33	Sunny	112
15 Oct 22	9:00	16 Oct 22	9:32	Sunny	194
21 Oct 22	9:00	22 Oct 22	9:34	Sunny	133
27 Oct 22	9:00	28 Oct 22	9:37	Sunny	118
Average					134
Min					111
Max					194

Figure D2.3 Graphical Presentation for 24-hr TSP Monitoring at AM3

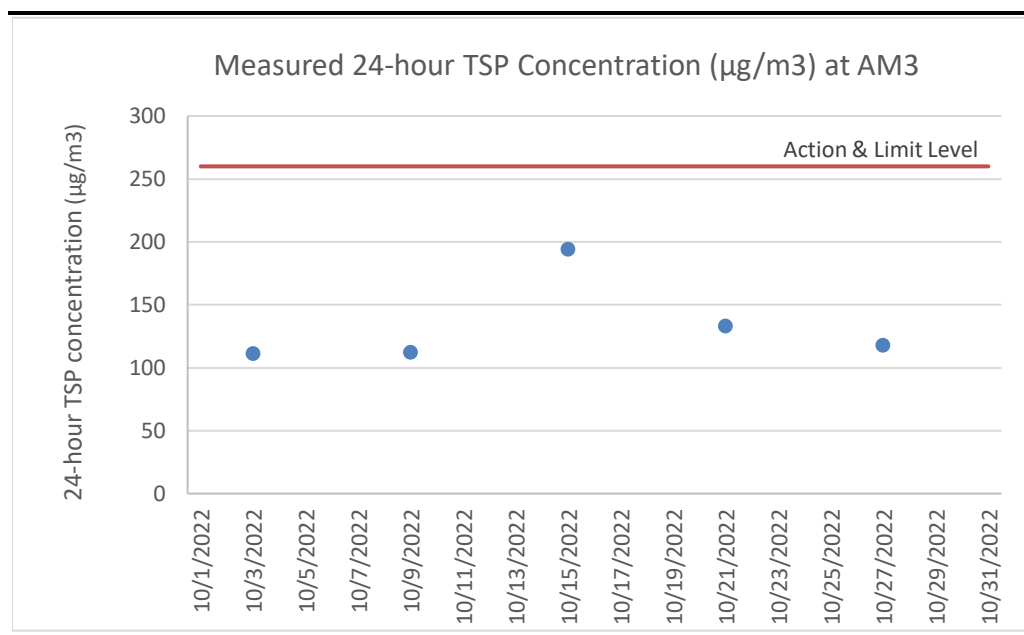
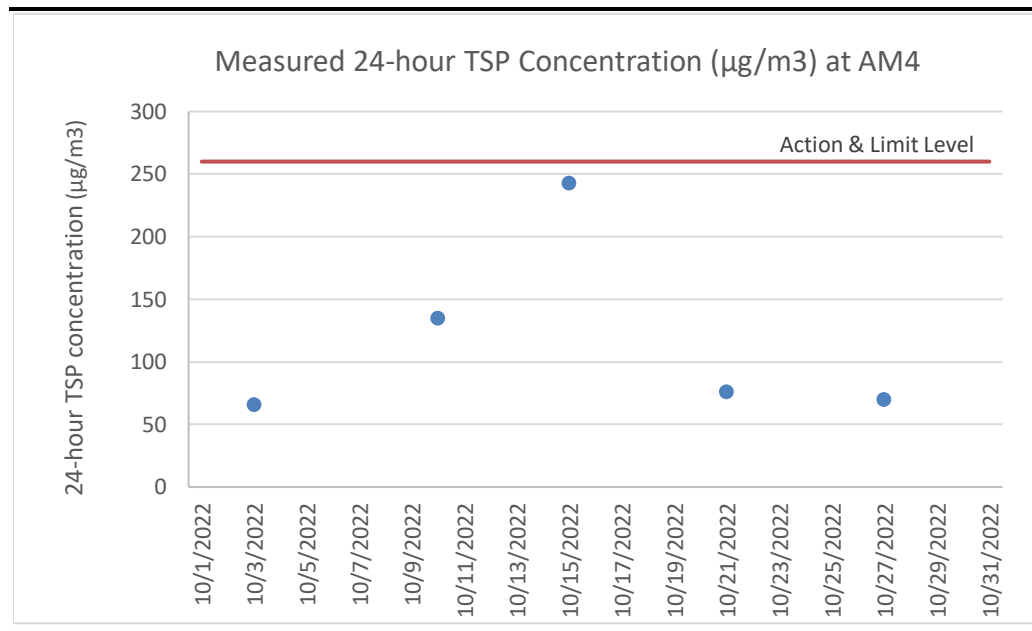


Table D2.4 24-hour TSP Monitoring Results at AM4

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ($\mu\text{g}/\text{m}^3$)
3 Oct 22	9:00	4 Oct 22	9:11	Sunny	66
10 Oct 22	11:45	11 Oct 22	11:50	Sunny	135
15 Oct 22	9:00	16 Oct 22	9:05	Sunny	243
21 Oct 22	9:00	22 Oct 22	8:58	Sunny	76
27 Oct 22	9:00	28 Oct 22	8:20	Sunny	70
Average					118
Min					66
Max					243

Figure D2.4 Graphical Presentation for 24-hr TSP Monitoring at AM4



Annex D3

Event and Action Plan for Dust Monitoring

Annex D3 *Event and Action Plan for Air Quality Monitoring During Operation/Restoration Phase*

Event	Action		
	ET	IEC	Contractor
Exceedance of Action/Limit Level for dust monitoring	<ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to daily and continue until the monitoring results reduce to below action level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance Submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Exceedance of Action Level for odour	<ul style="list-style-type: none"> Identify source(s) and investigate the cause(s) of exceedance or complaint Prepare the odour complaint form or the Notification of Exceedance within 24 hours Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Increase monitoring frequency to daily until odour not being detected for three consecutive days 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice Amend working methods as required Implement amended working methods, if necessary

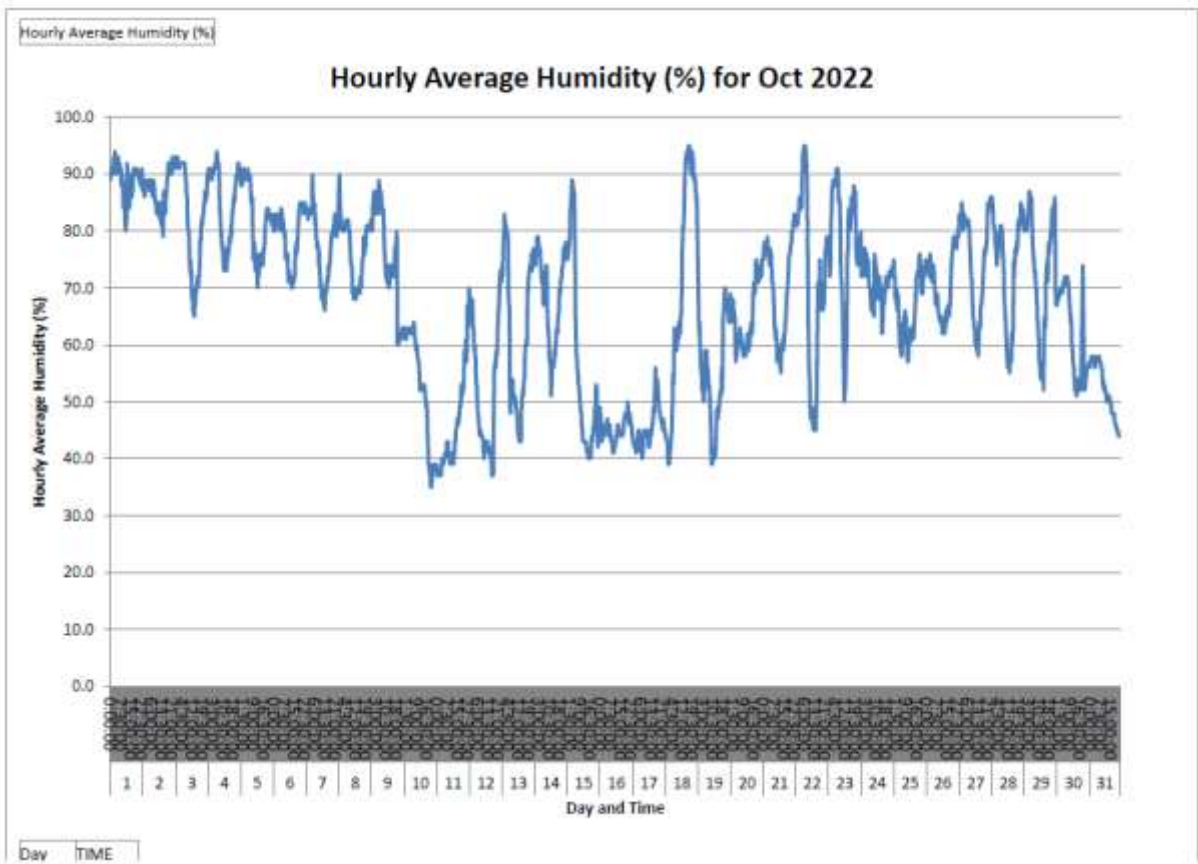
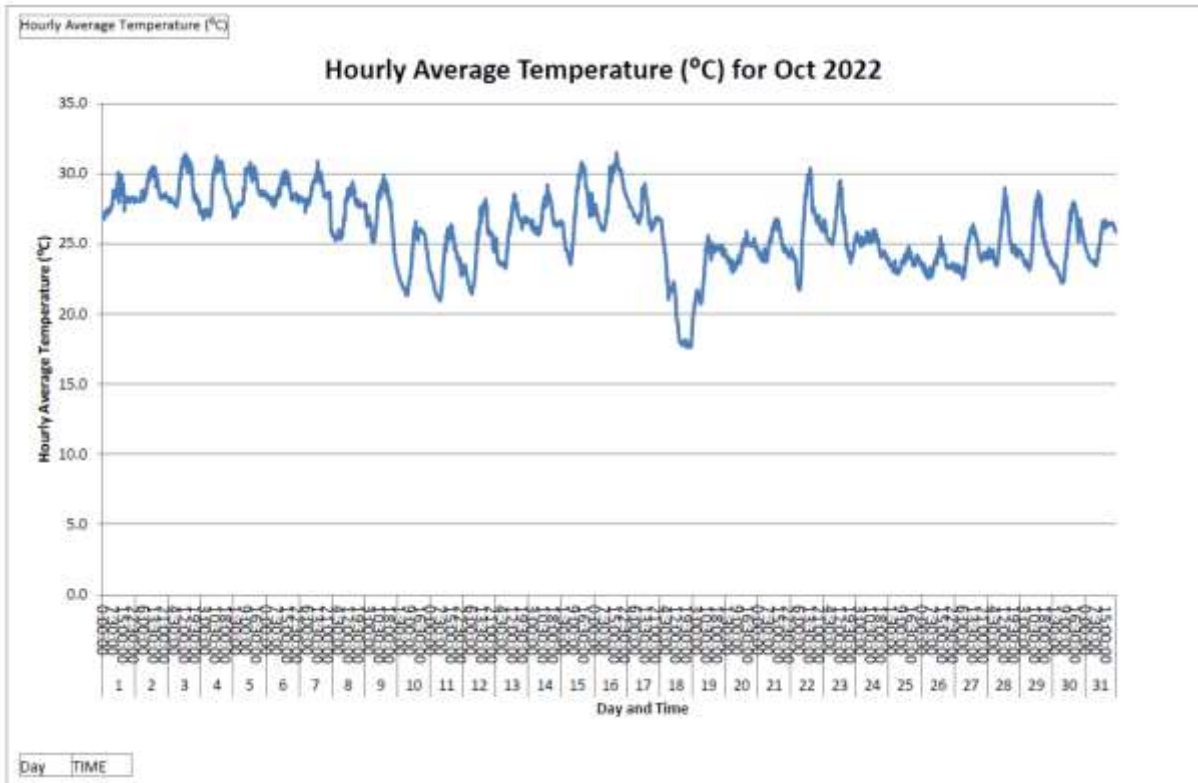
Event	Action		
	ET	IEC	Contractor
Exceedance of Limit Level for odour	<ul style="list-style-type: none"> Identify source(s) and investigate the cause(s) of exceedance or complaint Prepare the odour complaint form or the Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operating activities and implementation of odour mitigation measures Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice Submit proposals for remedial measures to IEC within 3 working days of notification Implement the agreed proposal or amend working methods as required Resubmit proposals if problem still not under control
Exceedance of Limit Level for ambient VOCs, ammonia and H ₂ S at the monitoring locations	<ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to monthly and continue until the monitoring results reduce to below limit level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operating activities and implementation of landfill gas control measures Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice Amend working methods as required Implement amended working methods, if necessary

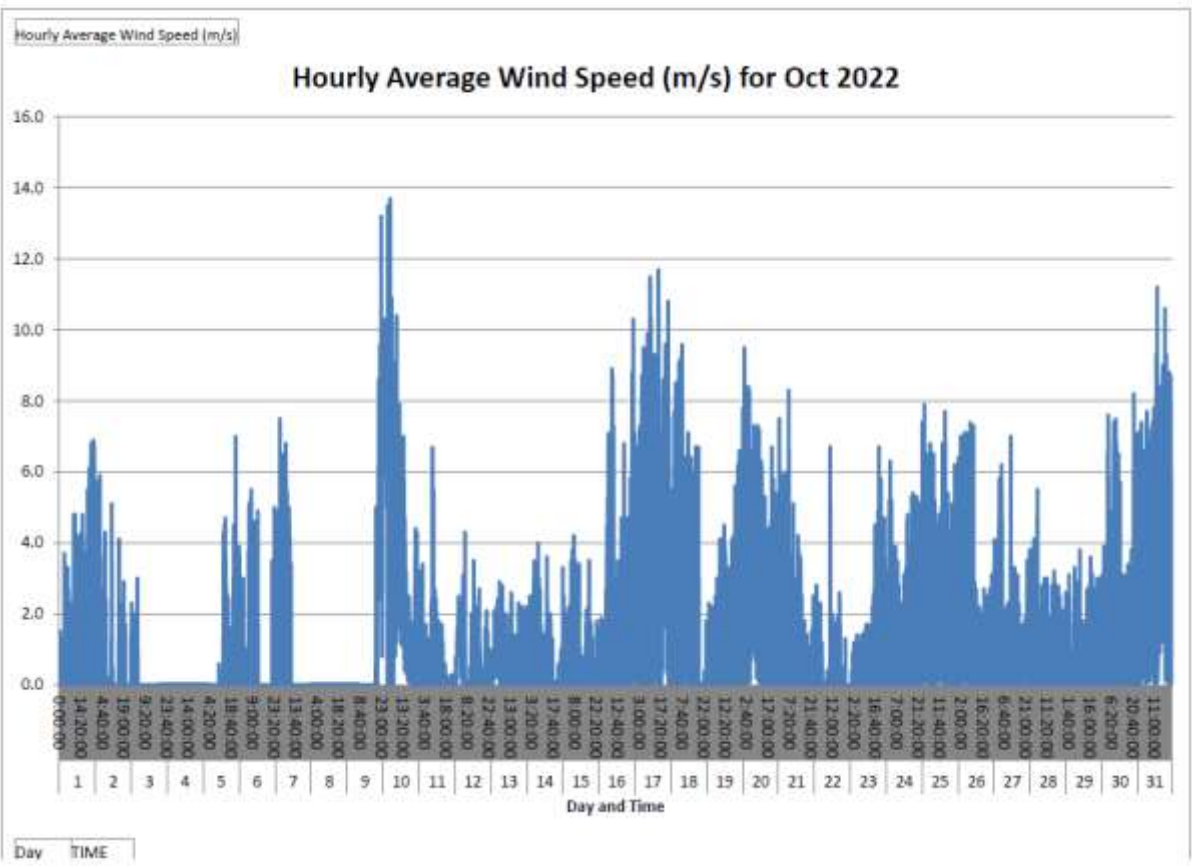
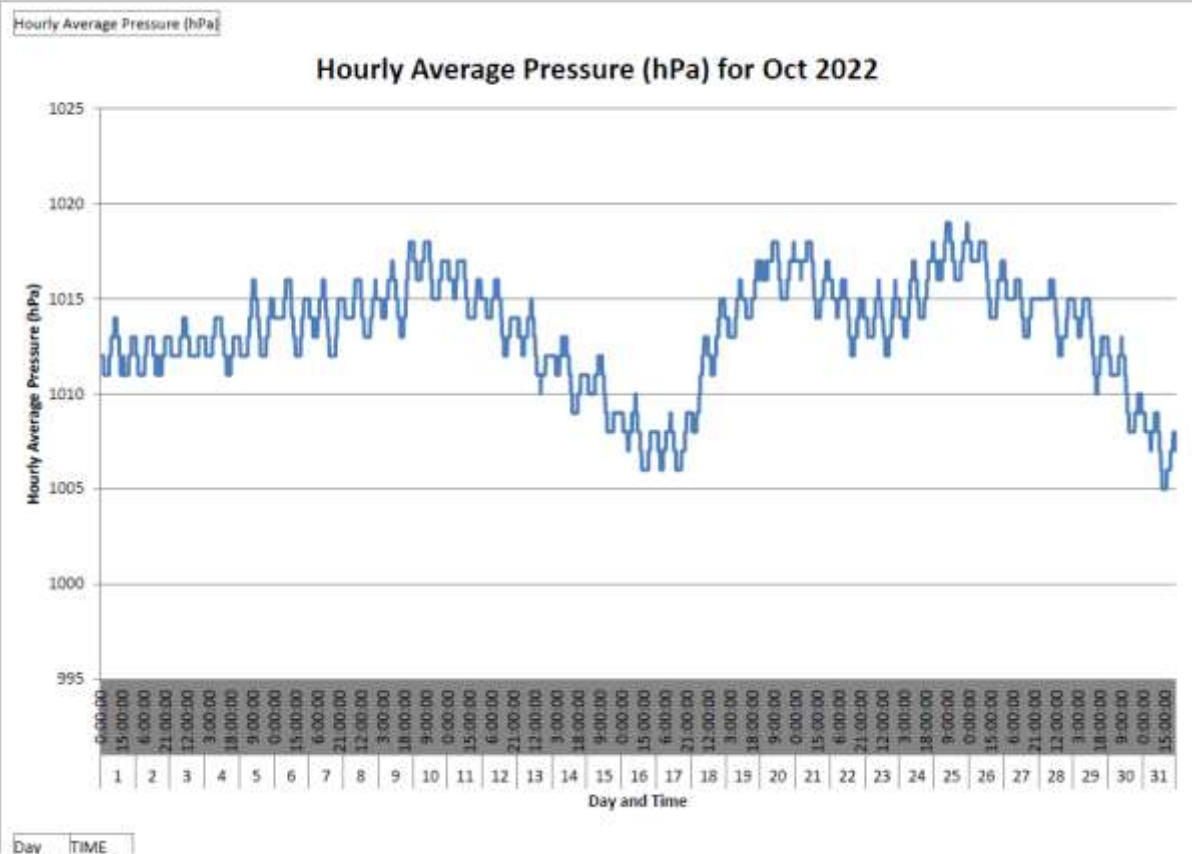
Event	Action		
	ET	IEC	Contractor
Exceedance of Limit Level of stack emission of the thermal oxidizer, flares and generator	<ul style="list-style-type: none"> Identify source(s) and investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to monthly when there are two consecutive exceedances and continue until the monitoring results reduce to below limit level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operating performance of the stack Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable performance Amend design as required Implement amended design, if necessary

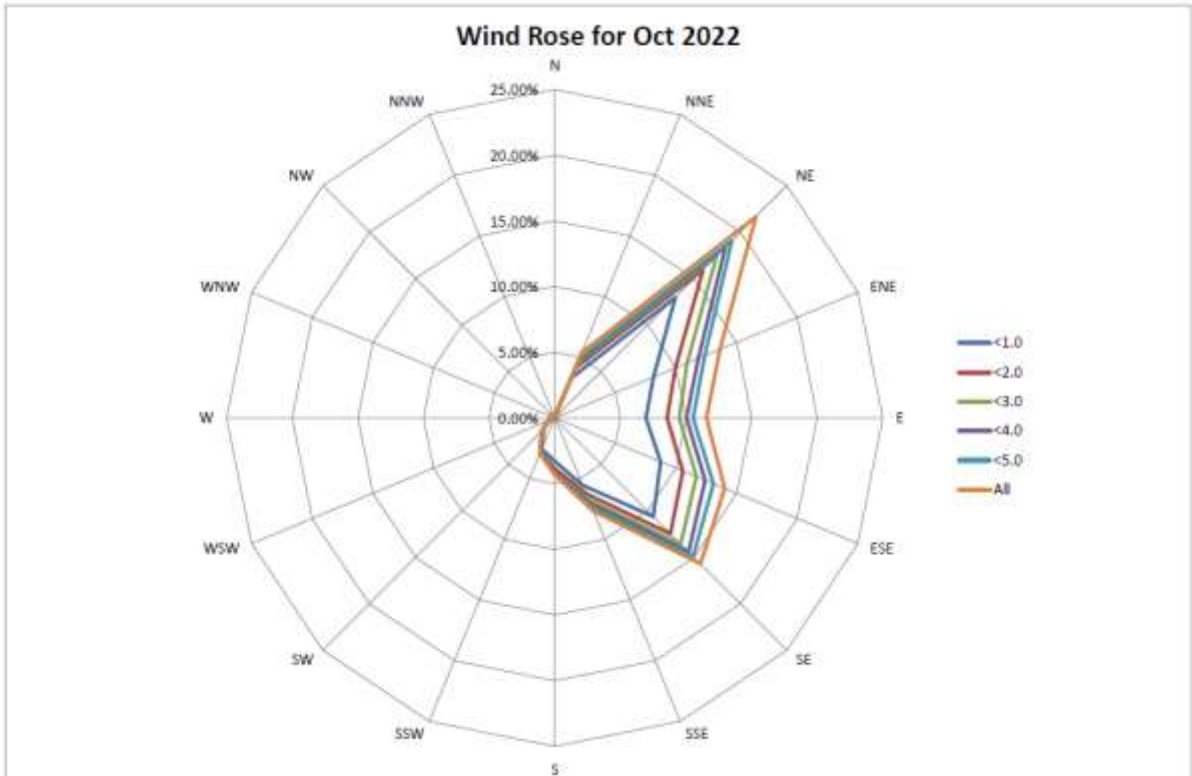
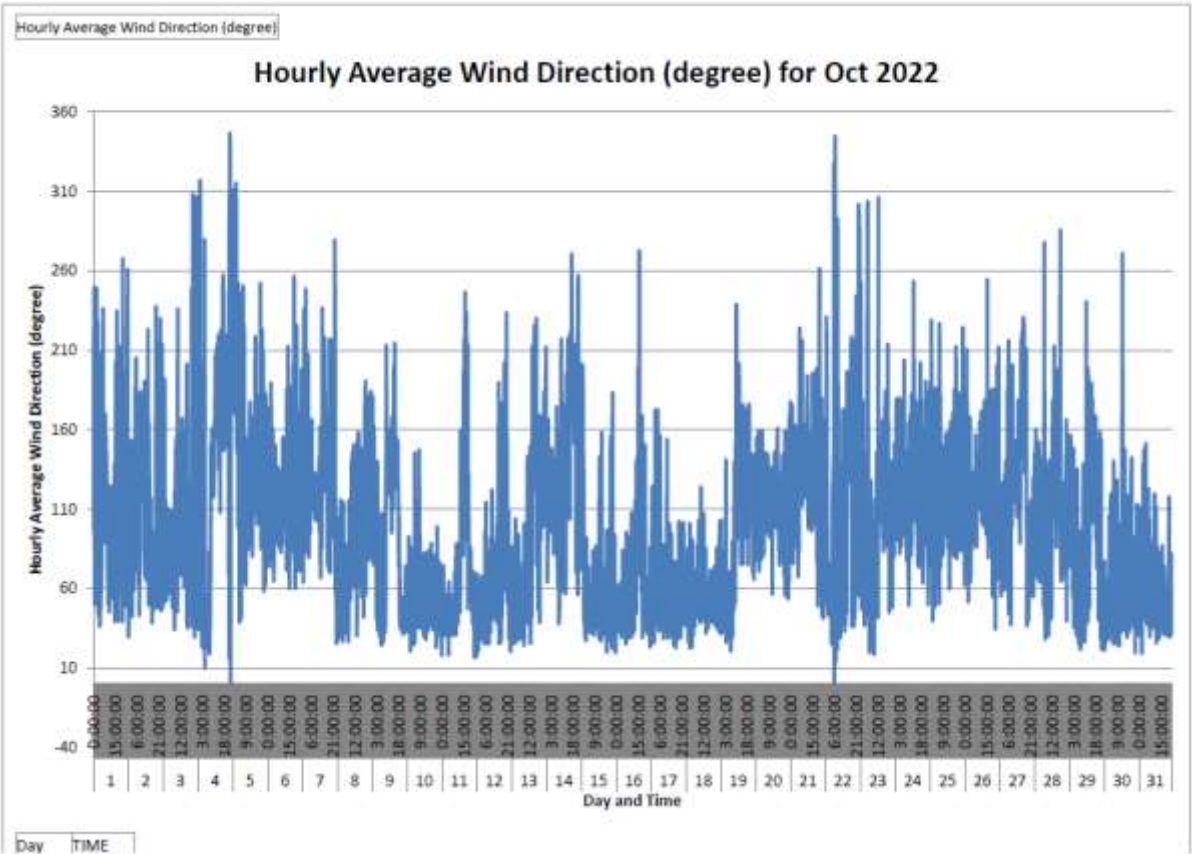
Annex D4

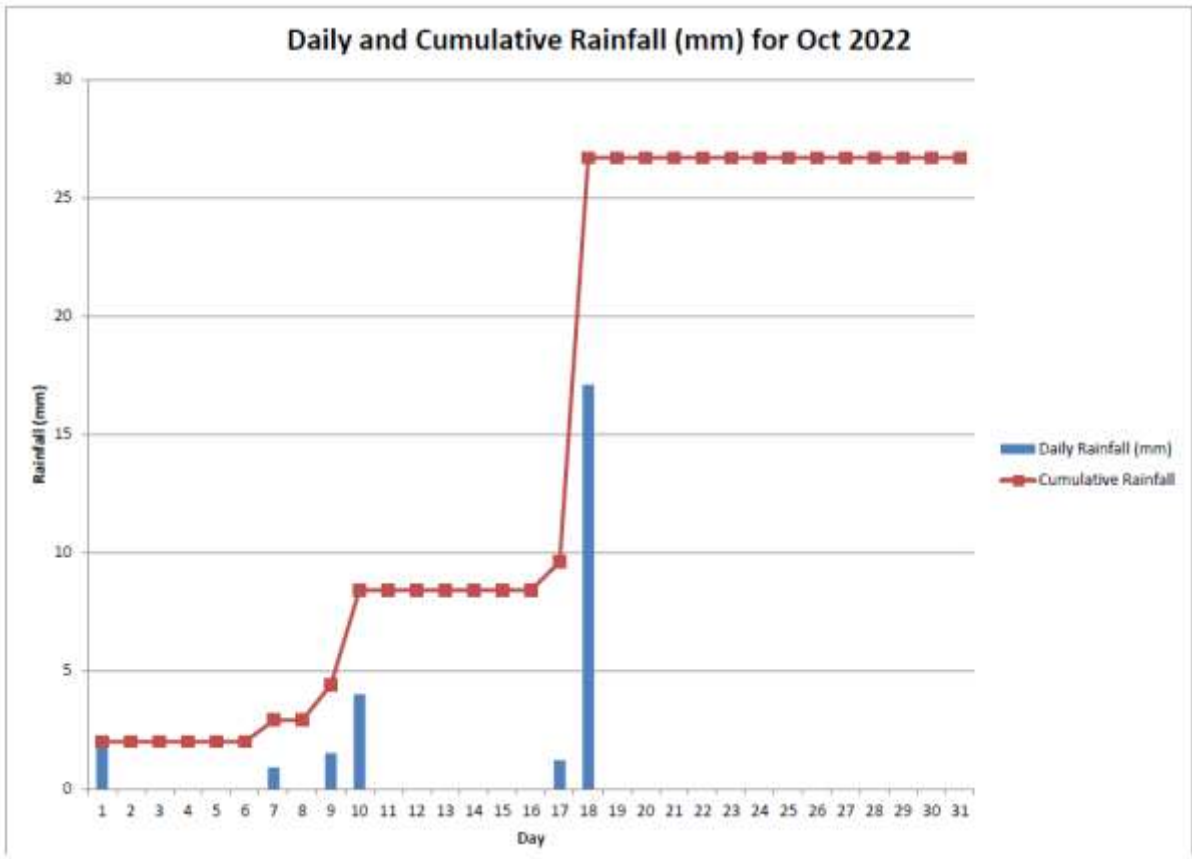
Meteorological Data

Annex D4 Meteorological Data









Annex D5

Certificates of the Qualified Odour Panelist



Certificate for a Qualified Odour Panellist

This is to certify that

LAU MEI TUNG

has participated in Ten (10) sets of individual N-Butanol Screening Test
during 25 October 2021 - 03 November 2021

with Individual Threshold: 41 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality -
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v
with at least 10 sets of individual threshold estimates and standard deviation less than 2.3

03 November 2021

Issue Date

03 November 2022

Valid Until


Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

WONG KA HEI

has participated in Ten (10) sets of individual N-Butanol Screening Test
during 25 October 2021 - 03 November 2021

with Individual Threshold: 40 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality –
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003) –

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 – 80 ppb/v
with at least 10 sets of individual threshold estimates and standard deviation less than 2.3

03 November 2021

Issue Date

03 November 2022

Valid Until

Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

WONG HO YU

has participated in Ten (10) sets of individual N-Butanol Screening Test
during 25 October 2021 - 03 November 2021

with Individual Threshold: 56 ppb/v

and

fulfill the Requirement of the European Standard Method of Air Quality -
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v
with at least 10 sets of individual threshold estimates and standard deviation less than 2.3

03 November 2021

Issue Date

03 November 2022

Valid Until


Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

LAO KA LEONG

has participated in Ten (10) sets of individual N-Butanol Screening Test
during 14 December 2021 - 20 December 2021

with Individual Threshold: 31 ppb/v

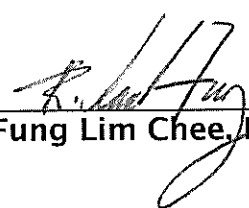
and

fulfill the Requirement of the European Standard Method of Air Quality -
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003) -

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 - 80 ppb/v
with at least 10 sets of individual threshold estimates and standard deviation less than 2.3

20 December 2021
Issue Date

20 December 2022
Valid Until


Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

Cheung Wai Hung

has participated in Ten (10) sets of individual n-Butanol Screening Tests

during 19 May 2022 to 6 September 2022

with Individual Threshold: 42 ppb/v; Standard Deviation: 1.27

and

fulfil the Requirement of the European Standard Method of Air Quality –
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003)

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 – 80 ppb/v
with at least 10 sets of Individual threshold estimates and standard deviation less than 2.3

6 September 2022

Issue Date

6 September 2023

Valid Until

Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

Kwong Kin Wing

has participated in Ten (10) sets of individual n-Butanol Screening Tests

during 15 August 2022 – 30 August 2022

with Individual Threshold: 29 ppb/v; Standard Deviation: 1.31

and

fulfil the Requirement of the European Standard Method of Air Quality –
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003)

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 – 80 ppb/v
with at least 10 sets of Individual threshold estimates and standard deviation less than 2.3

30 August 2022

Issue Date

30 August 2023

Valid Until

Fung Lim Chee, Richard



Certificate for a Qualified Odour Panellist

This is to certify that

Wong Hei Wang

has participated in Ten (10) sets of individual n-Butanol Screening Tests
during 28 April 2022 to 6 September 2022

with Individual Threshold: 43 ppb/v; Standard Deviation: 1.28

and

fulfil the Requirement of the European Standard Method of Air Quality –
Determination of Odour Concentration by Dynamic Olfactometry (EN13725:2003)

The Requirement of the Odour Threshold of n-Butanol in Nitrogen Gas in the Range of 20 – 80 ppb/v
with at least 10 sets of Individual threshold estimates and standard deviation less than 2.3

6 September 2022

Issue Date

6 September 2023

Valid Until

Fung Lim Chee, Richard

Annex D6

Odour Monitoring Results

Table D6.1 Odour Monitoring Results

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
13-Oct-22	Sunny	OP1	14:44	29.1	5.4	S	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP2	14:47	28.4	3.5	S	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP3	14:50	30.7	4.6	SE	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP4	14:52	31.1	2.4	E	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP5	14:54	30.0	3.8	S	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP6	14:56	29.8	1.7	NE	Yes	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP7	14:58	29.9	2.9	S	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP8	15:01	30.4	6.3	S	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP9	15:01	29.7	6.6	E	Yes	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP10	15:01	28.9	1.3	N	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP11	15:01	30.5	2.6	NE	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP12	15:24	29.4	1.3	E	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP13	15:18	28.4	0.0	N/A	N/A	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP14	15:15	28.6	2.6	N	No	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP15	14:20	30.5	1.4	W	Yes	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP16	14:25	31.5	2.2	W	Yes	0	N/A	N/A	N/A
13-Oct-22	Sunny	OP17	14:27	32.2	2.0	W	Yes	0	N/A	N/A	N/A

Annex D7

Thermal Oxidizer, Landfill
Gas Flare and Landfill Gas
Generator Stack Emission
Monitoring Results

Table D7.1 Thermal Oxidiser Stack Emission Monitoring Results

Parameters	Monitoring Results
NO ₂	0.39 gs ⁻¹
CO	<0.01 gs ⁻¹
SO ₂	0.04 gs ⁻¹
Benzene	<2 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.3 x 10 ⁻⁴ gs ⁻¹
Exhaust gas velocity	11.9 ms ⁻¹

Table D7.2 Thermal Oxidiser Stack Continuous Monitoring Results

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)
1-Oct-22	920	1240	
2-Oct-22	924	1246	
3-Oct-22	921	1238	
4-Oct-22	928	1444	
5-Oct-22	921	1593	
6-Oct-22	928	1486	
7-Oct-22	934	1334	
8-Oct-22	930	1280	
9-Oct-22	926	1272	
10-Oct-22	926	1243	
11-Oct-22	930	1264	
12-Oct-22	928	1206	
13-Oct-22	922	1205	
14-Oct-22	935	1205	
15-Oct-22	931	1206	
16-Oct-22	927	1204	11.9
17-Oct-22	931	1206	
18-Oct-22	928	1208	
19-Oct-22	901	1189	
20-Oct-22	934	1210	
21-Oct-22	934	1215	
22-Oct-22	927	1207	
23-Oct-22	917	1184	
24-Oct-22	927	1212	
25-Oct-22	912	1193	
26-Oct-22	920	1207	
27-Oct-22	931	1206	
28-Oct-22	937	1210	
29-Oct-22	933	1209	
30-Oct-22	933	1204	
31-Oct-22	912	1147	
Average	926	1248	-
Min	901	1147	-
Max	937	1593	-

Notes:

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

Table D7.3 Landfill Gas Flare Stack Emission Monitoring Results

Parameters	Monitoring Results (Flare 1 - F601)
NO ₂	0.013 gs ⁻¹
CO	<0.01 gs ⁻¹
SO ₂	0.26 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.8 x 10 ⁻⁵ gs ⁻¹
Exhaust gas velocity	6.5 ms ⁻¹

Table D7.4 Landfill Gas Flare Stack Continuous Monitoring Results

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
Flare 1 - F601				
1-Oct-22	924	1074		In Operation
2-Oct-22	910	988		In Operation
3-Oct-22	954	1183		In Operation
4-Oct-22	-	-		Under Maintenance
5-Oct-22	945	1006		In Operation
6-Oct-22	820	1023		In Operation
7-Oct-22	990	1013		In Operation
8-Oct-22	880	1073		In Operation
9-Oct-22	990	1163		In Operation
10-Oct-22	880	1083		In Operation
11-Oct-22	990	1083		In Operation
12-Oct-22	970	1093		In Operation
13-Oct-22	830	993		In Operation
14-Oct-22	830	1073		In Operation
15-Oct-22	900	1033		In Operation
16-Oct-22	890	1003	6.5	In Operation
17-Oct-22	980	1083		In Operation
18-Oct-22	900	1063		In Operation
19-Oct-22	900	1153		In Operation
20-Oct-22	935	1073		In Operation
21-Oct-22	950	1113		In Operation
22-Oct-22	925	1073		In Operation
23-Oct-22	890	1063		In Operation
24-Oct-22	820	1023		In Operation
25-Oct-22	960	1103		In Operation
26-Oct-22	880	1023		In Operation
27-Oct-22	960	1073		In Operation
28-Oct-22	890	1033		In Operation
29-Oct-22	850	1013		In Operation
30-Oct-22	870	1023		In Operation
31-Oct-22	820	1003		In Operation
Average	908	1060	-	
Min	820	988	-	
Max	990	1183	-	
Flare 2 - F602				
1-Oct-22	890	1103		In Operation
2-Oct-22	890	1098		In Operation
3-Oct-22	890	1053		In Operation
4-Oct-22	860	1093	6.5	In Operation
5-Oct-22	890	1083		In Operation
6-Oct-22	890	1083		In Operation
7-Oct-22	830	1053		In Operation

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
8-Oct-22	880	1093		In Operation
9-Oct-22	840	1053		In Operation
10-Oct-22	890	1073		In Operation
11-Oct-22	880	1093		In Operation
12-Oct-22	825	1033		In Operation
13-Oct-22	890	1093		In Operation
14-Oct-22	820	993		In Operation
15-Oct-22	880	1043		In Operation
16-Oct-22	880	1103		In Operation
17-Oct-22	880	1073		In Operation
18-Oct-22	830	1083		In Operation
19-Oct-22	830	1043		In Operation
20-Oct-22	910	1133		In Operation
21-Oct-22	880	1103		In Operation
22-Oct-22	890	1053		In Operation
23-Oct-22	900	1113		In Operation
24-Oct-22	890	1093		In Operation
25-Oct-22	840	1053		In Operation
26-Oct-22	860	1073		In Operation
27-Oct-22	900	1113		In Operation
28-Oct-22	860	1073		In Operation
29-Oct-22	890	1083		In Operation
30-Oct-22	880	1073		In Operation
31-Oct-22	870	1053		In Operation
Average	872	1076	-	
Min	820	993	-	
Max	910	1133	-	

Notes:

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

Table D7.5 Landfill Gas Generator Stack Emission Monitoring Results

Parameters	Monitoring Results
NO ₂	0.08 gs ⁻¹
CO	0.56 gs ⁻¹
SO ₂	0.006 gs ⁻¹
Benzene	<1.12 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.7 x 10 ⁻⁶ gs ⁻¹
Exhaust gas velocity	10.3 ms ⁻¹

Table D7.6 Landfill Gas Generator Stack Continuous Monitoring Results

Date	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status (Landfill Gas Generator in Operation)
1-Oct-22	861		In Operation (ENGA)
2-Oct-22	867		In Operation (ENGA)
3-Oct-22	865		In Operation (ENGA)
4-Oct-22	865		In Operation (ENGA)
5-Oct-22	865		In Operation (ENGA)
6-Oct-22	865		In Operation (ENGA)
7-Oct-22	864		In Operation (ENGA)
8-Oct-22	863		In Operation (ENGA)
9-Oct-22	860		In Operation (ENGA)
10-Oct-22	856		In Operation (ENGA)
11-Oct-22	855		In Operation (ENGA)
12-Oct-22	864		In Operation (ENGA)
13-Oct-22	865		In Operation (ENGA)
14-Oct-22	865		In Operation (ENGA)
15-Oct-22	851		In Operation (ENGA)
16-Oct-22	852	10.3	In Operation (ENGA)
17-Oct-22	855		In Operation (ENGA)
18-Oct-22	859		In Operation (ENGA)
19-Oct-22	865		In Operation (ENGA)
20-Oct-22	866		In Operation (ENGA)
21-Oct-22	867		In Operation (ENGA)
22-Oct-22	869		In Operation (ENGA)
23-Oct-22	874		In Operation (ENGA)
24-Oct-22	871		In Operation (ENGA)
25-Oct-22	873		In Operation (ENGA)
26-Oct-22	869		In Operation (ENGA)
27-Oct-22	874		In Operation (ENGA)
28-Oct-22	877		In Operation (ENGA)
29-Oct-22	877		In Operation (ENGA)
30-Oct-22	875		In Operation (ENGA)
31-Oct-22	893		In Operation (ENGA)
Average	866	-	
Min	851	-	
Max	893	-	
1-Oct-22	847		In Operation (ENGB)
2-Oct-22	863		In Operation (ENGB)
3-Oct-22	861		In Operation (ENGB)
4-Oct-22	858		In Operation (ENGB)
5-Oct-22	860		In Operation (ENGB)
6-Oct-22	857		In Operation (ENGB)
7-Oct-22	864		In Operation (ENGB)
8-Oct-22	862		In Operation (ENGB)
9-Oct-22	859		In Operation (ENGB)
10-Oct-22	855		In Operation (ENGB)

Date	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status (Landfill Gas Generator in Operation)
11-Oct-22	856		In Operation (ENGB)
12-Oct-22	858	10.3	In Operation (ENGB)
13-Oct-22	862		In Operation (ENGB)
14-Oct-22	859		In Operation (ENGB)
15-Oct-22	858		In Operation (ENGB)
16-Oct-22	848		In Operation (ENGB)
17-Oct-22	859		In Operation (ENGB)
18-Oct-22	858		In Operation (ENGB)
19-Oct-22	857		In Operation (ENGB)
20-Oct-22	857		In Operation (ENGB)
21-Oct-22	861		In Operation (ENGB)
22-Oct-22	862		In Operation (ENGB)
23-Oct-22	867		In Operation (ENGB)
24-Oct-22	865		In Operation (ENGB)
25-Oct-22	865		In Operation (ENGB)
26-Oct-22	863		In Operation (ENGB)
27-Oct-22	864		In Operation (ENGB)
28-Oct-22	866		In Operation (ENGB)
29-Oct-22	866		In Operation (ENGB)
30-Oct-22	863		In Operation (ENGB)
31-Oct-22	865		In Operation (ENGB)
Average	860	-	
Min	847	-	
Max	867	-	

Notes:

(a) The exhaust gas velocity was calculated based on the cross-section area of the stack and the gas flow and combustion temperature data measured during the stack emission monitoring.

Annex E

Noise

Annex E1

Calibration Certificates for Noise Monitoring Equipment

Certificate of Calibration

校正證書

Certificate No. : C216480

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-2189) Date of Receipt / 收件日期 : 25 October 2021

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(50 \pm 25)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 9 November 2021

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification. (after adjustment)
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
K P Cheuk
Project Engineer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 10 November 2021
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C216480

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C210084
CL281	Multifunction Acoustic Calibrator	AV210017

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	* 96.3	± 1.1

* Out of IEC 61672 Class 1 Spec.

6.1.1.2 After Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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Certificate of Calibration

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Certificate No. : C216480

證書編號

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	Ref.
			Slow			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.4	-8.6 ± 1.4
					500 Hz	90.8	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.3	+1.2 ± 1.6
					4 kHz	95.1	+1.0 ± 1.6
					8 kHz	93.0	-1.1 (+2.1 ; -3.1)
					16 kHz	86.1	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.1	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.6
					4 kHz	93.3	-0.8 ± 1.6
					8 kHz	91.1	-3.0 (+2.1 ; -3.1)
					16 kHz	84.2	-8.5 (+3.5 ; -17.0)

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C216480

證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 20044

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C221365
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-0258) Date of Receipt / 收件日期 : 14 February 2022
Description / 儀器名稱 : Sound Level Meter (EQ018)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00809405
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 12 March 2022


TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Fluke Everett Service Center, USA
- Agilent Technologies / Keysight Technologies

Tested By : 
測試 : K C Lee
Engineer

Certified By : 
核證 : H C Chan
Engineer

Date of Issue : 16 March 2022
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C221365
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration was performed before the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	Ref.
			Slow			94.0	± 0.3

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C221365
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.5
					250 Hz	85.4	-8.6 ± 1.4
					500 Hz	90.8	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.7	+1.0 ± 1.6
					8 kHz	92.9	-1.1 (+2.1 ; -3.1)
					16 kHz	85.5	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.1	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	92.9	-0.8 ± 1.6
					8 kHz	91.0	-3.0 (+2.1 ; -3.1)
					16 kHz	83.5	-8.5 (+3.5 ; -17.0)

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration

校正證書

Certificate No. : C221365
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 16463

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	16 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Certificate of Calibration 校正證書

Certificate No. : C224780
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-1539) Date of Receipt / 收件日期 : 4 August 2022
Description / 儀器名稱 : Sound Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(50 \pm 25)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

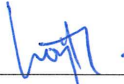
DATE OF TEST / 測試日期 : 20 August 2022

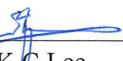
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
H T Wong
Assistant Engineer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 23 August 2022
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。



Certificate of Calibration

校正證書

Certificate No. : C224780
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C223647
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C221750

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

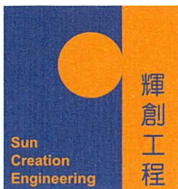
Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C216478

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-2189) Date of Receipt / 收件日期 : 25 October 2021

Description / 儀器名稱 : Sound Calibrator (EQ087)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34657231
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(50 \pm 25)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 9 November 2021

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
K P Cheuk
Project Engineer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 10 November 2021
簽發日期

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C216478

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C213954
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C201309

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.3	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.001	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Annex E2

Noise Monitoring Results

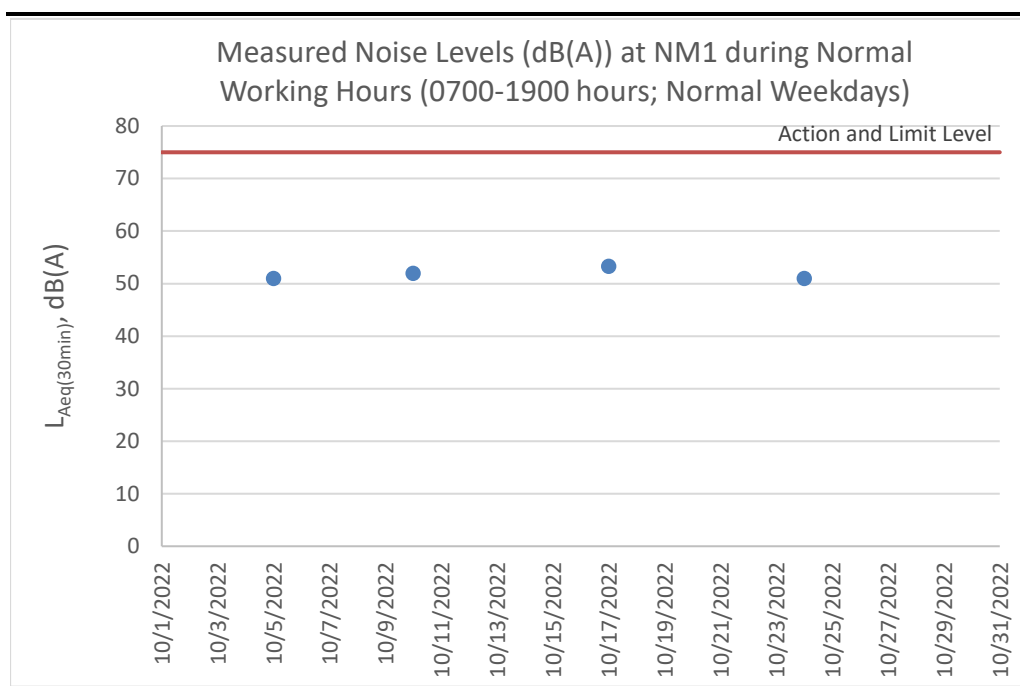
Table E2.1 Measured Noise Levels (dB(A)) at NM1 during Normal Working Hours (0700-1900 hours; Normal Weekdays)

Date	Start Time	Finish Time	Weather	L ₁₀ (30min)	L ₉₀ (30min)	L _{eq} (30min)
5 Oct 22	13:50	14:20	Sunny	53.5	47.0	51.0
10 Oct 22	13:58	14:28	Cloudy	53.4	50.4	52.0
17 Oct 22	14:24	14:54	Cloudy	55.1	51.1	53.3
24 Oct 22	10:06	10:36	Sunny	52.8	47.1	51.0
Average						51.8
Min						51.0
Max						53.3

Note:

Correction of +3 dB(A) was made for free field measurements.

Figure E2.1 Graphical Presentation for Noise Monitoring at NM1



Annex E3

Event and Action Plan for Noise Monitoring

Annex E3 *Event and Action Plan for Operational Noise Monitoring*

Event	Action		
	ET	IEC	Contractor
<p>Action Level</p> <ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance and complaint Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Submit proposals for remedial measures to IEC Implement the agreed proposals 	
<p>Limit Level</p> <ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance and complaint Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD whether the cause of exceedance is due to the Project Analyse the operation of SENTX and investigate the causes of exceedance Provide interim report to Contractor, IEC, Project Proponent and EPD the causes of the exceedances Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Report the remedial measures implemented and the additional monitoring results to Contractor, IEC, Project Proponent and EPD Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Take immediate measures to avoid further exceedance Submit proposals for remedial measures to IEC within 3 working days of notification Implement the agreed proposals Resubmit proposals if problem still not under control Stop the relevant activity of works as determined by the Project Proponent until the exceedance is abated 	

Annex F

Surface Water Quality

Annex F1

Calibration Certificates for
Surface Water Quality
Monitoring Equipment



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	BEN TAM	WORK ORDER:	HK2237607
CLIENT:	ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	22-Sep-2022
		DATE OF ISSUE:	28-Sep-2022

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type:	Multifunctional Meter
Service Nature:	Performance Check
Scope:	Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Brand Name/ Model No.:	[YSI]/ [Professional DSS]
Serial No./ Equipment No.:	[17B102764/17B100758]/ [EQW019]
Date of Calibration:	27-September-2022

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2237607
SUB-BATCH: 0
DATE OF ISSUE: 28-Sep-2022
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 27-September-2022 **Date of Next Calibration:** 27-December-2022

PARAMETERS:

Conductivity Method Ref: APHA (21st edition), 2510B

Expected Reading (µS/cm)	Displayed Reading (µS/cm)	Tolerance (%)
146.9	154.1	+4.9
6667	7043	+5.6
12890	13282	+3.0
58670	60170	+2.6
	Tolerance Limit (%)	±10.0

Dissolved Oxygen Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.90	3.86	-0.04
6.19	6.09	-0.10
7.76	7.78	+0.02
	Tolerance Limit (mg/L)	±0.20

pH Value Method Ref: APHA (21st edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.20	+0.20
7.0	7.20	+0.20
10.0	9.95	-0.05
	Tolerance Limit (pH unit)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
 Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2237607
SUB-BATCH: 0
DATE OF ISSUE: 28-Sep-2022
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 27-September-2022 **Date of Next Calibration:** 27-December-2022

PARAMETERS:

Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	-0.12	--
4	3.86	-3.5
40	37.35	-6.6
80	77.12	-3.6
400	371.05	-7.2
800	728.04	-9.0
	Tolerance Limit (%)	±10.0

Salinity Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.67	+6.7
20	20.56	+2.8
30	31.12	+3.7
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
 Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2237607
SUB-BATCH: 0
DATE OF ISSUE: 28-Sep-2022
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 27-September-2022 Date of Next Calibration: 27-December-2022

PARAMETERS:

Temperature Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
7.0	6.7	-0.3
23.0	22.4	-0.6
43.5	42.7	-0.8
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

Annex F2

Surface Water Quality Monitoring Results

Table F2.1 Surface Water Quality Monitoring Results at DP4

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (oC)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
24 Oct 22	10:30	Sunny		Unable to collect water sample due to insufficient flow					-
					Average	-	-	-	-
					Min	-	-	-	-
					Max	-	-	-	-

Table F2.2 Surface Water Quality Monitoring Results at DP6

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (oC)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
24 Oct 22	10:45	Sunny		Unable to collect water sample due to insufficient flow					-
					Average	-	-	-	-
					Min	-	-	-	-
					Max	-	-	-	-

Annex F3

Event and Action Plan for Surface Water Quality Monitoring

Annex F3 **Event and Action Plan for Water Quality Monitoring During Operation/Restoration Phase**

Event	Action		
	ET	IEC	Contractor
Exceedance of Limit Level for surface water monitoring	<ul style="list-style-type: none"> Identify source(s) of impact and investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to weekly if exceedance is due to the Project until no exceedance of Limit Level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance Submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Exceedance of Limit Level for groundwater monitoring	<ul style="list-style-type: none"> Identify source(s) of impact and investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to weekly if exceedance is due to the Project until no exceedance of Limit Level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Divert groundwater collected at the collection sumps to the leachate treatment plant Submit proposals for remedial measures to IEC Rectify any unacceptable practice or design Amend working methods as required Implement amended working methods, if necessary

Event	Action		
	ET	IEC	Contractor
Exceedance of Limit Level for leachate level	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operating activities and performance of the leachate collection system Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Check the performance of the leachate collection system Rectify any unacceptable practice; Amend leachate collection design if required Implement amended leachate collection system, if necessary
Exceedance of Limit Level of effluent discharge from LTP	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to weekly until no exceedance of Limit Level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operation performance of the LTP Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice; Carry out remedial measures or amend design as required Implement amended design, if necessary

Annex F4

Calibration Certificates for Effluent Quality Monitoring Equipment



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	IVAN LEUNG	WORK ORDER:	HK2239449
CLIENT:	ALS TECHNICHEM (HK) PTY LTD		
ADDRESS:	11/F., CHUNG SHUN KNITTING CENTRE, 1-3 WING YIP STREET, KWAI CHUNG, N.T.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	07-Oct-2022
		DATE OF ISSUE:	14-Oct-2022

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type:	pH meter
Service Nature:	Performance Check
Scope:	pH Value and Temperature
Brand Name/ Model No.:	[TOA]/ [HM-30P]
Serial No./ Equipment No.:	[790332]/ [HK1383]
Date of Calibration:	12-October-2022

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Mr Chan Siu Ming, Vico
Manager - Inorganics

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2239449
 SUB-BATCH: 0
 DATE OF ISSUE: 14-Oct-2022
 CLIENT: ALS TECHNICHEM (HK) PTY LTD

Equipment Type: pH meter
 Brand Name/ Model No.: [TOA]/ [HM-30P]
 Serial No./ Equipment No.: [790332]/ [HK1383]
 Date of Calibration: 12-October-2022

Date of Next Calibration: 12-January-2023

PARAMETERS:

pH Value Method Ref: APHA (21st edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.99	-0.01
7.0	7.06	+0.06
10.0	9.88	-0.12
	Tolerance Limit (pH unit)	±0.20

Temperature Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	10.4	-0.6
23.0	22.8	-0.2
45.5	45.2	-0.3
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
 Manager - Inorganics

Annex F5

Leachate Levels Monitoring Results

Table F5.1 Leachate Levels Monitoring Results (Pump Station No.1X (Cell 1X))

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
Pump Station No. 1X (Cell 1X)			
1-Oct-22	66	79	73
2-Oct-22	66	79	73
3-Oct-22	66	79	73
4-Oct-22	62	73	68
5-Oct-22	62	73	68
6-Oct-22	70	82	76
7-Oct-22	68	82	75
8-Oct-22	73	84	79
9-Oct-22	70	84	77
10-Oct-22	70	84	77
11-Oct-22	75	88	82
12-Oct-22	70	82	76
13-Oct-22	77	88	83
14-Oct-22	66	77	72
15-Oct-22	68	79	74
16-Oct-22	70	82	76
17-Oct-22	70	82	76
18-Oct-22	70	82	76
19-Oct-22	70	84	77
20-Oct-22	64	64	64
21-Oct-22	75	88	82
22-Oct-22	68	82	75
23-Oct-22	75	86	81
24-Oct-22	75	86	81
25-Oct-22	75	88	82
26-Oct-22	75	88	82
27-Oct-22	73	86	80
28-Oct-22	73	84	79
29-Oct-22	70	82	76
30-Oct-22	62	75	69
31-Oct-22	62	75	69
Average	70	82	76
Min	62	64	64
Max	77	88	83

Table F5.2 Leachate Levels Monitoring Results (Pump Station No.2X (Cell 2X))

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
Pump Station No. 2X (Cell 2X)			
1-Oct-22	66	70	68
2-Oct-22	66	70	68
3-Oct-22	66	70	68
4-Oct-22	79	84	82
5-Oct-22	79	84	82
6-Oct-22	75	82	79
7-Oct-22	70	75	73
8-Oct-22	70	70	70
9-Oct-22	62	66	64
10-Oct-22	62	66	64
11-Oct-22	82	86	84
12-Oct-22	70	75	73
13-Oct-22	82	88	85
14-Oct-22	66	73	70
15-Oct-22	79	84	82

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
16-Oct-22	70	75	73
17-Oct-22	70	75	73
18-Oct-22	79	84	82
19-Oct-22	75	79	77
20-Oct-22	86	90	88
21-Oct-22	70	75	73
22-Oct-22	79	84	82
23-Oct-22	66	70	68
24-Oct-22	66	70	68
25-Oct-22	73	79	76
26-Oct-22	79	84	82
27-Oct-22	84	88	86
28-Oct-22	64	68	66
29-Oct-22	70	75	73
30-Oct-22	79	86	74
31-Oct-22	79	86	83
Average	73	78	75
Min	62	66	64
Max	86	90	88

Table F5.3 Leachate Levels Monitoring Results (Pump Station No.3X (Cell 3X))

Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
Pump Station No. 3X (Cell 3X)			
1-Oct-22	62	62	62
2-Oct-22	62	62	62
3-Oct-22	62	62	62
4-Oct-22	64	64	64
5-Oct-22	64	64	64
6-Oct-22	66	66	66
7-Oct-22	64	64	64
8-Oct-22	70	70	70
9-Oct-22	64	64	64
10-Oct-22	64	64	64
11-Oct-22	70	70	70
12-Oct-22	68	66	67
13-Oct-22	70	70	70
14-Oct-22	64	62	63
15-Oct-22	50	66	58
16-Oct-22	66	66	66
17-Oct-22	66	66	66
18-Oct-22	64	64	64
19-Oct-22	66	64	65
20-Oct-22	68	68	68
21-Oct-22	64	64	64
22-Oct-22	66	66	66
23-Oct-22	68	68	68
24-Oct-22	68	68	68
25-Oct-22	66	66	66
26-Oct-22	64	64	64
27-Oct-22	70	70	70
28-Oct-22	66	66	66
29-Oct-22	70	70	70
30-Oct-22	70	68	69
31-Oct-22	70	68	69
Average	66	66	66
Min	50	62	58
Max	70	70	70

Table F5.4 Leachate Levels Monitoring Results (Pump Station No.4X (Cell 4X))

Date	Meter No.X7 (cm)	Meter No.X8 (cm)	Average (cm)
Pump Station No. 4X (Cell 4X)			
1-Oct-22	215	213	214
2-Oct-22	215	213	214
3-Oct-22	215	213	214
4-Oct-22	160	162	161
5-Oct-22	160	162	161
6-Oct-22	61	63	62
7-Oct-22	65	70	68
8-Oct-22	48	52	50
9-Oct-22	56	59	58
10-Oct-22	56	59	58
11-Oct-22	56	61	59
12-Oct-22	48	52	50
13-Oct-22	56	61	59
14-Oct-22	59	61	60
15-Oct-22	48	52	50
16-Oct-22	61	63	62
17-Oct-22	61	63	62
18-Oct-22	50	52	51
19-Oct-22	65	67	66
20-Oct-22	65	70	68
21-Oct-22	63	67	65
22-Oct-22	61	65	63
23-Oct-22	54	56	55
24-Oct-22	54	56	55
25-Oct-22	54	56	55
26-Oct-22	50	54	52
27-Oct-22	65	70	68
28-Oct-22	61	65	63
29-Oct-22	52	56	54
30-Oct-22	54	56	55
31-Oct-22	54	56	55
Average	79	81	80
Min	48	52	50
Max	215	213	214

Annex F6

Effluent Quality Monitoring Results

Table F6.1 Effluent Monitoring Results

		7 Oct 22
On-site Measurements		
Temperature	°C	35.3
pH Value	pH Unit	8.2
Volume Discharged	m ³	1,124
Laboratory Analysis		
Suspended Solids (SS)	mg/L	49.0
Alkalinity	mg/L	1070
Ammoniacal-nitrogen	mg/L	0.44
Chloride	mg/L	1220
Nitrite-nitrogen	mg/L	0.07
Phosphate	mg/L	2.45
Sulphate	mg/L	385
Total Nitrogen	mg/L	101.0
Nitrate-nitrogen	mg/L	65.4
Total Inorganic Nitrogen	mg/L	65.91
Biochemical Oxygen Demand (BOD)	mg/L	8
Chemical Oxygen Demand (COD)	mg/L	484
Oil & Grease	mg/L	<5
Total Organic Carbon (TOC)	mg/L	205
Boron	µg/L	3400
Calcium	mg/L	66.0
Iron	mg/L	0.73
Magnesium	mg/L	26.4
Potassium	mg/L	529
Cadmium	µg/L	<1.0
Chromium	µg/L	74
Copper	µg/L	<10
Nickel	µg/L	74
Zinc	µg/L	100

Annex F7

Calibration Certificates for Groundwater Monitoring Equipment



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK2228780
CLIENT:	ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	25-Jul-2022
		DATE OF ISSUE:	29-Jul-2022

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the laboratory or quoted from relevant international standards.

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type:	Multifunctional Meter
Service Nature:	Performance Check
Scope:	Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Brand Name/ Model No.:	[YSI]/ [Professional DSS]
Serial No./ Equipment No.:	[20J101862/ 15H103928]/ [EQW018]
Date of Calibration:	28-July-2022

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Mr Chan Siu Ming, Vico
Manager - Inorganics

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2228780
SUB-BATCH: 0
DATE OF ISSUE: 29-Jul-2022
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 28-July-2022 **Date of Next Calibration:** 28-October-2022

PARAMETERS:

Conductivity Method Ref: APHA (21st edition), 2510B

Expected Reading (µS/cm)	Displayed Reading (µS/cm)	Tolerance (%)
146.9	158.0	+7.6
6667	6884	+3.3
12890	13531	+5.0
58670	58656	-0.0
	Tolerance Limit (%)	±10.0

Dissolved Oxygen Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.96	2.94	-0.02
5.08	5.05	-0.03
7.51	7.51	+0.00
	Tolerance Limit (mg/L)	±0.20

pH Value Method Ref: APHA (21st edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.95	-0.05
7.0	7.12	+0.12
10.0	9.97	-0.03
	Tolerance Limit (pH unit)	±0.20

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
 Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: **HK2228780**
 SUB-BATCH: **0**
 DATE OF ISSUE: **29-Jul-2022**
 CLIENT: **ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING**

Equipment Type: **Multifunctional Meter**
 Brand Name/
 Model No.: **[YSI]/ [Professional DSS]**
 Serial No./
 Equipment No.: **[20J101862/ 15H103928]/ [EQW018]**
 Date of Calibration: **28-July-2022** Date of Next Calibration: **28-October-2022**

PARAMETERS:

Turbidity Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	-0.01	--
4	4.09	+2.3
40	38.89	-2.8
80	77.59	-3.0
400	422.82	+5.7
800	755.63	-5.5
	Tolerance Limit (%)	±10.0

Salinity Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.34	+3.4
20	20.65	+3.2
30	30.62	+2.1
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
 Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2228780
SUB-BATCH: 0
DATE OF ISSUE: 29-Jul-2022
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 28-July-2022 Date of Next Calibration: 28-October-2022

PARAMETERS:

Temperature Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.0	8.4	-0.6
21.5	20.3	-1.2
38.0	37.1	-0.9
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Mr Chan Siu Ming, Vico
Manager - Inorganics

Annex F8

Groundwater Monitoring Results

Table F8.1 Groundwater Monitoring Results

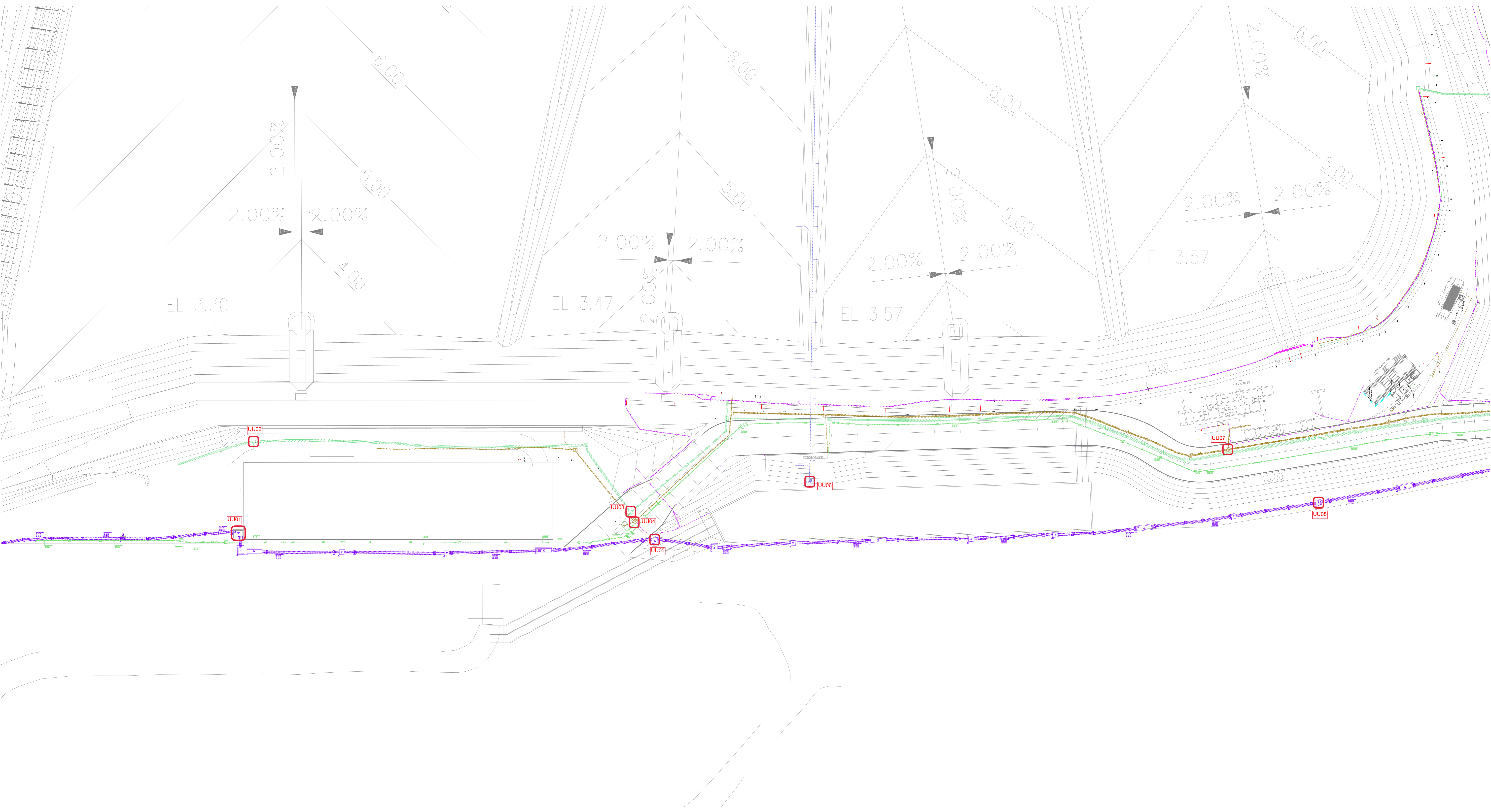
Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	2.92	3.06	3.03	3.10	3.38	3.05	2.88	3.06	3.49	3.41	3.53	6.73	36.54	45.13
Bicarbonate Alkalinity as CaCO ₃	mg/L	90	251	186	<1	2	<1	<1	<1	53	189	167	54	16	11
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	<1	76	66	125	72	91	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO ₃	mg/L	90	251	186	127	68	197	85	133	53	189	167	54	16	11
pH Value	pH Unit	8	8	7.9	11.2	10.2	11.3	10.6	11.1	8.1	7.7	8	6.9	5.7	5.5
Electrical Conductivity	µS/cm	2080	953	1140	912	1020	1330	2110	1810	2060	1170	461	314	92	97
Ammonia as N	mg/L	1.23	0.02	1.47	2.49	1.28	3.1	5.23	4.97	0.43	<0.01	<0.01	<0.01	<0.01	<0.01
Chloride	mg/L	534	46	182	139	173	205	601	344	388	178	30	22	15	19
Nitrite as N	mg/L	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.04	<0.01	<0.01
Sulphate as SO ₄ - Turbidimetric	mg/L	83	187	112	71	137	98	70	218	371	130	30	60	3	2
Sulphide as S ₂	mg/L	0.2	<0.1	0.1	4.7	1.5	10.1	4	2.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	1.4	0.1	1.6	3.1	1.8	4.3	6.1	6.3	1	0.1	<0.1	0.2	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.64	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	1.2	0.1	<0.01	<0.01	0.1	0.11
Total Nitrogen as N	mg/L	1.4	0.8	1.6	3.1	1.8	4.3	6.1	6.3	2.3	0.2	<0.1	0.2	0.1	0.1
Boron	µg/L	240	190	210	200	240	200	480	190	380	240	70	20	20	10
Calcium	mg/L	60.7	62.3	82.7	40.6	16.8	34.4	32.5	56.6	120	95.7	62.7	27.2	0.92	0.9
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	23	52.4	6.44	<0.05	0.08	<0.05	<0.05	<0.05	4.12	8.96	3.27	4.55	1	1.02
Sodium	mg/L	293	50.9	112	95.5	140	161	309	238	266	128	25.9	23.9	11.4	12.2
Iron	mg/L	<0.04	<0.04	0.16	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.58	<0.04	<0.04
Potassium	mg/L	23.1	11.5	25.3	27.9	46.4	55.3	53.7	69.4	43.4	12.3	6.66	2.71	3.4	3.37
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chromium	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	1	2	<1	<1	<1	1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	800	152	1000	2	<1	<1	<1	<1	33	209	58	809	31	8
Nickel	µg/L	<1	<1	<1	<1	<1	2	<1	3	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	491	<10	<10
Biochemical Oxygen Demand	mg/L	<2	<2	<2	3	<2	8	2	2	2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	12	4	14	19	22	39	22	34	27	8	4	4	4	3
Total Organic Carbon	mg/L	3	2	5	4	7	8	4	10	8	3	1	<1	<1	<1

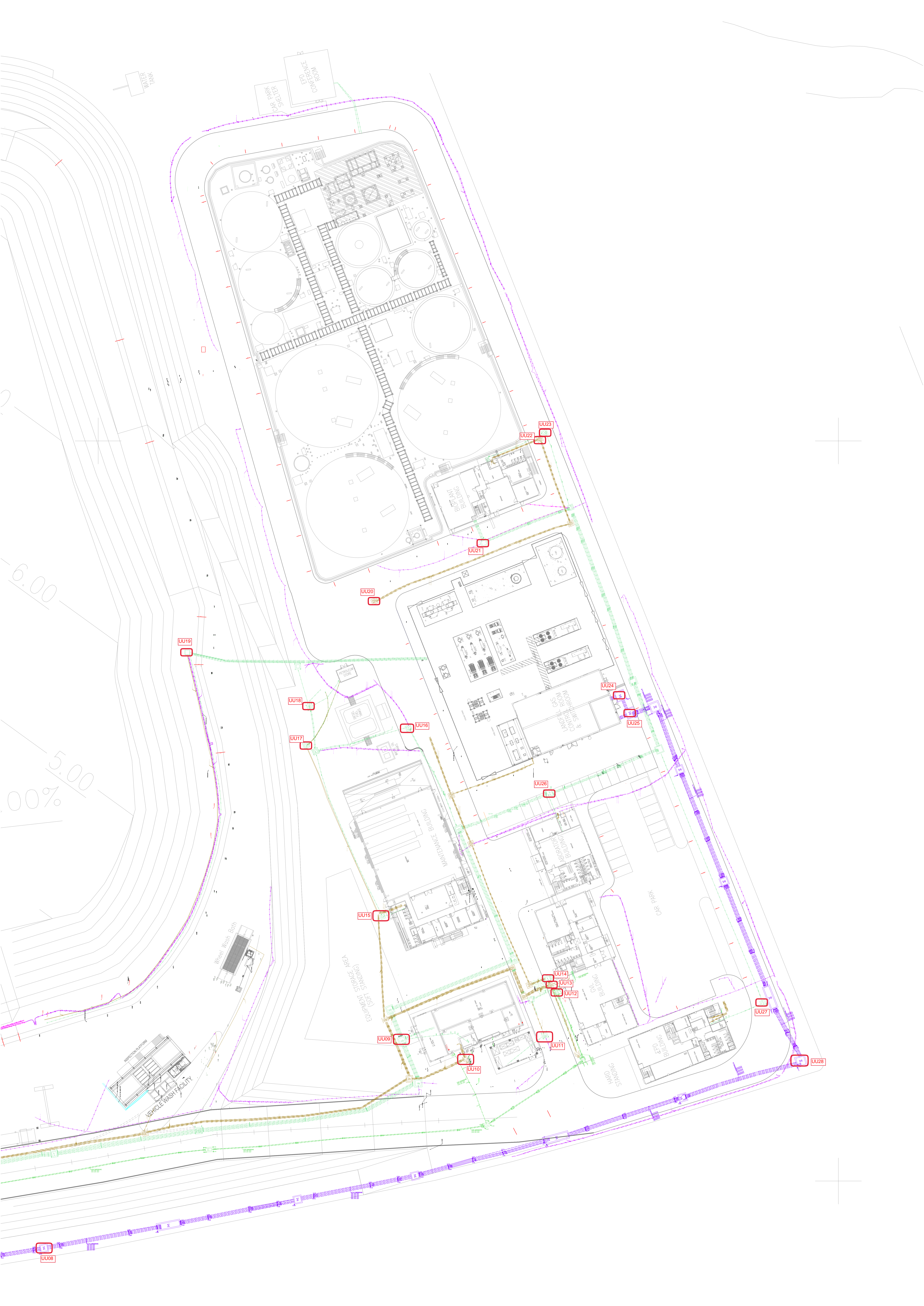
Annex G

Landfill Gas

Annex G1

Landfill Gas Monitoring
Locations for Service Voids,
Utilities and Manholes
along the Site Boundary and
Within the SENTX Site





Annex G2

Calibration Certificates for Landfill Gas Monitoring Equipment



CERTIFICATE OF ANALYSIS

CONTACT: MR IVAN LEUNG
CLIENT: ALS TECHNICHEM (HK) PTY LTD
ADDRESS: 11/F., CHUNG SHUN KNITTING CENTRE,
1-3 WING YIP STREET, KWAI CHUNG, N.T.

WORK ORDER: HK2237701
SUB BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 23-Sep-2022
DATE OF ISSUE: 30-Sep-2022

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. The performance of the equipment stated in this report is checked with independent reference material and results are compared against a calibrated secondary source. The "Instrument Specification" quoted is the acceptance criteria applicable for similar equipment used by the laboratory or quoted from relevant international standards. The "Next Calibration Date" is recommended according to best practice principles as practised by the laboratory or quoted from relevant international standards. The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type: Landfill Gas Analyser
Service Nature: Performance Check
Scope: Carbon dioxide, Methane and Oxygen
Brand Name/ Model No.: GA5000
Serial No./Equipment No.: G507306 (HK1935)
Date of Calibration: 29 September, 2022

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms Chan Ka Yu, Karen
Manager - Organics

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK2237701
 Sub-Batch: 0
 Client: ALS TECHNICHEM (HK) PTY LTD
 Date of Issue: 30-Sep-2022

Equipment Type: Landfill Gas Analyser
 Brand Name/
 Model No.: GA5000
 Serial No./
 Equipment No.: G507306 (HK1935)

Date of Calibration: 29 September, 2022 Date of next Calibration: 29 October, 2022

Parameters:

Methane

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 0.3
1.0	1.0	0.0	± 0.3
10.0	10.0	0.0	± 0.5

Carbon Dioxide

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 0.3
1.0	1.0	0.0	± 0.3
10.0	10.0	0.0	± 0.5

Oxygen

Calibrated Gas Standard, %	Monitor Readout, %	% error	Instrument Specification, %
0.0 (Nitrogen)	0.0	0.0	± 1.0
23.5	23.9	0.4	± 1.0

Ms Chan Ka Yu, Karen
 Manager - Organics

Annex G3

Landfill Gas Monitoring Results

Table G3.1 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	4.69	0.0	1.0	14.8
LFG2	3.77	0.0	2.1	15.1
LFG3	3.62	0.0	1.8	13.5
LFG4	3.77	0.0	0.0	18.8
LFG5	3.49	0.0	0.2	8.3
LFG6	3.81	0.0	0.9	13.2
LFG7	3.38	0.0	0.0	17.7
LFG8	3.46	0.0	0.0	19.6
LFG9	3.60	0.0	0.2	8.7
LFG10	3.80	0.0	0.0	19.4
LFG11	3.47	0.0	0.2	9.4
LFG12	3.60	0.0	0.0	19.7
LFG13	4.10	24.1	0.0	3.9
LFG14	5.10	0.0	0.1	19.5
LFG15	4.97	0.0	0.0	17.1
LFG16	4.55	0.0	0.0	18.6
LFG17	4.82	0.0	0.0	17.5
LFG18	3.90	0.0	0.0	18.9
LFG19	3.76	0.0	0.0	18.8
LFG20	3.95	0.0	0.0	19.1
LFG21	5.39	0.0	0.0	19.7
LFG22	6.72	0.0	0.0	19.3
LFG23	14.65	0.0	4.0	15.0
LFG24	25.97	0.0	0.0	18.1
GP1	Probe bent	0.0	7.1	10.2
GP2 (shallow)	Probe broken		Unmeasurable due to broken probe	
GP2 (deep)	Probe broken		Unmeasurable due to broken probe	
GP3 (shallow)	Probe bent	0.0	0.4	18.8
GP3 (deep)	Probe bent	0.0	0.1	19.3
GP4 (shallow)	Probe bent	0.0	0.2	19.1
GP4 (deep)	Probe bent	0.0	0.1	19.2
GP5 (shallow)	Probe bent	0.0	7.6	14.0
GP5 (deep)	12.92	0.0	0.0	19.2
GP6	10.03	0.0	6.0	12.0
GP7	2.40	0.0	0.3	18.3
GP12	Probe bent	0.1	0.1	19.3
GP15	3.67	0.2	0.0	19.8
P7	3.21	0.1	0.0	19.5
P8	2.89	0.2	0.0	19.8
P9	2.88	0.2	0.0	20.1

Table G3.2 *Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes*

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	19.6
UU02	0.0	0.0	19.6
UU03	0.0	0.0	19.6
UU04	0.0	0.0	19.5
UU05	0.0	0.0	19.4
UU06	0.0	0.0	19.4
UU07	0.1	0.0	19.9
UU08	0.0	0.0	19.8
UU09	0.0	0.0	19.6
UU10	0.0	0.0	19.4
UU11	0.0	0.0	18.3
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	19.8
UU14	0.0	0.0	19.8
UU15	0.0	0.0	19.8
UU16	0.0	0.0	19.9
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	20.1
UU19	0.1	0.0	19.4
UU20	0.0	0.0	18.6
UU21	0.0	0.0	18.8
UU22	0.0	0.0	19.3
UU23	0.0	0.0	19.7
UU24	0.0	0.0	19.1
UU25	0.0	0.0	19.2
UU26	0.0	0.0	19.4
UU27	0.0	0.0	18.7
UU28	0.0	0.0	19.1

Annex G4

Event and Action Plan for Landfill Gas Monitoring

Annex G4 *Event and Action Plan for Landfill Gas Monitoring*

Event	Action		
	ET	IEC	Contractor
Limit Level being exceeded for field monitoring at the perimeter monitoring wells	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check monitoring data, all plant, equipment and the Contractor’s working methods Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Increase the monitoring frequency to daily if exceedance is due to the Project for monitoring wells in the areas where there is development within 250m of the SENTX Site Boundary and to weekly for other monitoring wells, until no exceedance of limit level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Repeat field measurement to confirm findings Check the performance of landfill gas management system Rectify unacceptable practice Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Limit Level being exceeded for the bulk gas sampling at the perimeter monitoring wells	<ul style="list-style-type: none"> Check and compare the results of field monitoring and laboratory analyse of bulk samples If the results of field monitoring also show exceedance, the action(s) for limit level being exceeded for field monitoring would have been triggered If the results of field monitoring does not show exceedance, the sampling procedures should be checked and if deems necessary, to repeat the monitoring and recalibrate the portable monitoring instruments Notify the above findings to Contractor and IEC 	<ul style="list-style-type: none"> Verify the findings by ET 	<ul style="list-style-type: none"> Nil

Event	Action		
	ET	IEC	Contractor
Limit Level being exceeded at the permanent gas monitoring system	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check the methane gas level at the perimeter monitoring wells, manholes or utilities duct Check monitoring data, all plant, equipment and the Contractor's working methods Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Evacuate all staff in the concerned building Open the doors and window of all rooms on the ground floor Do not allow staff to go back to the room if methane level is higher than 1% gas Check the performance of the landfill gas management system Rectify unacceptable practice Consider changes of working methods Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Limit Level being exceeded during surface emission monitoring	<ul style="list-style-type: none"> Repeat the measurement to confirm findings Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check monitoring data, all plant, equipment and the Contractor's working methods Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Increase the monitoring frequency to monthly if exceedance is due to the Project until no exceedance of limit level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Check landfill gas management system Rectify unacceptable practice Consider changes of working methods Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate

Event	Action		
	ET	IEC	Contractor
Limit Level being exceeded at the service voids, utilities pits, manholes and location of vegetation stress	<ul style="list-style-type: none"> Repeat the measurement to confirm findings Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check monitoring data, all plant, equipment and the Contractor's working methods Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Increase the monitoring frequency to weekly if exceedance is due to the Project until no exceedance of limit level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Check landfill gas management system Rectify unacceptable practice Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate

Annex H

Cumulative Statistics on
Exceedances,
Environmental Complaints,
Notification of Summons
and Status of Prosecutions

Table H1 *Cumulative Statistics on Exceedances*

		Total No. recorded in this reporting period	Total No. recorded since project commencement
Air Quality (Dust)	Action	0	0
	Limit	0	3
Air Quality (Odour)	Action	0	0
	Limit	0	0
Air Quality (Emissions of Thermal Oxidiser)	Limit	0	0
Air Quality (Emissions of Landfill Gas Flare)	Limit	1	2
Air Quality (Emissions of Landfill Gas Generator)	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality (Surface Water)	Limit	0	60
Water Quality (Leachate)	Limit	0	0
Water Quality (Leachate Level)	Limit	3	13
Water Quality (Groundwater)	Limit	0	9
Landfill Gas (Perimeter Landfill Gas Monitoring Wells)	Limit	1	2
Landfill Gas (Service Void, Utilities and Manholes)	Limit	0	0
Landfill Gas (Permanent Gas Monitoring System)	Limit	0	0

Table H2 *Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions*

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Prosecutions
This Reporting Period (1 - 31 October 2022)	0	0	0
Total no. received since project commencement	1	0	0

Annex I

Monitoring Schedule for the Next Reporting Period

**South East New Territories (SENT) Landfill Extension
EM&A Impact Monitoring Schedule during Operation/ Restoration Phase**

November 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 Perimeter LFG Monitoring Perimeter LFG Bulk Gas Sampling	2 Dust Monitoring	3 Noise Monitoring	4 Service Void LFG Monitoring	5
6	7 Groundwater Monitoring	8 Dust Monitoring Groundwater Monitoring Leachate Monitoring	9 Noise Monitoring	10	11	12
13	14 Dust Monitoring	15 Noise Monitoring	16	17 VOCs Monitoring Stack Monitoring	18 Flammable Gas Monitoring Stack Monitoring	19
20 Dust Monitoring	21 Surface Water Monitoring Noise Monitoring	22	23	24 Odour Monitoring	25	26 Dust Monitoring
27	28 Noise Monitoring	29	30			
1	2					