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

South East New Territories (SENT) Landfill Extension

Quarterly Environmental Monitoring & Audit Report No.17

October 2023

ERM

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

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:	Quarterly Environmental Monitoring & Audit Report No. 17 for South East New Territories (SENT) Landfill Extension
Date of Report:	10 October 2023

Reference EM&A Manual Requirement

EM&A Manual: Section 11.4

The quarterly EM&A summary report shall be prepared by the ET, certified by the ET Leader and verified by the IEC. The quarterly EM&A summary report should contain all information listed under Section 11.4 of the approved EM&A Manual.

ET Certification

I hereby certify that the above referenced document/plan complies with the above referenced EM&A Manual requirement.

Terence Fong,
Environmental Team Leader:
(ERM Hong-Kong, Limited)

Date: 10 October 2023

IEC Verification

I hereby verify that the above referenced document/plan complies with the above referenced EM&A Manual requirement.

Claudine Lee,
Independent Environmental Checker:
(Meinhardt Infrastructure and Environment Limited)

Date: 13 October 2023

South East New Territories (SENT) Landfill Extension

Quarterly Environmental Monitoring & Audit Report No.17

Environmental Resources Management

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Client:	Project No:
Green Valley Landfill Ltd.	0465169
Summary:	Date: 10 October 2023
This document presents the Quarterly EM&A Report No.17 for *South East New Territories (SENT) Landfill Extension*	Approved by:  Terence Fong *Partner*

Revision	Description	By	Checked	Approved	Date
0	Quarterly EM&A Report No.17	AL	TF	TF	10 Oct 23

Distribution

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ANNEXES

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) of the Project commenced on 2 January 2019.

This Quarterly EM&A report presents the EM&A works carried out during the period from 1 January 2023 to 31 March 2023 for the Project in accordance with the updated EM&A Manual.

Exceedance of Action and Limit Levels for Air Quality

Eight exceedances of Action and Limit Levels for Total Suspended Particulates (TSP) and one exceedance of Limit Level for thermal oxidizer stack emission (SO_2) were recorded for air quality monitoring in the reporting period.

The TSP exceedances at AM2 on 7 January 2023, at AM2 and AM3 on 31 January 2023, at AM2 on 8 March and 14 March 2023 were considered Project-related upon further investigation, while the TSP exceedance at AM1 on 31 January 2023, 2 March and 14 March 2023 were considered non-Project-related upon further investigation. The thermal oxidizer stack emission (SO_2) exceedance on 18 January 2023 was considered Project-related upon further 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

One exceedance of the Limit Level for groundwater (Chemical Oxygen Demand (COD)) was recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedance at MWX-6 on 7 March 2023 was considered to non Project-related activities upon further investigation.

Exceedance of Action and Limit Levels for Landfill Gas

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

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.

1 INTRODUCTION

1.1 BACKGROUND

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.

1.2 PROJECT DESCRIPTION

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 Mm^3 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

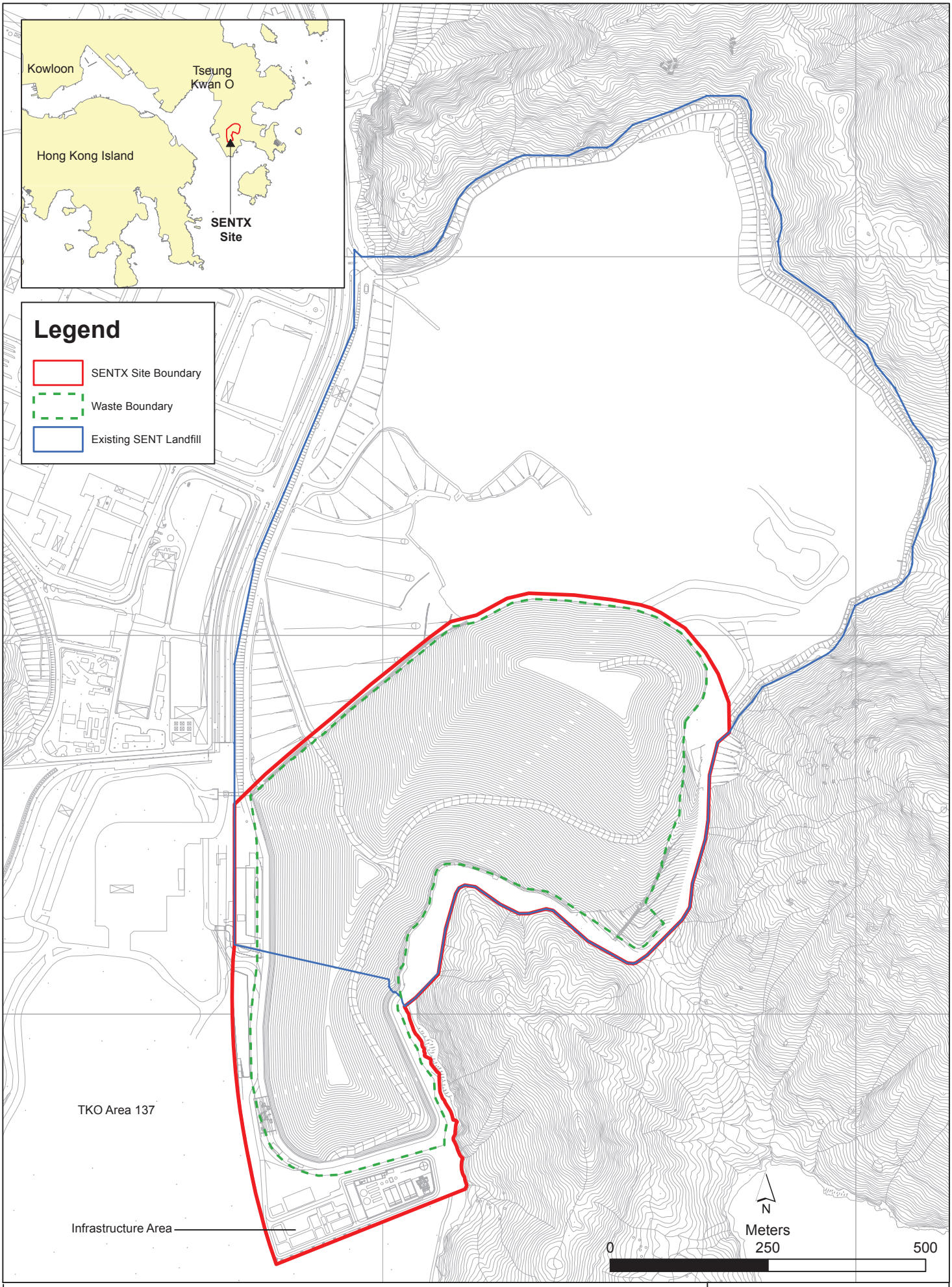

Figure 1.1

Layout Plan of SENTX

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Date: 5/9/2018

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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.

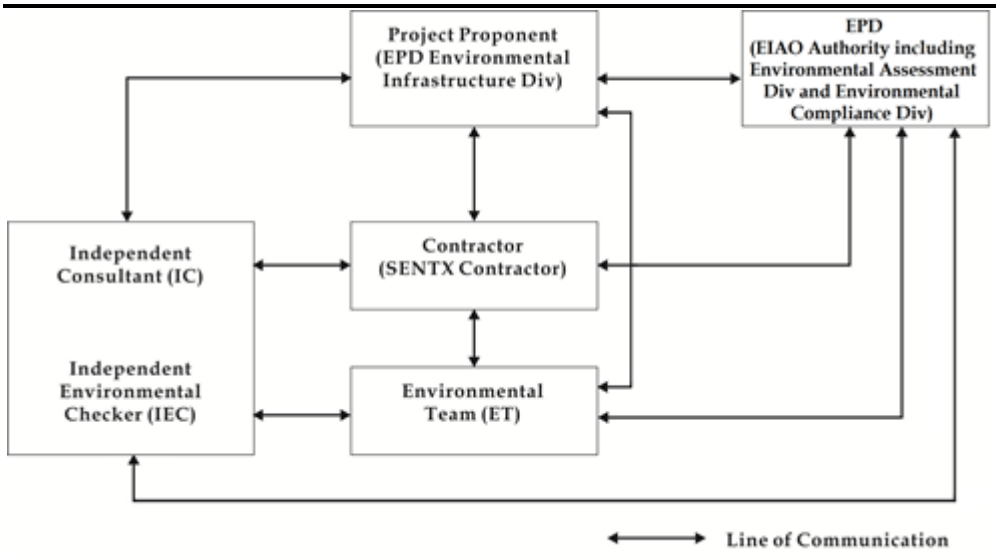
1.3 SCOPE OF THE EM&A REPORT

This is the Quarterly EM&A Report for the Project which summarises the key findings of the EM&A programme during the reporting period from 1 January 2023 to 31 March 2023 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 summarized 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	Terence Fong	2271 3156
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:

January 2023

- Rectification of defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP), infrastructure area and waste reception area;
- Construction of overflow wier at Cell 4X;
- Installation of drainage pipes at Cell 4X overflow weir;
- Deployment of liner at Cell 4X (tie-in with SENT Landfill Base Cell) at North side – Landfill;

- Construction of rockwall bench 2;
- Construction of temporary landfill gas pipe connection;
- Maintenance and improvement of temporary surface water drainage; and
- Construction of DP3 leachate pipe connection.

February 2023

- Rectification of defects and latent defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP) and infrastructure area;
- Construction of rockwall bench 2;
- Stone filling at overflow weir;
- Installation of LFG pipes at SENT and SENTX tie-in area;
- Placement of drainage stones at SENT and SENTX tie-in area; and
- Maintenance and improvement of temporary surface water drainage.

March 2023

- Rectification of latent defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP) and infrastructure area;
- Construction of rockwall bench 2;
- Deployment of liner system at rockwall buttress bench 2;
- Installation of ST pipes at Cell 4X;
- Maintenance and improvement of temporary surface water drainage; and
- Rectification of outstanding minor items for weighmaster house and guard house.

The implementation schedule of the mitigation measures 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
Construction 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:

- Three environmental management meetings were held with the Contractor, ER, ET, IEC and EPD on 19 January 2023, 22 February 2023 and 23 March 2023; and
- Environmental toolbox trainings on the following topics were provided by the Contractor to the workers:
    - Tree Protection Zones on 12 January 2023;

- Cleaning Recycling on 19 January 2023;
- Illegal dumping on 8 February 2023;
- Indoor air quality on 22 February 2023;
- Persistent Organic Pollutants on 8 March 2023; and
- Wastewater Management on 22 March 2023.

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 the recommended mitigation measures are presented in *Table 1.4*.

Table 1.4 Status of Submissions required under the EP and Implementation Status of the recommended 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

Description	Ref No.	Status
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
	GW-RE0245-23	Validity from 15 March 2023 to 14 September 2023

2 EM&A RESULTS

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 air quality 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) AM3 - SENTX Site Boundary (West, near RC15) AM4 - SENTX Site Boundary (West, near EPD building)	260 μg m^{-3}	260 μg m^{-3}

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 CEDD 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 air quality monitoring programme and monitoring locations are summarised in *Table 2.2* and illustrated in *Figure 2.1* respectively.

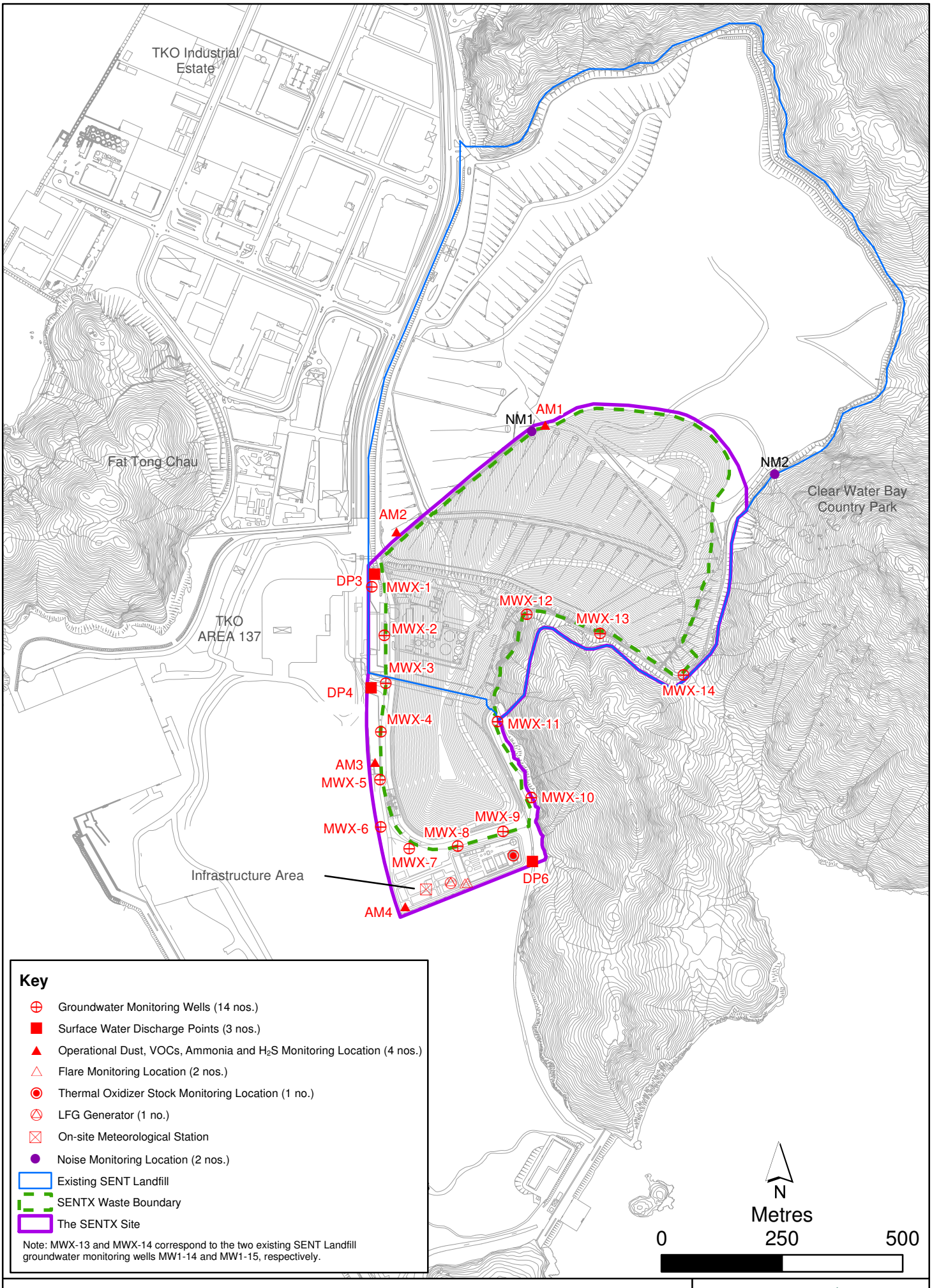


Figure 2.1

Environmental Monitoring Locations

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Date: 19/11/2019

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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	1, 7, 13, 19, 25, 31 January 2023	Tisch TE-5170 (S/N: 3976)
AM2	SENTX Site Boundary (West, near DP3)			6, 12, 18, 24 February 2023	Tisch TE-5170 (S/N: 3573)
AM3	SENTX Site Boundary (West, near RC15)				Tisch TE-5170 (S/N: 3572)
AM4	SENTX Site Boundary (West, near EPD building)			2, 8, 14, 20, 26 March 2023	Tisch TE-5170 (S/N: 3957)

Monitoring Schedule for the Reporting Period

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

Results and Observations

The 24-hour TSP monitoring results are summarised in *Table 2.3*. The detailed monitoring results and the graphical presentation of the 24-hour TSP monitoring results at each monitoring location are provided in *Annex D1.*

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

Month	Monitoring Station	24-hr TSP Concentration (μg m^{-3})		Action Level (μg/m^3)	Limit Level (μg/m^3)
		Average	Range		
January 2023	AM1	173	43 - 509	260	260
	AM2	142	47 - 337	260	260
	AM3	153	78 - 267	260	260
	AM4	122	71 - 158	260	260
February 2023	AM1	116	75 - 192	260	260
	AM2	102	43 - 211	260	260
	AM3	139	62 - 191	260	260
	AM4	109	47 - 169	260	260
March 2023	AM1	220	58 - 401	260	260
	AM2	252	108 - 452	260	260
	AM3	125	41 - 225	260	260
	AM4	102	35 - 145	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.

Action and Limit Levels exceedances were recorded for TSP monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex D2* were undertaken. Investigation of the Action and Limit Levels exceedances was conducted and the investigation reports are

presented in *Annex D7*. Based on the investigation conducted for the monitoring event with potential Limit Levels exceedance with the Contractor and the IEC, the TSP exceedances at AM2 on 7 January 2023, at AM2 and AM3 on 31 January 2023, at AM2 on 8 March and 14 March 2023 were considered Project-related upon further investigation, while the TSP exceedance at AM1 on 31 January 2023, 2 March and 14 March 2023 were considered non-Project-related.

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.

Meteorological Data

Meteorological data obtained from the SENTX on-site meteorological monitoring station was used for the dust monitoring and is shown in *Annex D3*. 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 4 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	• Odour intensity ≥ Class 2 recorded; or • One documented complaint received	• Odour intensity ≥ 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.

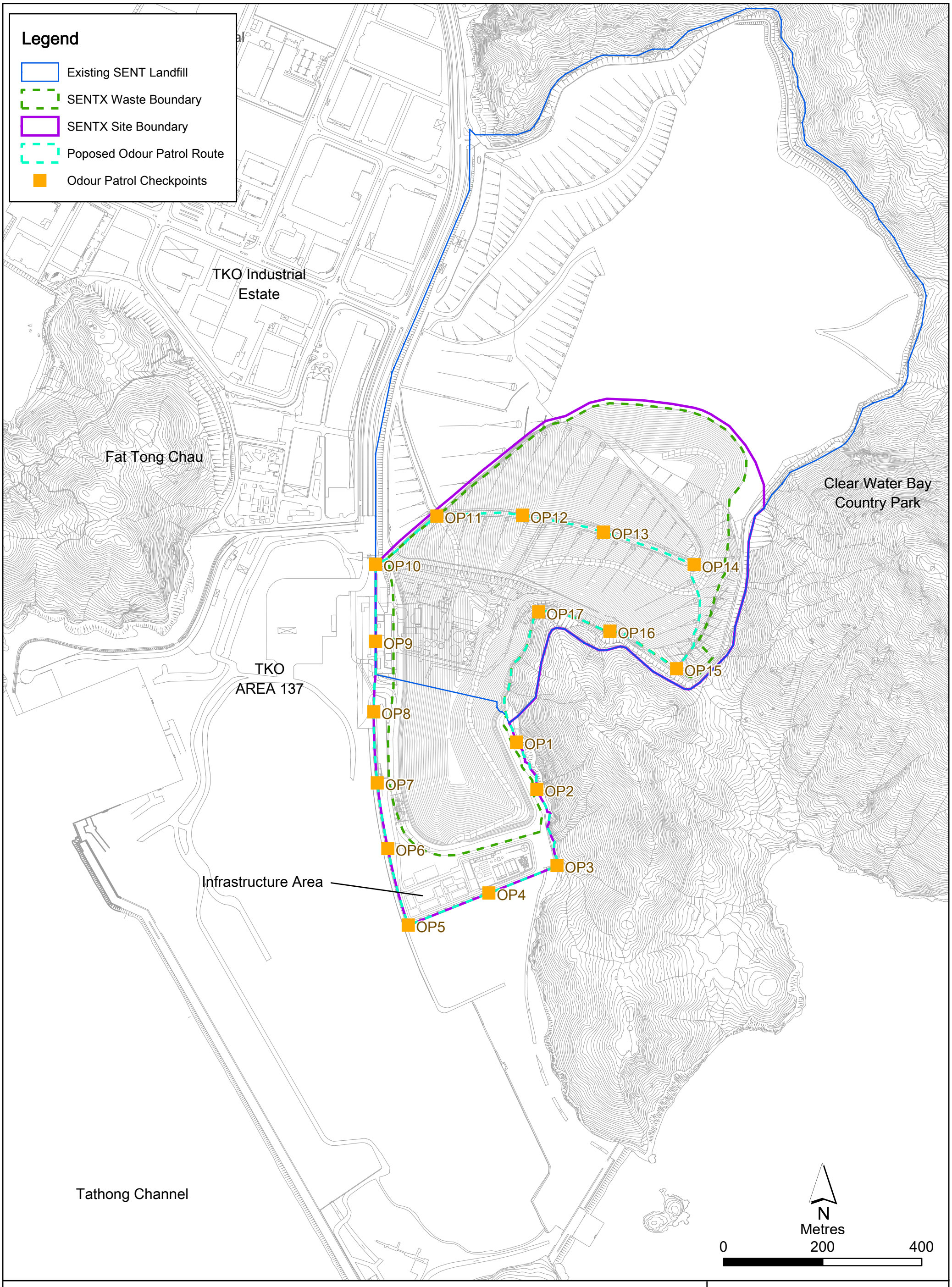

Figure 2.2

Odour Patrol Route for
Operation/ Restoration Phase Odour Monitoring

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Date: 18/8/2022

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Table 2.5 Odour Monitoring Details

Patrol Locations	Parameters	Patrol Frequency [a]	Monitoring Dates and Time
Patrol along the SENTX Site Boundary (Checkpoints OP1 – OP17)	Odour Intensity (see *Table 2.6*)	Period 1 - First month of operation 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	Conducted by ET & IEC: 26 January 2023, 3 February 2023
		Three times per week on different days conducted by an independent third party together with the ET and IEC [b]	Conducted by an independent third party, ET & IEC: 22 March 2023
		Period 2 - Three months following period 1 [c] Weekly conducted by the ET and the IEC	
		Once every two weeks conducted by an independent third party together with the ET and IEC [b]	
		Period 3 - Throughout operation following period 2 [c] Monthly conducted by the ET and the IEC	
		Quarterly conducted by an independent third party together with the ET and IEC [b]	

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
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 D4*, 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 ≥ Class 2 recorded	Odour intensity ≥ Class 3 recorded on 2 consecutive patrol
OP2	0		
OP3	0		
OP4	0 - 1		
OP5	0 - 1		
OP6	0		
OP7	0 - 1		
OP8	0		
OP9	0 - 1		
OP10	0 - 1		
OP11	0 - 1		
OP12	0		
OP13	0 - 1		
OP14	0 - 1		
OP15	0		
OP16	0		
OP17	0		

The potential odour source in the reporting period included the generator, dump truck, pump truck at LTP and tipping area at SENTX, the nearby vegetation and Towngas plant and the excavator from other project site.

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 D2*.

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 NO_2, CO, SO_2, Benzene and Vinyl chloride and in-situ analysis for exhaust gas velocity at monthly interval and for laboratory analysis for non-methane organic compounds and ammonia (for thermal oxidizer only) at quarterly interval. 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 oxidizer 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 • NO_2 • CO • SO_2 • Benzene • Vinyl chloride In-situ analysis for • Exhaust gas velocity	Monthly for the first 12 months of operation and thereafter at quarterly intervals	18 January 2023, 21 February 2023, 22 March 2023
	Laboratory analysis for • Non-methane organic compounds	Quarterly for the 1st year of operation (b)	21 February 2023
	Laboratory analysis for • Ammonia	Quarterly	21 February 2023
	• Gas combustion temperature • Exhaust temperature • Exhaust gas velocity (a)	Continuously	1 January – 31 March 2023
Stack of Landfill Gas Flare	Laboratory analysis for • NO_2 • CO • SO_2 • Benzene • Vinyl chloride In-situ analysis for • Exhaust gas velocity	Monthly for the first 12 months of operation and thereafter at quarterly intervals	17 January 2023, 22 February 2023, 23 March 2023
	Laboratory analysis for • Non-methane organic compounds	Quarterly for the 1st year of operation (b)	22 February 2023
	• Gas combustion temperature • Exhaust temperature • Exhaust gas velocity (a)	Continuously	1 January – 31 March 2023

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Landfill Gas Generator	Laboratory analysis for • NO_2 • CO • SO_2 • Benzene • Vinyl chloride In-situ analysis for • Exhaust gas velocity	Monthly for the first 12 months of operation and thereafter at quarterly intervals	17 January 2023, 21 February 2023, 23 March 2023
	Laboratory analysis for • Non-methane organic compounds	Quarterly for the 1st year of operation (b)	21 February 2023
	• Exhaust temperature • Exhaust gas velocity (a)	Continuously	1 January – 31 March 2023

Note:

(a) The exhaust gas velocity will be 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 D5,* respectively.

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

Parameters	Monitoring Results (Range in Bracket)	Limit Level
	January 2023	
NO_2	1.21 gs^{-1}	1.58 gs^{-1}
CO	<0.01 gs^{-1}	0.53 gs^{-1}
SO_2	0.21 gs^{-1}	0.07 gs^{-1}
Benzene	<2.0 x 10^{-4} gs^{-1}	3.01 x 10^{-2} gs^{-1}
Vinyl chloride	<1.6 x 10^{-4} gs^{-1}	2.23 x 10^{-3} gs^{-1}
Gas combustion temperature	929°C (910°C – 965°C)	850°C (minimum)
Exhaust gas exit temperature	1,236K (1,221K – 1,255K)	443K (minimum) (a)
Exhaust gas velocity	11.4 ms^{-1} (b)	7.5 ms^{-1} (minimum) (a)
	February 2023	
NO_2	0.95 gs^{-1}	1.58 gs^{-1}
CO	<0.01 gs^{-1}	0.53 gs^{-1}
SO_2	<0.01 gs^{-1}	0.07 gs^{-1}
Non-Methane Organic Carbons	<2.0 x 10^{-4} gs^{-1}	-
Benzene	<1.3 x 10^{-4} gs^{-1}	3.01 x 10^{-2} gs^{-1}
Vinyl chloride	<3.0 x 10^{-3} gs^{-1}	2.23 x 10^{-3} gs^{-1}
Ammonia	0.0384 gs^{-1}	-(c)
Gas combustion temperature	923°C (895°C – 942°C)	850°C (minimum)
Exhaust gas exit temperature	1,230K (1,198K – 1,256K)	443K (minimum) (a)
Exhaust gas velocity	10.1 ms^{-1} (b)	7.5 ms^{-1} (minimum) (a)
	March 2023	
NO_2	1.34 gs^{-1}	1.58 gs^{-1}
CO	<0.01 gs^{-1}	0.53 gs^{-1}
SO_2	<0.01 gs^{-1}	0.07 gs^{-1}
Benzene	<2.0 x 10^{-4} gs^{-1}	3.01 x 10^{-2} gs^{-1}
Vinyl chloride	<1.4 x 10^{-4} gs^{-1}	2.23 x 10^{-3} gs^{-1}
Gas combustion temperature	928°C (908°C – 956°C)	850°C (minimum)
Exhaust gas exit temperature	1,222K (1,188K – 1,240K)	443K (minimum) (a)
Exhaust gas velocity	11.3 ms^{-1} (b)	7.5 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.

(c) The emission limit for ammonia is under review and will be supplemented in subsequent revision.

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

Parameters	Monitoring Results (Range in Bracket)	Limit Level
	January 2023	
NO_2	0.024 gs^{-1}	0.97 gs^{-1}
CO	0.111 gs^{-1}	2.43 gs^{-1}
SO_2	<0.012 gs^{-1}	0.22 gs^{-1}
Benzene	<1.8 x 10^{-4} gs^{-1}	4.14 x 10^{-4} gs^{-1}
Vinyl chloride	<1.44 x 10^{-4} gs^{-1}	2.60 x 10^{-4} gs^{-1}
Gas combustion temperature	Flare 1: 869°C (820°C – 930°C)	815°C (minimum)
	Flare 2: 853°C (820°C – 920°C)	
Exhaust gas exit temperature	Flare 1: 1,058K (963K – 1,153K)	923 K (minimum) (a)
	Flare 2: 1,071K (1,028K – 1,113K)	
Exhaust gas velocity	12.5 ms^{-1} (b)	9.0 m s^{-1} (minimum) (a)
	February 2023	
NO_2	0.02 gs^{-1}	0.97 gs^{-1}
CO	0.16 gs^{-1}	2.43 gs^{-1}
SO_2	0.02 gs^{-1}	0.22 gs^{-1}
Non-Methane Organic Carbons	<1.2 x 10^{-4} gs^{-1}	-
Benzene	<9.6 x 10^{-5} gs^{-1}	4.14 x 10^{-4} gs^{-1}
Vinyl chloride	0.006 gs^{-1}	2.60 x 10^{-4} gs^{-1}
Gas combustion temperature	Flare 1: 869°C (830°C – 900°C)	815°C (minimum)
	Flare 2: 860°C (820°C – 900°C)	
Exhaust gas exit temperature	Flare 1: 1,049K (1,003K – 1,093K)	923 K (minimum) (a)
	Flare 2: 1,081K (1,053K – 1,153K)	
Exhaust gas velocity	8.9 ms^{-1} (b)	9.0 m s^{-1} (minimum) (a)
	March 2023	
NO_2	0.02 gs^{-1}	0.97 gs^{-1}
CO	<0.01 gs^{-1}	2.43 gs^{-1}
SO_2	<0.01 gs^{-1}	0.22 gs^{-1}
Benzene	<9.5 x 10^{-5} gs^{-1}	4.14 x 10^{-4} gs^{-1}
Vinyl chloride	<7.6 x 10^{-5} gs^{-1}	2.60 x 10^{-4} gs^{-1}
Gas combustion temperature	Flare 1: 936°C (870°C – 990°C)	815°C (minimum)
	Flare 2: 927°C (830°C – 990°C)	
Exhaust gas exit temperature	Flare 1: 1,103K (1,053K – 1,193K)	923 K (minimum) (a)
	Flare 2: 1,128K (993K – 1,203K)	
Exhaust gas velocity	6.2 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
	January 2023	
NO_2	0.044 gs^{-1}	1.91 gs^{-1}
CO	0.731 gs^{-1}	2.48 gs^{-1}
SO_2	<0.001 gs^{-1}	0.528 gs^{-1}
Benzene	<7.0 x 10^{-5} gs^{-1}	2.47 x 10^{-4} gs^{-1}
Vinyl chloride	<9.6 x 10^{-6} gs^{-1}	1.88 x 10^{-5} gs^{-1}
Exhaust gas exit temperature	ENGA: 860K (849K – 869K)	723K (minimum) (a)
	ENGB : 859K (834K – 873K)	
Exhaust gas velocity	10.0 ms^{-1} (b)	30.0 ms^{-1} (minimum) (a)
	February 2023	
NO_2	0.053 gs^{-1}	1.91 gs^{-1}
CO	0.973 gs^{-1}	2.48 gs^{-1}
SO_2	<0.002 gs^{-1}	0.528 gs^{-1}
Non-Methane Organic Carbons	<1.0 x 10^{-4} gs^{-1}	-
Benzene	<1.3 x 10^{-5} gs^{-1}	2.47 x 10^{-4} gs^{-1}
Vinyl chloride	<3.3 x 10^{-3} gs^{-1}	1.88 x 10^{-5} gs^{-1}
Exhaust gas exit temperature	ENGA: 869K (860K – 872K)	723K (minimum) (a)
	ENGB : 861K (860K – 862K)	
Exhaust gas velocity	12.1 ms^{-1} (b)	30.0 ms^{-1} (minimum) (a)
	March 2023	
NO_2	0.079 gs^{-1}	1.91 gs^{-1}
CO	0.942 gs^{-1}	2.48 gs^{-1}
SO_2	<0.001 gs^{-1}	0.528 gs^{-1}
Benzene	9.7 x 10^{-5} gs^{-1}	2.47 x 10^{-4} gs^{-1}
Vinyl chloride	<1.2 x 10^{-5} gs^{-1}	1.88 x 10^{-5} gs^{-1}
Exhaust gas exit temperature	ENGA: 875K (868K – 881K)	723K (minimum) (a)
	ENGB : 864K (859K – 875K)	
Exhaust gas velocity	13.9 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 Level exceedance was recorded for thermal oxidizer stack emission (SO_2) in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex D2* were undertaken. Investigation of the Action and Limit Levels exceedances was conducted and the investigation report is presented in *Annex D7*. Based on the investigation conducted for the monitoring event with potential Limit Levels exceedance with the Contractor and the IEC, the thermal oxidizer stack emission (SO_2) exceedance on 18 January 2023 was considered Project-related.

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.

2.1.4 Ambient VOCs, Ammonia and H_2S Monitoring

Monitoring Requirements and Equipment

According to the updated EM&A Manual of the Project, ambient VOCs, ammonia and H_2S monitoring 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 quarterly interval.

The Limit Levels for ambient VOCs, ammonia and H_2S monitoring is provided in *Table 2.15* below.

Table 2.15 Limit Levels for Ambient VOCs, Ammonia and H_2S Monitoring

Parameters	**Limit Level (μg m^{-3})**
Methane	NA [a]
Ammonia	180
H_2S	42
Dichlorodifluoro-methane	NA [a]
Vinyl Chloride	26
Methanol	2,660
Ethanol	19,200
Dimethylsulphide	8
Carbon Disulphide	150
Methylene Chloride	3,530
Chloroform	99
Methyl propionate	353
Butan-2-ol	667
1.1.1-Trichloroethane	5,550
1.2-Dichloroethane	210
Benzene	33
Carbon Tetrachloride	64
Dipropyl ether	NA [a]
Heptane	2,746
Trichloroethylene	5,500
Ethyl propionate	29
Methyl butanoate	30
Methanethiol	10
Toluene	1,244
Ethyl butanoate	71
Propyl benzene	19
Octane	7,942
Propyl propionate	276
1.2-Dibromoethane (EDB)	39

Parameters	Limit Level (μg m^{-3})
Butyl acetate	7,240
Tetrachloroethylene	1,380
Ethyl benzene	738
Nonane	11,540
Ethanethiol	13
Decanes	3,608
Limonene	212
Butyl benzene	47
Undecane	5,562
Butanethiol	4
Terpenes	NA [(a)]
Xylenes	534
Dichlorobenzene	120

Notes:

(a) No relevant WHO/USEPA/CARB's ambient criteria, odour thresholds and WEL available.

VOCs

Ambient air samples were drawn into the pre-cleaned and vacuum canister directly when the valve of the flow controller (with preset flow rate) was opened. After sampling, the valve will be closed manually and the canister with VOCs gas samples were transported for laboratory analysis.

Methane

Pre-cleaned Tedlar bag was placed in the vacuum chamber. Ambient air was collected in the Tedlar bag under the vacuum condition when the pump is switched on. The Tedlar bag was filled up to 90% of total capacity to avoid leakage and bag deformation. After sampling, pump is switched off and the valve of Tedlar bag was closed manually. The air samples were transported back to laboratory for analysis.

Ammonia

Calibrated personal air pump was used to pump the air through a sulfuric acid-treated silica gel sorbent tube. Gaseous ammonia in air was then trapped in the sorbent tube. The tube was transported back to laboratory for analysis.

H_2S

H_2S in air is collected in mid-get impingers by aspirating a measured volume of air through an alkaline suspension of cadmium hydroxide (as the absorbing solution). The sulphide is precipitated as cadmium sulphide to prevent air oxidation of the sulphide. Arabinogalactan is added to the cadmium hydroxide slurry prior to sampling to minimize photo-decomposition of the precipitated cadmium sulphide. The solution is transported back to laboratory for analysis.

All air samples collected for laboratory analysis were transported to ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066) laboratory within 24 hours and analysed within 48 hours.

The ambient VOCs, ammonia and H_2S monitoring programme and monitoring locations are summarised in *Table 2.16* and illustrated in *Figure 2.1,* respectively.

Table 2.16 Ambient VOCs, Ammonia and H_2S Monitoring Details

Monitoring Station	Location	Parameter	Frequency	Monitoring Date
AM1	SENTX Site Boundary (North)	• Methane • Ammonia • A suite of VOCs [(a)] • H_2S	Quarterly	2 February 2023
AM2	SENTX Site Boundary (West, near DP3)			
AM3	SENTX Site Boundary (West, near RC15)			
AM4	SENTX Site Boundary (West, near EPD building)			

Notes:

(a) A suite of VOCs includes:

- Trichloroethylene
- Vinyl chloride
- Methylene chloride
- Chloroform
- 1,2-dichloroethane
- 1,1,1-trichloroethane
- Carbon tetrachloride
- Tetrachloroethylene
- 1,2-dibromoethane
- Benzene
- Toluene
- Carbon disulphide
- Propyl benzene
- Ethyl benzene
- Butyl benzene
- Xylenes
- Decanes
- Undecane
- Limonene
- Terpenes
- Ethanol
- Butan-2-ol
- Dimethylsulphide
- Methyl propionate
- Ethyl propionate
- Propyl propionate
- Butyl acetate
- Ethyl butanoate
- Dichlorobenzene
- Methyl butanoate
- Dipropyl ether
- Methanethiol
- Ethanethiol
- Butanethiol
- Methanol
- Heptanes
- Octanes
- Nonanes
- Dichlorodifluoro-methane
- Methane

Monitoring Schedule for the Reporting Month

The schedule for ambient VOCs, ammonia and H_2S monitoring during the reporting period is provided in *Annex C.*

Results and Observations

The ambient VOCs, ammonia and H_2S monitoring results are summarized in *Tables 2.17* and provided in *Annex D6.*

Table 2.17 Summary of Ambient VOCs, Ammonia and H_2S Monitoring Results in the Reporting Period

Parameters	Limit Level (μg m^{-3})	Monitoring Results (μg m^{-3})			
		AM1	AM2	AM3	AM4
Ammonia	180	157	111	74	72
H_2S	42	<15	<15	<15	<15
Methane	NA [(a)]	0.00033 %(v/v)	0.00023 %(v/v)	0.00018 %(v/v)	0.00017 %(v/v)
1.1.1-Trichloroethane	5,550	<0.8	<0.8	<0.8	<0.8
1.2-Dibromoethane (EDB)	39	<1.0	<1.0	<1.0	<1.0
1.2-Dichloroethane	210	<0.3	<0.3	<0.3	<0.3
Benzene	33	0.6	0.7	0.6	0.6
Butan-2-ol	667	<0.6	<0.6	<0.6	<0.6
Butanethiol	4	<1.2	<1.2	<1.2	<1.2
Carbon Disulphide	150	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	64	<0.6	<0.6	<0.6	<0.6
Chloroform	99	<0.8	<0.8	<0.8	<0.8
Decanes	3,608	<0.7	<0.7	<0.7	<0.7
Dichlorobenzene	120	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoro-methane	NA [(a)]	1	1.2	1	0.9
Dimethylsulphide	8	<0.2	<0.2	<0.2	<0.2
Dipropyl ether	NA [(a)]	<0.8	<0.8	<0.8	<0.8
Limonene	212	<0.4	<0.4	<0.4	<0.4
Ethanethiol	13	<0.6	<0.6	<0.6	<0.6
Ethanol	19,200	<3.8	3.9	<3.8	<3.8
Ethyl butanoate	71	<1.0	<1.0	<1.0	<1.0
Ethyl propionate	29	<0.8	<0.8	<0.8	<0.8
Ethyl benzene	738	<0.5	<0.5	<0.5	0.6
Heptane	2,746	<0.8	<0.8	<0.8	<0.8
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	22.4	39.1	35.2	28.4
Methyl butanoate	30	<0.8	<0.8	<0.8	<0.8
Methyl propionate	353	<0.7	<0.7	<0.7	<0.7
Methylene Chloride	3,530	0.9	1.2	1.8	0.7
Butyl acetate	76	<1.0	<1.0	<1.0	<1.0
Butyl benzene	47	<1.0	<1.0	<1.0	<1.0
Nonane	11,540	<0.9	<0.9	<0.9	<0.9
Propyl benzene	19	<0.8	<0.8	<0.8	<0.8
Octane	7,942	<0.9	<0.9	<0.9	<0.9
Propyl propionate	276	<1.0	<1.0	<1.0	<1.0
Terpenes	NA [(a)]	<0.8	<0.8	<0.8	<0.8
Tetrachloroethylene	1,380	<0.7	<0.7	<0.7	<0.7
Toluene	1,244	1.2	0.9	1	1
Trichloroethylene	5,500	<1.1	<1.1	<1.1	<1.1
Undecane	5,562	<1.2	<1.2	<1.2	<1.2
Vinyl Chloride	26	<0.3	<0.3	<0.3	<0.3
Xylenes	534	0.8	0.7	0.9	1.8

Notes:

(a) No relevant WHO/USEPA/CARB's ambient criteria and WEL available.

All ambient VOCs, ammonia and H_2S 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 D2*.

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 2.18* below.

Table 2.18 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) or 75 dB(A) recorded at the monitoring station	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		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 a sound level meter placed 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 2.19*.

Table 2.19 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 the operation period of the Project	3, 9, 16, 26 January 2023 1, 7, 13, 20, 27 February 2023 9, 15, 21, 28 March 2023	Sound Level Meter: Rion NL-52 (S/N: 00131627) Acoustic Calibrator: CAL200 (S/N: 15678)

2.2.2 *Monitoring Schedule for the Reporting Period*

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

2.2.3 *Results and Observations*

A total of 13 impact noise monitoring events were scheduled during the reporting period. The noise monitoring results are summarised in *Table 2.20* and graphically presented in *Annex E1*.

Table 2.20 Summary of Noise Monitoring Results in the Reporting Period

Month	Monitoring Station	Measured Noise Level $L_{eq\ (30\ min)}$, dB(A)		
		Average	Range	Action and Limit Level
January 2023	NM1	52.5	51.5 – 53.5	75
February 2023	NM1	52.6	51.3 – 54.3	75
March 2023	NM1	54.5	48.9 – 59.9	75

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

No exceedance of the Action and Limit Levels for operation noise monitoring was recorded in the reporting period. No further mitigation measure was required in accordance with the Event and Action Plan presented in *Annex E2*.

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 2023.

The parameters as listed in *Table 2.22* were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Action and Limit Levels of the surface water quality impact monitoring are provided in *Table 2.21.*

Table 2.21 Action and 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 Table 10a of the *Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* 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 2.22*.

Table 2.22 Impact Surface Water Quality Monitoring Details

Monitoring Station	Location	Frequency	Monitoring Dates	Parameter		Equipment
DP4	Surface water discharge point DP4	Monthly	4 January 2023, 8 February 2023, 7 March 2023	• pH • Electrical conductivity (EC) • DO • SS • COD • BOD_5 • TOC • Ammoniacal –nitrogen • Nitrate-nitrogen • Nitrite–nitrogen • TKN • TN • Phosphate • Sulphate • Sulphide • Carbonate • Oil & Grease	• Bicarbonate • Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron	YSI Professional DSS (S/N: 15G100349)
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 2023.

Monitoring Schedule for the Reporting Period

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

Results and Observations

Three regular monitoring events for impact surface water quality monitoring were scheduled at all designated monitoring stations during the reporting period. However, sampling could not be carried out at all monitoring events due to insufficient flow. Details of impact water quality monitoring event are provided in *Annex F1*. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex F2*.

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 2.23* were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the leachate monitoring are provided in *Table 2.23*.

Table 2.23 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 2.24*.

Table 2.24 Leachate Levels and Effluent Quality Monitoring Details

Location	Frequency	Parameter	Monitoring Dates	Equipment
Leachate levels above the basal liner	Continuous	Leachate Levels	1 January – 31 March 2023	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)	*On-site Measurements*: • Volume • pH • Temperature *Laboratory analysis:* • Suspended Solids • COD • BOD_5 • 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	4 January 2023, 2 February 2023, 2 March 2023	TOA HM-30P (S/N: 790332) HORIBA U-52G (S/N: RSV50V1T)

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 summarized in *Table 2.25* and *Table 2.26*, respectively. The detailed monitoring results are provided in *Annex F3* and *Annex F4*, respectively.

Table 2.25 Summary of Leachate Levels in the Reporting Period

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
	January 2023	
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	71 (64 – 77)	> 178
Meter No. X-2	82 (70 – 88)	
Average	76 (70 – 83)	
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	77 (64 – 88)	> 180
Meter No. X-4	72 (59 – 86)	
Average	75 (62 – 87)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	67 (62 – 70)	> 175
Meter No. X-6	67 (62 – 70)	
Average	67 (62 – 70)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	57 (48 – 65)	> 186
Meter No. X-8	62 (52 – 70)	
Average	59 (50 – 68)	
	February 2023	
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	71 (64 – 75)	> 178
Meter No. X-2	83 (75 – 88)	
Average	77 (70 – 82)	
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	77 (64 – 88)	> 180
Meter No. X-4	73 (59 – 84)	
Average	75 (62 – 86)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	65 (62 – 70)	> 175
Meter No. X-6	65 (62 – 75)	
Average	65 (62 – 72)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	58 (48 – 65)	> 186
Meter No. X-8	62 (52 – 70)	
Average	60 (50 – 68)	
	March 2023	
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	70 (64 – 77)	> 178
Meter No. X-2	81 (64 – 88)	
Average	76 (70 – 83)	
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	79 (66 – 88)	> 180
Meter No. X-4	75 (62 – 84)	
Average	77 (64 – 86)	

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	55 (48 – 65)	> 175
Meter No. X-6	60 (52 – 70)	
Average	57 (50 – 68)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	55 (48 – 65)	> 186
Meter No. X-8	60 (52 – 70)	
Average	57 (50 – 68)	

Table 2.26 Summary of Effluent Quality Monitoring Results in the Reporting Period

January 2023		**Monitoring Results**	**Limit Level**
Parameters			
Temperature	°C	25.0	> 43 °C
pH Value	pH unit	8.0	6 – 10
Volume Discharged	m^3	1,339	>2,000 m^3
Suspended Solids (SS)	mg/L	14.3	> 800 mg/L
Phosphate	mg/L	2.96	> 25 mg/L
Sulphate	mg/L	201	> 800 mg/L
Total Inorganic Nitrogen [(a)]	mg/L	43.23	> 100 mg/L
BOD	mg/L	24	> 800 mg/L
COD	mg/L	806	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	5130	> 7,000 µg/L
Iron	mg/L	1.76	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	133	> 300 µg/L
Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	122	> 700 µg/L
Zinc	µg/L	43	> 700 µg/L
February 2023		**Monitoring Results**	**Limit Level**
Parameters			
Temperature	°C	22.0	> 43 °C
pH Value	pH unit	8.3	6 – 10
Volume Discharged	m^3	1,000	>2,000 m^3
Suspended Solids (SS)	mg/L	27.2	> 800 mg/L
Phosphate	mg/L	8.68	> 25 mg/L
Sulphate	mg/L	147	> 800 mg/L
Total Inorganic Nitrogen [(a)]	mg/L	54.75	> 100 mg/L
BOD	mg/L	17	> 800 mg/L
COD	mg/L	938	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	5390	> 7,000 µg/L
Iron	mg/L	2.35	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	218	> 300 µg/L

Copper	µg/L	12	> 1,000 µg/L
Nickel	µg/L	146	> 700 µg/L
Zinc	µg/L	126	> 700 µg/L
March 2023		**Monitoring Results**	**Limit Level**
Parameters			
Temperature	°C	25.7	> 43 °C
pH Value	pH unit	8.4	6 – 10
Volume Discharged	m^3	1,021	>2,000 m^3
Suspended Solids (SS)	mg/L	68.0	> 800 mg/L
Phosphate	mg/L	7.65	> 25 mg/L
Sulphate	mg/L	164	> 800 mg/L
Total Inorganic Nitrogen [(a)]	mg/L	34.52	> 100 mg/L
BOD	mg/L	19	> 800 mg/L
COD	mg/L	1010	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	5640	> 7,000 µg/L
Iron	mg/L	1.90	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	146	> 300 µg/L
Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	119	> 700 µg/L
Zinc	µg/L	54	> 700 µg/L

All the leachate levels and 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 F2*.

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 2.27* below.

Table 2.27 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 2.28* and illustrated in *Figure 2.1,* respectively.

Table 2.28 Groundwater Monitoring Details

Monitoring Location	Frequency	Parameter		Monitoring Dates	Equipment
All groundwater monitoring wells (MWX-1 to MWX-14)	Monthly	• Water level • pH • EC • COD • BOD5 • TOC • Ammoniacal–nitrogen • Nitrate-nitrogen • Nitrite–nitrogen • TKN • TN • Sulphate • Sulphide • Carbonate • Bicarbonate • Phosphate	• Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron	3, 4 January 2023, 8 February 2023, 7 March 2023	YSI Professional DSS (S/N: 15G100349)

Monitoring Schedule for the Reporting Month

The schedule for groundwater 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 2.29* and provided in *Annex F5,* respectively.

Table 2.29 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
	Average	Min	Max		Average	Min	Max	
MWX-1	0.53	<0.01	0.80	5.00	8	6	11	30
MWX-2	0.02	<0.01	0.02	5.00	5	3	6	30
MWX-3	1.17	0.18	1.74	5.00	17	15	19	30
MWX-4	3.64	0.48	6.17	7.63	29	24	34	36
MWX-5	1.74	0.27	2.61	5.00	30	30	30	30
MWX-6	2.80	0.44	4.23	5.00	43	38	48	46
MWX-7	3.42	0.66	6.35	6.55	18	11	30	36
MWX-8	7.80	0.96	13.80	15.85	38	34	42	50
MWX-9	1.41	1.22	1.74	7.30	9	8	10	71
MWX-10	0.03	0.02	0.04	5.00	7	4	8	30
MWX-11	0.16	0.13	0.17	5.00	5	4	8	30
MWX-12	0.02	<0.01	0.02	5.00	6	<2	12	30
MWX-13	0.02	<0.01	0.02	5.00	4	2	5	30
MWX-14	0.03	<0.01	0.03	5.00	3	<2	5	30

Limit Level exceedance was recorded for groundwater monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex F2* were undertaken. Investigation of the Limit Levels exceedances was conducted and the investigation reports are presented in *Annex F6*.

Based on the investigation conducted for the monitoring events with potential Action and Limit Levels exceedances with the Contractor and the IEC, the groundwater (COD) exceedance at MWX-6 on 7 March 2023 was considered non Project-related.

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.

2.4 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 2.30* below.

Table 2.30 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	2.2
	LFG2	1.0	4.2
	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	1.0	1.7
	LFG9	2.5	1.7
	LFG10	1.0	1.6
	LFG11	3.0	2.0
	LFG12	13.2	1.5
	LFG13	22.5	2.7
	LFG14	1.0	1.6
	LFG15	18.2	2.0
	LFG16	1.0	1.7
	LFG17	10.5	2.1
	LFG18	2.3	1.9
	LFG19	6.3	3.1
	LFG20	1.0	4.2
	LFG21	1.0	4.3
	LFG22	1.0	3.9
	LFG23	1.0	10.3
	LFG24	1.0	4.0
	GP1	1.0	8.5
	GP2 (shallow)	1.0	11.4
	GP2 (deep)	1.0	10.4
	GP3 (shallow)	1.0	3.9
	GP3 (deep)	1.0	1.9
	GP4 (shallow)	1.0	2.3
	GP4 (deep)	1.0	5.6
	GP5 (shallow)	1.0	9.5
	GP5 (deep)	1.0	7.5
	GP6	1.0	7.8
	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	

Parameters	Monitoring Location	Limit Level (% (v/v))
Permanent Gas Monitoring System		
Methane (or flammable gas)	Permanent Gas Monitoring System	1% by volume (20% LEL)
Area Between the SENTX Site Boundary and Waste Boundary (Surface Emission)		
Flammable gas	Area between SENTX site boundary and waste boundary	30 ppm

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.

Flammable gas detector in compliance with the specifications listed under Section 5.4.1 of the updated EM&A Manual was used to measure flammable gas concentration. Flammable gas surface emission survey was conducted at a slow pace with the inlet tube of the meter probe a few centimeters above ground surface to detect flammable gas emitted from the ground surface.

Bulk gas samples were collected into inert sample containers (i.e. 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 equipment used in the landfill gas monitoring programme is summarised in *Table 2.31.* The landfill gas monitoring locations for perimeter landfill gas monitoring wells and service voids, utilities and manholes along the Site boundary and within the SENTX site are illustrated in *Figure 2.3 - 2.4* and *Annex G1*, respectively.

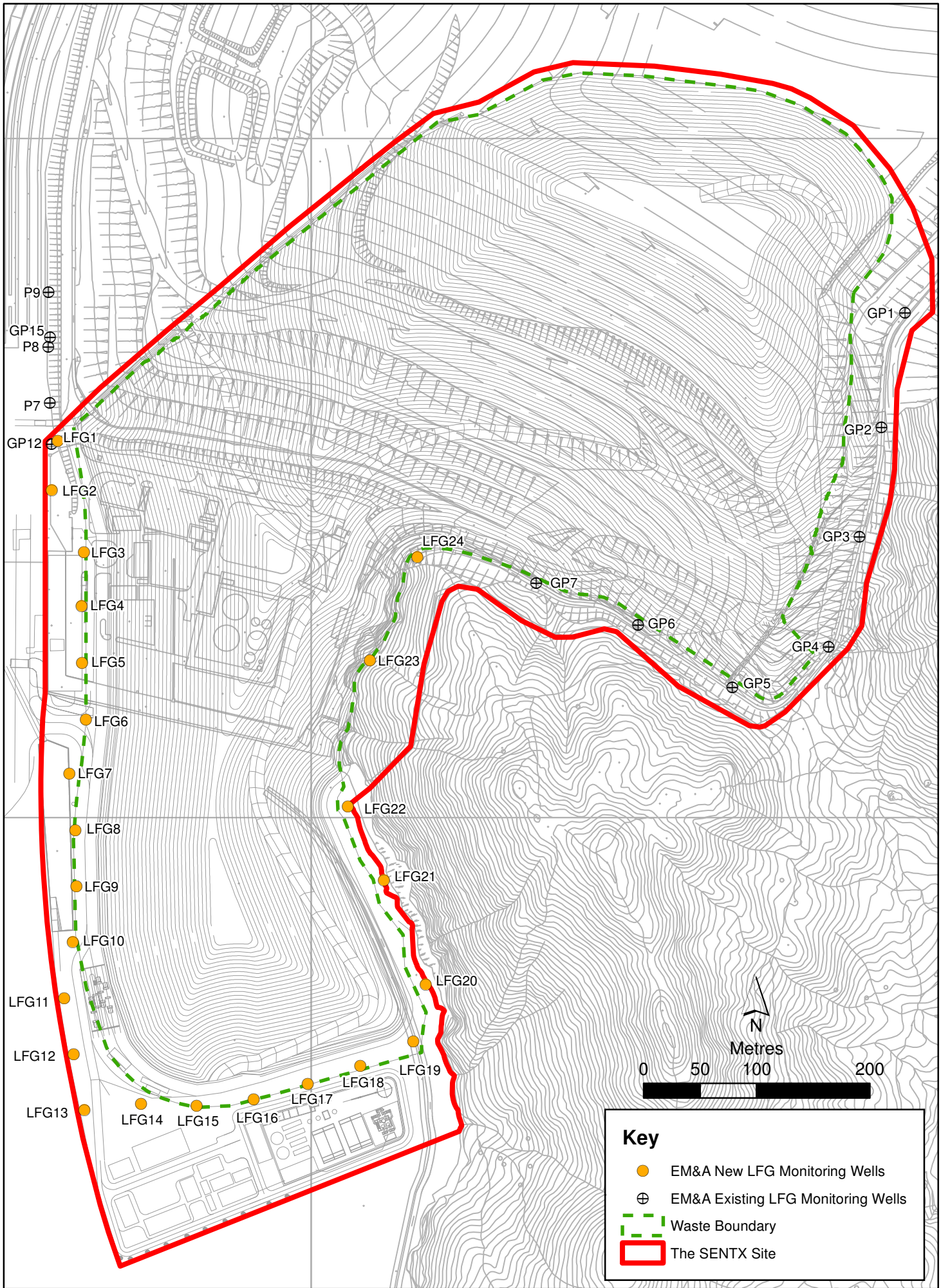

Figure 2.3

Location of Landfill Gas Monitoring Wells

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Date: 20/11/2019

Environmental Resources Management

ERM

TKO Industrial Estate

Fat Tong Chau

TKO AREA 137

Infrastructure Area

Clear Water Bay Country Park

Key

- Existing SENT Landfill
- SENTX Waste Boundary
- The SENTX Site
- Flammable Gas Surface Emission Monitoring Location

N

Metres

0 250 500

Figure 2.4

Flammable Gas Surface Emission Monitoring Locations

Environmental Resources Management

ERM

Table 2.31 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	• Methane • Carbon dioxide • Oxygen • Atmospheric pressure	9 January 2023, 14 February 2023, 1 March 2023	GA5000 (S/N: G507306)
Service voids, utilities and manholes along the Site boundary and within the SENTX Site (UU1 to UU28)	Monthly	• Methane • Carbon dioxide • Oxygen	9 January 2023, 15 February 2023, 1 March 2023	GA5000 (S/N: G507306)
Permanent gas monitoring system in all occupied on-site buildings	Continuous	• Methane (or flammable gas) by permanent gas monitoring system	1 January – 31 March 2023	Permanent gas monitoring system
Areas between the SENTX Site boundary and the waste boundary and location of vegetation stress	Quarterly	• Flammable gas emitted from the ground surface	2 February 2023	GMI Leak Surveyor (S/N: 554846)
Bulk gas sampling at least 2 of the perimeters LFG monitoring wells	Quarterly	• Methane • Carbon dioxide • Oxygen • Nitrogen • Carbon monoxide • Other flammable gas	14 February 2023	Gas sampling pump and Tedlar bags

Monitoring Schedule for the Reporting Month

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

Results and Observations

The landfill gas monitoring results are summarised and provided in *Tables 2.32 - 2.35 and Annex G2,* respectively.

Table 2.32 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 Level [(a)]	Monitoring Results			Limit Level [(a)]
	Average	Min	Max		Average	Min	Max	
LFG1	0.1	0.0	0.1	1.0	0.3	0.2	0.3	3.2
LFG2	0.1	0.0	0.1	1.0	0.3	0.1	0.4	4.3
LFG3	0.1	0.0	0.2	1.0	0.4	0.1	0.9	6.3
LFG4	0.1	0.0	0.2	1.0	0.1	0.1	0.1	7.0
LFG5	0.1	0.0	0.2	1.0	0.2	0.0	0.3	3.4
LFG6	0.2	0.0	0.3	1.0	0.1	0.1	0.2	9.1
LFG7	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.5
LFG8	0.0	0.0	0.0	12.6	0.0	0.0	0.1	2.4
LFG9	0.0	0.0	0.0	2.5	0.3	0.0	0.9	1.7
LFG10	0.0	0.0	0.0	3.5	0.1	0.0	0.1	1.6
LFG11	0.0	0.0	0.0	3.0	0.1	0.0	0.2	2.0
LFG12	0.0	0.0	0.0	13.2	0.0	0.0	0.0	1.5
LFG13	18.8	16.5	21.4	22.5	0.1	0.0	0.4	2.7
LFG14	0.0	0.0	0.0	5.2	0.0	0.0	0.1	1.8
LFG15	0.0	0.0	0.0	18.2	0.2	0.0	0.6	2.0
LFG16	0.0	0.0	0.0	1.0	0.1	0.1	0.1	2.0
LFG17	0.0	0.0	0.0	17.8	0.3	0.0	0.6	2.4
LFG18	0.0	0.0	0.0	2.3	0.3	0.1	0.7	2.1
LFG19	0.0	0.0	0.0	6.3	0.1	0.0	0.1	3.1
LFG20	0.0	0.0	0.0	1.0	0.4	0.2	0.8	4.6
LFG21	0.0	0.0	0.1	1.0	1.5	0.1	2.6	4.8
LFG22	0.0	0.0	0.1	1.0	0.3	0.0	0.6	4.0
LFG23	0.0	0.0	0.1	1.0	1.8	1.0	2.6	10.3
LFG24	0.0	0.0	0.1	1.0	0.4	0.3	0.5	4.7
GP1	0.1	0.0	0.3	1.0	5.4	5.2	5.6	10.6
GP2 (shallow)	0.1	0.0	0.2	1.0	2.0	1.4	3.0	11.4
GP2 (deep)	0.1	0.0	0.2	1.0	6.5	6.3	7.0	10.4
GP3 (shallow)	0.1	0.0	0.2	1.0	0.0	0.0	0.1	6.9
GP3 (deep)	0.1	0.0	0.2	1.0	0.2	0.0	0.5	5.6
GP4 (shallow)	0.0	0.0	0.1	1.0	0.1	0.1	0.1	11.6
GP4 (deep)	0.0	0.0	0.1	1.0	0.2	0.1	0.3	7.7
GP5 (shallow)	0.0	0.0	0.1	1.0	4.0	3.2	4.5	10.8
GP5 (deep)	0.0	0.0	0.1	1.0	0.1	0.1	0.1	7.5
GP6	0.0	0.0	0.1	1.0	5.1	4.6	5.5	8.4
GP7	0.0	0.0	0.1	1.0	0.0	0.0	0.1	4.5
GP12	0.1	0.0	0.1	1.0	0.0	0.0	0.0	2.3
GP15	0.0	0.0	0.1	1.0	0.0	0.0	0.1	2.2
P7	0.0	0.0	0.1	1.0	0.0	0.0	0.1	2.5
P8	0.0	0.0	0.1	1.0	0.1	0.0	0.2	1.7
P9	0.0	0.0	0.0	1.0	0.1	0.0	0.1	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 2.33 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
	Average	Min	Max	
UU01	0.0	0.0	0.1	1.0
UU02	0.0	0.0	0.1	1.0
UU03	0.0	0.0	0.0	1.0
UU04	0.0	0.0	0.0	1.0
UU05	0.0	0.0	0.0	1.0
UU06	0.0	0.0	0.0	1.0
UU07	0.0	0.0	0.0	1.0
UU08	0.0	0.0	0.0	1.0
UU09	0.0	0.0	0.0	1.0
UU10	0.0	0.0	0.0	1.0
UU11	0.0	0.0	0.0	1.0
UU12	Voided due to latest site programme and on-going operation work			1.0
UU13	0.0	0.0	0.0	1.0
UU14	0.0	0.0	0.0	1.0
UU15	0.0	0.0	0.0	1.0
UU16	0.0	0.0	0.0	1.0
UU17	Voided due to latest site programme and on-going operation work			1.0
UU18	0.0	0.0	0.0	1.0
UU19	0.0	0.0	0.0	1.0
UU20	0.0	0.0	0.0	1.0
UU21	0.0	0.0	0.0	1.0
UU22	0.0	0.0	0.0	1.0
UU23	0.0	0.0	0.0	1.0
UU24	0.0	0.0	0.0	1.0
UU25	0.0	0.0	0.0	1.0
UU26	0.0	0.0	0.0	1.0
UU27	0.0	0.0	0.0	1.0
UU28	0.0	0.0	0.0	1.0

Table 2.34 Summary of Landfill Gas Bulk Gas Sampling Monitoring Results in the Reporting Period

Parameters	Limit Level (LFG1) [(a)]	LFG1	Limit Level (LFG8) [(a)]	LFG8
Methane (% (v/v))	1.0	<0.0200	12.6	<0.020
Carbon Dioxide (% (v/v))	3.2	0.318	2.4	0.068
Oxygen (% (v/v))	-	19	-	21.1
Nitrogen (% (v/v))	-	80.9	-	78.9
Carbon Monoxide (% (v/v))	-	<0.020	-	<0.020
Hydrogen (% (v/v))	-	<0.020	-	<0.020
Ethane (ppmv)	-	<1.0	-	<1.0
Propane (ppmv)	-	<1.0	-	<1.0
Butane (ppmv)	-	<1.0	-	<1.0

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 2.35 Summary of Flammable Gas Surface Emission Monitoring Results in the Reporting Period

GPS Coordinates		Monitoring Results (ppm)	Limit Level (ppm)
Latitude (N)	Longitude (E)		
22°16′29″	114°16′35″	16	30

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 triggered at the ground floor of EPD building (EM585) on 13 March 2023. The Contractor had carried out indoor air quality checking around the area and no flammable gas was detected. The sensor was tested with standard gas and found malfunction. The Contractor has contacted the supplier for maintenance.

All the landfill gas 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 G3*.

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 19 January 2023, 16 February 2023 and 30 March 2023 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, 13 site inspections were carried out 5, 12, 19 and 26 January 2023, 2, 9, 16 and 22 February 2023 and 2, 9, 16, 23 and 30 March 2023.

Key observations during the site inspections are summarized in *Table 2.36*.

Table 2.36 Key Observations Identified during the Site Inspections in this Reporting Period

Inspection Date	Environmental Observations and Recommendations
5 January 2023	• The Contractor shall remove the deposited silt and grit accumulated at X10a channel and the general refuse in and around the X9 drop inlet regularly to ensure they are functioning properly at all times.
12 January 2023	• The Contractor shall continue to remove the general refuse, deposited silt and grit accumulated at X10a channel to ensure it is functioning properly at all times. • The Contractor shall arrange cleaning and removal of deposits along the main haul road and near site entrance more frequently to minimise mud to be carried on the public road.
19 January 2023	• The Contractor shall remove the general refuse accumulated at X10a channel regularly to ensure it is functioning properly at all times.
26 January 2023	• The Contractor shall display a NRMM label on the excavator near vehicle washing facilities. • The Contractor shall remove the drilling residue near Towngas plant and dispose of the waste regularly.
2 February 2023	• The Contractor shall clean up the oil spillage near sediment trap and handle the clean-up materials as chemical waste. • The Contractor shall remove the general refuse accumulated at X10a channel regularly to ensure it is functioning properly at all times.
9 February 2023	• The Contractor shall remove the general refuse and deposited silt and grit accumulated at X10a channel regularly to ensure it is functioning properly at all times.
16 February 2023	• The Contractor shall remove the general refuse accumulated at X10a channel (esp. near weighbridge) regularly to ensure it is functioning properly at all times.
22 February 2023	• The Contractor shall enhance watering around the site, especially near SENT and SENTX tie-in area, to minimise dust impact. • The Contractor shall remove the general refuse accumulated at X10a channel regularly to ensure it is functioning properly at all times.
2 March 2023	• The Contractor shall remove the general refuse accumulated at DP3 sediment pit and the sediment trap regularly to ensure they are functioning properly at all times. • The Contractor shall remove the general refuse and construction debris accumulated near LFG20 and dispose of the waste regularly.
9 March 2023	• The Contractor shall clean up the oil spillage near towngas plant and handle the clean-up materials as chemical waste.
16 March 2023	• The Contractor shall remove the stagnant water accumulated at the drainage channel near Towngas plant to ensure it is functioning properly at all times.
23 March 2023	• The Contractor shall remove the stagnant water accumulated at the drainage channel near Towngas plant to ensure it is functioning properly at all times.
30 March 2023	• The Contractor shall replace the faded NRMM label displaced on the generator near DP3. • The Contractor shall arrange cleaning and removal of deposits along the main haul road, especially near site entrance and vehicle washing facilities more frequently to minimise mud to be carried on the public road.

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 2.37*.

Table 2.37 *Summary of Environmental Deficiencies Identified and Corresponding Additional Control Measures*

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
Surface Water		
Intercepting channels & drainage system	• Reviewed drainage plan.	• Provision of additional drainage channels. • Expedite the construction of permanent sediment trap and discharge culverts.
DP channels (design & regular silt removal)	• 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.
Stockpiles & exposed soil	• Installed silt fencing near surface water channel along DP6 channel.	• Improve soil covering. • Compaction and cover for stockpiles and soil slopes.
Wetsep (treatment capacity & number)	• Reviewed Wetsep capacity. • Chemicals dosage of the Wetsep was increased to enhance the efficiency.	• Install additional Wetsep.
Backflow / ponding during heavy rainfall	• Raised with EPD (LDG) and CEDD.	N.A.

2.7 *WASTE MANAGEMENT STATUS*

The Contractor has registered as a 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 non-inert Construction Waste and chemical wastes. 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 2.38*.

Table 2.38 Quantities of Different Waste Disposed and Imported Fill Materials

Month/ Year	Inert C&D Materials [(a)] (in '000m³)	Imported Fill (in '000kg) [(b)]		Inert Construction Waste Re-used (in '000m³)	Non-inert Construction Waste [(c)] (in '000m³)	Recyclable Materials [(d)] (in '000kg)	Yard Waste (in '000kg)		Chemical Wastes (in '000kg)
		Rock	Soil				Y Park	SENT	
1 – 31 Jan 23	0	0	0	0	0	0	0	0	0.800
1 – 28 Feb 23	0	0	0	0	0	0	0	0	0.800
1 – 31 Mar 23	0	0	0	0	0	0	0	0	0.800

Notes:

(a) 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.

(b) Imported fill refers to materials generated from other project for on-site reuse.

(c) Non-inert construction wastes include general refuse disposed at landfill. Density assumption: 0.9 (kg/L) for general refuse.

(d) 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.

Eight exceedances of Action and Limit Levels for TSP and one exceedance of Limit Level for thermal oxidizer stack emission (SO_2) were recorded for air quality monitoring in the reporting period. The TSP exceedances at AM2 on 7 January 2023, at AM2 and AM3 on 31 January 2023, at AM2 on 8 March and 14 March 2023 were considered Project-related upon further investigation, while the TSP exceedance at AM1 on 31 January 2023, 2 March and 14 March 2023 were considered non-Project-related upon further investigation. The thermal oxidizer stack emission (SO_2) exceedance on 18 January 2023 was considered Project-related upon further investigation.

One exceedance of the Limit Level for groundwater (COD) was recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedance at MWX-6 on 7 March 2023 was considered to non Project-related activities upon further 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 and successful prosecutions are summarised in *Annex H*.

This Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 January 2023 to 31 March 2023 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 and landfill gas generator stack emission, ambient VOCs, ammonia and H_2S), noise, water quality (surface water, leachate and groundwater) and landfill gas monitoring were carried out in the reporting period. Results for noise and landfill gas monitoring complied with the Action and Limit Levels in the reporting period.

Eight exceedances of Action and Limit Levels for Total Suspended Particulates (TSP), one exceedance of Limit Level for thermal oxidizer stack emission (SO_2) and one exceedance of the Limit Level for groundwater (Chemical Oxygen Demand (COD)) were recorded in the reporting period.

Thirteen environmental site inspections were carried out during the reporting period. Environmental deficiencies were identified during the site inspection and the Contractor has proposed additional control measures to rectify the deficiencies.

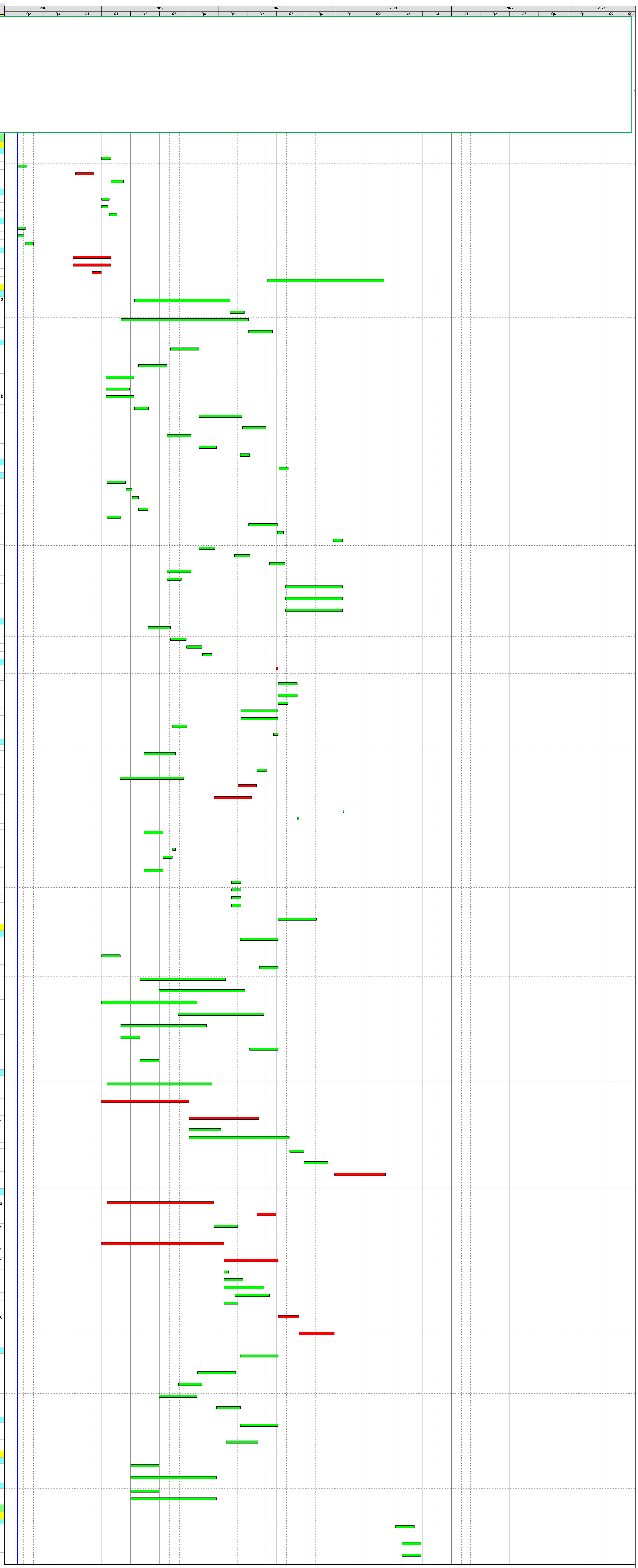
There were no complaints, notification of summons or prosecution recorded in the reporting period.

It is noted that most environmental pollution control and mitigation measures were properly implemented and the construction and operation activities of the Project did not introduce any adverse impact to the sensitive receivers in the reporting period. Yet, some environmental deficiencies were identified during the reporting period and additional control measures have been proposed by the Contractor to rectify the corresponding deficiencies. The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not recommended at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period. The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Annex A

Work Programme

#	WBS Path	Activity ID	Activity Name	Dur	Start	Finish	Total Float	Predecessor Details	Successor Details
336									
337									
338									
339									
340									
341									
342									
343									
344									
345									
346									
347									
348									
349									
350									
351									
352	**SA2.5 Construction (Initial Works)**			1153	12-Apr-18	07-Jun-21	705		
353	**SA2.5.02 Advance Works & Site Establishment**			1148	12-Apr-18	02-Jun-21	35		
354	**SA2.5.02.01 Site Establishment & Mobilization**			333	12-Apr-18	10-Mar-19	820		
355	5.02.01	52-1000	Site Mobilization for Parts X1 & X2	30	31-Dec-18	29-Jan-19	820	11-1100: FS, 11-1200: FS	52-1300: FS, M 3. 1: FS, M 3. 2: FS
356	5.02.01	52-1100	Site Mobilization for Parts X3, X4 & X5	30	12-Apr-18	11-May-18	1083	11-1300: FS, 11-1400: FS, 11-1500: FS	52-1300: FS, M 3. 1: FF
357	5.02.01	52-1200	Temporary Office for Employer / ER / IC	60	10-Oct-18	08-Dec-18	0	23-1300: FS	11-1700: SS, M 3. 1: FS
358	5.02.01	52-1300	Hoarding and Fencing Works	40	30-Jan-19	10-Mar-19	820	52-1000: FS, 52-1100: FS	32-1500: FS, M10. 1: FS -26, M10. 2: FS -13, M10. 3: FS
359	**SA2.5.02.02 Site Survey & Investigation Works for Parts X1 & X2**			50	31-Dec-18	18-Feb-19	840		
360	5.02.02	52-1400	Condition Survey	25	31-Dec-18	24-Jan-19	840	11-1100: FS, 11-1200: FS	52-1600: FS
361	5.02.02	52-1500	Topographic Survey	20	31-Dec-18	19-Jan-19	845	11-1100: FS, 11-1200: FS	52-1600: FS
362	5.02.02	52-1600	Site inspection, Review of Condition Survey Report	25	25-Jan-19	18-Feb-19	840	52-1500: FS, 52-1400: FS	32-1500: FS
363	**SA2.5.02.03 Site Survey & Investigation Works for Parts X3, X4 & X5**			50	12-Apr-18	31-May-18	1103		
364	5.02.03	52-1700	Condition Survey	25	12-Apr-18	06-May-18	1103	11-1300: FS, 11-1400: FS, 11-1500: FS	52-1900: FS
365	5.02.03	52-1800	Topographic Survey	20	12-Apr-18	01-May-18	1108	11-1300: FS, 11-1400: FS, 11-1500: FS	52-1900: FS
366	5.02.03	52-1900	Site inspection, Review of Condition Survey Report	25	07-May-18	31-May-18	1103	52-1700: FS, 52-1800: FS	32-1500: FS
367	**SA2.5.02.04 Environmental Monitoring**			975	02-Oct-18	02-Jun-21	35		
368	5.02.04	52-2000	Installation of Monitoring Stations & Wells (GP & GW)	120	02-Oct-18	29-Jan-19	0	23-1600: FS	52-2200: SS 60
369	5.02.04	52-2100	Installation of Monitoring Stations & Wells (GP & GW) on Buttress Wall	120	02-Oct-18	29-Jan-19	0	23-1600: FS	52-2200: SS 60
370	5.02.04	52-2200	Conduct Baseline Monitoring for Construction (one month)	30	01-Dec-18	30-Dec-18	0	52-2000: SS 60, 52-2100: SS 60	11-1100: FS
371	5.02.04	52-2300	Conduct Baseline Monitoring for Operation (one year)	365	03-Jun-20	02-Jun-21	35	32-1500: FS -400, 53-4500: FS	12-1400: FS
372	**SA2.5.03 Civil Engineering Works**			748	13-Jan-19	29-Jan-21	834		
373	**SA2.5.03.0 Buttress Wall**			475	02-Mar-19	18-Jun-20	83		
374	5.03.0	53-1000	Section adj. SENT	300	13-Apr-19	06-Feb-20	96	11-1300: FS, 23-2500: FS, 53-3000: FS, 31-1200: FS, 11-1400: FS	53-1100: FS, 53-1300: FS, 53-3100: FS, M 3. 5: FS -150, M 3. 7: FS
375	5.03.0	53-1100	Diversion of SENT Landfill Gas Pipe	45	07-Feb-20	22-Mar-20	96	23-2500: FS, 53-1000: FS	53-1300: FS, 54-4000: FS, M 3. 3: FS
376	5.03.0	53-1200	Section at Cell 4	400	02-Mar-19	04-Apr-20	83	11-1300: FS, 23-2500: FS, 53-3000: FS, 11-1400: FS	53-1300: FS, 53-3100: FS, M 3. 7: FS, M 3. 6: FS -200
377	5.03.0	53-1300	Install Landfill Gas Pipe on Buttress Wall	75	05-Apr-20	18-Jun-20	83	41-1500: FS, 53-1100: FS, 53-1200: FS, 53-1000: FS	54-4000: FS
378	**SA2.5.03.1 Landfill Cell 1**			503	13-Jan-19	29-May-20	214		
379	5.03.1	53-1400	Earth bund (Eastern)	90	04-Aug-19	01-Nov-19	9	11-1100: FS, 23-2500: FS, 53-4200: FS, 53-2800: FS	53-2000: FS, 53-2300: FS, 53-3400: FS, 63-1000: FS, 63-1100: FS, 63-1200: FS, 63-1300: FS, M 4. 2: FS
380	5.03.1	53-1500	Earth bund (Southern)	90	26-Apr-19	24-Jul-19	314	11-1100: FS, 23-2500: FS, 53-2800: FS	53-2000: FS, 53-2200: FS, 53-2300: FS, 53-3400: FS, 53-3700: FS, 53-3800: FS
381	5.03.1	53-1600	Earth bund (Western)	90	13-Jan-19	12-Apr-19	417	11-1100: FS, 23-2500: FS	53-1900: FS, 53-2000: FS, 53-2200: FS, 53-3800: FS
382	5.03.1	53-1700	Intercell bund (Cell 1/2)	75	13-Jan-19	28-Mar-19	432	11-1100: FS, 23-2500: FS	53-2000: FS
383	5.03.1	53-1800	Site Formation	90	13-Jan-19	12-Apr-19	217	11-1100: FS, 23-2500: FS, 31-1300: FS	53-1900: FS, 63-1100: FS, 63-1200: FS, 63-1300: FS, M 4. 1: FS -45
384	5.03.1	53-1900	Pump Station (PS#1X)	45	13-Apr-19	27-May-19	507	53-1800: FS, 53-1600: FS	53-2100: FS, 53-2200: FS
385	5.03.1	53-2000	Lining Works	135	02-Nov-19*	15-Mar-20	214	41-1500: FS, 53-1400: FS, 53-1500: FS, 53-1600: FS, 53-1700: FS	53-2100: FS
386	5.03.1	53-2100	Protective Stone Laying & Leachate Collection Pipe	75	16-Mar-20	29-May-20	214	53-2000: FS, 41-1500: FS, 53-1900: FS	32-1500: FS, 54-2800: FS, M 4. 3: FS
387	5.03.1	53-2200	Install Leachate Force Main	75	25-Jul-19	07-Oct-19	449	53-1500: FS, 53-1600: FS, 41-1500: FS, 53-1900: FS	54-2800: FS
388	5.03.1	53-2300	Install Landfill Gas Pipe on earth bund	55	02-Nov-19	26-Dec-19	258	41-1500: FS, 53-1400: FS, 53-1500: FS	54-4000: FS
389	5.03.1	53-2400	Leachate Pipe Connection (Cell 1 to LTP)	30	09-Mar-20	07-Apr-20	266	23-2500: FS, 54-1000: SS	54-2800: FS
390	**SA2.5.03.4 Landfill Cell 4**			30	09-Jul-20	07-Aug-20	144		
391	5.03.4	53-2500	Provide Temporary Leachate Pipe on Cell 4 Area	30	09-Jul-20	07-Aug-20	144	23-2500: FS, 63-2600: SS -90	54-2800: FS, M 3. 3: FS
392	**SA2.5.03.5 Drainage - Surface Run-Off**			740	16-Jan-19	24-Jan-21	839		
393	5.03.5	53-2600	Construct Cut-Off Channel 12A	60	16-Jan-19	16-Mar-19	9	11-1100: FS, 23-2800: FS	53-2700: FS
394	5.03.5	53-2700	Connect Cut-Off Channel 12A to DP6	20	17-Mar-19	05-Apr-19	9	53-2600: FS, 31-1400: FS, 23-1900: FS	53-2800: FS
395	5.03.5	53-2800	Diversion from Existing Trapezoidal Channel into Channel 12A	20	06-Apr-19	25-Apr-19	9	53-2700: FS	53-1400: FS, 53-1500: FS, 53-2900: FS, 63-1000: FS, 63-1900: FS, M 3. 3: FS
396	5.03.5	53-2900	Removal of Existing Trapezoidal Channel along Eastern Bund	30	26-Apr-19	25-May-19	9	53-2800: FS	53-4200: FS
397	5.03.5	53-3000	Cut-Off Channel C4 Diversion to Cut-Off Channel 17-2	45	16-Jan-19	01-Mar-19	83	11-1300: FS, 23-2800: FS	53-1000: FS, 53-1200: FS
398	5.03.5	53-3100	Cut-Off Channel X5 on Buttress Wall, Cell 4, Cell 3	90	05-Apr-20	03-Jul-20	289	53-1000: FS, 53-1200: FS	53-3200: FS
399	5.03.5	53-3200	Temporary Diversion Cut-Off Channel X5 to 12A	20	04-Jul-20	23-Jul-20	289	53-3100: FS, 23-1900: FS	53-3300: FS, M 3. 4: FS
400	5.03.5	53-3300	Culvert X5 (5m long) & Perm Connection of Cut-Off Channel X5	30	26-Dec-20	24-Jan-21	134	53-4100: FF, 63-1900: FS, 53-3200: FS	32-1500: FS
401	5.03.5	53-3400	Construct Perimeter Channel X6 on Eastern Bund & Southern Bund of Cell 1	50	02-Nov-19	21-Dec-19	249	53-1400: FS, 53-1500: FS	53-3500: FS
402	5.03.5	53-3500	Construct Perimeter Channel X6 on Eastern Bund of Cell 2	50	20-Feb-20	09-Apr-20	189	63-1000: FS, 53-3400: FS	53-3600: FS
403	5.03.5	53-3600	Construct Perimeter Channel X6 Eastern Bund of Cell 3	50	09-Jun-20	28-Jul-20	129	63-1900: FS, 53-3500: FS	53-3900: FS
404	5.03.5	53-3700	Culvert X6 (25m long) at Cell 1 Southern Bund	75	25-Jul-19	07-Oct-19	1314	53-1500: FS	
405	5.03.5	53-3800	Perimeter Channel (X9B) at Cell 1 Southern & Western Bund	45	25-Jul-19	07-Sep-19	1344	53-1500: FS, 53-1600: FS	
406	5.03.5	53-3900	Drop Inlet & Culvert (X9) - 21m long	180	29-Jul-20	24-Jan-21	129	11-1100: FS, 23-1900: FS, 53-3600: FS	53-4000: FF, 53-4100: FF, 53-6000: FS, M 9. 1: FS -90, M 9. 2: FS
407	5.03.5	53-4000	Sediment Trap (ST)	180	29-Jul-20	24-Jan-21	129	11-1100: FS, 23-1900: FS, 11-1200: FS, 53-3900: FF	53-6000: FS, M 9. 3: FS -90, M 9. 4: FS
408	5.03.5	53-4100	Dual Culvert 74m long (connect to DP4)	180	29-Jul-20	24-Jan-21	129	11-1100: FS, 11-1200: FS, 23-1900: FS, 53-3900: FF	53-3300: FF, 53-6000: FS, M 9. 1: FS -90, M 9. 2: FS
409	**SA2.5.03.6 Drainage - Ground Water**			200	26-May-19	11-Dec-19	209		
410	5.03.6	53-4200	Construct Groundwater Collection Pipe along Cells X1 & X2 Eastern Bund	70	26-May-19	03-Aug-19	9	11-1100: FS, 23-1600: FS, 53-2900: FS	53-1400: FS, 53-4300: FS, 63-1000: FS, 63-1900: FS
411	5.03.6	53-4300	Construct Groundwater Collection Pipe along Cell X3 Eastern Bund	50	04-Aug-19	22-Sep-19	159	53-4200: FS	53-4400: FS, 63-1900: FS
412	5.03.6	53-4400	Construct Groundwater Collection Pipe along Intercell Bund X2/X3	50	23-Sep-19	11-Nov-19	209	53-4300: FS	53-4500: FS, 63-1200: FS
413	5.03.6	53-4500	Construct Manhole MH-X1	30	12-Nov-19	11-Dec-19	209	53-4400: FS	52-2300: FS, M 9. 5: FS
414	**SA2.5.03.7 Utilities - Distribution within New Infrastructure Area**			391	11-Aug-19	04-Sep-20	276		
415	5.03.7	53-4600	Power Supply HV Works (Transformer & HV switchgear)	5	30-Jun-20	04-Jul-20	0	54-3000: FS	12-1200: FS
416	5.03.7	53-4700	Power Distribution, LV Power Supply Works	2	05-Jul-20	06-Jul-20	0	54-3100: FS, 12-1200: FS	12-1000: FS
417	5.03.7	53-4800	Sewerage (Collection to LTP)	60	07-Jul-20	04-Sep-20	271	54-1000: FS, 54-3100: FS, 54-3300: FS, 54-4100: FS	12-1100: FS, 53-6100: FS
418	5.03.7	53-4900	Sewerage (Discharge to Site Boundary)	60	07-Jul-20	04-Sep-20	271	54-1000: FS, 54-4100: FS, 54-4600: FS	12-1100: FS, 53-6100: FS
419	5.03.7	53-5000	Lighting Provision	30	07-Jul-20	05-Aug-20	6	54-1000: FS, 54-4100: FS, 54-4600: FS	12-1100: FS, 32-2100: FS
420	5.03.7	53-5100	Fire Services	115	12-Mar-20	04-Jul-20	2	53-6800: FS	12-1000: FS
421	5.03.7	53-5200	Water Supply (Fresh & Salt)	115	12-Mar-20	04-Jul-20	338	53-6600: FS, 53-6700: FS	12-1100: FS
422	5.03.7	53-5300	Telecom & Network	45	11-Aug-19	24-Sep-19	622	53-6400: FS	12-1100: FS
423	5.03.7	53-5400	Gas Network (LFG to LTP)	15	22-Jun-20	06-Jul-20	176	54-1000: FF	54-2800: FS
424	**SA2.5.03.8 Utilities - Works Associated with Utilities Undertakers**			703	27-Feb-19	29-Jan-21	129		
425	SA2.5.03.8.U1 CLP			459	27-Feb-19	30-May-20	43		
426	5.03.8.U1	53-5500	Excavate Trench for CLP Cable	100	13-May-19	20-Aug-19	194	23-2900: FS	53-5800: FS, 54-1000: SS, 54-4100: SS, 54-4600: SS, M10. 1: FS -60, M10. 2: FS -30, M10. 3: FS
427	5.03.8.U1	53-5600	Backfill Trench after CLP Cable Laying	30	01-May-20	30-May-20	43	53-5800: FS	54-1000: FF, 54-4100: FF, 54-4600: FF
428	5.03.8.U1	53-5700	CLP Cable Laying (from CLP Substation to Site Boundary)	200	27-Feb-19	14-Sep-19	229	32-2400: FS	54-3000: FS
429	5.03.8.U1	53-5800	CLP Cable Laying (from Site Boundary to HV Switchroom)	60	02-Mar-20	30-Apr-20	0	53-5500: FS, 54-2900: FS, 32-2400: FS, 53-5900: FF 15	53-5600: FS, 54-3000: FS
430	5.03.8.U1	53-5900	CLP HV associated equipment installation	120	18-Dec-19	15-Apr-20	0	54-2900: FS, 32-2400: FS	53-5800: FF 15
431	SA2.5.03.8.U2 DSD			147	05-Sep-20	29-Jan-21	129		
432	5.03.8.U2	53-6000	Connection to Storm Drain System	5	25-Jan-21	29-Jan-21	129	53-4100: FS, 53-4000: FS, 53-3900: FS	32-1500: FS
433	5.03.8.U2	53-6100	Connection to Foul Drain System	5	05-Sep-20	09-Sep-20	271	53-4800: FS, 53-4900: FS	32-1500: FS
434	SA2.5.03.8.U3 Telecom			100	13-May-19	20-Aug-19	327		
435	5.03.8.U3	53-6200	Excavate Trench for PCCW	60	13-May-19	11-Jul-19	307	23-2900: FS	53-6400: FS, 54-1000: SS, 54-4100: SS, 54-4600: SS, M10. 1: FS -40, M10. 2: FS -20, M10. 3: FS
436	5.03.8.U3	53-6300	Backfill Trench after PCCW Cable Laying	10	11-Aug-19	20-Aug-19	327	53-6400: FS	54-1000: FF, 54-4100: FF, 54-4600: FF
437	5.03.8.U3	53-6400	Laying Cables & Connection	30	12-Jul-19	10-Aug-19	327	53-6200: FS	53-5300: FS, 53-6300: FS
438	SA2.5.03.8.U4 WSD			304	13-May-19	11-Mar-20	338		
439	5.03.8.U4	53-6500	Install Watermain & Piping for Water Supplies	60	13-May-19	11-Jul-19	216	23-2900: FS	53-6600: FS, 53-6700: FS, 53-6800: FS, 53-6900: FS
440	5.03.8.U4	53-6600	Connection for Fresh Water & Meter Installation	30	11-Feb-20	11-Mar-20	338	53-6500: FS, 32-2300: FS	53-5200: FS
441	5.03.8.U4	53-6700	Connection for Salt Water	30	11-Feb-20	11-Mar-20	338	53-6500: FS, 32-2300: FS	53-5200: FS
442	5.03.8.U4	53-6800	Connection for Fire Services	30	11-Feb-20	11-Mar-20	2	53-6500: FS, 32-2300: FS	53-5100: FS
443	5.03.8.U4	53-6900	Connection for Cooling Tower & Meter Installation	30	11-Feb-20	11-Mar-20	117	53-6500: FS, 32-2300: FS	54-2700: FS, 54-3900: FS
444	SA2.5.03.8.U5 HyD Lighting			120	07-Jul-20	03-Nov-20	216		
445	5.03.8.U5	53-7000	Installation of Public Street Lighting / Handover	120	07-Jul-20	03-Nov-20	216	54-4100: FS, 54-4600: FS, 54-1000: FS	32-1500: FS
446	**SA2.5.04 Building Construction, incl. E&M and System Installation, and T&C**			890	31-Dec-18	07-Jun-21	0		
447	**SA2.5.04.A Part X1 Area A**			554	31-Dec-18	06-Jul-20	36		
448	5.04.A	54-1000	General Area & Access Road	120	09-Mar-20	06-Jul-20	6	23-1300: FS, 53-5500: SS, 53-5600: FF, 53-6200: SS, 53-6300: FF, 12-1000: FF, 11-1100: FS, 54-1100: FF, 54-1800: FF	32-2100: FS, 53-2400: SS, 53-4800: FS, 53-4900: FS, 53-5000: FS, 53-5400: FF, 53-7000: FS, 68-1700: FS
449	5.04.A	54-1100	Carpark & Supporting Area	60	31-Dec-18	28-Feb-19	64	23-1300: FS, 11-1100: FS	32-1500: FS, M 5.11: FS -30, M 5.12: FS, 54-1000: FF, 54-1800: FS
450	5.04.A	54-1200	Diesel Fuel Tanks	60	08-May-20	06-Jul-20	36	23-1300: FS, 23-5200: FS, 12-1000: FF, 11-1100: FS	32-2200: FS
451	5.04.A	54-1300	EPD Building	270	30-Apr-19	24-Jan-20	44	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-1700: SS 60	32-2100: FS, M 5. 4: FS -135, M 5. 5: FS, 12-1000: FS, 54-1400: SS 60
452	5.04.A	54-1400	Fire Service Tank	270	29-Jun-19	24-Mar-20	44	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-1300: SS 60	32-2100: FS, M 5.10: FS, 12-1000: FS, 54-1600: SS 60
453	5.04.A	54-1500	GVL Building	300	31-Dec-18	26-Oct-19	44	23-1300: FS, 23-5200: FS, 11-1100: FS	32-2100: FS, M 5. 1: SF 30, M 5. 2: SF 150, M 5. 3: FS, 54-1700: SS 60
454	5.04.A	54-1600	Laboratory Building	270	28-Aug-19	23-May-20	44	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-1400: SS 60	32-2100: FS, M 5. 6: FS -135, M 5. 7: FS, 12-1000: FS, 32-2200: FS
455	5.04.A	54-1700	Maintenance Building & Area	270	01-Mar-19	25-Nov-19	44	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-1500: SS 60	32-2100: FS, M 5. 8: FS -135, M 5. 9: FS, 12-1000: FS, 54-1300: SS 60
456	5.04.A	54-1800	Storage Facility & Area	60	01-Mar-19	29-Apr-19	64	23-1300: FS, 11-1100: FS, 54-1100: FS	32-1500: FS, M 5.11: FS -30, M 5.12: FS, 54-1000: FF, 54-2000: FS
457	5.04.A	54-1900	Waste Oil Tanks	90	08-Apr-20	06-Jul-20	36	23-1300: FS, 23-5200: FS, 12-1000: FF, 11-1100: FS	32-2200: FS
458	5.04.A	54-2000	Water Service House	60	30-Apr-19	28-Jun-19	64	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-1800: FS	32-2100: FS, M 5.10: FS, 12-1000: FS, 54-4400: FS
459	**SA2.5.04.B Part X1 Area B**			890	31-Dec-18	07-Jun-21	0		
460	SA2.5.04.B.1 BioPlant Building			330	17-Jan-19	12-Dec-19	243		
461	5.04.B.1	54-2100	LTP BioPlant Building	330	17-Jan-19	12-Dec-19	243	23-1300: FS, 23-5200: FS, 23-3200: FS, 11-1100: FS, 31-1000: FS	32-2100: FS, 32-2200: FS, M 6. 2: FS -165, M 6. 3: FS
462	SA2.5.04.B.2 Leachate Treatment Plant			589	31-Dec-18	10-Aug-20	21		
463	5.04.B.2	54-2200	Main Plant Area included Civil works	274	31-Dec-18	30-Sep-19	0	23-1300: FS, 23-3200: FS, 11-1100: FS	54-2300: FS, 54-2400: FS, 54-2500: FS, 64-1100: FS, M 6. 1: SF 30, M 6. 4: FS -137, M 6. 5: FS
464	5.04.B.2	54-2300	MEP Installation	220	01-Oct-19	07-May-20	0	41-2100: FS, 41-1800: FS, 22-2100: FS, 54-2200: FS, 11-1100: FS	12-1000: FS 60, 32-1900: FS, 54-2600: FS, M 6. 8: FS -110, M 6. 9: FS, 32-2200: FS
465	5.04.B.2	54-2400	SBR Tanks	100	01-Oct-19	08-Jan-20	236	41-2400: FS, 54-2200: FS	54-2600: FS, M 6. 6: FS
466	5.04.B.2	54-2500	Ammonia Stripper	315	01-Oct-19	10-Aug-20	21	41-3000: FS, 54-2200: FS	54-2600: FS, M 6. 8: FS -150, M 6. 9: FS
467	SA2.5.04.B.3 LTP - Test & Commission			301	11-Aug-20	07-Jun-21	0		
468	5.04.B.3	54-2600	Dry testing	45	11-Aug-20	24-Sep-20	21	54-2300: FS, 54-2400: FS, 54-2500: FS	23-6600: FS -150, 23-6900: SS, 54-2700: FS, M11. 1: FS
469	5.04.B.3	54-2700	Wet testing	75	25-Sep-20	08-Dec-20	21	54-2600: FS, 12-1200: FS, 53-6900: FS, 31-2200: FS, 23-6800: FS	54-2800: FS, M11. 2: FS
470	5.04.B.3	54-2800	Operational testing	160	30-Dec-20	07-Jun-21	0	54-2700: FS, 53-2400: FS, 53-2500: FS, 53-2100: FS, 53-2200: FS, 63-1700: FS, 63-2600: FS, 53-5400: FS, 54-4000: FS	32-1500: FS, M11. 3: FS, M11. 4: FS
471	**SA2.5.04.C Part X1 Area C**			730	31-Dec-18	29-Dec-20	0		
472	SA2.5.04.C.1 LFG - Power Supply Building			530	17-Jan-19	29-Jun-20	5		
473	5.04.C.1	54-2900	LFG Building (with Transformer Room)	335	17-Jan-19	17-Dec-19	0	23-1300: FS, 23-3500: FS, 11-1100: FS, 31-1000: FS	53-5800: FS, 53-5900: FS, 54-3000: FS, 54-3100: FS, M 7. 6: FS
474	5.04.C.1	54-3000	Transformer & HV Swtichgear Installation	60	01-May-20	29-Jun-20	0	54-2900: FS, 41-1200: FS, 53-5800: FS, 53-5700: FS	53-4600: FS, M 7. 4: FS -30, M 7. 5: FS, M 7. 5: FF
475	5.04.C.1	54-3100	MEP Installation, with T&C	75	18-Dec-19	01-Mar-20	125	54-2900: FS	32-1400: FS, 32-2100: FS, 53-4700: FS, 53-4800: FS, M 7. 4: FS -30, M 7. 5: FS
476	SA2.5.04.C.2 LFG Treatment Plant			554	31-Dec-18	06-Jul-20	0		
477	5.04.C.2	54-3200	Main Plant Area included Civil Works	384	31-Dec-18	18-Jan-20	0	23-3500: FS, 11-1100: FS	54-3300: FS, 54-3400: FS, 54-3500: FS, 54-3600: FS, 54-3700: FS, 54-3800: FS, M 7. 1: SF 30, M 7. 2: FS -200, M 7. 3: FS
478	5.04.C.2	54-3300	MEP Installation	170	19-Jan-20	06-Jul-20	0	54-3200: FS, 12-1000: FF	32-2000: FS, 53-4800: FS, 54-3900: FS, M 7. 4: FS -80, M 7. 5: FS
479	5.04.C.2	54-3400	GHS600 Blower 601 A&B Relocation	15	19-Jan-20	02-Feb-20	155	23-5800: FS, 54-3200: FS	54-3900: FS, M 7. 4: FS -8, M 7. 5: FS
480	5.04.C.2	54-3500	Pre-treatment	60	19-Jan-20	18-Mar-20	110	41-3900: FS, 54-3200: FS	54-3900: FS, M 7. 4: FS -30, M 7. 5: FS
481	5.04.C.2	54-3600	Flares (incl. PLC control, interlink to Towngas PF & LTP)	125	19-Jan-20	22-May-20	45	41-3300: FS, 54-3200: FS	54-3900: FS, M 7. 4: FS -60, M 7. 5: FS
482	5.04.C.2	54-3700	LFG Engine (incl. on-grid protection, PLC control, turning)	110	21-Feb-20	09-Jun-20	27	41-3600: FS, 54-3200: FS	54-3900: FS, M 7. 4: FS -60
483	5.04.C.2	54-3800	Cooling System	45	19-Jan-20	03-Mar-20	125	22-1500: FS, 54-3200: FS	54-3900: FS, M 7. 4: FS -25, M 7. 5: FS
484	SA2.5.04.C.3 LFG - Test & Commission			176	07-Jul-20	29-Dec-20	0		
485	5.04.C.3	54-3900	MEP Testing	65	07-Jul-20	09-Sep-20	0	54-3400: FS, 54-3500: FS, 54-3600: FS, 54-3700: FS, 54-3800: FS, 12-1200: FS, 53-6900: FS, 31-2200: FS, 54-3300: FS	23-7000: SS -150, 23-7300: SS, 54-4000: FS, M11. 1: FS -30, M11. 2: FS
486	5.04.C.3	54-4000	Operational Testing	111	10-Sep-20	29-Dec-20	0	53-1300: FS, 63-2700: FS, 63-1800: FS, 53-2300: FS, 53-1100: FS, 54-3900: FS, 23-7200: FS	32-1500: FS, 54-2800: FS, 63-4800: FF, 63-4900: FS, 63-4600: FS, M11. 3: FS, M11. 4: FS
487	**SA2.5.04.D Part X1 Area D**			374	29-Jun-19	06-Jul-20	6		
488	5.04.D	54-4100	General Area & Access Road	120	09-Mar-20	06-Jul-20	6	23-1300: FS, 53-5500: SS, 53-5600: FF, 53-6200: SS, 53-6300: FF, 12-1000: FF, 11-1100: FS	32-2100: FS, 53-4800: FS, 53-4900: FS, 53-5000: FS, 53-7000: FS, M 8. 5: FS
489	5.04.D	54-4200	VWF Building	120	28-Oct-19	24-Feb-20	63	23-1300: FS, 23-5200: FS, 41-4500: FS, 11-1100: FS, 54-4300: SS 60	32-2100: FS, M 8. 4: FS, M 8. 6: FS -60, M 8. 7: FS, 12-1000: FS, 54-4500: SS 60
490	5.04.D	54-4300	Weighbridge	75	29-Aug-19	11-Nov-19	63	41-4200: FS, 23-1300: FS, 23-5200: FS, 11-1100: FS, 54-4400: SS 60	32-2100: FS, M 8. 6: FS -40, M 8. 7: FS, 54-4200: SS 60
491	5.04.D	54-4400	Weighmaster House	120	29-Jun-19	26-Oct-19	64	23-1300: FS, 23-5200: FS, 11-1100: FS, 54-2000: FS	32-2100: FS, M 8. 1: FS, 12-1000: FS, 54-4300: SS 60
492	5.04.D	54-4500	Wheel Wash Bath	75	27-Dec-19	10-Mar-20	63	23-1300: FS, 23-5200: FS, 41-4500: FS, 11-1100: FS, 54-4200: SS 60	32-2100: FS, M 8. 3: FS, 12-1000: FS, 54-4700: SS 30
493	**SA2.5.04.E Part X1 Area E & Part X2**			163	26-Jan-20	06-Jul-20	6		
494	5.04.E	54-4600	General Area & Access Road	120	09-Mar-20	06-Jul-20	6	53-5500: SS, 53-5600: FF, 53-6200: SS, 53-6300: FF, 12-1000: FF, 11-1100: FS, 11-1200: FS	32-2100: FS, 53-4900: FS, 53-5000: FS, 53-7000: FS
495	5.04.E	54-4700	Guard House & Entrance Gate	100	26-Jan-20	04-May-20	63	23-1300: FS, 23-5200: FS, 11-1100: FS, 11-1200: FS, 54-4500: SS 30	32-2100: FS, M 8. 2: FS, 12-1000: FS
496	**SA2.5.08 Landscape Works - Advance Screen Planting in CWB Country Park**			270	01-Apr-19	26-Dec-19	529		
497	**SA2.5.08.N Area N**			270	01-Apr-19	26-Dec-19	529		
498	5.08.N	58-1000	Advance Screen Planting	90	01-Apr-19*	29-Jun-19	529	23-7900: FS, 31-1100: FS, 11-1500: FS	14-1800: SS -60, 58-1100: SS, 68-1600: SS 30, M 3. 2: FS
499	5.08.N	58-1100	Establishment of Screen Planting	270	01-Apr-19*	26-Dec-19	529	58-1000: SS, 14-1800: FS	32-1500: FS
500	**SA2.5.08.S Area S**			270	01-Apr-19	26-Dec-19	529		
501	5.08.S	58-1200	Advance Screen Planting	90	01-Apr-19*	29-Jun-19	529	23-7900: FS, 31-1100: FS, 11-1500: FS	58-1300: SS, M 3. 2: FS
502	5.08.S	58-1300	Establishment of Screen Planting	270	01-Apr-19*	26-Dec-19	529	58-1200: SS	32-1500: FS
503	**SA2.6 Construction (Remaining Works)**			1474	01-Apr-19	13-Apr-23	30		
504	**SA2.6.02 Advance Works**			80	09-Jul-21	26-Sep-21	339		
505	**SA2.6.02.9 Demolition of SENT Infrastructure Area**			80	09-Jul-21	26-Sep-21	339		
506	6.02.9	62-1000	Existing SENT General Infrastructure Facility & Building	60	09-Jul-21	06-Sep-21	239	32-2100: FS, 12-1300: FS	23-2000: SS -90, 63-2800: FS, 63-2900: FS, 63-3000: FS, 63-4300: FS, M12. 4: FS -30, M12. 5: FS
507	6.02.9	62-1100	Existing SENT LTP	60	29-Jul-21	26-Sep-21	339	32-1500: FS, 12-1300: FS, 23-2200: FS	63-3000: FS, 63-4500: FS, M12. 4: FS -30, M12. 5: FS
508	6.02.9	62-1200	Existing SENT LFG	60	29-Jul-21	26-Sep-21	339	32-1500: FS, 12-1300: FS, 23-2200: FS	63-3000: FS, 63-4500: FS, M12. 4: FS -30, M12. 5: FS



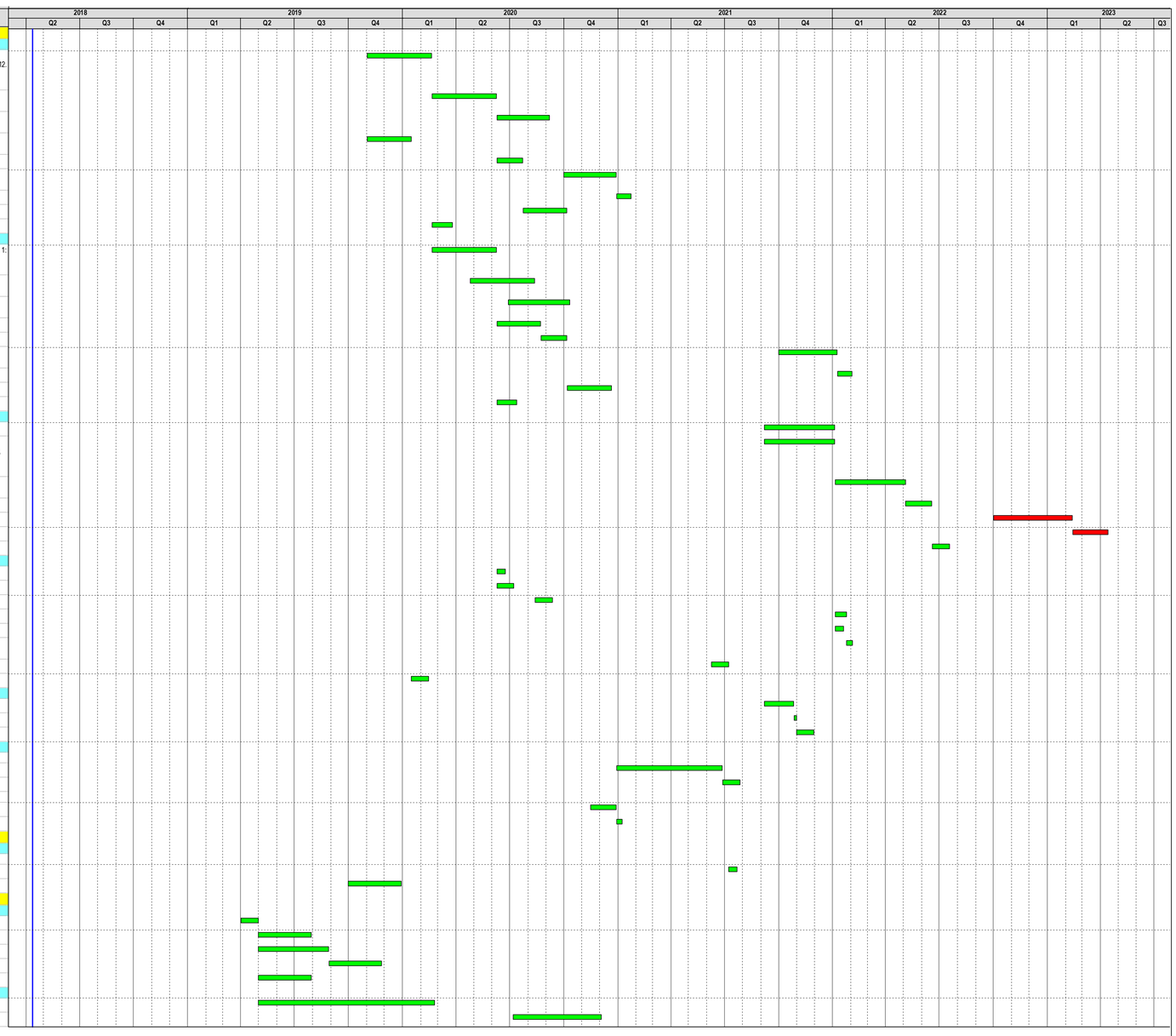
Remaining Work
Critical Remaining Work
Milestone

South-East New Territories Land Fill Extension (SA2-SENTX)
Baseline Programme

GREEN VALLEY LANDFILL, LIMITED

Date	Revision	Checked	Approved
11-May-18	SENTX-GVL-W-PB-ZZ-0001 Rev. I01		
20-Jul-18	SENTX-GVL-W-PB-ZZ-0001 Rev. I02 (Detailed)		

#	WBS Path	Activity ID	Activity Name	Dur	Start	Finish	Total Float	Predecessor Details	Successor Details
509			**SA2.6.03 Civil Engineering Works**	1259	02-Nov-19	13-Apr-23	30		
510			**SA2.6.03.2 Landfill Cell 2**	449	02-Nov-19	23-Jan-21	810		
511	6.03.2	63-1000	Earth bund (Eastern)	110	02-Nov-19	19-Feb-20	9	11-1100: FS, 23-2500: FS, 53-4200: FS, 53-1400: FS, 53-2800: FS	53-3500: FS, 63-1500: FS, 63-1800: FS, 63-1900: FS, 63-2000: FS, 63-2100: FS, 63-2200: FS, M12. 1: FS -50, M12. 2: FS, 63-1100: FS
512	6.03.2	63-1100	Earth bund (Western)	110	20-Feb-20	08-Jun-20	84	11-1100: FS, 23-2500: FS, 53-1800: FS, 53-1400: FS, 63-1000: FS	63-1400: FS, 63-1500: FS, 63-1700: FS, 63-3500: FS, 63-3600: FS, 63-1200: FS
513	6.03.2	63-1200	Intercell bund (Cell 2/3)	90	09-Jun-20	06-Sep-20	734	11-1100: FS, 23-2500: FS, 53-1800: FS, 53-1400: FS, 53-4400: FS, 63-1100: FS	63-1500: FS
514	6.03.2	63-1300	Site Formation	75	02-Nov-19	15-Jan-20	14	11-1100: FS, 23-2500: FS, 53-1800: FS, 53-1400: FS	63-1400: FS, 63-4200: FS
515	6.03.2	63-1400	Pump Station (PS#2X)	45	09-Jun-20	23-Jul-20	84	63-1300: FS, 63-1100: FS	63-1600: FS, 63-1700: FS
516	6.03.2	63-1500	Lining Works	90	01-Oct-20*	29-Dec-20	710	41-1500: FS, 63-1000: FS, 63-1100: FS, 63-1200: FS	63-1600: FS, M12. 3: FS, 63-2400: FS
517	6.03.2	63-1600	Protective Stone Laying & Leachate Collection Pipe	25	30-Dec-20	23-Jan-21	810	63-1500: FS, 41-1500: FS, 63-1400: FS	32-1600: FS, M12. 3: FS
518	6.03.2	63-1700	Install Leachate Force Main	75	24-Jul-20	06-Oct-20	84	63-1100: FS, 41-1500: FS, 63-1400: FS	54-2800: FS, M12. 3: FS
519	6.03.2	63-1800	Install Landfill Gas Pipe on earth bund	35	20-Feb-20	25-Mar-20	168	41-1500: FS, 63-1000: FS	54-4000: FS, M12. 3: FS
520			**SA2.6.03.3 Landfill Cell 3**	714	20-Feb-20	02-Feb-22	435		
521	6.03.3	63-1900	Earth bund (Eastern)	110	20-Feb-20	08-Jun-20	9	11-1100: FS, 53-4200: FS, 63-1000: FS, 53-4300: FS, 53-2800: FS, 63-4200: FS	53-3300: FS, 53-3600: FS, 63-2400: FS, 63-2700: FS, M12. 1: FS -50, M12. 2: FS, 63-2000: FS -45, 63-2200: FS
522	6.03.3	63-2000	Earth bund (Western)	110	25-Apr-20	12-Aug-20	19	11-1100: FS, 63-1000: FS, 63-1900: FS -45	63-2300: FS, 63-2400: FS, 63-2600: FS, 63-3700: FS, 63-2100: FS -45
523	6.03.3	63-2100	Intercell bund (Cell 3/4)	105	29-Jun-20	11-Oct-20	789	11-1100: FS, 63-1000: FS, 63-4200: FS, 63-2000: FS -45	63-2400: FS
524	6.03.3	63-2200	Site Formation	75	09-Jun-20	22-Aug-20	9	11-1100: FS, 63-1000: FS, 63-1900: FS	63-2300: FS
525	6.03.3	63-2300	Pump Station (PS#3X)	45	23-Aug-20	06-Oct-20	9	63-2200: FS, 63-2000: FS	63-2500: FS, 63-2600: FS
526	6.03.3	63-2400	Lining Works	100	01-Oct-21*	08-Jan-22	435	41-1500: FS, 63-1900: FS, 63-2000: FS, 63-2100: FS, 63-1500: FS	63-2500: FS, M12. 3: FS
527	6.03.3	63-2500	Protective Stone Laying & Leachate Collection Pipe	25	09-Jan-22	02-Feb-22	435	63-2400: FS, 41-1500: FS, 63-2300: FS	32-1700: FS, M12. 3: FS
528	6.03.3	63-2600	Install Leachate Force Main	75	07-Oct-20	20-Dec-20	9	63-2000: FS, 41-1500: FS, 63-2300: FS	53-2500: SS -90, 54-2800: FS, M12.3: FS
529	6.03.3	63-2700	Install Landfill Gas Pipe on earth bund	35	09-Jun-20	13-Jul-20	58	41-1500: FS, 63-1900: FS	54-4000: FS, M12. 3: FS
530			**SA2.6.03.4 Landfill Cell 4**	584	07-Sep-21	13-Apr-23	30		
531	6.03.4	63-2800	Remaining Portion of Buttress Wall	120	07-Sep-21	04-Jan-22	494	62-1000: FS	
532	6.03.4	63-2900	Earth bund (Western) incl. MSE Wall	120	07-Sep-21	04-Jan-22	239	62-1000: FS	63-3000: FS, 63-3100: FS, 63-3200: FS, 63-3400: FS, 63-3800: FS, 63-3900: FS, 63-4100: SS -90, M 9. 6: FS -60, M 9. 7: FS -30, M 9. 8: FS
533	6.03.4	63-3000	Site Formation	120	05-Jan-22	04-May-22	239	62-1000: FS, 62-1100: FS, 62-1200: FS, 63-2900: FS, 63-4100: FS	63-3100: FS
534	6.03.4	63-3100	Pump Station (PS#4X)	45	05-May-22	18-Jun-22	239	63-3000: FS, 63-2900: FS	63-3300: FS, 63-3400: FS
535	6.03.4	63-3200	Lining Works	135	01-Oct-22*	12-Feb-23	0	41-1500: FS, 63-2900: FS	63-3300: FS, M12. 6: FS
536	6.03.4	63-3300	Protective Stone Laying & Leachate Collection Pipe	60	13-Feb-23	13-Apr-23	0	41-1500: FS, 63-3200: FS, 63-3100: FS	12-1900: FS, 32-1800: FS, M12. 6: FS
537	6.03.4	63-3400	Install Leachate Force Main & Remove Temporary Leachate Pipe	30	19-Jun-22	18-Jul-22	269	41-1500: FS, 63-2900: FS, 63-3100: FS	12-1900: FS, 32-1800: FS, M12. 6: FS
538			**SA2.6.03.5 Drainage - Surface Run-Off**	750	16-Jan-20	03-Feb-22	464		
539	6.03.5	63-3500	Perimeter Channel (X9A) at Cell 2 Western Bund	15	09-Jun-20	23-Jun-20	1054	63-1100: FS	12-1900: FS
540	6.03.5	63-3600	Perimeter Channel (X10A) at Cell 2 Western Bund	30	09-Jun-20	08-Jul-20	1029	63-1100: FS	63-4000: FS
541	6.03.5	63-3700	Perimeter Channel (X10A) at Cell 3 Western Bund	30	13-Aug-20	11-Sep-20	964	63-2000: FS	63-4000: FS
542	6.03.5	63-3800	Perimeter Channel (X10A) at Cell 4 Western Bund	20	05-Jan-22	24-Jan-22	464	63-2900: FS	63-4000: FS
543	6.03.5	63-3900	Perimeter Channel (X10C) at Cell 4 Western Bund	15	05-Jan-22	19-Jan-22	469	63-2900: FS	63-4000: FS
544	6.03.5	63-4000	Connection to Existing DP3	10	25-Jan-22	03-Feb-22	464	63-3900: FS, 63-3600: FS, 63-3700: FS, 63-3800: FS	12-1900: FS
545	6.03.5	63-4100	Remove Cut-Off Channel C-7 at bottom of Buttress Wall	30	09-Jun-21	08-Jul-21	419	63-2900: SS -90	63-3000: FS
546	6.03.5	63-4200	Temporary Channel (X7T) at SENT Infrastructure Area	30	16-Jan-20	14-Feb-20	14	63-1300: FS	63-1900: FS, 63-2100: FS
547			**SA2.6.03.6 Drainage - Ground Water**	85	07-Sep-21	30-Nov-21	529		
548	6.03.6	63-4300	Construct Temporary Channel (TC-1), from MH-1 to Existing UC-825	50	07-Sep-21	26-Oct-21	529	23-1900: FS, 11-1300: FS, 62-1000: FS	63-4400: FS
549	6.03.6	63-4400	Divert GW at MH-1 to TC-1	5	27-Oct-21	31-Oct-21	529	63-4300: FS	63-4500: FS, M 9. 9: FS
550	6.03.6	63-4500	Reconnection of GWCP across Cell 4	30	01-Nov-21	30-Nov-21	529	62-1100: FS, 62-1200: FS, 63-4400: FS	12-1900: FS
551			**SA2.6.03.8 Utilities - Works Associated with Utilities Undertakes**	255	15-Nov-20	27-Jul-21	655		
552			SA2.6.03.8.U1 CLP	210	30-Dec-20	27-Jul-21	655		
553	6.03.8.U1	63-4600	LFG Generator On-grid Testing	180	30-Dec-20	27-Jun-21	655	32-2500: FS, 12-1200: FS, 54-4000: FS	63-4700: FS
554	6.03.8.U1	63-4700	LFG Generator On-grid Inspection & Verify	30	28-Jun-21	27-Jul-21	655	63-4600: FS	12-1900: FS
555			SA2.6.03.8.U6 TownGas	55	15-Nov-20	08-Jan-21	855		
556	6.03.8.U6	63-4800	Laying Gas Mains (from LFG to Town Gas PF)	45	15-Nov-20	29-Dec-20	855	54-4000: FF	63-4900: FS
557	6.03.8.U6	63-4900	Gas Meter Relocation & Connection at LFG	10	30-Dec-20	08-Jan-21	855	63-4800: FS, 54-4000: FS	12-1900: FS
558			**SA2.6.04 Building & E&M Works**	661	01-Oct-19	22-Jul-21	660		
559			**SA2.6.04.C Part X1 Area C**	661	01-Oct-19	22-Jul-21	660		
560			SA2.6.04.C.02 LFG Treatment Plant	661	01-Oct-19	22-Jul-21	660		
561	6.04.C.02	64-1000	GHS600 Blower 601 C Relocation	15	08-Jul-21	22-Jul-21	660	32-1500: FS	12-1900: FS
562	6.04.C.02	64-1100	Absorption Chiller (Optional)	90	01-Oct-19	29-Dec-19	1231	54-2200: FS	12-1900: FS
563			**SA2.6.08 Landscape Works**	613	01-Apr-19	03-Dec-20	891		
564			**SA2.6.08.1 SENT Area - Tree Removal & Transplanting**	240	01-Apr-19	26-Nov-19	1264		
565	6.08.1	68-1000	Access trees condition and select for transplanting	30	01-Apr-19*	30-Apr-19	1264	14-1300: FS	68-1100: FS, 68-1200: FS, 68-1400: FS
566	6.08.1	68-1100	Prepare new site to receive trees	90	01-May-19	29-Jul-19	1264	68-1000: FS	68-1200: SS
567	6.08.1	68-1200	Transplant selected trees	120	01-May-19	28-Aug-19	1264	68-1000: FS, 68-1100: SS	68-1300: FS
568	6.08.1	68-1300	Prune trees prior to removal from Cell 4	90	29-Aug-19	26-Nov-19	1264	68-1200: FS	12-1900: FS
569	6.08.1	68-1400	Tree Felling - Part X3	90	01-May-19	29-Jul-19	1384	23-8200: FS, 31-1600: FS, 68-1000: FS	12-1900: FS
570			**SA2.6.08.2 SENTX Area - Trial Nursery & Tree Planting**	583	01-May-19	03-Dec-20	891		
571	6.08.2	68-1600	Trial Nursery	300	01-May-19	24-Feb-20	1174	14-1800: FS, 58-1000: SS 30	12-1900: FS, M 3. 2: FS
572	6.08.2	68-1700	Landscaping in New Infrastructure Area	150	07-Jul-20	03-Dec-20	891	54-1000: FS, 23-7600: FS	12-1900: FS



Remaining Work
Critical Remaining Work
Milestone

South-East New Territories Land Fill Extension (SA2-SENTX)
Baseline Programme

GREEN VALLEY LANDFILL LIMITED

Date	Revision	Checked	Approved
11-May-18	SENTX-GVL-W-PB-ZZ-0001 Rev. I01		
20-Jul-18	SENTX-GVL-W-PB-ZZ-0001 Rev. I02 (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) D C O/R A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
Air Quality – Construction Phase								
4.8.1	AQ1	<u>Blasting</u> • 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	✓	*Air Pollution Control (Construction Dust) Regulations*	Not applicable. Blasting is not required in the latest landfill design
4.8.1	AQ2	<u>Rock Drilling</u> • 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	✓	*Air Pollution Control (Construction Dust) Regulations*	Not applicable. Rock drilling is not required in the latest landfill design

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

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4.8.1	AQ3	<u>Site Access Road</u> • 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.	To minimise potential dust nuisance	Main haul road	SENTX Contractor		✓			*Air Pollution Control (Construction Dust) Regulations* *HKAQO and EIAO-TM Annex 4*	Deficiency of mitigation measures but rectified by the Contractor
4.8.1	AQ4	<u>Stockpiling of Dusty Materials</u> • 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* *HKAQO and EIAO-TM Annex 4*	Implemented
4.8.1	AQ5	<u>Loading, unloading or transfer of dusty materials</u> • 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* *HKAQO and EIAO-TM Annex 4*	Implemented
4.8.1	AQ6	<u>Site Boundary and Entrance</u> • 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* *HKAQO and EIAO-TM Annex 4*	Not applicable

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4.8.1	AQ7	<u>Excavation Works</u> • 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.	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	AQ8	<u>Building Demolition</u> • 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> • 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 *Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1* should be implemented.	To minimise potential dust nuisance	Stone crushing plant/ construction phase	SENTX Contractor		✓			*Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1*	Not applicable. Stone crushing plant is not required in the latest landfill design

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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		✓			*HKAQO and EIAO-TM Annex 4*	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 *Figure 3.2a*	SENTX Contractor		✓			*HKAQO and EIAO-TM Annex 4*	Implemented
Air Quality – Operation, Restoration and Aftercare Phases											
4.8.2	AQ13	<u>Odour</u> • Enclosing the weighbridge area	To minimise odour nuisance	Weighbridge area	SENTX Contractor	✓		✓		*EIAO-TM Annex 4*	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	✓		✓		*EIAO-TM Annex 4*	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			✓		*EIAO-TM Annex 4*	Not Applicable. As SENTX will receive construction waste

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		before leaving the tipping face									only, which is relatively dry, the amount of liquor generated is expected to minimal
4.8.2	AQ16	• Washing down the area where spillage of RCV liquor is discovered promptly	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		*EIAO-TM Annex 4*	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	• 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			✓		*EIAO-TM Annex 4*	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	• 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	✓		✓	✓	*EIAO-TM Annex 4*	Implemented
4.8.2	AQ19	• Progressive restoration of the areas which	To minimise	SENTX Site	SENTX	✓		✓	✓	*EIAO-TM Annex 4*	Implemented

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		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	odour nuisance		Contractor						
4.8.2	AQ20	• Installing deodorizers along the site boundary adjacent to the ASRs	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor			✓	✓	*EIAO-TM Annex 4*	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary.
4.8.2	AQ21	• 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	✓		✓	✓	*EIAO-TM Annex 4*	Implemented
4.8.2 and SENTX latest design	AQ22	• Maintaining the size of the active tipping face not greater than 1,200 m^2	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		*EIAO-TM Annex 4*	Implemented
4.8.2	AQ23	• Promptly covering the MSW with soil or selected inert materials to control odour emissions	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		*EIAO-TM Annex 4*	Not Applicable. SENTX will not receive MSW.
4.8.2	AQ24	• 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			✓		*EIAO-TM Annex 4*	Not Applicable. SENTX will not have

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								any special waste trench.
4.8.2 and SENTX latest design	AQ25	• 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	✓	*EIAO-TM Annex 4*	Implemented
4.8.2	AQ26	• 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	✓	*EIAO-TM Annex 4*	Not Applicable. SENTX will not have any special waste trench.
4.8.2	AQ27	• 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	✓	*EIAO-TM Annex 4*	Implemented
4.8.2	AQ28	• 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	✓	*EIAO-TM Annex 4*	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary. Moreover, SENTX will not have any special waste

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											trench.
4.8.2	AQ29	• 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			✓		*EIAO-TM Annex 4*	Not Applicable. SENTX will not have any special waste trench.
4.8.2 and SENTX latest design	AQ30	• 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	✓		✓	✓	*EIAO-TM Annex 4*	Implemented
4.8.2 and SENTX latest design	AQ31	• 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	✓		✓	✓	*EIAO-TM Annex 4*	Implemented
4.8.2	AQ32	• Rescheduling of waste filling activities on-site by avoiding waste filling activities carrying out at the northern area of the site in the summer months between July to November	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		*EIAO-TM Annex 4*	Not Applicable. As SENTX will receive construction waste only which is significantly less

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											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			✓		*HKAQO and EIAO-TM Annex 4*	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			✓		*HKAQO and EIAO-TM Annex 4*	Implemented
4.8.2	AQ35	• Limiting the vehicle speed within SENTX site boundary;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		*HKAQO and EIAO-TM Annex 4*	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			✓		*HKAQO and EIAO-TM Annex 4*	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 emissions;	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ39	Providing sufficient underground landfill gas collection system to capture the landfill gas	To minimise gaseous	SENTX Site	SENTX Contractor			✓	✓	*EIAO-TM Annex 4*	Implemented

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		generated as much as possible; and	emissions, including LFG and VOCs								
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_2S, 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
4.10.2 and SENTX	AQ43	Monitoring of parameters for thermal oxidizer, flares and generator in accordance with requirements stated in Tables 3.4a, 3.5a	Ensure the gaseous emission from the project	At the flares and thermal oxidizer stacks	SENTX Contractor			✓	✓ (1)	Emission Limits specified in Contract	Implemented

(1) For LFG flare and LFG generator only.

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latest design		and 3.6a of the EM&A Manual respectively.	meets the air quality requirement	when they are in operation							
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			✓		*EIAO-TM Annex 4*	Implemented
4.10.2	AQ46	Monitoring of meteorological station, continuously	Collect site specific meteorological data	At meteorological station shown in *Figure 11.3a*	SENTX Contractor		✓	✓	✓	-	Implemented
Noise – Construction Phase											
5.7.1	N1	Adopt good site practice listed below:	To minimise	All	SENTX		✓			*Noise Control*	Implemented

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		• 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 construction activities.	potential construction noise nuisance.	construction works area	Contractor		*Ordinance (NCO) and EIAO-TM Annex 5*	
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

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Noise – Operation/Restoration Phase											
5.7.2	N3	Adopt good site practice listed below: • Choose quieter PME;	To minimise potential operational noise nuisance.	Within the SENTX Site	SENTX Contractor			✓		*Noise Control Ordinance (NCO) and EIAO-TM Annex 5*	Implemented
		• Include noise levels specification when ordering new plant items;								-	Implemented
		• Locate fixed plant items or noise emission points away from the NSRs as far as practicable;								-	Implemented
		• Locate noisy machines in completely enclosed plant rooms or buildings; and								-	Implemented
		• 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.								-	Implemented

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5.8	N4	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
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*	Implemented
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	All construction works area	SENTX Contractor		✓			*ProPECC PN 1/94* *WPCO* *EIAO-TM Annex 6*	Deficiency of mitigation measures but rectified by the Contractor

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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
			works								
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
6.8.1	WQ5	• 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	• 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	• 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	• 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	SENTX Site	SENTX Contractor		✓			*ProPECC PN 1/94* *WPCO* *Waste Disposal*	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) D C O/R A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
			improper handling of fuel and oil				*Ordinance (WDO)*	
6.8.1	WQ9	• Implementation of excavation schedules, lining and covering of excavated stockpiles	To minimise contaminated stormwater run-off from the SENTX Site	All construction works	SENTX Contractor	✓	*ProPECC PN 1/94* *WPCO* *EIAO-TM Annex 6*	Implemented
6.13	WQ10	• 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>						
		• 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	• 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	• A licensed waste collector will be employed to clean the chemical toilets on a	To minimise potential water	SENTX Site	SENTX Contractor	✓	*WPCO* *WDO*	Implemented

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		regular basis.	quality impacts arising from the sewage effluents								
Water Quality – Operation/Restoration and Aftercare Phases											
6.9.1	WQ14	<u>Surface Water Management</u> • Inspections of the drainage system, sand traps, settlement ponds and surface water channels will be performed regularly to identify areas necessary for maintenance, cleaning or repair.	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		*WPCO* *Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM)* *EIAO-TM Annex 6*	Implemented
6.9.1	WQ15	• 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* *Water-TM* *EIAO-TM Annex 6*	Implemented
6.9.1	WQ16	• 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* *Water-TM*	Implemented

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6.9.2 and SENTX latest design	WQ17	<u>Groundwater Management</u> • 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* *Water-TM* *EIAO-TM Annex 6*	Implemented
6.9.2	WQ18	• 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* *Water-TM* *EIAO-TM Annex 6*	Implemented
SENTX latest design	WQ19	<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			✓	✓	-	Implemented
6.9.3	WQ20	<u>Leachate Management</u> • 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* *Water-TM* *EIAO-TM Annex 6*	Implemented

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6.9.3	WQ21	• 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* *Water-TM*	Implemented
6.9.3	WQ22	• 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* *Water-TM* *EIAO-TM Annex 6*	Implemented
6.9.3	WQ23	• 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* *Water-TM* *EIAO-TM Annex 6*	Implemented
6.9.3 and SENTX latest design	WQ24	• 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	To minimise potential water quality impacts on surrounding water bodies	Leachate treatment plant	SENTX Contractor			✓	✓	*WPCO* *Water-TM* *EIAO-TM Annex 6*	Implemented

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		landfill if the leachate storage lagoon are full and leachate cannot be transported to the LTP for treatment.	arising from the landfill operations.								
6.13	WQ25	• 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* *Water-TM*	Implemented
6.10.1	WQ26	<u>Potential Leakage of Leachate</u>									Implemented
		• 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*	
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	SENTX Site	SENTX Contractor			✓	✓	*WPCO* *Water-TM* *EIAO-TM Annex 6*	Implemented

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			arising from surface breakout of leachate.								
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 requirements	Before construction works commence	SENTX Contractor	✓	✓			*WDO*	Implemented
7.6.1	WM2	<u>Management of Waste Disposal</u> 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. A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓			*WDO* *Waste Disposal (Charges for Disposal of Construction Waste) Regulation;* *Works Bureau Technical Circular No.31/2004; and* *Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)*	Implemented

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		established.						
7.6.1	WM3	<u>Measures for the Reduction of Construction Waste Generation</u>						
		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-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.	To reduce construction waste generation	SENTX Site	SENTX Contractor	✓	*WDO* *EIAO-TM Annex 7*	Implemented
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 *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.*	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor	✓	*WDO* *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes*	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* *EIAO-TM Annex 7*	Implemented
7.6.1 and SENTX	WM6	<u>General Refuse</u>						
		General refuse will be stored in enclosed bins	To ensure proper	SENTX Site	SENTX	✓	*WDO*	Deficiency of

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latest design		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 can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	handling of general refuse		Contractor		*EIAO-TM Annex 7*	mitigation measures but rectified by the Contractor
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								

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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
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 *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.*	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor			✓		*WDO* *EIAO-TM Annex 7* *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes*	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* *EIAO-TM Annex 7*	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.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		*WDO* *EIAO-TM Annex 7*	Implemented

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		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.									
Landfill Gas Hazards – Design and Construction Phase											
8.6.2 and SENTX latest design	LFG1	Precautionary measures to be adopted by the 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 *Landfill Gas Hazard Assessment Guidance Notes (the Guidance Note*). Those precautionary measures applicable to the SENTX will be confirmed in the detailed Qualitative Landfill Gas Hazard Assessment to be submitted by the contractor.	To protect workers from landfill gas risk	All construction works area	SENTX Contractor		✓			*Paragraphs 8.3 to 8.49 of EPD's Landfill Gas Hazards Assessment Guidance Note* *EIAO-TM Annex 7*	Implemented
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 *Guidance Note* 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	To protect workers from landfill gas risk	Confined space within the construction works area	SENTX Contractor		✓				Implemented

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		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.									
8.6.3	LFG4	Implementation of engineering measures according to Contract Specification requirements. These measures will include the placement of liner and installation of landfill gas management system to contain, manage and control landfill gas.	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor	✓	✓	✓	✓	*EIAO-TM Annex 7*	Implemented
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 *Guidance Notes*). 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	✓	✓			*EPD's Landfill Gas Hazards Assessment Guidance Note* *EIAO-TM Annex 7*	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	To protect workers from	SENTX Site	SENTX Contractor			✓	✓	*Landfill Gas Hazards Assessment Guidance*	Implemented

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		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.	landfill gas risk							*Note*	
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			✓	✓	*Landfill Gas Hazards Assessment Guidance Note*	Implemented
Ecology – Construction Phase											
9.10.2	EC1	Measures to control construction runoff: • Exposed soil areas will be minimised to reduce the contamination of runoff and erosion;	To minimise potential water quality impacts affecting ecological resources	All construction works area	SENTX Contractor		✓			*EIAO-TM Annex 16* *ProPECC PN 1/94* *Water Pollution Control Ordinance (WPCO)* *EIAO-TM Annex 6*	Implemented
		• To prevent stormwater runoff from washing across exposed soil surfaces, perimeter channels will be constructed								-	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) D C O/R A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		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;					-	Deficiency of mitigation measures but rectified by the Contractor
		• Temporary covers such as tarpaulin will also be provided to minimise the generation of high suspended solids runoff;					-	Implemented
		• The surface runoff contained any oil and grease will pass through the oil interceptors; and,					-	Implemented
		• 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
9.10.2 and SENTX latest design	EC2	<u>Good Construction Practice</u>:						
		• Fences along the boundary of the SENTX Site will be erected before the commencement of works to prevent vehicle movements, and encroachment	To minimise potential ecological impacts arising	SENTX Site	SENTX Contractor	✓	*EIAO-TM Annex 16*	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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		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.	from the Project								
Ecology – Operation, Restoration and Aftercare Phases											
9.10.2	EC3	<u>Measures for Controlling Leakage of Landfill Leachate</u> 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			✓	✓	*EIAO-TM Annex 16* *WPCO* *Water-TM* *EIAO-TM Annex 6*	Implemented
9.10.2	EC4	<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			✓	✓	*EIAO-TM Annex 16*	Implemented
9.10.3 and SENTX latest	EC5	The following compensation planting is recommended as the mitigation measures for the habitat affected due to the SENTX:	Compensation of habitat loss due to the Project	SENTX Site	SENTX Contractor			✓	✓	*EIAO-TM Annex 16*	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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
design		• Provision of 6 ha of mixed woodland planting to compensate the loss of shrubland; and • Provision 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.									
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			✓	✓	*EIAO-TM Annex 16*	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,	To enhance ecological value of the habitats	SENTX Site	SENTX Contractor			✓	✓	*EIAO-TM Annex 16*	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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		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).									
9.10.3	EC8	It is also recommended that a trial nursery for native plant species be set up to fine tone the planting matrix and management intensity of the recommended indigenous tree species for 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.	To select the most suitable indigenous tree species for the SENTX	SENTX Site	SENTX Contractor	✓		✓	✓	*EIAO-TM Annex 16*	Implemented
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

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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
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 will include storage and reuse of topsoil as appropriate.	To minimise the landscape and visual impacts	All construction works area	SENTX Contractor		✓			*EIAO-TM Annex 18*	Not applicable
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		✓			*EIAO-TM Annex 18 and ETWBC 3/2006*	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.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor	✓	✓			*EIAO-TM Annex 18 and ETWBC 3/2006*	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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		Sufficient time for necessary tree root and crown preparation periods will be allowed in the project programme.									
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		✓			*EIAO-TM Annex 18*	Implemented
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	✓	✓			*EIAO-TM Annex 18*	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	✓	✓			*EIAO-TM Annex 18 and ETWBC 7/2002*	Not applicable
10.6.5	LV8	CM8 - Planting trials will be carried out in an	To minimise the	SENTX Site	SENTX		✓			*EIAO-TM Annex 18*	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) D	C	O/R	A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		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.	landscape and visual impacts		Contractor						
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 *ER Report* 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	✓	✓			*EIAO-TM Annex 18*	Implemented
Landscape and Visual – Operation/Restoration Phase											
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	To minimise the landscape and	Tipping area	SENTX Contractor			✓		*EIAO-TM Annex 18*	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] D C O/R A	What requirements or standards for the measure to achieve?	Implementation Status and Remarks
		number of units and lux level and will be hooded and directional.	visual impacts					
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

January 2023

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

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

February 2023

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

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

March 2023

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

Annex D

Air Quality

Annex D1

24-hour TSP Monitoring Results

Table D1.1 24-hour TSP Monitoring Results at AM1

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m3)
1 Jan 23	8:00	2 Jan 23	7:33	Sunny	50
7 Jan 23	8:00	8 Jan 23	7:37	Cloudy	178
13 Jan 23	8:00	14 Jan 23	7:48	Cloudy	43
19 Jan 23	8:00	20 Jan 23	7:36	Cloudy	140
25 Jan 23	8:00	26 Jan 23	8:06	Cloudy	118
31 Jan 23	8:00	1 Feb 23	7:48	Sunny	509
6 Feb 23	8:00	7 Feb 23	7:36	Sunny	109
12 Feb 23	8:00	13 Feb 23	7:45	Fine	75
18 Feb 23	8:00	19 Feb 23	8:11	Fine	89
24 Feb 23	8:00	25 Feb 23	8:11	Sunny	192
2 Mar 23	8:00	3 Mar 23	7:58	Sunny	401
8 Mar 23	8:00	9 Mar 23	8:02	Sunny	165
14 Mar 23	8:00	15 Mar 23	7:46	Cloudy	306
20 Mar 23	8:00	21 Mar 23	7:46	Cloudy	171
26 Mar 23	8:00	27 Mar 23	8:17	Rainy	58
				Average	174
				Min	43
				Max	509

Figure D1.1 Graphical Presentation for 24-hr TSP Monitoring at AM1

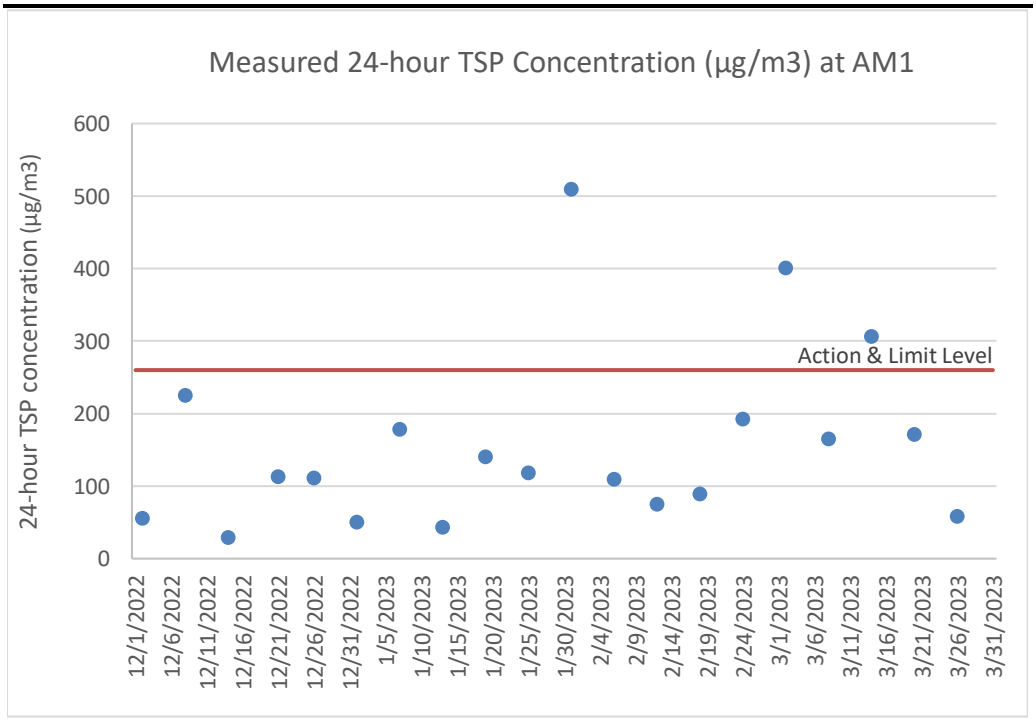


Table D1.2 24-hour TSP Monitoring Results at AM2

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m3)
1 Jan 23	8:00	2 Jan 23	7:42	Sunny	56
7 Jan 23	8:00	8 Jan 23	7:38	Cloudy	337
13 Jan 23	8:00	14 Jan 23	7:58	Cloudy	47
19 Jan 23	8:00	20 Jan 23	7:33	Cloudy	84
25 Jan 23	8:00	26 Jan 23	7:39	Cloudy	64
31 Jan 23	8:00	1 Feb 23	7:33	Sunny	266
6 Feb 23	8:00	7 Feb 23	7:33	Sunny	61
12 Feb 23	8:00	13 Feb 23	8:07	Fine	43
18 Feb 23	8:00	19 Feb 23	7:43	Fine	93
24 Feb 23	8:00	25 Feb 23	7:56	Sunny	211
2 Mar 23	8:00	3 Mar 23	7:53	Sunny	236
8 Mar 23	8:00	9 Mar 23	8:13	Sunny	313
14 Mar 23	8:00	15 Mar 23	7:39	Cloudy	452
20 Mar 23	8:00	21 Mar 23	7:48	Cloudy	151
26 Mar 23	8:00	27 Mar 23	8:25	Rainy	108
				Average	168
				Min	43
				Max	452

Figure D1.2 Graphical Presentation for 24-hr TSP Monitoring at AM2

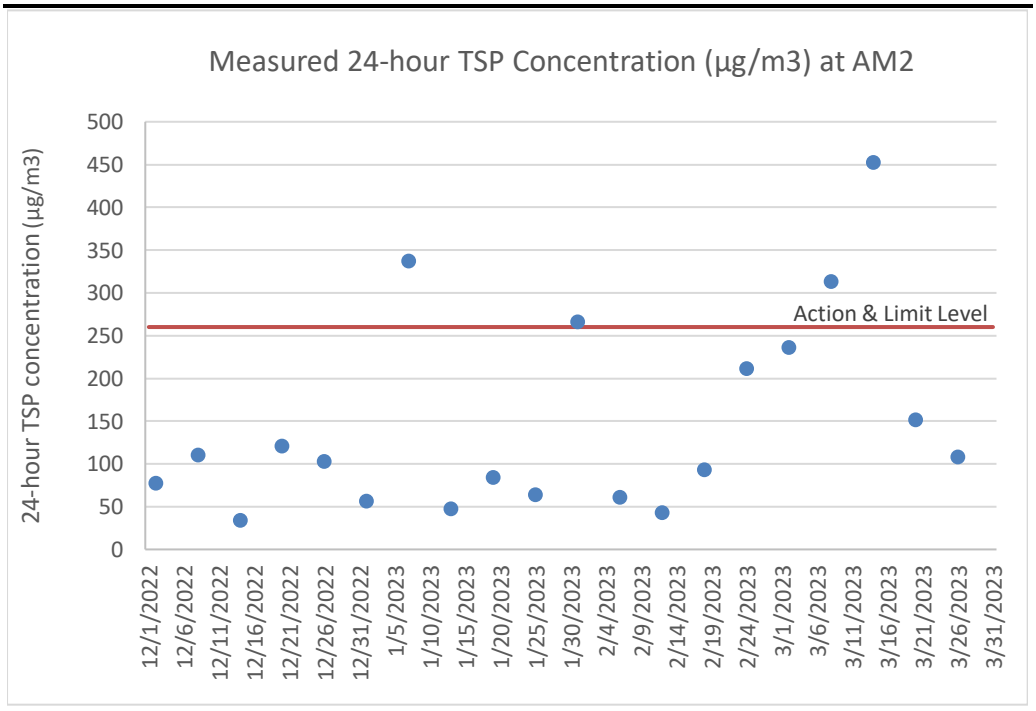


Table D1.3 24-hour TSP Monitoring Results at AM3

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m3)
1 Jan 23	8:00	2 Jan 23	7:44	Sunny	80
7 Jan 23	8:00	8 Jan 23	7:52	Cloudy	134
13 Jan 23	8:00	14 Jan 23	7:55	Cloudy	78
19 Jan 23	8:00	20 Jan 23	7:33	Cloudy	224
25 Jan 23	8:00	26 Jan 23	7:42	Cloudy	137
31 Jan 23	8:00	1 Feb 23	7:45	Sunny	267
6 Feb 23	8:00	7 Feb 23	8:05	Sunny	115
12 Feb 23	8:00	13 Feb 23	7:32	Fine	62
18 Feb 23	8:00	19 Feb 23	7:56	Fine	191
24 Feb 23	8:00	25 Feb 23	8:01	Sunny	187
2 Mar 23	8:00	3 Mar 23	8:05	Sunny	225
8 Mar 23	8:00	9 Mar 23	8:04	Sunny	129
14 Mar 23	8:00	15 Mar 23	7:50	Cloudy	106
20 Mar 23	8:00	21 Mar 23	8:02	Cloudy	124
26 Mar 23	8:00	27 Mar 23	8:07	Rainy	41
				Average	140
				Min	41
				Max	267

Figure D1.3 Graphical Presentation for 24-hr TSP Monitoring at AM3

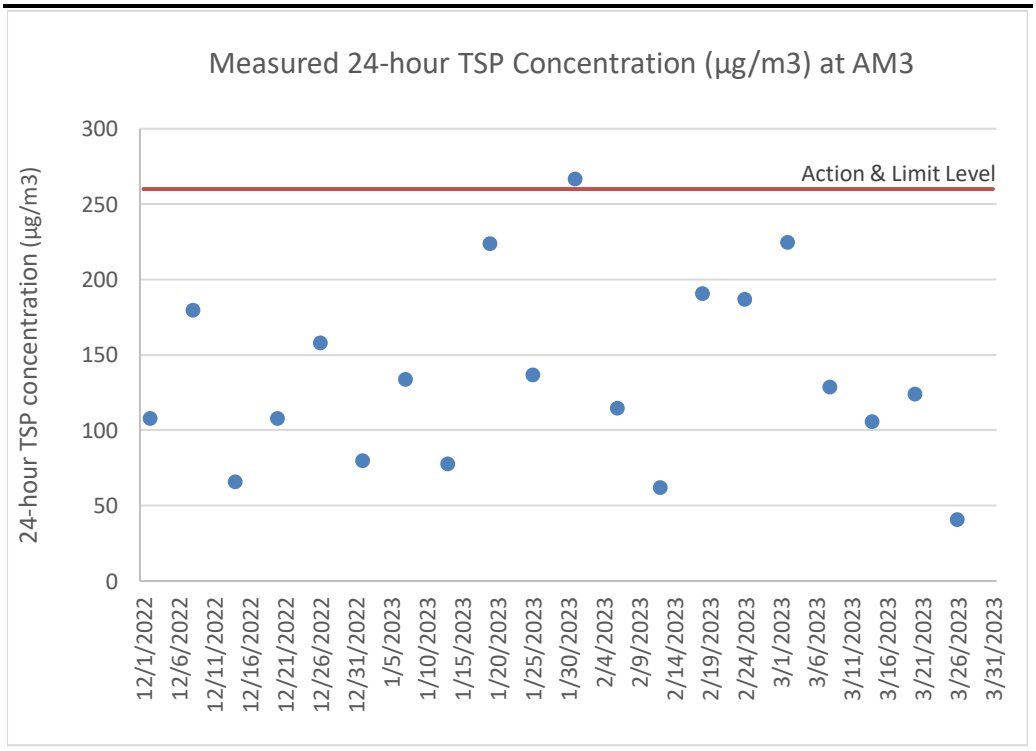
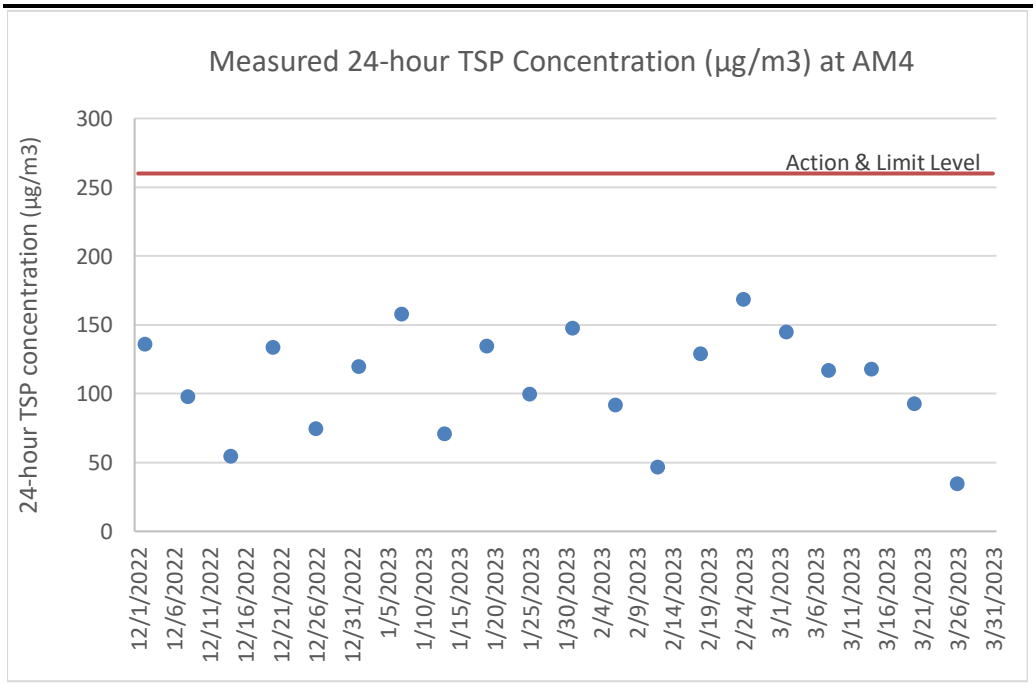


Table D1.4 24-hour TSP Monitoring Results at AM4

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m3)
1 Jan 23	8:00	2 Jan 23	7:38	Sunny	120
7 Jan 23	8:00	8 Jan 23	7:52	Cloudy	158
13 Jan 23	8:00	14 Jan 23	7:37	Cloudy	71
19 Jan 23	8:00	20 Jan 23	7:41	Cloudy	135
25 Jan 23	8:00	26 Jan 23	7:51	Cloudy	100
31 Jan 23	8:00	1 Feb 23	7:36	Sunny	148
6 Feb 23	8:00	7 Feb 23	7:33	Sunny	92
12 Feb 23	8:00	13 Feb 23	7:40	Fine	47
18 Feb 23	8:00	19 Feb 23	7:59	Fine	129
24 Feb 23	8:00	25 Feb 23	7:45	Sunny	169
2 Mar 23	8:00	3 Mar 23	7:38	Sunny	145
8 Mar 23	8:00	9 Mar 23	8:16	Sunny	117
14 Mar 23	8:00	15 Mar 23	7:32	Cloudy	118
20 Mar 23	8:00	21 Mar 23	7:41	Cloudy	93
26 Mar 23	8:00	27 Mar 23	8:19	Rainy	35
				Average	112
				Min	35
				Max	169

Figure D1.4 Graphical Presentation for 24-hr TSP Monitoring at AM4



Annex D2

Event and Action Plan for Air Quality Monitoring

Annex D2 Event and Action Plan for Air Quality Monitoring During Operation/ Restoration Phase

	Action		
Event	**ET**	**IEC**	**Contractor**
Exceedance of Action/Limit Level for dust monitoring	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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_2S at the monitoring locations	• 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	• 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	• Rectify any unacceptable practice • Amend working methods as required • Implement amended working methods, if necessary

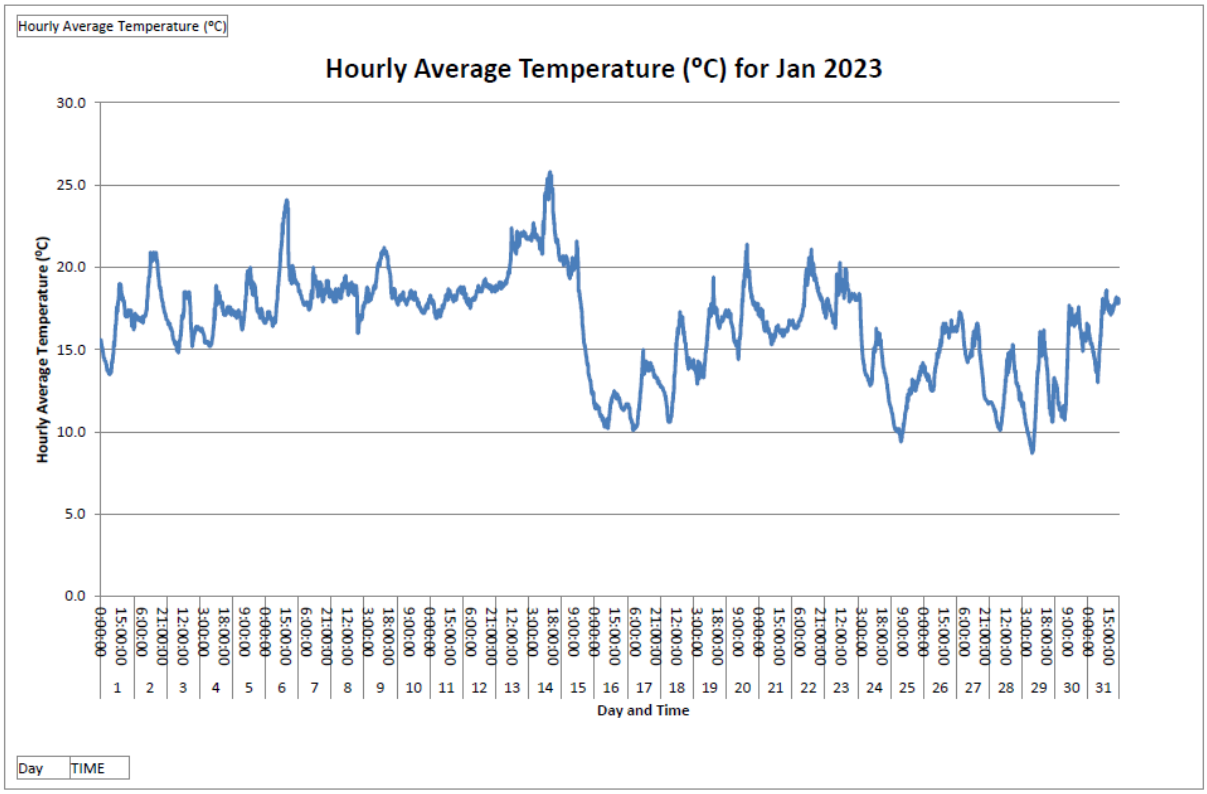
	Action		
Event	**ET**	**IEC**	**Contractor**
Exceedance of Limit Level of stack emission of the thermal oxidizer, flares and generator	• Identify source(s) and investigate the cause(s) of exceedance • Prepare the Notification of Exceedance within 24 hours • Inform Contractor, IEC, Project Proponent and 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	• 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	• Rectify any unacceptable performance • Amend design as required • Implement amended design, if necessary

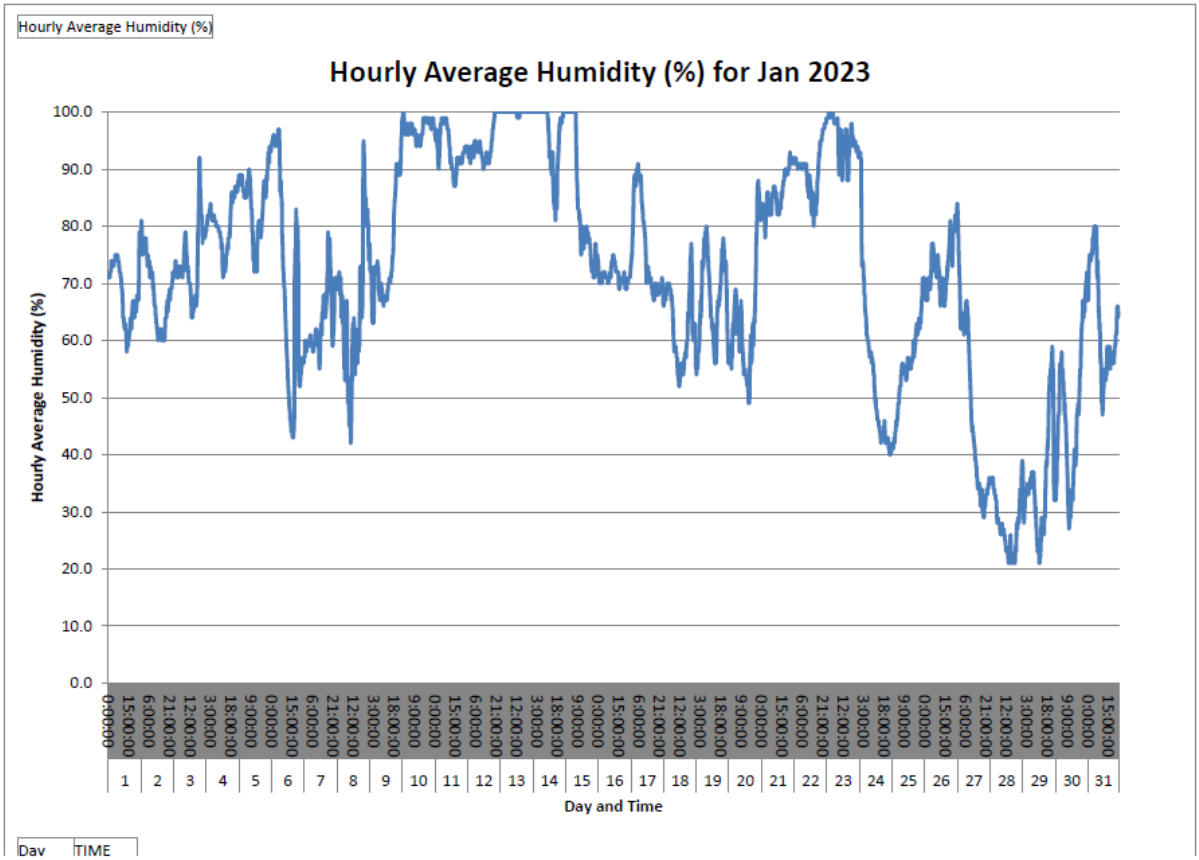
Annex D3

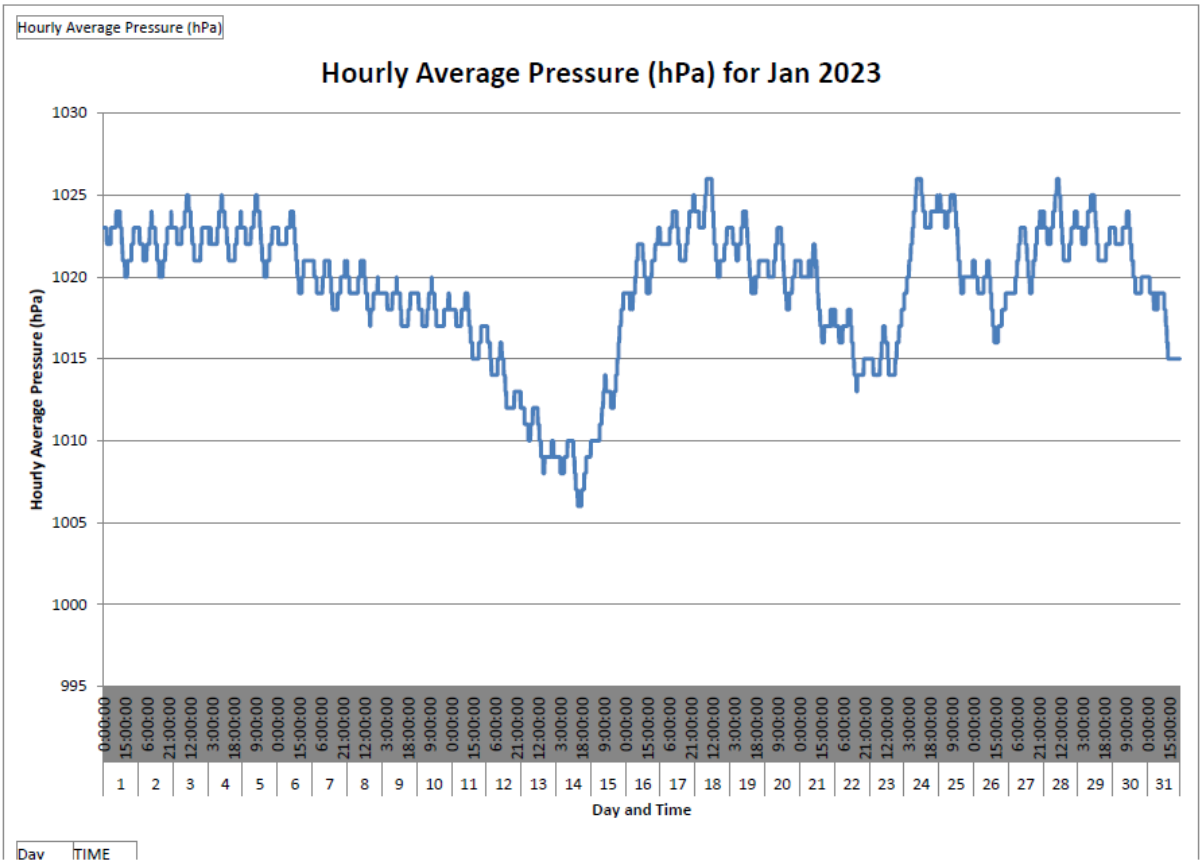
Meteorological Data

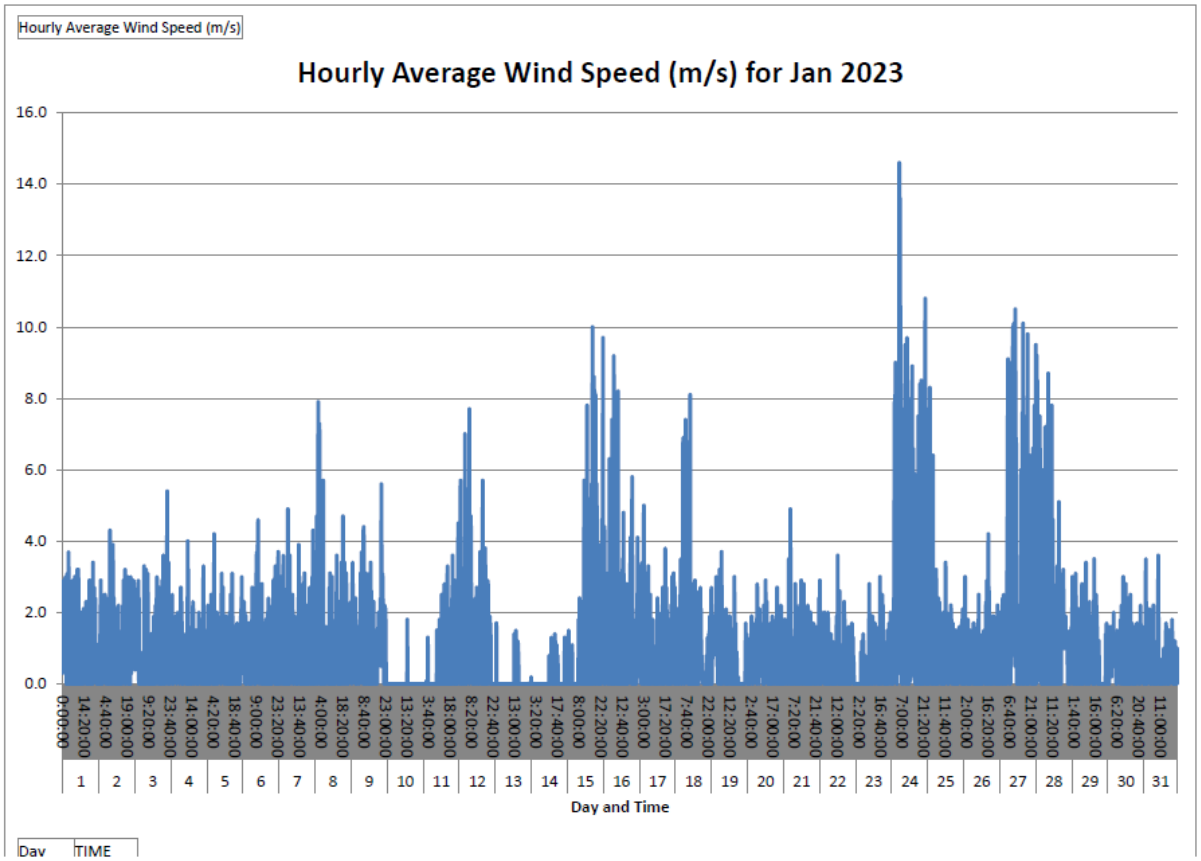
Annex D3 Meteorological Data

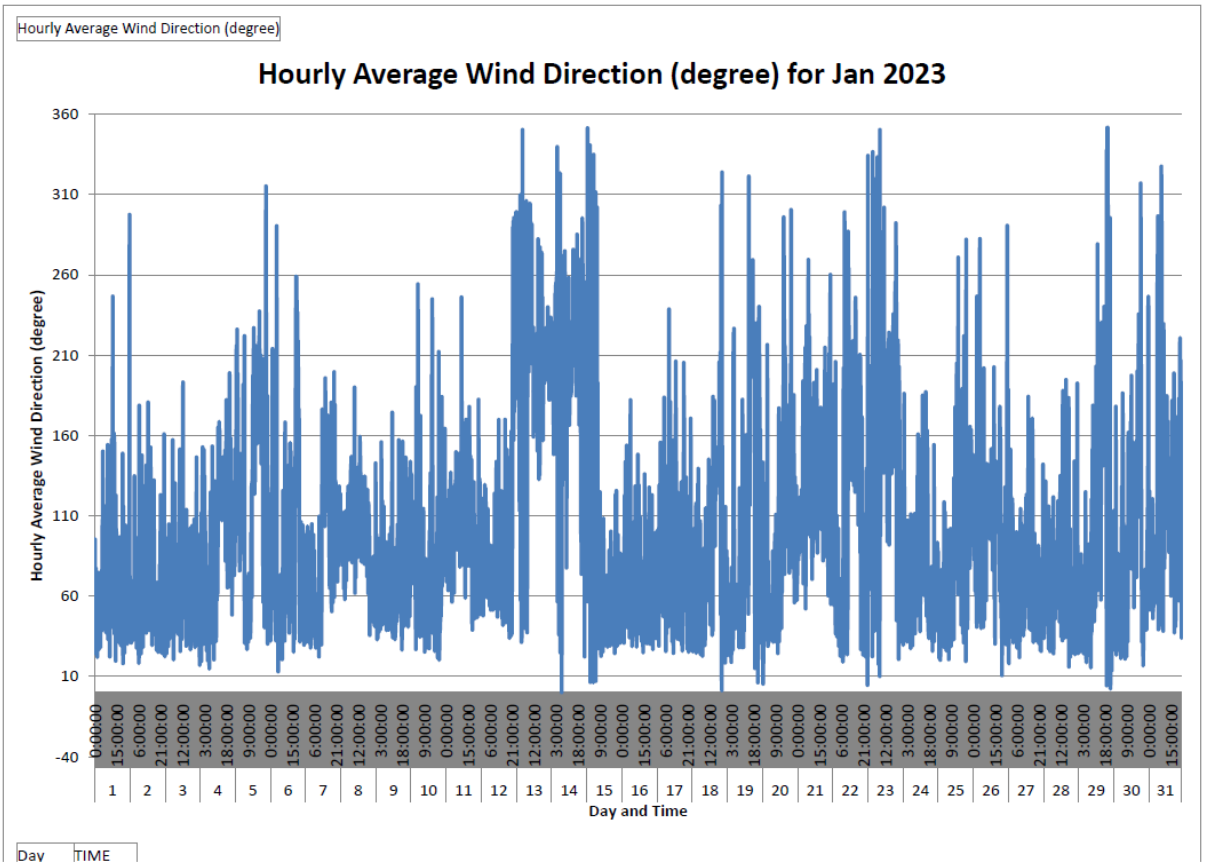
January 2023

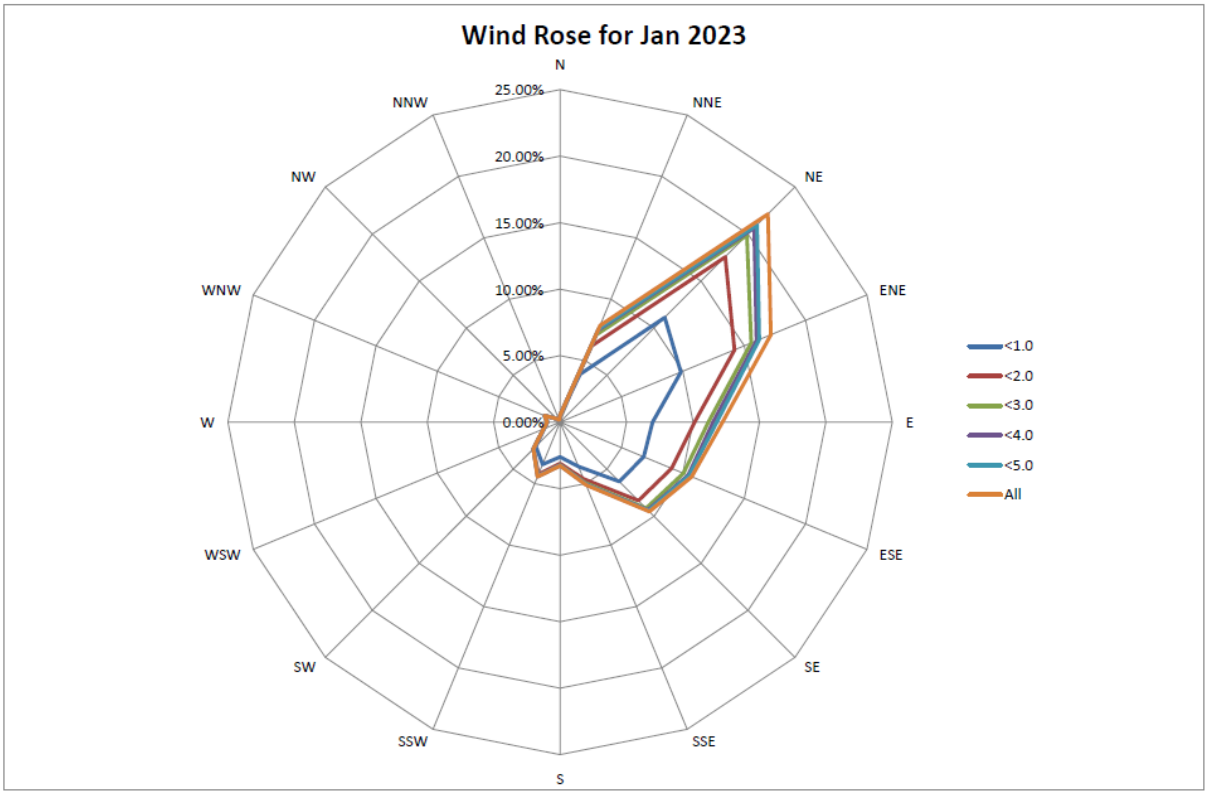


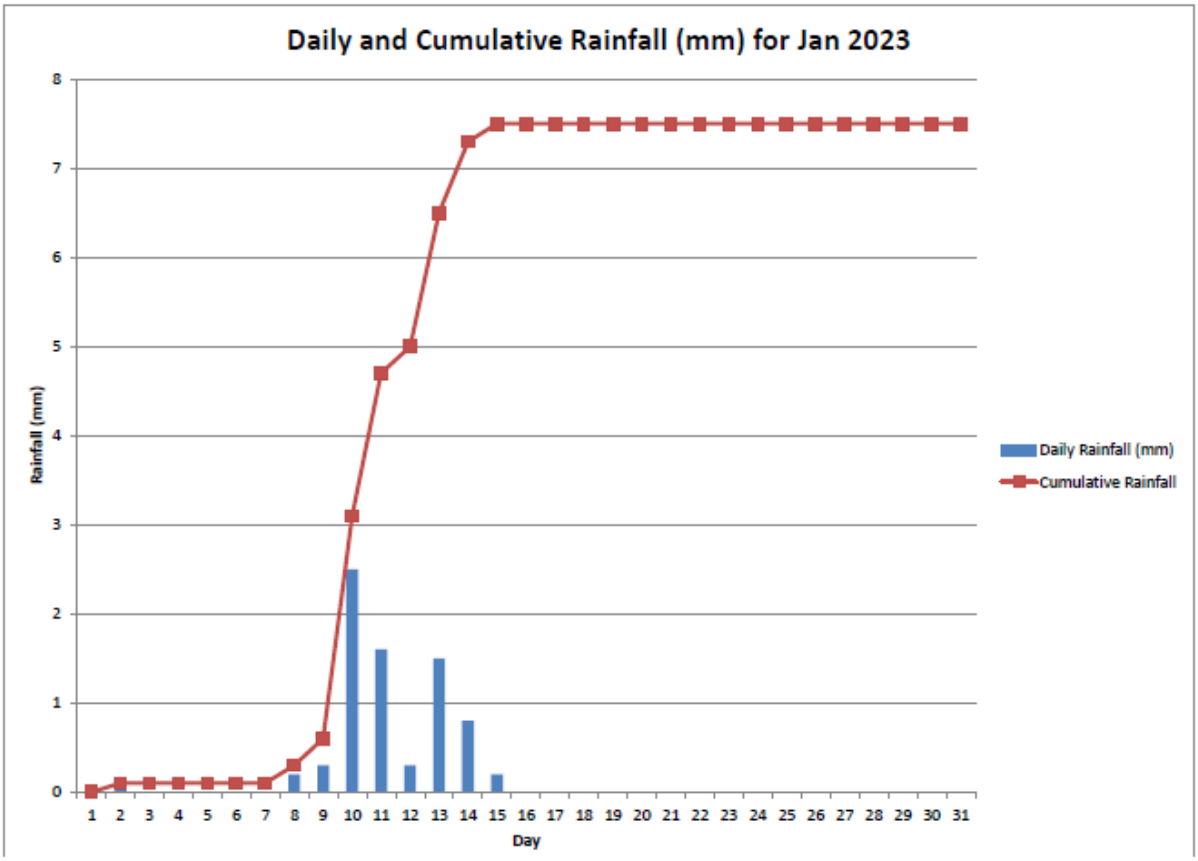



Hourly Average Pressure (hPa)
Hourly Average Pressure (hPa) for Jan 2023
Hourly Average Pressure (hPa)
Day and Time
Day
TIME

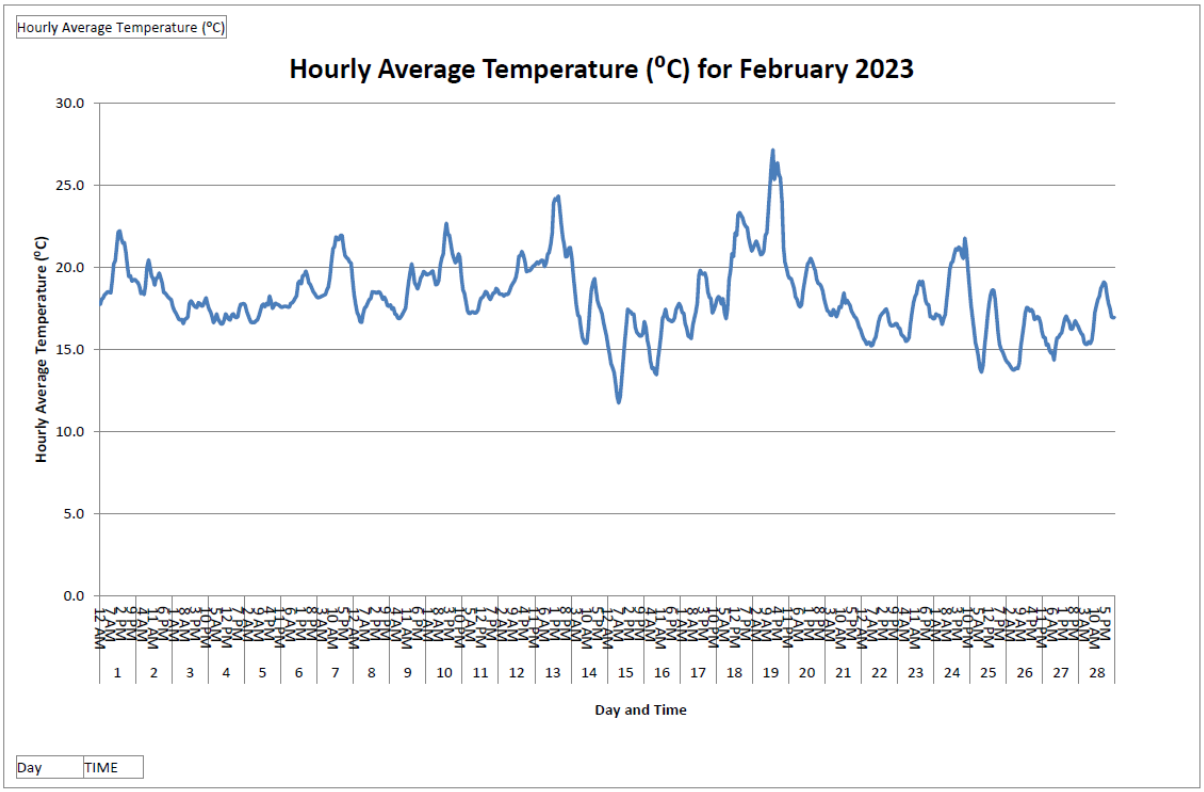

Hourly Average Wind Speed (m/s)
Hourly Average Wind Speed (m/s) for Jan 2023
Day and Time
Day
TIME

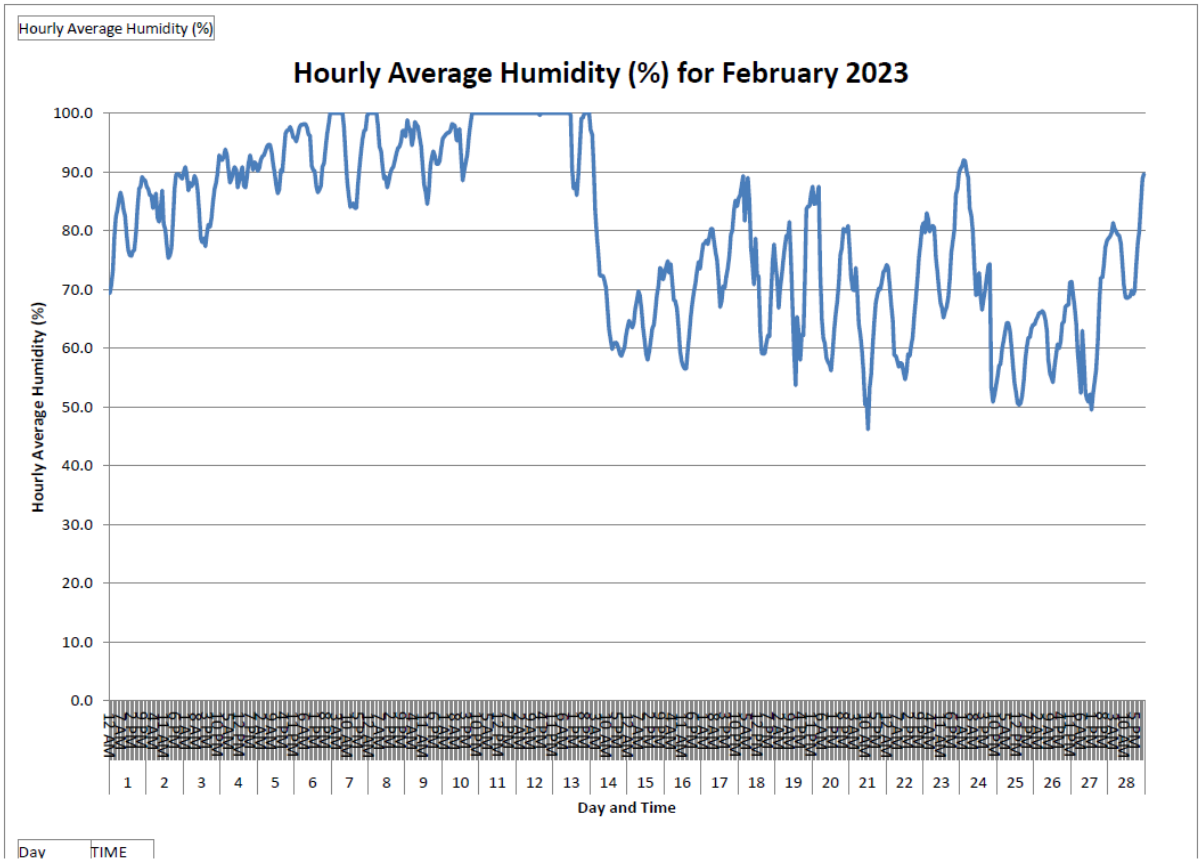

Hourly Average Wind Direction (degree)
Hourly Average Wind Direction (degree) for Jan 2023
Hourly Average Wind Direction (degree)
360
310
260
210
160
110
60
10
-40
Day and Time
Day
TIME

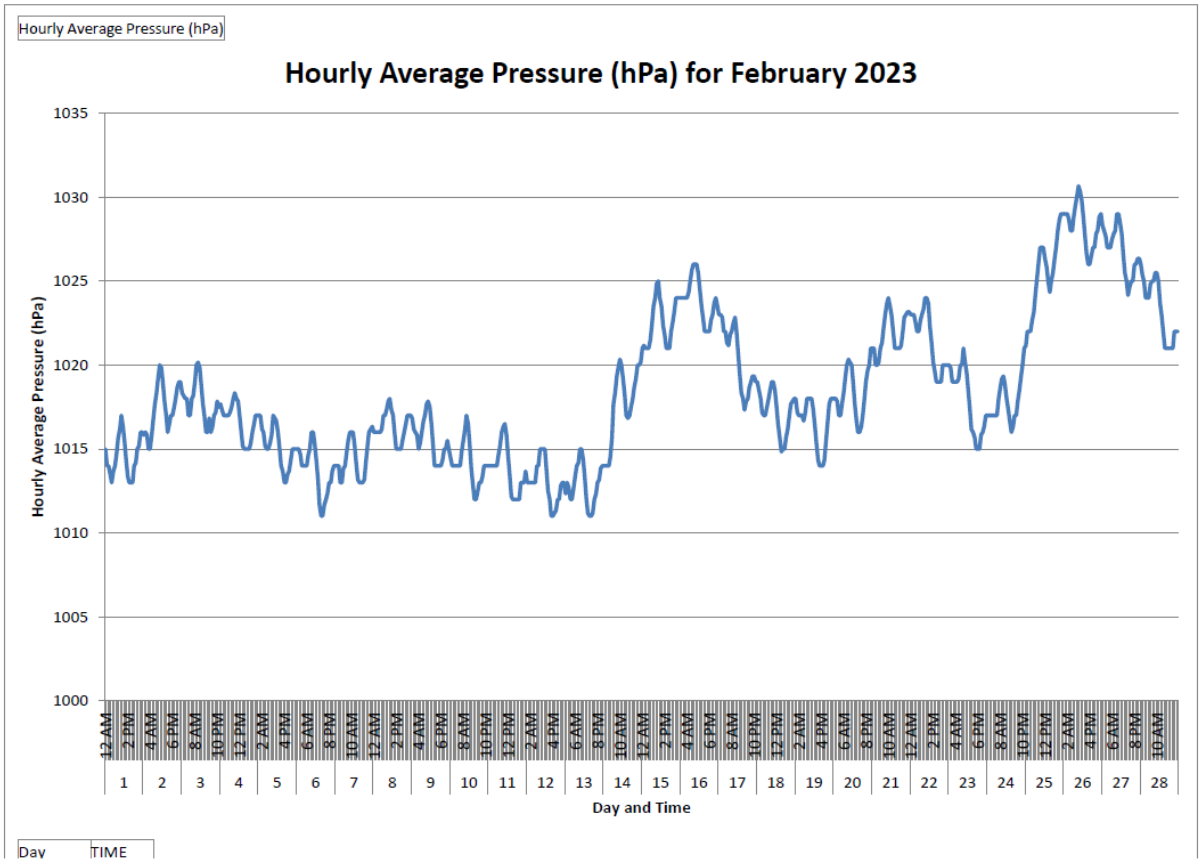

Wind Rose for Jan 2023
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
<1.0
<2.0
<3.0
<4.0
<5.0
All

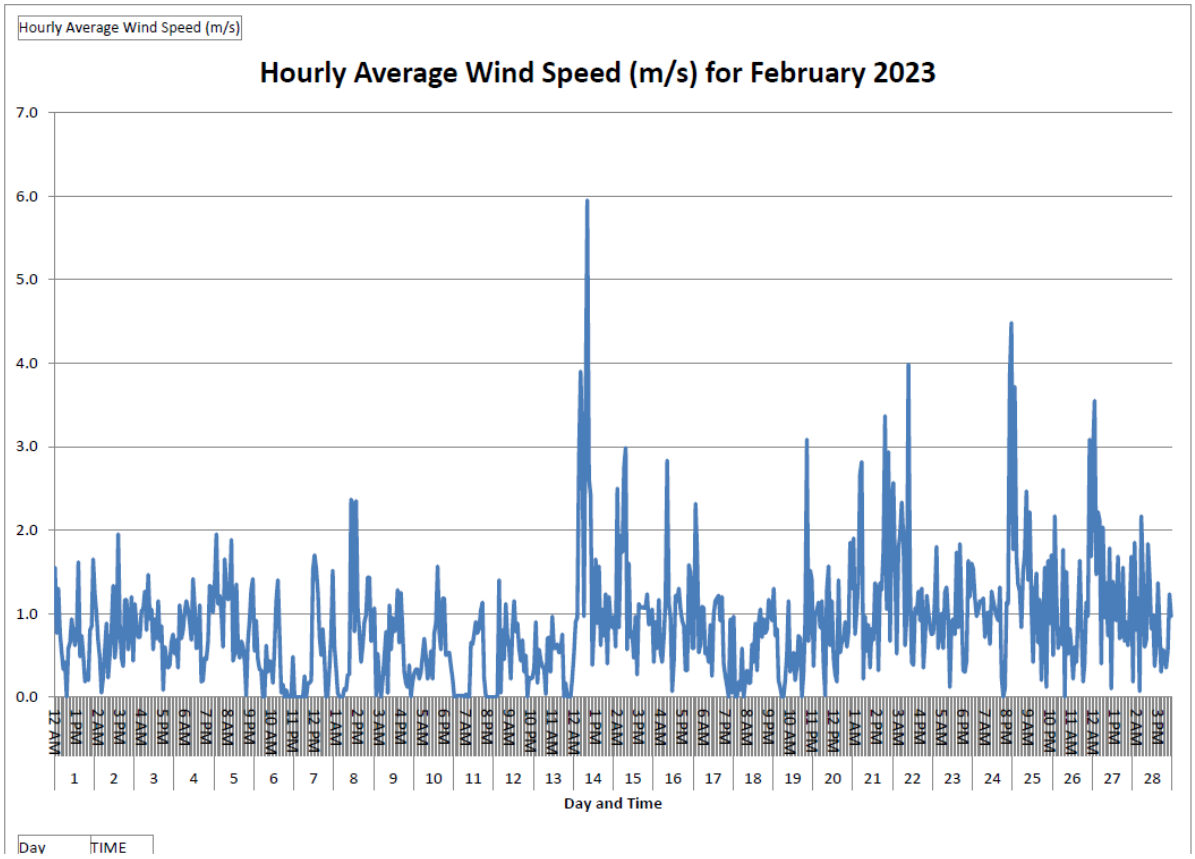

Daily and Cumulative Rainfall (mm) for Jan 2023
Rainfall (mm)
Day
Daily Rainfall (mm)
Cumulative Rainfall

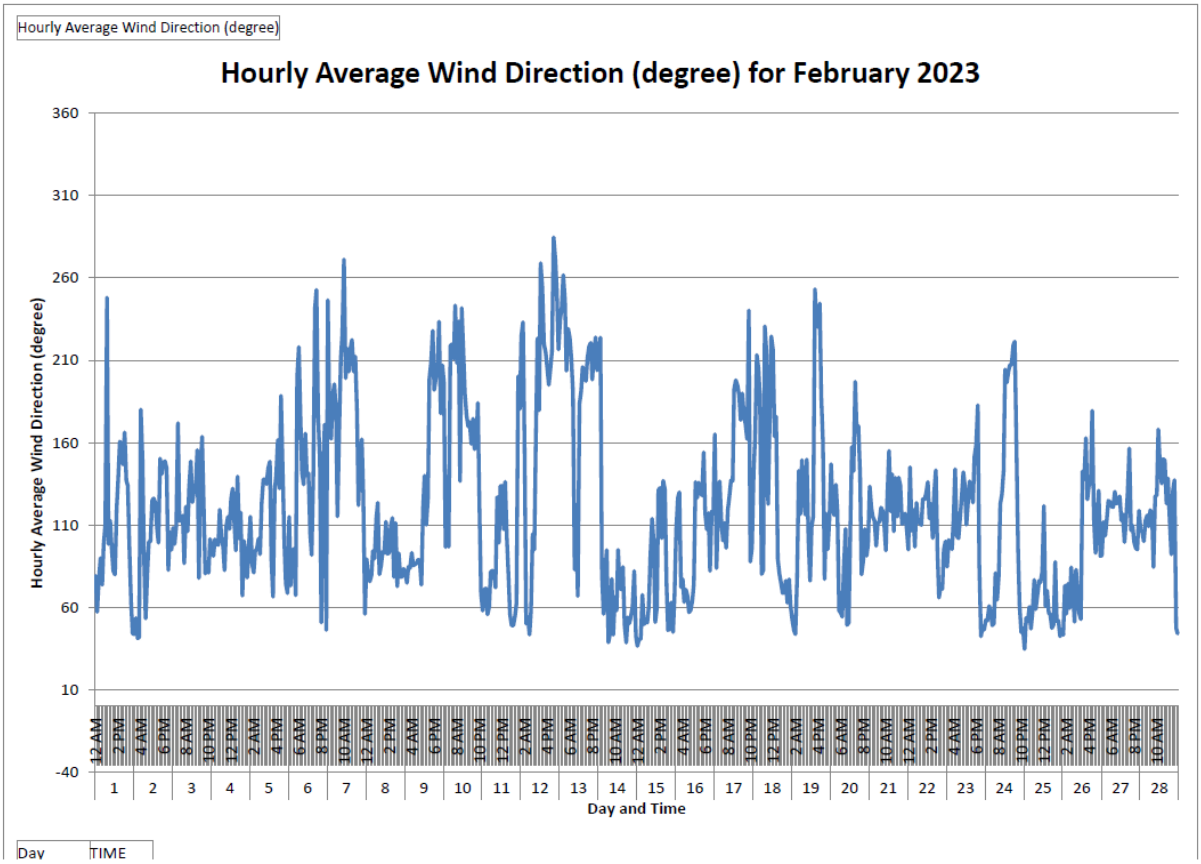
February 2023

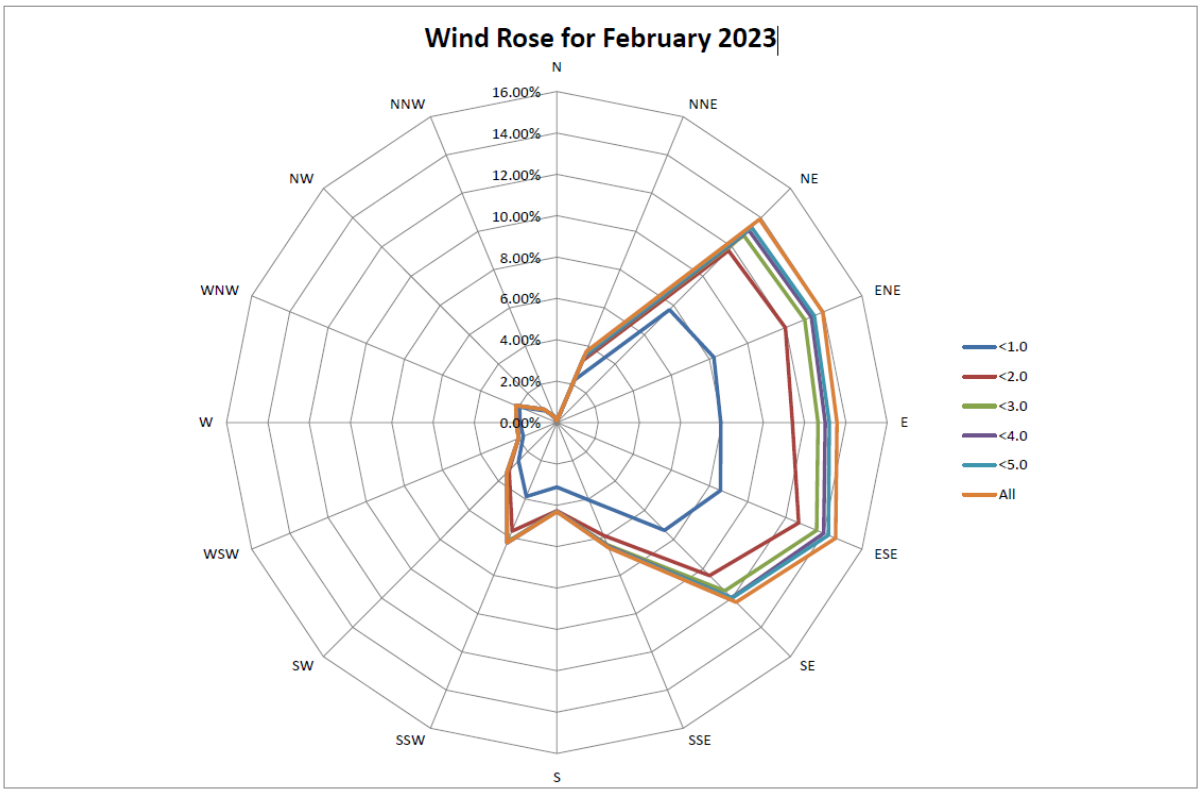


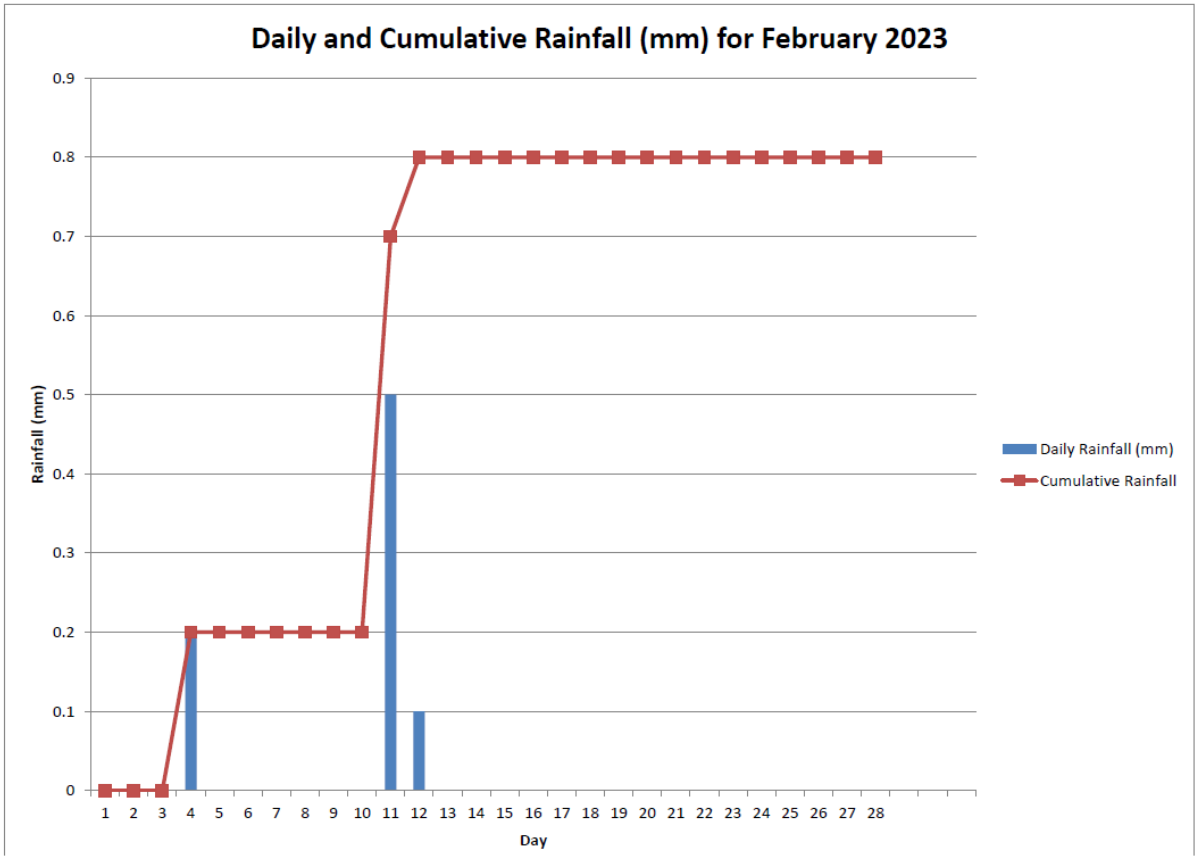



Hourly Average Pressure (hPa)
Hourly Average Pressure (hPa) for February 2023
Hourly Average Pressure (hPa)
Day and Time
Day
TIME

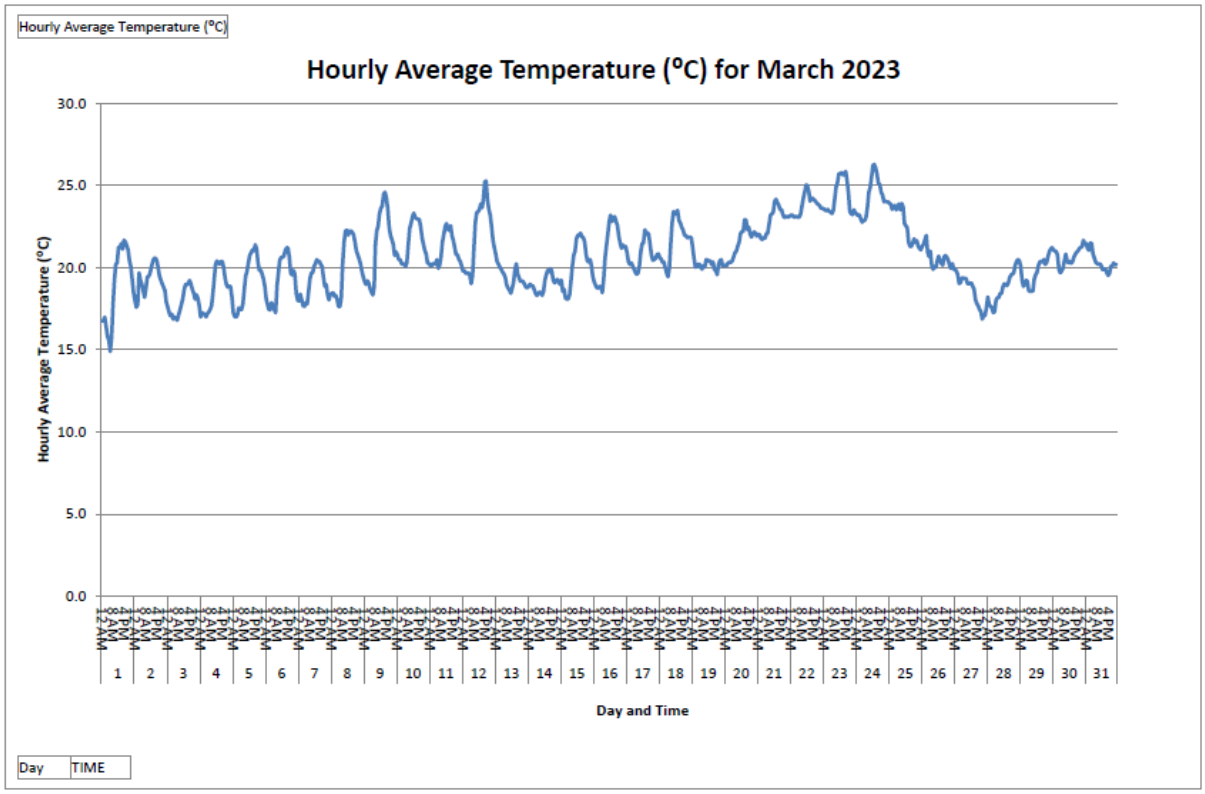

Hourly Average Wind Speed (m/s)
Hourly Average Wind Speed (m/s) for February 2023
Day and Time
Day
TIME

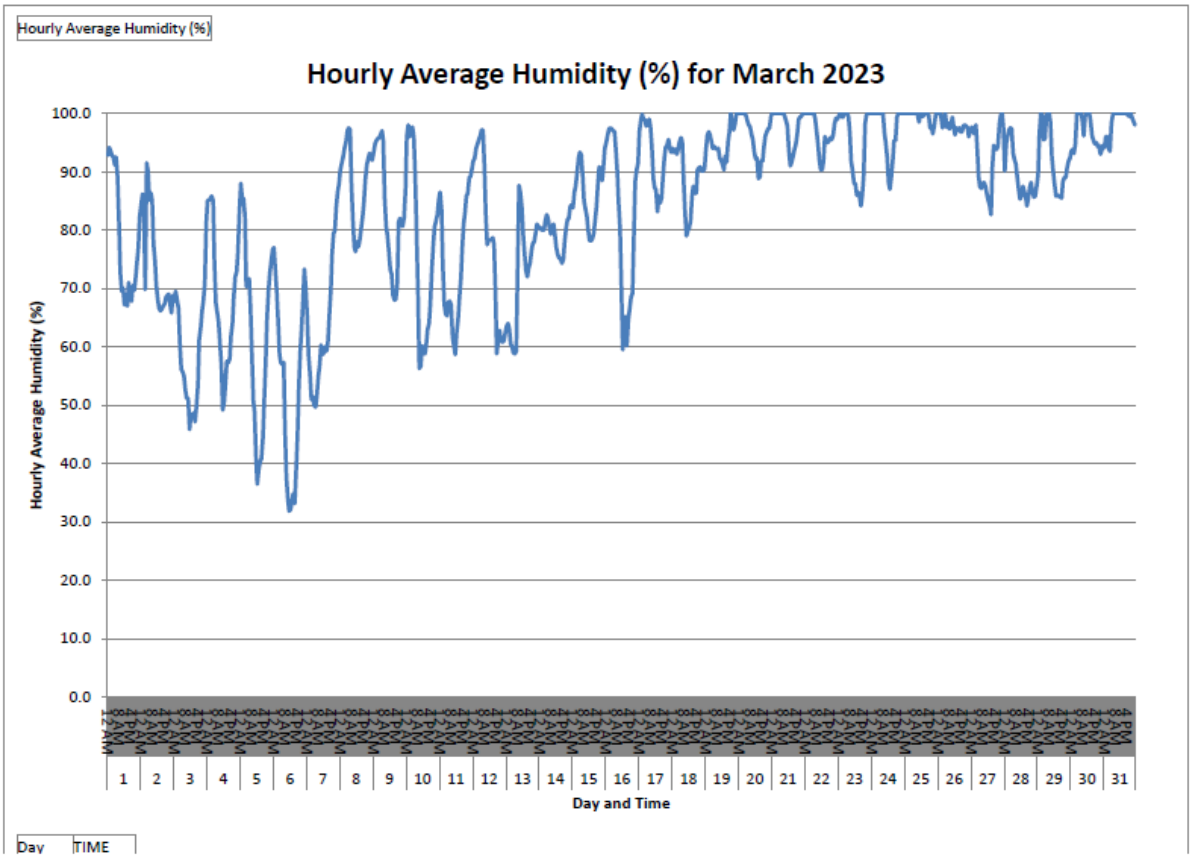

Hourly Average Wind Direction (degree)
Hourly Average Wind Direction (degree) for February 2023
Hourly Average Wind Direction (degree)
360
310
260
210
160
110
60
10
-40
Day and Time
Day
TIME

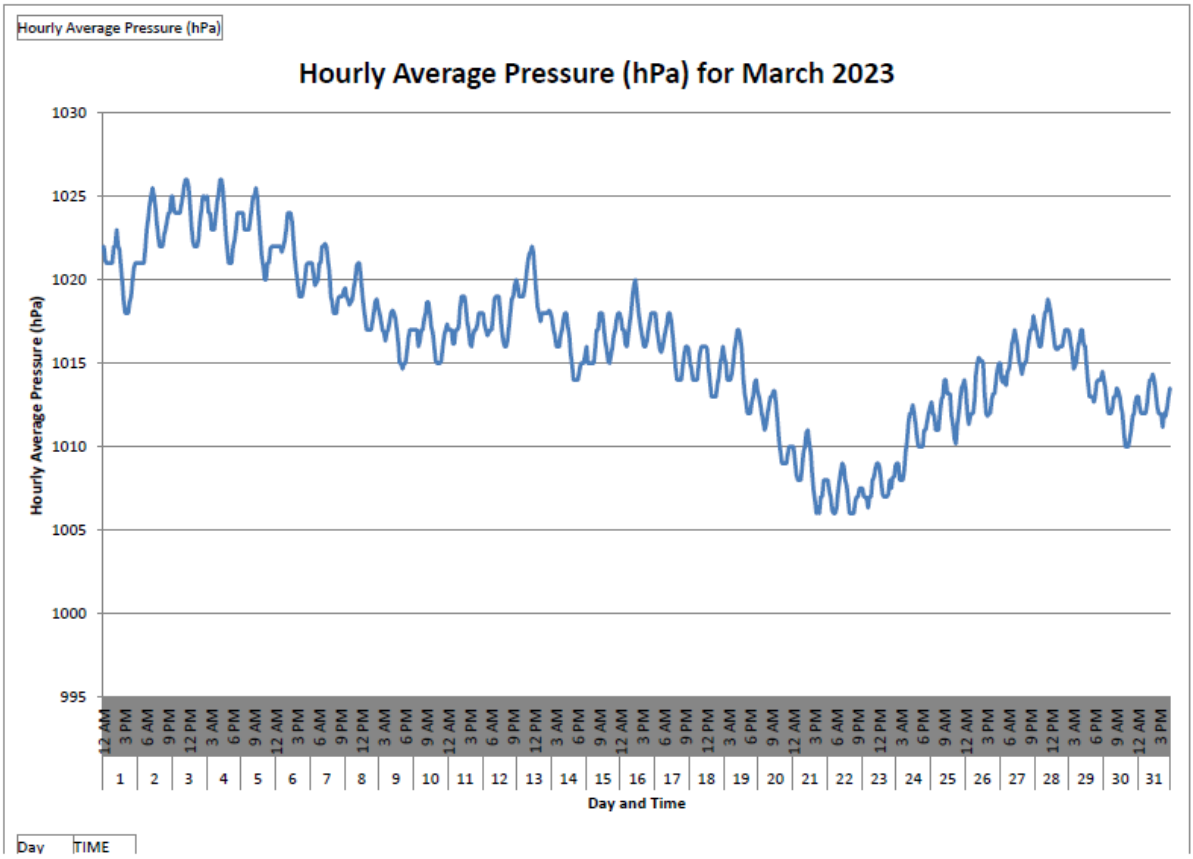

Wind Rose for February 2023
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
16.00%
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
<1.0
<2.0
<3.0
<4.0
<5.0
All

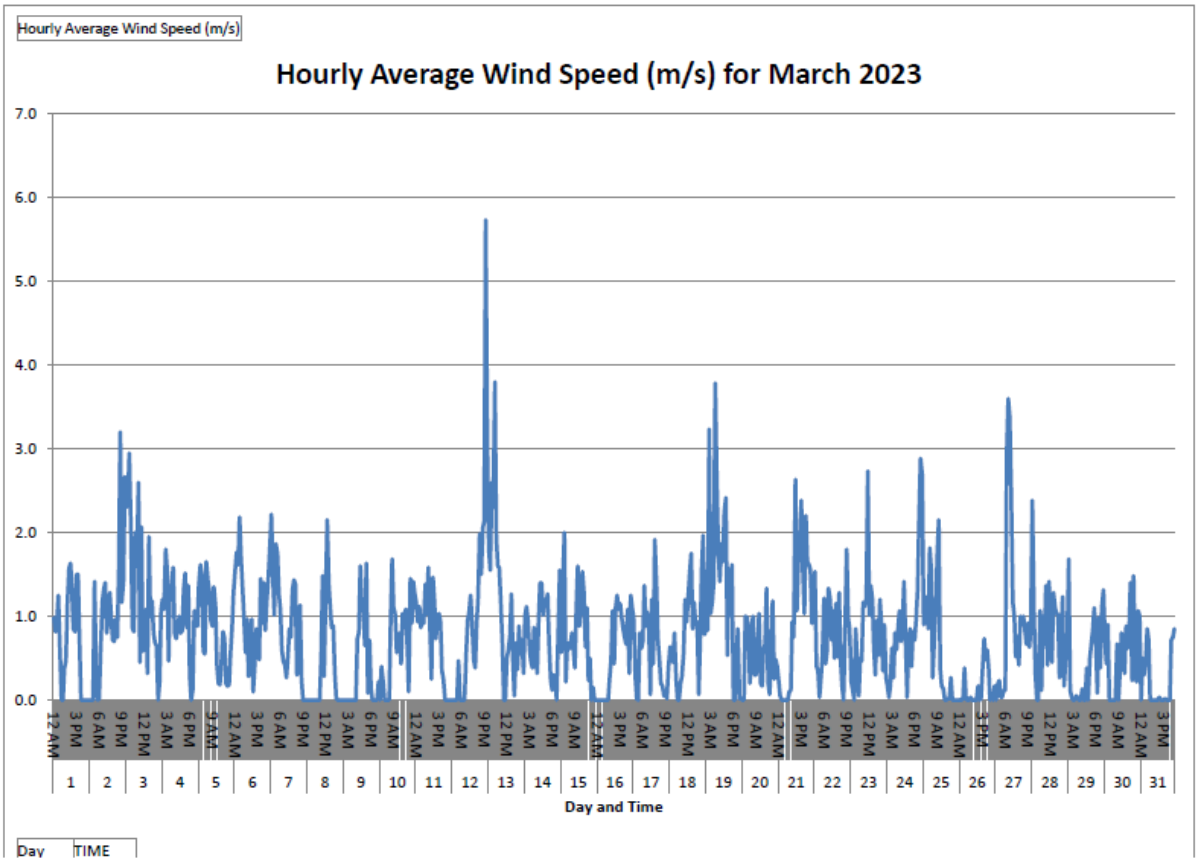

Daily and Cumulative Rainfall (mm) for February 2023
Rainfall (mm)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
Day
Daily Rainfall (mm)
Cumulative Rainfall

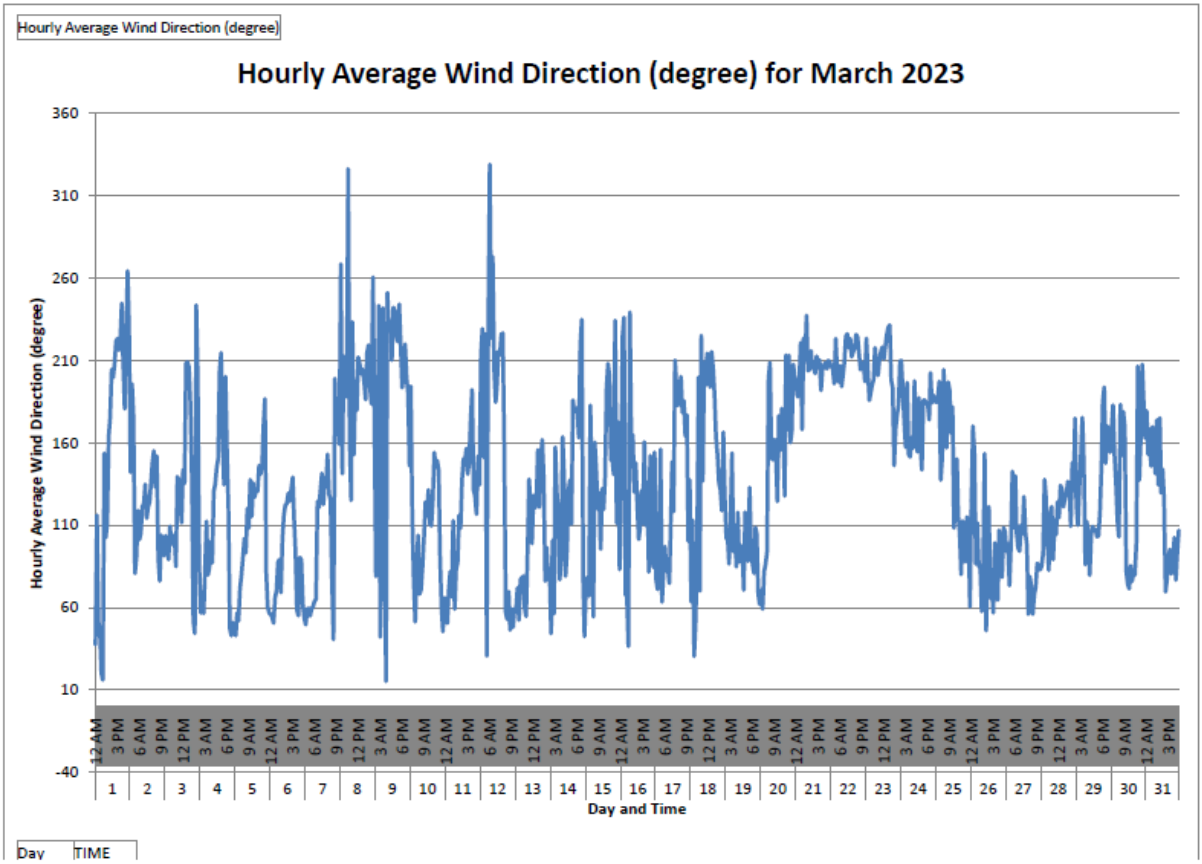
March 2023

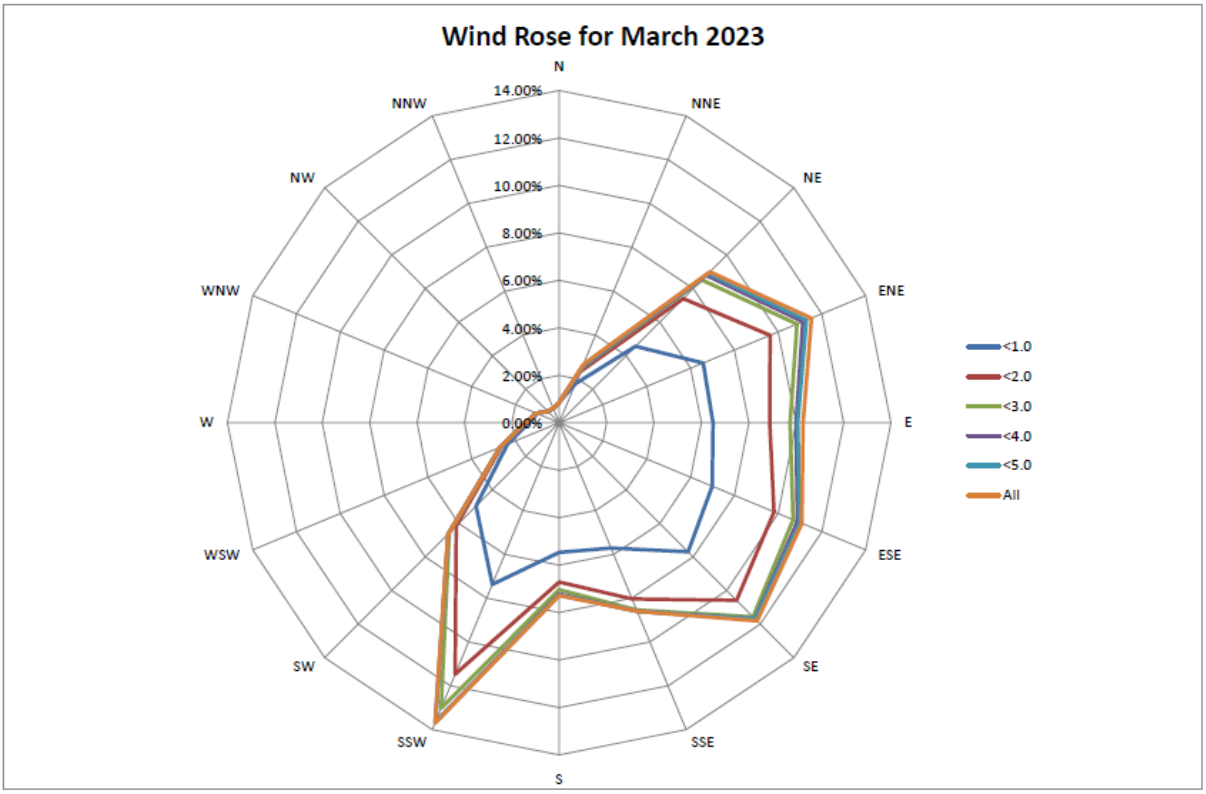

Hourly Average Temperature (°C)
Hourly Average Temperature (°C) for March 2023
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Hourly Average Temperature (°C)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Day and Time
Day
TIME

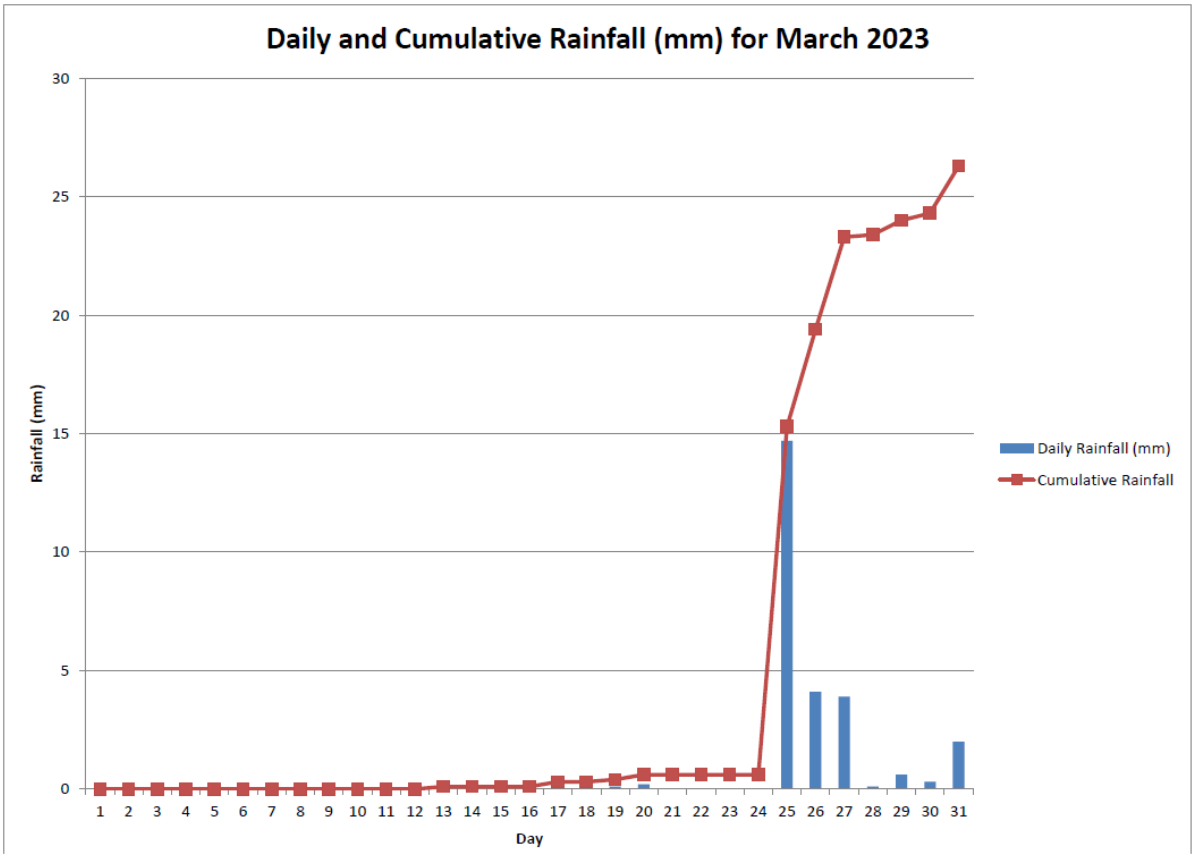

Hourly Average Humidity (%)
Hourly Average Humidity (%) for March 2023
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Hourly Average Humidity (%)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Day and Time
Day
TIME


Hourly Average Pressure (hPa)
Hourly Average Pressure (hPa) for March 2023
1030
1025
1020
1015
1010
1005
1000
995
Hourly Average Pressure (hPa)
Day and Time
Day
TIME


Hourly Average Wind Speed (m/s)
Hourly Average Wind Speed (m/s) for March 2023
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Day and Time
Day
TIME


Hourly Average Wind Direction (degree)
Hourly Average Wind Direction (degree) for March 2023
Hourly Average Wind Direction (degree)
360
310
260
210
160
110
60
10
-40
Day and Time
Day
TIME


Wind Rose for March 2023
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
<1.0
<2.0
<3.0
<4.0
<5.0
All


Daily and Cumulative Rainfall (mm) for March 2023
Rainfall (mm)
30
25
20
15
10
5
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Day
Daily Rainfall (mm)
Cumulative Rainfall

Annex D4

Odour Monitoring Results

Table D4.1 Odour Monitoring Results

Date	Weather	Location	Time	Temperature (oC)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
26 Jan 23	Fine	OP1	14:37	20.8	5.5	N	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP2	14:41	17.8	5.2	N	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP3	14:43	20.5	1.9	W	No	0	N/A	N/A	N/A
26 Jan 23	Fine	OP4	14:45	20.3	1.6	E	Yes	1	Leachate	Pump truck	N/A
26 Jan 23	Fine	OP5	14:49	20.3	0.0	N/A	N/A	0	N/A	N/A	N/A
26 Jan 23	Fine	OP6	14:51	18.0	4.9	NE	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP7	14:53	17.9	1.3	N	No	0	N/A	N/A	N/A
26 Jan 23	Fine	OP8	14:56	21.9	0.0	N/A	N/A	0	N/A	N/A	N/A
26 Jan 23	Fine	OP9	15:00	19.8	1.1	SE	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP10	15:02	22.3	0.0	N/A	N/A	0	N/A	N/A	N/A
26 Jan 23	Fine	OP11	15:16	21.2	4.8	E	No	0	N/A	N/A	N/A
26 Jan 23	Fine	OP12	15:13	21.4	3.7	E	No	0	N/A	N/A	N/A
26 Jan 23	Fine	OP13	15:11	21.5	0.0	N/A	N/A	0	N/A	N/A	N/A
26 Jan 23	Fine	OP14	15:07	22.4	2.0	NW	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP15	15:34	17.5	1.8	W	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP16	15:32	17.6	4.0	NE	Yes	0	N/A	N/A	N/A
26 Jan 23	Fine	OP17	15:29	17.8	3.7	N	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP1	14:36	18.1	4.5	N	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP2	14:39	19.5	1.4	N	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP3	14:41	19.9	1.3	W	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP4	14:44	20.9	N/A	N/A	N/A	0	N/A	N/A	N/A
3 Feb 23	Fine	OP5	14:46	21.0	N/A	N/A	N/A	0	N/A	N/A	N/A
3 Feb 23	Fine	OP6	14:48	20.8	3.9	N	No	0	N/A	N/A	N/A
3 Feb 23	Fine	OP7	14:51	18.2	N/A	N/A	N/A	1	Exhaust Gas	Excavator	From WSD Project
3 Feb 23	Fine	OP8	14:56	20.9	0.8	SE	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP9	15:00	19.8	1.5	E	Yes	1	Town Gas	Town Gas Plant	N/A
3 Feb 23	Fine	OP10	15:02	19.6	2.5	E	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP11	15:15	17.8	6.7	NE	No	0	N/A	N/A	N/A
3 Feb 23	Fine	OP12	15:13	18.7	2.3	NE	No	0	N/A	N/A	N/A
3 Feb 23	Fine	OP13	15:10	19.5	2.6	NE	No	0	N/A	N/A	N/A
3 Feb 23	Fine	OP14	15:08	19.5	N/A	N/A	N/A	0	N/A	N/A	N/A
3 Feb 23	Fine	OP15	15:31	18.0	5.7	N	Yes	0	N/A	N/A	N/A
3 Feb 23	Fine	OP16	15:30	18.0	5.7	NE	No	0	N/A	N/A	N/A
3 Feb 23	Fine	OP17	15:27	18.0	5.5	NE	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP1	14:05	24.9	1.1	S	No	0	N/A	N/A	N/A

Date	Weather	Location	Time	Temperature (oC)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
22 Mar 23	Fine	OP2	14:08	24.7	0.8	S	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP3	14:11	25.1	0.8	SW	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP4	14:13	25.3	N/A	N/A	No	1	Grass	Grass	N/A
22 Mar 23	Fine	OP5	14:15	26.0	0.5	SE	No	1	Exhaust Gas	Generator	N/A
22 Mar 23	Fine	OP6	14:17	25.4	0.7	N	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP7	14:19	25.3	1.0	SW	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP8	14:22	25.6	1.2	SW	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP9	14:25	24.8	0.7	SW	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP10	14:27	25.4	1.0	SW	No	1	Exhaust Gas	Traffic	N/A
22 Mar 23	Fine	OP11	14:40	25.3	1.3	SW	Yes	1	Exhaust Gas	Landfill	N/A
22 Mar 23	Fine	OP12	14:39	25.0	0.8	S	Yes	0	N/A	N/A	N/A
22 Mar 23	Fine	OP13	14:36	24.8	0.5	SW	Yes	1	Grass	Grass	N/A
22 Mar 23	Fine	OP14	14:34	25.0	N/A	N/A	No	1	Grass	Grass	N/A
22 Mar 23	Fine	OP15	14:50	24.6	1.3	SE	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP16	14:53	25.1	0.8	SE	No	0	N/A	N/A	N/A
22 Mar 23	Fine	OP17	14:55	25.5	1.7	SW	Yes	0	N/A	N/A	N/A

Annex D5

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

Table D5.1 Thermal Oxidiser Stack Emission Monitoring Results

Parameters	**Monitoring Results (January 2023)**
NO_2	1.21 gs^{-1}
CO	<0.01 gs^{-1}
SO_2	0.21 gs^{-1}
Benzene	<2.0 x 10^{-4} gs^{-1}
Vinyl chloride	<1.6 x 10^{-4} gs^{-1}
Exhaust gas velocity	11.4 ms^{-1}
Parameters	**Monitoring Results (February 2023)**
NO_2	0.95 gs^{-1}
CO	<0.01 gs^{-1}
SO_2	<0.01 gs^{-1}
Benzene	<2.0 x 10^{-4} gs^{-1}
Vinyl chloride	<1.3 x 10^{-4} gs^{-1}
Non-Methane Organic Carbons	<3.0 x 10^{-3} gs^{-1}
Ammonia	0.0384 gs^{-1}
Exhaust gas velocity	10.1 ms^{-1}
Parameters	**Monitoring Results (March 2023)**
NO_2	1.34 gs^{-1}
CO	<0.01 gs^{-1}
SO_2	<0.01 gs^{-1}
Benzene	<2.0 x 10^{-4} gs^{-1}
Vinyl chloride	<1.4 x 10^{-4} gs^{-1}
Exhaust gas velocity	11.3 ms^{-1}

Table D5.2 Thermal Oxidiser Stack Continuous Monitoring Results

Date	**Gas Combustion Temperature (°C)**	**Exhaust temperature (K)**	**Exhaust gas velocity (ms^{-1}) [a]**
01 Jan 23	926	1238	
02 Jan 23	939	1234	
03 Jan 23	934	1239	
04 Jan 23	920	1231	
05 Jan 23	912	1230	
06 Jan 23	927	1238	
07 Jan 23	923	1233	
08 Jan 23	923	1231	
09 Jan 23	925	1227	
10 Jan 23	926	1233	
11 Jan 23	936	1239	
12 Jan 23	938	1243	11.4
13 Jan 23	917	1234	
14 Jan 23	941	1246	
15 Jan 23	965	1245	
16 Jan 23	947	1221	
17 Jan 23	927	1232	
18 Jan 23	911	1228	
19 Jan 23	942	1255	
20 Jan 23	925	1237	
21 Jan 23	918	1229	
22 Jan 23	Under Maintenance		
23 Jan 23	Under Maintenance		

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [a]
24 Jan 23	Under Maintenance		
25 Jan 23	929	1236	
26 Jan 23	910	1227	
27 Jan 23	939	1242	
28 Jan 23	942	1251	
29 Jan 23	941	1252	
30 Jan 23	927	1226	
31 Jan 23	911	1229	
01 Feb 23	918	1232	
02 Feb 23	937	1244	
03 Feb 23	927	1230	
04 Feb 23	930	1241	
05 Feb 23	913	1226	
06 Feb 23	Under Maintenance		
07 Feb 23	Under Maintenance		
08 Feb 23	Under Maintenance		
09 Feb 23	924	1230	
10 Feb 23	942	1245	
11 Feb 23	906	1256	
12 Feb 23	903	1198	
13 Feb 23	916	1219	
14 Feb 23	922	1229	10.1
15 Feb 23	924	1232	
16 Feb 23	925	1235	
17 Feb 23	922	1228	
18 Feb 23	924	1229	
19 Feb 23	930	1237	
20 Feb 23	902	1198	
21 Feb 23	895	1210	
22 Feb 23	930	1233	
23 Feb 23	924	1230	
24 Feb 23	925	1232	
25 Feb 23	937	1234	
26 Feb 23	935	1232	
27 Feb 23	934	1233	
28 Feb 23	925	1234	
01 Mar 23	930	1233	
02 Mar 23	937	1239	
03 Mar 23	932	1230	
04 Mar 23	932	1239	
05 Mar 23	927	1230	
06 Mar 23	918	1214	
07 Mar 23	929	1237	
08 Mar 23	928	1231	
09 Mar 23	928	1233	
10 Mar 23	926	1233	
11 Mar 23	923	1233	
12 Mar 23	908	1222	
13 Mar 23	Under Maintenance	-	
14 Mar 23	Under Maintenance	-	11.3
15 Mar 23	Under Maintenance	-	
16 Mar 23	930	1232	
17 Mar 23	940	1235	
18 Mar 23	919	1188	
19 Mar 23	956	1240	
20 Mar 23	924	1213	
21 Mar 23	930	1212	
22 Mar 23	925	1209	

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [(a)]
23 Mar 23	926	1215	
24 Mar 23	917	1212	
25 Mar 23	919	1213	
26 Mar 23	927	1212	
27 Mar 23	930	1207	
28 Mar 23	939	1212	
29 Mar 23	921	1211	
30 Mar 23	929	1218	
31 Mar 23	927	1216	
Average	927	1229	10.9
Min	895	1188	10.1
Max	965	1256	11.4

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 D5.3 Landfill Gas Flare Stack Emission Monitoring Results

Parameters	Monitoring Results (January 2023)
	Flare 1 – F601
NO_2	0.024 gs^{-1}
CO	0.111 gs^{-1}
SO_2	<0.012 gs^{-1}
Benzene	<1.8 x 10^{-4} gs^{-1}
Vinyl chloride	<1.44 x 10^{-4} gs^{-1}
Exhaust gas velocity	12.5 ms^{-1}
Parameters	**Monitoring Results (February 2023) Flare 1 – F601**
NO_2	0.02 gs^{-1}
CO	0.16 gs^{-1}
SO_2	0.02 gs^{-1}
Benzene	<1.2 x 10^{-4} gs^{-1}
Vinyl chloride	<9.6 x 10^{-5} gs^{-1}
Non-Methane Organic Carbons	0.006 gs^{-1}
Exhaust gas velocity	8.9 ms^{-1}
Parameters	**Monitoring Results (March 2023) Flare 1 – F601**
NO_2	0.02 gs^{-1}
CO	<0.01 gs^{-1}
SO_2	<0.01 gs^{-1}
Benzene	<9.5 x 10^{-5} gs^{-1}
Vinyl chloride	<7.6 x 10^{-5} gs^{-1}
Exhaust gas velocity	6.2 ms^{-1}

Table D5.4 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 Jan 23	-	-		Under Maintenance
2 Jan 23	820	1035		In Operation
3 Jan 23	830	1060		In Operation
4 Jan 23	865	1069		In Operation
5 Jan 23	887	1037		In Operation
6 Jan 23	880	1058		In Operation
7 Jan 23	890	1073		In Operation
8 Jan 23	870	1023		In Operation
9 Jan 23	870	1068		In Operation
10 Jan 23	830	1043		In Operation
11 Jan 23	880	1063		In Operation
12 Jan 23	830	1053		In Operation
13 Jan 23	890	1073		In Operation
14 Jan 23	880	1053		In Operation
15 Jan 23	880	1073		In Operation
16 Jan 23	900	1073	12.5	In Operation
17 Jan 23	890	1073		In Operation
18 Jan 23	830	1053		In Operation
19 Jan 23	860	963		In Operation
20 Jan 23	890	1053		In Operation
21 Jan 23	820	973		In Operation
22 Jan 23	910	1093		In Operation
23 Jan 23	880	1073		In Operation
24 Jan 23	870	1073		In Operation
25 Jan 23	880	1073		In Operation
26 Jan 23	870	1063		In Operation
27 Jan 23	930	1153		In Operation
28 Jan 23	860	1083		In Operation
29 Jan 23	860	1063		In Operation
30 Jan 23	870	1063		In Operation
31 Jan 23	840	1043		In Operation
1 Feb 23	860	1073		In Operation
2 Feb 23	880	1043		In Operation
3 Feb 23	870	1073		In Operation
4 Feb 23	830	1023		In Operation
5 Feb 23	880	1033		In Operation
6 Feb 23	840	1053		In Operation
7 Feb 23	880	1053		In Operation
8 Feb 23	890	1033		In Operation
9 Feb 23	880	1043		In Operation
10 Feb 23	-	-		Under Maintenance
11 Feb 23	-	-	8.9	Under Maintenance
12 Feb 23	-	-		Under Maintenance
13 Feb 23	-	-		Under Maintenance
14 Feb 23	-	-		Under Maintenance
15 Feb 23	-	-		Under Maintenance
16 Feb 23	-	-		Under Maintenance
17 Feb 23	-	-		Under Maintenance
18 Feb 23	-	-		Under Maintenance
19 Feb 23	-	-		Under Maintenance
20 Feb 23	860	1023		In Operation
21 Feb 23	880	1043		In Operation
22 Feb 23	880	1053		In Operation

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) (a)	Operation Status
23 Feb 23	900	1053		In Operation
24 Feb 23	870	1003		In Operation
25 Feb 23	900	1093		In Operation
26 Feb 23	880	1083		In Operation
27 Feb 23	840	1023		In Operation
28 Feb 23	830	1073		In Operation
01 Mar 23	923	1090		In Operation
02 Mar 23	954	1093		In Operation
03 Mar 23	880	1083		In Operation
04 Mar 23	958	1083		In Operation
05 Mar 23	980	1073		In Operation
06 Mar 23	915	1083		In Operation
07 Mar 23	934	1083		In Operation
08 Mar 23	940	1063		In Operation
09 Mar 23	-	-		Under Maintenance
10 Mar 23	910	1063		In Operation
11 Mar 23	920	1083		In Operation
12 Mar 23	940	1083		In Operation
13 Mar 23	960	1093		In Operation
14 Mar 23	980	1153		In Operation
15 Mar 23	920	1093	6.2	In Operation
16 Mar 23	990	1193		In Operation
17 Mar 23	990	1163		In Operation
18 Mar 23	970	1093		In Operation
19 Mar 23	940	1083		In Operation
20 Mar 23	950	1123		In Operation
21 Mar 23	900	1083		In Operation
22 Mar 23	880	1053		In Operation
23 Mar 23	870	1063		In Operation
24 Mar 23	890	1073		In Operation
25 Mar 23	940	1113		In Operation
26 Mar 23	950	1133		In Operation
27 Mar 23	960	1173		In Operation
28 Mar 23	930	1123		In Operation
29 Mar 23	950	1153		In Operation
30 Mar 23	970	1143		In Operation
31 Mar 23	900	1103		In Operation
Average	895	1073	9.2	
Min	820	963	6.2	
Max	990	1193	12.5	
Flare 2 – F602				
1 Jan 23	-	-		Under Maintenance
2 Jan 23	-	-		Under Maintenance
3 Jan 23	-	-		Under Maintenance
4 Jan 23	-	-		Under Maintenance
5 Jan 23	-	-		Under Maintenance
6 Jan 23	830	1053		In Operation
7 Jan 23	860	1103		In Operation
8 Jan 23	840	1073		In Operation
9 Jan 23	870	1073	12.5	In Operation
10 Jan 23	840	1073		In Operation
11 Jan 23	820	1043		In Operation
12 Jan 23	900	1113		In Operation
13 Jan 23	860	1113		In Operation
14 Jan 23	820	1073		In Operation
15 Jan 23	820	1053		In Operation
16 Jan 23	840	1063		In Operation

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) (a)	Operation Status
17 Jan 23	920	1113		In Operation
18 Jan 23	880	1073		In Operation
19 Jan 23	860	1073		In Operation
20 Jan 23	840	1063		In Operation
21 Jan 23	840	1053		In Operation
22 Jan 23	860	1053		In Operation
23 Jan 23	-	-		Under Maintenance
24 Jan 23	-	-		Under Maintenance
25 Jan 23	-	-		Under Maintenance
26 Jan 23	-	-		Under Maintenance
27 Jan 23	880	1103		In Operation
28 Jan 23	830	1028		In Operation
29 Jan 23	870	1063		In Operation
30 Jan 23	-	-		Under Maintenance
31 Jan 23	840	1043		In Operation
1 Feb 23	860	1088		In Operation
2 Feb 23	-	-		Under Maintenance
3 Feb 23	-	-		Under Maintenance
4 Feb 23	860	1083		In Operation
5 Feb 23	840	1093		In Operation
6 Feb 23	880	1103		In Operation
7 Feb 23	900	1153		In Operation
8 Feb 23	-	-		Under Maintenance
9 Feb 23	850	1083		In Operation
10 Feb 23	840	1063		In Operation
11 Feb 23	-	-		Under Maintenance
12 Feb 23	870	1053		In Operation
13 Feb 23	870	1073		In Operation
14 Feb 23	860	1093	8.9	In Operation
15 Feb 23	880	1083		In Operation
16 Feb 23	880	1093		In Operation
17 Feb 23	840	1073		In Operation
18 Feb 23	830	1053		In Operation
19 Feb 23	830	1053		In Operation
20 Feb 23	-	-		Under Maintenance
21 Feb 23	840	1053		In Operation
22 Feb 23	820	1073		In Operation
23 Feb 23	880	1083		In Operation
24 Feb 23	880	1083		In Operation
25 Feb 23	-	-		Under Maintenance
26 Feb 23	-	-		Under Maintenance
27 Feb 23	-	-		Under Maintenance
28 Feb 23	890	1093		In Operation
01 Mar 23	990	1193		In Operation
02 Mar 23	905	1113		In Operation
03 Mar 23	930	1123		In Operation
04 Mar 23	910	1113		In Operation
05 Mar 23	900	1103		In Operation
06 Mar 23	910	1113		In Operation
07 Mar 23	920	1133		In Operation
08 Mar 23	990	1193		In Operation
09 Mar 23	-	-		Under Maintenance
10 Mar 23	900	1103		In Operation
11 Mar 23	910	1113		In Operation
12 Mar 23	910	1123		In Operation
13 Mar 23	910	1103		In Operation
14 Mar 23	920	1133	6.2	In Operation

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) (a)	Operation Status
15 Mar 23	940	1143		In Operation
16 Mar 23	990	1193		In Operation
17 Mar 23	990	1203		In Operation
18 Mar 23	880	1113		In Operation
19 Mar 23	990	1183		In Operation
20 Mar 23	940	1163		In Operation
21 Mar 23	910	1143		In Operation
22 Mar 23	830	993		In Operation
23 Mar 23	910	1123		In Operation
24 Mar 23	930	1123		In Operation
25 Mar 23	940	1113		In Operation
26 Mar 23	950	1133		In Operation
27 Mar 23	990	1193		In Operation
28 Mar 23	950	1133		In Operation
29 Mar 23	930	1133		In Operation
30 Mar 23	870	1063		In Operation
31 Mar 23	860	1043		In Operation
Average	886	1098	9.2	
Min	820	993	6.2	
Max	990	1203	12.5	

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 D5.5 Landfill Gas Generator Stack Emission Monitoring Results

Parameters	Monitoring Results (January 2023)
NO_2	0.044 gs^{-1}
CO	0.731 gs^{-1}
SO_2	<0.001 gs^{-1}
Benzene	<7.0 x 10^{-5} gs^{-1}
Vinyl chloride	<9.6 x 10^{-6} gs^{-1}
Exhaust gas velocity	10.0 ms^{-1}
Parameters	**Monitoring Results (February 2023)**
NO_2	0.053 gs^{-1}
CO	0.973 gs^{-1}
SO_2	<0.002 gs^{-1}
Benzene	<1.0 x 10^{-4} gs^{-1}
Vinyl chloride	<1.3 x 10^{-5} gs^{-1}
Non-Methane Organic Carbons	<3.3 x 10^{-3} gs^{-1}
Exhaust gas velocity	12.1 ms^{-1}
Parameters	**Monitoring Results (March 2023)**
NO_2	0.079 gs^{-1}
CO	0.942 gs^{-1}
SO_2	<0.001 gs^{-1}
Benzene	9.7 x 10^{-5} gs^{-1}
Vinyl chloride	<1.2 x 10^{-5} gs^{-1}
Non-Methane Organic Carbons	13.9 ms^{-1}

Table D5.6 Landfill Gas Generator Stack Continuous Monitoring Results

Date	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [a]	Operation Status (Landfill Gas Generator in Operation)
ENGA			
1 Jan 23	-	10.0	Standby
2 Jan 23	-		Standby
3 Jan 23	-		Standby
4 Jan 23	-		Standby
5 Jan 23	860		In Operation
6 Jan 23	860		In Operation
7 Jan 23	-		Standby
8 Jan 23	-		Standby
9 Jan 23	-		Standby
10 Jan 23	-		Standby
11 Jan 23	-		Standby
12 Jan 23	-		Standby
13 Jan 23	-		Standby
14 Jan 23	-		Standby
15 Jan 23	-		Standby
16 Jan 23	-		Standby
17 Jan 23	856		In Operation
18 Jan 23	849		In Operation
19 Jan 23	856		In Operation
20 Jan 23	860		In Operation
21 Jan 23	869		In Operation
22 Jan 23	-		Standby
23 Jan 23	-		Standby
24 Jan 23	-		Standby

Date	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [a]	Operation Status (Landfill Gas Generator in Operation)
25 Jan 23	-		Standby
26 Jan 23	860		In Operation
27 Jan 23	860		In Operation
28 Jan 23	860		In Operation
29 Jan 23	861		In Operation
30 Jan 23	865		In Operation
31 Jan 23	865		In Operation
1 Feb 23	868		In Operation
2 Feb 23	868		In Operation
3 Feb 23	868		In Operation
4 Feb 23	869		In Operation
5 Feb 23	870		In Operation
6 Feb 23	865		In Operation
7 Feb 23	867		In Operation
8 Feb 23	866		In Operation
9 Feb 23	872		In Operation
10 Feb 23	867		In Operation
11 Feb 23	867		In Operation
12 Feb 23	870		In Operation
13 Feb 23	871		In Operation
14 Feb 23	860	12.1	In Operation
15 Feb 23	868		In Operation
16 Feb 23	868		In Operation
17 Feb 23	869		In Operation
18 Feb 23	869		In Operation
19 Feb 23	870		In Operation
20 Feb 23	-		Under Maintenance
21 Feb 23	-		Under Maintenance
22 Feb 23	-		Under Maintenance
23 Feb 23	-		Under Maintenance
24 Feb 23	870		In Operation
25 Feb 23	870		In Operation
26 Feb 23	872		In Operation
27 Feb 23	868		In Operation
28 Feb 23	870		In Operation
01 Mar 23	871		In Operation
02 Mar 23	876		In Operation
03 Mar 23	873		In Operation
04 Mar 23	874		In Operation
05 Mar 23	875		In Operation
06 Mar 23	868		In Operation
07 Mar 23	877		In Operation
08 Mar 23	878		In Operation
09 Mar 23	879		In Operation
10 Mar 23	879		In Operation
11 Mar 23	881		In Operation
12 Mar 23	879	13.9	In Operation
13 Mar 23	875		In Operation
14 Mar 23	876		In Operation
15 Mar 23	877		In Operation
16 Mar 23	879		In Operation
17 Mar 23	-		Under Maintenance
18 Mar 23	-		Under Maintenance
19 Mar 23	-		Under Maintenance
20 Mar 23	874		In Operation
21 Mar 23	869		In Operation
22 Mar 23	869		In Operation
23 Mar 23	874		In Operation

Date	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [a]	Operation Status (Landfill Gas Generator in Operation)
24 Mar 23	875		In Operation
25 Mar 23	-		Under Maintenance
26 Mar 23	-		Under Maintenance
27 Mar 23	-		Under Maintenance
28 Mar 23	-		Under Maintenance
29 Mar 23	-		Under Maintenance
30 Mar 23	-		Under Maintenance
31 Mar 23	-		Under Maintenance
Average	869	12.0	
Min	849	10.0	
Max	881	13.9	
ENGB			
1 Jan 23	836		In Operation
2 Jan 23	834		In Operation
3 Jan 23	853		In Operation
4 Jan 23	843		In Operation
5 Jan 23	870		In Operation
6 Jan 23	852		In Operation
7 Jan 23	853		In Operation
8 Jan 23	855		In Operation
9 Jan 23	862		In Operation
10 Jan 23	862		In Operation
11 Jan 23	863		In Operation
12 Jan 23	865	10.0	In Operation
13 Jan 23	868		In Operation
14 Jan 23	868		In Operation
15 Jan 23	861		In Operation
16 Jan 23	861		In Operation
17 Jan 23	871		In Operation
18 Jan 23	-		Under Maintenance
19 Jan 23	-		Under Maintenance
20 Jan 23	-		Under Maintenance
21 Jan 23	859		In Operation
22 Jan 23	861		In Operation
23 Jan 23	862		In Operation
24 Jan 23	857		In Operation
25 Jan 23	859		In Operation
26 Jan 23	873		In Operation
27 Jan 23	-		Standby
28 Jan 23	-		Standby
29 Jan 23	-		Standby
30 Jan 23	-		Standby
31 Jan 23	-		Standby
1 Feb 23	-		Under Maintenance
2 Feb 23	-		Under Maintenance
3 Feb 23	-		Under Maintenance
4 Feb 23	-		Under Maintenance
5 Feb 23	-		Under Maintenance
6 Feb 23	-		Under Maintenance
7 Feb 23	-		Under Maintenance
8 Feb 23	-		Under Maintenance
9 Feb 23	-		Under Maintenance
10 Feb 23	-		Under Maintenance
11 Feb 23	-		Under Maintenance
12 Feb 23	-	12.1	Under Maintenance
13 Feb 23	-		Under Maintenance
14 Feb 23	-		Under Maintenance
15 Feb 23	-		Under Maintenance

Date	Exhaust temperature (K)	Exhaust gas velocity (ms^{-1}) [a]	Operation Status (Landfill Gas Generator in Operation)
16 Feb 23	-		Under Maintenance
17 Feb 23	-		Under Maintenance
18 Feb 23	-		Under Maintenance
19 Feb 23	-		Under Maintenance
20 Feb 23	860		In Operation
21 Feb 23	860		In Operation
22 Feb 23	861		In Operation
23 Feb 23	862		In Operation
24 Feb 23	-		Under Maintenance
25 Feb 23	-		Under Maintenance
26 Feb 23	-		Under Maintenance
27 Feb 23	-		Under Maintenance
28 Feb 23	-		Under Maintenance
01 Mar 23	-		Under Maintenance
02 Mar 23	-		Under Maintenance
03 Mar 23	-		Under Maintenance
04 Mar 23	-		Under Maintenance
05 Mar 23	-		Under Maintenance
06 Mar 23	-		Under Maintenance
07 Mar 23	-		Under Maintenance
08 Mar 23	-		Under Maintenance
09 Mar 23	-		Under Maintenance
10 Mar 23	-		Under Maintenance
11 Mar 23	-		Under Maintenance
12 Mar 23	-	13.9	Under Maintenance
13 Mar 23	-		Under Maintenance
14 Mar 23	-		Under Maintenance
15 Mar 23	-		Under Maintenance
16 Mar 23	-		Under Maintenance
17 Mar 23	867		In Operation
18 Mar 23	862		In Operation
19 Mar 23	863		In Operation
20 Mar 23	875		In Operation
21 Mar 23	-		Under Maintenance
22 Mar 23	-		Under Maintenance
23 Mar 23	-		Under Maintenance
24 Mar 23	870		In Operation
25 Mar 23	866		In Operation
26 Mar 23	864		In Operation
27 Mar 23	863		In Operation
28 Mar 23	859		In Operation
29 Mar 23	860		In Operation
30 Mar 23	859		In Operation
31 Mar 23	859		In Operation
Average	860	12.0	
Min	834	10.0	
Max	875	13.9	

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 D6

Ambient VOCs, Ammonia and H_2S Monitoring Results

Table D6.1 Ambient VOCs, Ammonia and H_2S Monitoring Results

Parameters	Limit Level	Monitoring Results (µg m^{-3})			
		AM1	AM2	AM3	AM4
Ammonia	180	157	111	74	72
H2S	42	<15	<15	<15	<15
Methane	NA [a]	0.00033 %(v/v)	0.00023 %(v/v)	0.00018 %(v/v)	0.00017 %(v/v)
1.1.1-Trichloroethane	5,550	<0.8	<0.8	<0.8	<0.8
1.2-Dibromoethane (EDB)	39	<1.0	<1.0	<1.0	<1.0
1.2-Dichloroethane	210	<0.3	<0.3	<0.3	<0.3
Benzene	33	0.6	0.7	0.6	0.6
Butan-2-ol	667	<0.6	<0.6	<0.6	<0.6
Butanethiol	4	<1.2	<1.2	<1.2	<1.2
Carbon Disulphide	150	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	64	<0.6	<0.6	<0.6	<0.6
Chloroform	99	<0.8	<0.8	<0.8	<0.8
Decanes	3,608	<0.7	<0.7	<0.7	<0.7
Dichlorobenzene	120	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoro-methane	NA [a]	1	1.2	1	0.9
Dimethylsulphide	8	<0.2	<0.2	<0.2	<0.2
Dipropyl ether	NA [a]	<0.8	<0.8	<0.8	<0.8
Limonene	212	<0.4	<0.4	<0.4	<0.4
Ethanethiol	13	<0.6	<0.6	<0.6	<0.6
Ethanol	19,200	<3.8	3.9	<3.8	<3.8
Ethyl butanoate	71	<1.0	<1.0	<1.0	<1.0
Ethyl propionate	29	<0.8	<0.8	<0.8	<0.8
Ethyl benzene	738	<0.5	<0.5	<0.5	0.6
Heptane	2,746	<0.8	<0.8	<0.8	<0.8
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	22.4	39.1	35.2	28.4
Methyl butanoate	30	<0.8	<0.8	<0.8	<0.8
Methyl propionate	353	<0.7	<0.7	<0.7	<0.7
Methylene Chloride	3,530	0.9	1.2	1.8	0.7
Butyl acetate	76	<1.0	<1.0	<1.0	<1.0
Butyl benzene	47	<1.0	<1.0	<1.0	<1.0
Nonane	11,540	<0.9	<0.9	<0.9	<0.9
Propyl benzene	19	<0.8	<0.8	<0.8	<0.8

Parameters	Limit Level	Monitoring Results (μg m^{-3})			
		AM1	AM2	AM3	AM4
Octane	7,942	<0.9	<0.9	<0.9	<0.9
Propyl propionate	276	<1.0	<1.0	<1.0	<1.0
Terpenes	NA [(a)]	<0.8	<0.8	<0.8	<0.8
Tetrachloroethylene	1,380	<0.7	<0.7	<0.7	<0.7
Toluene	1,244	1.2	0.9	1	1
Trichloroethylene	5,500	<1.1	<1.1	<1.1	<1.1
Undecane	5,562	<1.2	<1.2	<1.2	<1.2
Vinyl Chloride	26	<0.3	<0.3	<0.3	<0.3
Xylenes	534	0.8	0.7	0.9	1.8

Notes:

(a) No relevant WHO/USEPA/CARB's ambient criteria, odour thresholds and WEL available.

Annex D7

Investigation Reports of Environmental Quality Limit Exceedance

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	7 January 2023
Time	8:00 (7 January 2023) – 8:00 (8 January 2023)
Monitoring Location	AM2
Parameter	24-hour Total Suspended Particulates (TSP)
Action / Limit Levels	Action level: >260 µg/ m^3 Limit level: >260 µg/m^3
Measured Level	337 µg/m^3
Possible reason	From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly east-southeasterly to easterly wind with highest wind speed 8.0 m/s was recorded on 7 and 8 January 2023 during the sampling event. On 6 and 9 January 2023 (monitoring event was conducted on Saturday and Sunday), the ET site representative observed construction works of Cell 4X and SENT Landfill tie-in area and unpaved areas in the vicinity dust monitoring station AM2. This could be the potential cause for the exceedance. Based on this observation, the TSP exceedance at AM2 was deemed to Project-related activities. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted at AM2 on 13 January 2023 to confirm findings. 24-hour TSP level of 47 µg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM2.
Action Taken / Action to be Taken	In accordance with Table 3.8b of the updated EM&A Manual, the monitoring frequency at AM2 shall be increased to daily, until no exceedance of the Action/Limit Level. It should be noted that the turnaround time for the laboratory analysis of the dust filter paper is 5 working days and the preliminary results for the monitoring event conducted on 7 to 8 January 2023 were available on 16 January 2023. Repeat measurement was conducted on 13 January 2023 and the TSP monitoring result at AM2 is well below the Action/Limit Level. Hence, the daily TSP monitoring at AM2 shall not be triggered. Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation measures according to the updated EM&A Manual to avoid any exceedance of the Action and Limit Levels.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 20 February 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	18 January 2023
Time	10:55 – 11:25
Monitoring Location	Thermal Oxidiser
Parameter	Sulphur Dioxide (SO_2)
Trigger Levels	>0.07 g/s
Measured Level	0.21 g/s
Possible reason	As confirmed by the Contractor, the thermal oxidiser was under normal operating conditions during the sampling event. The thermal oxidiser stack emission monitoring results (NO_2, CO, Benzene, Vinyl chloride, gas combustion temperature, exhaust temperature and exhaust gas velocity) on 18 January 2023 were well within the respective limit levels. It is possible that the slight exceedance of SO_2 limit level measured on 18 January 2023 could be due to some short-term system instability (e.g. insufficient air, short gas residence time or ineffective mixing of gas and air during the combustion) during the sampling event. Hence, the SO_2 exceedance at the thermal oxidiser on 18 January 2023 is considered to be Project related. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 21 February 2023 (it should be noted that the turnaround time of the laboratory analysis of the flue gas sample is 3 weeks and the results were available on 6 March 2023) to confirm findings. The SO_2 concentration (<0.01 g/s) measured on 21 February 2023 is well below Limit Level. There is no consecutive exceedance of SO_2 concentrations in the flue gas emission of thermal oxidiser.
Action Taken / Action to be Taken	Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to closely monitoring the operating conditions of the thermal oxidiser to avoid any exceedance of the Limit Levels.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 7 March 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	31 January 20233
Time	8:00 (31 January 2023) – 8:00 (1 February 2023)
Monitoring Location	AM1, AM2, AM3
Parameter	24-hour Total Suspended Particulates (TSP)
Action / Limit Levels	Action level: >260 µg/ m^3 Limit level: >260 µg/m^3
Measured Level	AM1: 509 µg /m^3 AM2: 266 µg /m^3 AM3: 267 µg /m^3
Possible reason	From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly east-northeasterly to easterly wind with highest wind speed 3.6 m/s was recorded on 31 January and 1 February 2023 during the sampling event. <u>AM1</u> On 31 January 2023, dust and traffic emission from the SENT landfill in vicinity and located at the east of dust monitoring location AM1 were observed. The sample taken at AM1 on the day might not represent the operation dust emission from SENTX. In addition, no SENTX works which may lead to potential dust emission was conducted in the vicinity of dust monitoring location AM1 on the sampling day based on on-site observations and construction and operation activities as described by the Contractor. Environmental deficiency was not observed during the weekly site inspection on 26 January 2023 and 2 February 2023 (before and after the sampling event). The Contractor has implemented the dust control and mitigation measures recommended in the updated EM&A Manual. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 6 February 2023 to confirm findings. 24-hour TSP level of 109 µg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM1. Due to presence of the influencing factor from the SENT landfill and no potential source from the Project-related activities in the vicinity of AM1 which may lead to the high TSP level was identified, there is no adequate evidence showing that the TSP exceedance at AM1 was deemed to Project-related activities.

	AM2 On 31 January 2023, the ET site representative observed construction works of Cell 4X and SENT Landfill tie-in area and unpaved areas in the vicinity dust monitoring station AM2. This could be the potential cause for the exceedance. Based on this observation, the TSP exceedance at AM2 was deemed to Project-related activities. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 6 February 2023 to confirm findings. 24-hour TSP level of 61 μg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM2. AM3 On 31 January 2023, no works from SENTX which may generate dust emission were conducted in the vicinity of AM3 on the sampling day based on the ET site representative on-site observations and the Contractor's record of the construction and operation activities carried out on that day. The dust and traffic emission from SENTX haul road at the east of dust monitoring location AM3 could be the potential dust source contributing to the exceedance. The TSP exceedance at AM3 was therefore deemed to Project-related activities. It should be noted that dust emitted from the public fill stockpiling areas and active earthworks from another project site in close vicinity of dust monitoring station AM3 could also contribute to the project. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 6 February 2023 to confirm findings. 24-hour TSP level of 115 μg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM3.
Action Taken / Action to be Taken	In accordance with Table 3.8b of the updated EM&A Manual, the monitoring frequency at AM1, AM2 and AM3 shall be increased to daily, until no exceedance of the Action/Limit Level. It should be noted that the turnaround time for the laboratory analysis of the dust filter paper is 5 working days and the preliminary results for the monitoring event conducted on 31 January to 1 February 2023 were available on 8 February 2023. Repeat measurement was conducted on 6 February 2023 and the TSP monitoring results at AM1, AM2 and AM3 are well below the Action/Limit Level. Hence, the daily TSP monitoring at AM1, AM2 and AM3 shall not be triggered. Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is

	reminded to implement relevant and appropriate mitigation measures according to the updated EM&A Manual to avoid any exceedance of the Action/Limit Level. In addition, the Contractor was reminded to discuss the dust control measures with CEDD to minimize the dust impact from the other project site to proximity to the SENTX boundary.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 20 February 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	2 March 2023
Time	8:00 (2 March 2023) – 8:00 (3 March 2023)
Monitoring Location	AM1
Parameter	24-hour Total Suspended Particulates (TSP)
Action / Limit Levels	Action level: >260 µg/ m^3 Limit level: >260 µg/m^3
Measured Level	401 µg/m^3
Possible reason	From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly east-southeasterly to easterly wind with highest wind speed 9.5 m/s was recorded on 2 and 3 March 2023 during the sampling event. On 2 March 2023, dust and traffic emission from the SENT landfill in vicinity and located at the east of dust monitoring location AM1 were observed. The sample taken at AM1 on the day might not represent the operation dust emission from SENTX. In addition, no SENTX works which may lead to potential dust emission was conducted in the vicinity of dust monitoring location AM1 on the sampling day based on on-site observations and construction and operation activities as described by the Contractor. Environmental deficiency was not observed during the weekly site inspection on 2 March 2023. The Contractor has implemented the dust control and mitigation measures recommended in the updated EM&A Manual. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 9 March 2023 to confirm findings. 24-hour TSP level of 165 µg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM1. Due to presence of the influencing factor from the SENT landfill and no potential source from the Project-related activities in the vicinity of AM1 which may lead to the high TSP level was identified, there is no adequate evidence showing that the TSP exceedance at AM1 was deemed to Project-related activities.
Action Taken / Action to be Taken	Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation measures according to the updated EM&A Manual to avoid any exceedance of the Action and Limit Levels. In addition, the Contractor was reminded to implement additional

	dust control measures to minimize the dust impact from SENT landfill to the SENTX boundary.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 22 March 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	8 March 2023
Time	8:00 (8 March 2023) – 8:00 (9 March 2023)
Monitoring Location	AM2
Parameter	24-hour Total Suspended Particulates (TSP)
Action / Limit Levels	Action level: >260 µg/ m^3 Limit level: >260 µg/m^3
Measured Level	313 µg/m^3
Possible reason	From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly southwesterly to south-southwesterly wind with highest wind speed 3.8 m/s was recorded on 8 and 9 March 2023 during the sampling event. On 8 and 9 March 2023 (during the sampling event), the ET site representative observed construction works at Cell 4X and SENT Landfill tie-in area and unpaved areas in the vicinity dust monitoring station AM2. This could be the potential cause for the exceedance. Based on this observation, the TSP exceedance at AM2 was deemed to Project-related activities. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted at AM2 on 14 March 2023 to confirm findings. Exceedance of 24-hour TSP Action/Limit Levels was recorded at AM2 (452 µg/m^3) during the sampling event, which showed consecutive dust impact at AM2.
Action Taken / Action to be Taken	In accordance with Table 3.8b of the updated EM&A Manual, the monitoring frequency at AM2 shall be increased to daily, until no exceedance of the Action/Limit Level. It should be noted that the turnaround time for the laboratory analysis of the dust filter paper is 5 working days and the preliminary results for the monitoring event conducted on 8 to 9 March 2023 were available on 17 March 2023. Repeat measurement and the regular TSP monitoring were conducted on 14 March and 20 March 2023, respectively. The TSP monitoring result at AM2 on 14 March 2023 exceeded the Action/Limit Level. However, 24-hour TSP level of 151 µg/m^3 (below Action/Limit Levels) was measured during the regular TSP monitoring event on 20 March 2023. Hence, the daily TSP monitoring at AM2 shall not be triggered. Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation

	measures according to the updated EM&A Manual to avoid any exceedance of the Action/Limit Levels. ET will continue to closely monitor the dust monitoring results and collect additional data for investigation and further review, if necessary.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 23 March 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	14 March 2023
Time	8:00 (14 March 2023) – 8:00 (15 March 2023)
Monitoring Location	AM1 and AM2
Parameter	24-hour Total Suspended Particulates (TSP)
Action / Limit Levels	Action level: >260 µg/ m^3 Limit level: >260 µg/m^3
Measured Level	AM1: 306 µg /m^3 AM2: 452 µg /m^3
Possible reason	From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly east-northeasterly to south-easterly wind with highest wind speed 2.0 m/s was recorded on 14 and 15 March 2023 during the sampling event. <u>AM1</u> On 14 March 2023, dust and traffic emission from the SENT landfill in vicinity and located at the east of dust monitoring location AM1 were observed. The sample taken at AM1 on the day might not represent the operation dust emission from SENTX. In addition, no SENTX works which may lead to potential dust emission was conducted in the vicinity of dust monitoring location AM1 on the sampling day based on on-site observations and construction and operation activities as described by the Contractor. Environmental deficiency was not observed during the weekly site inspection on 9 and 16 March 2023. The Contractor has implemented the dust control and mitigation measures recommended in the updated EM&A Manual. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 20 March 2023 to confirm findings. 24-hour TSP level of 171 µg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM1. Due to presence of the influencing factor from the SENT landfill and no potential source from the Project-related activities in the vicinity of AM1 which may lead to the high TSP level was identified, there is no adequate evidence showing that the TSP exceedance at AM1 was deemed to Project-related activities. <u>AM2</u> On 14 March 2023, the ET site representative observed construction works at Cell 4X and SENT Landfill tie-in area and unpaved areas

	in the vicinity dust monitoring station AM2. This could be the potential cause for the exceedance. Based on this observation, the TSP exceedance at AM2 was deemed to Project-related activities. In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 20 March 2023 to confirm findings. 24-hour TSP level of 151 µg/m^3 (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM2.
Action Taken / Action to be Taken	In accordance with Table 3.8b of the updated EM&A Manual, the monitoring frequency at AM2 shall be increased to daily, until no exceedance of the Action/Limit Level. It should be noted that the turnaround time for the laboratory analysis of the dust filter paper is 5 working days and the preliminary results for the monitoring event conducted on 14 to 15 March 2023 were available on 22 March 2023. Repeat measurement was conducted on 20 March 2023 and the TSP monitoring results at AM2 is well below the Action/Limit Level. Hence, the daily TSP monitoring at AM2 shall not be triggered. Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation measures according to the updated EM&A Manual to avoid any exceedance of the Action/Limit Level. The Contractor is also reminded to implement additional dust control measures to minimize the dust impact from SENT Landfill to the SENTX boundary. ET will continue to closely monitor the dust monitoring results and collect additional data for investigation and further review, if necessary.
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 31 March 2023

Annex E

Noise

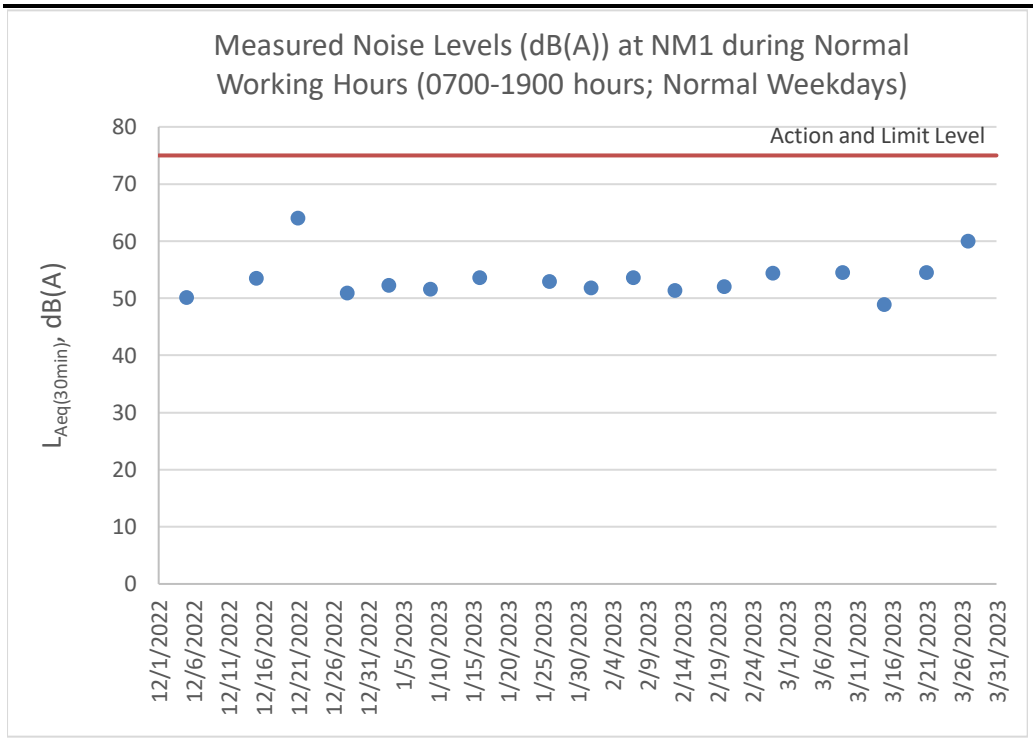
Annex E1

Noise Monitoring Results

Table E1.1 ***Measured Noise Levels (dB(A)) at NM1 during Normal Working Hours (0700-1900 hours; Normal Weekdays)***

Date	Start Time	Finish Time	Weather	$L_{10\ (30min)}$	$L_{90\ (30min)}$	$L_{eq\ (30min)}$
3 Jan 23	10:32	11:02	Cloudy	54.1	49.5	52.2
9 Jan 23	9:02	9:32	Cloudy	54.0	48.1	51.5
16 Jan 23	9:40	10:10	Cloudy	55.0	51.5	53.5
26 Jan 23	10:20	10:50	Cloudy	55.2	46.4	52.9
1 Feb 23	9:22	9:52	Cloudy	53.9	48.4	51.8
7 Feb 23	9:43	10:13	Cloudy	55.4	50.3	53.6
13 Feb 23	10:50	11:20	Cloudy	53.7	48.0	51.3
20 Feb 23	9:36	10:06	Sunny	53.7	49.8	52.0
27 Feb 23	10:16	10:46	Sunny	56.3	50.5	54.3
9 Mar 23	14:33	15:03	Sunny	56.5	51.7	54.5
15 Mar 23	9:28	9:58	Sunny	50.6	46.5	48.9
21 Mar 23	9:31	10:01	Cloudy	56.0	52.5	54.5
27 Mar 23	9:52	10:22	Cloudy	52.9	48.3	59.9
					Average	53.1
					Min	48.9
					Max	59.9

Figure E1.1 ***Graphical Presentation for Noise Monitoring at NM1***



Annex E2

Event and Action Plan for Noise Monitoring

Annex E2 Event and Action Plan for Operational Noise Monitoring

Event	Action		
	ET	**IEC**	**Contractor**
Action Level	• 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	• 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	• Submit proposals for remedial measures to IEC • Implement the agreed proposals
Limit Level	• 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 Contactor, IEC, Project Proponent and EPD • Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring	• 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	• 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

Water Quality

Annex F1

Surface Water Quality Monitoring Results

Table F1.1 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
4 Jan 23	14:37	Sunny	Unable to collect water sample due to insufficient flow						-
8 Feb 23	14:18	Cloudy	Unable to collect water sample due to insufficient flow						-
7 Mar 23	15:15	Sunny	Unable to collect water sample due to insufficient flow						-
					Average	-	-	-	
					Min	-	-	-	
					Max	-	-	-	

Table F1.2 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
4 Jan 23	14:31	Sunny	Unable to collect water sample due to insufficient flow						-
8 Feb 23	14:12	Cloudy	Unable to collect water sample due to insufficient flow						-
7 Mar 23	16:00	Sunny	Unable to collect water sample due to insufficient flow						-
					Average	-	-	-	
					Min	-	-	-	
					Max	-	-	-	

Annex F2

Event and Action Plan for Water Quality Monitoring

Annex F2 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	• 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 •	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• Rectify any unacceptable practice; • Carry out remedial measures or amend design as required • Implement amended design, if necessary

Annex F3

Leachate Levels Monitoring Results

Table F3.1 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 Jan 23	70	82	76
2 Jan 23	70	82	76
3 Jan 23	70	82	76
4 Jan 23	66	79	73
5 Jan 23	77	88	83
6 Jan 23	73	84	79
7 Jan 23	70	82	76
8 Jan 23	75	88	82
9 Jan 23	75	88	82
10 Jan 23	70	82	76
11 Jan 23	70	82	76
12 Jan 23	64	75	70
13 Jan 23	66	79	73
14 Jan 23	68	82	75
15 Jan 23	73	84	79
16 Jan 23	73	84	79
17 Jan 23	75	70	73
18 Jan 23	66	77	72
19 Jan 23	66	77	72
20 Jan 23	75	70	73
21 Jan 23	75	88	82
22 Jan 23	73	86	80
23 Jan 23	73	86	80
24 Jan 23	73	86	80
25 Jan 23	73	86	80
26 Jan 23	73	86	80
27 Jan 23	68	82	75
28 Jan 23	66	77	72
29 Jan 23	70	82	76
30 Jan 23	70	82	76
31 Jan 23	66	77	72
1 Feb 23	73	86	80
2 Feb 23	68	82	75
3 Feb 23	75	88	82
4 Feb 23	70	84	77
5 Feb 23	73	86	80
6 Feb 23	73	86	80
7 Feb 23	68	79	74
8 Feb 23	75	88	82
9 Feb 23	70	82	76
10 Feb 23	64	75	70
11 Feb 23	73	84	79
12 Feb 23	68	79	74
13 Feb 23	68	79	74
14 Feb 23	70	82	76
15 Feb 23	68	82	75
16 Feb 23	66	77	72
17 Feb 23	75	88	82
18 Feb 23	70	84	77
19 Feb 23	75	86	81
20 Feb 23	75	86	81
21 Feb 23	70	82	76
22 Feb 23	64	75	70
23 Feb 23	73	84	79
24 Feb 23	66	77	72

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
25 Feb 23	75	86	81
26 Feb 23	75	88	82
27 Feb 23	75	88	82
28 Feb 23	70	82	76
1 Mar 23	77	88	83
2 Mar 23	70	82	76
3 Mar 23	77	88	83
4 Mar 23	70	82	76
5 Mar 23	70	84	77
6 Mar 23	70	84	77
7 Mar 23	77	64	71
8 Mar 23	73	84	79
9 Mar 23	64	77	71
10 Mar 23	73	84	79
11 Mar 23	64	77	71
12 Mar 23	64	77	71
13 Mar 23	64	77	71
14 Mar 23	73	84	79
15 Mar 23	64	77	71
16 Mar 23	73	84	79
17 Mar 23	64	77	71
18 Mar 23	70	84	77
19 Mar 23	70	84	77
20 Mar 23	70	84	77
21 Mar 23	64	75	70
22 Mar 23	73	84	79
23 Mar 23	66	77	72
24 Mar 23	73	86	80
25 Mar 23	68	79	74
26 Mar 23	70	82	76
27 Mar 23	70	82	76
28 Mar 23	73	84	79
29 Mar 23	77	88	83
30 Mar 23	70	84	77
31 Mar 23	70	82	76
Average	71	82	76
Min	64	64	70
Max	77	88	83

Table F3.2 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 Jan 23	82	77	80
2 Jan 23	82	77	80
3 Jan 23	82	77	80
4 Jan 23	86	82	84
5 Jan 23	88	86	87
6 Jan 23	70	66	68
7 Jan 23	77	73	75
8 Jan 23	86	82	84
9 Jan 23	86	82	84
10 Jan 23	64	59	62
11 Jan 23	70	66	68
12 Jan 23	77	73	75
13 Jan 23	82	77	80
14 Jan 23	86	82	84
15 Jan 23	73	68	71
16 Jan 23	73	68	71
17 Jan 23	77	73	75
18 Jan 23	82	79	81
19 Jan 23	86	82	84
20 Jan 23	66	62	64
21 Jan 23	73	68	71
22 Jan 23	73	68	71
23 Jan 23	73	68	71
24 Jan 23	73	68	71
25 Jan 23	73	68	71
26 Jan 23	73	68	71
27 Jan 23	77	73	75
28 Jan 23	82	79	81
29 Jan 23	66	62	64
30 Jan 23	66	62	64
31 Jan 23	73	68	71
1 Feb 23	77	73	75
2 Feb 23	82	79	81
3 Feb 23	86	82	84
4 Feb 23	64	59	62
5 Feb 23	77	73	75
6 Feb 23	77	73	75
7 Feb 23	82	77	80
8 Feb 23	86	82	84
9 Feb 23	64	59	62
10 Feb 23	70	66	68
11 Feb 23	77	73	75
12 Feb 23	86	82	84
13 Feb 23	86	82	84
14 Feb 23	64	59	62
15 Feb 23	70	66	68
16 Feb 23	77	73	75
17 Feb 23	82	77	80
18 Feb 23	86	82	84
19 Feb 23	68	64	66
20 Feb 23	68	64	66
21 Feb 23	75	70	73
22 Feb 23	79	75	77
23 Feb 23	84	79	82
24 Feb 23	88	84	86
25 Feb 23	68	64	66

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
26 Feb 23	79	75	77
27 Feb 23	79	75	77
28 Feb 23	84	79	82
1 Mar 23	88	84	86
2 Mar 23	66	64	65
3 Mar 23	73	68	71
4 Mar 23	77	73	75
5 Mar 23	88	82	85
6 Mar 23	88	82	85
7 Mar 23	66	62	64
8 Mar 23	73	68	71
9 Mar 23	79	75	77
10 Mar 23	84	79	82
11 Mar 23	88	84	86
12 Mar 23	73	70	72
13 Mar 23	73	70	72
14 Mar 23	79	75	77
15 Mar 23	84	79	82
16 Mar 23	88	84	86
17 Mar 23	68	66	67
18 Mar 23	75	70	73
19 Mar 23	84	80	82
20 Mar 23	86	82	84
21 Mar 23	66	62	64
22 Mar 23	73	68	71
23 Mar 23	77	73	75
24 Mar 23	82	79	81
25 Mar 23	88	84	86
26 Mar 23	84	79	82
27 Mar 23	84	79	82
28 Mar 23	70	66	68
29 Mar 23	79	77	78
30 Mar 23	86	82	84
31 Mar 23	66	64	65
Average	78	73	75
Min	64	59	62
Max	88	86	87

Table F3.3 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 Jan 23	70	70	70
2 Jan 23	70	70	70
3 Jan 23	70	70	70
4 Jan 23	70	70	70
5 Jan 23	62	62	62
6 Jan 23	64	64	64
7 Jan 23	66	66	66
8 Jan 23	68	68	68
9 Jan 23	68	68	68
10 Jan 23	70	70	70
11 Jan 23	62	62	62
12 Jan 23	64	64	64
13 Jan 23	66	66	66
14 Jan 23	66	66	66
15 Jan 23	70	70	70
16 Jan 23	70	70	70
17 Jan 23	62	62	62
18 Jan 23	64	64	64
19 Jan 23	66	64	65
20 Jan 23	66	66	66
21 Jan 23	66	66	66
22 Jan 23	70	70	70
23 Jan 23	70	70	70
24 Jan 23	70	70	70
25 Jan 23	70	70	70
26 Jan 23	70	70	70
27 Jan 23	62	62	62
28 Jan 23	64	64	64
29 Jan 23	64	64	64
30 Jan 23	64	64	64
31 Jan 23	66	66	66
1 Feb 23	66	66	66
2 Feb 23	66	66	66
3 Feb 23	66	66	66
4 Feb 23	66	66	66
5 Feb 23	66	66	66
6 Feb 23	66	66	66
7 Feb 23	66	66	66
8 Feb 23	68	68	68
9 Feb 23	68	68	68
10 Feb 23	68	68	68
11 Feb 23	68	75	72
12 Feb 23	70	70	70
13 Feb 23	70	70	70
14 Feb 23	70	70	70
15 Feb 23	62	62	62
16 Feb 23	62	62	62
17 Feb 23	64	64	64
18 Feb 23	62	64	63
19 Feb 23	62	62	62
20 Feb 23	62	62	62
21 Feb 23	64	64	64
22 Feb 23	64	64	64
23 Feb 23	64	64	64
24 Feb 23	64	64	64
25 Feb 23	64	64	64

Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
26 Feb 23	62	62	62
27 Feb 23	62	62	62
28 Feb 23	62	62	62
1 Mar 23	70	70	70
2 Mar 23	70	70	70
3 Mar 23	68	68	68
4 Mar 23	66	68	67
5 Mar 23	66	66	66
6 Mar 23	66	66	66
7 Mar 23	64	64	64
8 Mar 23	64	64	64
9 Mar 23	64	64	64
10 Mar 23	62	64	63
11 Mar 23	62	62	62
12 Mar 23	70	70	70
13 Mar 23	70	70	70
14 Mar 23	68	68	68
15 Mar 23	68	68	68
16 Mar 23	66	66	66
17 Mar 23	66	66	66
18 Mar 23	64	64	64
19 Mar 23	64	64	64
20 Mar 23	64	64	64
21 Mar 23	62	62	62
22 Mar 23	70	70	70
23 Mar 23	70	70	70
24 Mar 23	68	68	68
25 Mar 23	68	68	68
26 Mar 23	64	68	66
27 Mar 23	64	64	64
28 Mar 23	70	70	70
29 Mar 23	64	64	64
30 Mar 23	66	66	66
31 Mar 23	66	66	66
Average	66	66	66
Min	62	62	62
Max	70	75	72

Table F3.3 Leachate Levels Monitoring Results (Pump Station No.4X (Cell 4X))

Date	Meter No.X6 (cm)	Meter No.X7 (cm)	Average (cm)
Pump Station No. 4X (Cell 4X)			
1 Jan 23	54	59	57
2 Jan 23	54	59	57
3 Jan 23	54	59	57
4 Jan 23	56	61	59
5 Jan 23	59	63	61
6 Jan 23	61	65	63
7 Jan 23	61	65	63
8 Jan 23	65	70	68
9 Jan 23	65	70	68
10 Jan 23	65	70	68
11 Jan 23	59	63	61
12 Jan 23	63	67	65
13 Jan 23	56	61	59
14 Jan 23	61	65	63
15 Jan 23	48	52	50
16 Jan 23	48	52	50
17 Jan 23	56	61	59
18 Jan 23	61	65	63
19 Jan 23	65	70	68
20 Jan 23	48	52	50
21 Jan 23	50	54	52
22 Jan 23	56	61	59
23 Jan 23	56	61	59
24 Jan 23	56	61	59
25 Jan 23	56	61	59
26 Jan 23	56	61	59
27 Jan 23	56	61	59
28 Jan 23	56	61	59
29 Jan 23	54	59	57
30 Jan 23	54	59	57
31 Jan 23	54	59	57
1 Feb 23	52	56	54
2 Feb 23	52	56	54
3 Feb 23	48	54	51
4 Feb 23	48	52	50
5 Feb 23	65	67	66
6 Feb 23	65	67	66
7 Feb 23	63	67	65
8 Feb 23	61	65	63
9 Feb 23	59	63	61
10 Feb 23	56	61	59
11 Feb 23	54	59	57
12 Feb 23	65	70	68
13 Feb 23	65	70	68
14 Feb 23	65	70	68
15 Feb 23	65	70	68
16 Feb 23	63	67	65
17 Feb 23	61	65	63
18 Feb 23	59	65	62
19 Feb 23	54	59	57
20 Feb 23	54	59	57
21 Feb 23	52	56	54
22 Feb 23	48	52	50
23 Feb 23	65	70	68
24 Feb 23	63	67	65
25 Feb 23	59	65	62

Date	Meter No.X6 (cm)	Meter No.X7 (cm)	Average (cm)
26 Feb 23	54	59	57
27 Feb 23	54	59	57
28 Feb 23	50	54	52
1 Mar 23	50	56	53
2 Mar 23	63	67	65
3 Mar 23	59	63	61
4 Mar 23	54	59	57
5 Mar 23	48	52	50
6 Mar 23	48	52	50
7 Mar 23	63	67	65
8 Mar 23	61	65	63
9 Mar 23	56	61	59
10 Mar 23	52	56	54
11 Mar 23	48	52	50
12 Mar 23	59	63	61
13 Mar 23	59	63	61
14 Mar 23	54	59	57
15 Mar 23	52	56	54
16 Mar 23	48	52	50
17 Mar 23	63	67	65
18 Mar 23	59	63	61
19 Mar 23	52	56	54
20 Mar 23	50	54	52
21 Mar 23	63	67	65
22 Mar 23	59	63	61
23 Mar 23	54	59	57
24 Mar 23	50	54	52
25 Mar 23	65	70	68
26 Mar 23	52	56	54
27 Mar 23	52	56	54
28 Mar 23	52	56	54
29 Mar 23	59	63	61
30 Mar 23	65	67	66
31 Mar 23	48	52	50
Average	57	61	59
Min	48	52	50
Max	65	70	68

Figure F3.1 *Graphical Presentation for Leachate Levels Monitoring (Pump Station No.1X (Cell 1X))*

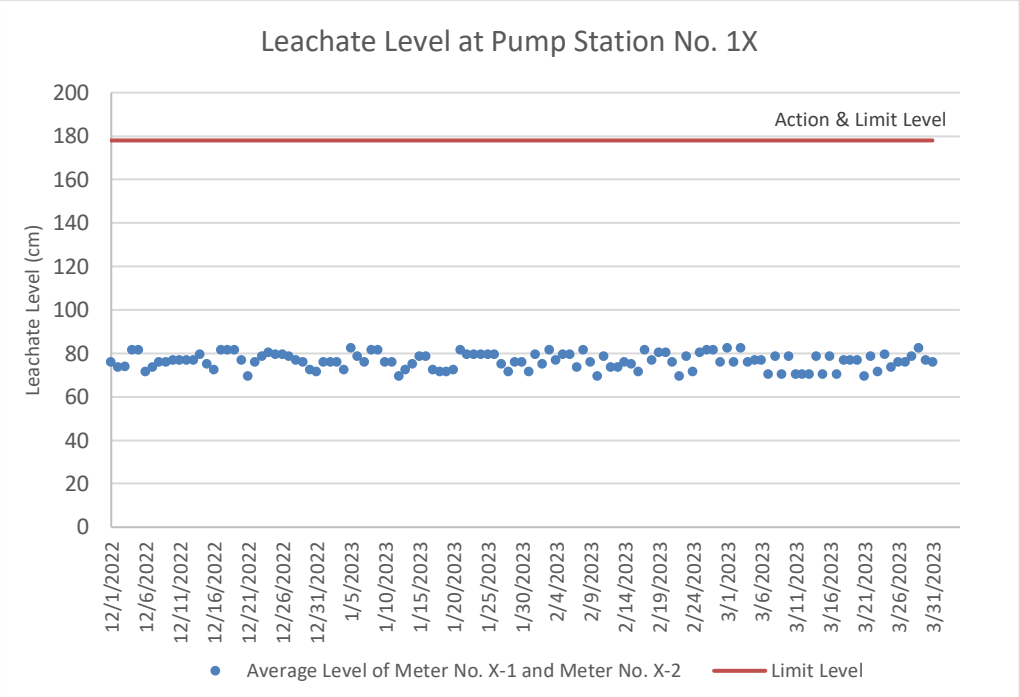


Figure F3.2 *Graphical Presentation for Leachate Levels Monitoring (Pump Station No.2X (Cell 2X))*

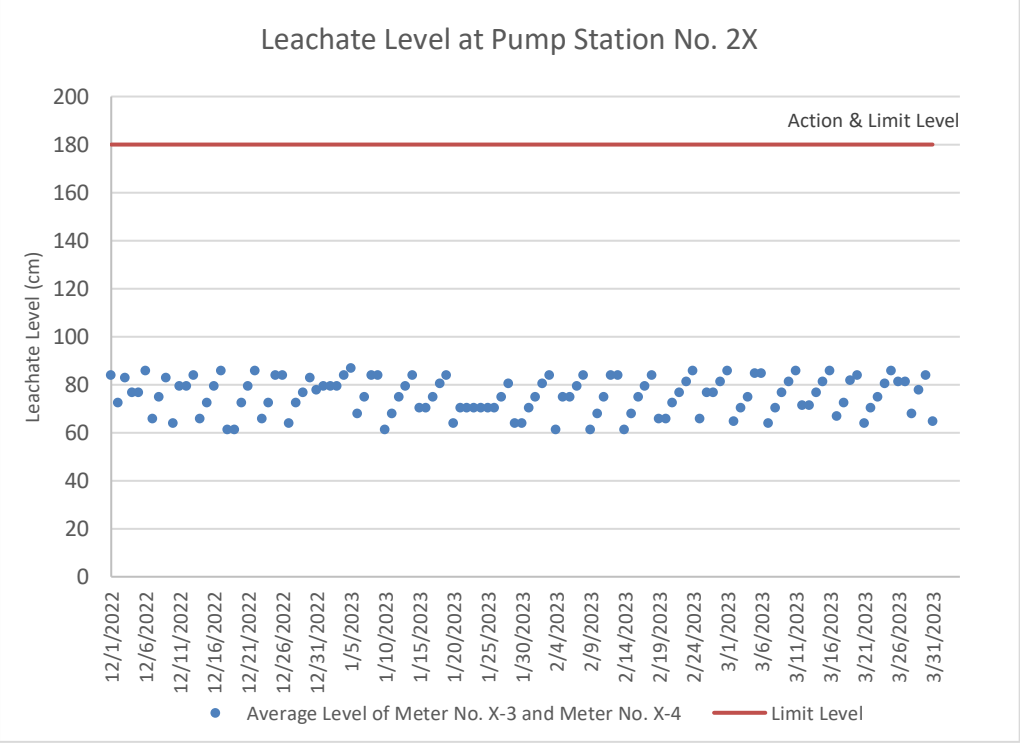


Figure F3.3 *Graphical Presentation for Leachate Levels Monitoring (Pump Station No.3X (Cell 3X))*

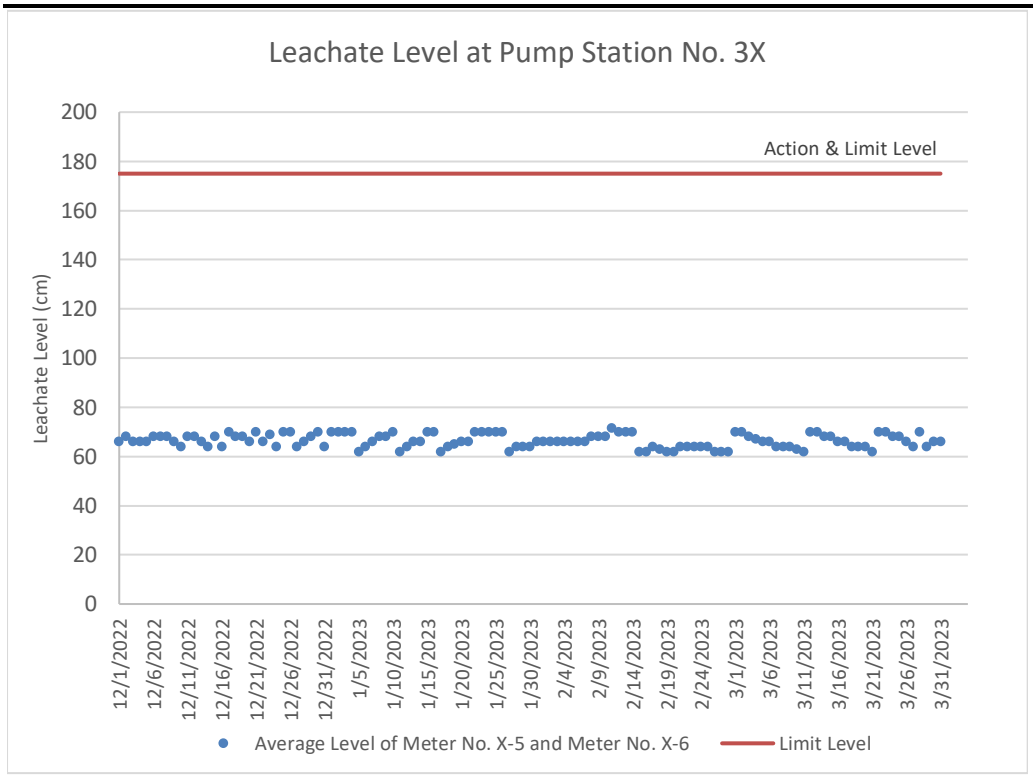
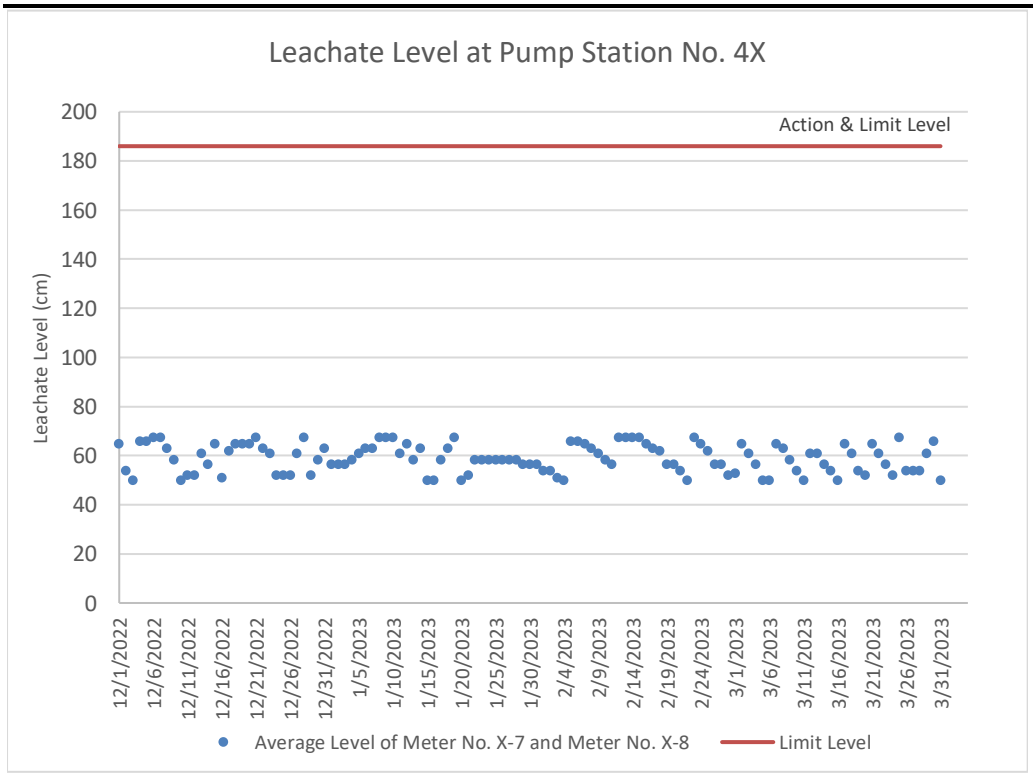


Figure F3.4 *Graphical Presentation for Leachate Levels Monitoring (Pump Station No.4X (Cell 4X))*



Annex F4

Effluent Quality Monitoring Results

Table F4.1 Effluent Monitoring Results

		4 Jan 23	2 Feb 23	2 Mar 23
On-site Measurements				
Temperature	°C	25.0	22.0	25.7
pH Value	pH Unit	8.0	8.3	8.4
Volume Discharged	m^3	1,339	1,000	1,021
Laboratory Analysis				
Suspended Solids (SS)	mg/L	14.3	27.2	68
Alkalinity	mg/L	2170	2080	2390
Ammoniacal-nitrogen	mg/L	0.08	0.08	0.02
Chloride	mg/L	1950	2200	1780
Nitrite-nitrogen	mg/L	0.25	0.37	0.1
Phosphate	mg/L	2.96	8.68	7.65
Sulphate	mg/L	201	147	164
Total Nitrogen	mg/L	111	144	87.6
Nitrate-nitrogen	mg/L	42.9	54.3	34.4
Total Inorganic Nitrogen	mg/L	43.23	54.75	34.52
Biochemical Oxygen Demand (BOD)	mg/L	24	17	19
Chemical Oxygen Demand (COD)	mg/L	806	938	1010
Oil & Grease	mg/L	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	257	667	447
Boron	µg/L	5130	5390	5640
Calcium	mg/L	17.7	20.9	19.5
Iron	mg/L	1.76	2.35	1.9
Magnesium	mg/L	24.9	25.2	27.7
Potassium	mg/L	787	910	1030
Cadmium	µg/L	<1.0	<1.0	<1.0
Chromium	µg/L	133	218	146
Copper	µg/L	<10	12	<10
Nickel	µg/L	122	146	119
Zinc	µg/L	43	126	54

Annex F5

Groundwater Monitoring Results

Table F5.1 Groundwater Monitoring Results (January 2023)

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	2.85	2.94	2.91	2.91	2.92	2.89	2.55	2.91	2.54	2.43	2.95	6.79	35.59	41.91
Bicarbonate Alkalinity as CaCO3	mg/L	100	256	139	<1	<1	<1	33	<1	123	221	251	54	18	13
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	63	77	113	29	90	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	100	256	139	101	132	189	62	131	123	221	251	54	18	13
pH Value	pH Unit	8	7.9	7.9	10.9	11.1	11.3	9.3	10.9	8.2	7.9	7.6	7	5.9	5.9
Electrical Conductivity	µS/cm	1270	922	1130	945	1260	1320	2440	1770	1000	948	856	306	92	98
Ammonia as N	mg/L	0.8	0.02	1.58	4.27	2.34	3.74	6.35	8.64	1.22	0.02	0.13	0.02	<0.01	<0.01
Chloride	mg/L	305	38	204	175	206	190	665	364	184	114	74	21	15	18
Nitrite as N	mg/L	<0.01	0.02	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<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	0.02	<0.01	0.02	0.01	0.01	0.04	0.01	<0.01
Sulphate as SO4 - Turbidimetric	mg/L	70	197	90	74	124	100	36	196	88	93	83	61	3	4
Sulphide as S2	mg/L	0.2	<0.1	<0.1	7.2	7.7	17.4	2.5	5.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.8	0.1	1.8	5	2.4	4.2	7.1	9.6	1.4	0.1	0.2	0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.59	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.03	0.01	<0.01	0.01	0.1	0.08
Total Nitrogen as N	mg/L	0.8	0.7	1.8	5	2.5	4.2	7.1	9.7	1.4	0.1	0.2	0.1	0.1	<0.1
Boron	µg/L	110	180	200	200	200	180	690	190	270	180	90	20	20	10
Calcium	mg/L	63.6	59.6	72.6	35.3	35	33.6	22.5	40.4	53.8	84.2	96.7	24.8	0.85	1.01
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	8.39	57.5	4.79	0.13	<0.05	<0.05	3.2	<0.05	6.27	7.01	6.84	4.26	0.98	0.88
Sodium	mg/L	151	47.4	120	113	151	161	370	247	113	88.9	51.5	22.6	12.3	13.2
Iron	mg/L	0.06	<0.04	0.09	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Potassium	mg/L	20.8	11.8	27.2	29.8	54.9	56.2	49.5	64.8	21.6	13.1	9.26	2.95	3.63	3.41
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	<1	<1	<1	<1	<1
Lead	µg/L	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	664	156	848	<1	<1	<1	<1	<1	58	657	754	590	18	8
Nickel	µg/L	<1	<1	<1	1	1	2	<1	4	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	24	11	<10
Biochemical Oxygen Demand	mg/L	<2	<2	2	<2	<2	7	<2	<2	2	3	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	7	3	15	24	30	44	11	38	8	8	4	<2	2	2
Total Organic Carbon	mg/L	4	1	8	10	12	12	6	16	4	4	2	<1	<1	<1

Table F5.2 Groundwater Monitoring Results (February 2023)

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	2.41	2.71	2.94	2.37	2.72	1.71	2.64	2.96	2.84	2.03	3.17	6.29	Dry	41.41
Bicarbonate Alkalinity as CaCO3	mg/L	132	260	126	<1	<1	<1	42	<1	123	242	223	56	NA	12
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	72	88	134	24	79	<1	<1	<1	<1	NA	<1
Total Alkalinity as CaCO3	mg/L	132	260	126	108	141	204	66	117	123	242	223	56	NA	12
pH Value	pH Unit	7.9	8	8	10.9	11.2	11.4	9.2	10.9	8.3	8	8	7	NA	5.6
Electrical Conductivity	µS/cm	998	874	1110	960	1280	1300	2430	2050	862	776	667	302	NA	99
Ammonia	mg/L	<0.01	<0.01	0.18	0.48	0.27	0.44	0.66	0.96	1.74	0.04	0.17	<0.01	NA	<0.01
Chloride	mg/L	179	41	203	188	215	193	652	458	151	72	51	21	NA	18
Nitrite	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.15	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01
Phosphorus	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.03	0.02	0.01	0.03	NA	<0.01
Sulphate	mg/L	60	141	79	63	123	79	41	167	58	36	47	55	NA	4
Sulphide	mg/L	<0.1	<0.1	<0.1	8.9	13.8	22.4	1.9	4.8	0.1	<0.1	<0.1	<0.1	NA	<0.1
Total Kjeldahl Nitrogen	mg/L	0.1	<0.1	1.9	6	3.2	5.3	6.5	10.9	1.8	<0.1	0.3	<0.1	NA	<0.1
Nitrate	mg/L	<0.01	0.45	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	0.07
Total Nitrogen	mg/L	0.1	0.5	1.9	6	3.2	5.3	6.6	10.9	1.8	<0.1	0.3	<0.1	NA	0.1
Boron	µg/L	130	180	200	190	200	190	710	240	320	90	80	20	NA	10
Calcium	mg/L	58.8	57.5	63.9	38.1	38.5	31.3	25.1	51.5	40.9	79.8	74.8	25.2	NA	0.92
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	NA	<0.20
Magnesium	mg/L	7.33	51.3	4.17	<0.05	<0.05	<0.05	4.64	<0.05	6.4	7.53	6	4.14	NA	0.89
Sodium	mg/L	114	46.9	125	115	158	161	437	320	102	57.9	48.6	25.9	NA	14.2
Iron	mg/L	0.05	<0.04	0.1	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.38	NA	<0.04
Potassium	mg/L	19.8	10.6	27	31.3	56.8	54.9	50.4	72	18.6	8.34	8.51	3.01	NA	3.82
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	NA	<0.2
Chromium	µg/L	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	NA	<1
Copper	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1
Manganese	µg/L	573	172	751	<1	2	<1	1	<1	82	1120	750	726	NA	7
Nickel	µg/L	<1	<1	<1	1	1	2	<1	4	<1	<1	<1	<1	NA	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	13	NA	10
Biochemical Oxygen Demand	mg/L	<2	<2	<2	6	4	10	<2	3	<2	<2	<2	<2	NA	<2
Chemical Oxygen Demand	mg/L	6	6	16	28	30	38	12	34	10	4	4	5	NA	<2
Total Organic Carbon	mg/L	4	4	10	8	10	11	6	15	7	2	<1	3	NA	<1

Table F5.3 Groundwater Monitoring Results (March 2023)

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	2.71	2.81	2.91	2.67	2.85	2.66	2.36	2.61	2.28	2.16	2.75	6.33	35.38	39.36
Bicarbonate Alkalinity as CaCO3	mg/L	155	256	113	<1	<1	<1	34	<1	131	214	235	55	17	16
Carbonate Alkalinity as CaCO3	mg/L	<1	<1	<1	62	52	120	26	79	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO3	mg/L	155	256	113	96	76	202	61	129	131	214	235	55	17	16
pH Value	pH Unit	7.8	8	8	10.7	10.7	11.3	9.3	10.9	8.3	7.9	8	7	5.6	5.8
Electrical Conductivity	µS/cm	982	874	1090	1130	1430	1340	2240	2920	786	727	694	298	93	107
Ammonia	mg/L	0.26	<0.01	1.74	6.17	2.61	4.23	3.25	13.8	1.27	0.02	0.17	0.01	0.02	0.03
Chloride	mg/L	166	40	217	238	320	206	535	821	133	81	53	21	14	18
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.02	0.02	0.04	0.01	<0.01
Sulphate	mg/L	61	132	78	63	120	96	62	90	46	43	48	48	3	5
Sulphide	mg/L	<0.1	<0.1	0.2	10	8	27.8	1.2	25.2	1.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	0.4	<0.1	2.2	6.7	3.5	4.8	3.3	13.8	1.5	0.1	0.4	0.1	<0.1	0.1
Nitrate	mg/L	0.07	0.41	0.01	<0.01	<0.01	0.02	0.65	<0.01	<0.01	0.01	<0.01	0.01	0.1	0.07
Total Nitrogen	mg/L	0.4	0.5	2.2	6.7	3.5	4.9	6.7	13.8	1.5	0.1	0.4	0.1	0.2	0.2
Boron	µg/L	140	180	220	190	190	180	400	430	320	80	80	20	10	10
Calcium	mg/L	57.6	59.4	60.9	40.5	35.2	36.1	17.3	80.4	42.3	80.3	81.1	24.7	0.82	1.01
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	8.5	49.4	3.44	<0.05	<0.05	<0.05	1.6	<0.05	6.22	7.26	6.29	3.78	0.94	0.8
Sodium	mg/L	108	45.1	123	138	185	157	286	415	90.9	43.7	49.7	23.9	13.3	13.5
Iron	mg/L	<0.04	<0.04	0.09	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	0.29	<0.04	<0.04
Potassium	mg/L	18.8	10.5	26	31.4	53.1	54	54.6	69	15.2	7.05	8.72	2.9	3.89	3.56
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	1	<1	<1	1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	1220	197	633	<1	<1	<1	<1	<1	126	1130	759	590	12	8
Nickel	µg/L	<1	<1	<1	1	<1	2	1	2	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	15	<10	<10	11	13
Biochemical Oxygen Demand	mg/L	<2	<2	<2	<2	2	3	<2	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	11	6	19	34	30	48	30	42	10	8	8	12	5	5
Total Organic Carbon	mg/L	6	6	6	9	6	10	6	13	5	5	5	4	3	2

Figure F5.1 Graphical Presentation for Groundwater Monitoring (MWX-1)

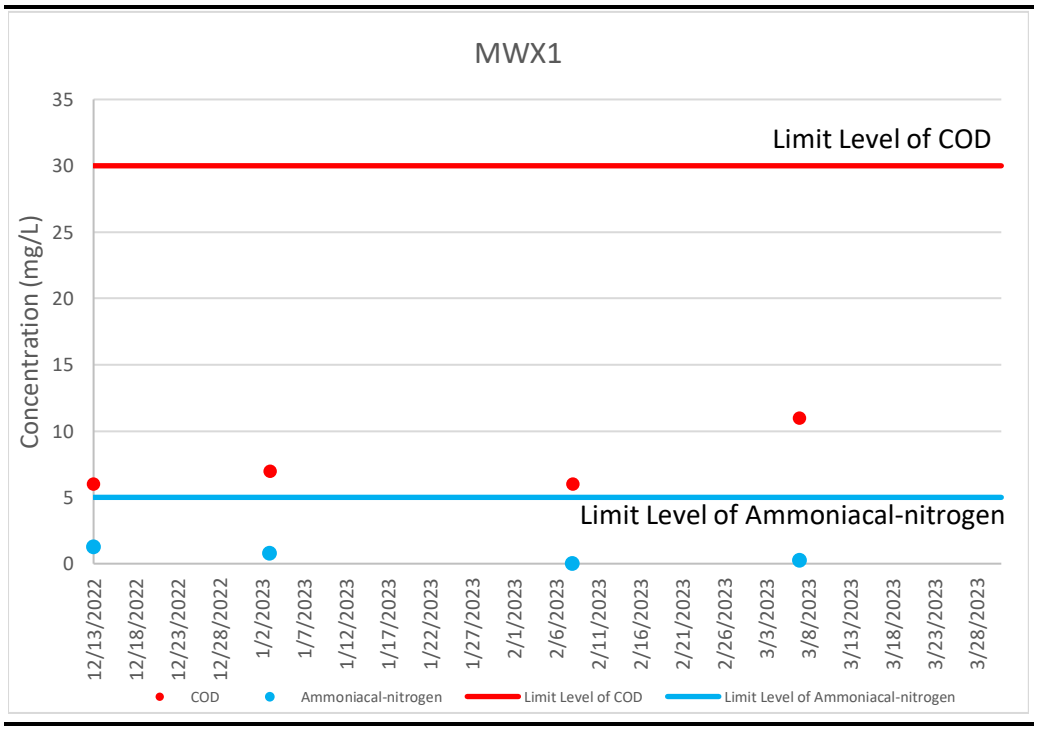


Figure F5.2 Graphical Presentation for Groundwater Monitoring (MWX-2)

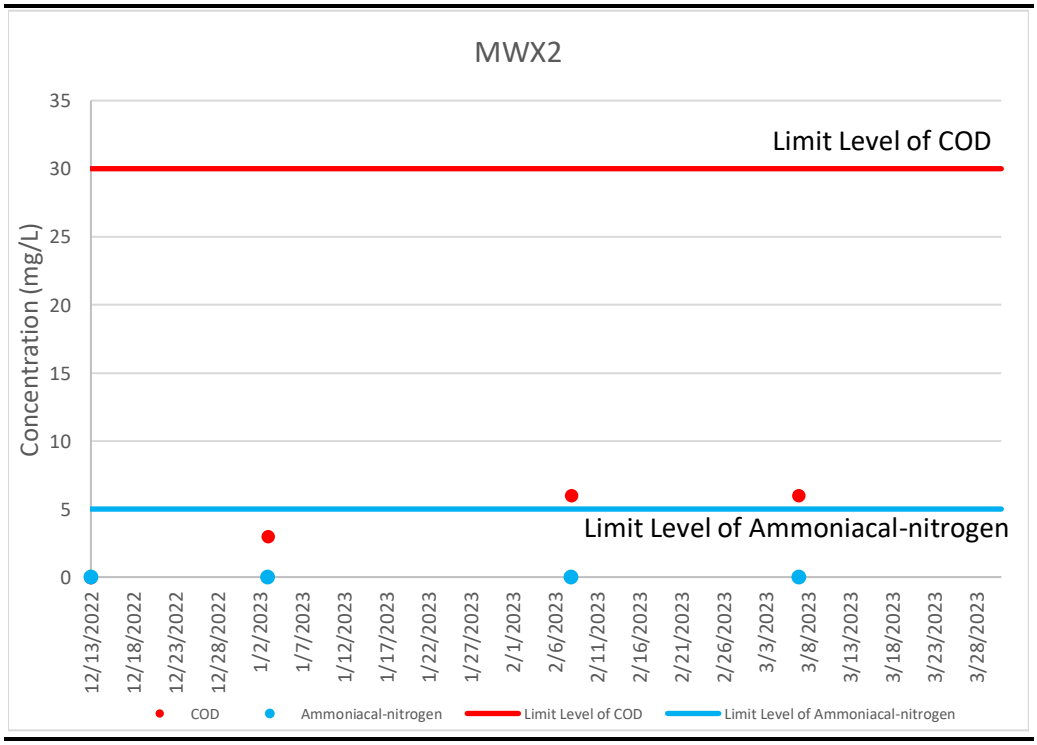


Figure F5.3 Graphical Presentation for Groundwater Monitoring (MWX-3)

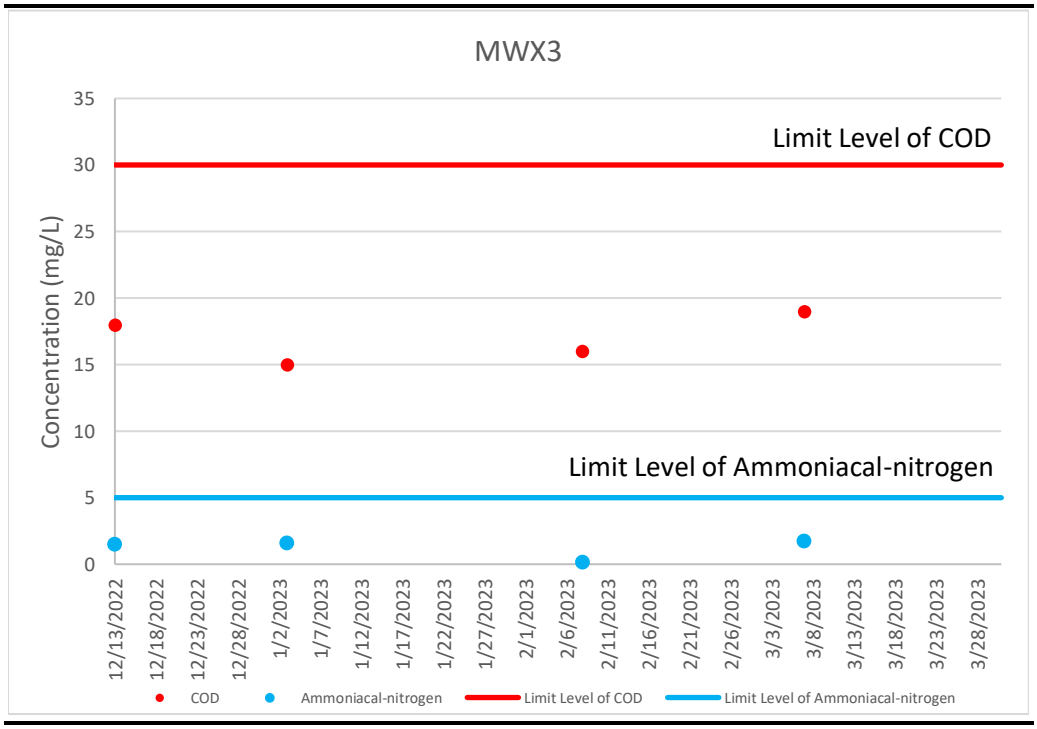


Figure F5.4 Graphical Presentation for Groundwater Monitoring (MWX-4)

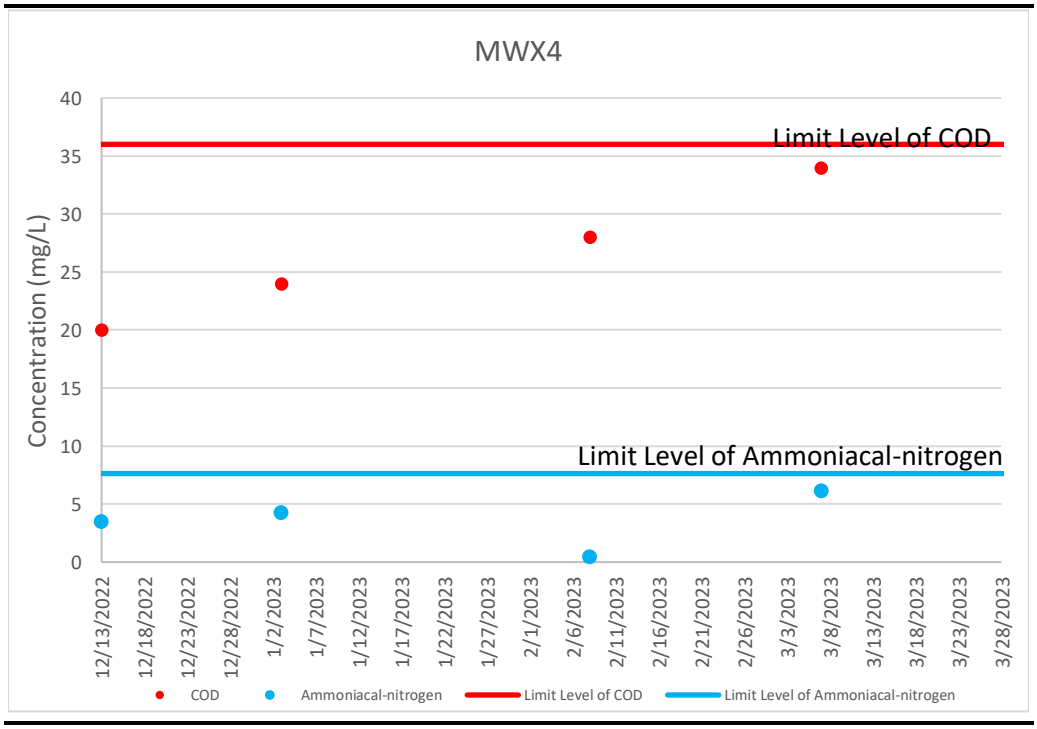


Figure F5.5 Graphical Presentation for Groundwater Monitoring (MWX-5)

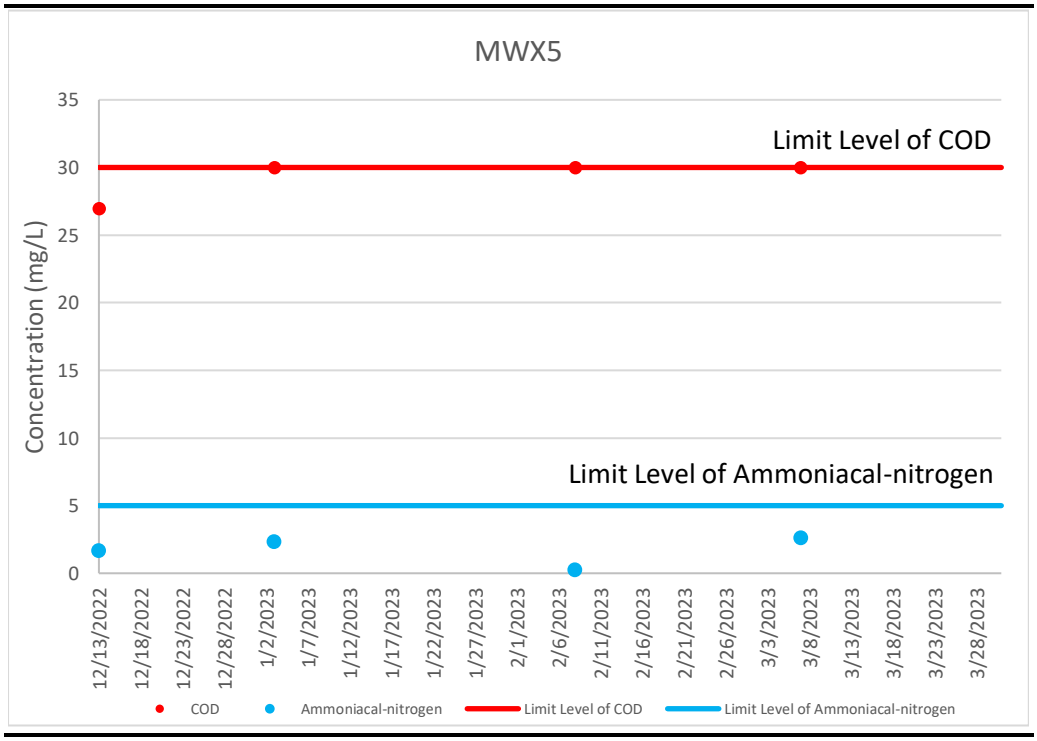


Figure F5.6 Graphical Presentation for Groundwater Monitoring (MWX-6)

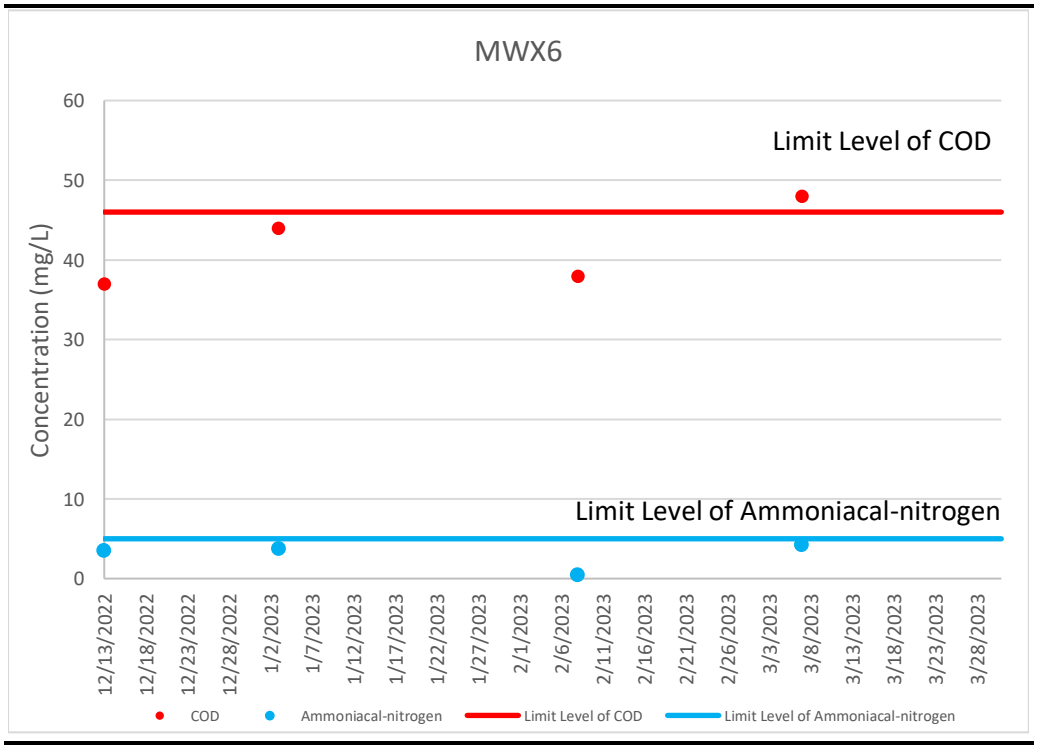


Figure F5.7 Graphical Presentation for Groundwater Monitoring (MWX-7)

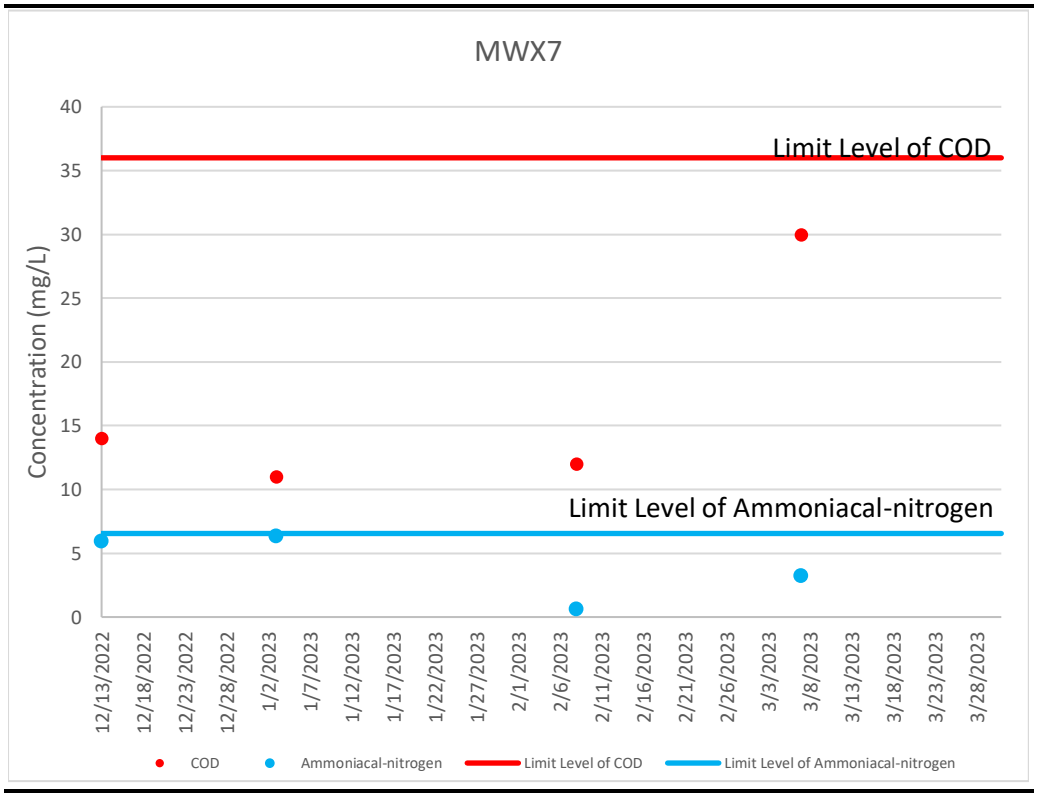


Figure F5.8 Graphical Presentation for Groundwater Monitoring (MWX-8)

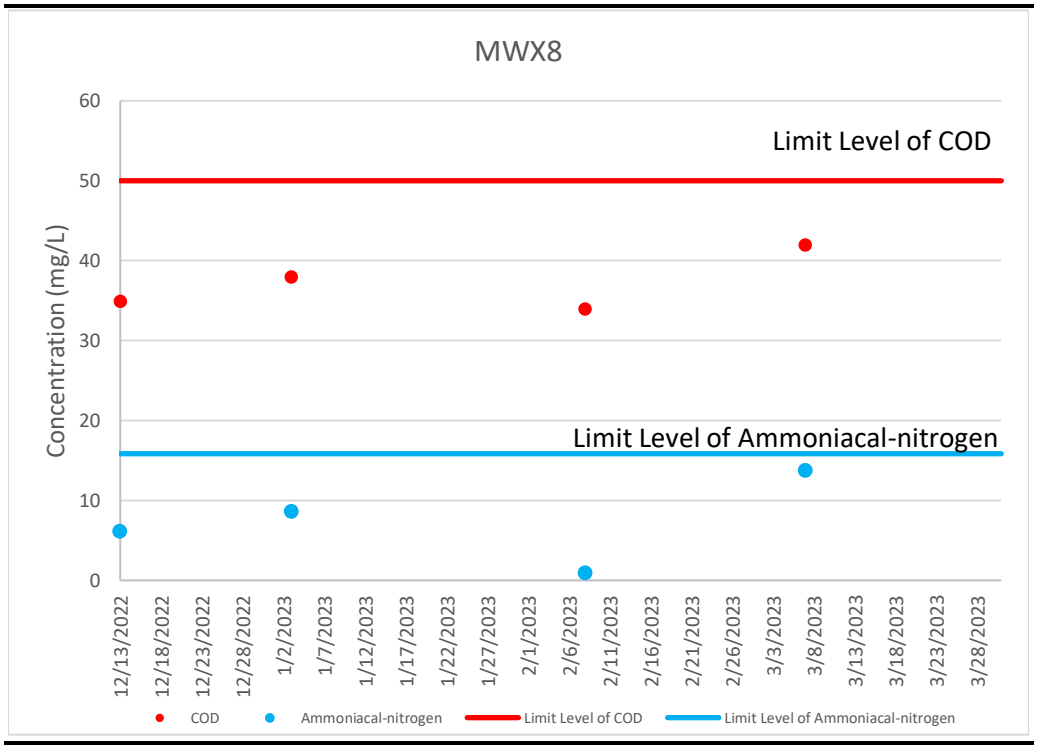


Figure F5.9 Graphical Presentation for Groundwater Monitoring (MWX-9)

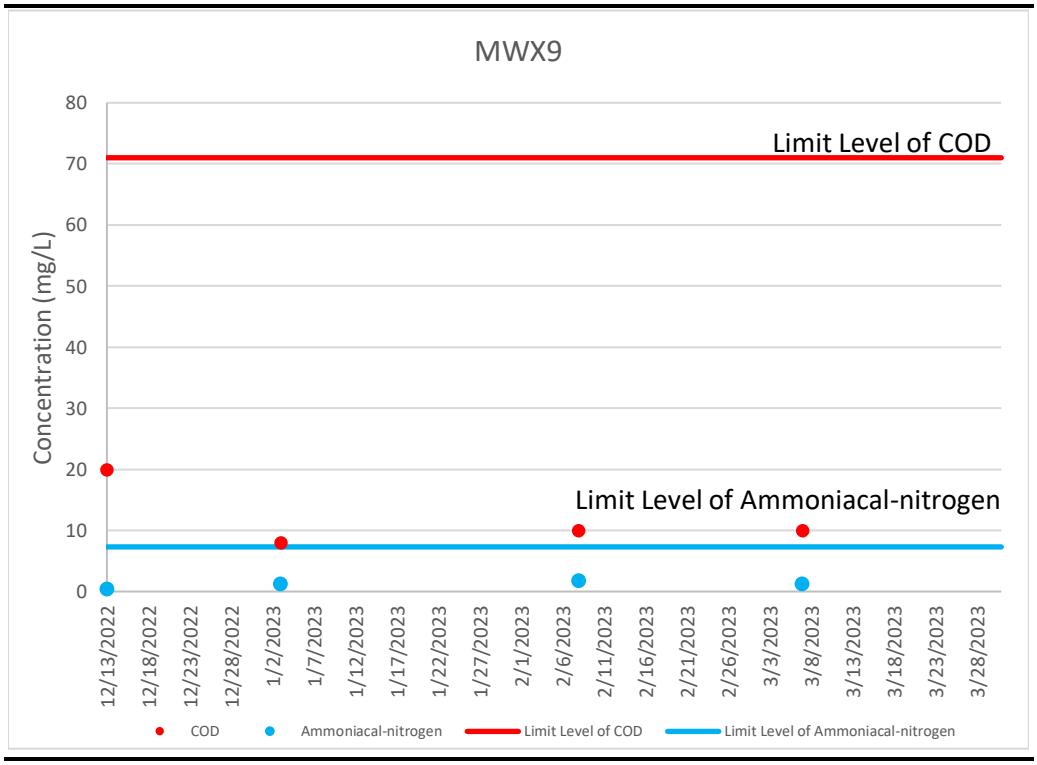


Figure F5.10 Graphical Presentation for Groundwater Monitoring (MWX-10)

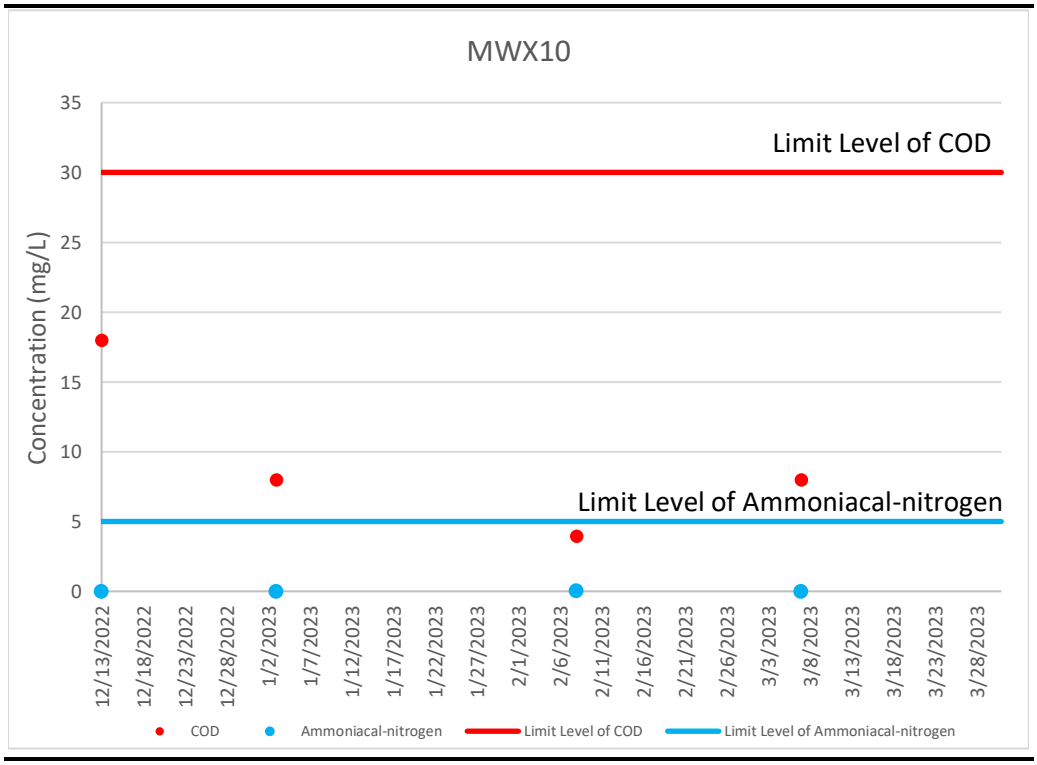


Figure F5.11 Graphical Presentation for Groundwater Monitoring (MWX-11)

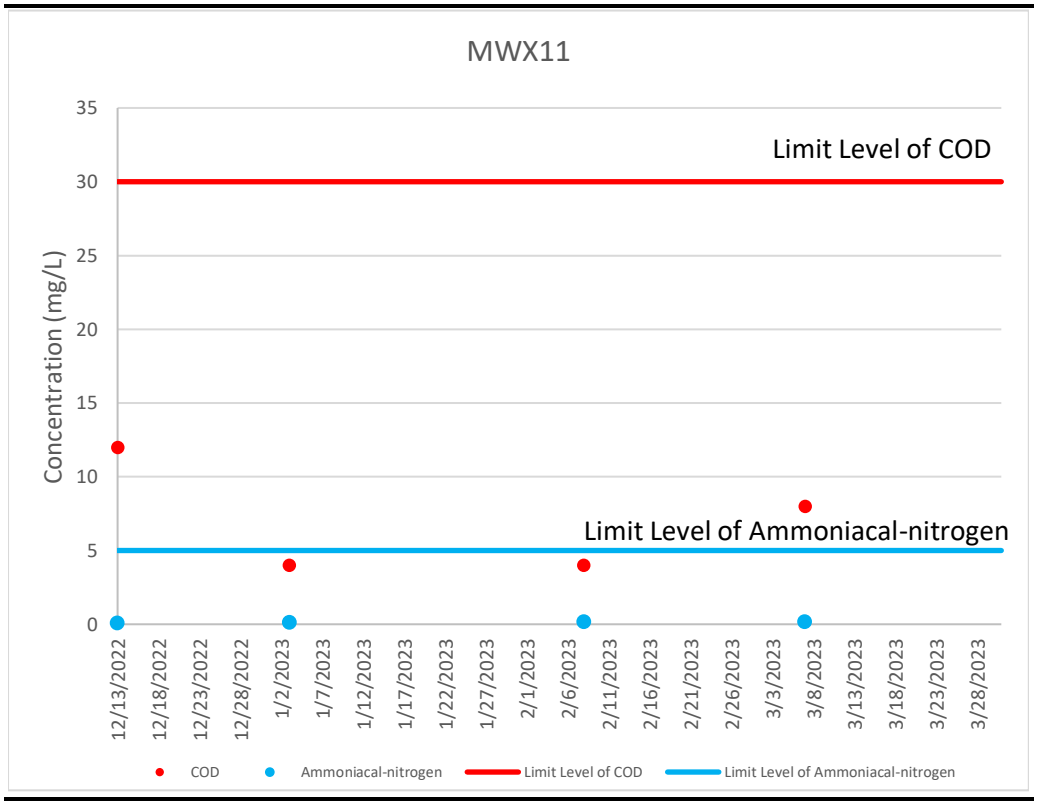


Figure F5.12 Graphical Presentation for Groundwater Monitoring (MWX-12)

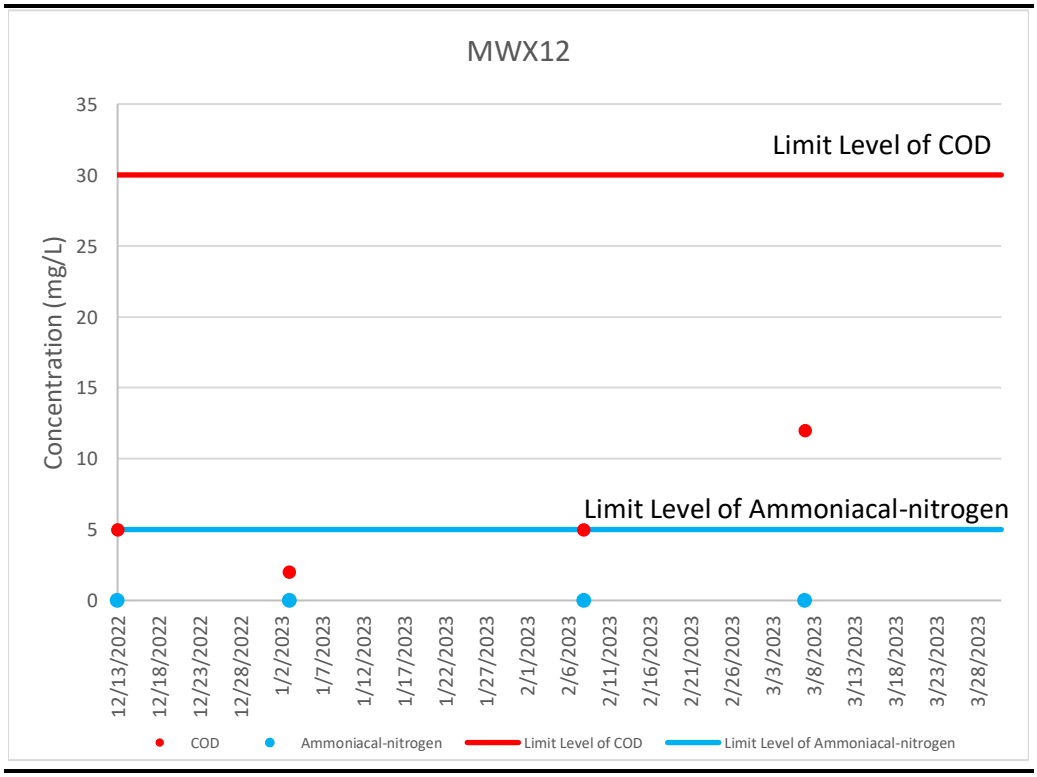


Figure F5.13 Graphical Presentation for Groundwater Monitoring (MWX-13)

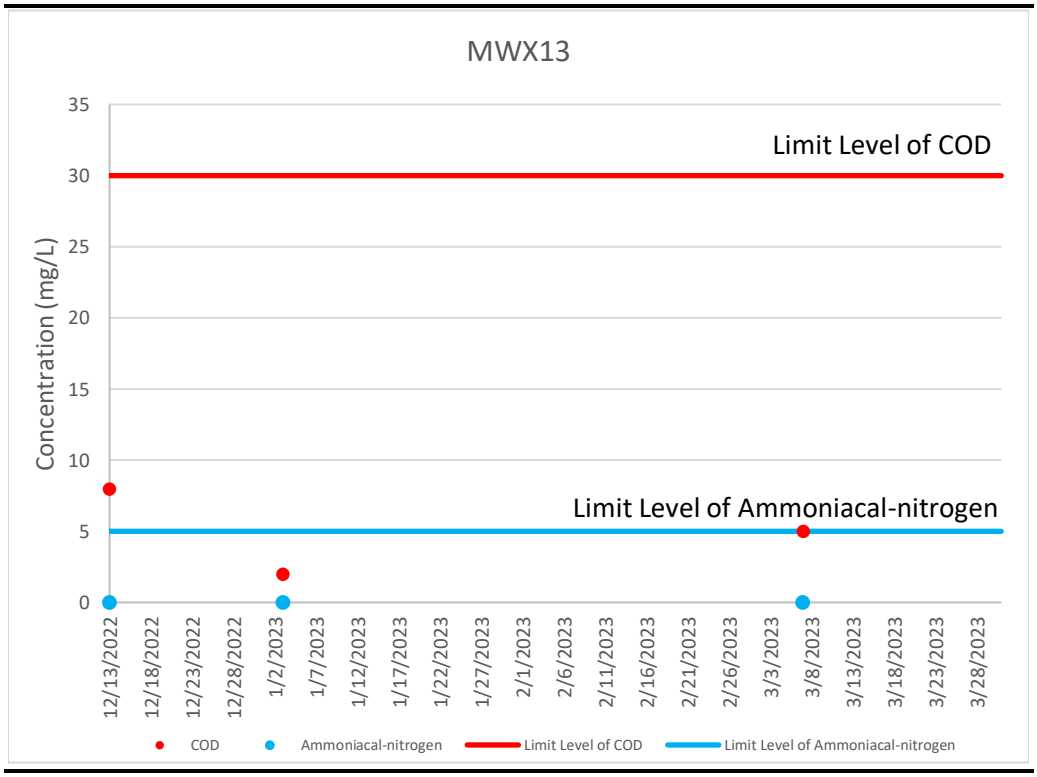
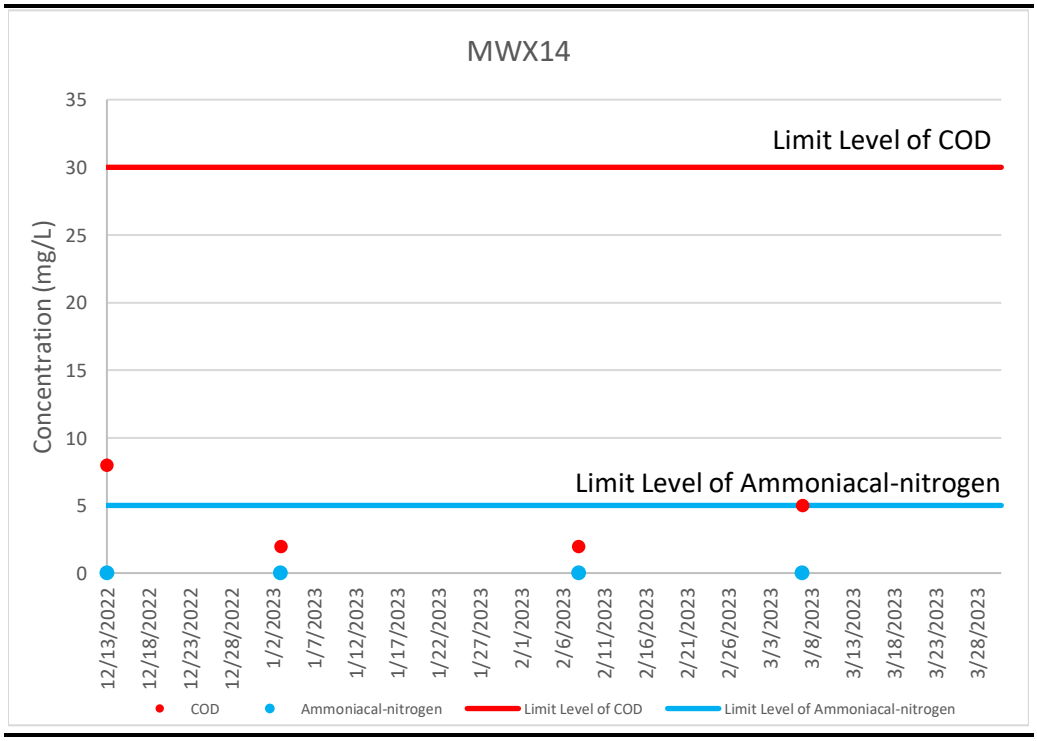


Figure F5.14 Graphical Presentation for Groundwater Monitoring (MWX-14)



Annex F6

Investigation Reports of Environmental Quality Limit Exceedance

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	7 March 2023
Time	14:51
Monitoring Location	MWX-6
Parameter	Chemical Oxygen Demand (COD)
Limit Levels	>46 mg /L
Measured Level	48 mg /L
Possible reason	Groundwater contaminated with leachate is commonly characterized by high COD and ammoniacal-nitrogen levels as a result of degradation of organic matters in the waste. The ammoniacal-nitrogen monitoring result at groundwater monitoring well MWX-6 (4.23 mg/L) and the COD monitoring results of the groundwater monitoring wells adjacent to MWX-6 (MWX-5: 30 mg/L and MWX-7: 30 mg/L) are well within the respective limit levels. Hence, there is a low possibility of the elevation of COD level at MWX-6 is due to leachate contamination from SENTX operation or at least it is not conclusive to base on these results to demonstrate exceedance was due to leachate contamination. In accordance with Table 4.5b of the updated EM&A Manual, repeat measurement was conducted on 13 April 2023 to confirm findings. Exceedance of COD Limit Level was recorded at MWX-6 (54 mg/L) during the sampling event. MWX-6 showed consecutive exceedance of the groundwater quality limit. According to the findings of the desktop review commissioned by GVL and EPD (the Employer) in May 2021 to investigate the potential sources of the elevated methane levels at the perimeter landfill gas monitoring wells at SENTX, pockets of organic matters are identified in the fill materials of the SENTX site upon review of the historical site investigation borehole logs at the Project Site area. It is possible that the elevated COD concentration measured at MWX-6 (with detection of elevated levels of methane (up to 12.2% v/v) and in close proximity to LFG13, which shows elevated methane levels continuously) on 7 March 2023 could be due to localised organic matters within or around the monitoring wells and background fluctuation. Due to the presence of influencing factor from non-project source and the COD levels at all other groundwater monitoring wells are within the respective limit level, there is no adequate evidence showing that the COD level exceedance measured at MWX-6 on 7 March 2023 was deemed to Project-related activities. It should also be noted that although the COD level exceeded the

	limit level of the EM&A programme, it is still well within the WPCO effluent discharge limit of COD (80 mg/L) and the standard for effluents discharged into the inshore waters of the Junk Bay Water Control Zone as stipulated under Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (80 mg/L). The slight exceedance of COD at MWX-6 on 7 March 2023 will not cause adverse water quality impact to the Junk Bay Water Control Zone.
Action Taken / Action to be Taken	Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to implement relevant and appropriate mitigation measures according to the updated EM&A Manual to avoid any exceedance of the Action and Limit Levels. ET will continue to closely monitor the groundwater quality monitoring results and collect additional data for investigation and further review, if necessary.
Remarks	-

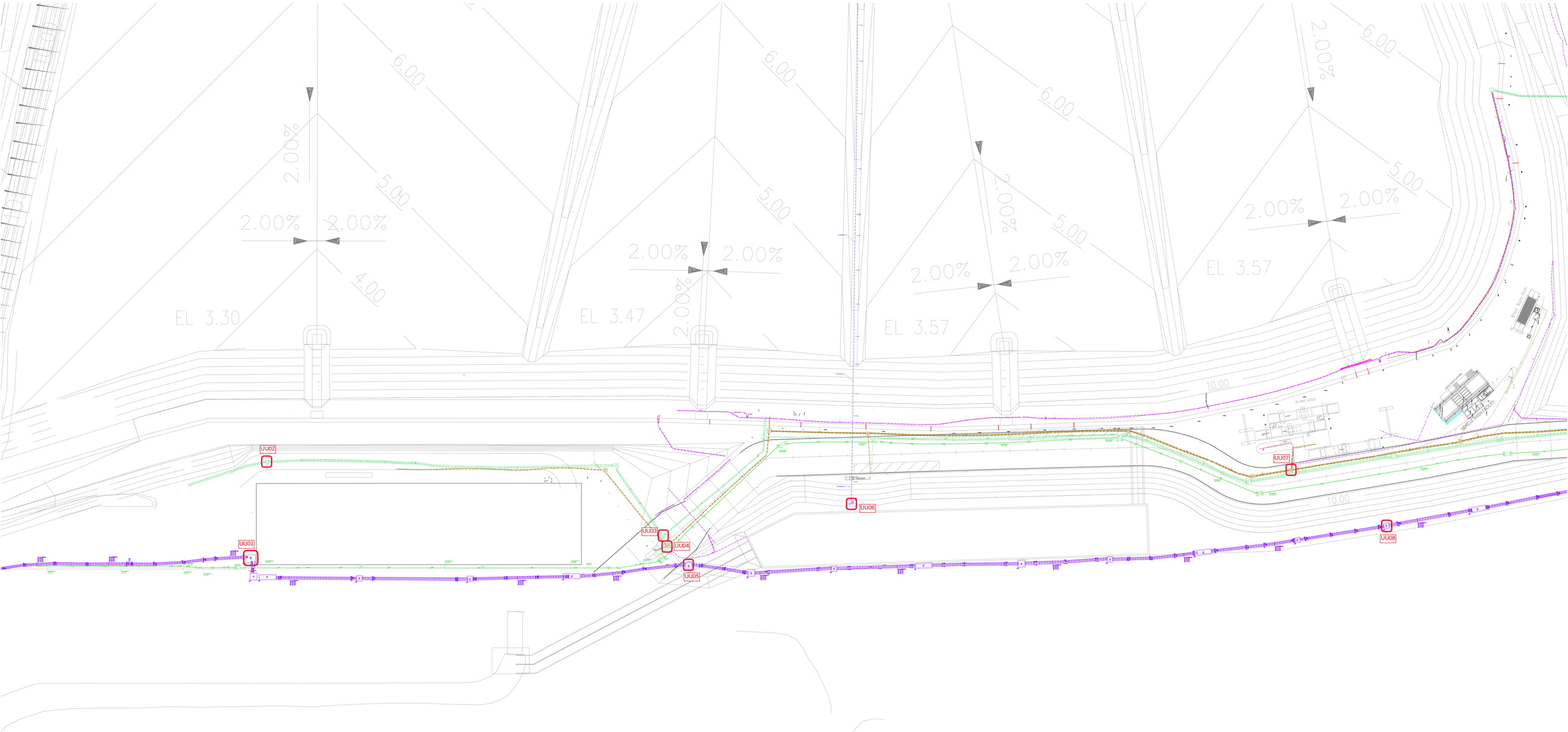
Prepared by: Abbey Lau
Designation: Environmental Team
Date: 28 April 2023

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


6.00
5.00
4.00
2.00%
EL 3.30
EL 3.47
EL 3.57
EL 3.57
10.00
10.00
UU01
UU02
UU03
UU04
UU05
UU06
UU07
UU08

UU08
UU28
UU27
UU10
UU11
UU09
UU12
UU13
UU14
UU15
UU26
UU25
UU24
UU16
UU17
UU18
UU19
UU20
UU21
UU22
UU23
HARD STANDING
EPD BUILDING
CIVIL BUILDING
CAR PARK
LABORATORY BUILDING
MAINTENANCE BUILDING
EQUIPMENT STORAGE AREA (SOFT STANDING)
VEHICLE WASH FACILITY
INSPECTION PLATFORM
Wheel Wash Bath
LANDFILL GAS CONTROL ROOM & SWITCHROOM
DIESEL FUEL TANKS
PETROLEUM STORE
BIOPLANT BUILDING
EPD CONFERENCE ROOM
CAR PARK SHELTER
WATER TANK

Annex G2

Landfill Gas Monitoring Results

Table G2.1 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells (January 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	2.50	0.0	0.3	18.1
LFG2	2.25	0.0	0.3	19.9
LFG3	2.44	0.0	0.9	19.4
LFG4	2.50	0.0	0.1	20.5
LFG5	2.48	0.0	0.0	20.7
LFG6	2.32	0.0	0.1	20.6
LFG7	2.31	0.0	0.0	18.9
LFG8	2.40	0.0	0.0	21.0
LFG9	2.29	0.0	0.1	12.8
LFG10	2.21	0.0	0.1	15.9
LFG11	2.14	0.0	0.2	13.9
LFG12	2.16	0.0	0.0	20.9
LFG13	2.05	16.5	0.0	6.6
LFG14	1.94	0.0	0.0	17.8
LFG15	2.14	0.0	0.0	20.9
LFG16	2.20	0.0	0.1	20.9
LFG17	2.36	0.0	0.6	15.5
LFG18	2.03	0.0	0.2	20.4
LFG19	2.33	0.0	0.1	8.8
LFG20	2.16	0.0	0.2	20.6
LFG21	2.33	0.1	2.6	11.0
LFG22	2.28	0.1	0.6	18.6
LFG23	12.23	0.1	1.8	17.1
LFG24	5.99	0.1	0.5	20.4
GP1	Probe bent	0.3	5.6	13.5
GP2 (shallow)	Probe bent	0.2	1.7	16.6
GP2 (deep)	Probe bent	0.2	6.3	13.9
GP3 (shallow)	Probe bent	0.2	0.1	21.0
GP3 (deep)	Probe bent	0.2	0.2	20.8
GP4 (shallow)	Probe bent	0.1	0.1	20.9
GP4 (deep)	Probe bent	0.1	0.1	20.9
GP5 (shallow)	Probe bent	0.1	4.5	8.5
GP5 (deep)	38.47	0.1	0.1	21.0
GP6	36.90	0.1	5.2	15.3
GP7	36.19	0.1	0.1	21.0
GP12	1.23	0.0	0.0	21.0
GP15	2.69	0.0	0.1	20.9
P7	2.54	0.0	0.0	21.0
P8	2.57	0.0	0.0	21.0
P9	2.42	0.0	0.1	20.9

Table G2.2 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells (February 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	2.45	0.1	0.3	17.9
LFG2	2.31	0.1	0.4	18.6
LFG3	2.48	0.2	0.1	20.2
LFG4	2.37	0.2	0.1	19.2
LFG5	2.63	0.2	0.2	10.2
LFG6	2.31	0.3	0.1	19.6
LFG7	2.56	0.0	0.0	20.3
LFG8	2.42	0.0	0.1	20.2
LFG9	2.30	0.0	0.9	6.0
LFG10	1.90	0.0	0.1	20.4
LFG11	1.45	0.0	0.2	8.7
LFG12	2.05	0.0	0.0	20.3
LFG13	2.01	18.5	0.4	1.4
LFG14	1.71	0.0	0.1	20.6
LFG15	2.01	0.0	0.1	20.2
LFG16	2.09	0.0	0.1	17.6
LFG17	2.28	0.0	0.3	20.2
LFG18	2.30	0.0	0.7	18.7
LFG19	2.32	0.0	0.1	20.9
LFG20	2.28	0.0	0.3	20.2
LFG21	2.34	0.0	0.1	20.6
LFG22	2.38	0.0	0.2	20.1
LFG23	12.51	0.0	2.6	16.9
LFG24	5.97	0.0	0.3	20.2
GP1	Probe bent	0.0	5.2	14.3
GP2 (shallow)	Probe bent	0.0	3.0	12.5
GP2 (deep)	Probe bent	0.0	7.0	11.7
GP3 (shallow)	Probe bent	0.0	0.0	20.7
GP3 (deep)	Probe bent	0.0	0.0	20.8
GP4 (shallow)	Probe bent	0.0	0.1	20.6
GP4 (deep)	Probe bent	0.0	0.3	20.0
GP5 (shallow)	Probe bent	0.0	4.2	6.7
GP5 (deep)	38.33	0.0	0.1	20.6
GP6	36.39	0.0	5.5	14.6
GP7	35.91	0.0	0.0	20.9
GP12	1.91	0.1	0.0	20.2
GP15	2.41	0.0	0.0	20.3
P7	2.30	0.0	0.1	20.2
P8	2.50	0.0	0.2	20.0
P9	2.18	0.0	0.1	20.3

Table G2.3 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells (March 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	3.88	0.1	0.2	18.1
LFG2	4.13	0.1	0.1	18.8
LFG3	3.76	0.1	0.1	20.2
LFG4	4.01	0.1	0.1	20.0
LFG5	3.63	0.1	0.3	8.0
LFG6	4.11	0.2	0.2	19.4
LFG7	3.83	0.0	0.0	19.8
LFG8	3.85	0.0	0.0	19.9
LFG9	3.82	0.0	0.0	20.0
LFG10	3.97	0.0	0.0	19.8
LFG11	3.98	0.0	0.0	5.2
LFG12	3.88	0.0	0.0	19.7
LFG13	3.97	21.4	0.0	1.0
LFG14	5.24	0.0	0.0	19.9
LFG15	5.40	0.0	0.6	12.6
LFG16	5.08	0.0	0.1	19.5
LFG17	4.95	0.0	0.0	20.2
LFG18	5.36	0.0	0.1	19.5
LFG19	5.26	0.0	0.0	20.2
LFG20	5.54	0.0	0.8	18.3
LFG21	7.13	0.0	1.8	14.2
LFG22	7.84	0.0	0.0	20.2
LFG23	14.65	0.0	1.0	18.5
LFG24	26.35	0.0	0.3	19.8
GP1	Probe bent	0.0	5.5	14.6
GP2 (shallow)	Probe bent	0.0	1.4	16.4
GP2 (deep)	Probe bent	0.0	6.3	16.3
GP3 (shallow)	Probe bent	0.0	0.0	20.1
GP3 (deep)	Probe bent	0.0	0.5	19.2
GP4 (shallow)	Probe bent	0.0	0.1	20.1
GP4 (deep)	Probe bent	0.0	0.3	19.7
GP5 (shallow)	Probe bent	0.0	3.2	9.9
GP5 (deep)	14.14	0.0	0.1	20.0
GP6	11.69	0.0	4.6	15.4
GP7	3.02	0.0	0.0	20.3
GP12	2.64	0.1	0.0	20.1
GP15	3.94	0.1	0.0	19.8
P7	3.60	0.1	0.0	19.9
P8	3.11	0.1	0.0	19.9
P9	2.23	0.0	0.0	19.9

Table G2.4 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (January 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.00	0.0	20.8
UU02	0.00	0.1	20.7
UU03	0.00	0.0	20.7
UU04	0.00	0.0	20.7
UU05	0.00	0.0	20.6
UU06	0.00	0.0	20.6
UU07	0.00	0.1	20.6
UU08	0.00	0.0	20.5
UU09	0.00	0.1	20.3
UU10	0.00	0.0	20.1
UU11	0.00	0.1	19.8
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.00	0.1	19.9
UU14	0.00	0.1	20.1
UU15	0.00	0.1	20.4
UU16	0.00	0.0	20.7
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.00	0.1	20.5
UU19	0.00	0.1	20.6
UU20	0.00	0.0	20.7
UU21	0.00	0.0	20.7
UU22	0.00	0.0	20.6
UU23	0.00	0.0	20.6
UU24	0.00	0.0	20.6
UU25	0.00	0.0	20.6
UU26	0.00	0.0	20.6
UU27	0.00	0.1	19.4
UU28	0.00	0.1	19.6

Table G2.5 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (February 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.1	20.3
UU02	0.0	0.1	20.3
UU03	0.0	0.1	20.3
UU04	0.0	0.1	20.3
UU05	0.0	0.1	20.4
UU06	0.0	0.1	20.4
UU07	0.0	0.1	20.5
UU08	0.0	0.0	20.3
UU09	0.0	0.1	20.4
UU10	0.0	0.1	20.4
UU11	0.0	0.1	20.4
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.1	20.5
UU14	0.0	0.1	20.5
UU15	0.0	0.1	20.3
UU16	0.0	0.1	20.1
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.1	20.2
UU19	0.0	0.1	20.4
UU20	0.0	0.1	20.1
UU21	0.0	0.1	20.1
UU22	0.0	0.1	20.2
UU23	0.0	0.1	20.2
UU24	0.0	0.1	20.3
UU25	0.0	0.1	20.3
UU26	0.0	0.0	20.4
UU27	0.0	0.1	20.4
UU28	0.0	0.1	20.5

Table G2.6 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (March 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.1	0.1	20.3
UU02	0.1	0.0	20.5
UU03	0.0	0.0	20.0
UU04	0.0	0.0	20.1
UU05	0.0	0.0	20.2
UU06	0.0	0.0	20.3
UU07	0.0	0.0	20.0
UU08	0.0	0.0	20.3
UU09	0.0	0.0	20.1
UU10	0.0	0.0	20.1
UU11	0.0	0.0	20.2
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	20.2
UU14	0.0	0.0	20.3
UU15	0.0	0.0	20.2
UU16	0.0	0.0	20.1
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	20.1
UU19	0.0	0.0	20.1
UU20	0.0	0.0	20.0
UU21	0.0	0.0	20.0
UU22	0.0	0.0	20.0
UU23	0.0	0.0	20.0
UU24	0.0	0.0	19.9
UU25	0.0	0.1	20.0
UU26	0.0	0.0	20.3
UU27	0.0	0.0	20.3
UU28	0.0	0.0	20.4

Table G2.7 Landfill Gas Bulk Gas Sampling Monitoring Results

Parameters	LFG1	LFG8
Methane (% (v/v))	<0.0200	<0.020
Carbon Dioxide (% (v/v))	0.318	0.068
Oxygen (% (v/v))	19	21.1
Nitrogen (% (v/v))	80.9	78.9
Carbon Monoxide (% (v/v))	<0.020	<0.020
Hydrogen (% (v/v))	<0.020	<0.020
Ethane (ppmv)	<1.0	<1.0
Propane (ppmv)	<1.0	<1.0
Butane (ppmv)	<1.0	<1.0

Table G2.8 Flammable Gas Surface Emission Monitoring Results

Time	GPS Coordinates Latitude (N)	Longitude (E)	Weather Condition	Temperature (^{o}C)	Wind Direction (Deg)	Wind Speed (m/s)	Monitoring Results (ppm)
13:44	22^{o}16′29″	114^{o}16′35″	Cloudy	18.9	205	3.5	16

Annex G3

Event and Action Plan for Landfill Gas Monitoring

Annex G3 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	• 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	• 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	• 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	• 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	• Verify the findings by ET	• Nil

Event	Action		
	ET	IEC	Contractor
Limit Level being exceeded at the permanent gas monitoring system	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	• 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	8	11
Air Quality (Odour)	Action	0	0
	Limit	0	0
Air Quality (Emissions of Thermal Oxidiser)	Limit	1	1
Air Quality (Emissions of Landfill Gas Flare)	Limit	0	4
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	1
Water Quality (Leachate Level)	Limit	0	16
Water Quality (Groundwater)	Limit	1	10
Landfill Gas (Perimeter Landfill Gas Monitoring Wells)	Limit	0	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 (Jan-Mar 2023)	0	0	0
Total no. received since project commencement	1	0	0