



South East New Territories (SENT) Landfill Extension

Quarterly Environmental Monitoring
& Audit Report No.19

PREPARED FOR



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

Green Valley Landfill Ltd.

DATE

5 March 2024

REFERENCE

0465169





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. 19 for South East New Territories (SENT) Landfill Extension
Date of Report:	5 March 2024

Reference EP Condition

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: 5 March 2024

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: 7 March 2024

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South East New Territories (SENT) Landfill Extension

Quarterly Environmental Monitoring & Audit Report No.19

0465169



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CLIENT: Green Valley Landfill Ltd.

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EXECUTIVE SUMMARY

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

This Quarterly EM&A report presents the EM&A works carried out during the period from 1 July 2023 to 30 September 2023 for the Project in accordance with the updated EM&A Manual.

EXCEEDANCE OF ACTION AND LIMIT LEVELS FOR AIR QUALITY

Two exceedances of Action and Limit Levels for Total Suspended Particulates (TSP) and one exceedance of Limit Level for thermal oxidizer stack emission (SO₂) were recorded for air quality monitoring in the reporting period.

The TSP exceedance at AM1 on 22 September 2023 and 28 September 2023 were considered non Project related upon further investigation, while the thermal oxidizer stack emission (SO₂) exceedance on 13 September 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

Three exceedances of the Limit Level for groundwater (Chemical Oxygen Demand (COD)), one exceedance of Limit Levels for surface water (Suspended Solids) (SS) and thirty-five exceedances of the Limit Level for Leachate Level were recorded for water quality impact monitoring in the reporting period.

The groundwater (COD) exceedances at MWX-7 on 11 July and 22 September 2023, and at MWX-6 on 2 August 2023 were considered non Project related upon further investigation. The surface water (SS) exceedance at DP4 on 4 August 2023 was considered Project related upon further investigation. The leachate level exceedances at Pump Station No. 1X from 8 September to 16 September 2023, Pump Station No. 3X from 8 September to 20 September 2023 and Pump Station No. 4X from 8 September to 20 September 2023 were considered Project related 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 Mm³ and provides an additional lifespan of about 6 years, commencing operation upon exhaustion of the SENT Landfill. The SENTX will receive construction waste only.

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.

⁽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

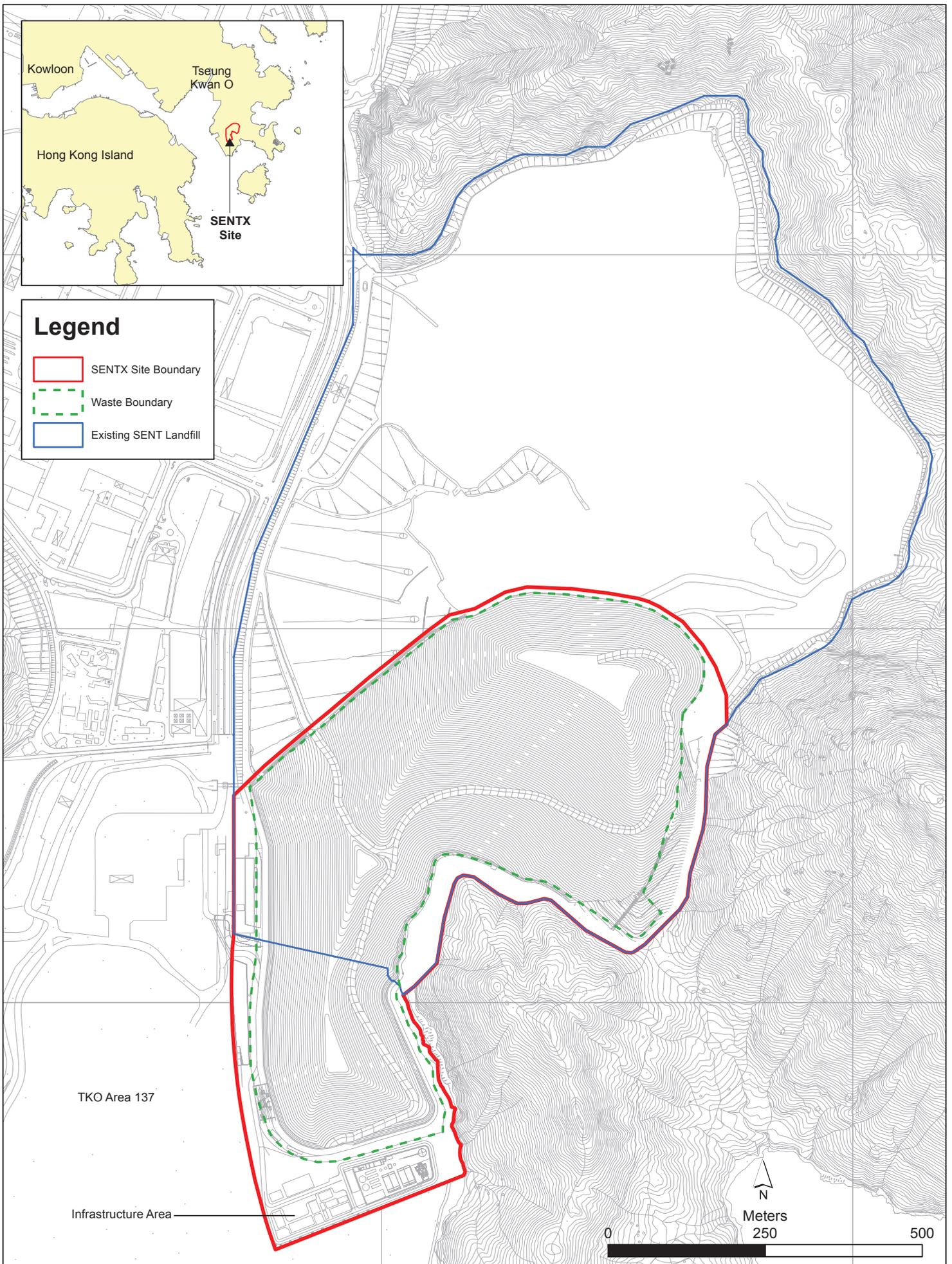


Figure 1.1

Layout Plan of SENTX



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.

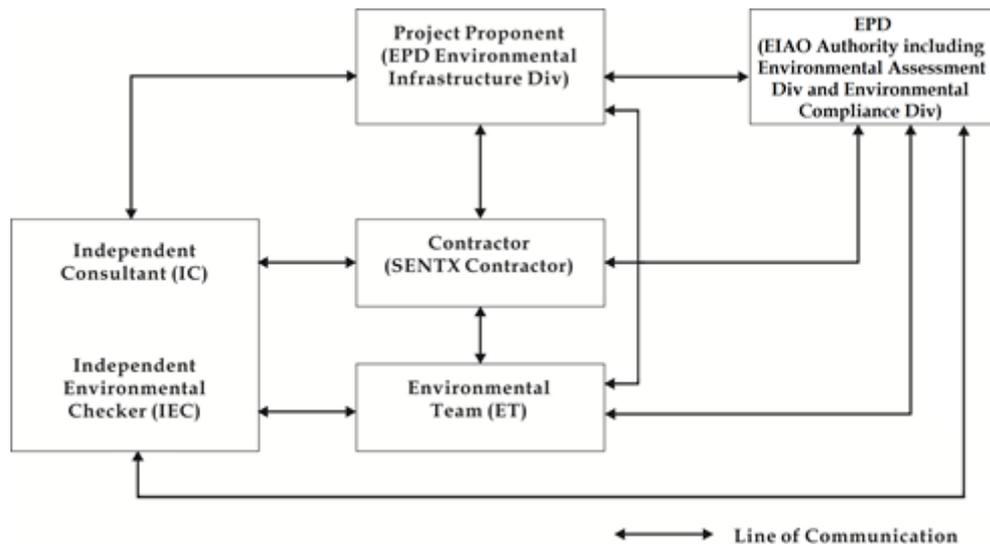
1.3 SCOPE OF THE EM&A REPORT

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 July 2023 to 30 September 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 summarised in **Table 1.2** below.

TABLE 1.2 CONTACT INFORMATION OF KEY PERSONNEL

Party	Position	Name	Telephone
Contractor (Green Valley Landfill Limited)	Project Manager	Carl Lai	2706 8829
Environmental Team (ET) (ERM-Hong Kong, Limited)	ET Leader	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:

July 2023

- Rectification of latent defects at Landfill Gas (LFG) Plant and Leachate Treatment Plant (LTP);
- Construction of SENT soil bench tie in;
- Maintenance and improvement of temporary surface water drainage;
- Civil and E&M works for Diesel Fuel Tank, such as canopy, pumps and equipment installation;
- Liner installation at Cell 4X buttress wall;
- Rectification of outstanding minor items for weighmaster house and guard house; and
- Restoration of Phase 1 Cell 1X.

August 2023

- Rectification of latent defects at LFG Plant and LTP;

- Maintenance and improvement of temporary surface water drainage;
- Rectification of outstanding minor items for weighmaster house and guard house;
- E&M works for Diesel Fuel Tank, such as pumps and equipment; and
- Restoration of Phase 1 Cell 1X.

September 2023

- Rectification of latent defects at LFG Plant and LTP;
- Maintenance and improvement of temporary surface water drainage;
- Rectification of outstanding minor items for weighmaster house and guard house; and
- Restoration of Phase 1 Cell 1X.

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

1.6 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

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

TABLE 1.3 SUMMARY OF STATUS FOR THE ENVIRONMENTAL ASPECTS UNDER THE UPDATED EM&A MANUAL

Parameters	Status
Air Quality	
Baseline Monitoring	The results of baseline air quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Noise	
Baseline Monitoring	The results of baseline noise monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Water Quality	
Baseline Monitoring	The results of baseline surface water quality monitoring were reported in Baseline Monitoring Report and Pre-operation Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Impact Monitoring	On-going
Landfill Gas	
Impact Monitoring	On-going
Waste Management	
Waste Monitoring	On-going
Landscape and Visual	

Parameters	Status
Baseline Monitoring	The results of baseline landscape and visual monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Operation Phase Audit	On-going
Site Environmental Audit	
Regular Site Inspection	On-going
Complaint Hotline and Email Channel	On-going
Environmental Log Book	On-going

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

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

- Three environmental management meeting was held with the Contractor, ER, ET, IEC and EPD on 20 July 2023, 17 August 2023 and 21 September 2023; and
- Environmental toolbox trainings on the following topics were provided by the Contractor to the workers:
 - Good Vehicle Maintenance Practice on 19 July 2023;
 - Renewable Energy on 26 July 2023;
 - Cut Down Construction Dust on 16 August 2023;
 - Chemical Waste Handling on 23 August 2023;
 - Quality Powered Mechanical Equipment (QPME) on 20 September 2023; and
 - Cleaning Recycling on 26 September 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 mitigation measures are presented in **Table 1.4**.

TABLE 1.4 STATUS OF SUBMISSIONS REQUIRED UNDER THE EP AND IMPLEMENTATION STATUS OF MITIGATION MEASURES

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

1.8 STATUS OF OTHER STATUTORY ENVIRONMENTAL REQUIREMENTS

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

TABLE 1.5 STATUS OF STATUTORY ENVIRONMENTAL REQUIREMENTS

Description	Ref No.	Status
Environmental Permit	EP-308/2008	Granted on 5 August 2008
Variation of Environmental Permit	EP-308/2008/A	Granted on 6 January 2012
	EP-308/2008/B	Granted on 20 January 2017
Further Environmental Permit	FEP-01/308/2008/B	Granted on 16 May 2018
Water Discharge License under WPCO (Permit Holder: GVL)	Licence No.: WT00041447-2022	Validity from 17 June 2022 to 30 June 2024
Billing Account for Disposal of Construction Waste	Chit Account Number: 5001692	Approved on 28 December 2005
Registration as a Chemical Waste Producer (Permit Holder: GVL)	5296-839-G2228-01	Issued on 31 December 2015
Construction Noise Permit (Permit Holder: GVL)	GW-RE0245-23	Validity from 15 March 2023 to 14 September 2023
	GW-RE1146-23	Validity from 15 September 2023 to 14 March 2024

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

2.1.1.1 MONITORING REQUIREMENTS AND EQUIPMENT

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

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

TABLE 2.1 ACTION AND LIMIT LEVELS FOR 24-HOUR TSP

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

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

The equipment used in the impact dust monitoring programme and monitoring locations are summarised in **Table 2.2** and illustrated in **Figure 2.1**, respectively.

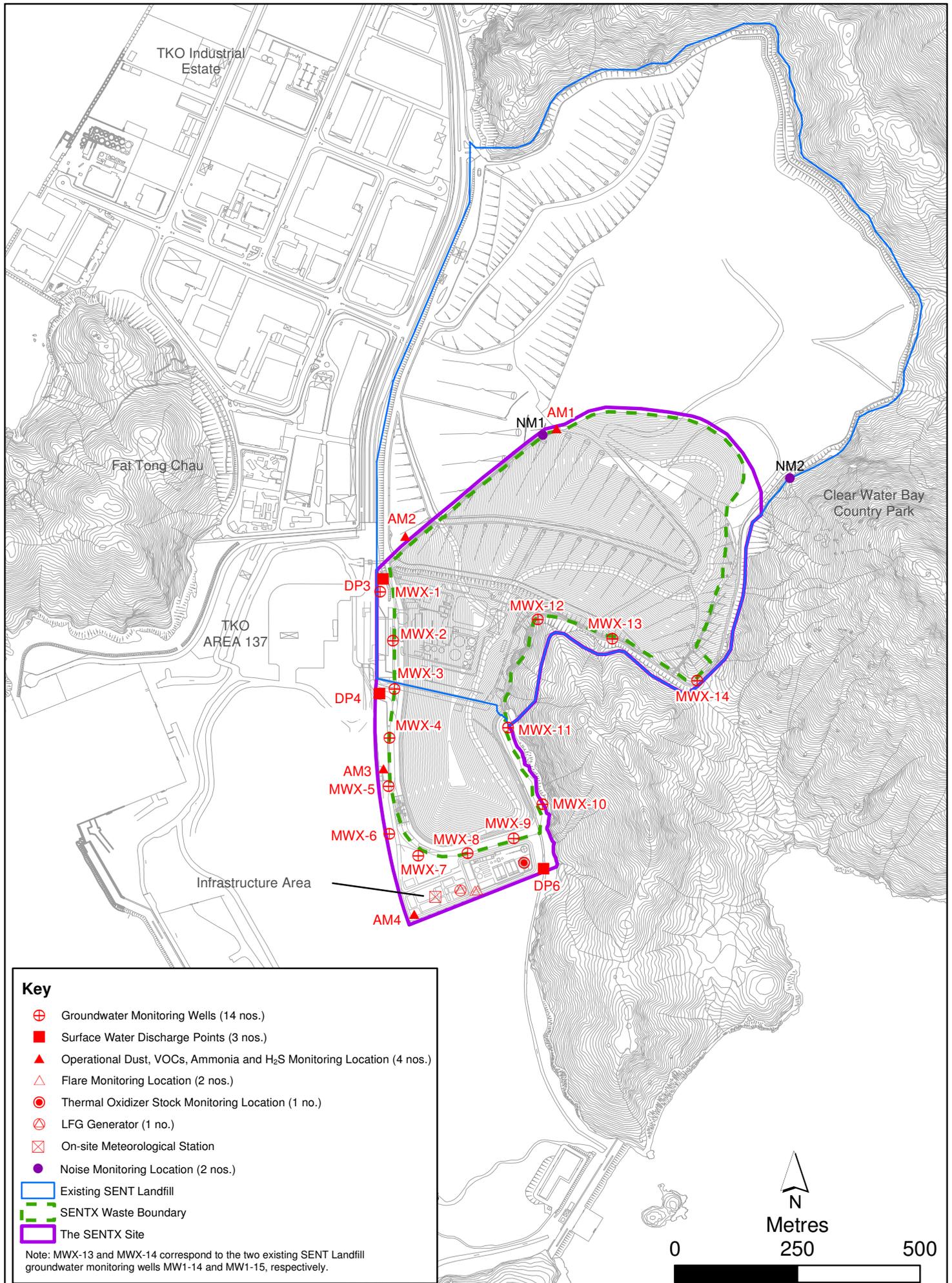


Figure 2.1

Environmental Monitoring Locations



TABLE 2.2 DUST MONITORING DETAILS

Monitoring Station	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
AM1	SENTX Site Boundary (North)	24-hour TSP	Once every 6 days	6, 12, 18, 24, 30 Jul 2023	Tisch TE-5170 (S/N: 3976)
AM2	SENTX Site Boundary (West, near DP3)			5, 11, 17, 23, 29 Aug 2023	Tisch TE-5170 (S/N: 3573)
AM3	SENTX Site Boundary (West, near RC15)			4, 10, 16, 22, 28 Sep 2023	Tisch TE-5170 (S/N: 3572)
AM4	SENTX Site Boundary (West, near EPD building)				Tisch TE-5170 (S/N: 3957)

2.1.1.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.1.1.3 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	Average 24-hr TSP Concentration ($\mu\text{g m}^{-3}$)		Action Level ($\mu\text{g/m}^3$)	Limit Level ($\mu\text{g/m}^3$)
		Average	Range		
July 2023	AM1	118	83 - 157	260	260
	AM2	120	80 - 157	260	260
	AM3	116	81 - 143	260	260
	AM4	80	49 - 133	260	260
August 2023	AM1	70	53 - 112	260	260
	AM2	120	76 - 156	260	260
	AM3	97	56 - 125	260	260
	AM4	79	46 - 105	260	260
September 2023	AM1	176	29 - 357	260	260
	AM2	106	43 - 196	260	260
	AM3	122	33 - 238	260	260
	AM4	85	39 - 189	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 AM1 on 22 September 2023 and 28 September 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.

2.1.1.4 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

2.1.2.1 MONITORING REQUIREMENTS

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

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

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

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

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

TABLE 2.4 ACTION AND LIMIT LEVELS FOR ODOUR PATROL

Parameter	Action Level	Limit Level
Perceived odour intensity and odour complaints	<ul style="list-style-type: none"> • Odour intensity \geq Class 2 recorded; or • One documented complaint received 	<ul style="list-style-type: none"> • Odour intensity \geq Class 3 recorded on 2 consecutive patrol ^(a) ^(b)

Notes:

(a) i.e. either Class 3-strong or Class 4-extreme odour intensity.

(b) The exceedances of the odour intensity do not need to be recorded at the same location.

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

The odour monitoring programme and patrol route are summarised in **Table 2.5** and illustrated in **Figure 2.2** respectively.

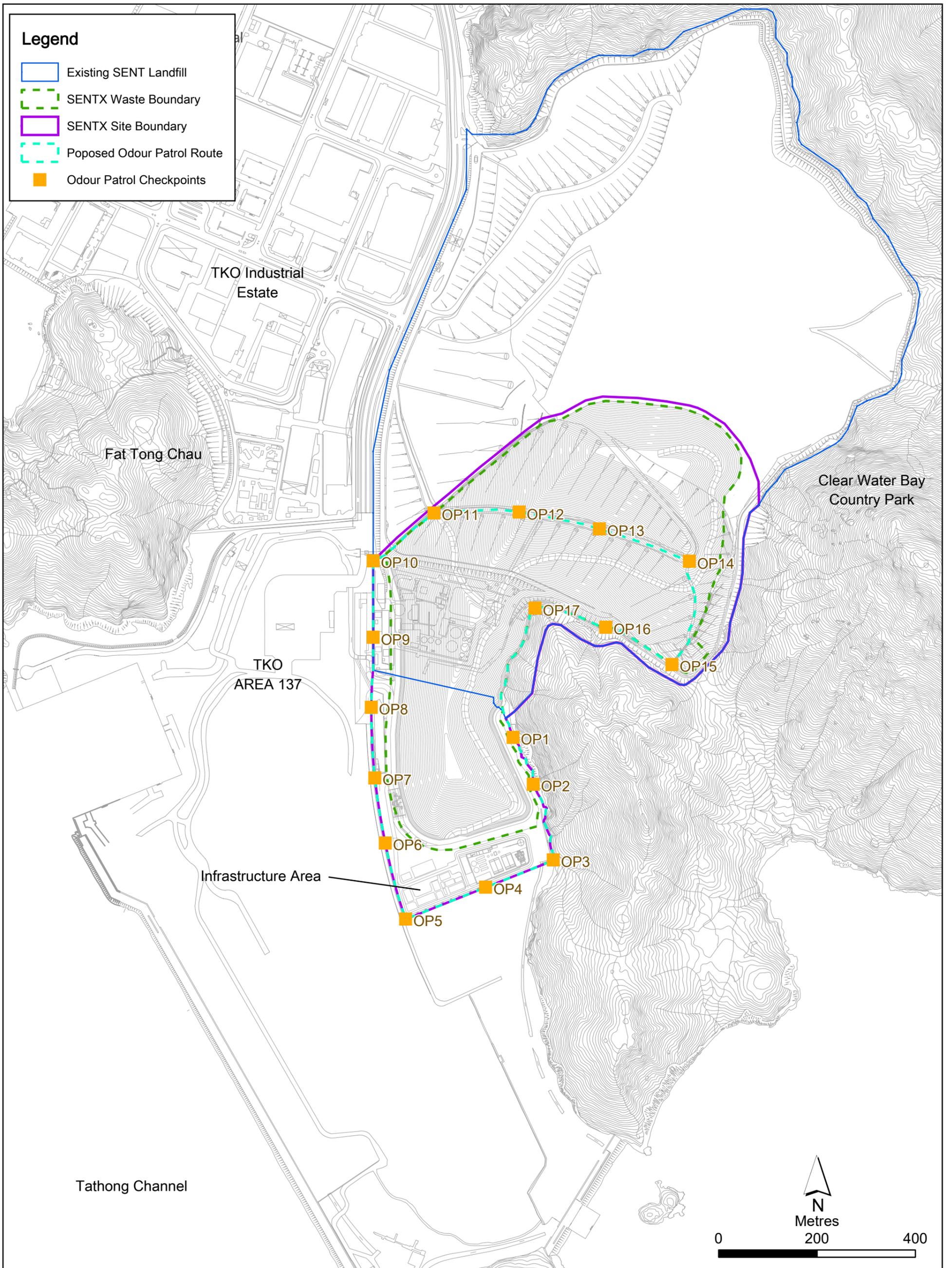


Figure 2.2

Odour Patrol Route for
Operation/ Restoration Phase Odour Monitoring



TABLE 2.5 ODOUR MONITORING DETAILS

Patrol Locations	Parameters	Patrol Frequency ^(a)	Monitoring Dates
Patrol along the SENTX Site Boundary (Checkpoints OP1 – OP17)	Odour Intensity (see Table 2.6)	<p><u>Period 1 - First month of operation</u> Daily, three times a day in the morning, afternoon and evening/night (between 18:00 and 22:00 hrs) conducted by the ET and the IEC</p> <p>Three times per week on different days conducted by an independent third party together with the ET and IEC ^(b)</p> <p><u>Period 2 - Three months following period 1 ^(c)</u> Weekly conducted by the ET and the IEC</p> <p>Once every two weeks conducted by an independent third party together with the ET and IEC ^(b)</p> <p><u>Period 3 - Throughout operation following period 2 ^(c)</u> Monthly conducted by the ET and the IEC</p> <p>Quarterly conducted by an independent third party together with the ET and IEC ^(b)</p>	<p><u>Conducted by ET & IEC:</u> 27 Jul 2023, 17 Aug 2023</p> <p><u>Conducted by an independent third party, ET & IEC:</u> 20 Sep 2023</p>

Notes:

- (a) Reduction of monitoring frequency will be subject to the monitoring results to demonstrate environmentally acceptable performance.
- (b) Patrol shall be scheduled so that they are carried out together with the patrols to be carried out jointly by the ET and the IEC.
- (c) Commencement of each period will be justified by the ET Leader and verified by the IEC and will be subject to agreement with the EPD (EIAO Authority) and Project Proponent.

TABLE 2.6 ODOUR INTENSITY LEVEL

Class	Odour Intensity	Description
0	Not Detected	No odour perceived or an odour so weak that it cannot be easily characterised or described.
1	Slight	Identified odour, slight
2	Moderate	Identified odour, moderate
3	Strong	Identified odour, strong
4	Extreme	Severe odour

2.1.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.1.2.3 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	Action Level	Limit Level
OP1	0 - 1	Odour intensity \geq Class 2 recorded	Odour intensity \geq Class 3 recorded on 2 consecutive patrol
OP2	0 - 1		
OP3	0 - 1		
OP4	0 - 1		
OP5	0		
OP6	0		
OP7	0		
OP8	0 - 1		
OP9	0 - 1		
OP10	0 - 1		
OP11	0 - 1		
OP12	0 - 1		
OP13	0 - 1		
OP14	0		

Odour Checkpoints	Odour Intensity Class	Action Level	Limit Level
OP15	0 - 1		
OP16	0 - 1		
OP17	0		

The potential odour source in the reporting period included the sediment trap, LTP and tipping area at SENTX and the nearby vegetation. 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

2.1.3.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, the performance of the thermal oxidiser, landfill gas flare and landfill gas generator was monitored when they are in operation. Gas samples were collected from the stack of the thermal oxidizer, landfill gas flare and landfill gas generator for laboratory analysis for NO₂, CO, SO₂, Benzene and Vinyl chloride and in-situ analysis for exhaust gas velocity at monthly interval 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 oxidize was determined by S-Pitot tube during the emission sampling.

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

TABLE 2.11 THERMAL OXIDISER, LANDFILL GAS FLARE AND LANDFILL GAS GENERATOR STACK EMISSION MONITORING DETAILS

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Thermal Oxidiser	Laboratory analysis for <ul style="list-style-type: none"> • NO₂ • CO • SO₂ • Benzene • Vinyl chloride In-situ analysis for <ul style="list-style-type: none"> • Exhaust gas velocity 	Monthly for the first 12 months of operation and thereafter at quarterly intervals	12 Jul 2023, 15 Aug 2023, 13 Sep 2023
	Laboratory analysis for <ul style="list-style-type: none"> • Non-methane organic compounds CO 	Quarterly for the 1 st year of operation ^(b)	15 Aug 2023
	Laboratory analysis for <ul style="list-style-type: none"> • Ammonia • Gas combustion temperature • Exhaust temperature • Exhaust gas velocity ^(a) 	Quarterly	15 Aug 2023
	<ul style="list-style-type: none"> • Gas combustion temperature • Exhaust temperature • Exhaust gas velocity ^(a) 	Continuously	1 Jul – 30 Sep 2023
Stack of Landfill Gas Flare	Laboratory analysis for <ul style="list-style-type: none"> • NO₂ • CO • SO₂ • Benzene • Vinyl chloride In-situ analysis for <ul style="list-style-type: none"> • Exhaust gas velocity 	Monthly for the first 12 months of operation and thereafter at quarterly intervals	11 Jul 2023, 16 Aug 2023, 14 Sep 2023
	Laboratory analysis for <ul style="list-style-type: none"> • Non-methane organic compounds CO 	Quarterly for the 1 st year of operation ^(b)	16 Aug 2023

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Landfill Gas Flare	<ul style="list-style-type: none"> Gas combustion temperature Exhaust temperature Exhaust gas velocity^(a) 	Continuously	1 Jul – 30 Sep 2023
Stack of Landfill Gas Generator	Laboratory analysis for <ul style="list-style-type: none"> NO₂ CO SO₂ Benzene Vinyl chloride In-situ analysis for <ul style="list-style-type: none"> Exhaust gas velocity 	Monthly for the first 12 months of operation and thereafter at quarterly intervals	11 Jul 2023, 16 Aug 2023, 14 Sep 2023
	Laboratory analysis for <ul style="list-style-type: none"> Non-methane organic compounds 	Quarterly for the 1 st year of operation ^(b)	16 Aug 2023
	<ul style="list-style-type: none"> Exhaust temperature Exhaust gas velocity^(a) 	Continuously	1 Jul – 30 Sep 2023

Notes:

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

2.1.3.2 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**.

2.1.3.3 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
July 2023		
NO ₂	0.92 gs ⁻¹	1.58 gs ⁻¹
CO	0.02 gs ⁻¹	0.53 gs ⁻¹
SO ₂	<0.01 gs ⁻¹	0.07 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹	3.01 x 10 ⁻² gs ⁻¹
Vinyl chloride	<7.0 x 10 ⁻⁵ gs ⁻¹	2.23 x 10 ⁻³ gs ⁻¹
Gas combustion temperature	922°C (871°C – 959°C)	850°C (minimum)
Exhaust gas exit temperature	1,215K (1,183K – 1,230K)	443K (minimum) ^(a)
Exhaust gas velocity	5.8 ms ⁻¹ ^(b)	7.5 ms ⁻¹ (minimum) ^(a)
August 2023		
NO ₂	0.14 gs ⁻¹	1.58 gs ⁻¹
CO	0.03 gs ⁻¹	0.53 gs ⁻¹
SO ₂	<0.01 gs ⁻¹	0.07 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹	3.01 x 10 ⁻² gs ⁻¹
Vinyl chloride	<9.0 x 10 ⁻⁵ gs ⁻¹	2.23 x 10 ⁻³ gs ⁻¹
Non-Methane Organic Carbon	0.009 gs ⁻¹	-
Ammonia	0.0361 gs ⁻¹	- ^(c)
Gas combustion temperature	922°C (885°C – 955°C)	850°C (minimum)
Exhaust gas exit temperature	1,212K (1,180K – 1,228K)	443K (minimum) ^(a)
Exhaust gas velocity	8.7 ms ⁻¹ ^(b)	7.5 ms ⁻¹ (minimum) ^(a)
September 2023		

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	0.23 gs ⁻¹	1.58 gs ⁻¹
CO	0.03 gs ⁻¹	0.53 gs ⁻¹
SO ₂	0.92 gs ⁻¹	0.07 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹	3.01 x 10 ⁻² gs ⁻¹
Vinyl chloride	<1.0 x 10 ⁻⁴ gs ⁻¹	2.23 x 10 ⁻³ gs ⁻¹
Gas combustion temperature	919°C (869°C – 939°C)	850°C (minimum)
Exhaust gas exit temperature	1,203K (1,183K – 1,218K)	443K (minimum) ^(a)
Exhaust gas velocity	8.1 ms ⁻¹ ^(b)	7.5 ms ⁻¹ (minimum) ^(a)

Notes:

(a) Level under full load condition.

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

(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
July 2023		
NO ₂	0.02 gs ⁻¹	0.97 gs ⁻¹
CO	0.04 gs ⁻¹	2.43 gs ⁻¹
SO ₂	0.03 gs ⁻¹	0.22 gs ⁻¹
Benzene	1.34 x 10 ⁻⁴ gs ⁻¹	4.14 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.07 x 10 ⁻⁴ gs ⁻¹	2.60 x 10 ⁻⁴ gs ⁻¹
Gas combustion temperature	Flare 1: 867°C (820°C – 930°C) Flare 2: 854°C (830°C – 900°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,072K (1,003K – 1,153K) Flare 2: 1,082K (1,043K – 1,143K)	923 K (minimum) ^(a)
Exhaust gas velocity	8.5 ms ⁻¹ ^(b)	9.0 m s ⁻¹ (minimum) ^(a)
August 2023		

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	<0.02 gs ⁻¹	0.97 gs ⁻¹
CO	0.08 gs ⁻¹	2.43 gs ⁻¹
SO ₂	0.06 gs ⁻¹	0.22 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹	4.14 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.8 x 10 ⁻⁵ gs ⁻¹	2.60 x 10 ⁻⁴ gs ⁻¹
Non-Methane Organic Carbon	0.003 gs ⁻¹	-
Gas combustion temperature	Flare 1: 878°C (830°C – 980°C) Flare 2: 855°C (820°C – 930°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,056K (993K – 1,133K) Flare 2: 1,063K (1,003K – 1,123K)	923 K (minimum) ^(a)
Exhaust gas velocity	8.9 ms ⁻¹ ^(b)	9.0 m s ⁻¹ (minimum) ^(a)

September 2023

NO ₂	<0.01 gs ⁻¹	0.97 gs ⁻¹
CO	0.20 gs ⁻¹	2.43 gs ⁻¹
SO ₂	0.02 gs ⁻¹	0.22 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹	4.14 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.7 x 10 ⁻⁵ gs ⁻¹	2.60 x 10 ⁻⁴ gs ⁻¹
Gas combustion temperature	Flare 1: 889°C (833°C – 990°C) Flare 2: 936°C (889°C – 988°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,046K (979K – 1,151K) Flare 2: 1,112K (1,076K – 1,178K)	923 K (minimum) ^(a)
Exhaust gas velocity	9.1 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.

TABLE 2.14 SUMMARY OF LANDFILL GAS GENERATOR STACK EMISSION MONITORING IN THE REPORTING PERIOD

Parameters	Monitoring Results (Range in Bracket)	Limit Level
July 2023		
NO ₂	0.032 gs ⁻¹	1.91 gs ⁻¹
CO	0.678 gs ⁻¹	2.48 gs ⁻¹
SO ₂	<0.001 gs ⁻¹	0.528 gs ⁻¹
Benzene	3.4 x 10 ⁻⁵ gs ⁻¹	2.47 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<8.9 x 10 ⁻⁶ gs ⁻¹	1.88 x 10 ⁻⁵ gs ⁻¹
Exhaust gas exit temperature	ENGA: 847K (843K – 875K) ENGB : 845K (841K – 872K)	723K (minimum) ^(a)
Exhaust gas velocity	10.6 ms ⁻¹ ^(b)	30.0 ms ⁻¹ (minimum) ^(a)
August 2023		
NO ₂	0.024 gs ⁻¹	1.91 gs ⁻¹
CO	0.895 gs ⁻¹	2.48 gs ⁻¹
SO ₂	<0.001 gs ⁻¹	0.528 gs ⁻¹
Benzene	6.9 x 10 ⁻⁵ gs ⁻¹	2.47 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.1 x 10 ⁻⁵ gs ⁻¹	1.88 x 10 ⁻⁵ gs ⁻¹
Non-Methane Organic Carbons	1.9 x 10 ⁻³ gs ⁻¹	-
Exhaust gas exit temperature	ENGA: 865K (846K – 876K) ENGB: 855K (843K – 875K)	723K (minimum) ^(a)
Exhaust gas velocity	13.1 ms ⁻¹ ^(b)	30.0 ms ⁻¹ (minimum) ^(a)
September 2023		

Parameters	Monitoring Results (Range in Bracket)	Limit Level
NO ₂	0.007 gs ⁻¹	1.91 gs ⁻¹
CO	0.89 gs ⁻¹	2.48 gs ⁻¹
SO ₂	0.001 gs ⁻¹	0.528 gs ⁻¹
Benzene	1.5 x 10 ⁻⁴ gs ⁻¹	2.47 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.07 x 10 ⁻⁵ gs ⁻¹	1.88 x 10 ⁻⁵ gs ⁻¹
Exhaust gas exit temperature	ENGA: 867K (844K – 895K) ENGB: 849K (841K – 871K)	723K (minimum) ^(a)
Exhaust gas velocity	13.0 ms ⁻¹ ^(b)	30.0 ms ⁻¹ (minimum) ^(a)

Notes:

(a) Level under full load condition.

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

Limit Level exceedance was recorded for thermal oxidizer stack emission monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in **Annex D2** were undertaken. Investigation of the Limit Levels exceedance 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, thermal oxidizer stack emission (SO₂) exceedance on 13 September 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 H₂S MONITORING

2.1.4.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual of the Project, ambient VOCs, ammonia and H₂S 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 H₂S monitoring is provided in **Table 2.15** below.

TABLE 2.15 LIMIT LEVELS FOR AMBIENT VOCs, AMMONIA AND H₂S MONITORING

Parameters	Limit Level (µg m ⁻³)
Methane	NA ^(a)
Ammonia	180
H ₂ S	42

Parameters	Limit Level ($\mu\text{g m}^{-3}$)
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
Butyl acetate	7,240
Tetrachloroethylene	1,380

Parameters	Limit Level ($\mu\text{g m}^{-3}$)
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.

2.1.4.2 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.

2.1.4.3 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.

2.1.4.4 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.

2.1.4.5 H₂S

H₂S 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 H₂S 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 H₂S MONITORING DETAILS

Monitoring Station	Location	Parameter	Frequency	Monitoring Date
AM1	SENTX Site Boundary (North)	<ul style="list-style-type: none"> • Methane • Ammonia • A suite of VOCs ^(a) • H₂S 	Quarterly	15 Aug 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 | • Butyl benzene | • Dichlorobenzene |
| • Vinyl chloride | • Xylenes | • Methyl butanoate |
| • Methylene chloride | • Decanes | • Dipropyl ether |
| • Chloroform | • Undecane | • Methanethiol |
| • 1,2-dichloroethane | • Limonene | • Ethanethiol |
| • 1,1,1-trichloroethane | • Terpenes | • Butanethiol |
| • Carbon tetrachloride | • Ethanol | • Methanol |
| • Tetrachloroethylene | • Butan-2-ol | • Heptanes |
| • 1,2-dibromoethane | • Dimethylsulphide | • Octanes |
| • Benzene | • Methyl propionate | • Nonanes |
| • Toluene | • Ethyl propionate | • Dichlorodifluoromethane |
| • Carbon disulphide | • Propyl propionate | • Methane |
| • Propyl benzene | • Butyl acetate | |
| • Ethyl benzene | • Ethyl butanoate | |

2.1.4.6 MONITORING SCHEDULE FOR THE REPORTING MONTH

The schedule for ambient VOCs, ammonia and H₂S monitoring during the reporting period is provided in **Annex C**.

2.1.4.7 RESULTS AND OBSERVATIONS

The ambient VOCs, ammonia and H₂S monitoring results are summarized in **Tables 2.17** and provided in **Annex D6**.

TABLE 2.17 SUMMARY OF AMBIENT VOCS, AMMONIA AND H₂S MONITORING RESULTS IN THE REPORTING PERIOD

Parameters	Limit Level ($\mu\text{g m}^{-3}$)	Monitoring Results ($\mu\text{g m}^{-3}$)			
		AM1	AM2	AM3	AM4
Ammonia	180	16	54	18	37
H ₂ S	42	<15	<15	<15	<15
Methane	NA ^(a)	0.00016 %(v/v)	0.00013 %(v/v)	0.00014 %(v/v)	0.00014 %(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	<0.5	1.3	<0.5	<0.5
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	3.2	2.6	20.9	2
Carbon Tetrachloride	64	1	0.9	1	0.9
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)	3.5	3.6	3.5	3.7
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	0.5	<0.4
Ethanethiol	13	<0.6	<0.6	<0.6	<0.6
Ethanol	19,200	<3.8	<3.8	<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	0.9	0.7	0.6
Heptane	2,746	<0.8	<0.8	<0.8	<0.8

Parameters	Limit Level ($\mu\text{g m}^{-3}$)	Monitoring Results ($\mu\text{g m}^{-3}$)			
		AM1	AM2	AM3	AM4
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	<2.6	<2.6	<2.6	<2.6
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	1.4	0.9	2.3	1
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	0.9	0.8	1.4	0.7
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	0.5	0.8	2.6	1.1

Notes:

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

All ambient VOCs, ammonia and H₂S 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 sound level meter at the designated monitoring station NM1 (see **Figure 2.1**) in accordance with the requirements stipulated in the updated EM&A Manual. Acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. Details of the deployed equipment are provided in **Table 2.19**.

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 operation of the Project	3, 13, 19, 25, 31 Jul 2023 7, 14, 24, 30 Aug 2023 5, 11, 18, 25 Sep 2023	Sound Level Meter: Rion NL-52 (S/N: 00643049) Acoustic Calibrator: CAL200 (S/N: 15678)

2.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.2.3 RESULTS AND OBSERVATIONS

A total of 13 impact noise monitoring events were scheduled during the reporting period. Results for noise monitoring are summarised in **Table 2.20**. The monitoring results and the graphical presentation of the data are provided in **Annex E1**.

TABLE 2.20 SUMMARY OF OPERATION 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
July 2023	NM1	53.5	51.7 – 55.3	75
August 2023	NM1	54.7	51.4 – 57.2	75
September 2023	NM1	52.2	49.1 – 55.2	75

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

No 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

2.3.1.1 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.

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

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

TABLE 2.21 LIMIT LEVELS FOR SURFACE WATER QUALITY

Parameters	Limit Level
DP3	
Ammoniacal-nitrogen	> 0.5 mg/L
COD	> 80 mg/L
SS	> 30 mg/L

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	
DP3	Surface water discharge point DP3	Monthly	11 Jul 2023, 4 Aug 2023, 15 Aug 2023 (Re-measurement (SS) at DP4), 22 Sep 2023	<ul style="list-style-type: none"> • pH • Electrical conductivity (EC) • DO • SS • COD • BOD₅ • TOC • Ammoniacal-nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • TKN • TN • Phosphate • Sulphate • Sulphide • Carbonate • Oil & Grease 	<ul style="list-style-type: none"> • Bicarbonate • Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron 	Horiba U-52G (S/N: RSV50V1T)
DP4	Surface water discharge point DP4					
DP6	Surface water discharge point DP6					

2.3.1.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.3.1.3 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 stations in July 2023, and DP3 and DP6 in August 2023 and DP3 in September 2023 due to insufficient flow. Details of impact water quality monitoring event are provided in **Annex F1**.

Limit Level exceedance was recorded for surface water (SS) in the reporting period and actions in accordance with the Event and Action Plan presented in **Annex F2** were undertaken. Investigation of the Limit Level exceedance was conducted and the investigation report of the exceedance is presented in **Annex F6**.

Based on the investigation conducted for the monitoring event with potential Limit Level exceedance with the Contractor, and the IEC, the SS exceedance at DP4 on 4 August 2023 was considered Project related. The monitoring frequency shall increase to weekly in accordance with Table 4.5b of the updated EM&A Manual until no exceedance of Limit Level. However, the SS results at DP4 of the additional monitoring event conducted on 15 August 2023 are well below the Limit Level and the weekly surface water monitoring at DP4 was therefore not triggered.

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

2.3.2 LEACHATE MONITORING

2.3.2.1 MONITORING REQUIREMENTS AND EQUIPMENT

According to the updated EM&A Manual, continuous monitoring of leachate level and monthly 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	

Parameters	Limit Level
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 Jul – 30 Sep 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	<i>On-site Measurements:</i> <ul style="list-style-type: none"> • Volume • pH • Temperature <i>Laboratory analysis:</i>	6 Jul 2023, 2 Aug 2023, 7 Sep 2023	Lutron PH-208 (S/N: TF30605)

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)	<ul style="list-style-type: none"> • Suspended Solids • COD • BOD₅ • TOC • Ammoniacal-nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • Total Nitrogen • Sulphate • Phosphate • Oil & Grease • Alkalinity • Chloride • Calcium • Potassium • Magnesium • Iron • Zinc • Copper • Chromium • Nickel • Cadmium • Boron 		
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Note:

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

2.3.2.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.3.2.3 RESULTS AND OBSERVATIONS

The leachate levels and effluent quality monitoring results are summarised 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)
July 2023		
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	77 (75 – 77)	> 178
Meter No. X-2	87 (64 – 88)	
Average	82 (71 – 83)	
Pump Station No. 2X (Cell 2X)		

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
Meter No. X-3	80 (65 – 90)	> 180
Meter No. X-4	78 (66 – 93)	
Average	79 (66 – 92)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	63 (48 – 70)	> 175
Meter No. X-6	68 (59 – 78)	
Average	66 (54 – 73)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	58 (50 – 70)	> 186
Meter No. X-8	60 (41 – 89)	
Average	59 (49 – 71)	
August 2023		
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	75 (66 – 79)	> 178
Meter No. X-2	86 (79 – 88)	
Average	81 (73 – 84)	
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	80 (63 – 89)	> 180
Meter No. X-4	81 (73 – 90)	
Average	81 (69 – 90)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	62 (53 – 70)	> 175
Meter No. X-6	64 (55 – 77)	
Average	63 (55 – 74)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	59 (52 – 63)	> 186
Meter No. X-8	63 (52 – 70)	
Average	61 (54 – 67)	
September 2023		
Pump Station No. 1X (Cell 1X)		
Meter No. X-1	125 (66 – 249)	> 178
Meter No. X-2	124 (66 – 237)	
Average	124 (72 – 243)	

Monitoring Location	Average Leachate Head Levels (cm) (Range in Bracket)	Limit Level (cm)
Pump Station No. 2X (Cell 2X)		
Meter No. X-3	80 (61 – 89)	> 180
Meter No. X-4	85 (81 – 89)	
Average	82 (73 – 88)	
Pump Station No. 3X (Cell 3X)		
Meter No. X-5	130 (48 – 213)	> 175
Meter No. X-6	133 (50 – 222)	
Average	131 (49 – 218)	
Pump Station No. 4X (Cell 4X)		
Meter No. X-7	150 (52 – 287)	> 186
Meter No. X-8	155 (54 – 278)	
Average	153 (56 – 283)	

TABLE 2.26 SUMMARY OF EFFLUENT QUALITY MONITORING RESULTS IN THE REPORTING PERIOD

Parameters		Monitoring Results	Limit Level
July 2023			
Temperature	°C	33.2	> 43 °C
pH Value	pH unit	8.4	6 – 10
Volume Discharged	m ³	1,013	>2,000 m ³
Suspended Solids (SS)	mg/L	41	> 800 mg/L
Phosphate	mg/L	3.54	> 25 mg/L
Sulphate	mg/L	324	> 800 mg/L
Total Inorganic Nitrogen ^(a)	mg/L	52.51	> 100 mg/L
BOD	mg/L	9	> 800 mg/L
COD	mg/L	796	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	5220	> 7,000 µg/L
Iron	mg/L	2	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	111	> 300 µg/L

Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	101	> 700 µg/L
Zinc	µg/L	99	> 700 µg/L
Parameters		Monitoring Results	Limit Level
August 2023			
Temperature	°C	35.8	> 43 °C
pH Value	pH unit	8.4	6 – 10
Volume Discharged	m ³	728	>2,000 m ³
Suspended Solids (SS)	mg/L	39.8	> 800 mg/L
Phosphate	mg/L	8.28	> 25 mg/L
Sulphate	mg/L	244	> 800 mg/L
Total Inorganic Nitrogen ^(a)	mg/L	59.74	> 100 mg/L
BOD	mg/L	9	> 800 mg/L
COD	mg/L	1130	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	6000	> 7,000 µg/L
Iron	mg/L	1.84	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	129	> 300 µg/L
Copper	µg/L	<10	> 1,000 µg/L
Nickel	µg/L	126	> 700 µg/L
Zinc	µg/L	82	> 700 µg/L
Parameters		Monitoring Results	Limit Level
September 2023			
Temperature	°C	33	> 43 °C
pH Value	pH unit	8.3	6 – 10
Volume Discharged	m ³	775	>2,000 m ³
Suspended Solids (SS)	mg/L	28.3	> 800 mg/L
Phosphate	mg/L	2.28	> 25 mg/L

Sulphate	mg/L	451	> 800 mg/L
Total Inorganic Nitrogen ^(a)	mg/L	54.14	> 100 mg/L
BOD	mg/L	11	> 800 mg/L
COD	mg/L	675	> 2,000 mg/L
Oil & Grease	mg/L	<5	> 20 mg/L
Boron	µg/L	3850	> 7,000 µg/L
Iron	mg/L	1.13	> 5 mg/L
Cadmium	µg/L	<1.0	> 1 µg/L
Chromium	µg/L	85	> 300 µg/L
Copper	µg/L	11	> 1,000 µg/L
Nickel	µg/L	82	> 700 µg/L
Zinc	µg/L	114	> 700 µg/L

Limit Levels exceedances were recorded for leachate level 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 report is presented in **Annex F6**.

Based on the investigation conducted for the monitoring event with potential Limit Levels exceedances with the Contractor and the IEC, the leachate level exceedances at Pump Station No. 1X from 8 September to 16 September 2023, Pump Station No. 3X from 8 September to 20 September 2023 and Pump Station No. 4X from 8 September to 20 September 2023 were 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.

All effluent quality monitoring results were below the Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in **Annex F2**.

2.3.3 GROUNDWATER MONITORING

2.3.3.1 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

Location	Frequency	Parameter		Monitoring Dates	Equipment
All groundwater monitoring wells (MWX-1 to MWX-14)	Monthly	<ul style="list-style-type: none"> • Water level • pH • EC • COD • BOD5 • TOC • Ammoniacal-nitrogen • Nitrate-nitrogen • Nitrite-nitrogen • TKN • TN • Sulphate • Sulphide • Carbonate • Bicarbonate • Phosphate 	<ul style="list-style-type: none"> • Chloride • Sodium • Potassium • Calcium • Magnesium • Nickel • Manganese • Chromium • Cadmium • Copper • Lead • Iron • Zinc • Mercury • Boron 	10, 11 Jul 2023, 1, 2 Aug 2023, 21, 22 Sep 2023	Horiba U-52G (S/N: RSV50V1T) Horiba U-52G (S/N: NVAE080GT)

2.3.3.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.3.3.3 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

	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	0.22	0.17	0.32	5.00	5	4	7	30
MWX-2	0.01	<0.01	0.01	5.00	4	3	4	30
MWX-3	1.00	0.91	1.05	5.00	16	14	17	30
MWX-4	3.94	3.02	4.90	7.63	23	18	29	36
MWX-5	2.42	2.24	2.58	5.00	30	26	38	30
MWX-6	3.56	3.44	3.74	5.00	45	36	54	46
MWX-7	0.42	0.29	0.48	6.55	28	27	29	36
MWX-8	7.66	7.07	8.63	15.85	44	25	70	50

MWX-9	0.96	0.24	1.60	7.30	14	6	22	71
MWX-10	0.03	<0.01	0.03	5.00	6	3	9	30
MWX-11	0.15	0.14	0.17	5.00	6	5	7	30
MWX-12	0.02	<0.01	0.02	5.00	5	<2	7	30
MWX-13	0.04	<0.01	0.04	5.00	5	<2	5	30
MWX-14	<0.01	<0.01	<0.01	5.00	5	<2	5	30

Limit Level exceedances were 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 event with potential Limit Levels exceedance with the Contractor and the IEC, the groundwater (COD) exceedances at MWX-7 on 11 July 2023 and 22 September 2023, and at MWX-6 on 2 August 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.

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	3.2
	LFG2	1.0	4.3
	LFG3	1.0	6.3
	LFG4	1.0	7.0
	LFG5	1.0	3.4
	LFG6	1.0	9.1
	LFG7	1.0	1.5

Parameters	Monitoring Location	Limit Level (% (v/v))	
	LFG8	12.6	2.4
	LFG9	2.5	1.7
	LFG10	3.5	1.6
	LFG11	3.0	2.0
	LFG12	13.2	1.5
	LFG13	22.5	2.7
	LFG14	5.2	1.8
	LFG15	18.2	2.0
	LFG16	1.0	2.0
	LFG17	17.8	2.4
	LFG18	2.3	2.1
	LFG19	6.3	3.1
	LFG20	1.0	4.6
	LFG21	1.0	4.8
	LFG22	1.0	4.0
	LFG23	1.0	10.3
	LFG24	1.0	4.7
	GP1	1.0	10.6
	GP2 (shallow)	1.0	11.4
	GP2 (deep)	1.0	10.4
	GP3 (shallow)	1.0	6.9
	GP3 (deep)	1.0	5.6
	GP4 (shallow)	1.0	11.6
	GP4 (deep)	1.0	7.7
	GP5 (shallow)	1.0	10.8
	GP5 (deep)	1.0	7.5
	GP6	1.0	8.4
	GP7	1.0	4.5
	GP12	1.0	2.3
	GP15	1.0	2.2
	P7	1.0	2.5
	P8	1.0	1.7
	P9	1.0	2.7

Service Voids, Utilities Pits and Manholes

Parameters	Monitoring Location	Limit Level (% (v/v))
Methane (or flammable gas)	Service voids, utilities pits and manholes	1% by volume
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.

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	<ul style="list-style-type: none"> Methane Carbon dioxide Oxygen 	24 Jul 2023, 3 Aug 2023, 4 Sep 2023	GA5000 (S/N: G507306)

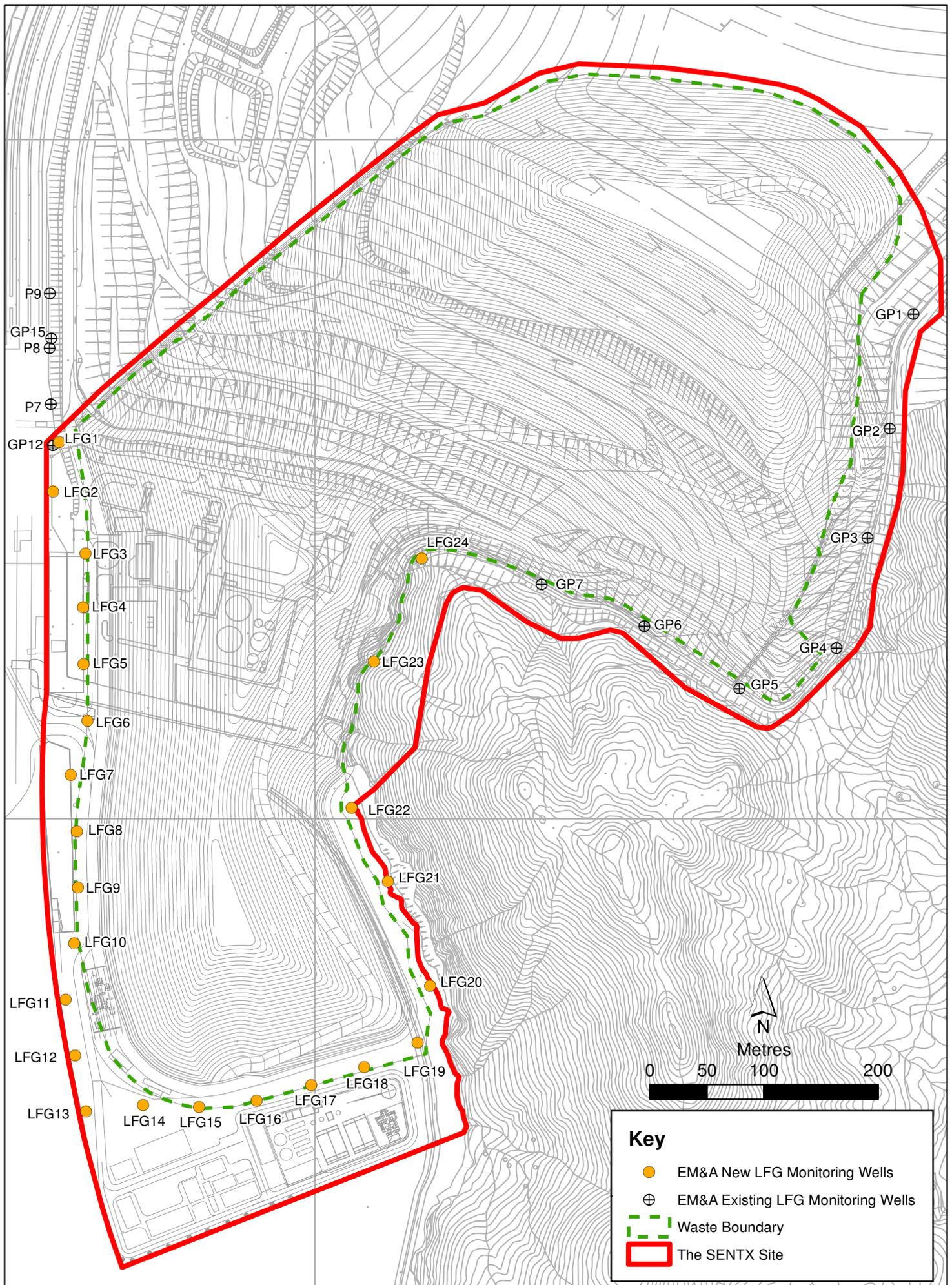


Figure 2.3

Location of Landfill Gas Monitoring Wells



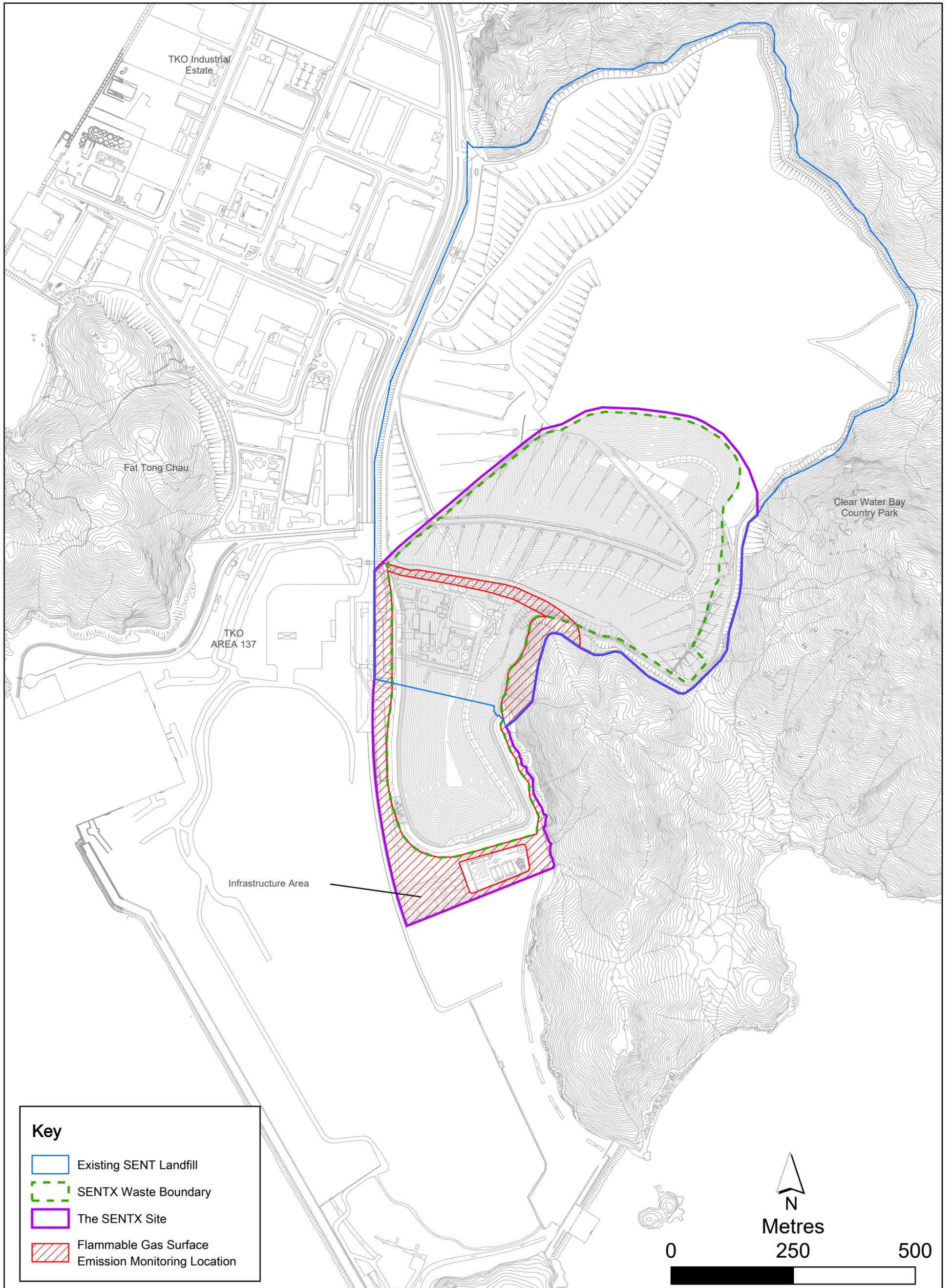


Figure 2.4

Flammable Gas Surface Emission Monitoring Locations



Monitoring Location	Frequency	Parameter	Monitoring Dates	Equipment
		<ul style="list-style-type: none"> Atmospheric pressure 		
Service voids, utilities and manholes along the Site boundary and within the SENTX Site (UU1 to UU28)	Monthly	<ul style="list-style-type: none"> Methane Carbon dioxide Oxygen 	24 Jul 2023, 4 Aug 2023, 4 Sep 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 Jul – 30 Sep 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	16 Aug 2023	GMI Leak Surveyor (S/N: 554846)
Bulk gas sampling at least 2 of the perimeter LFG monitoring wells	Quarterly	<ul style="list-style-type: none"> Methane Carbon dioxide Oxygen Nitrogen Carbon monoxide Other flammable gas 	3 Aug 2023	Gas sampling pump and Tedlar bags

2.4.2 MONITORING SCHEDULE FOR THE REPORTING MONTH

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

2.4.3 RESULTS AND OBSERVATIONS

The landfill gas monitoring results are summarised and provided in **Tables 2.32 - 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	0	0	1	0.8	0.4	1.2	3.2
LFG2	0	0	0	1	1	0.6	1.5	4.3
LFG3	0	0	0	1	3.3	2.8	3.8	6.3
LFG4	0	0	0	1	0	0	0.1	7
LFG5	0	0	0	1	0.5	0.3	0.9	3.4
LFG6	0	0	0	1	0.1	0	0.1	9.1
LFG7	0	0	0	1	0	0	0	1.5

Location	Methane (% (v/v))				Carbon Dioxide (% (v/v))			
	Monitoring Results			Limit Level (a)	Monitoring Results			Limit Level (a)
	Average	Min	Max		Average	Min	Max	
LFG8	0	0	0	12.6	0	0	0.1	2.4
LFG9	0	0	0	2.5	0.2	0	0.3	1.7
LFG10	0	0	0	3.5	0.2	0.1	0.2	1.6
LFG11	0	0	0	3	0.2	0.2	0.3	2
LFG12	0	0	0	13.2	0	0	0	1.5
LFG13	8.9	0.4	25.8	22.5	0	0	0.1	2.7
LFG14	0	0	0	5.2	0.2	0.1	0.3	1.8
LFG15	0.2	0	0.6	18.2	0.7	0.5	0.9	2
LFG16	0	0	0	1	0.1	0	0.2	2
LFG17	1.3	0	2.6	17.8	0.9	0.1	1.5	2.4
LFG18	0	0	0	2.3	0.1	0	0.2	2.1
LFG19	0	0	0	6.3	0.1	0	0.2	3.1
LFG20	0	0	0	1	1.7	0	4.5	4.6
LFG21	0	0	0	1	1.5	0.9	2.2	4.8
LFG22	0	0	0	1	0.8	0	1.3	4
LFG23	0	0	0	1	0.2	0	0.4	10.3
LFG24	0	0	0	1	2.8	0	8.4	4.7
GP1	0	0	0	1	4	0.1	7.5	10.6
GP2 (shallow)	0	0	0	1	0.9	0.2	1.3	11.4
GP2 (deep)	0	0	0	1	1.9	0.3	4.9	10.4
GP3 (shallow)	0	0	0	1	0.4	0	1	6.9
GP3 (deep)	0	0	0	1	0	0	0	5.6
GP4 (shallow)	0	0	0	1	0.2	0	0.5	11.6
GP4 (deep)	0	0	0	1	0.1	0.1	0.2	7.7
GP5 (shallow)	0	0	0	1	0.5	0.2	0.8	10.8
GP5 (deep)	0	0	0	1	0.1	0	0.2	7.5
GP6	0	0	0	1	4.9	4.3	5.6	8.4

Location	Methane (% (v/v))				Carbon Dioxide (% (v/v))			
	Monitoring Results			Limit Level (a)	Monitoring Results			Limit Level (a)
	Average	Min	Max		Average	Min	Max	
GP7	0	0	0	1	0.2	0.1	0.2	4.5
GP12	0	0	0	1	0.1	0.1	0.2	2.3
GP15	0	0	0	1	0	0	0.1	2.2
P7	0	0	0	1	0.1	0.1	0.1	2.5
P8	0	0	0	1	0.2	0	0.4	1.7
P9	0	0	0	1	0.1	0	0.3	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

Location	Methane (% (v/v))			
	Monitoring Results			Limit Levels
	Average	Min	Max	
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 SAMPLING MONITORING RESULTS IN THE REPORTING PERIOD

Parameters	Limit Level (LFG2) ^(a)	LFG2	Limit Level (LFG8) ^(a)	LFG8
Methane (% (v/v))	1.0	<0.020	12.6	<0.020
Carbon Dioxide (% (v/v))	4.3	<0.020	2.4	<0.020
Oxygen (% (v/v))	-	20.6	-	20.5
Nitrogen (% (v/v))	-	76.5	-	76.4
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 Latitude (N)	Longitude (E)	Monitoring Results (ppm)	Limit Level (ppm)
No flammable gas surface emission detected in the reporting period.			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 not triggered at all occupied on-site buildings at SENTX from July 2023 to September 2023.

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 28 July 2023, 24 August 2023 and 28 September 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 summarized 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 on 6, 13, 20 and 27 July 2023, 3, 10, 17, 24 and 31 August 2023 and 7, 14, 21 and 28 September 2023.

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

TABLE 2.36 KEY OBSERVATIONS IDENTIFIED DURING THE SITE INSPECTION IN THIS REPORTING MONTH

Inspection Date	Environmental Observations and Recommendations
6 July 2023	<ul style="list-style-type: none"> The Contractor shall remove the stagnant water accumulated in the drip tray at DP4 Wetsep and handle the clean-up materials as chemical waste.

Inspection Date	Environmental Observations and Recommendations
13 July 2023	<ul style="list-style-type: none"> No observations during the site inspection.
20 July 2023	<ul style="list-style-type: none"> The Contractor shall remove the deposited silt and grit accumulated at DP3 sediment pit regularly to ensure it is functioning properly at all times.
27 July 2023	<ul style="list-style-type: none"> The Contractor shall remove the stagnant water accumulated in the drip tray at DP4 Wetsep and handle the clean-up materials as chemical waste.
3 August 2023	<ul style="list-style-type: none"> The Contractor shall remove the general refuse, deposited silt and grit accumulated at X10 channel regularly to ensure it is functioning properly at all times. The Contractor shall remove the stagnant water accumulated in the drip tray at DP4 Wetsep and handle the clean-up materials as chemical waste. The Contractor shall remove the general refuse accumulated near welfare facilities and dispose of the waste regularly.
10 August 2023	<ul style="list-style-type: none"> The Contractor shall remove the general refuse and mulch accumulated at the channel and around the planting area near Towngas plant, to ensure it is functioning properly at all times. The Contractor shall remove the ST pipes residue accumulated near Towngas plant and dispose of the waste regularly.
17 August 2023	<ul style="list-style-type: none"> The Contractor shall remove the general refuse, deposited silt and grit accumulated at X10 channel and the drain near site entrance regularly to ensure they are functioning properly at all times. The Contractor shall provide drip trays for the chemicals stored near diesel fuel tanks.
24 August 2023	<ul style="list-style-type: none"> The Contractor shall clean up the oil spill near Towngas plant and handle the clean-up materials as chemical waste. The Contractor shall remove the stagnant water accumulated in the drip trays at DP4 Wetseps and handle the clean-up materials as chemical waste.
31 August 2023	<ul style="list-style-type: none"> The Contractor shall cover the stockpile of dusty materials by impervious sheeting near Towngas plant to minimise dust impact. The Contractor shall remove the general refuse accumulated near site entrance and dispose of the waste regularly.
7 September 2023	<ul style="list-style-type: none"> The Contractor shall replace the faded NRMM label displayed on the excavator at Cell 1X restoration area. The Contractor shall remove the deposited silt and grit accumulated at X10 channel regularly and maintain the silt fencing along X10 channel to minimise SS runoff to the channel. The Contractor shall remove the general refuse accumulated at X10 channel drop inlet to ensure it is functioning properly at all times.
14 September 2023	<ul style="list-style-type: none"> The Contractor shall remove the deposited silt and grit and general refuse accumulated at X10 channel regularly to ensure it is functioning properly at all times.
21 September 2023	<ul style="list-style-type: none"> The Contractor shall remove the deposited silt and grit accumulated at X10 channel and the channel near site entrance regularly to ensure they are functioning properly at all times.

Inspection Date	Environmental Observations and Recommendations
28 September 2023	<ul style="list-style-type: none"> The Contractor shall review the treatment capacity of DP4 Wetsep to ensure all surface water is treated before discharge. The Contractor shall remove the deposited silt and grit and general refuse accumulated at X10 channel regularly to ensure it is functioning properly at all times. The Contractor shall replace the faded NRMM label displayed on the road roller at Cell 1X restoration area. The Contractor shall clean up the algae accumulated at DP6 Wetsep to ensure it is functioning properly at all times.

The Contractor has rectified all observations identified during environmental site inspections in the reporting period. Key environmental deficiencies identified and the corresponding rectification actions are presented in **Table 2.37**.

TABLE 2.37 SUMMARY OF ENVIRONMENTAL DEFICIENCIES IDENTIFIED AND CORRESPONDING RECTIFICATION ACTIONS

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

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

2.7 WASTE MANAGEMENT STATUS

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

As informed by the Contractor, waste generated during this reporting period include mainly yard waste. 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 summarized in **Table 2.38**.

TABLE 2.38 QUANTITIES OF DIFFERENT WASTE GENERATED AND IMPORTED FILL MATERIALS

Month /Year	Inert C&D Materials ^(a) (in '000m ³)	Imported Fill (in '000kg) ^(b)	Inert Construction Waste Re-used (in '000m ³)	Non-inert Construction Waste ^(c) (in '000m ³)	Recyclable Materials ^(d) (in '000kg)	Yard Waste (in '000kg)		Chemical Wastes (in '000kg)
						Y Park	SENT	
1 – 30 Jul 23	0	0	0	0	0	11.780	0	0.800
1 – 31 Aug 23	0	0	0	0	0	0	0	1.400
1 – 30 Sep 23	0	0	0	0	0	0	0	0.890

Notes:

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

2.8 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

2.9 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

The operation/ restoration phase noise and landfill gas monitoring results complied with the Action and Limit Levels in the reporting period.

Two exceedances of Action and Limit Levels for Total Suspended Particulates (TSP) and one exceedance of Limit Level for thermal oxidizer stack emission (SO₂) were recorded for air quality monitoring in the reporting period. The TSP exceedances at AM1 on 22 September 2023 and 28 September 2023 were considered non Project related upon further investigation. The thermal oxidizer stack emission (SO₂) exceedance on 13 September 2023 was considered Project related upon further investigation.

Three exceedances of the Limit Level for groundwater (COD), one exceedance of Limit Levels for surface water (SS) and thirty-five exceedances of the Limit Level for Leachate Level were recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedances at MWX-7 on 11 July and 22 September 2023, and at MWX-6 on 2 August 2023 were considered non Project related upon further investigation. The surface water (SS) exceedance at DP4 on 4 August 2023 was considered Project related upon further investigation. The leachate level exceedances at Pump Station No. 1X from 8 September to 16 September 2023, Pump Station No. 3X from 8 September to 20 September 2023 and Pump Station No. 4X from 8 September to 20 September 2023 were considered Project related 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, successful prosecutions are summarised in **Annex H**.

3. CONCLUSION AND RECOMMENDATIONS

This Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 July 2023 to 30 September 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 H₂S), 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.

Two exceedances of Action and Limit Levels for Total Suspended Particulates (TSP), one exceedance of Limit Level for thermal oxidizer stack emission (SO₂), three exceedances of the Limit Level for groundwater (COD), one exceedance of Limit Levels for surface water (SS) and thirty-five exceedances of the Limit Level for Leachate Level 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	Activity Name	Dur	Start	Finish	Phase	Predecessor Details	Successor Details	2018		2019		2020		2021		2022		2023		
									Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
332	SA2.5	Construction (Initial Works)	1163	12-Apr-18	07-Jun-21	756															
333	SA2.5.02	Advance Works & Site Establishment	1148	12-Apr-18	02-Jun-21	35															
334	SA2.5.02.01	Site Establishment & Mobilization	333	12-Apr-18	15-May-19	820															
335	5.02.01	52-1000 Site Mobilization for Parts X1 & X2	30	31-Dec-18	20-Jan-19	820															
336	5.02.01	52-1100 Site Mobilization for Parts X3, X4 & X5	30	12-Apr-18	11-May-18	1063															
337	5.02.01	52-1200 Temporary Office for Employer / ERI/C	60	10-Oct-18	08-Dec-18	0															
338	5.02.01	52-1300 Hoarding and Fencing Works	40	30-Jan-19	10-Mar-19	820															
339	SA2.5.02.02	Site Survey & Investigation Works for Parts X1 & X2	50	31-Dec-18	18-Feb-19	840															
340	5.02.02	52-1400 Condition Survey	25	31-Dec-18	24-Jan-19	840															
341	5.02.02	52-1500 Topographic Survey	20	31-Dec-18	19-Jan-19	845															
342	5.02.02	52-1600 Site Inspection, Review of Condition Survey Report	25	25-Jan-19	18-Feb-19	840															
343	SA2.5.02.03	Site Survey & Investigation Works for Parts X3, X4 & X5	58	12-Apr-18	31-May-18	1103															
344	5.02.03	52-1700 Condition Survey	25	12-Apr-18	06-May-18	1103															
345	5.02.03	52-1800 Topographic Survey	20	12-Apr-18	01-May-18	1108															
346	5.02.03	52-1900 Site Inspection, Review of Condition Survey Report	25	07-May-18	31-May-18	1103															
347	SA2.5.02.04	Environmental Monitoring	975	02-Oct-18	02-Jun-21	35															
348	5.02.04	52-2000 Installation of Monitoring Stations & Waits (SP & DVI)	120	02-Oct-18	20-Jan-19	0															
349	5.02.04	52-2100 Installation of Monitoring Stations & Waits (SP & DVI) on Butress Wall	120	02-Oct-18	20-Jan-19	0															
350	5.02.04	52-2200 Conduct Baseline Monitoring for Construction (one month)	30	01-Dec-18	30-Dec-18	0															
351	5.02.04	52-2300 Conduct Baseline Monitoring for Operation (one year)	365	03-Jun-20	02-Jun-21	35															
352	SA2.5.03	Civil Engineering Works	748	13-Jan-19	29-Jan-21	834															
353	SA2.5.03.01	Butress Wall	475	03-Apr-19	03-Jun-20	43															
354	5.03.01	53-1000 Section adj. SENT	300	13-Apr-19	06-Feb-20	96															
355	5.03.01	53-1100 Characterise SENT Landfill Gas Pipe	45	07-Feb-20	23-Mar-20	96															
356	5.03.01	53-1200 Section at Cell 4	400	02-Mar-19	04-Apr-20	83															
357	5.03.01	53-1300 Install Landfill Gas Pipe on Butress Wall	75	05-Apr-20	18-Jun-20	83															
358	SA2.5.03.01	Landfill Cell 1	503	13-Jan-19	29-May-20	214															
359	5.03.01	53-1400 Earth bund (Eastern)	90	04-Aug-19	01-Nov-19	9															
360	5.03.01	53-1500 Earth bund (Southern)	90	26-Apr-19	24-Jul-19	314															
361	5.03.01	53-1600 Earth bund (Western)	90	13-Jan-19	12-Apr-19	417															
362	5.03.01	53-1700 Interfill bund (Cell 1G)	75	13-Jan-19	28-Mar-19	432															
363	5.03.01	53-1800 Site Formation	90	13-Jan-19	12-Apr-19	217															
364	5.03.01	53-1900 Pump Station (PS#1X)	45	13-Apr-19	27-May-19	507															
365	5.03.01	53-2000 Lining Works	135	02-Nov-19	15-Mar-20	214															
366	5.03.01	53-2100 Protective Store Laying & Leachate Collection Pipe	75	16-Mar-20	29-May-20	214															
367	5.03.01	53-2200 Install Leachate Force Main	75	25-Jul-19	07-Oct-19	449															
368	5.03.01	53-2300 Install Landfill Gas Pipe on earth bund	55	03-Nov-19	26-Dec-19	258															
369	5.03.01	53-2400 Leachate Pipe Connection (Cell 1 to LTP)	30	09-Mar-20	07-Apr-20	266															
370	SA2.5.03.01	Landfill Cell 4	30	09-Jul-20	07-Aug-20	144															
371	5.03.01	53-2500 Provide Temporary Leachate Pipe on Cell 4 Area	30	09-Jul-20	07-Aug-20	144															
372	SA2.5.03.02	Drainage - Surface Run-Off	740	16-Jan-19	31-May-21	859															
373	5.03.02	53-2600 Construct Cut-Off Channel 12A	60	16-Jan-19	18-Mar-19	9															
374	5.03.02	53-2700 Construct Cut-Off Channel 12A to DP6	20	17-Mar-19	05-Apr-19	9															
375	5.03.02	53-2800 Diversion from Existing Trapezoidal Channel into Channel 12A	20	06-Apr-19	25-Apr-19	9															
376	5.03.02	53-2900 Removal of Existing Trapezoidal Channel along Eastern Bund	30	26-Apr-19	25-May-19	9															
377	5.03.02	53-3000 Cut-Off Channel 04 Diversion to Cut-Off Channel 11-2	45	16-Jan-19	01-Mar-19	83															
378	5.03.02	53-3100 Cut-Off Channel XS on Butress Wall, Cell 4, Cell 3	90	05-Apr-20	03-Jul-20	289															
379	5.03.02	53-3200 Temporary Diversion Cut-Off Channel XS to 12A	20	04-Jul-20	23-Jul-20	289															
380	5.03.02	53-3300 Culvert XS (5m long) & Perm Connection of Cut-Off Channel XS	30	26-Dec-20	24-Jan-21	134															
381	5.03.02	53-3400 Construct Perimeter Channel XS on Eastern Bund & Southern Bund of Cell 1	50	02-Nov-19	21-Dec-19	249															
382	5.03.02	53-3500 Construct Perimeter Channel XS on Eastern Bund of Cell 2	50	20-Feb-20	08-Apr-20	189															
383	5.03.02	53-3600 Construct Perimeter Channel XS Eastern Bund of Cell 3	50	06-Jun-20	26-Jul-20	129															
384	5.03.02	53-3700 Culvert XS (25m long) at Cell 1 Southern Bund	75	25-Jul-19	07-Oct-19	1314															
385	5.03.02	53-3800 Perimeter Channel (OSB) at Cell 1 Southern & Western Bund	45	25-Jul-19	07-Sep-19	1344															
386	5.03.02	53-3900 Drop Inlet & Culvert (OS) - 21m long	180	29-Jul-20	24-Jan-21	129															
387	5.03.02	53-4000 Sediment Trap (ST)	180	29-Jul-20	24-Jan-21	129															
388	5.03.02	53-4100 Dual Culvert 14m long (connect to DP4)	180	29-Jul-20	24-Jan-21	129															
389	SA2.5.03.02	Drainage - Groundwater	200	26-May-19	11-Dec-19	269															
390	5.03.02	53-4200 Construct Groundwater Collection Pipe along Cells X1 & X2 Eastern Bund	70	26-May-19	02-Aug-19	9															
391	5.03.02	53-4300 Construct Groundwater Collection Pipe along Cell X3 Eastern Bund	50	04-Aug-19	22-Sep-19	159															
392	5.03.02	53-4400 Construct Groundwater Collection Pipe along Interfill Bund X2/X3	50	25-Sep-19	14-Nov-19	209															
393	5.03.02	53-4500 Construct Manhole MH-X1	30	13-Nov-19	11-Dec-19	209															
394	SA2.5.03.03	Utilities - Distribution within New Infrastructure Area	391	11-Aug-19	04-Sep-20	276															
395	5.03.03	53-4600 Power Supply HV Works (Transformer & HV switchgear)	5	30-Jun-20	04-Jul-20	0															
396	5.03.03	53-4700 Power Distribution, LV Power Supply Works	2	05-Jul-20	06-Jul-20	0															
397	5.03.03	53-4800 Sewerage (Collection to LTP)	60	07-Jul-20	04-Sep-20	271															
398	5.03.03	53-4900 Sewerage (Discharge to Site Boundary)	60	07-Jul-20	04-Sep-20	271															
399	5.03.03	53-5000 Lighting Provision	30	07-Jul-20	05-Aug-20	6															
400	5.03.03	53-5100 Fire Services	115	02-Mar-20	04-Jul-20	2															
401	5.03.03	53-5200 Construct Firewater (Fresh & Salt)	110	03-Mar-20	04-Jul-20	338															
402	5.03.03	53-5300 Telecom & Network	45	11-Aug-19	24-Sep-19	622															
403	5.03.03	53-5400 Gas Network (LFG to LTP)	15	22-Jun-20	06-Jul-20	176															
404	SA2.5.03.04	Utilities - Works Associated with Utilities Undertakes	703	27-Feb-19																	

WBS Path	Activity ID	Activity Name	Dur	Start	Finish	Task ID	Predecessor Details	Successor Details	2018			2019			2020			2021			2022			2023		
									Q1	Q2	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
508	SA2.6.03	Chd Engineering Works	1269	02-Nov-19	13-Apr-23	30																				
510	SA2.6.03.1	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, 63-4200 FS, 63-1400 FS, 63-2800 FS	63-3000 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, 63-1800 FS, 63-1400 FS, 63-3000 FS	63-1400 FS, 63-1500 FS, 63-1700 FS, 63-3500 FS, 63-3000 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, 63-1800 FS, 63-1400 FS, 63-3000 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, 63-1800 FS, 63-1400 FS	63-1400 FS, 63-4200 FS																		
515	6.03.2	63-1400 Pump Station (PS42X)	45	09-Jun-20	23-Jul-20	84	63-1500 FS, 63-1100 FS	63-1600 FS, 63-1700 FS																		
516	6.03.2	63-1500 Leachate Works	90	01-Oct-21	29-Dec-21	710	41-1500 FS, 63-1000 FS, 63-1100 FS, 63-1200 FS	63-1800 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	32-1800 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	26-Mar-20	168	41-1500 FS, 63-1000 FS	54-4000 FS, M12, 3 FS																		
522	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, 63-4200 FS, 63-1000 FS, 63-4000 FS, 63-2800 FS, 63-4200 FS	63-3000 FS, 63-3600 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, 63-1100 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	23-Aug-20	9	11-1100 FS, 63-1000 FS, 63-1900 FS	63-3200 FS																		
525	6.03.3	63-2300 Pump Station (PS43X)	45	23-Aug-20	16-Oct-20	9	63-2200 FS, 63-2000 FS	63-2500 FS, 63-2600 FS																		
526	6.03.3	63-2400 Leachate 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-21	03-Feb-21	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	53-2100 FS, 40, 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 Butress 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, 63-3000 FS, 63-4100 FS, 63-4100 FS, 55, 40, M, 6, 6 FS, 40, 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	63-3100 FS																		
534	6.03.4	63-3100 Pump Station (PS44X)	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 Leachate Works	135	01-Oct-22	12-Feb-23	0	41-1500 FS, 63-2900 FS	63-3300 FS, M12, 3 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	790	16-Jan-20	03-Feb-22	464																				
539	6.03.5	63-3500 Perimeter Channel (X10A) at Cell 2 Western Bund	15	09-Jan-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 OP3	10	25-Jan-22	03-Feb-22	464	63-3900 FS, 63-3900 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 Butress Wall	30	09-Jun-21	08-Jul-21	419	63-2900 SS, 40	63-3000 FS																		
546	6.03.5	63-4200 Temporary Channel (XT) 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 M11 to Existing LIC-625	60	07-Sep-21	20-Oct-21	529	23-1900 FS, 11-1300 FS, 62-1000 FS	63-4400 FS																		
549	6.03.6	63-4400 Divert OCV at M11 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 Reconnect of GWP 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 Undertakers	255	15-Nov-20	27-Jul-21	655																				
552	SA2.6.03.8.1	CLP	210	20-Dec-20	27-Jul-21	655																				
553	6.03.8.U1	63-4600 LFG Generator Ongrid Testing	180	30-Dec-20	27-Jun-21	655	32-2000 FS, 12-1200 FS, 64-4000 FS	63-4700 FS																		
554	6.03.8.U1	63-4700 LFG Generator Ongrid Inspection & Verify	30	28-Jun-21	27-Jul-21	655	63-4600 FS	12-1900 FS																		
555	SA2.6.03.8.2	TownGas	55	15-Nov-20	08-Jan-21	855																				
556	6.03.8.U2	63-4800 Laying Gas Mains (from LFG to Town Gas PP)	45	15-Nov-20	29-Dec-20	855	64-4000 FF	63-4900 FS																		
557	6.03.8.U2	63-4900 Gas Meter Relocation & Connection at LFG	10	30-Dec-20	08-Jan-21	855	63-4800 FS, 64-4000 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.1	LFG Treatment Plant	661	01-Oct-19	22-Jul-21	660																				
561	6.04.C.02	64-1000 (4000) Storage 01 C Relocation	15	06-Jul-21	02-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	Landscaping 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	03-Apr-19	1264	14-1300 FS	68																		



ANNEX B

ENVIRONMENTAL MITIGATION
IMPLEMENTATION SCHEDULE

ANNEX B ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

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

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

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		fragments and material resulting from blasting									
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		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Rock drilling is not required in the latest landfill design
4.8.1	AQ3	<u>Site Access Road</u> <ul style="list-style-type: none"> The main haul road will be kept clear of dusty materials or sprayed with water. The main haul road will be paved with aggregate or gravel. Vehicle speed will be limited to 10kph. 	To minimise potential dust nuisance	Main haul road	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ4	<u>Stockpiling of Dusty Materials</u> <ul style="list-style-type: none"> Any stockpile of dusty materials will be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides or sprayed 	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>	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⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		with water so as to ensure that the entire surface is wet.								<i>HKAQO and EIAO-TM Annex 4</i>	
4.8.1	AQ5	<u>Loading, unloading or transfer of dusty materials</u> <ul style="list-style-type: none"> All dusty materials will be sprayed with water immediately prior to any loading, unloading or transfer operation so as to maintain the dusty material wet. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ6	<u>Site Boundary and Entrance</u> <ul style="list-style-type: none"> Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of height not less than 2.4m from ground level will be provided along the entire length of that portion of the site boundary except for the site entrance or exit. 	To minimise potential dust nuisance	Site boundary and entrance	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.1	AQ7	<u>Excavation Works</u> <ul style="list-style-type: none"> Working area of any excavation or earth moving operation will be sprayed with water immediately before, during and immediately after the operation so as to ensure that the entire surface is wet. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ8	<u>Building Demolition</u> <ul style="list-style-type: none"> The area where the demolition works are planned to take place will be sprayed with water immediately prior to, during and immediately after the demolition activities. Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads or street. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.1	AQ9	<u>Construction of the Superstructure of Building</u> <ul style="list-style-type: none"> Effective dust screens, sheeting or netting will be provided to enclose the scaffolding from the ground level up to the highest level of the scaffolding. 	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i> <i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.1	AQ10	Should a stone crushing plant be needed on site, the control measures recommended in the <i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i> should be implemented.	To minimise potential dust nuisance	Stone crushing plant/ construction phase	SENTX Contractor		✓			<i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i>	Not applicable. Stone crushing plant is not required in the latest landfill design
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	To minimise potential dust nuisance	All construction works area	SENTX Contractor		✓			<i>HKAQO and EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		gaseous emissions.									
4.10.1	AQ12	Dust monitoring once every 6 days	Ensure the dust generated from the project meets the air quality requirement	At monitoring locations shown in <i>Figure 3.2a</i>	SENTX Contractor		✓			<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
Air Quality – Operation, Restoration and Aftercare Phases											
4.8.2	AQ13	<u>Odour</u> <ul style="list-style-type: none"> Enclosing the weighbridge area 	To minimise odour nuisance	Weighbridge area	SENTX Contractor	✓		✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, enclosing the weighbridge area is not necessary
4.8.2	AQ14	<ul style="list-style-type: none"> Providing a vehicle washing facility before the exit of SENTX and providing sufficient signage to remind RCV drivers to pass through the facility before leaving SENTX 	To minimise odour nuisance	Vehicle washing facility	SENTX Contractor	✓		✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ15	<ul style="list-style-type: none"> Reminding the RCV drivers to empty the liquor collection sump and close the valve before leaving 	To minimise odour nuisance	Tipping face	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		the tipping face									is relatively dry, the amount of liquor generated is expected to minimal
4.8.2	AQ16	<ul style="list-style-type: none"> Washing down the area where spillage of RCV liquor is discovered promptly 	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ17	<ul style="list-style-type: none"> Reminding operators to properly maintain their RCVs and ensure that liquor does not leak from the vehicles 	To minimise odour nuisance	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only, which is relatively dry, the amount of liquor generated is expected to minimal.
4.8.2	AQ18	<ul style="list-style-type: none"> Installation of landfill gas control system to enhance collection of landfill gas from the waste mass and hence minimise odour associated with fugitive landfill gas emissions 	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
4.8.2	AQ19	<ul style="list-style-type: none"> Progressive restoration of the areas which reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent landfill gas extraction system 	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓		✓	✓	EIAO-TM Annex 4	Implemented
4.8.2	AQ20	<ul style="list-style-type: none"> Installing deodorizers along the site boundary adjacent to the ASRs 	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor			✓	✓	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	<ul style="list-style-type: none"> Erecting a vertical barrier, wall or structure softened by planting rows of trees/shrubs or landscape feature along the site boundary, particularly in the areas near the ASRs 	To minimise odour nuisance	SENTX Site boundary	SENTX Contractor	✓		✓	✓	EIAO-TM Annex 4	Implemented
4.8.2 and SENTX latest design	AQ22	<ul style="list-style-type: none"> Maintaining the size of the active tipping face not greater than 1,200 m² 	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented

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						D	C	O/R	A		
4.8.2	AQ23	<ul style="list-style-type: none"> Promptly covering the MSW with soil or selected inert materials to control odour emissions 	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not receive MSW.
4.8.2	AQ24	<ul style="list-style-type: none"> Maintaining the size of the special waste trench not greater than 6m (l) x 2.5m (w) 	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	AQ25	<ul style="list-style-type: none"> Covering daily covered area with a tarpaulin sheet or 300mm of soil after the landfill operating hours 	To minimise odour nuisance	Daily covered area	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented
4.8.2	AQ26	<ul style="list-style-type: none"> Covering special waste trench with 600 mm of soil and an impervious liner after 5 pm 	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have any special waste trench.
4.8.2	AQ27	<ul style="list-style-type: none"> Covering the non-active tipping face with 600mm of soil and an impermeable liner (on top of the intermediate cover), which will not only control odour emissions from landfilled waste but also enhance landfill gas extraction by the landfill gas extraction system 	To minimise odour nuisance	Intermediate cover	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented

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						D	C	O/R	A		
4.8.2	AQ28	<ul style="list-style-type: none"> Applying deodorizers or odour suppression agents to control odour emissions from the active tipping face and special waste trench, if any, through spraying or fogging equipment 	To minimise odour nuisance	Active tipping face and special waste trench	SENTX Contractor			✓		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 trench.
4.8.2	AQ29	<ul style="list-style-type: none"> Providing a mobile cover with retractable or suitable opening to cover up the opening of the special waste trench except during waste deposition and a suitable odour removal unit. The mobile cover should be equipped with powered extraction and suitable odour removal unit for purifying the trapped gas inside the trench before release into the atmosphere 	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have any special waste trench.

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						D	C	O/R	A		
4.8.2 and SENTX latest design	AQ30	<ul style="list-style-type: none"> Providing a thermal oxidizer for the leachate treatment plant 	To minimise odour nuisance as a result of breakdown of thermal oxidizer	Leachate treatment plant	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.8.2 and SENTX latest design	AQ31	<ul style="list-style-type: none"> Enclosing all the leachate storage and treatment tanks (except for the Sequential Batch Reactor (SBR) or Membrane Bioreactor (MBR) tanks) and diverting the exhaust air from these tanks to a thermal oxidizer or flare to avoid potential odour emissions from the LTP 	To minimise odour nuisance	Leachate treatment plant	SENTX Contractor	✓		✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ32	<ul style="list-style-type: none"> Rescheduling of waste filling activities on-site by avoiding waste filling activities 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			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, rescheduling of waste filling activities is not necessary.
4.8.2 and SENTX latest design	AQ33	<u>Dust, Gaseous Emission and LFG including Volatile Organic Compounds (VOCs)</u>	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented

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						D	C	O/R	A		
		<ul style="list-style-type: none"> Keeping the main haul road to the waste filling area wet by regular watering; 									
4.8.2	AQ34	<ul style="list-style-type: none"> Compacting the exposed daily and intermediate covered areas well to avoid fugitive dust emission; 	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ35	<ul style="list-style-type: none"> Limiting the vehicle speed within SENTX site boundary; 	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ36	<ul style="list-style-type: none"> Providing vehicle washing bay to avoid vehicles carrying dust to public roads; 	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ37	<ul style="list-style-type: none"> Switching off the engine when the diesel-driven equipment is idling; 	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ38	<ul style="list-style-type: none"> Maintaining the construction equipment properly to avoid any black smoke emissions; 	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ39	<ul style="list-style-type: none"> Providing sufficient underground landfill gas collection system to capture the landfill gas 	To minimise gaseous emissions,	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 4</i>	Implemented

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						D	C	O/R	A		
		generated as much as possible; and	including LFG and VOCs								
4.8.2	AQ40	<ul style="list-style-type: none"> 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			✓	✓	<i>EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ41	<ul style="list-style-type: none"> Monitoring of ambient TSP once every 6 days 	Ensure the dust emission from the project meets the dust requirement	At monitoring locations shown in <i>Figure 11.3a</i>	SENTX Contractor		✓	✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ42	<ul style="list-style-type: none"> Monitoring of ambient VOCs, ammonia and H₂S, quarterly 	Ensure the gaseous emission from the project meets the air quality requirement	At monitoring locations shown in <i>Figure 11.3a</i>	SENTX Contractor			✓	✓	Odour thresholds or 1% of Occupational Exposure Limit (OEL) as stipulated in the "UK Health and Safety Executive (HSE) EH 40/05 Occupational Exposure Limits", whichever is lower.	Implemented

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						D	C	O/R	A		
4.10.2 and SENTX latest design	AQ43	<ul style="list-style-type: none"> Monitoring of parameters for thermal oxidizer, flares and generator in accordance with requirements stated in Tables 3.4a, 3.5a and 3.6a of the EM&A Manual respectively. 	Ensure the gaseous emission from the project meets the air quality requirement	At the flares and thermal oxidizer stacks when they are in operation	SENTX Contractor			✓	✓ ⁽²⁾	Emission Limits specified in Contract	Implemented
4.10.2	AQ44	<ul style="list-style-type: none"> 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 	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

⁽²⁾ For LFG flare and LFG generator only.

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						D	C	O/R	A		
		of the thermal oxidiser could be discontinued.									
4.10.2 and SENTX latest design	AQ45	<ul style="list-style-type: none"> Odour patrol in accordance with requirements stated in Table 3.7a of the EM&A Manual. 	Ensure the odour emission from the project meets the odour requirement	Along SENTX Site boundary	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.10.2	AQ46	<ul style="list-style-type: none"> Monitoring of meteorological station, continuously 	Collect site specific meteorological data	At meteorological station shown in <i>Figure 11.3a</i>	SENTX Contractor		✓	✓	✓	-	Implemented
Noise – Construction Phase											
5.7.1	N1	<p>Adopt good site practice listed below:</p> <ul style="list-style-type: none"> Only well-maintained plant will be operated on-site and plant should be serviced regularly during the construction program; Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program; Mobile plant, if any, will be sited as far from NSRs as 	To minimise potential construction noise nuisance.	All construction works area	SENTX Contractor		✓			<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<p>possible;</p> <ul style="list-style-type: none"> 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. 									
5.8	N2	Weekly noise monitoring	Ensure noise generated from the project meets the criteria	At monitoring locations shown in <i>Figure 6.4a</i>	SENTX Contractor		✓			<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented

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						D	C	O/R	A		

Noise – Operation/Restoration Phase

5.7.2	N3	Adopt good site practice listed below:	To minimise potential operational noise nuisance.	Within the SENTX Site	SENTX Contractor			✓	<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented
		<ul style="list-style-type: none"> Choose quieter PME; 							-	Implemented
		<ul style="list-style-type: none"> Include noise levels specification when ordering new plant items; 							-	Implemented
		<ul style="list-style-type: none"> Locate fixed plant items or noise emission points away from the NSRs as far as practicable; 							-	Implemented
		<ul style="list-style-type: none"> Locate noisy machines in completely enclosed plant rooms or buildings; and 							-	Implemented
		<ul style="list-style-type: none"> 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
5.8	N4	Weekly noise monitoring	Ensure noise generated from the project	At monitoring locations	SENTX Contractor			✓	<i>Noise Control Ordinance (NCO) and</i>	Implemented

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						D	C	O/R	A		
			meets the criteria	shown in Figure 6.4a					EIAO-TM Annex 5		
Water Quality – Construction Phase											
6.8.1	WQ1	<u>Construction Runoff</u> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Silt removal facilities, channels and manholes will be maintained and the deposited silt and grit should be removed regularly to ensure they are functioning properly at all times. 	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor		✓		ProPECC PN 1/94 WPCO EIAO-TM Annex 6	Deficiency of mitigation measures but rectified by the Contractor	
6.8.1	WQ4	<ul style="list-style-type: none"> Temporary covers such as tarpaulin will also be provided to minimise the 	To minimise potential water quality impacts arising from the	All construction works area	SENTX Contractor		✓		ProPECC PN 1/94 WPCO	Implemented	

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

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						D	C	O/R	A		
		site maintenance of machinery and equipment will be collected by a licensed chemical waste collector.	quality impacts arising from improper handling of fuel and oil							WPCO Waste Disposal Ordinance (WDO)	
6.8.1	WQ9	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&A Manual. 	To minimise potential water quality impacts on surface water arising from the construction works	SENTX Site	SENTX Contractor		✓			WPCO Water-TM	Implemented
6.8.2	WQ11	<p><u>Sewage Effluents</u></p> <ul style="list-style-type: none"> Sufficient chemical toilets will be provided for the construction workforce. 	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO	Implemented
6.8.2	WQ12	<ul style="list-style-type: none"> Untreated sewage will not be allowed to discharge into the surrounding water body. 	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor		✓			WPCO WDO	Deficiency of mitigation measures but rectified by the Contractor
6.8.2	WQ13	<ul style="list-style-type: none"> A licensed waste collector 	To minimise potential water	SENTX Site	SENTX Contractor		✓			WPCO	Implemented

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						D	C	O/R	A		
		will be employed to clean the chemical toilets on a regular basis.	quality impacts arising from the sewage effluents							WDO	
Water Quality – Operation/Restoration and Aftercare Phases											
6.9.1	WQ14	<u>Surface Water Management</u> <ul style="list-style-type: none"> Inspections of the drainage system, sand 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	Deficiency of mitigation measures but rectified by the Contractor
6.9.1	WQ15	<ul style="list-style-type: none"> Regular maintenance and replacement, if required, of the HDPE liner will be conducted to prevent degradation from affecting the performance of the capping system. 	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.1	WQ16	<ul style="list-style-type: none"> Monitoring of surface water quality will be conducted on a regular 	To minimise potential water quality impacts on surface water	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented

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						D	C	O/R	A		
		basis as stated in the EM&A Manual.	arising from the landfill operations.								
6.9.2 and SENTX latest design	WQ17	<u>Groundwater Management</u> <ul style="list-style-type: none"> The groundwater management facilities including the groundwater monitoring wells will be inspected regularly during routine groundwater monitoring programme. 	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.2	WQ18	<ul style="list-style-type: none"> Monitoring of groundwater water quality will be conducted on a regular basis as stated in the EM&A Manual. 	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
SENTX latest design	WQ19	<u>Sewage</u> <ul style="list-style-type: none"> All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available. 	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
6.9.3	WQ20	<u>Leachate Management</u> <ul style="list-style-type: none"> The leachate pump houses and related ancillary 	To minimise potential water quality impacts on surrounding	Leachate pump houses and related	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented

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						D	C	O/R	A		
		equipment will be inspected regularly and repairs, if necessary.	water bodies arising from the landfill operations.	ancillary equipment							
6.9.3	WQ21	<ul style="list-style-type: none"> For equipment such as pumps that require routine scheduled maintenance, the maintenance will be performed following manufacturer's recommended frequency. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate pumps	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.9.3	WQ22	<ul style="list-style-type: none"> Preventive maintenance will be implemented so that the possibility for forced shutdown during wet season will be kept to minimal. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.9.3	WQ23	<ul style="list-style-type: none"> Emergency procedures or a contingency plan will be established when the LTP is malfunctioned. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented

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						D	C	O/R	A		
6.9.3 and SENTX latest design	WQ24	<ul style="list-style-type: none"> There will be sufficient redundancy in the system to handle the leachate flow even if one treatment train is down for maintenance. The leachate may be required to temporarily store within the landfill if the leachate storage lagoon are full and leachate cannot be transported to the LTP for treatment. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.13	WQ25	<ul style="list-style-type: none"> Monitor the quality of effluent discharged from the LTP 	To ensure discharge quality comply with WPCO requirement	Leachate treatment plant discharge point	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.10.1	WQ26	<p><u>Potential Leakage of Leachate</u></p> <ul style="list-style-type: none"> Regular groundwater quality monitoring will be carried out to monitor the performance of the leachate containment system. 	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented
6.10.1	WQ27	<ul style="list-style-type: none"> Maintenance and replacement of the capping system should be 	To minimise potential water quality impacts on surrounding	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM	Implemented

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						D	C	O/R	A		
		carried out, if necessary, to prevent control infiltration and leachate seepage from any damaged cap.	water bodies arising from the leachate leakage.							EIAO-TM Annex 6	
6.10.1	WQ28	<ul style="list-style-type: none"> Maintaining control of the leachate level through extraction 	To minimise potential water quality impacts on surrounding water bodies arising from surface breakout of leachate.	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
Waste Management – Construction Phase											
7.6.1	WM1	All the necessary waste disposal permits are obtained prior to the commencement of construction work.	To ensure compliance with relevant statutory 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	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	Implemented

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						D	C	O/R	A		
		<p>disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor.</p> <p>A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.</p>								<p>No.31/2004; and Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)</p>	

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						D	C	O/R	A		
7.6.1	WM3	<p><u>Measures for the reduction of construction waste generation</u></p> <p>Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.</p>	To reduce construction waste generation	SENTX Site	SENTX Contractor		✓			WDO EIAO-TM Annex 7	Implemented
7.6.1	WM4	<p><u>Chemical Waste</u></p> <p>The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>.</p>	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor		✓			WDO <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
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 latest design	WM6	<u>General Refuse</u> General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to a transfer station or other landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts. Recycling bins will be provided at strategic	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor		✓			WDO EIAO-TM Annex 7	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⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.									
7.6.1	WM7	<u>Staff Training</u> At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓				Implemented
7.8	WM8	<u>Environmental Monitoring & Audit Requirements</u> Weekly audits of the waste management practices will be carried out during the construction phase. The audits examine all aspects of waste management including	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor		✓		WDO		Implemented

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						D	C	O/R	A		
		waste generation, storage, recycling, transport and disposal.									
Waste Management – Operation/Restoration Phase											
7.6.2 and SENTX latest design	WM9	<u>Sludge</u> In case off-site disposal is required, the Contractor will ensure that sludge generated from the LTP will be delivered in closed container to other waste disposal facility e.g. other landfills or a sludge treatment facility, for proper disposal on a daily basis.	To ensure proper handling of sludge	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Not applicable
7.6.2	WM10	<u>Chemical Waste</u> The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7 <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented

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						D	C	O/R	A		
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. Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Implemented

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						D	C	O/R	A		

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 <i>Landfill Gas Hazard Assessment Guidance Notes (the Guidance Note)</i> . Those precautionary measures applicable to the SENTX will be confirmed in the detailed Qualitative Landfill Gas Hazard Assessment to be submitted by the contractor.	To protect workers from landfill gas risk	All construction works area	SENTX Contractor		✓			<i>Paragraphs 8.3 to 8.49 of EPD's Landfill Gas Hazards Assessment Guidance Note EIAO-TM Annex 7</i>	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	To protect workers from landfill gas risk	Confined space within the construction works area	SENTX Contractor		✓				Implemented

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						D	C	O/R	A		
		<p>Paragraphs 8.23 to 8.28 of EPD's <i>Guidance Note</i> will be followed.</p> <p>In the event of the trigger levels being exceeded, it is recommended that a person, such as the Safety Officer, is nominated, with deputies, to be responsible for dealing with any emergency which may occur due to landfill gas. In an emergency situation, the nominated person, or his deputies, shall have the necessary authority and shall ensure that the confined space is evacuated and the necessary works implemented for reducing the concentrations of gas. The appropriate organisations shall be contact.</p>									
8.6.3	LFG4	Implementation of engineering measures	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor	✓	✓	✓	✓	<i>EIAO-TM Annex 7</i>	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		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.									
8.6.3	LFG5	Engineering measures to significant engineering measures will be required in the design of the SENTX to protect the staff working in the infrastructure area. These measures include a combination of passive and active systems (examples are recommended in EPD's <i>Guidance Notes</i>). Landfill gas monitoring boreholes will be installed at the edge of the waste slope between the waste and the new infrastructure area to	To protect workers from landfill gas risk	Infrastructure Area	SENTX Contractor	✓	✓		<i>EPD's Landfill Gas Hazards Assessment Guidance Note EIAO-TM Annex 7</i>	Implemented	

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		monitor the migration of landfill gas, if any.									
Landfill Gas Hazards – Operation, Restoration and Aftercare Phases											
8.6.4	LFG7	To train and ensure staff to take appropriate precautions at all times when entering enclosed spaces or plant rooms. Undertake regular monitoring of landfill gas at the perimeter boreholes to detect if there are any signs of off-site landfill gas migration. Prepare and implement emergency plan in case off-site landfill gas migration is detected. A permanent gas monitoring system with alarm will be installed and operated in all occupied on-site buildings.	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor			✓	✓	Landfill Gas Hazards Assessment Guidance Note	Implemented
8.7 and SENTX latest design	LFG8	<u>Environmental Monitoring & Audit Requirements</u> Undertake regular monitoring of landfill gas within the	To protect workers from landfill gas risk	Within the SENTX and along the SENTX boundary	SENTX Contractor			✓	✓	Landfill Gas Hazards Assessment Guidance Note	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		SENTX and along the SENTX boundary as required by the Contract Specification.									
Ecology – Construction Phase											
9.10.2	EC1	Measures to control construction runoff: <ul style="list-style-type: none"> Exposed soil areas will be minimised to reduce the contamination of runoff and erosion; 	To 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
		<ul style="list-style-type: none"> To prevent stormwater runoff from washing across exposed soil surfaces, perimeter channels will be constructed in advance of site formation works and earthworks and intercepting channels will be provided for example along the edge of excavation; 								-	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Temporary covers such as tarpaulin will also be provided to minimise the generation of high suspended solids runoff; 								-	Implemented
		<ul style="list-style-type: none"> The surface runoff contained any oil and grease will pass through the oil interceptors; and, 								-	Implemented
		<ul style="list-style-type: none"> 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

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						D	C	O/R	A		
9.10.2 and SENTX latest design	EC2	<u>Good Construction Practice:</u> <ul style="list-style-type: none"> Fences along the boundary of the SENTX Site will be erected before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas. The work site boundaries will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas. 	To minimise potential ecological impacts arising from the Project	SENTX Site	SENTX Contractor		✓			EIAO-TM Annex 16	Reminder was given to the Contractor
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	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

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						D	C	O/R	A		
		migration of leachate to habitats in the vicinity.									
9.10.2	EC4	<p><u>Measures for Controlling Migration of Landfill Gas</u></p> <p>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.</p>	To minimise potential landfill gas migration affecting ecological resources	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Implemented
9.10.3 and SENTX latest design	EC5	<p>The following compensation planting is recommended as the mitigation measures for the habitat affected due to the SENTX:</p> <ul style="list-style-type: none"> Provision of 6 ha of mixed woodland planting 	Compensation of habitat loss due to the Project	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Not applicable

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						D	C	O/R	A		
		<p>to compensate the loss of shrubland; and</p> <ul style="list-style-type: none"> 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	Not applicable
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	To enhance ecological value of the habitats	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Not applicable

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						D	C	O/R	A		
		<p>in the restoration plan, which can establish well in coastal area with exposure to strong wind and salt spray, with sand soil base. Taking consideration of the relative poor substrate and the difficulties of establishment of some native trees in Hong Kong, it is recommended to include approximately 20% of non-native tree species in the compensatory woodland. The non-native tree species can serve as a nurse species to facilitate the establishment of the native tree species, especially the shading, and it can be replaced by established native tree species progressively. Plant species can also make reference to food plants of butterfly species (in particularly butterfly species of conservation interests</p>									

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						D	C	O/R	A		
		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 tune 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	To select the most suitable indigenous tree species for the SENTX	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⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		plants.									
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		✓	✓	✓	<i>EIAO-TM Annex 16</i>	Implemented
Landscape and Visual – Construction Phase											
10.6.5	LV1	CM1 - The construction area and area allowed for the contractor's office, leachate treatment plant and laboratory areas will be minimised to a practical minimum, to avoid impacts on adjacent landscape.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor		✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented
10.6.5	LV2	CM2 - Topsoil, where identified, will be stripped and stored for re-use in the construction of the soft	To minimise the landscape and visual impacts	All construction works area	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		landscape works, where practical. The Contract Specification will include storage and reuse of topsoil as appropriate.									
10.6.5	LV3	CM3 - All existing trees at the edges of the landfill will be carefully protected during construction. Detailed Tree Protection Specification will be provided in the Contract Specification. Under this Specification, the Contractor will be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in Contractor's works areas.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor		✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented
10.6.5	LV4	CM4 - Trees unavoidably affected by the works will be transplanted, where	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor	✓	✓			<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented

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						D	C	O/R	A		
		necessary and practical. A detailed Tree Transplanting Specification will be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods will be allowed in the project programme.									
10.6.5 and SENTX latest design	LV5	CM5 - Within 3 months of taking possession of the SENTX Site, the Contractor will plant advance screen planting of native species at Light Standard size at 1.5m centres along the High Junk Peak Trail so as to screen views of the Works from the trail. Tree planting locations will be agreed with AFCD. Works will be completed within 9 months of taking possession of the SENTX Site.	To minimise the landscape and visual impacts	At High Junk Peak Hiking Trail	SENTX Contractor		✓			<i>EIAO-TM Annex 18</i>	Implemented

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						D	C	O/R	A		
10.6.5	LV6	CM6 - The Contractor's office, leachate treatment plant and laboratory will be given an aesthetic treatment in earth tones to reduce their visual impact and albedo and blend them into the surrounding landscape.	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓			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

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5	LV8	CM8 - Planting trials will be carried out in an on-site nursery prior to implementation of the first phase of restoration to establish the best planting matrix and management intensity of the recommended plant materials for the restoration.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor		✓			EIAO-TM Annex 18	Implemented
11.4.1 and SENTX latest design	LV9	During the preparation of the detailed landscape design plan, the design submission will be audited against the recommendation proposed in the <i>ER Report</i> by the Registered Landscape Architect from the ET.	To ensure the implementation of mitigation measures proposed in this EIA Report	SENTX Site	SENTX Contractor/ET	✓	✓			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

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
10.6.5 and SENTX latest design	LV11	OM2 - Filling and restoration will be phased during the course of operations in a minimum of 4 phases, the restoration of each phase to commence immediately on the completion of filling in that phase.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV12	OM3 - Catch fences will be erected at the perimeter of the waste boundary, to ensure that all waste stays within the site and is not blown into surrounding areas.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
10.6.5	LV13	OM4 - All night-time lighting will be reduced to a practical minimum both in terms of number of units and lux level and will be hooded and directional.	To minimise the landscape and visual impacts	Tipping area	SENTX Contractor			✓		EIAO-TM Annex 18	Implemented
11.4.2 and SENTX latest design	LV14	<ul style="list-style-type: none"> The condition of the restoration plantation will be audited at monthly intervals by a Registered 	To check the restoration plantation	SENTX Site	SENTX Contractor/ET			✓		EIAO-TM Annex 18	Not applicable

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? ⁽¹⁾				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		Landscape Architect from the ET.									



ANNEX C

MONITORING SCHEDULE FOR THIS
REPORTING PERIOD

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

July 2023

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

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

August 2023

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 Groundwater Monitoring	2 Groundwater Monitoring Leachate Monitoring	3 Perimeter LFG Monitoring Perimeter LFG Bulk Gas Sampling	4 Service voids LFG Monitoring Surface Water Monitoring	5 Dust Monitoring
6	7 Noise Monitoring (10:00 - 10:30)	8	9	10	11 Dust Monitoring	12
13	14 Noise Monitoring	15 Stack Monitoring VOCs Monitoring	16 Stack Monitoring Flammable gas monitoring	17 Dust Monitoring Odour Monitoring	18	19
20	21	22	23 Dust Monitoring	24 Noise Monitoring	25	26
27	28	29 Dust Monitoring	30 Noise Monitoring	31		

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

September 2023

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



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/m ³)
6 Jul 23	8:00	7 Jul 23	8:00	Sunny	142
12 Jul 23	8:00	13 Jul 23	8:00	Sunny	117
18 Jul 23	8:00	19 Jul 23	8:00	Cloudy	157
24 Jul 23	8:00	25 Jul 23	8:00	Sunny	90
30 Jul 23	8:00	31 Jul 23	8:00	Cloudy	83
5 Aug 23	8:00	6 Aug 23	8:00	Sunny	112
11 Aug 23	8:00	12 Aug 23	8:00	Cloudy	68
17 Aug 23	8:00	18 Aug 23	8:00	Sunny	59
23 Aug 23	8:00	24 Aug 23	8:00	Fine	53
29 Aug 23	8:00	30 Aug 23	8:00	Cloudy	56
4 Sep 23	8:00	5 Sep 23	8:00	Sunny	113
10 Sep 23	8:00	11 Sep 23	8:00	Cloudy	29
16 Sep 23	8:00	17 Sep 23	8:00	Cloudy	37
22 Sep 23	8:00	23 Sep 23	8:00	Sunny	357
28 Sep 23	8:00	29 Sep 23	8:00	Sunny	343
Average					118
Min					29
Max					357

FIGURE D1.1 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM1

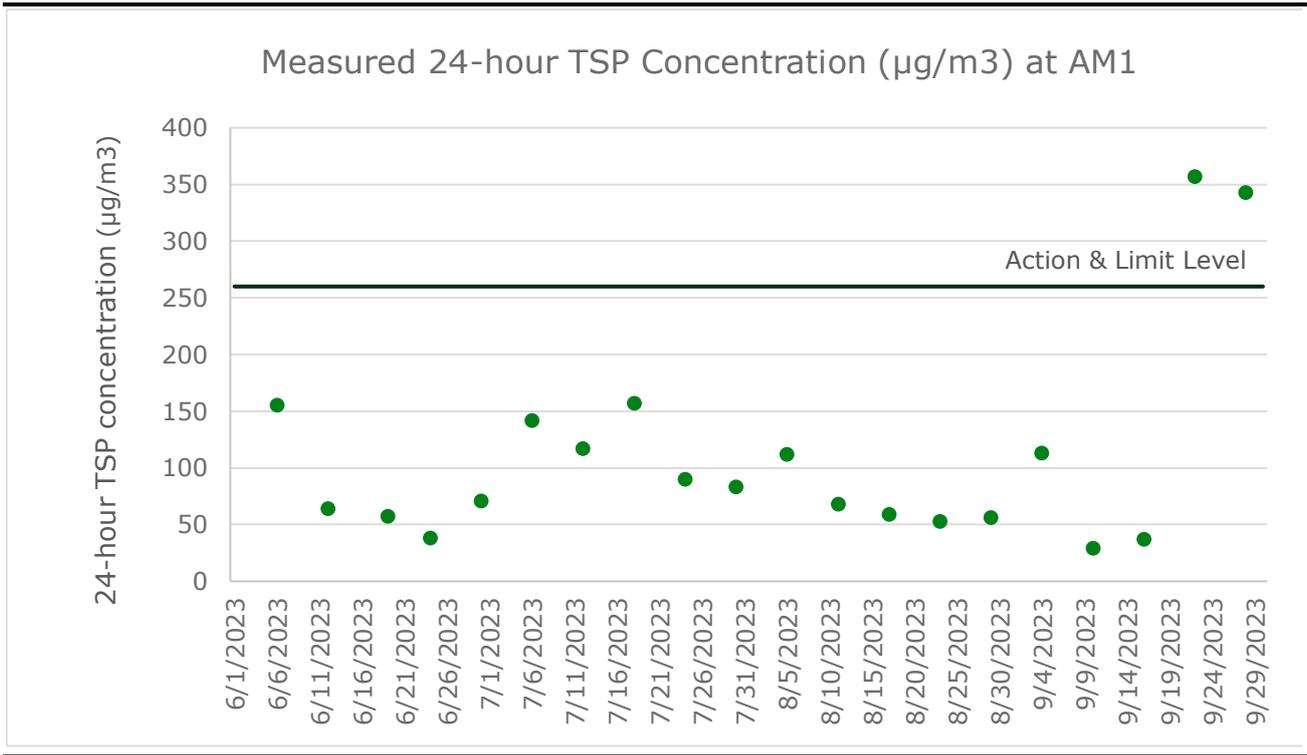


TABLE D1.2 24-HOUR TSP MONITORING RESULTS AT AM2

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m ³)
6 Jul 23	8:00	7 Jul 23	8:00	Sunny	157
12 Jul 23	8:00	13 Jul 23	8:00	Sunny	118
18 Jul 23	8:00	19 Jul 23	8:00	Cloudy	108
24 Jul 23	8:00	25 Jul 23	8:00	Sunny	135
30 Jul 23	8:00	31 Jul 23	8:00	Cloudy	80
5 Aug 23	8:00	6 Aug 23	8:00	Sunny	156
11 Aug 23	8:00	12 Aug 23	8:00	Cloudy	76
17 Aug 23	8:00	18 Aug 23	8:00	Sunny	103
23 Aug 23	8:00	24 Aug 23	8:00	Fine	113
29 Aug 23	8:00	30 Aug 23	8:00	Cloudy	154
6 Sep 23	8:00	7 Sep 23	8:00	Cloudy	123
10 Sep 23	8:00	11 Sep 23	8:00	Cloudy	51
16 Sep 23	8:00	17 Sep 23	8:00	Cloudy	43
22 Sep 23	8:00	23 Sep 23	8:00	Sunny	119
28 Sep 23	8:00	29 Sep 23	8:00	Sunny	196
Average					114
Min					43
Max					196

FIGURE D1.2 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM2

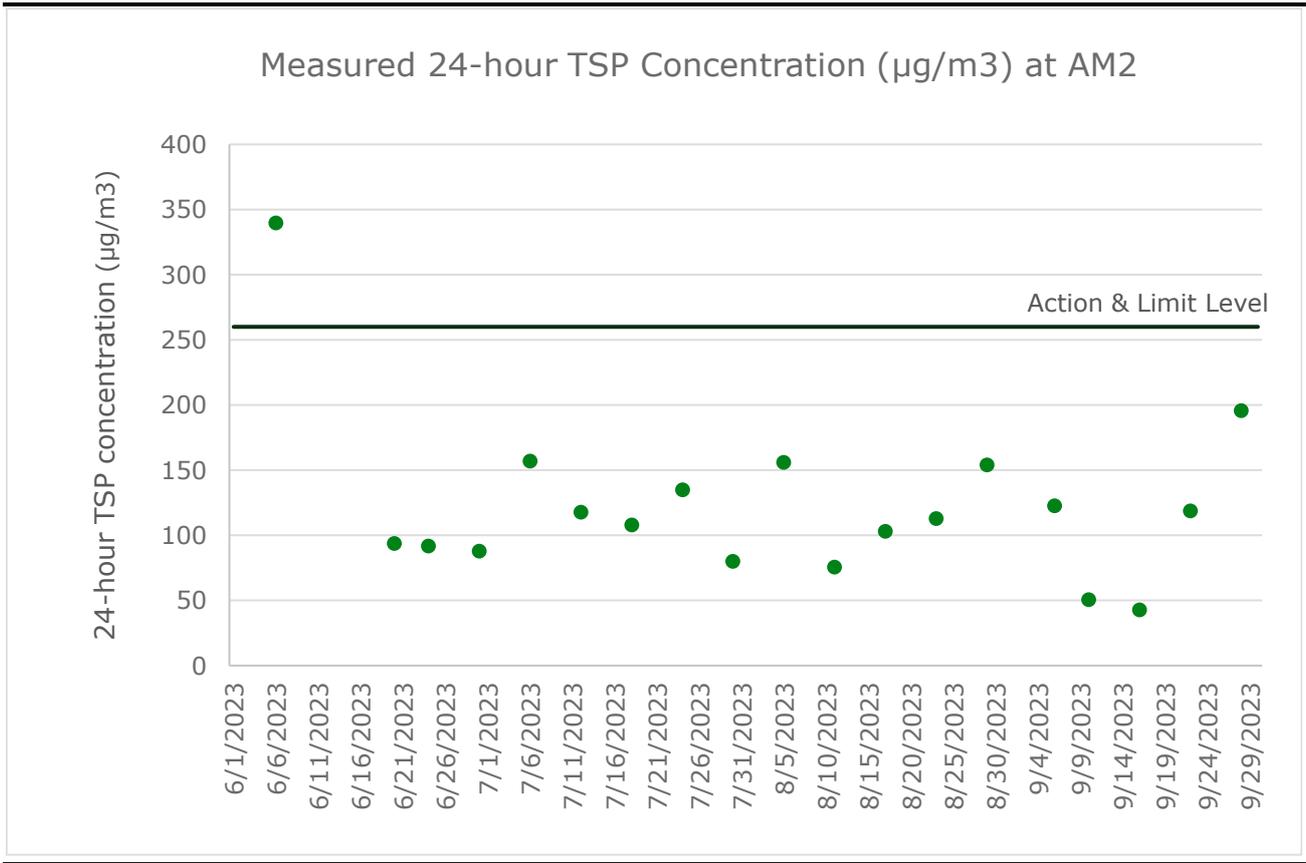


TABLE D1.3 24-HOUR TSP MONITORING RESULTS AT AM3

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m ³)
6 Jul 23	8:00	7 Jul 23	8:00	Sunny	90
12 Jul 23	8:00	13 Jul 23	8:00	Sunny	137
18 Jul 23	8:00	19 Jul 23	8:00	Cloudy	130
24 Jul 23	8:00	25 Jul 23	8:00	Sunny	143
30 Jul 23	8:00	31 Jul 23	8:00	Cloudy	81
5 Aug 23	8:00	6 Aug 23	8:00	Sunny	112
11 Aug 23	8:00	12 Aug 23	8:00	Cloudy	56
17 Aug 23	8:00	18 Aug 23	8:00	Sunny	125
23 Aug 23	8:00	24 Aug 23	8:00	Fine	75
29 Aug 23	8:00	30 Aug 23	8:00	Cloudy	115
4 Sep 23	8:00	5 Sep 23	8:00	Sunny	238
10 Sep 23	8:00	11 Sep 23	8:00	Cloudy	33
16 Sep 23	8:00	17 Sep 23	8:00	Cloudy	52
22 Sep 23	8:00	23 Sep 23	8:00	Sunny	144
28 Sep 23	8:00	29 Sep 23	8:00	Sunny	141
Average					109
Min					33
Max					238

FIGURE D1.3 GRAPHICAL PRESENTATION FOR 24-HR TSP MONITORING AT AM3

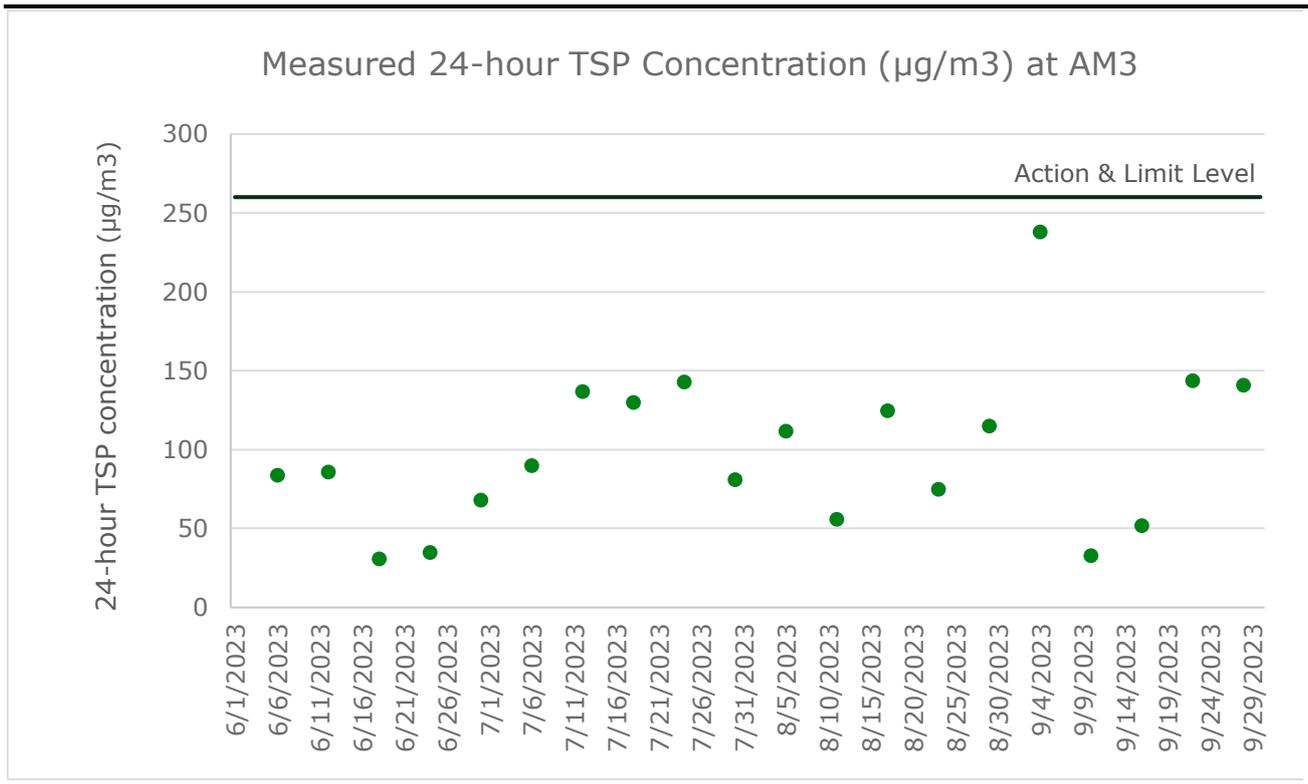
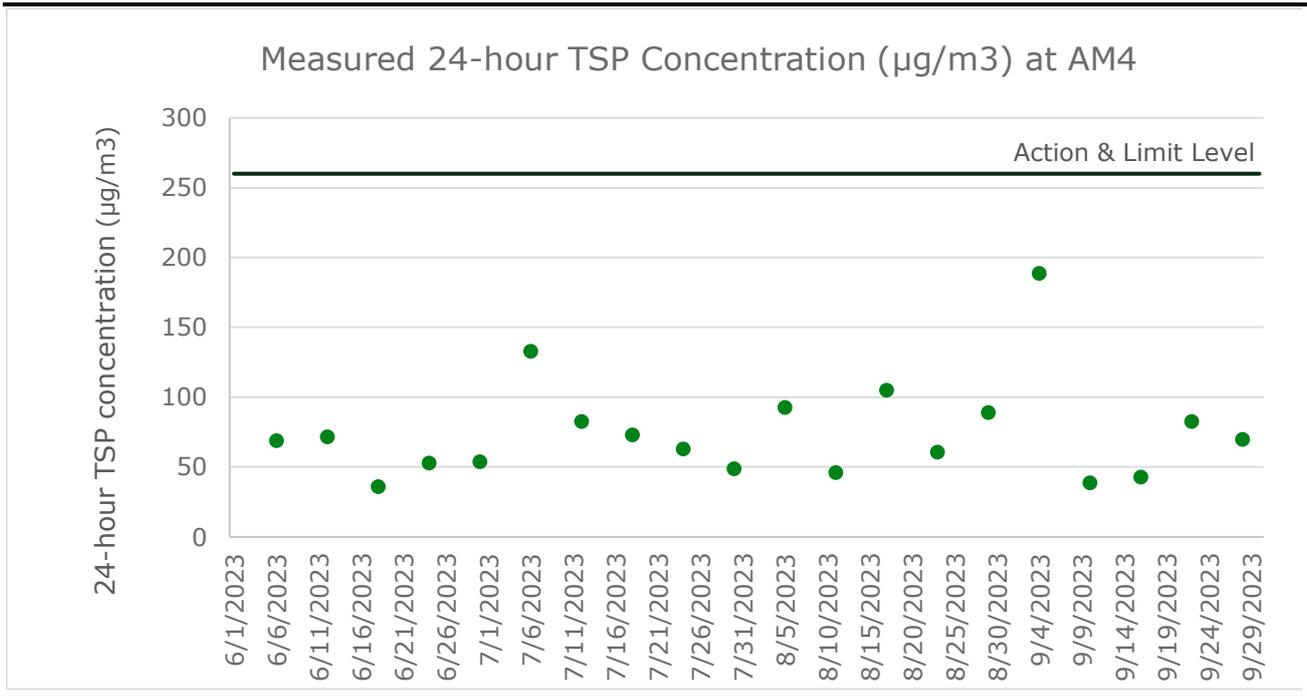


TABLE D1.4 24-HOUR TSP MONITORING RESULTS AT AM4

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP (µg/m ³)
6 Jul 23	8:00	7 Jul 23	8:00	Sunny	133
12 Jul 23	8:00	13 Jul 23	8:00	Sunny	83
18 Jul 23	8:00	19 Jul 23	8:00	Cloudy	73
24 Jul 23	8:00	25 Jul 23	8:00	Sunny	63
30 Jul 23	8:00	31 Jul 23	8:00	Cloudy	49
5 Aug 23	8:00	6 Aug 23	8:00	Sunny	93
11 Aug 23	8:00	12 Aug 23	8:00	Cloudy	46
17 Aug 23	8:00	18 Aug 23	8:00	Sunny	105
23 Aug 23	8:00	24 Aug 23	8:00	Fine	61
29 Aug 23	8:00	30 Aug 23	8:00	Cloudy	89
4 Sep 23	8:00	5 Sep 23	8:00	Sunny	189
10 Sep 23	8:00	11 Sep 23	8:00	Cloudy	39
16 Sep 23	8:00	17 Sep 23	8:00	Cloudy	43
22 Sep 23	8:00	23 Sep 23	8:00	Sunny	83
28 Sep 23	8:00	29 Sep 23	8:00	Sunny	70
Average					80
Min					39
Max					189

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	<ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Assess effectiveness of Contractor's remedial measures and keep the Project Proponent and IEC informed of the results Repeat measurement to confirm finding if exceedance is due to the Project Increase monitoring frequency to daily and continue until the monitoring results reduce to below action level 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance Submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Exceedance of Action Level for odour	<ul style="list-style-type: none"> Identify source(s) and investigate the cause(s) of exceedance or complaint Prepare the odour complaint form or the Notification of Exceedance within 24 hours Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures Ensure remedial measures are properly implemented Increase monitoring frequency to daily 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Check Contractor's working methods Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice Amend working methods as required Implement amended working methods, if necessary

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

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

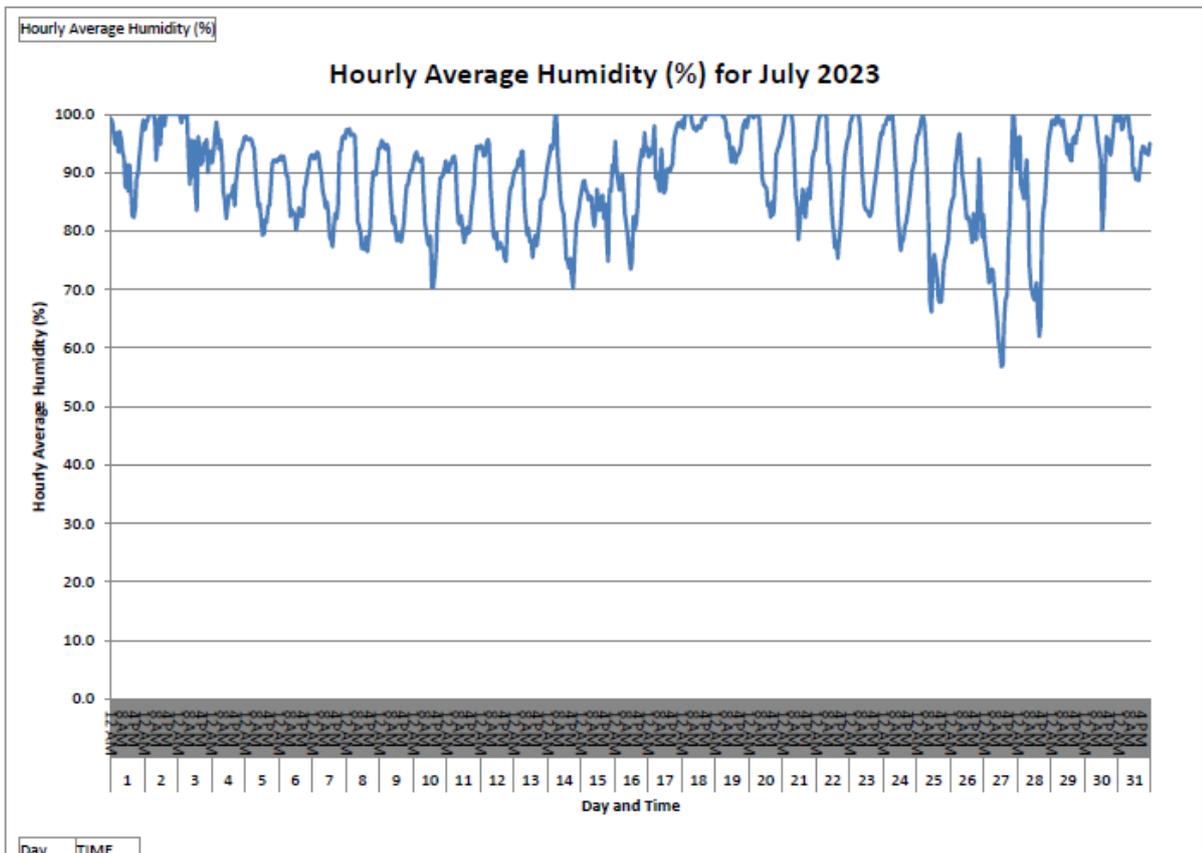
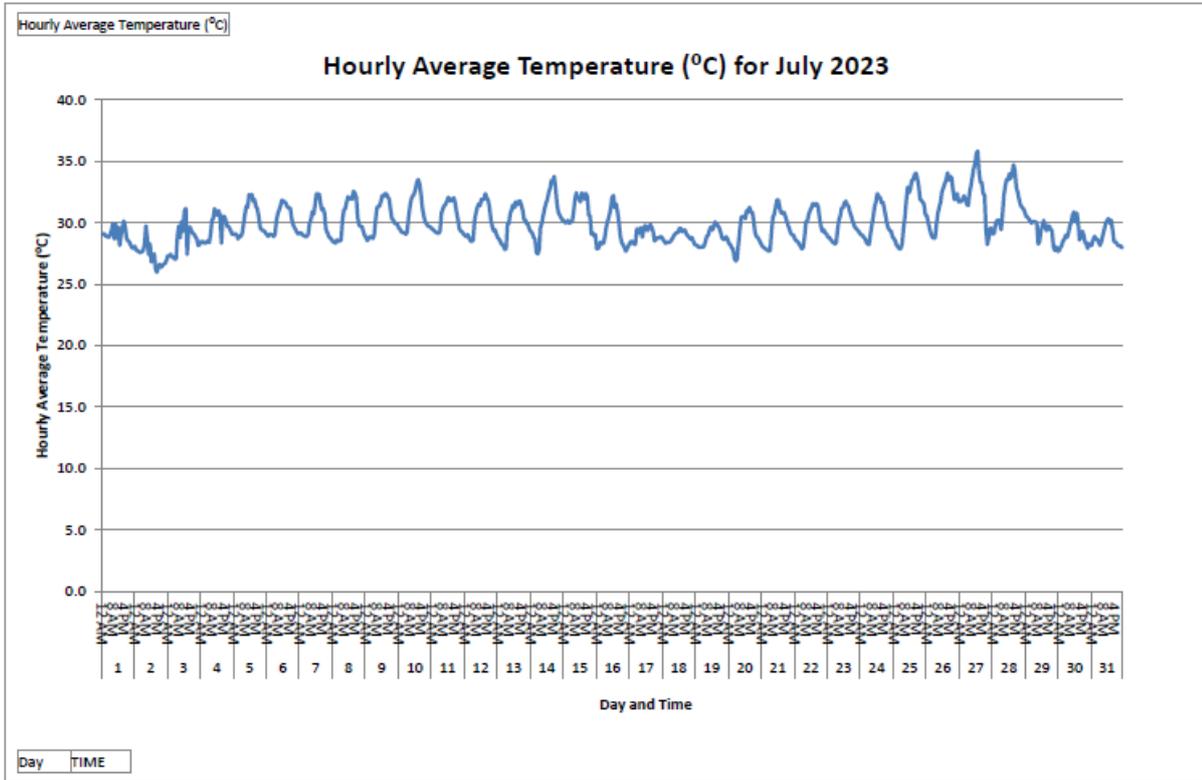


ANNEX D3

METEOROLOGICAL DATA

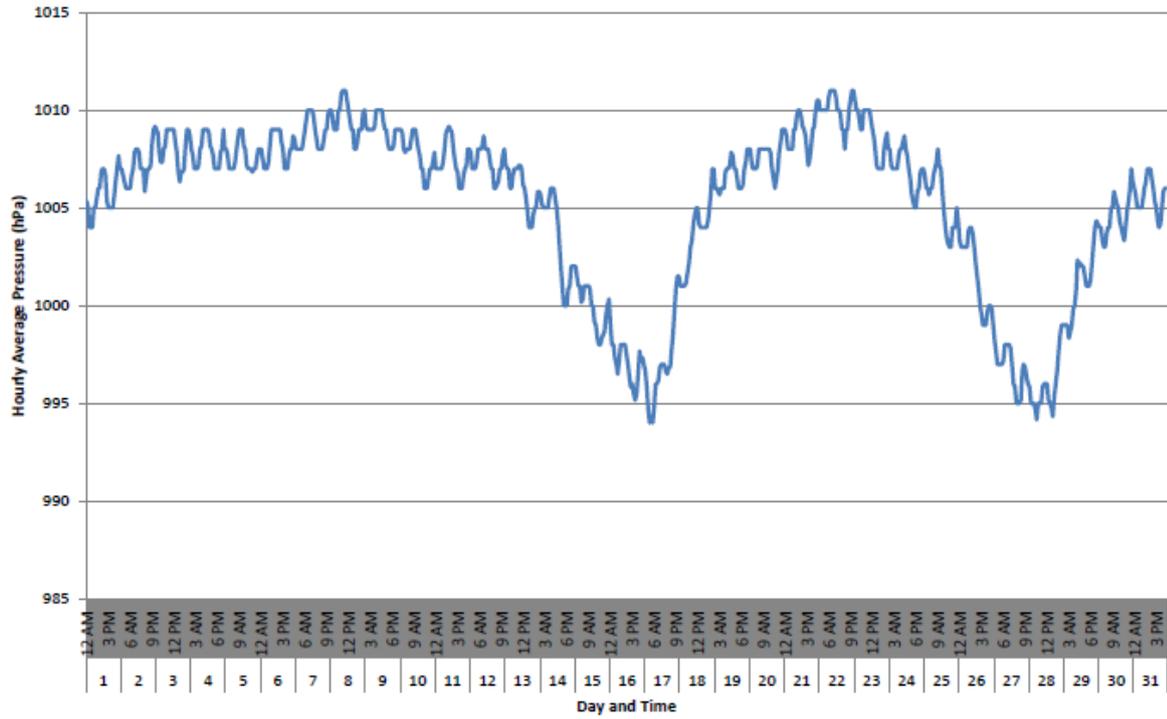
ANNEX D3 METEOROLOGICAL DATA

JULY 2023



Hourly Average Pressure (hPa)

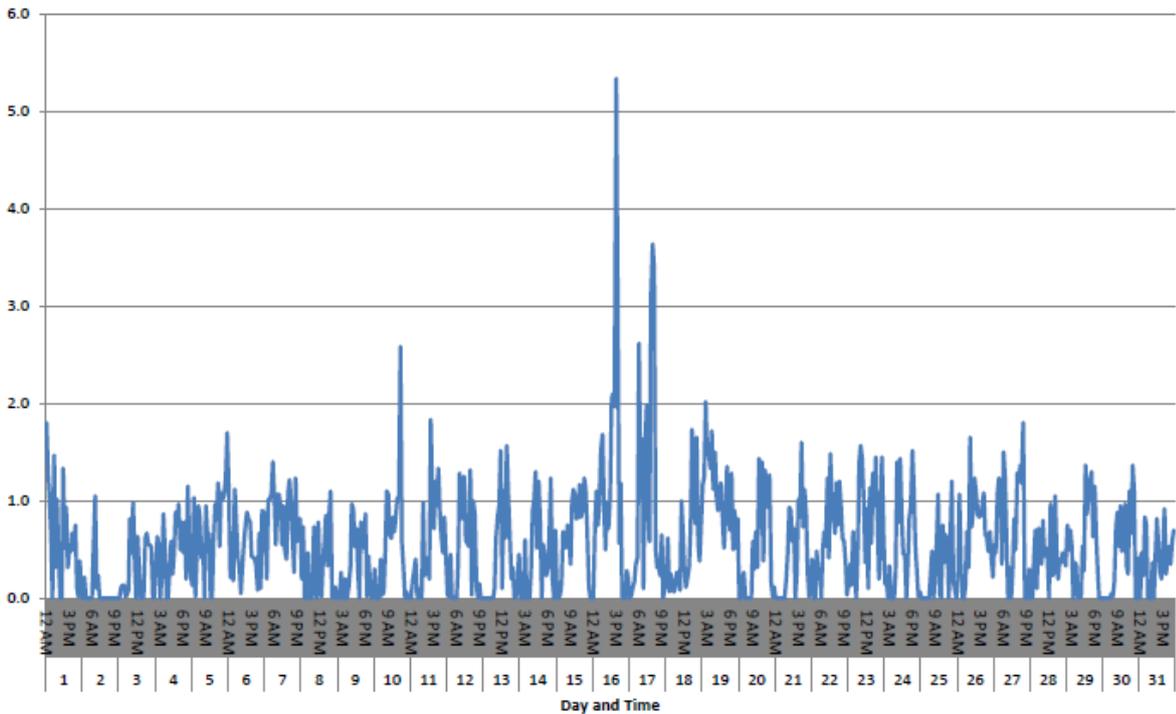
Hourly Average Pressure (hPa) for July 2023



Day TIME

Hourly Average Wind Speed (m/s)

Hourly Average Wind Speed (m/s) for July 2023

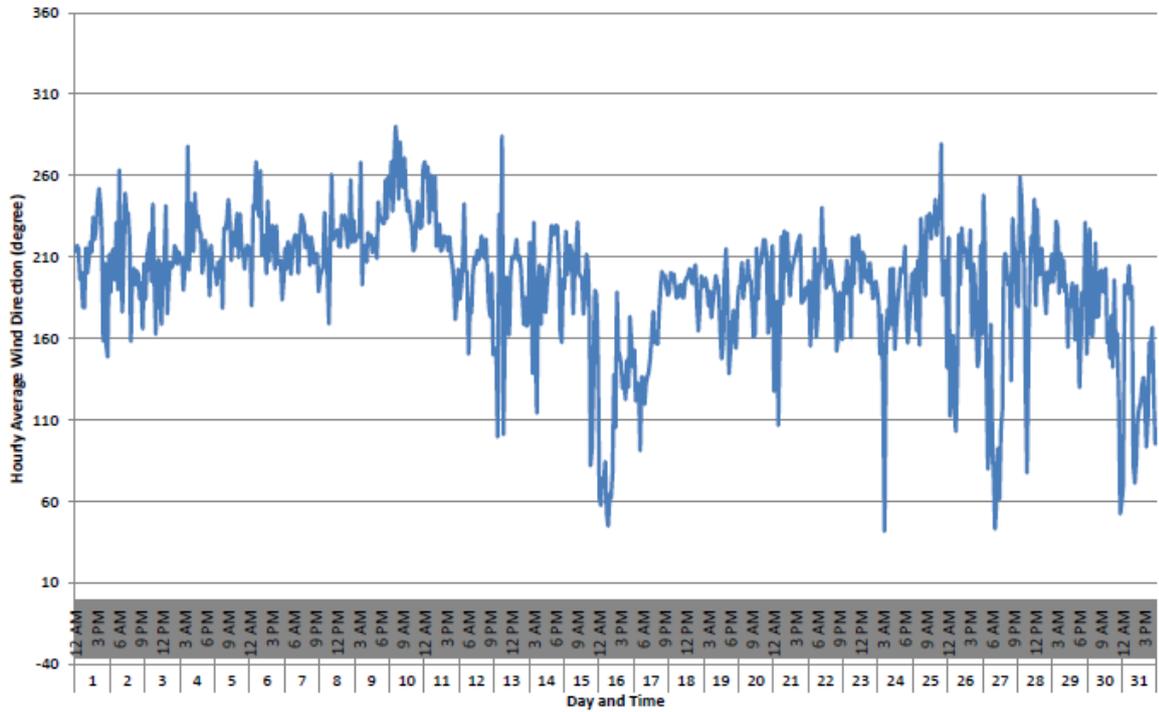


Day TIME



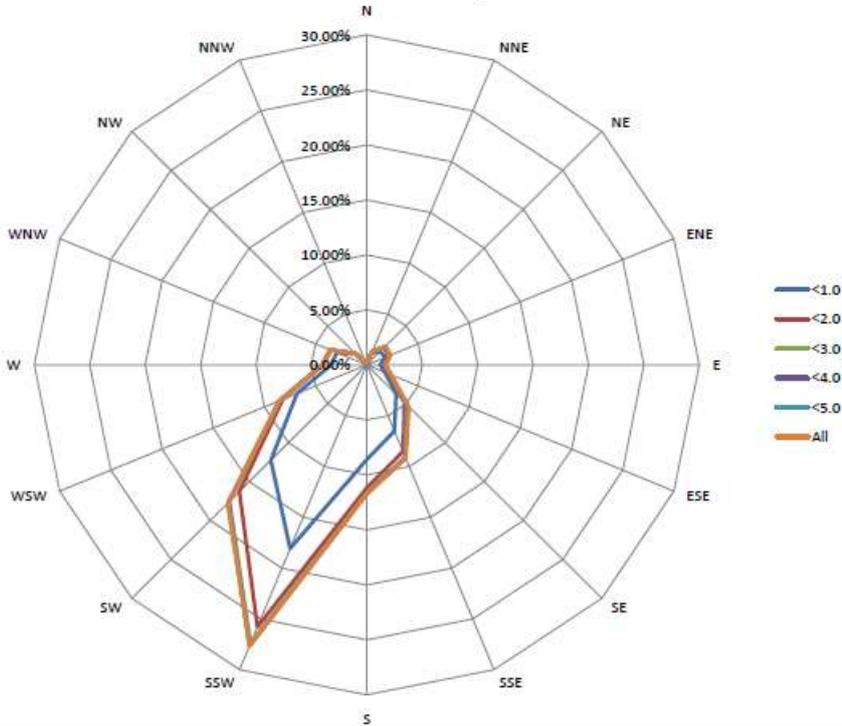
Hourly Average Wind Direction (degree)

Hourly Average Wind Direction (degree) for July 2023

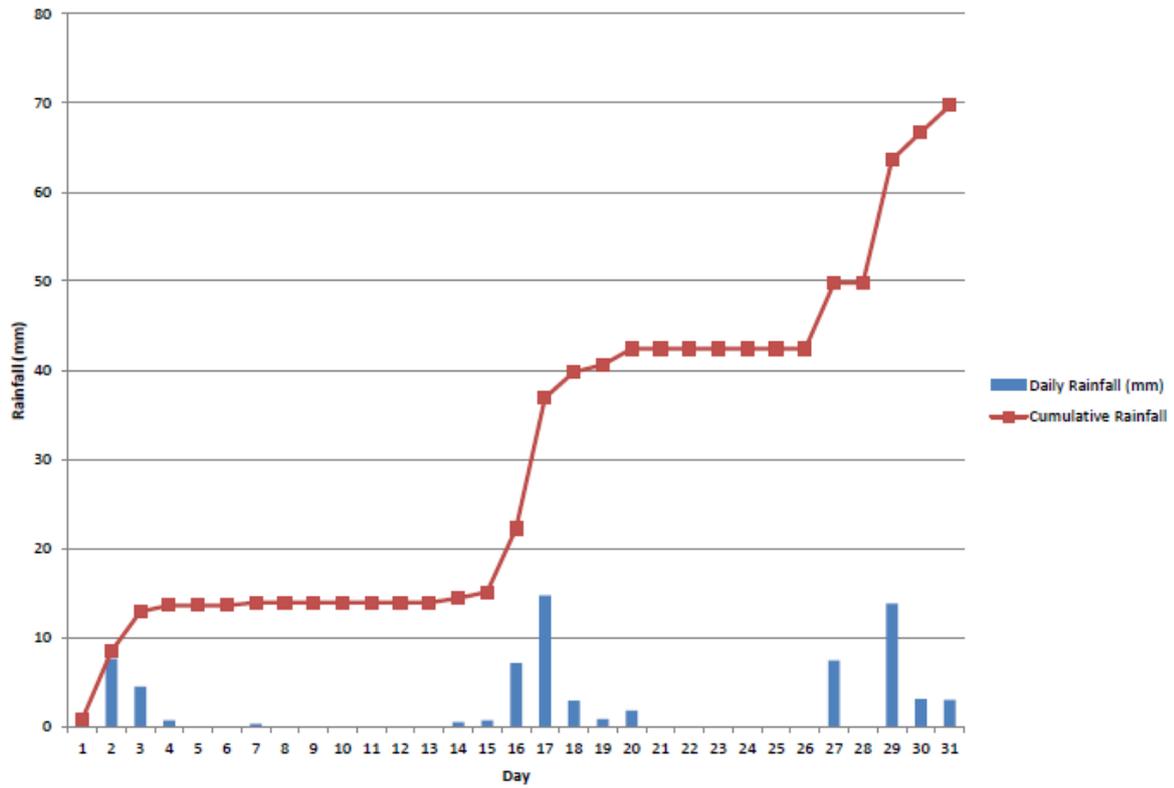


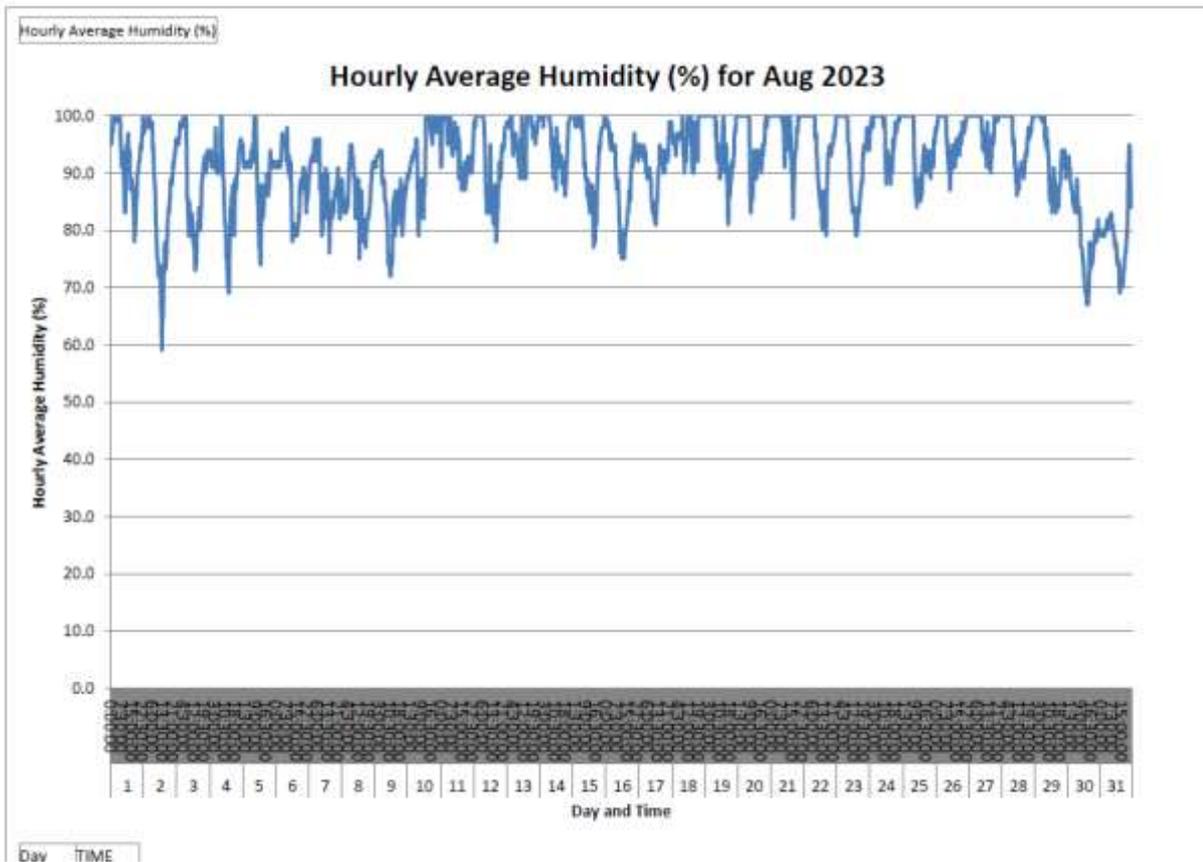
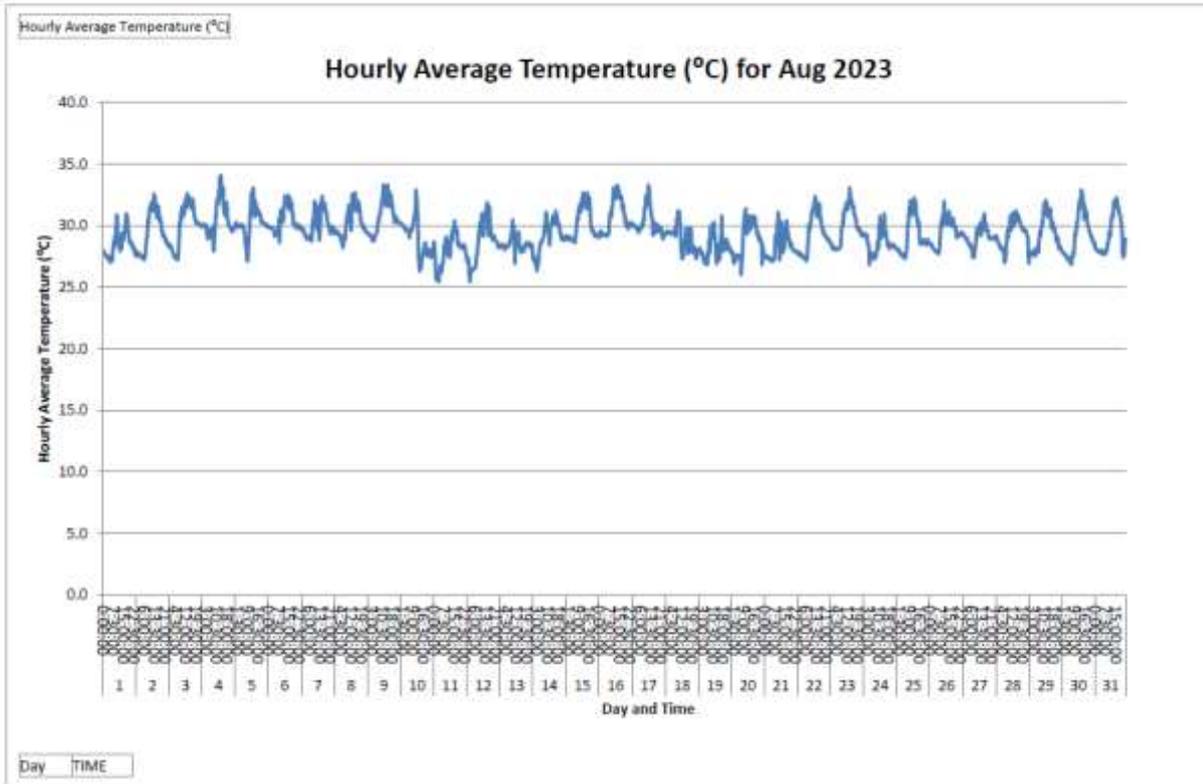
Day TIME

Wind Rose for July 2023



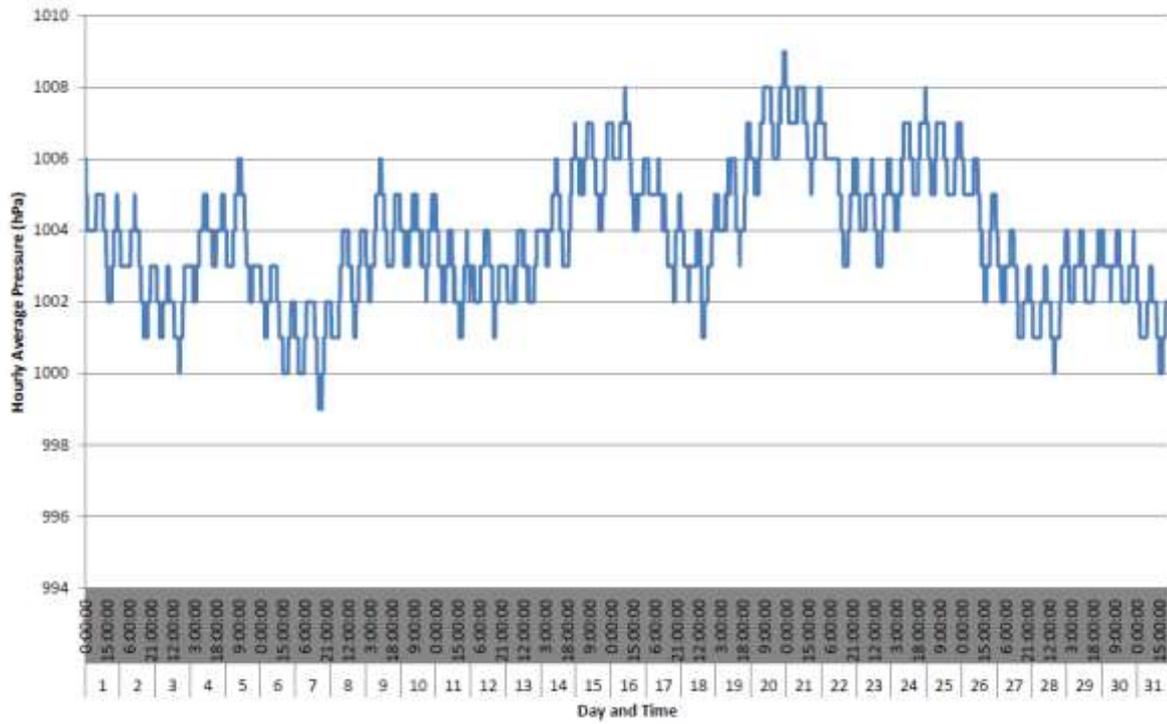
Daily and Cumulative Rainfall (mm) for July 2023





Hourly Average Pressure (hPa)

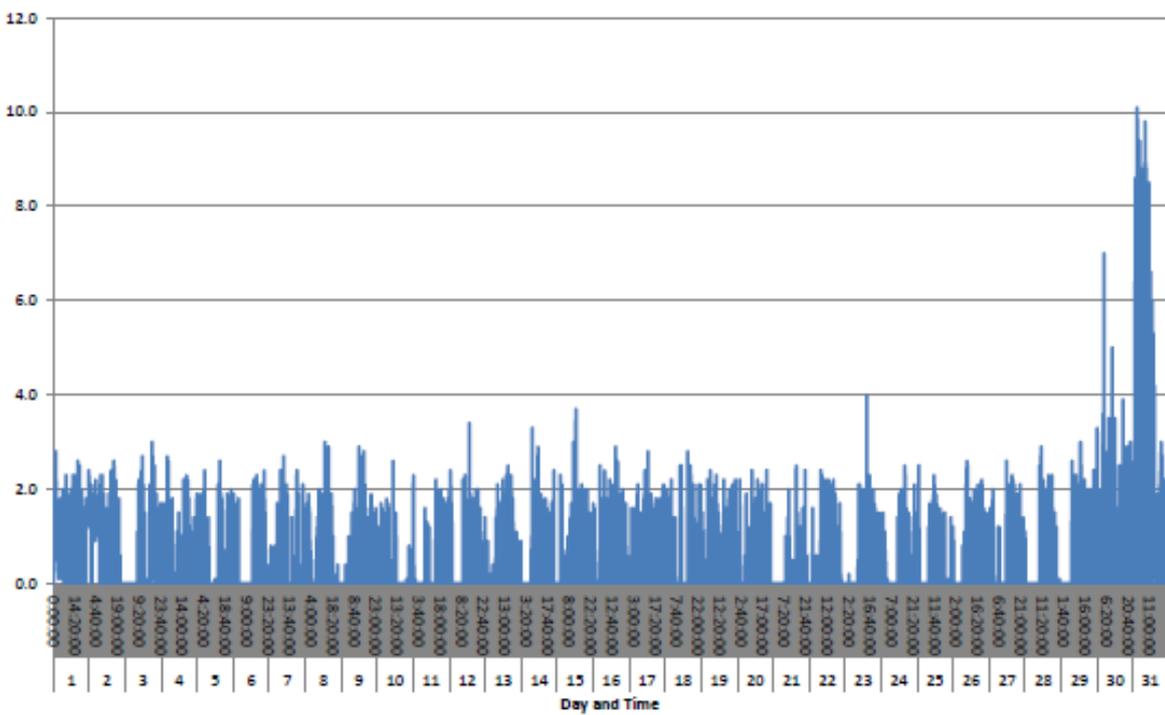
Hourly Average Pressure (hPa) for Aug 2023



Day TIME

Hourly Average Wind Speed (m/s)

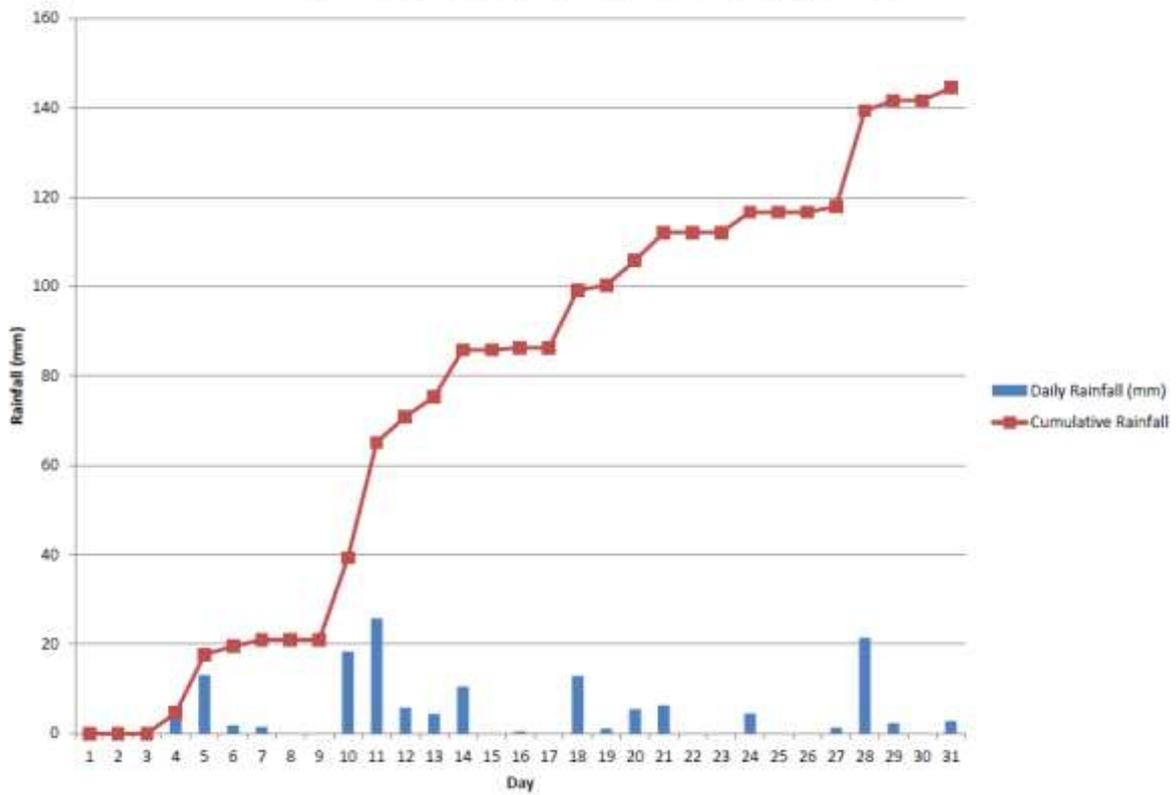
Hourly Average Wind Speed (m/s) for Aug 2023



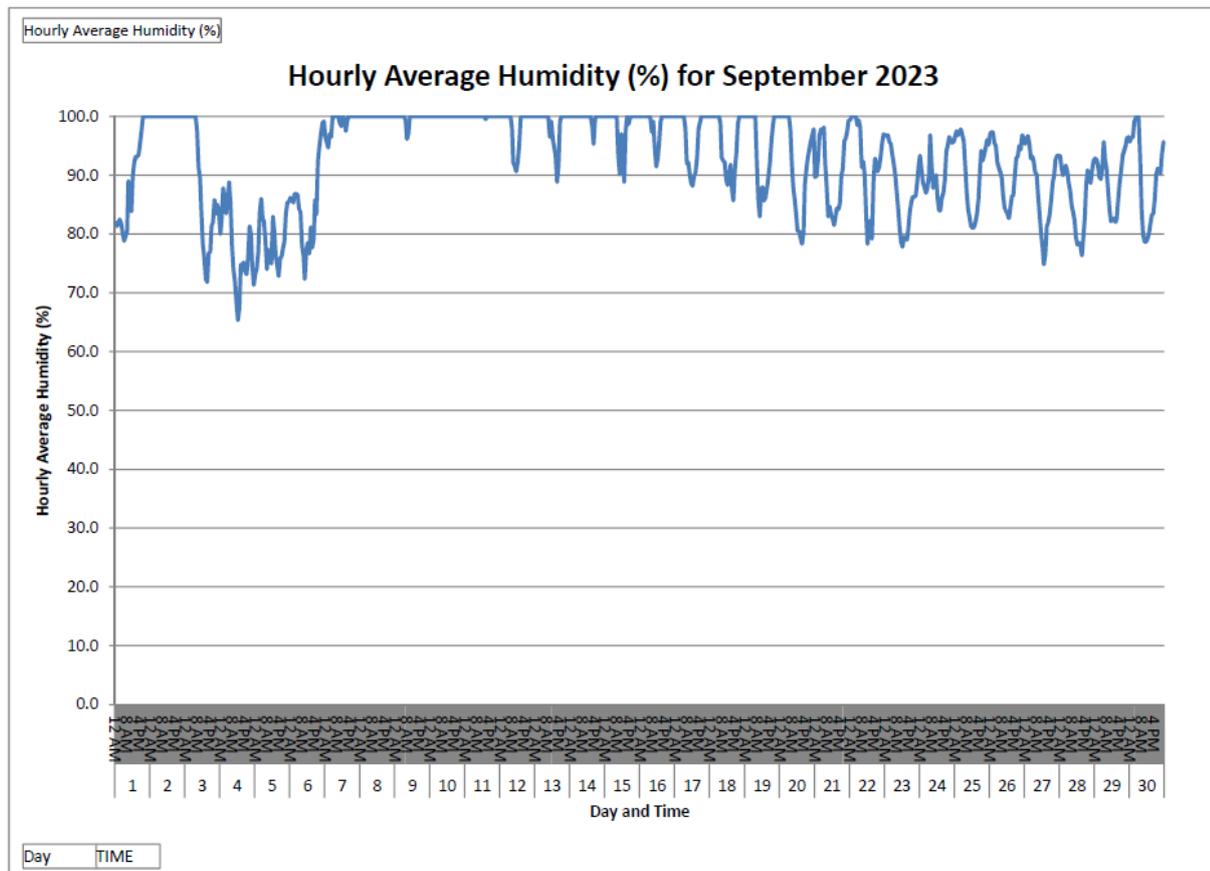
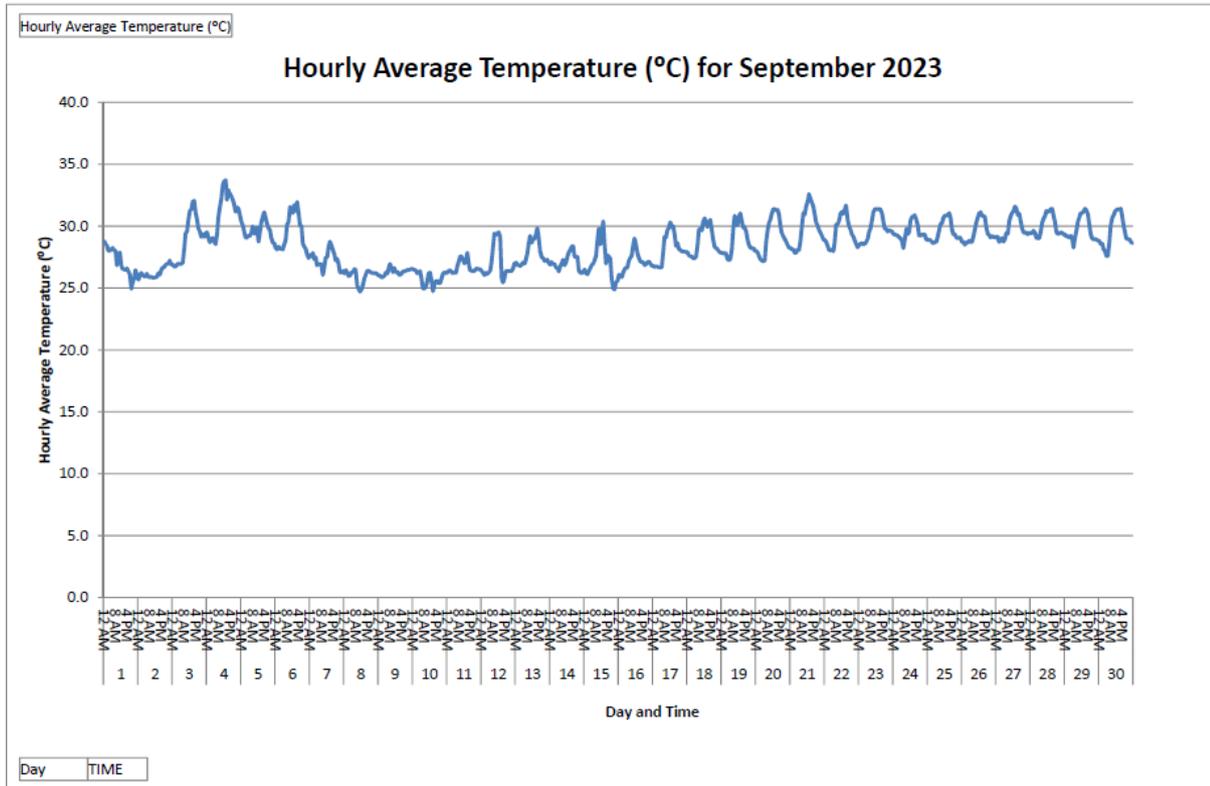
Day TIME



Daily and Cumulative Rainfall (mm) for Aug 2023

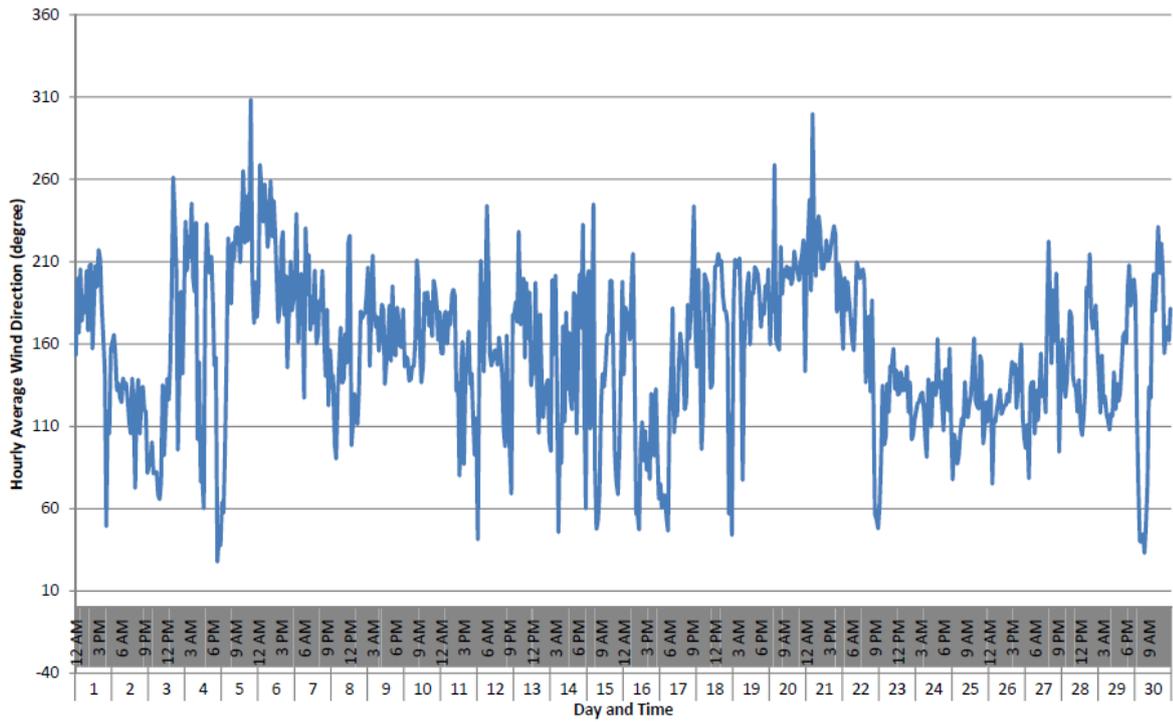


SEPTEMBER 2023



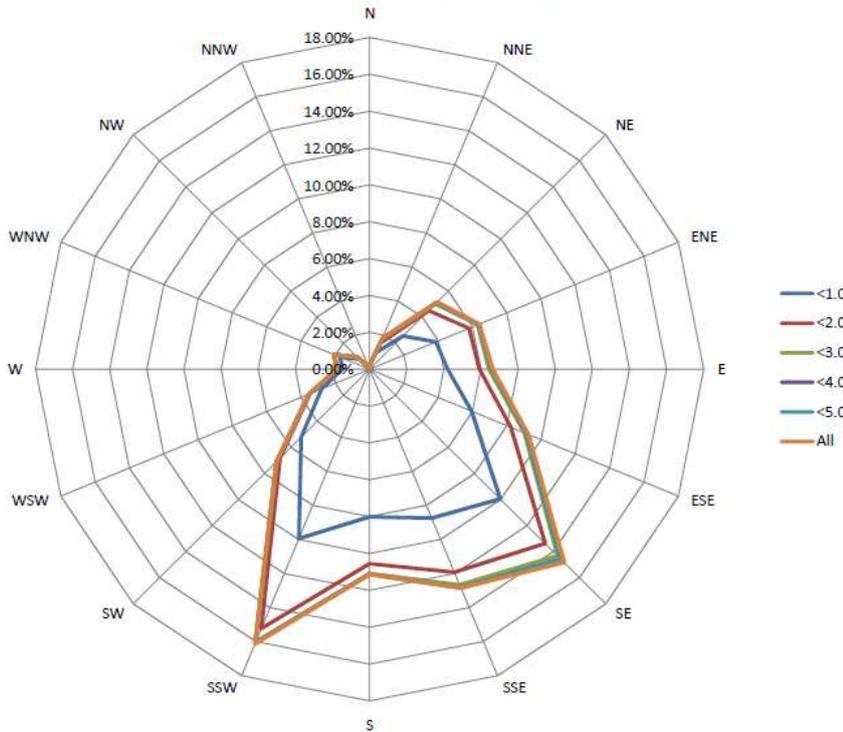
Hourly Average Wind Direction (degree)

Hourly Average Wind Direction (degree) for September 2023

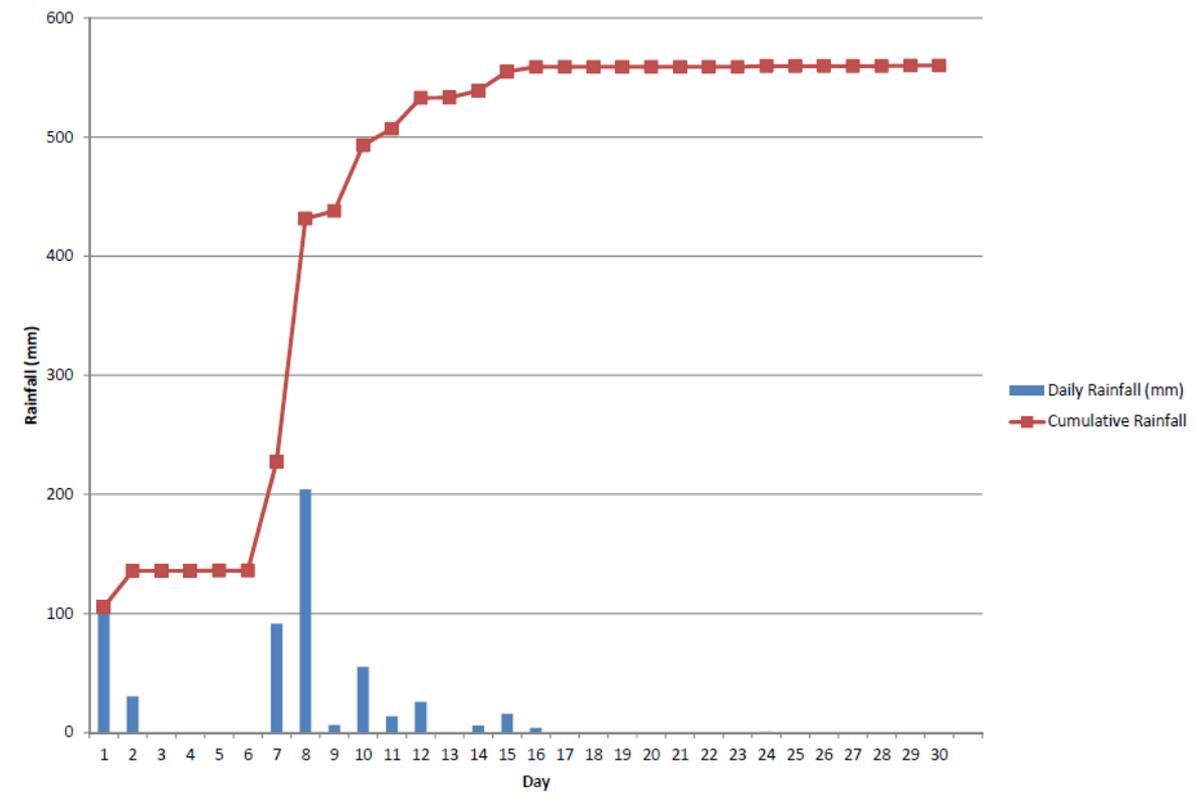


Day TIME

Wind Rose for September 2023



Daily and Cumulative Rainfall (mm) for September 2023





ANNEX D4

ODOUR MONITORING RESULTS

ANNEX D4 ODOUR MONITORING RESULTS

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
27 Jul 23	Sunny	OP1	14:16	33.1	0.6	N	Y	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP2	14:20	33.9	4.5	S	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP3	14:22	34.3	0.9	SW	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP4	14:24	34.9	3.0	S	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP5	14:26	35.4	2.8	NW	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP6	14:28	36.2	3.1	S	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP7	14:29	35.1	5.0	S	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP8	14:32	34.5	4.7	S	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP9	14:36	35.6	1.9	E	Y	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP10	14:37	36.9	0.9	SE	N	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP11	14:49	35.5	1.9	SW	Y	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP12	14:48	34.5	1.8	SW	Y	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP13	14:45	35.6	1.7	SW	Y	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP14	14:43	35.7	0.0	N/A	N/A	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP15	14:58	34.2	0.0	N/A	N/A	0	N/A	N/A	N/A
27 Jul 23	Sunny	OP16	15:02	34.2	2.6	NE	Y	1	Waste	Tipping area	N/A

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
27 Jul 23	Sunny	OP17	15:04	34.6	0.0	N/A	N/A	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP1	15:03	28.0	N/A	N/A	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP2	15:06	29.4	1.7	NE	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP3	15:09	29.2	0.9	E	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP4	15:10	29.1	1.6	SE	N	1	Leachate	LTP	N/A
17 Aug 23	Rainy	OP5	15:12	29.4	1.3	E	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP6	15:15	30.6	1.8	SE	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP7	15:17	30.6	2.5	SE	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP8	15:20	32.8	3.5	SE	Y	1	Sludge	Sediment trap	N/A
17 Aug 23	Rainy	OP9	15:28	30.7	1.9	SE	Y	1	Landfill gas	Tipping area	N/A
17 Aug 23	Rainy	OP10	15:30	30.0	3.2	E	Y	1	Waste	Tipping area	N/A
17 Aug 23	Rainy	OP11	15:47	31.8	0.0	N/A	N	1	Waste	Tipping area	N/A
17 Aug 23	Rainy	OP12	15:45	29.4	1.5	SE	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP13	15:44	29.5	0.0	N/A	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP14	15:42	30.0	0.0	N/A	N	0	N/A	N/A	N/A

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
17 Aug 23	Rainy	OP15	16:00	30.7	0.0	N/A	N	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP16	15:58	30.5	1.5	E	Y	0	N/A	N/A	N/A
17 Aug 23	Rainy	OP17	15:56	31.1	1.1	NW	Y	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP1	10:20	32.3	0.5	E	Yes	1	Grassy	Vegetation	N/A
20 Sep 23	Sunny	OP2	10:24	31.8	1.2	SE	Yes	1	Grassy	Vegetation	N/A
20 Sep 23	Sunny	OP3	10:29	31.9	1.0	NW	Yes	1	Grassy	Vegetation	N/A
20 Sep 23	Sunny	OP4	10:32	30.6	1.9	NE	Yes	1	Ammonia	LTP	N/A
20 Sep 23	Sunny	OP5	10:35	32.3	0.0	N/A	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP6	10:37	31.6	1.4	SW	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP7	10:39	32.1	2.0	SE	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP8	10:42	32.5	0.7	S	Yes	1	Soil	Sediment trap	N/A
20 Sep 23	Sunny	OP9	10:48	31.9	1.4	S	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP10	10:51	31.4	1.0	S	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP11	11:01	32.0	0.4	W	Yes	1	Grassy	Vegetation	N/A
20 Sep 23	Sunny	OP12	11:01	32.3	0.5	SE	Yes	1	Grassy	Vegetation	N/A
20 Sep 23	Sunny	OP13	10:59	31.2	0.5	W	Yes	1	Grassy	Vegetation	N/A

Date	Weather	Location	Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
20 Sep 23	Sunny	OP14	11:57	31.4	0.5	NE	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP15	11:14	32.2	1.2	SE	Yes	1	Rubbish	Tipping area	N/A
20 Sep 23	Sunny	OP16	11:18	32.4	0.7	NE	No	0	N/A	N/A	N/A
20 Sep 23	Sunny	OP17	11:21	32.2	1.3	SW	No	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 (July 2023)
NO ₂	0.92 gs ⁻¹
CO	0.02 gs ⁻¹
SO ₂	<0.01 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<7.0 x 10 ⁻⁵ gs ⁻¹
Exhaust gas velocity	5.8 ms ⁻¹
Parameters	Monitoring Results (August 2023)
NO ₂	0.14 gs ⁻¹
CO	0.03 gs ⁻¹
SO ₂	<0.01 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.0 x 10 ⁻⁵ gs ⁻¹
Non-Methane Organic Carbons	0.009 gs ⁻¹
Ammonia	0.0361 gs ⁻¹
Exhaust gas velocity	8.7 ms ⁻¹
Parameters	Monitoring Results (September 2023)
NO ₂	0.23 gs ⁻¹
CO	0.03 gs ⁻¹
SO ₂	0.92 gs ⁻¹
Benzene	<1.0 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.0 x 10 ⁻⁴ gs ⁻¹
Exhaust gas velocity	8.1 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)	
1 Jul 23	938	1223	5.8	
2 Jul 23	916	1208		
3 Jul 23	944	1228		
4 Jul 23	902	1204		
5 Jul 23	919	1213		
6 Jul 23	929	1222		
7 Jul 23	933	1219		
8 Jul 23	896	1183		
9 Jul 23	910	1216		
10 Jul 23	905	1211		
11 Jul 23	951	1225		
12 Jul 23	950	1228		
13 Jul 23	941	1228		
14 Jul 23	932	1224		
15 Jul 23	935	1230		
16 Jul 23	914	1217		
17 Jul 23	901	1213		
18 Jul 23	906	1208		
19 Jul 23	913	1209		
20 Jul 23	871	1194		
21 Jul 23	Under Maintenance			
22 Jul 23	926	1223		
23 Jul 23	915	1206		
24 Jul 23	886	1198		
25 Jul 23	929	1219		
26 Jul 23	925	1219		
27 Jul 23	948	1222		
28 Jul 23	926	1212		
29 Jul 23	959	1225		
30 Jul 23	934	1215		
31 Jul 23	912	1206		
1 Aug 23	921	1224		
2 Aug 23	944	1228		
3 Aug 23	907	1218		
4 Aug 23	944	1222		
5 Aug 23	885	1180		

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)
6 Aug 23	929	1221	8.7
7 Aug 23	921	1218	
8 Aug 23	903	1212	
9 Aug 23	895	1208	
10 Aug 23	898	1206	
11 Aug 23	931	1220	
12 Aug 23	917	1195	
13 Aug 23	939	1212	
14 Aug 23	923	1212	
15 Aug 23	930	1224	
16 Aug 23	937	1218	
17 Aug 23	924	1206	
18 Aug 23	910	1205	
19 Aug 23	933	1214	
12 Aug 23	917	1195	
13 Aug 23	939	1212	
14 Aug 23	923	1212	
15 Aug 23	930	1224	
16 Aug 23	937	1218	
17 Aug 23	924	1206	
18 Aug 23	910	1205	
19 Aug 23	933	1214	
15 Aug 23	930	1224	
20 Aug 23	955	1227	
21 Aug 23	Under Maintenance		
22 Aug 23	Under Maintenance		
23 Aug 23	Under Maintenance		
24 Aug 23	Under Maintenance		
25 Aug 23	Under Maintenance		
26 Aug 23	Under Maintenance		
27 Aug 23	Under Maintenance		
28 Aug 23	Under Maintenance		
29 Aug 23	Under Maintenance		
30 Aug 23	Under Maintenance		
31 Aug 23	922	1180	
1 Sep 23	917	1194	
2 Sep 23	911	1183	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)
3 Sep 23	921	1204	
4 Sep 23	917	1206	
5 Sep 23	914	1204	
6 Sep 23	915	1194	
7 Sep 23	933	1216	
8 Sep 23	907	1188	
9 Sep 23	913	1204	
10 Sep 23	927	1209	
11 Sep 23	922	1204	
12 Sep 23	924	1200	
13 Sep 23	926	1207	
14 Sep 23	934	1210	
15 Sep 23	918	1203	
16 Sep 23	926	1201	
17 Sep 23	939	1207	
18 Sep 23	903	1199	8.1
19 Sep 23	912	1202	
20 Sep 23	908	1200	
12 Sep 23	924	1200	
13 Sep 23	926	1207	
14 Sep 23	934	1210	
15 Sep 23	918	1203	
16 Sep 23	926	1201	
17 Sep 23	939	1207	
18 Sep 23	903	1199	
19 Sep 23	912	1202	
20 Sep 23	908	1200	
21 Sep 23	920	1201	
22 Sep 23	924	1209	
23 Sep 23	939	1208	
24 Sep 23	910	1206	
25 Sep 23	921	1209	
26 Sep 23	916	1208	
27 Sep 23	869	1193	
28 Sep 23	925	1191	
29 Sep 23	939	1214	
30 Sep 23	918	1218	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms⁻¹) (a)
Average	921	1210	7.5
Min	869	1180	5.8
Max	959	1230	8.7

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 (July 2023)
	Flare 1 – F601
NO ₂	0.02 gs ⁻¹
CO	0.04 gs ⁻¹
SO ₂	0.03 gs ⁻¹
Benzene	1.34 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.07 x 10 ⁻⁴ gs ⁻¹
Exhaust gas velocity	8.5 ms ⁻¹
Parameters	Monitoring Results (August 2023)
	Flare 1 – F601
NO ₂	<0.02 gs ⁻¹
CO	0.08 gs ⁻¹
SO ₂	0.06 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<0.98 x 10 ⁻⁵ gs ⁻¹
Non-Methane Organic Carbons	0.003 gs ⁻¹
Exhaust gas velocity	8.9 ms ⁻¹
Parameters	Monitoring Results (September 2023)
	Flare 1 – F601
NO ₂	<0.01 gs ⁻¹
CO	0.20 gs ⁻¹
SO ₂	0.02 gs ⁻¹
Benzene	<1.22 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<9.7 x 10 ⁻⁵ gs ⁻¹
Exhaust gas velocity	9.1 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 Jul 23	870	1117	8.5	In Operation
2 Jul 23	870	1093		In Operation
3 Jul 23	860	1113		In Operation
4 Jul 23	880	1113		In Operation
5 Jul 23	840	1083		In Operation
6 Jul 23	880	1143		In Operation
7 Jul 23	870	1123		In Operation
8 Jul 23	880	1113		In Operation
9 Jul 23	860	1063		In Operation
10 Jul 23	880	1043		In Operation
11 Jul 23	860	1043		In Operation
12 Jul 23	880	1053		In Operation
13 Jul 23	840	1023		In Operation
14 Jul 23	830	1043		In Operation
15 Jul 23	820	1053		In Operation
16 Jul 23	880	1113		In Operation
17 Jul 23	830	1043		In Operation
18 Jul 23	860	1033		In Operation
19 Jul 23	870	1053		In Operation
20 Jul 23	930	1063		In Operation
21 Jul 23	880	1053		In Operation
22 Jul 23	880	1053		In Operation
23 Jul 23	830	1023		In Operation
24 Jul 23	870	1033		In Operation
25 Jul 23	850	1053		In Operation
26 Jul 23	860	1003		In Operation
27 Jul 23	860	1093		In Operation
28 Jul 23	860	1093		In Operation
29 Jul 23	920	1153		In Operation
30 Jul 23	910	1033		In Operation
31 Jul 23	870	1103		In Operation
1 Aug 23	877	1043	In Operation	
2 Aug 23	830	1023	In Operation	
3 Aug 23	835	993	In Operation	
4 Aug 23	850	1003	In Operation	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
5 Aug 23	850	1043	8.9	In Operation
6 Aug 23	-	-		Under Maintenance
7 Aug 23	860	1033		In Operation
8 Aug 23	860	1023		In Operation
9 Aug 23	980	1133		In Operation
10 Aug 23	970	1063		In Operation
11 Aug 23	950	1103		In Operation
12 Aug 23	880	1053		In Operation
13 Aug 23	860	1033		In Operation
14 Aug 23	850	1043		In Operation
15 Aug 23	870	1023		In Operation
16 Aug 23	910	1093		In Operation
17 Aug 23	980	1083		In Operation
18 Aug 23	950	1123		In Operation
19 Aug 23	870	1053		In Operation
14 Aug 23	850	1043		In Operation
15 Aug 23	870	1023		In Operation
16 Aug 23	910	1093		In Operation
17 Aug 23	980	1083		In Operation
18 Aug 23	950	1123		In Operation
19 Aug 23	870	1053		In Operation
20 Aug 23	830	1023		In Operation
21 Aug 23	860	1053		In Operation
22 Aug 23	880	1063		In Operation
23 Aug 23	860	1053		In Operation
24 Aug 23	850	1063		In Operation
25 Aug 23	840	1043		In Operation
26 Aug 23	860	1073		In Operation
27 Aug 23	860	1053		In Operation
28 Aug 23	860	1063		In Operation
29 Aug 23	860	1053		In Operation
30 Aug 23	865	1085		In Operation
31 Aug 23	890	1073	In Operation	
19 Aug 23	870	1053	In Operation	
20 Aug 23	830	1023	In Operation	
21 Aug 23	860	1053	In Operation	
22 Aug 23	880	1063	In Operation	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
23 Aug 23	860	1053		In Operation
24 Aug 23	850	1063		In Operation
25 Aug 23	840	1043		In Operation
26 Aug 23	860	1073		In Operation
27 Aug 23	860	1053		In Operation
28 Aug 23	860	1063		In Operation
29 Aug 23	860	1053		In Operation
30 Aug 23	865	1085		In Operation
31 Aug 23	890	1073		In Operation
1 Sep 23	843	1029		In Operation
2 Sep 23	852	1041		In Operation
3 Sep 23	859	1023		In Operation
4 Sep 23	954	1034		In Operation
5 Sep 23	874	979		In Operation
6 Sep 23	880	1003		In Operation
7 Sep 23	946	1074		In Operation
8 Sep 23	936	1106		In Operation
9 Sep 23	876	1047		In Operation
10 Sep 23	990	1151		In Operation
11 Sep 23	901	1127		In Operation
12 Sep 23	988	1149		In Operation
13 Sep 23	897	1055		In Operation
14 Sep 23	935	1024		In Operation
15 Sep 23	856	1046		In Operation
16 Sep 23	971	1085		In Operation
17 Sep 23	881	1012		In Operation
18 Sep 23	900	1082		In Operation
19 Sep 23	845	979		In Operation
20 Sep 23	844	1047		In Operation
21 Sep 23	892	1035		In Operation
22 Sep 23	833	1027		In Operation
23 Sep 23	861	1008		In Operation
13 Sep 23	897	1055		In Operation
14 Sep 23	935	1024		In Operation
15 Sep 23	856	1046		In Operation
16 Sep 23	971	1085		In Operation
17 Sep 23	881	1012	9.1	In Operation

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
18 Sep 23	900	1082		In Operation
19 Sep 23	845	979		In Operation
20 Sep 23	844	1047		In Operation
21 Sep 23	892	1035		In Operation
22 Sep 23	833	1027		In Operation
23 Sep 23	861	1008		In Operation
24 Sep 23	848	1010		In Operation
25 Sep 23	849	1041		In Operation
26 Sep 23	858	1037		In Operation
27 Sep 23	843	1025		In Operation
28 Sep 23	841	1034		In Operation
29 Sep 23	972	1044		In Operation
30 Sep 23	847	1032		In Operation
Average	878	1058		
Min	820	979		
Max	990	1153		
Flare 2 – F602				
1 Jul 23	880	1143		In Operation
2 Jul 23	840	1043		In Operation
3 Jul 23	830	1053		In Operation
4 Jul 23	860	1083		In Operation
5 Jul 23	860	1063		In Operation
6 Jul 23	840	1083		In Operation
7 Jul 23	880	1073		In Operation
8 Jul 23	860	1093		In Operation
9 Jul 23	400	-		Under Maintenance
10 Jul 23	880	1113		In Operation
11 Jul 23	860	1093		In Operation
12 Jul 23	880	1103		In Operation
13 Jul 23	850	1083		In Operation
14 Jul 23	830	1053		In Operation
15 Jul 23	850	1083		In Operation
16 Jul 23	860	1083		In Operation
17 Jul 23	830	1053		In Operation
18 Jul 23	840	1083		In Operation
19 Jul 23	900	1123		In Operation
20 Jul 23	870	1063	8.5	In Operation

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
21 Jul 23	870	1123		In Operation
22 Jul 23	840	1083		In Operation
23 Jul 23	830	1073		In Operation
24 Jul 23	830	1053		In Operation
25 Jul 23	860	1083		In Operation
26 Jul 23	840	1093		In Operation
27 Jul 23	830	1063		In Operation
28 Jul 23	870	1093		In Operation
29 Jul 23	840	1053		In Operation
30 Jul 23	150	-		Under Maintenance
31 Jul 23	850	1093		In Operation
1 Aug 23	830	1063		In Operation
2 Aug 23	840	1053		In Operation
3 Aug 23	890	1003		In Operation
4 Aug 23	830	1053		In Operation
5 Aug 23	860	1083		In Operation
6 Aug 23	860	1083		In Operation
7 Aug 23	900	1093		In Operation
8 Aug 23	830	1033		In Operation
9 Aug 23	870	1083		In Operation
10 Aug 23	870	1073		In Operation
11 Aug 23	880	1023		In Operation
12 Aug 23	930	1123		In Operation
13 Aug 23	850	1063		In Operation
14 Aug 23	820	1023		In Operation
15 Aug 23	860	1043		In Operation
16 Aug 23	820	1053		In Operation
17 Aug 23	860	1053		In Operation
18 Aug 23	840	1053		In Operation
19 Aug 23	820	1023		In Operation
20 Aug 23	840	1053		In Operation
21 Aug 23	840	1063		In Operation
22 Aug 23	870	1116		In Operation
23 Aug 23	840	1063		In Operation
24 Aug 23	830	1083		In Operation
25 Aug 23	830	1043		In Operation
26 Aug 23	890	1053	8.9	In Operation

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
27 Aug 23	860	1053		In Operation
28 Aug 23	850	1083		In Operation
29 Aug 23	880	1103		In Operation
30 Aug 23	840	1083		In Operation
31 Aug 23	890	1073		In Operation
1 Sep 23	939	1142		In Operation
2 Sep 23	917	1091		In Operation
3 Sep 23	953	1110		In Operation
4 Sep 23	948	1126		In Operation
5 Sep 23	988	1178		In Operation
6 Sep 23	946	1128		In Operation
7 Sep 23	968	1134		In Operation
8 Sep 23	948	1121		In Operation
9 Sep 23	926	1097		In Operation
10 Sep 23	952	1128		In Operation
11 Sep 23	889	1076		In Operation
12 Sep 23	899	1076		In Operation
13 Sep 23	922	1098		In Operation
14 Sep 23	931	1109	9.1	In Operation
15 Sep 23	914	1098		In Operation
16 Sep 23	929	1110		In Operation
17 Sep 23	931	1111		In Operation
18 Sep 23	938	1109		In Operation
19 Sep 23	942	1121		In Operation
20 Sep 23	948	1118		In Operation
21 Sep 23	941	1114		In Operation
22 Sep 23	931	1109		In Operation
23 Sep 23	941	1110		In Operation
24 Sep 23	952	1124		In Operation
25 Sep 23	928	1104		In Operation
26 Sep 23	943	1104		In Operation
27 Sep 23	940	1119		In Operation
28 Sep 23	950	1121		In Operation
29 Sep 23	919	1085		In Operation
30 Sep 23	912	1084		In Operation
Average	878	1058	9.0	
Min	820	979	8.5	

Date	Gas Combustion Temperature (°C)	Exhaust Temperature (K)	Exhaust Gas Velocity (ms ⁻¹) (a)	Operation Status
Max	990	1153	9.1	

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 (July 2023)
NO ₂	0.032 gs ⁻¹
CO	0.678 gs ⁻¹
SO ₂	<0.001 gs ⁻¹
Benzene	3.4 x 10 ⁻⁵ gs ⁻¹
Vinyl chloride	<8.9 x 10 ⁻⁶ gs ⁻¹
Exhaust gas velocity	10.6 ms ⁻¹
Parameters	Monitoring Results (August 2023)
NO ₂	0.024 gs ⁻¹
CO	0.895 gs ⁻¹
SO ₂	<0.001 gs ⁻¹
Benzene	6.9 x 10 ⁻⁵ gs ⁻¹
Vinyl chloride	<1.1 x 10 ⁻⁵ gs ⁻¹
Non-Methane Organic Carbons	1.9 x 10 ⁻³ gs ⁻¹
Exhaust gas velocity	13.1 ms ⁻¹
Parameters	Monitoring Results (September 2023)
NO ₂	0.007 gs ⁻¹
CO	0.89 gs ⁻¹
SO ₂	0.001 gs ⁻¹
Benzene	1.5 x 10 ⁻⁴ gs ⁻¹
Vinyl chloride	<1.07 x 10 ⁻⁵ gs ⁻¹
Non-Methane Organic Carbons	13.0 ms ⁻¹

(a) The Landfill Gas Generator was under maintenance in the reporting period

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 Jul 23	847	10.6	In Operation
2 Jul 23	848		In Operation
3 Jul 23	847		In Operation
4 Jul 23	847		In Operation
5 Jul 23	847		In Operation
6 Jul 23	846		In Operation
7 Jul 23	875		In Operation
8 Jul 23	846		In Operation
9 Jul 23	847		In Operation
10 Jul 23	846		In Operation
11 Jul 23	847		In Operation
12 Jul 23	846		In Operation
13 Jul 23	847		In Operation
14 Jul 23	846		In Operation
15 Jul 23	847		In Operation
16 Jul 23	846		In Operation
17 Jul 23	849		In Operation
18 Jul 23	845		In Operation
19 Jul 23	850		In Operation
20 Jul 23	-		Under Maintenance
21 Jul 23	-		Under Maintenance
22 Jul 23	844		In Operation
23 Jul 23	845		In Operation
24 Jul 23	843		In Operation
25 Jul 23	843		In Operation
26 Jul 23	843		In Operation
27 Jul 23	845		In Operation
28 Jul 23	848		In Operation
29 Jul 23	844		In Operation
30 Jul 23	843		In Operation
31 Jul 23	843		In Operation
1 Aug 23	866	In Operation	
2 Aug 23	848	In Operation	

Date	Exhaust temperature (K)	Exhaust gas velocity (ms ⁻¹) ^(a)	Operation Status (Landfill Gas Generator in Operation)
3 Aug 23	870	13.1	In Operation
4 Aug 23	876		In Operation
5 Aug 23	867		In Operation
6 Aug 23	847		In Operation
7 Aug 23	846		In Operation
8 Aug 23	849		In Operation
9 Aug 23	851		In Operation
10 Aug 23	861		In Operation
11 Aug 23	873		In Operation
12 Aug 23	876		In Operation
13 Aug 23	846		In Operation
14 Aug 23	874		In Operation
15 Aug 23	847		In Operation
16 Aug 23	873		In Operation
17 Aug 23	847		In Operation
18 Aug 23	876		In Operation
19 Aug 23	874		In Operation
20 Aug 23	847		In Operation
21 Aug 23	876		In Operation
22 Aug 23	875		In Operation
23 Aug 23	875		In Operation
24 Aug 23	874		In Operation
25 Aug 23	875		In Operation
26 Aug 23	875		In Operation
27 Aug 23	875		In Operation
28 Aug 23	875		In Operation
29 Aug 23	874		In Operation
30 Aug 23	-		Under Maintenance
31 Aug 23	872		In Operation
1 Sep 23	872		In Operation
2 Sep 23	845	In Operation	
3 Sep 23	853	In Operation	
4 Sep 23	875	In Operation	
5 Sep 23	876	In Operation	
6 Sep 23	878	In Operation	

Date	Exhaust temperature (K)	Exhaust gas velocity (ms ⁻¹) ^(a)	Operation Status (Landfill Gas Generator in Operation)	
7 Sep 23	895	13.0	In Operation	
8 Sep 23	877		In Operation	
9 Sep 23	879		In Operation	
10 Sep 23	886		In Operation	
11 Sep 23	884		In Operation	
12 Sep 23	876		In Operation	
13 Sep 23	877		In Operation	
14 Sep 23	878		In Operation	
15 Sep 23	876		In Operation	
16 Sep 23	877		In Operation	
17 Sep 23	876		In Operation	
18 Sep 23	877		In Operation	
19 Sep 23	881		In Operation	
20 Sep 23	877		In Operation	
21 Sep 23	877		In Operation	
22 Sep 23	847		In Operation	
23 Sep 23	846		In Operation	
24 Sep 23	847		In Operation	
25 Sep 23	845		In Operation	
26 Sep 23	844		In Operation	
27 Sep 23	844		In Operation	
28 Sep 23	844		In Operation	
29 Sep 23	844		In Operation	
30 Sep 23	844		In Operation	
Average	860		12.2	
Min	843		10.6	
Max	895		13.1	
ENGB				
1 Jul 23	844			In Operation
2 Jul 23	844			In Operation
3 Jul 23	843	In Operation		
4 Jul 23	843	In Operation		
5 Jul 23	845	In Operation		
6 Jul 23	843	In Operation		
7 Jul 23	-	Under Maintenance		

Date	Exhaust temperature (K)	Exhaust gas velocity (ms ⁻¹) ^(a)	Operation Status (Landfill Gas Generator in Operation)	
8 Jul 23	842	9.1	In Operation	
9 Jul 23	843		In Operation	
10 Jul 23	843		In Operation	
11 Jul 23	843		In Operation	
12 Jul 23	842		In Operation	
13 Jul 23	843		In Operation	
14 Jul 23	842		In Operation	
15 Jul 23	844		In Operation	
16 Jul 23	842		In Operation	
17 Jul 23	844		In Operation	
18 Jul 23	841		In Operation	
19 Jul 23	845		In Operation	
20 Jul 23	870		In Operation	
21 Jul 23	872		In Operation	
22 Jul 23	842		In Operation	
23 Jul 23	843		In Operation	
24 Jul 23	842		In Operation	
25 Jul 23	842		In Operation	
26 Jul 23	842		In Operation	
27 Jul 23	843		In Operation	
28 Jul 23	846		In Operation	
29 Jul 23	843		In Operation	
30 Jul 23	842		In Operation	
31 Jul 23	841		In Operation	
1 Aug 23	852		13.1	In Operation
2 Aug 23	865			In Operation
3 Aug 23	845			In Operation
4 Aug 23	843			In Operation
5 Aug 23	847			In Operation
6 Aug 23	845			In Operation
7 Aug 23	872			In Operation
8 Aug 23	874	In Operation		
9 Aug 23	850	In Operation		
10 Aug 23	875	In Operation		
11 Aug 23	843	In Operation		

Date	Exhaust temperature (K)	Exhaust gas velocity (ms ⁻¹) ^(a)	Operation Status (Landfill Gas Generator in Operation)
12 Aug 23	844		In Operation
13 Aug 23	845		In Operation
14 Aug 23	846		In Operation
15 Aug 23	846		In Operation
16 Aug 23	850		In Operation
17 Aug 23	870		In Operation
18 Aug 23	846		In Operation
19 Aug 23	847		In Operation
20 Aug 23	846		In Operation
21 Aug 23	846		In Operation
22 Aug 23	-		Under Maintenance
23 Aug 23	-		Under Maintenance
24 Aug 23	-		Under Maintenance
25 Aug 23	-		Under Maintenance
26 Aug 23	-		Under Maintenance
27 Aug 23	-		Under Maintenance
28 Aug 23	-		Under Maintenance
29 Aug 23	875		In Operation
30 Aug 23	874		In Operation
31 Aug 23	871		In Operation
1 Sep 23	871		In Operation
2 Sep 23	843		In Operation
3 Sep 23	-		Under Maintenance
4 Sep 23	-		Under Maintenance
5 Sep 23	-		Under Maintenance
6 Sep 23	-		Under Maintenance
7 Sep 23	-		Under Maintenance
8 Sep 23	-		Under Maintenance
9 Sep 23	-		Under Maintenance
10 Sep 23	-		Under Maintenance
11 Sep 23	-		Under Maintenance
12 Sep 23	-		Under Maintenance
13 Sep 23	-		Under Maintenance
14 Sep 23	-		Under Maintenance
15 Sep 23	-	13.0	Under Maintenance

Date	Exhaust temperature (K)	Exhaust gas velocity (ms ⁻¹) ^(a)	Operation Status (Landfill Gas Generator in Operation)
16 Sep 23	-		Under Maintenance
17 Sep 23	-		Under Maintenance
18 Sep 23	-		Under Maintenance
19 Sep 23	-		Under Maintenance
20 Sep 23	-		Under Maintenance
21 Sep 23	845		In Operation
22 Sep 23	844		In Operation
23 Sep 23	843		In Operation
24 Sep 23	843		In Operation
25 Sep 23	841		In Operation
26 Sep 23	841		In Operation
27 Sep 23	841		In Operation
28 Sep 23	869		In Operation
29 Sep 23	869		In Operation
30 Sep 23	841		In Operation
Average	849	11.7	
Min	841	9.1	
Max	875	13.1	

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 H₂S
MONITORING RESULTS

TABLE D6.1 AMBIENT VOCS, AMMONIA AND H₂S MONITORING RESULTS

Parameters	Limit Level	Monitoring Results ($\mu\text{g m}^{-3}$)			
		AM1	AM2	AM3	AM4
Ammonia	180	16	54	18	37
H ₂ S	42	<15	<15	<15	<15
Methane	NA ^(a)	0.00016 %(v/v)	0.00013 %(v/v)	0.00014 %(v/v)	0.00014 %(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	<0.5	1.3	<0.5	<0.5
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	3.2	2.6	20.9	2
Carbon Tetrachloride	64	1	0.9	1	0.9
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)	3.5	3.6	3.5	3.7
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	0.5	<0.4
Ethanethiol	13	<0.6	<0.6	<0.6	<0.6
Ethanol	19,200	<3.8	<3.8	<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	0.9	0.7	0.6
Heptane	2,746	<0.8	<0.8	<0.8	<0.8

Parameters	Limit Level	Monitoring Results ($\mu\text{g m}^{-3}$)			
		AM1	AM2	AM3	AM4
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	<2.6	<2.6	<2.6	<2.6
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	1.4	0.9	2.3	1
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	0.9	0.8	1.4	0.7
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	0.5	0.8	2.6	1.1

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	13 September 2023
Time	11:49 – 12:19
Monitoring Location	Thermal Oxidiser
Parameter	Sulphur Dioxide (SO ₂)
Limit Levels	>0.07 g/s
Measured Level	0.92 g/s
Possible reason	<p>As confirmed by the Contractor, the thermal oxidiser was under normal operating conditions during the sampling event. The thermal oxidizer stack emission monitoring results (NO₂, CO, Benzene, Vinyl chloride, gas combustion temperature, exhaust temperature and exhaust gas velocity) on 13 September 2023 were well within the respective limit levels. It is possible that the slight exceedance of SO₂ limit level measured on 13 September 2023 could be due to some short-term system instability (e.g. insufficient air, short gas residence time or ineffective mixing of landfill gas and air during the combustion) during the sampling event. Hence, the SO₂ exceedance at the thermal oxidizer on 13 September 2023 is considered to be Project related.</p> <p>In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 16 October 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 2 November 2023) to confirm findings. Exceedance of SO₂ Limit Level was recorded at the thermal oxidiser (0.79 g/s) during the sampling event. The thermal oxidiser showed consecutive exceedance of the stack emission limit (SO₂).</p> <p>It should be noted that although the measured SO₂ level exceeded the limit level of the EM&A programme (which was set based on the stack design parameters), the slight exceedance of SO₂ on 13 September 2023 will not cause adverse air quality impact to the identified ASRs as the anticipated SO₂ concentrations at the identified ASRs will still be well below the respective AQO criteria with reference to the findings of the operational air quality impact assessment of the SENTX Environmental Review Report.</p>
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. The Contractor is also reminded to adjust the inlet gas and flow during the routine gas well monitoring.

Remarks	-
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Prepared by: Abbey Lau
Designation: Environmental Team
Date: 7 November 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	22 September 2023
Time	8:00 (22 September 2023) – 8:00 (23 September 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	357 µg /m ³
Possible reason	<p>From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly south-southwesterly to southeasterly wind with highest wind speed 4.1m/s was recorded on 22 and 23 September 2023 during the sampling event.</p> <p>On 22 September 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.</p> <p>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 21 September 2023. The Contractor has implemented the dust control and mitigation measures recommended in the updated EM&A Manual.</p> <p>In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 28 September 2023 to confirm findings. Exceedance of TSP Action and Limit Levels was recorded at AM1 (343 µg/m³) during the sampling event. AM1 showed consecutive exceedance of the TSP level.</p> <p>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.</p>
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/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.
Remarks	-

Prepared by: Abbey Lau
 Designation: Environmental Team
 Date: 9 October 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	28 September 2023
Time	8:00 (28 September 2023) – 8:00 (29 September 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	343 µg /m ³
Possible reason	<p>From the meteorological data obtained from the SENTX on-site meteorological monitoring station, a predominantly southeasterly to south-southeasterly wind with highest wind speed 5.2 m/s was recorded on 28 and 29 September 2023 during the sampling event.</p> <p>On 28 September 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.</p> <p>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 28 September 2023. The Contractor has implemented the dust control and mitigation measures recommended in the updated EM&A Manual.</p> <p>In accordance with Table 3.8b of the updated EM&A Manual, repeat measurement was conducted on 4 October 2023 to confirm findings. 24-hour TSP level of 76 µg/m³ (below Action and Limit Levels) was measured during the sampling event, which demonstrate no consecutive dust impact at AM1.</p> <p>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.</p>
Action Taken / Action to be Taken	<p>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.</p> <p>The Contractor is also reminded to implement additional dust</p>

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

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 11 October 2023



ANNEX E

NOISE



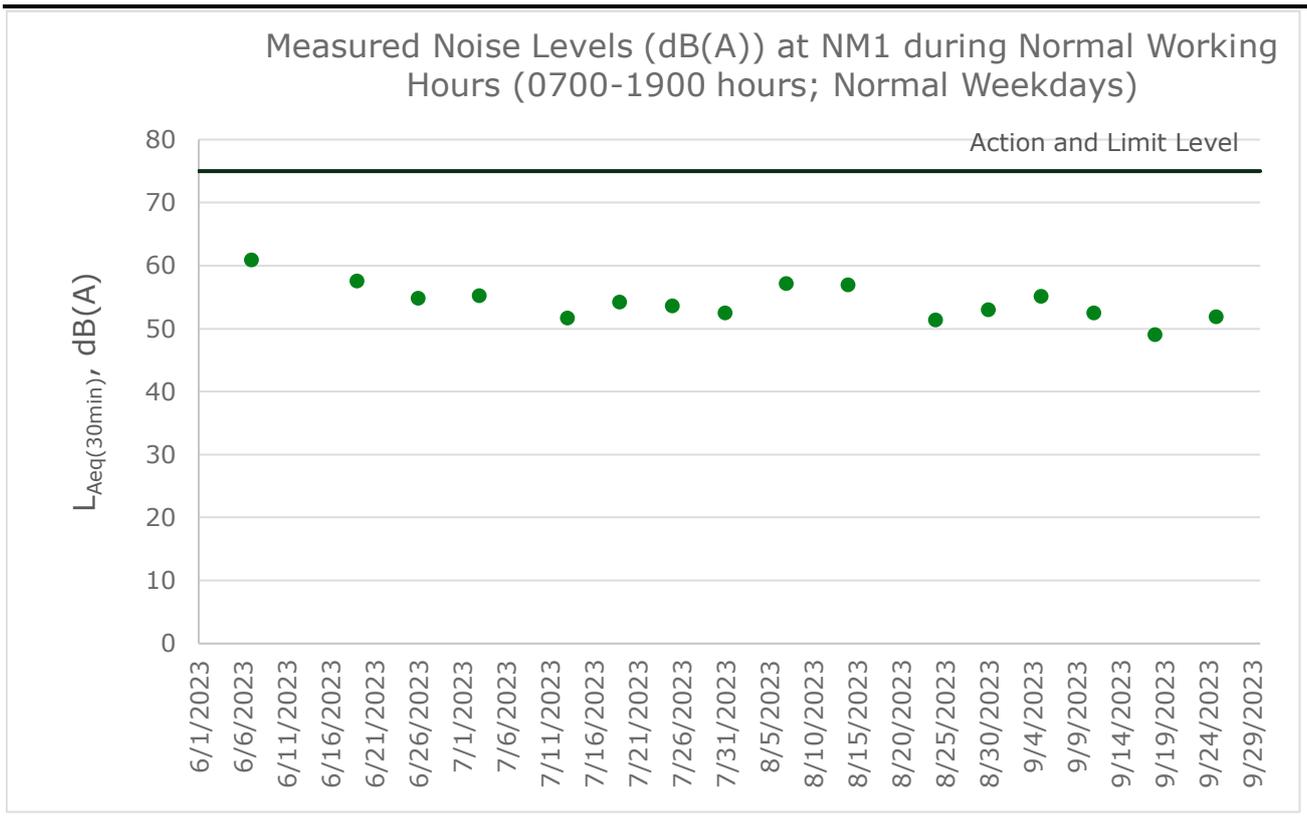
ANNEX E1

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 Jul 23	10:48	11:18	Sunny	58.2	51.7	55.3
13 Jul 23	10:45	11:15	Sunny	53.6	49.3	51.7
19 Jul 23	10:54	11:24	Cloudy	56.1	51.3	54.3
25 Jul 23	10:55	11:25	Sunny	55.0	49.6	53.7
31 Jul 23	11:01	11:31	Sunny	53.9	50.5	52.5
7 Aug 23	10:32	11:02	Sunny	59.7	53.3	57.2
14 Aug 23	10:42	11:12	Cloudy	58.3	54.2	57.0
24 Aug 23	10:51	11:21	Cloudy	52.5	49.2	51.4
30 Aug 23	10:53	11:23	Sunny	55.1	50.0	53.0
5 Sep 23	14:27	14:57	Cloudy	56.5	53.4	55.2
11 Sep 23	10:40	11:10	Cloudy	54.0	49.3	52.5
18 Sep 23	10:11	10:41	Sunny	50.9	46.4	49.1
25 Sep 23	10:41	11:11	Sunny	53.6	48.0	51.9
Average						53.4
Min						49.1
Max						57.2

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

Action			
Event	ET	IEC	Contractor
Action Level	<ul style="list-style-type: none"> Identify the source(s) and investigate the cause(s) of exceedance and complaint Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC and Project Proponent whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Have additional monitoring if exceedance is due to the Project. If exceedance stops, cease additional monitoring 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check monitoring data submitted by ET Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Submit proposals for remedial measures to IEC Implement the agreed proposals

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



ANNEX F

WATER QUALITY



ANNEX F1

SURFACE WATER QUALITY MONITORING
RESULTS

TABLE F1.1 SURFACE WATER QUALITY MONITORING RESULTS AT DP3

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
11 Jul 23	10:43	Sunny	Unable to collect water sample due to insufficient flow						
4 Aug 23	14:10	Sunny	Unable to collect water sample due to insufficient flow						
22 Sep 23	10:08	Sunny	Unable to collect water sample due to insufficient flow						
						Average	-	-	-
						Min	-	-	-
						Max	-	-	-

TABLE F1.2 SURFACE WATER QUALITY MONITORING RESULTS AT DP4

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
11 Jul 23	10:47	Sunny	Unable to collect water sample due to insufficient flow						
						Average	-	-	-
						Min	-	-	-
						Max	-	-	-

TABLE F1.3 SURFACE WATER QUALITY MONITORING RESULTS AT DP6

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (°C)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
11 Jul 23	10:32	Sunny	Unable to collect water sample due to insufficient flow						
4 Aug 23	14:02	Sunny	Unable to collect water sample due to insufficient flow						
						Average	-	-	-
						Min	-	-	-
						Max	-	-	-

TABLE F1.4 SURFACE WATER MONITORING RESULTS

Date				4 Aug 23	4 Aug 23	15 Aug 23	15 Aug 23	22 Sep 23	22 Sep 23	22 Sep 23
		Limit Level (DP3)	Limit Level (DP4 & 6)	DP4	DP4 (Duplicate)	DP4	DP4 (Duplicate)	DP4	DP6	DP4 (Duplicate)
On-site Measurement										
pH Value	pH Unit	6 - 9	6 - 9	8.2	8.6	7.36	7.92	8.1	8.2	8.1
Electrical Conductivity	µS/cm	-	-	763	764	360	345	360	273	360
Dissolved Oxygen	mg/L	-	-	57.4	46.3	6.75	6.39	7.1	8.3	7.3
Volume Discharge	m ³	-	-	1,360	1,360	6.75	6.39	7.1	8.3	7.3
Laboratory Analysis										
Bicarbonate	mg/L	-	-	39	36	-	-	62	83	62
Carbonate	mg/L	-	-	<1	2	-	-	<1	<1	<1
Suspended Solids (SS)	mg/L	30	20	57.4	46.3	12.2	12.6	8.1	2.4	8.4
Ammonia-nitrogen	mg/L	0.5	7.1	0.04	0.03	-	-	0.02	0.04	0.03
Chloride	mg/L	-	-	164	170	-	-	50	22	50
Nitrite-nitrogen	mg/L	-	-	0.02	0.02	-	-	0.02	0.01	0.02
Phosphate	mg/L	5	5	<0.01	<0.01	-	-	<0.01	<0.01	<0.01
Sulphate	mg/L	-	-	76	76	-	-	36	19	36
Sulphide	mg/L	2.5	2.5	<0.1	<0.1	-	-	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen(TKN)	mg/L	-	-	0.6	0.6	-	-	0.4	0.3	0.5
Nitrate-nitrogen	mg/L	-	-	0.14	0.13	-	-	0.06	0.2	0.06
Total Nitrogen(TN)	mg/L	50	50	0.8	0.8	-	-	0.5	0.5	0.5

Biochemical Oxygen Demand	mg/L	20	20	3	3	-	-	<2	<2	<2
Chemical Oxygen Demand	mg/L	80	30	18	20	-	-	10	6	9
Oil & Grease	mg/L	20	20	<5	<5	-	-	<5	<5	<5
Total Organic Carbon	mg/L	-	-	3	3	-	-	4	3	4
Boron	µg/L	1100	1100	70	70	-	-	60	50	60
Calcium	mg/L	-	-	52.1	51.9	-	-	29.8	28.6	30.8
Mercury	µg/L	1	1	<0.20	<0.20	-	-	<0.20	<0.20	<0.20
Magnesium	mg/L	-	-	3.4	3.4	-	-	1.7	1.9	1.74
Sodium	mg/L	-	-	74.1	76	-	-	31.5	20.1	31
Iron	mg/L	3	3	<0.04	<0.04	-	-	<0.04	<0.04	<0.04
Potassium	mg/L	-	-	10.6	10.4	-	-	7.61	5.92	7.87
Cadmium	µg/L	1	1	<0.2	<0.2	-	-	<0.2	<0.2	<0.2
Chromium	µg/L	300	300	<1	<1	-	-	<1	<1	<1
Copper	µg/L	300	300	1	2	-	-	1	<1	1
Lead	µg/L	300	300	<1	<1	-	-	<1	<1	<1
Manganese	µg/L	-	-	3	9	-	-	5	3	7
Nickel	µg/L	300	300	<1	<1	-	-	<1	<1	<1
Zinc	µg/L	-	-	<10	13	-	-	86	<10	1780



ANNEX F2

EVENT AND ACTION PLAN FOR WATER
QUALITY MONITORING

ANNEX F2 EVENT AND ACTION PLAN FOR WATER QUALITY MONITORING DURING OPERATION/ RESTORATION PHASE

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

Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> 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 		
Exceedance of Limit Level for leachate level	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operating activities and performance of the leachate collection system Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Check the performance of the leachate collection system Rectify any unacceptable practice; Amend leachate collection design if required Implement amended leachate collection system, if necessary
Exceedance of Limit Level of effluent discharge from LTP	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare Notification of Exceedance within 24 hours Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented Repeat measurement to confirm finding if exceedance is due to the Project 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Check with Contractor on the operation performance of the LTP Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice; Carry out remedial measures or amend design as required Implement amended design, if necessary

Action			
Event	ET	IEC	Contractor
	<ul style="list-style-type: none"> Increase monitoring frequency to weekly until no exceedance of Limit Level 		



ANNEX F3

LEACHATE LEVELS MONITORING
RESULTS

TABLE F3.1 LEACHATE LEVEL 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 Jul 23	75	88	82
2 Jul 23	75	86	81
3 Jul 23	75	86	81
4 Jul 23	77	88	83
5 Jul 23	77	88	83
6 Jul 23	75	88	82
7 Jul 23	77	88	83
8 Jul 23	75	88	82
9 Jul 23	77	88	83
10 Jul 23	77	88	83
11 Jul 23	77	88	83
12 Jul 23	77	88	83
13 Jul 23	77	88	83
14 Jul 23	77	88	83
15 Jul 23	77	88	83
16 Jul 23	77	88	83
17 Jul 23	77	88	83
18 Jul 23	77	88	83
19 Jul 23	77	88	83
20 Jul 23	77	88	83
21 Jul 23	77	64	71
22 Jul 23	77	88	83
23 Jul 23	77	88	83
24 Jul 23	77	88	83
25 Jul 23	77	88	83
26 Jul 23	77	88	83
27 Jul 23	77	88	83
28 Jul 23	77	88	83
29 Jul 23	77	88	83
30 Jul 23	77	88	83
31 Jul 23	77	88	83
1 Aug 23	77	88	83
2 Aug 23	77	88	83
3 Aug 23	77	88	83
4 Aug 23	77	88	83

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
5 Aug 23	77	88	83
6 Aug 23	77	85	81
7 Aug 23	77	88	83
8 Aug 23	77	88	83
9 Aug 23	77	88	83
10 Aug 23	77	88	83
11 Aug 23	77	86	82
12 Aug 23	77	88	83
13 Aug 23	77	86	82
14 Aug 23	79	88	84
15 Aug 23	77	88	83
16 Aug 23	77	88	83
17 Aug 23	77	88	83
18 Aug 23	77	88	83
19 Aug 23	77	88	83
20 Aug 23	73	86	80
21 Aug 23	68	82	75
22 Aug 23	75	86	81
23 Aug 23	73	86	80
24 Aug 23	75	86	81
25 Aug 23	68	79	74
26 Aug 23	77	88	83
27 Aug 23	70	82	76
28 Aug 23	70	82	76
29 Aug 23	77	88	83
30 Aug 23	68	79	74
31 Aug 23	66	79	73
1 Sep 23	66	79	73
2 Sep 23	70	82	76
3 Sep 23	70	82	76
4 Sep 23	73	84	79
5 Sep 23	88	82	85
6 Sep 23	75	86	81
7 Sep 23	77	88	83
8 Sep 23	249	237	243
9 Sep 23	240	222	231
10 Sep 23	240	222	231

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
11 Sep 23	233	222	228
12 Sep 23	231	213	222
13 Sep 23	226	209	218
14 Sep 23	213	195	204
15 Sep 23	195	177	186
16 Sep 23	184	166	175
17 Sep 23	164	148	156
18 Sep 23	131	113	122
19 Sep 23	77	88	83
21 Sep 23	75	88	82
22 Sep 23	77	88	83
23 Sep 23	77	88	83
24 Sep 23	77	88	83
25 Sep 23	77	88	83
26 Sep 23	77	88	83
27 Sep 23	77	88	83
28 Sep 23	77	88	83
29 Sep 23	77	66	72
30 Sep 23	77	66	72
Average	92	92	92
Min	66	66	66
Max	249	249	249

TABLE F3.2 LEACHATE LEVEL 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 Jul 23	88	86	87
2 Jul 23	75	66	71
3 Jul 23	75	66	71
4 Jul 23	86	77	82
5 Jul 23	88	86	87
6 Jul 23	88	86	87
7 Jul 23	90	93	92
8 Jul 23	88	86	87
9 Jul 23	84	82	83
10 Jul 23	84	82	83
11 Jul 23	86	84	85
12 Jul 23	75	73	74
13 Jul 23	77	75	76
14 Jul 23	84	82	83
15 Jul 23	79	77	78
16 Jul 23	81	79	80
17 Jul 23	83	81	82
18 Jul 23	84	82	83
19 Jul 23	77	75	76
20 Jul 23	74	66	70
21 Jul 23	74	77	76
22 Jul 23	89	90	90
23 Jul 23	65	66	66
24 Jul 23	65	66	66
25 Jul 23	80	82	81
26 Jul 23	65	66	66
27 Jul 23	78	79	79
28 Jul 23	80	82	81
29 Jul 23	67	68	68
30 Jul 23	80	82	81
31 Jul 23	80	82	81
1 Aug 23	80	84	82
2 Aug 23	72	73	73
3 Aug 23	85	86	86
4 Aug 23	76	77	77

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
5 Aug 23	87	88	88
6 Aug 23	80	82	81
7 Aug 23	76	79	78
8 Aug 23	89	90	90
9 Aug 23	80	82	81
10 Aug 23	74	75	75
11 Aug 23	87	90	89
12 Aug 23	82	86	84
13 Aug 23	82	84	83
14 Aug 23	78	82	80
15 Aug 23	82	84	83
16 Aug 23	80	82	81
17 Aug 23	76	77	77
18 Aug 23	70	77	74
19 Aug 23	87	86	87
20 Aug 23	78	77	78
21 Aug 23	78	77	78
22 Aug 23	63	75	69
23 Aug 23	87	86	87
24 Aug 23	78	75	77
25 Aug 23	87	86	87
26 Aug 23	78	77	78
27 Aug 23	78	77	78
28 Aug 23	78	77	78
29 Aug 23	80	79	80
30 Aug 23	85	84	85
31 Aug 23	87	86	87
1 Sep 23	87	86	87
2 Sep 23	63	82	73
3 Sep 23	63	82	73
4 Sep 23	87	84	86
5 Sep 23	87	84	86
6 Sep 23	87	86	87
7 Sep 23	87	88	88
8 Sep 23	87	88	88
9 Sep 23	67	88	78
10 Sep 23	67	88	78

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
11 Sep 23	85	86	86
12 Sep 23	61	86	74
13 Sep 23	63	84	74
14 Sep 23	87	83	85
15 Sep 23	87	84	86
16 Sep 23	69	84	77
17 Sep 23	89	84	87
18 Sep 23	84	89	87
19 Sep 23	84	84	84
20 Sep 23	87	81	84
21 Sep 23	69	84	77
22 Sep 23	89	86	88
23 Sep 23	82	81	82
24 Sep 23	67	86	77
25 Sep 23	80	84	82
26 Sep 23	89	84	87
27 Sep 23	85	81	83
28 Sep 23	89	86	88
29 Sep 23	80	86	83
30 Sep 23	80	86	83
Average	80	81	81
Min	61	66	66
Max	90	93	92

TABLE F3.3 LEACHATE LEVEL 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 Jul 23	64	68	66
2 Jul 23	70	73	72
3 Jul 23	70	73	72
4 Jul 23	64	68	66
5 Jul 23	70	73	72
6 Jul 23	57	62	60
7 Jul 23	64	68	66
8 Jul 23	64	68	66
9 Jul 23	62	66	64
10 Jul 23	64	68	66
11 Jul 23	66	70	68
12 Jul 23	66	70	68
13 Jul 23	66	70	68
14 Jul 23	64	68	66
15 Jul 23	59	64	62
16 Jul 23	60	65	62
17 Jul 23	61	66	63
18 Jul 23	62	66	64
19 Jul 23	64	68	66
20 Jul 23	59	66	63
21 Jul 23	55	59	57
22 Jul 23	68	78	73
23 Jul 23	66	70	68
24 Jul 23	66	70	68
25 Jul 23	70	75	73
26 Jul 23	57	62	60
27 Jul 23	62	68	65
28 Jul 23	70	75	73
29 Jul 23	57	64	61
30 Jul 23	48	59	54
31 Jul 23	64	68	66
1 Aug 23	57	62	60
2 Aug 23	66	70	68
3 Aug 23	55	62	59
4 Aug 23	64	68	66

Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
5 Aug 23	57	64	61
6 Aug 23	53	57	55
7 Aug 23	64	68	66
8 Aug 23	70	77	74
9 Aug 23	59	64	62
10 Aug 23	64	70	67
11 Aug 23	53	59	56
12 Aug 23	53	59	56
13 Aug 23	62	66	64
14 Aug 23	55	62	59
15 Aug 23	68	68	68
16 Aug 23	66	64	65
17 Aug 23	59	59	59
18 Aug 23	68	66	67
19 Aug 23	64	66	65
20 Aug 23	62	62	62
21 Aug 23	70	70	70
22 Aug 23	70	70	70
23 Aug 23	59	59	59
24 Aug 23	57	64	61
25 Aug 23	70	70	70
26 Aug 23	70	70	70
27 Aug 23	55	55	55
28 Aug 23	55	55	55
29 Aug 23	70	70	70
30 Aug 23	55	55	55
31 Aug 23	57	57	57
1 Sep 23	57	57	57
2 Sep 23	55	64	60
3 Sep 23	55	64	60
4 Sep 23	57	59	58
5 Sep 23	57	68	63
6 Sep 23	57	62	60
7 Sep 23	52	57	55
8 Sep 23	204	213	209
9 Sep 23	204	213	209
10 Sep 23	204	213	209

Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
11 Sep 23	204	215	210
12 Sep 23	208	217	213
13 Sep 23	213	222	218
14 Sep 23	213	222	218
15 Sep 23	211	220	216
16 Sep 23	213	222	218
17 Sep 23	208	220	214
18 Sep 23	204	214	209
19 Sep 23	197	208	203
20 Sep 23	186	197	192
21 Sep 23	151	157	154
22 Sep 23	151	77	114
23 Sep 23	71	73	72
24 Sep 23	48	50	49
25 Sep 23	71	73	72
26 Sep 23	73	75	74
27 Sep 23	53	55	54
28 Sep 23	55	57	56
29 Sep 23	77	79	78
30 Sep 23	77	79	78
Average	84	88	86
Min	48	50	49
Max	213	222	218

TABLE F3.4 LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.4X (CELL 4X))

Date	Meter No.X7 (cm)	Meter No.X8 (cm)	Average (cm)
Pump Station No. 4X (Cell 4X)			
1 Jul 23	52	48	50
2 Jul 23	52	65	59
3 Jul 23	52	65	59
4 Jul 23	56	41	49
5 Jul 23	63	61	62
6 Jul 23	61	56	59
7 Jul 23	70	67	69
8 Jul 23	61	61	61
9 Jul 23	63	61	62
10 Jul 23	52	52	52
11 Jul 23	65	65	65
12 Jul 23	50	50	50
13 Jul 23	54	52	53
14 Jul 23	52	52	52
15 Jul 23	70	70	70
16 Jul 23	68	68	68
17 Jul 23	66	66	66
18 Jul 23	65	65	65
19 Jul 23	63	61	62
20 Jul 23	54	45	50
21 Jul 23	52	50	51
22 Jul 23	59	56	58
23 Jul 23	56	56	56
24 Jul 23	56	56	56
25 Jul 23	61	61	61
26 Jul 23	65	65	65
27 Jul 23	52	61	57
28 Jul 23	52	89	71
29 Jul 23	52	61	57
30 Jul 23	61	59	60
31 Jul 23	56	65	61
1 Aug 23	61	70	66
2 Aug 23	52	61	57
3 Aug 23	59	56	58
4 Aug 23	63	63	63

Date	Meter No.X7 (cm)	Meter No.X8 (cm)	Average (cm)
5 Aug 23	63	70	67
6 Aug 23	56	63	60
7 Aug 23	59	67	63
8 Aug 23	61	70	66
9 Aug 23	63	70	67
10 Aug 23	56	54	55
11 Aug 23	54	61	58
12 Aug 23	54	54	54
13 Aug 23	59	67	63
14 Aug 23	61	70	66
15 Aug 23	61	67	64
16 Aug 23	59	67	63
17 Aug 23	59	67	63
18 Aug 23	59	67	63
19 Aug 23	52	61	57
20 Aug 23	56	65	61
21 Aug 23	56	65	61
22 Aug 23	59	67	63
23 Aug 23	56	65	61
24 Aug 23	59	57	58
25 Aug 23	56	52	54
26 Aug 23	61	67	64
27 Aug 23	61	54	58
28 Aug 23	61	54	58
29 Aug 23	63	54	59
30 Aug 23	61	70	66
31 Aug 23	61	70	66
1 Sep 23	61	70	66
2 Sep 23	67	54	61
3 Sep 23	67	54	61
4 Sep 23	61	56	59
5 Sep 23	56	56	56
6 Sep 23	59	67	63
7 Sep 23	61	70	66
8 Sep 23	276	274	275
9 Sep 23	276	274	275
10 Sep 23	276	274	275

Date	Meter No.X7 (cm)	Meter No.X8 (cm)	Average (cm)
11 Sep 23	287	278	283
12 Sep 23	283	274	279
13 Sep 23	278	270	274
14 Sep 23	267	278	273
15 Sep 23	259	278	269
16 Sep 23	259	267	263
17 Sep 23	261	278	270
18 Sep 23	252	272	262
19 Sep 23	232	252	242
20 Sep 23	197	215	206
21 Sep 23	114	131	123
22 Sep 23	52	74	63
23 Sep 23	54	70	62
24 Sep 23	70	63	67
25 Sep 23	54	74	64
26 Sep 23	56	65	61
27 Sep 23	65	74	70
28 Sep 23	67	74	71
29 Sep 23	61	64	63
30 Sep 23	61	64	63
Average	88	92	90
Min	50	41	49
Max	287	278	283

FIGURE F3.1 GRAPHICAL PRESENTATION FOR LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.1X (CELL 1X))

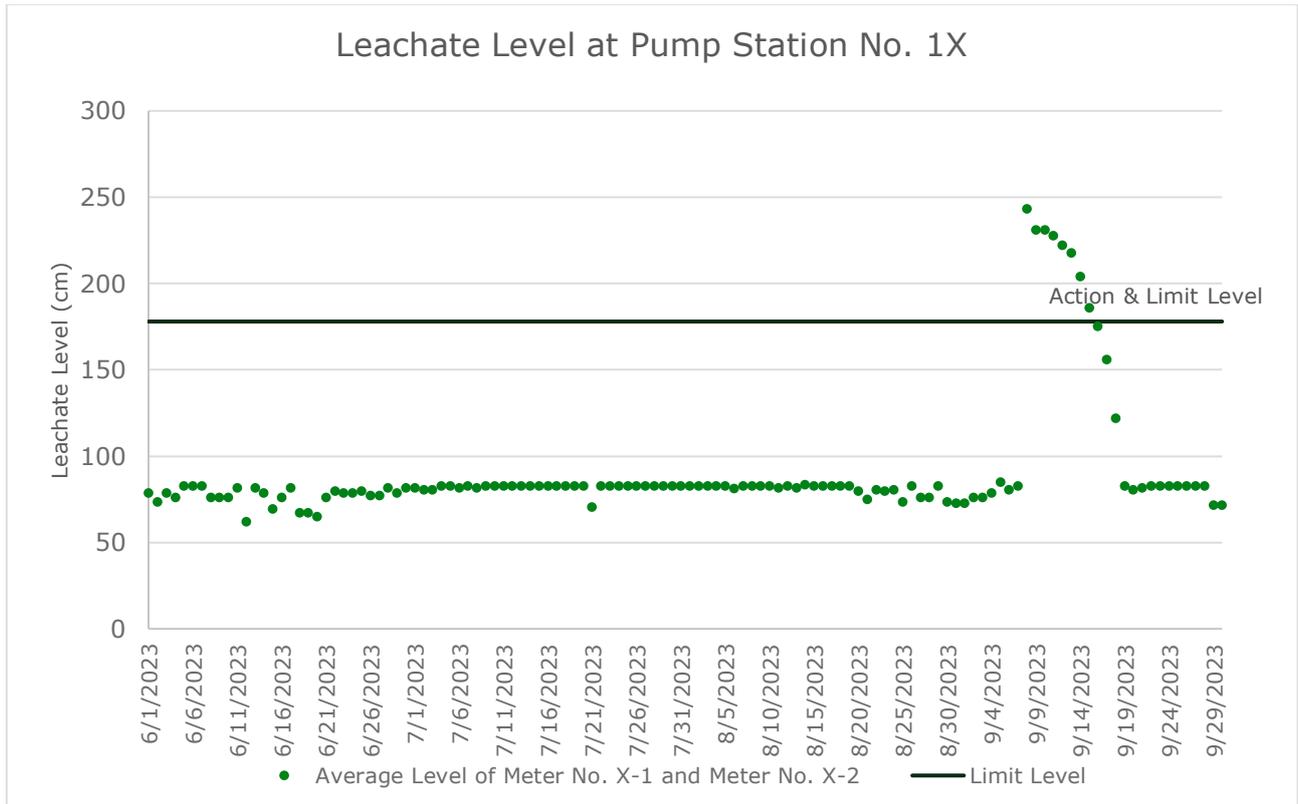


FIGURE F3.2 GRAPHICAL PRESENTATION FOR LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.2X (CELL 2X))

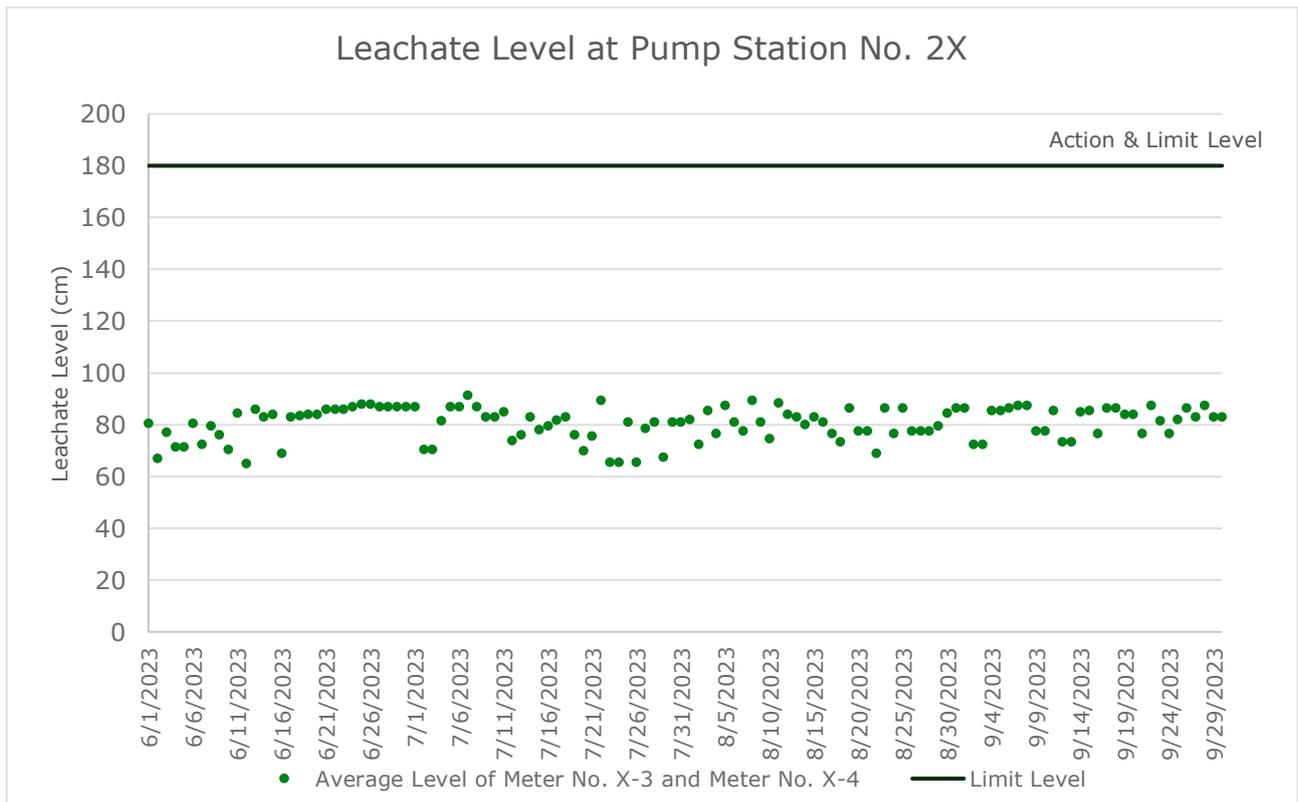


FIGURE F3.3 GRAPHICAL PRESENTATION FOR LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.3X (CELL 3X))

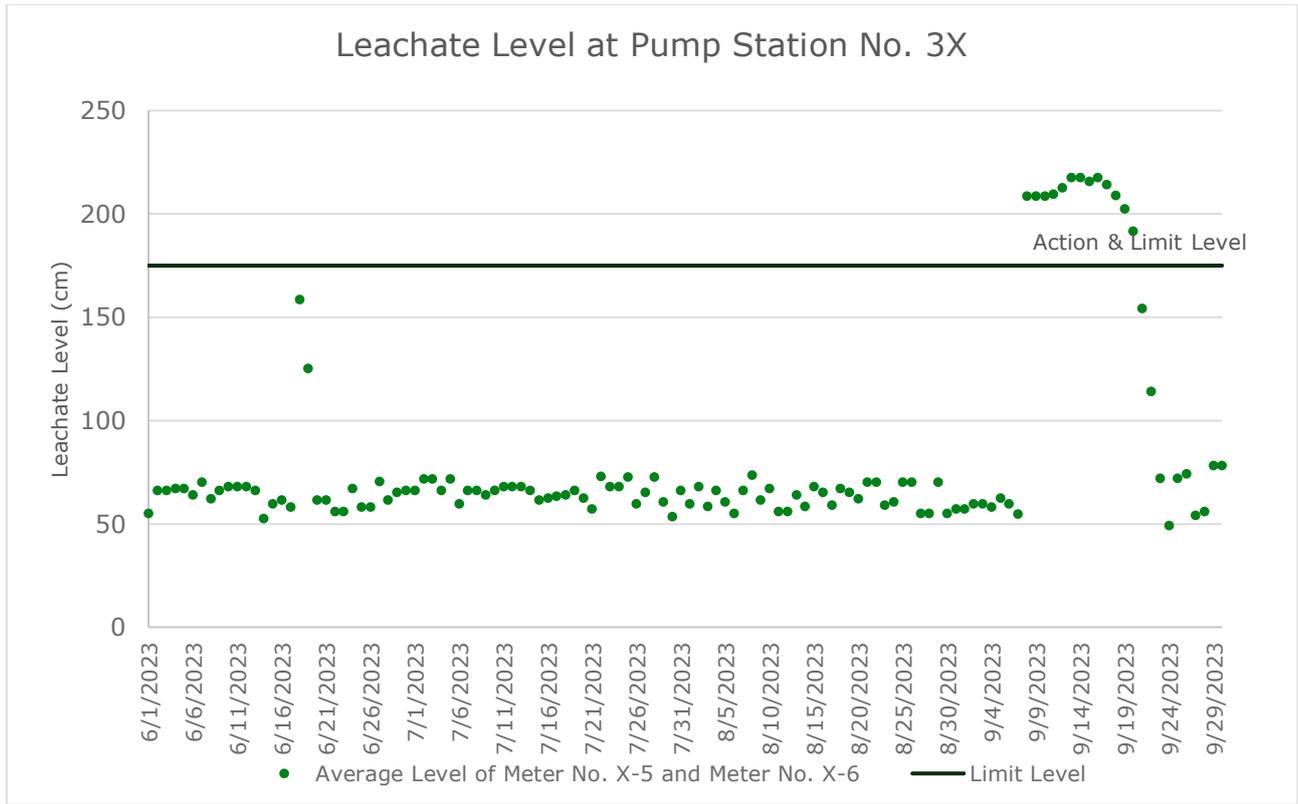
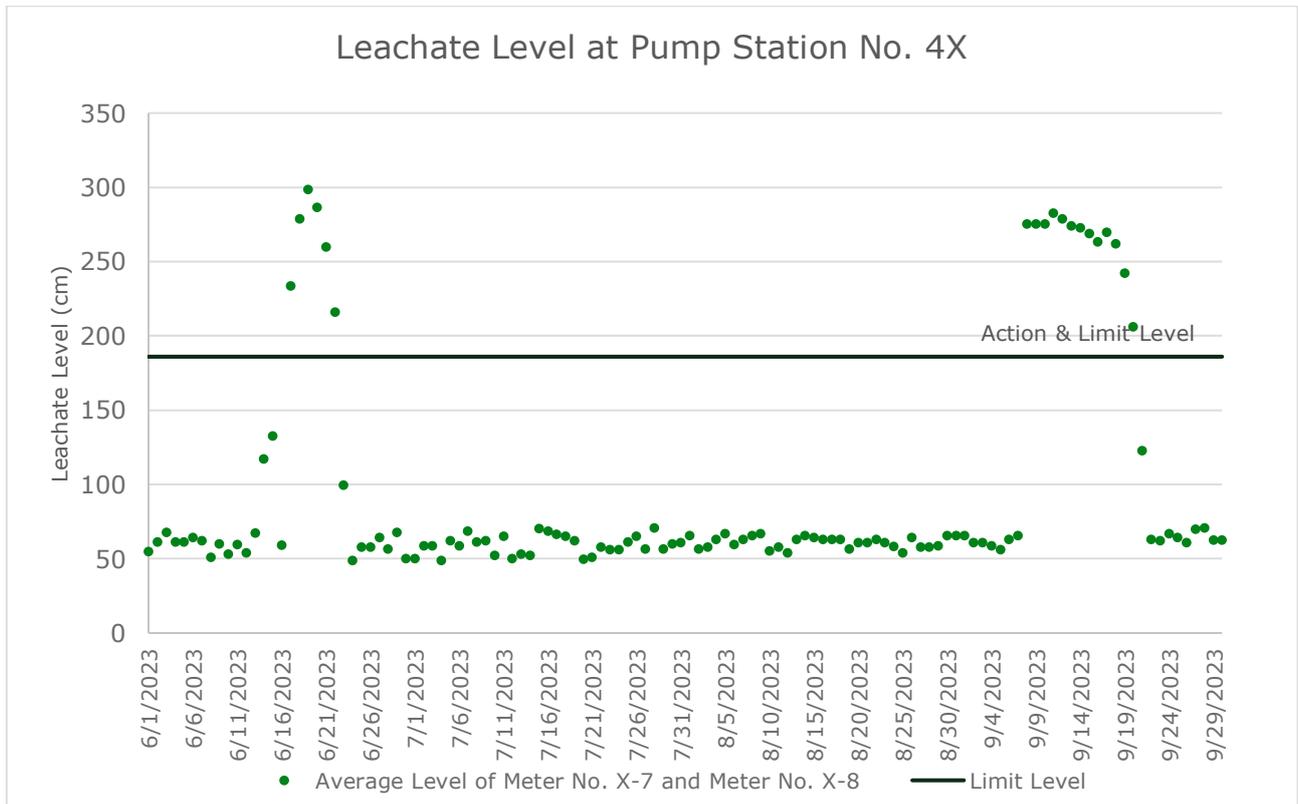


FIGURE F3.4 GRAPHICAL PRESENTATION FOR LEACHATE LEVEL MONITORING RESULTS (PUMP STATION NO.4X (CELL 4X))





ANNEX F4

EFFLUENT QUALITY MONITORING
RESULTS

TABLE F4.1 EFFLUENT MONITORING RESULTS

Date		6 Jul 23	2 Aug 23	7 Sep 23
On-site Measurements				
Temperature	°C	33.2	35.8	33.0
pH Value	pH Unit	8.4	8.4	8.3
Volume Discharged	m ³	1,013	728	775
Laboratory Analysis				
Suspended Solids (SS)	mg/L	41.0	39.8	28.3
Alkalinity	mg/L	1790	2300	1260
Ammoniacal-nitrogen	mg/L	0.26	0.02	0.44
Chloride	mg/L	1820	2380	1510
Nitrite-nitrogen	mg/L	0.15	0.22	<0.10
Phosphate	mg/L	3.54	8.28	2.28
Sulphate	mg/L	324	244	451
Total Nitrogen	mg/L	114	119	104
Nitrate-nitrogen	mg/L	52.1	59.5	53.7
Total Inorganic Nitrogen	mg/L	52.51	59.74	54.14
Biochemical Oxygen Demand (BOD)	mg/L	9	9	11
Chemical Oxygen Demand (COD)	mg/L	796	1130	675
Oil & Grease	mg/L	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	288	354	254
Boron	µg/L	5220	6000	3850
Calcium	mg/L	40.3	21.7	37.2
Iron	mg/L	2.0	1.84	1.13
Magnesium	mg/L	28.8	31.2	36.0
Potassium	mg/L	738	869	555
Cadmium	µg/L	<1.0	<1.0	<1.0
Chromium	µg/L	111	129	85
Copper	µg/L	<10	<10	11
Nickel	µg/L	101	126	82
Zinc	µg/L	99	82	114



ANNEX F5

GROUNDWATER MONITORING RESULTS

TABLE F5.1 GROUNDWATER MONITORING RESULTS (JULY 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	4.71	3.81	3.44	3.97	3.72	3.41	3.54	3.36	4.14	4.13	3.77	6.99	37.02	43.41
Bicarbonate Alkalinity as CaCO ₃	mg/L	140	235	172	<1	37	<1	<1	<1	145	237	200	54	17	14
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	<1	68	9	132	88	78	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO ₃	mg/L	140	235	172	72	46	179	112	104	145	237	200	54	17	14
pH Value	pH Unit	7.7	8.1	8	10.4	8.9	11.3	10.9	11	8	7.8	7.9	7	5.8	5.7
Electrical Conductivity	µS/cm	944	3340	1080	692	1340	1250	1400	2070	7110	1200	641	300	91	101
Ammonia	mg/L	0.07	0.6	1.43	2.37	1.47	3.44	5.16	4.53	0.4	<0.01	<0.01	<0.01	<0.01	<0.01
Chloride	mg/L	173	752	177	125	270	194	243	466	2110	159	46	21	14	17
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus	mg/L	<0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	0.02	0.01	0.04	0.01	<0.01
Sulphate	mg/L	68	390	115	72	184	114	164	252	500	155	71	57	3	4
Sulphide	mg/L	<0.1	<0.1	<0.1	4.1	0.5	6.4	1.9	2.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	0.2	0.6	1.7	2.8	2	4.4	5.9	6.1	0.6	0.2	0.1	<0.1	<0.1	<0.1
Nitrate	mg/L	0.35	0.79	<0.01	<0.01	<0.01	0.01	<0.01	0.04	0.43	0.02	0.04	<0.01	0.12	0.08
Total Nitrogen	mg/L	0.6	1.4	1.7	2.8	2	4.5	5.9	6.1	1.1	0.2	0.2	<0.1	0.2	0.1
Boron	µg/L	120	460	200	210	210	190	220	170	1520	350	110	30	20	20
Calcium	mg/L	58.4	81.5	77.6	20	29.8	33.8	22.1	76.6	135	92.6	81.7	24.2	0.73	1.15
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

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
Magnesium	mg/L	7.88	78.2	4.78	0.66	0.48	<0.05	<0.05	<0.05	96.1	8.42	4.69	3.75	0.92	0.8
Sodium	mg/L	97	419	110	89.4	177	153	198	266	1180	127	36	22.9	12.4	13.3
Iron	mg/L	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.43	<0.04	<0.04
Potassium	mg/L	16.9	30.4	26	24.9	58.6	55.3	52.1	75.3	67.5	13.7	8.88	2.74	3.59	3.54
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	2	<1	2	1	3	<1	<1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	176	157	962	2	6	<1	<1	2	162	795	47	755	18	9
Nickel	µg/L	<1	<1	<1	<1	<1	2	2	3	<1	<1	<1	<1	<1	<1
Zinc	µg/L	12	10	495	<10	<10	<10	<10	<10	<10	<10	17	20	<10	16
Biochemical Oxygen Demand	mg/L	<2	<2	<2	<2	<2	6	<2	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	7	28	18	19	30	43	41	32	23	10	7	<2	<2	<2
Total Organic Carbon	mg/L	3	<1	4	5	9	10	12	10	4	3	2	<1	<1	<1

TABLE F5.2 GROUNDWATER MONITORING RESULTS (AUGUST 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	3.11	3.71	2.94	3.57	3.02	2.81	3.04	3.36	4.24	3.33	3.37	6.89	36.52	44.01
Bicarbonate Alkalinity as CaCO ₃	mg/L	141	264	198	22	50	12	18	8	166	230	198	54	17	13
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	<1	50	5	133	74	68	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO ₃	mg/L	141	264	198	73	54	145	92	76	166	230	198	54	17	13
pH Value	pH Unit	7.6	8.4	8.3	10.4	8.6	11.3	10.7	11	8.2	8.2	8.3	7.4	5.8	5.7
Electrical Conductivity	µS/cm	1000	1420	987	794	1300	1100	1350	2240	10400	994	663	300	94	96
Ammonia	mg/L	0.14	0.05	1.33	3.47	1.6	4.32	4.94	7.52	0.72	<0.01	0.05	<0.01	<0.01	<0.01
Chloride	mg/L	201	146	140	159	257	205	263	548	3360	118	48	21	15	18
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	0.08	<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	0.06	0.02	0.01	0.05	<0.01	<0.01
Sulphate	mg/L	64	315	94	79	167	96	170	240	637	117	73	57	3	4
Sulphide	mg/L	<0.1	<0.1	<0.1	3.9	<0.1	12.1	<0.1	2.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	0.2	<0.1	1.4	3.5	1.8	4.5	5.1	7.7	0.8	0.1	0.1	<0.1	<0.1	<0.1
Nitrate	mg/L	0.04	1.14	0.01	<0.01	<0.01	0.01	0.03	0.02	0.02	<0.01	<0.01	0.01	0.1	0.13
Total Nitrogen	mg/L	0.3	1.2	1.4	3.5	1.8	4.5	5.2	7.8	0.8	0.1	0.1	<0.1	0.1	0.1
Boron	µg/L	130	230	200	200	210	180	220	170	2120	270	110	30	20	20
Calcium	mg/L	59.3	76.9	76.1	23	23.6	31.3	19.5	79.4	115	88.2	80.6	23.9	0.79	0.88
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



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
Magnesium	mg/L	8.99	65.4	5.13	0.41	0.41	<0.05	<0.05	0.45	152	8.13	4.95	1.32	0.9	0.77
Sodium	mg/L	109	105	86.2	105	181	161	189	313	1800	95.8	37.8	23.2	12.6	12.8
Iron	mg/L	<0.04	<0.04	0.12	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.46	<0.04	<0.04
Potassium	mg/L	20	18.5	27.5	26	60.4	55.1	51.2	81.1	78.3	14.6	8.26	2.52	3.58	3.39
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	4	<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	426	142	901	<1	4	<1	<1	<1	239	812	436	735	16	6
Nickel	µg/L	<1	<1	<1	<1	<1	2	2	4	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	29	12	<10	<10	<10	16	27	14	16
Biochemical Oxygen Demand	mg/L	<2	<2	<2	2	<2	9	<2	4	2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	4	3	13	24	24	49	28	30	54	4	6	<2	<2	<2
Total Organic Carbon	mg/L	2	<1	8	6	9	10	12	12	7	2	2	<1	<1	1

TABLE F5.3 GROUNDWATER MONITORING RESULTS (SEPTEMBER 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	3.81	4.01	4.54	4.47	3.92	4.01	3.74	4.96	5.04	4.93	6.47	7.49	38.72	46.41
Bicarbonate Alkalinity as CaCO ₃	mg/L	141	264	198	22	50	12	18	8	166	230	198	54	17	13
Carbonate Alkalinity as CaCO ₃	mg/L	<1	<1	<1	<1	10	116	70	73	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO ₃	mg/L	115	215	192	48	54	152	92	108	162	260	135	57	18	16
pH Value	pH Unit	8	8	7.9	8.3	9	11	10.6	11	8	7.3	7.8	6.9	5.7	5.7
Electrical Conductivity	µS/cm	1120	5770	1340	1800	900	1090	1460	2850	14400	1190	441	318	95	145
Ammonia	mg/L	0.12	0.95	1.6	0.6	0.48	2.86	4.8	5.32	0.55	<0.01	<0.01	<0.01	<0.01	<0.01
Chloride	mg/L	196	1550	210	338	148	156	310	693	4400	124	33	20	15	24
Nitrite	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphorus	mg/L	0.01	0.02	0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.06	0.02	<0.01	0.03	0.01	<0.01
Sulphate	mg/L	130	447	162	321	139	117	141	216	790	147	39	65	3	10
Sulphide	mg/L	<0.1	<0.1	<0.1	0.4	0.6	5.5	3.8	2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	0.4	1.9	1.8	1.1	1	4	6.4	6.3	0.6	0.2	0.1	0.1	<0.1	<0.1
Nitrate	mg/L	<0.01	1.74	0.02	<0.01	<0.01	<0.01	0.01	0.07	<0.01	<0.01	0.15	<0.01	0.13	0.21
Total Nitrogen	mg/L	0.4	3.7	1.8	1.1	1	4	6.4	6.5	0.6	0.2	0.3	0.1	0.1	0.2
Boron	µg/L	170	710	220	400	240	250	280	200	2560	430	100	30	20	20
Calcium	mg/L	58.4	101	117	76.9	24.8	17.4	23.3	116	127	103	52.1	28.8	0.82	2.6
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



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
Magnesium	mg/L	6.83	106	8.51	2.05	0.61	<0.05	0.2	223	223	8.91	3.03	4.24	0.96	1.67
Sodium	mg/L	140	903	127	259	118	158	223	386	2410	134	29.3	25.1	14.1	18.5
Iron	mg/L	<0.04	<0.04	0.14	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.24	<0.04	<0.04
Potassium	mg/L	24.3	53.7	32.5	42.6	52	61.8	62.4	100	135	16.2	8.29	3.53	4.34	5.31
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	4	2	2
Lead	µg/L	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	487	221	1180	28	6	<1	<1	<1	249	1100	18	746	10	9
Nickel	µg/L	<1	<1	<1	<1	<1	2	2	3	<1	<1	<1	<1	<1	<1
Zinc	µg/L	324	<10	68	<10	<10	<10	20	<10	12	11	<10	22	23	24
Biochemical Oxygen Demand	mg/L	<2	<2	<2	2	<2	4	3	2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	15	14	18	19	20	36	40	32	<20	9	7	7	8	8
Total Organic Carbon	mg/L	7	2	6	9	6	10	11	9	<5	4	4	2	4	4

FIGURE F5.1 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-1)

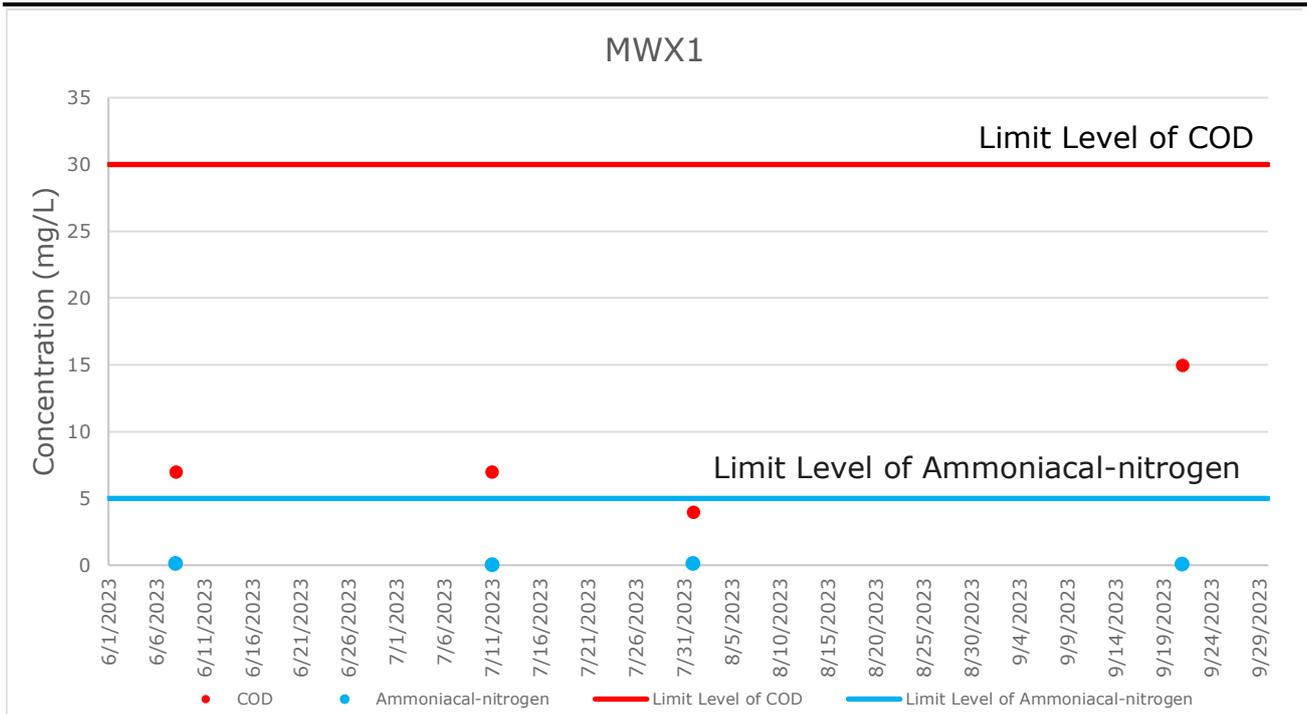


FIGURE F5.2 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-2)

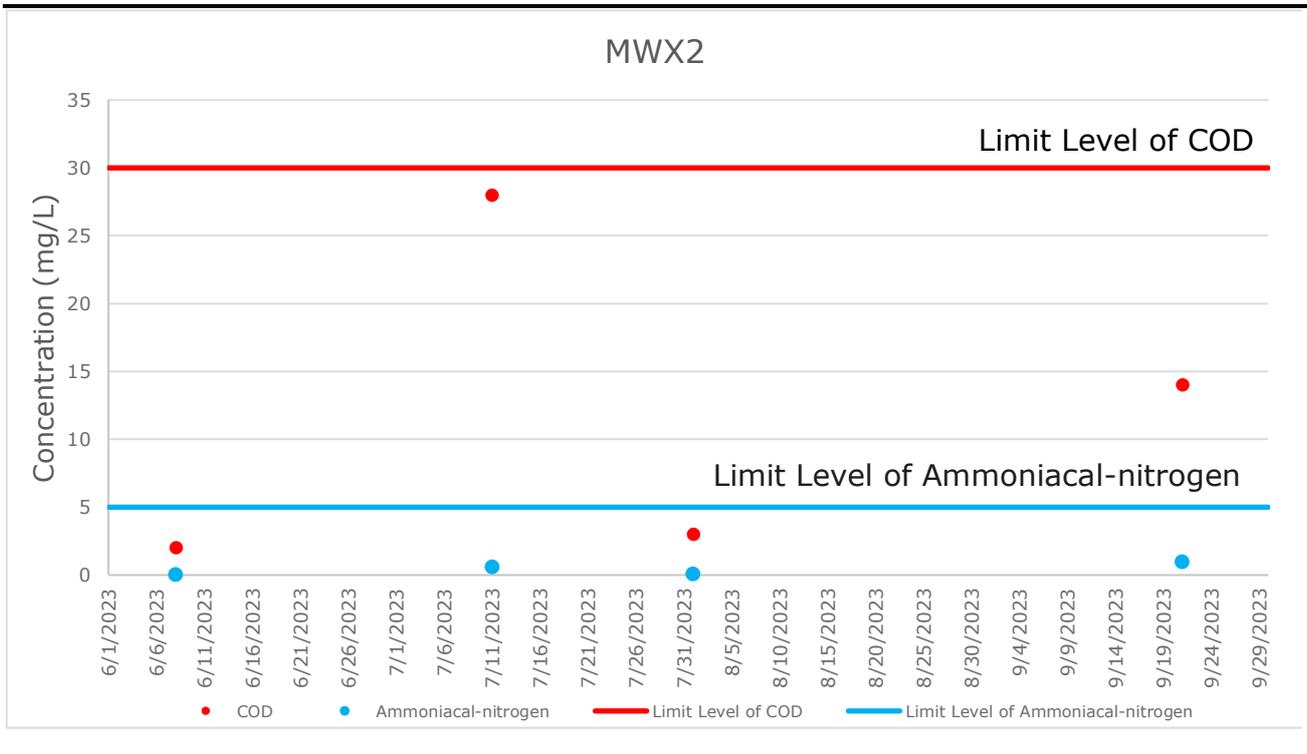


FIGURE F5.3 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-3)

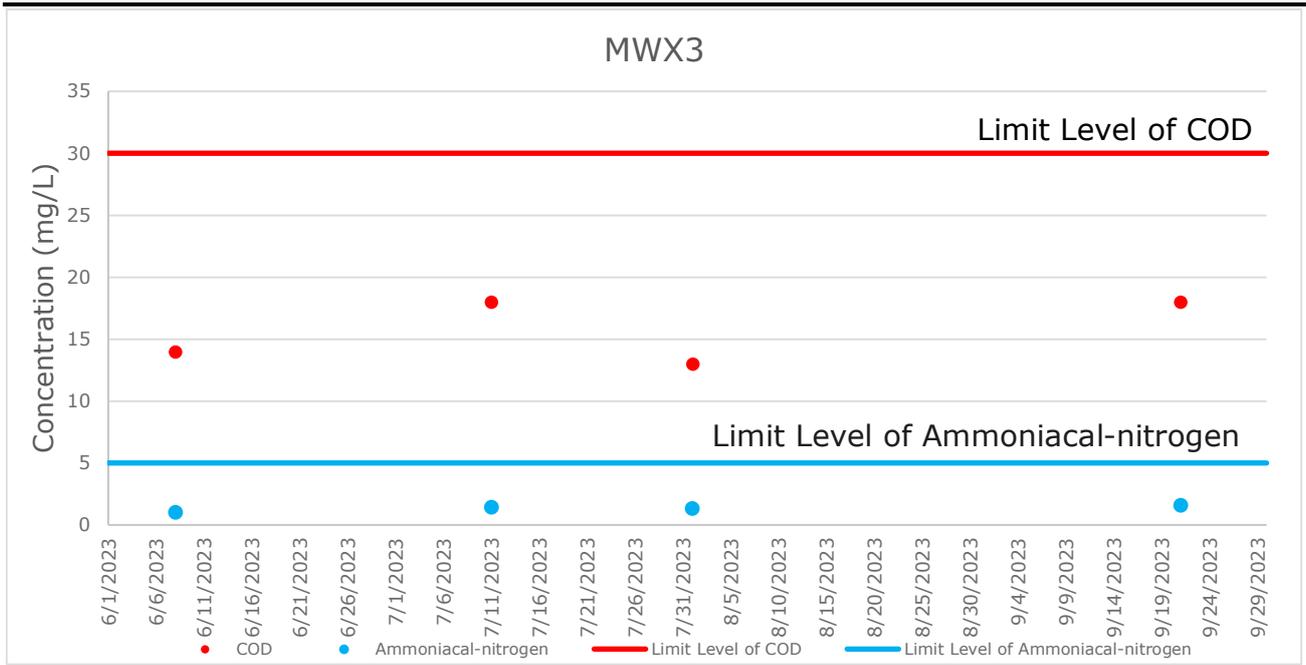


FIGURE F5.4 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-4)

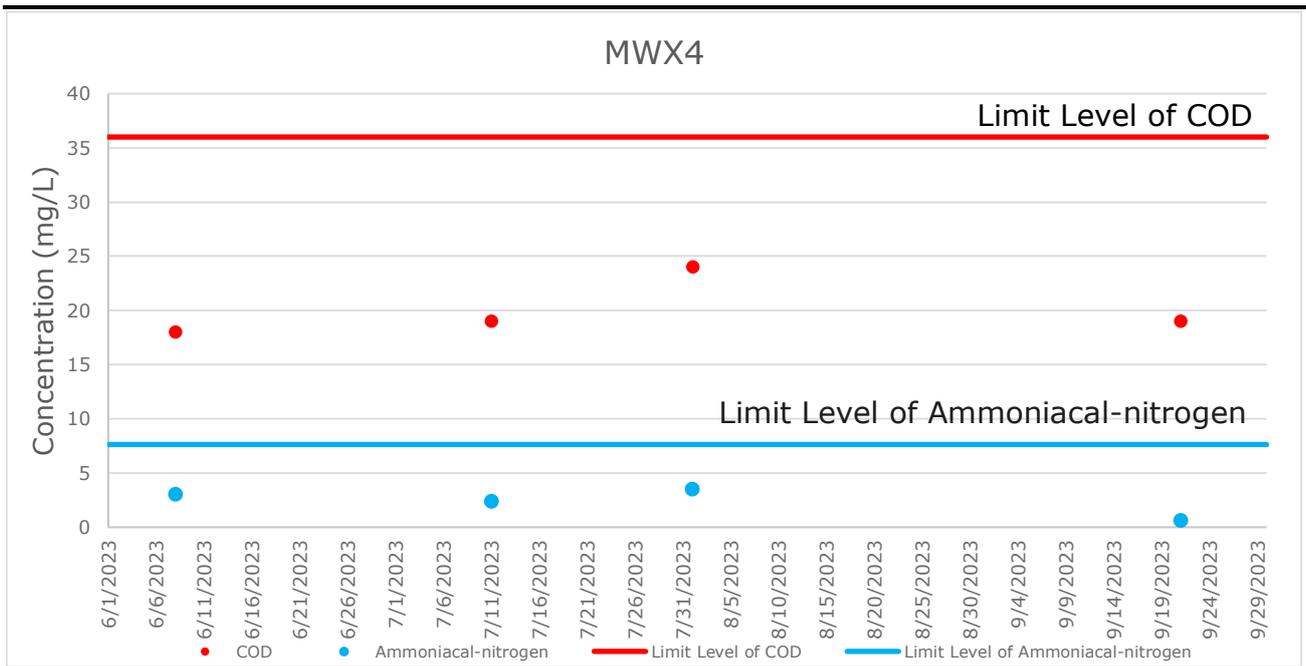


FIGURE F5.5 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-5)

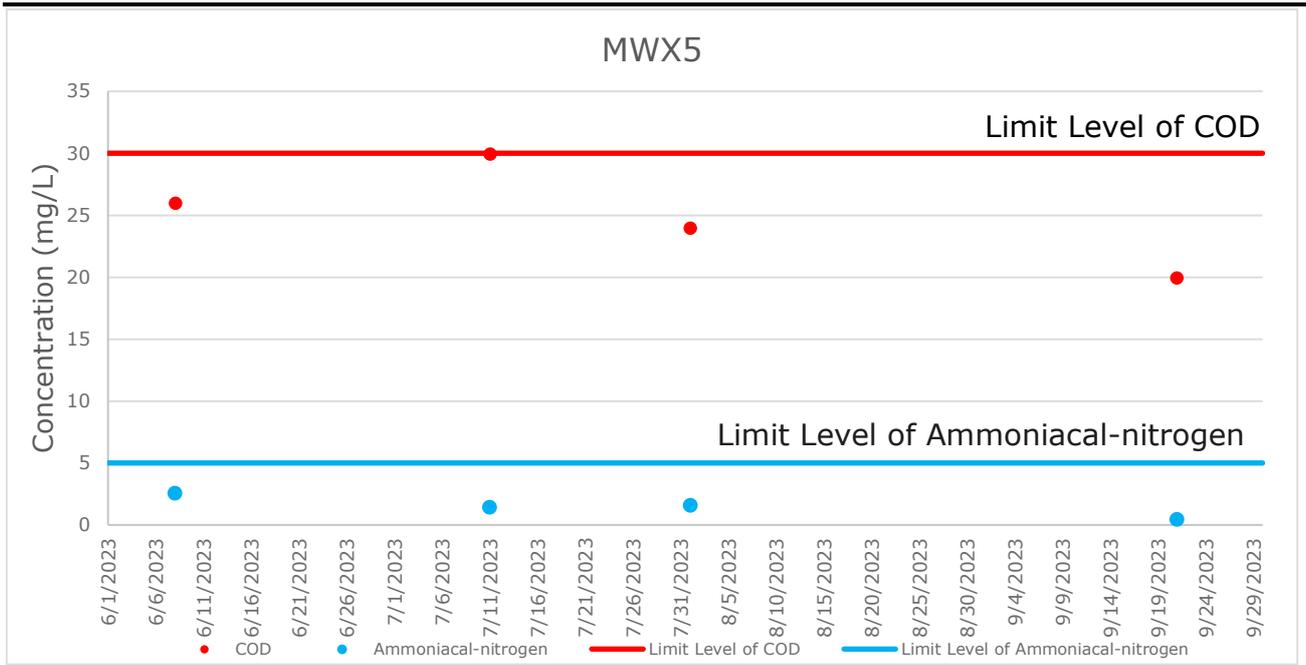


FIGURE F5.6 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-6)

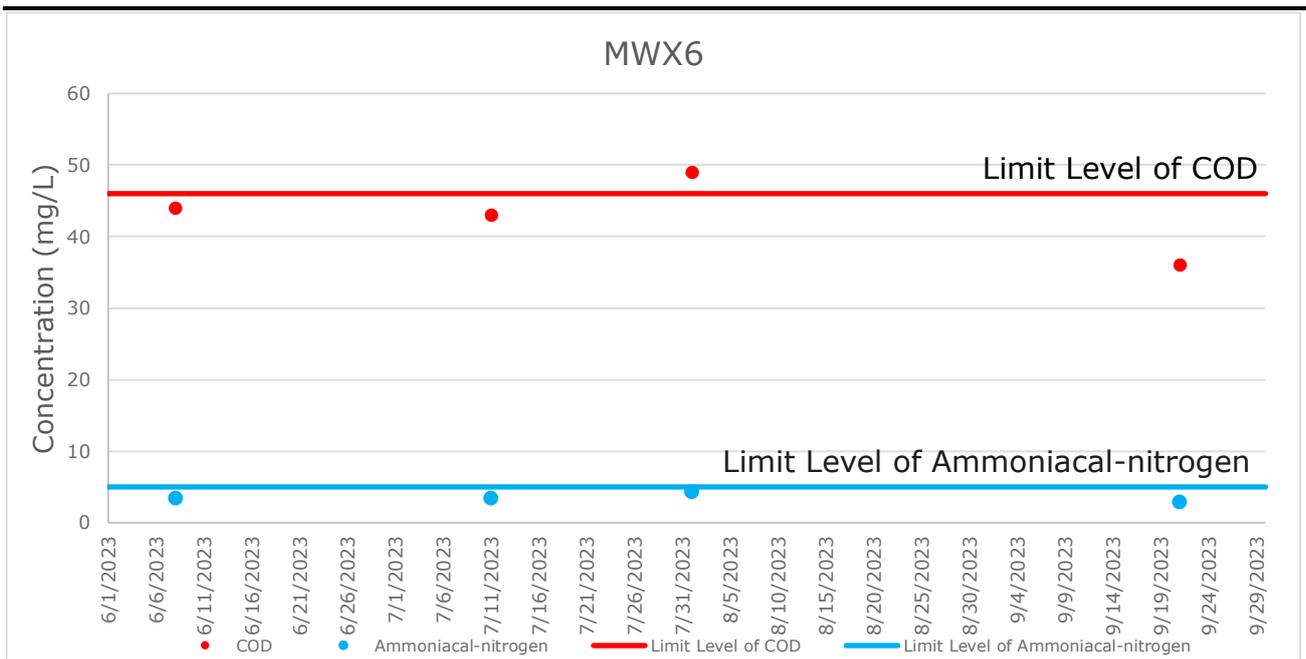


FIGURE F5.7 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-7)

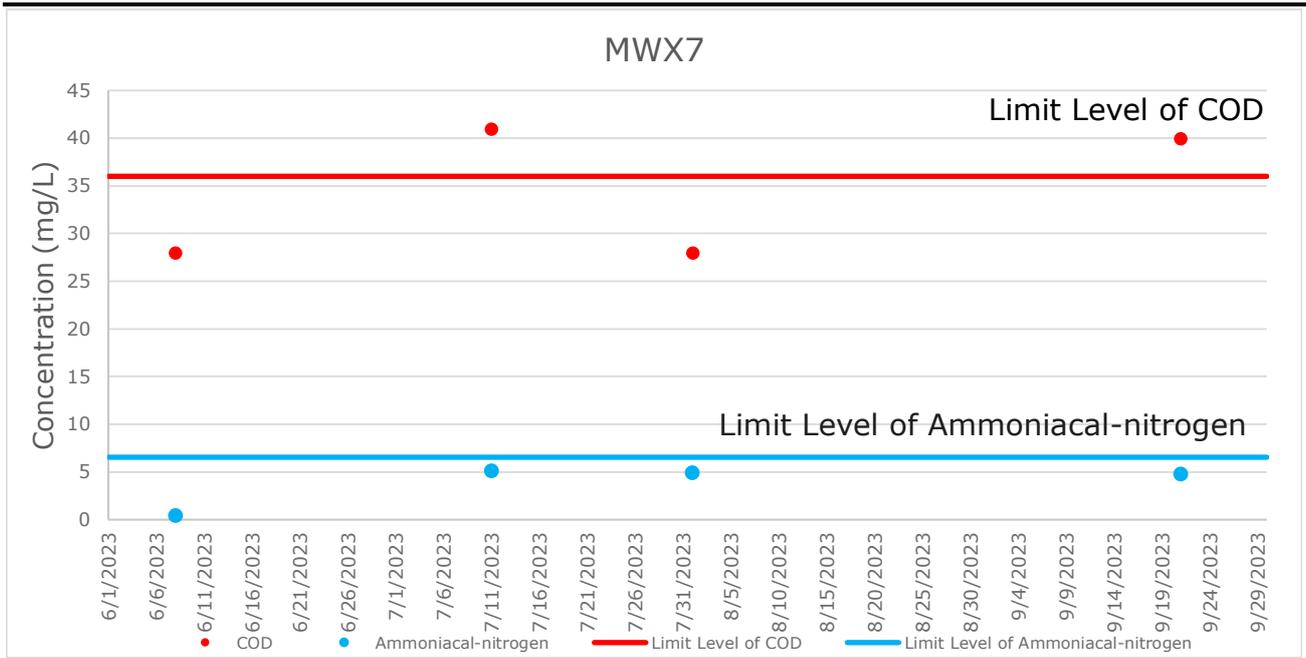


FIGURE F5.8 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-8)

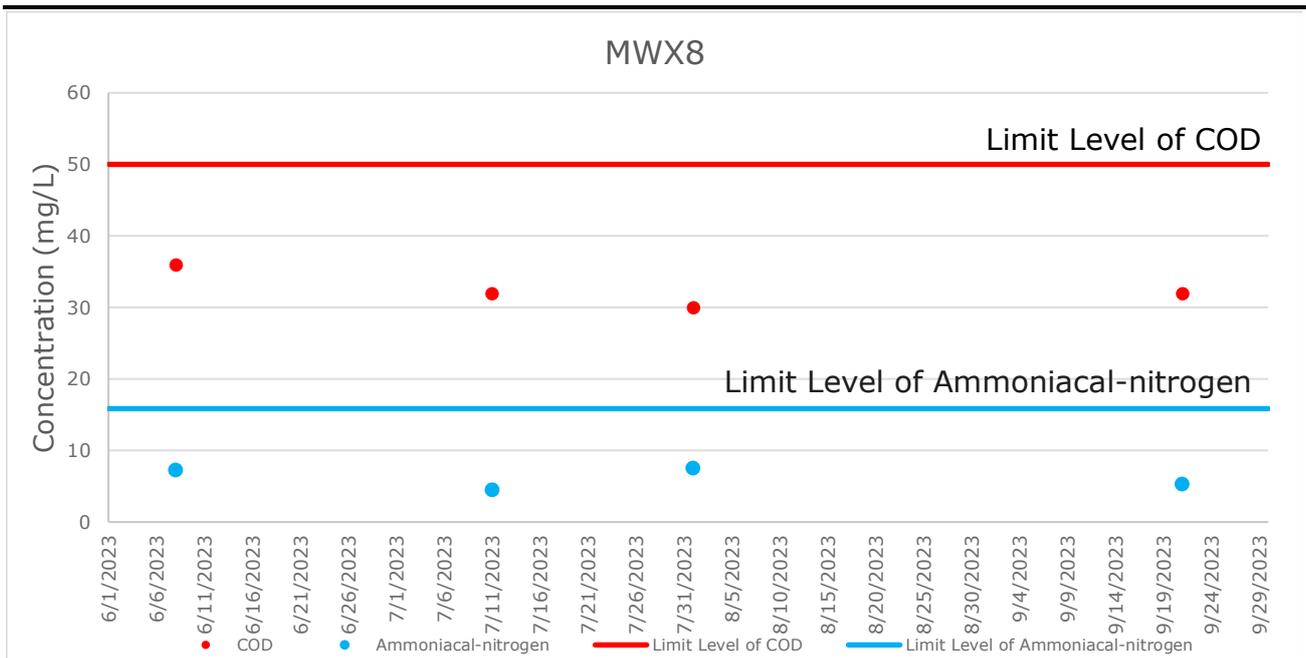


FIGURE F5.9 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-9)

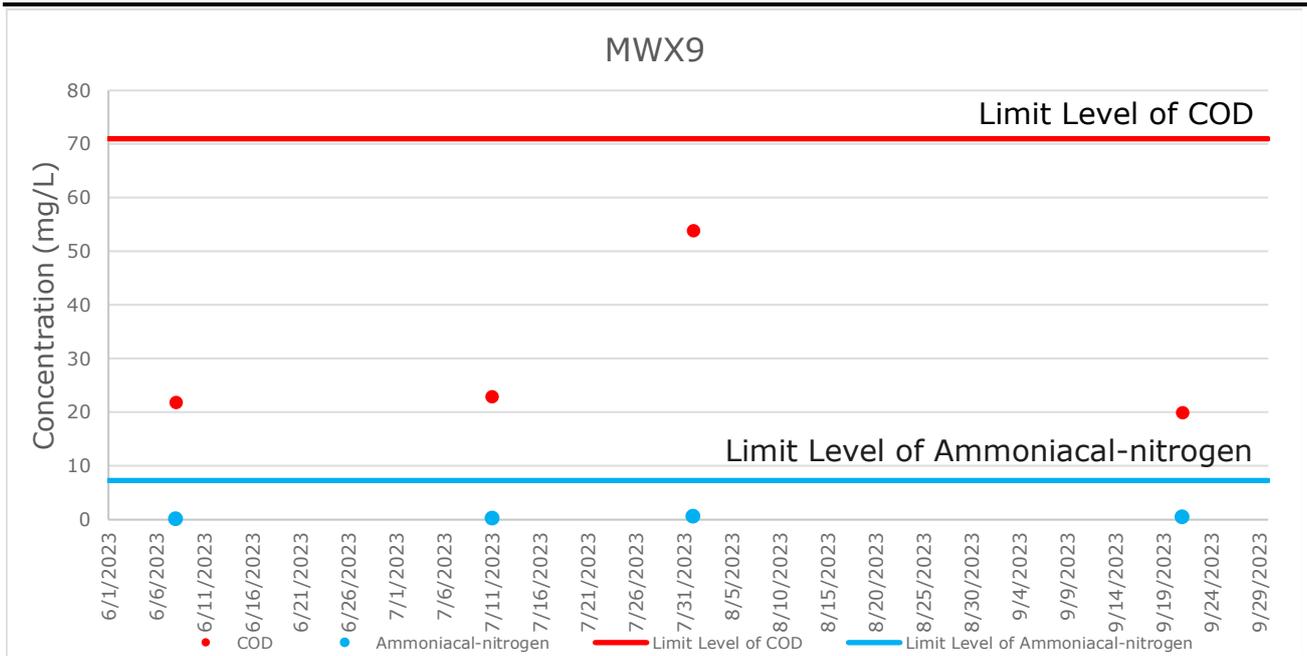


FIGURE F5.10 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-10)

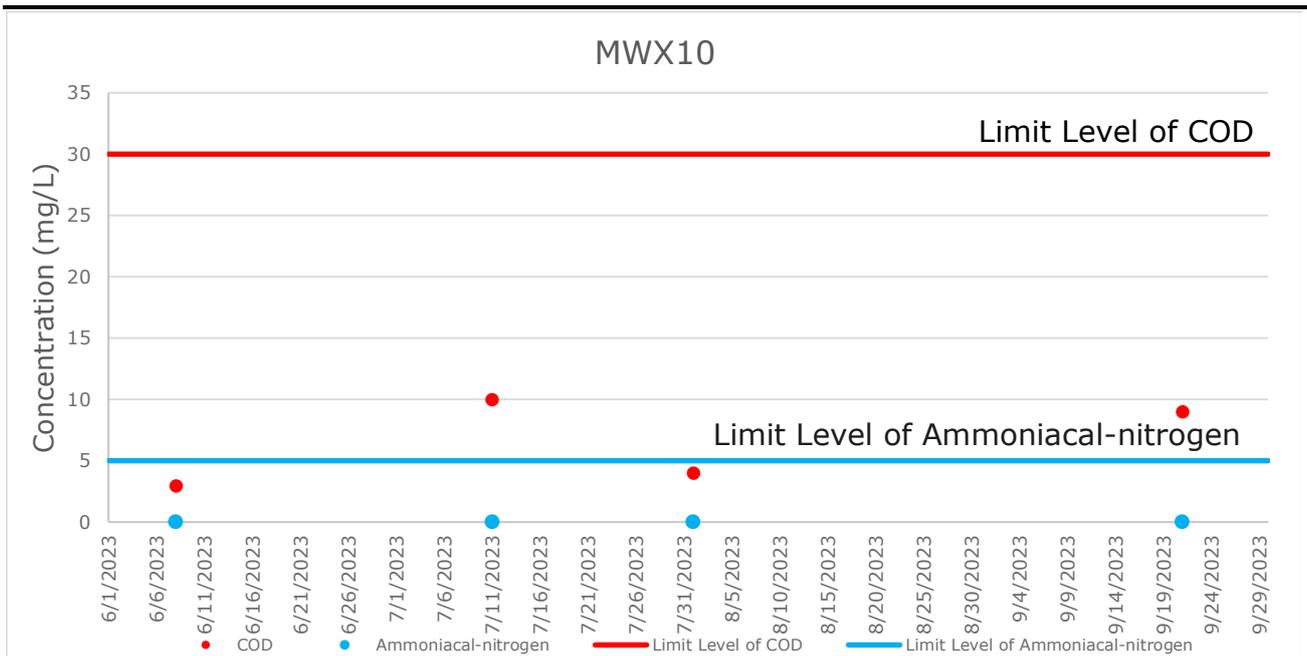


FIGURE F5.11 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-11)

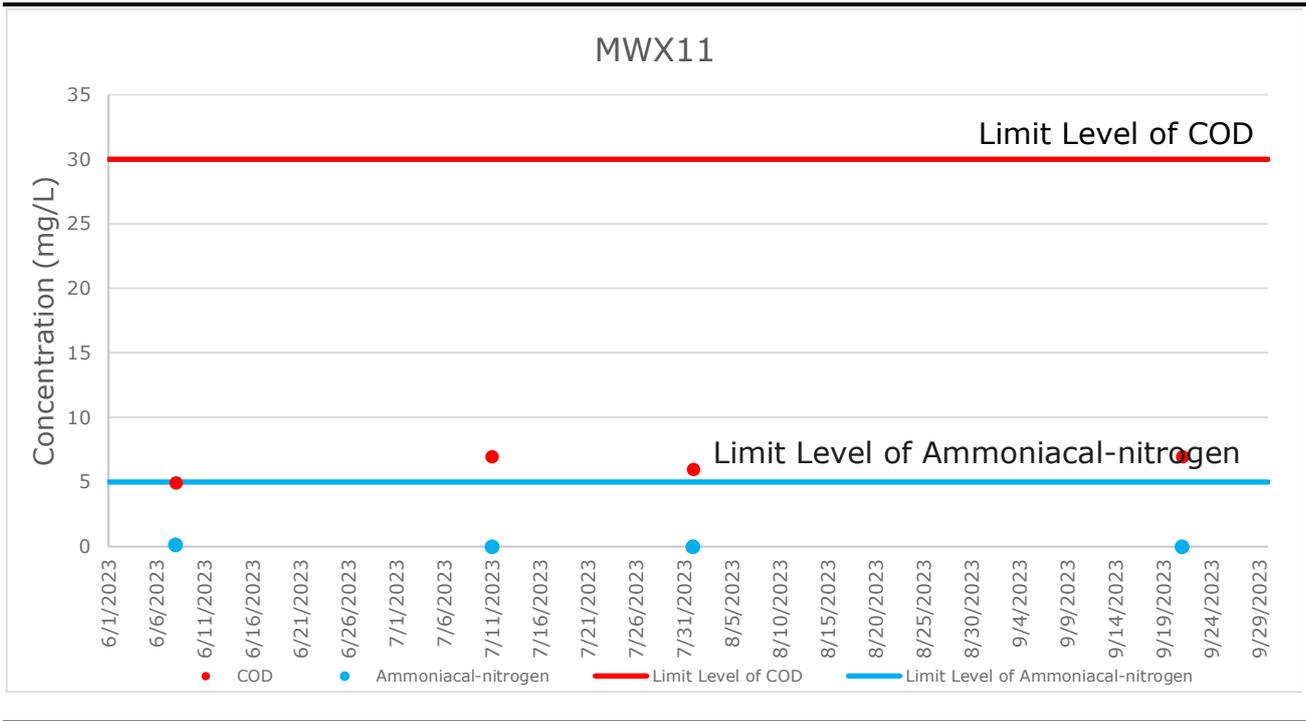


FIGURE F5.12 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-12)

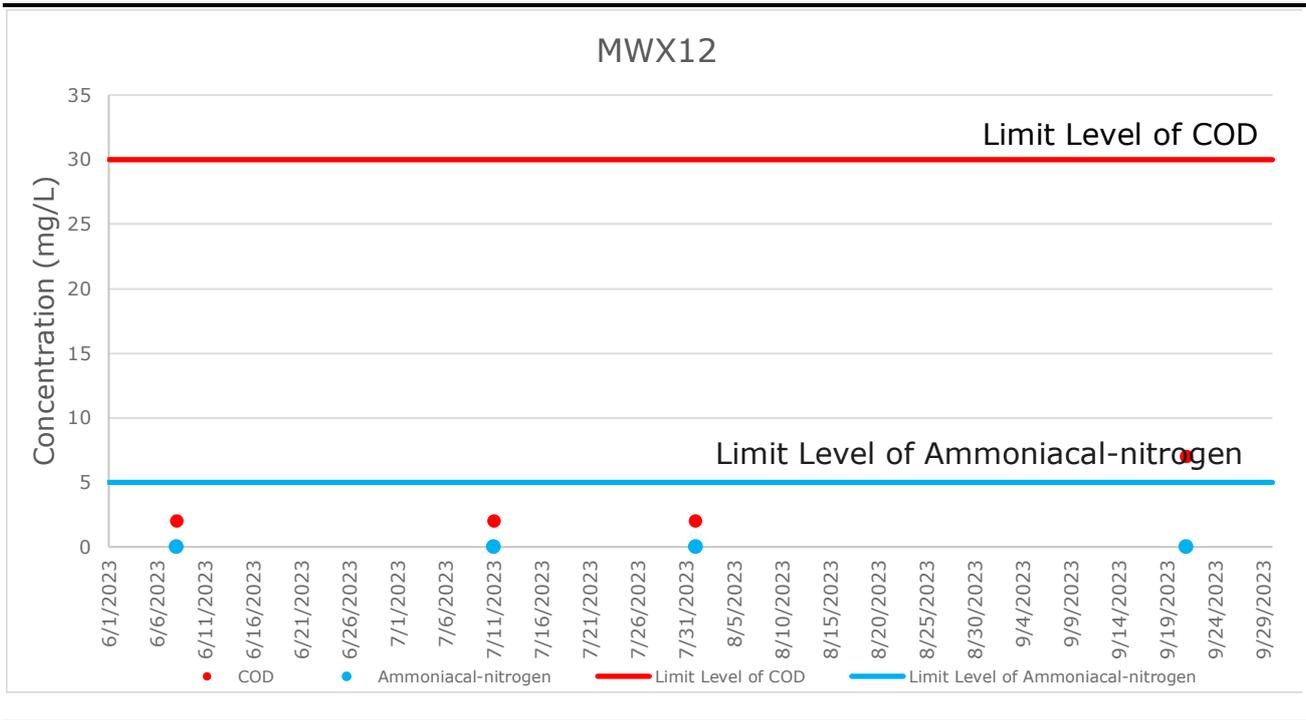


FIGURE F5.13 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-13)

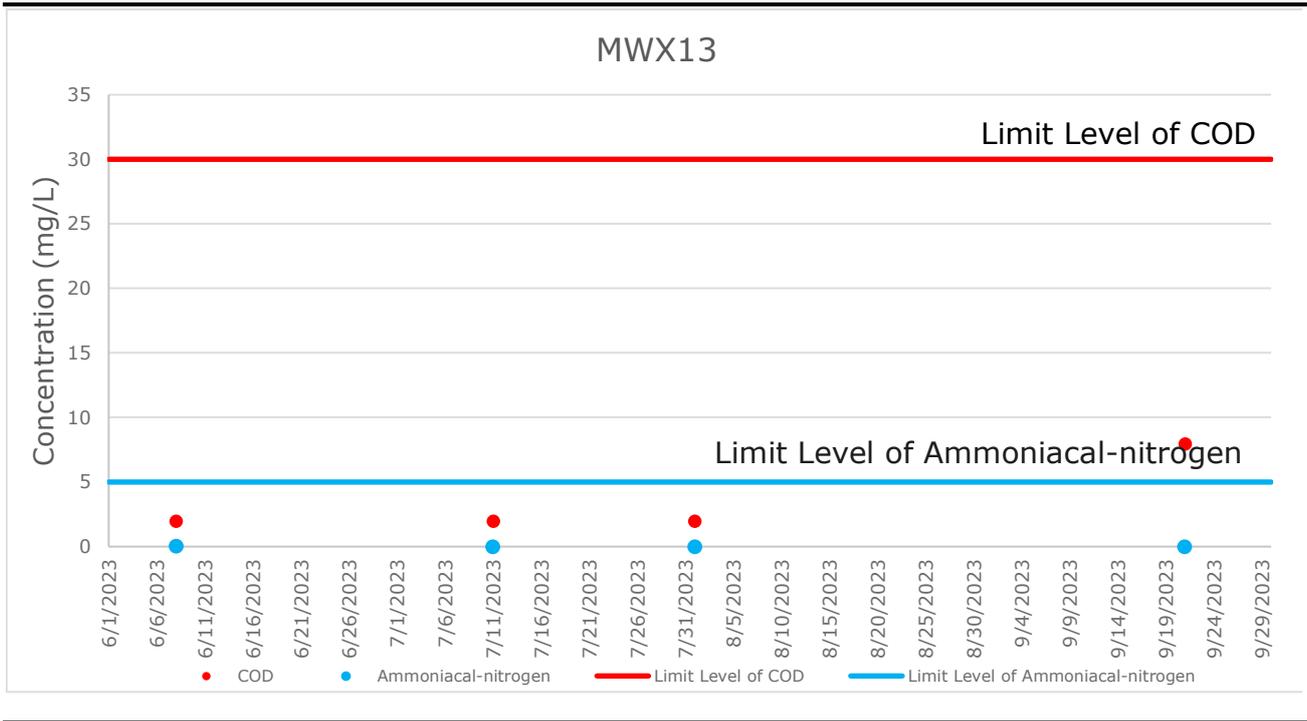
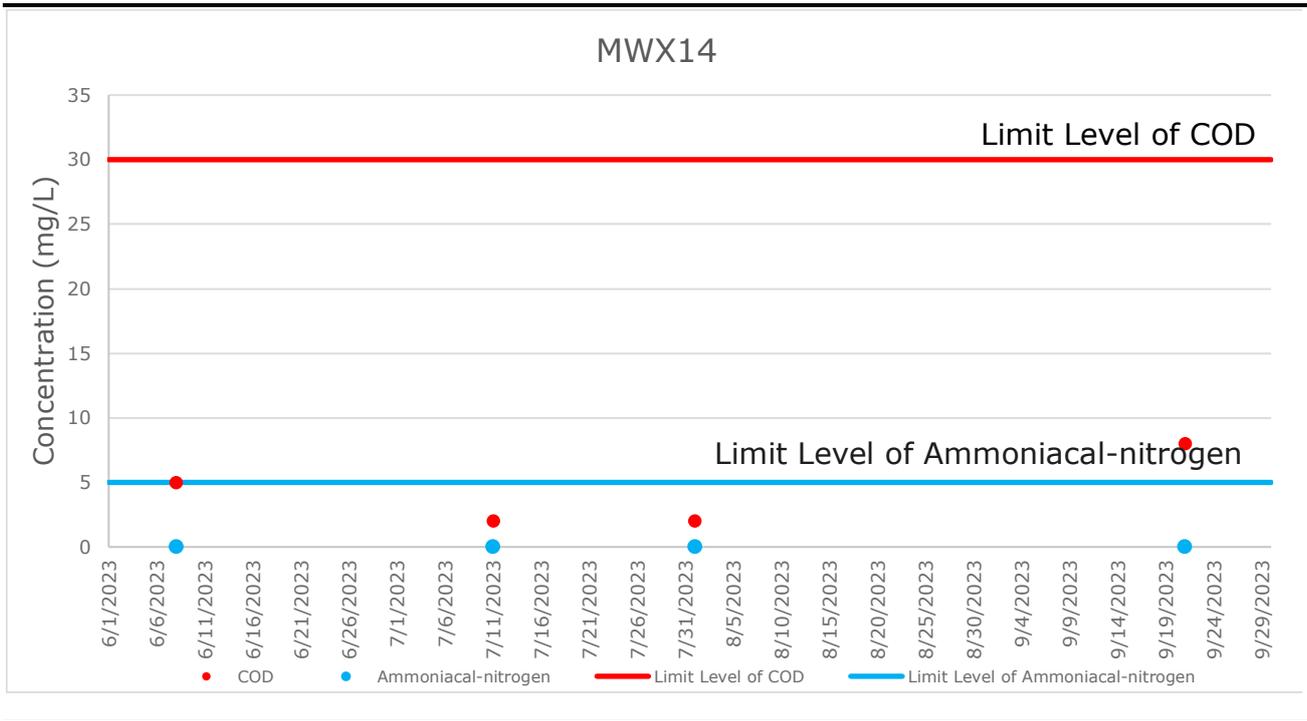


FIGURE F5.14 GRAPHICAL PRESENTATION FOR GROUNDWATER MONITORING (MWX-14)





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	11 July 2023
Time	11:35
Monitoring Location	MWX-7
Parameter	Chemical Oxygen Demand (COD)
Limit Levels	>36 mg /L
Measured Level	41 mg /L
Possible reason	<p>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 wells MWX-7 (5.16 mg/L) and the COD monitoring results of the groundwater monitoring wells adjacent to MWX-7 (MWX-6: 43 mg/L and MWX-8: 32 mg/L) are well within the respective limit levels. Hence, there is a low possibility of the elevation of COD level at MWX-7 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.</p> <p>In accordance with Table 4.5b of the updated EM&A Manual, repeat measurement was conducted on 2 August 2023 to confirm findings. COD concentration of 28 mg/L (below the Limit Level) was measured at MWX-7 during the sampling event, which demonstrate no consecutive groundwater quality impact at the monitoring location.</p> <p>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-7 on 11 July 2023 could be due to localised organic matters within or around the monitoring well and background fluctuation.</p> <p>Due to the presence of influencing factor from non-project source and the subsequent month monitoring results at MWX-7 did not show any exceedance, there is no adequate evidence showing that the COD level exceedance measured at MWX-7 on 11 July 2023 was deemed to Project-related activities.</p> <p>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</p>

	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-7 on 11 July 2023 will not cause adverse water quality impact to the Junk Bay Water Control Zone.
Action Taken / Action to be Taken	<p>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.</p> <p>ET will continue to closely monitor the groundwater quality monitoring results and collect additional data for investigation and further review, if necessary.</p>
Remarks	-

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

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	2 August 2023
Time	16:03
Monitoring Location	MWX-6
Parameter	Chemical Oxygen Demand (COD)
Limit Level	>46 mg /L
Measured Level	49 mg /L
Possible reason	<p>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 wells MWX-6 (4.32 mg/L) and the COD monitoring results of the groundwater monitoring wells adjacent to MWX-6 (MWX-5: 24 mg/L and MWX-7: 28 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.</p> <p>In accordance with Table 4.5b of the updated EM&A Manual, repeat measurement was conducted on 22 September 2023 to confirm findings. COD concentration of 36 mg/L (below the Limit Level) was measured at MWX-6 during the sampling event, which demonstrate no consecutive groundwater quality impact at the monitoring location.</p> <p>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 on 2 August 2023 could be due to localised organic matters within or around the monitoring well and background fluctuation.</p> <p>Due to the presence of influencing factor from non-project source and the subsequent month monitoring results at MWX-6 did not show any exceedance, there is no adequate evidence showing that the COD level exceedance measured at MWX-6 on 2 August 2023 was deemed to Project-related activities.</p> <p>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</p>

	<p>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 2 August 2023 will not cause adverse water quality impact to the Junk Bay Water Control Zone.</p>
Action Taken / Action to be Taken	<p>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.</p> <p>ET will continue to closely monitor the groundwater quality monitoring results and collect additional data for investigation and further review, if necessary.</p>
Remarks	-

Prepared by: Abbey Lau
 Designation: Environmental Team
 Date: 9 October 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	4 August 2023
Time	14:17 and 14:25 (Duplicate)
Monitoring Location	DP4
Parameter	Surface Water (Suspended Solids (SS))
Limit Level	>20 mg/L
Measured Level	DP4: 57.4 mg /L DP4 (Duplicate): 46.3 mg /L
Possible reason	<p>From the on-site rainfall record of July and August 2023, heavy rainfall events were recorded on 28 to 31 July and 4 August 2023 before the sampling event. Red and amber rainstorm warning signal were also issued by the Hong Kong Observatory on 29 and 31 August 2023, respectively.</p> <p>No works which may lead to potential SS increase (e.g. active stockpiling and excavation works) was conducted in the vicinity of surface water channel leading to DP4 on the sampling day based on on-site observations and construction activities described by the Contractor.</p> <p>During the sampling event, no raining was recorded and no other sources (e.g. other project sites) was identified in the vicinity of surface water channel leading to DP4 which might cause the SS exceedance at DP4. Site surface runoff at DP4 channel was treated by the Wetsep prior to discharge. The contaminated runoff from the unpaved areas during the previous rainfall events could also be the potential source of SS contributing to the exceedance. The SS exceedance at DP4 was therefore deemed to Project-related activities.</p> <p>In accordance with Table 4.5b of the updated EM&A Manual, repeat measurement was conducted on 15 August 2023 to confirm findings. Surface water samples with SS concentration of 12.2 mg/L and 12.6 mg/L (below the Limit Level) were sampled at DP4, which demonstrate no consecutive surface water quality impact at the monitoring location.</p>
Action Taken / Action to be Taken	<p>In accordance with Table 4.5b of the updated EM&A Manual, the monitoring frequency shall be increased to weekly until no exceedance of Limit Level. It should be noted that the turnaround time for the laboratory analysis of the surface water sample is 5 working days and the preliminary results for the monitoring event conducted on 4 August 2023 were available on 14 August 2023. Repeat measurement was conducted on 15 August 2023, and the SS results at DP4 are well below the Limit Level. Hence, the weekly</p>

	<p>surface water monitoring at DP4 shall not be triggered.</p> <p>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.</p> <p>In addition, the Contractor shall review the efficiency of the Wetsep near sediment trap and monitor the Wetsep operation regularly to ensure it is functioning properly at all times.</p>
Remarks	-

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

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	Pump Station No. 1X: 8 - 16 September 2023 Pump Station No. 3X: 8 - 20 September 2023 Pump Station No. 4X: 8 - 20 September 2023
Monitoring Location	Pump Station No. 1X (Cell 1X), Pump Station No. 3X (Cell 3X) and Pump Station No. 4X (Cell 4X)
Parameter	Leachate level
Limit Levels	Pump Station No. 1X: > 178 cm Pump Station No. 3X: > 175 cm Pump Station No. 4X: > 186 cm
Measured Level	<p><u>Pump Station No. 1X (Average of Meter No. X-1 and No. X-2)</u> 8 September 2023: 243 cm 9 September 2023: 235 cm 10 September 2023: 231 cm 11 September 2023: 228 cm 12 September 2023: 222 cm 13 September 2023: 218 cm 14 September 2023: 204 cm 15 September 2023: 186 cm 16 September 2023: 175 cm</p> <p><u>Pump Station No. 3X (Average of Meter No. X-5 and No. X-6)</u> 8 September 2023: 194 cm 9 September 2023: 194 cm 10 September 2023: 211 cm 11 September 2023: 210 cm 12 September 2023: 213 cm 13 September 2023: 218 cm 14 September 2023: 218 cm 15 September 2023: 216 cm 16 September 2023: 218 cm 17 September 2023: 214 cm 18 September 2023: 209 cm 19 September 2023: 203 cm 20 September 2023: 192 cm</p> <p><u>Pump Station No. 4X (Average of Meter No. X-7 and No. X-8)</u> 8 September 2023: 250 cm 9 September 2023: 272 cm 10 September 2023: 278 cm</p>

	<p>11 September 2023: 283 cm 12 September 2023: 279 cm 13 September 2023: 274 cm 14 September 2023: 273 cm 15 September 2023: 268 cm 16 September 2023: 263 cm 17 September 2023: 270 cm 18 September 2023: 262 cm 19 September 2023: 242 cm 20 September 2023: 206 cm</p>
Possible reason	<p>From the on-site rainfall record of September 2023, heavy rainfall events (up to 356 mm per day) were recorded from 7 to 15 September 2023. Amber, red and black rainstorm warning signals were also issued by the Hong Kong Observatory on 7, 8, 10, 14 and 15 September 2023. As confirmed by the Contractor, the leachate collection system and leachate treatment plant were under normal operating conditions during the reporting period.</p> <p>Accumulation of surface water at Cell 1X, 3X and 4X was observed during the reporting period, which could contribute to the leachate level exceedances. Based on this observation, the leachate level exceedances at Pump Station No. 1X, 3X and 4X were deemed to Project-related activities.</p> <p>It is understood that the large volume of leachate (contaminated surface runoff) accumulated at Cell 1X, 3X and 4X has exceeded the leachate treatment capacity (daily maximum effluent discharge volume of 1,783 m³ recorded from 8 to 20 September 2023, with daily effluent discharge limit of 2,000 m³ as stipulated in the WPCO license).</p>
Action Taken / Action to be Taken	<p>Examination of environmental performance of the Project will be continued during the weekly inspections. The Contractor is reminded to closely monitor the operating conditions of the leachate collection system (e.g. set alarm when the leachate level reach about 80% of the Limit Level) and pump out the leachate for treatment to avoid any exceedance of the Limit Level.</p>
Remarks	-

Prepared by: Abbey Lau
Designation: Environmental Team
Date: 9 October 2023

Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	22 September 2023
Time	11:32
Monitoring Location	MWX-7
Parameter	Chemical Oxygen Demand (COD)
Limit Level	>36 mg /L
Measured Level	40 mg /L
Possible reason	<p>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 wells MWX-7 (4.80 mg/L) and the COD monitoring results of the groundwater monitoring wells adjacent to MWX-7 (MWX-6: 36 mg/L and MWX-8: 32 mg/L) are well within the respective limit levels. Hence, there is a low possibility of the elevation of COD level at MWX-7 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.</p> <p>In accordance with Table 4.5b of the updated EM&A Manual, repeat measurement was conducted on 12 October 2023 to confirm findings. COD concentration of 31 mg/L (below the Limit Level) was measured at MWX-7 during the sampling event, which demonstrate no consecutive groundwater quality impact at the monitoring location.</p> <p>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-7 on 22 September 2023 could be due to localised organic matters within or around the monitoring well and background fluctuation.</p> <p>Due to the presence of influencing factor from non-project source and the subsequent month monitoring results at MWX-7 did not show any exceedance, there is no adequate evidence showing that the COD level exceedance measured at MWX-7 on 22 September 2023 was deemed to Project-related activities.</p> <p>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</p>

	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-7 on 22 September 2023 will not cause adverse water quality impact to the Junk Bay Water Control Zone.
Action Taken / Action to be Taken	<p>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.</p> <p>ET will continue to closely monitor the groundwater quality monitoring results and collect additional data for investigation and further review, if necessary.</p>
Remarks	-

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



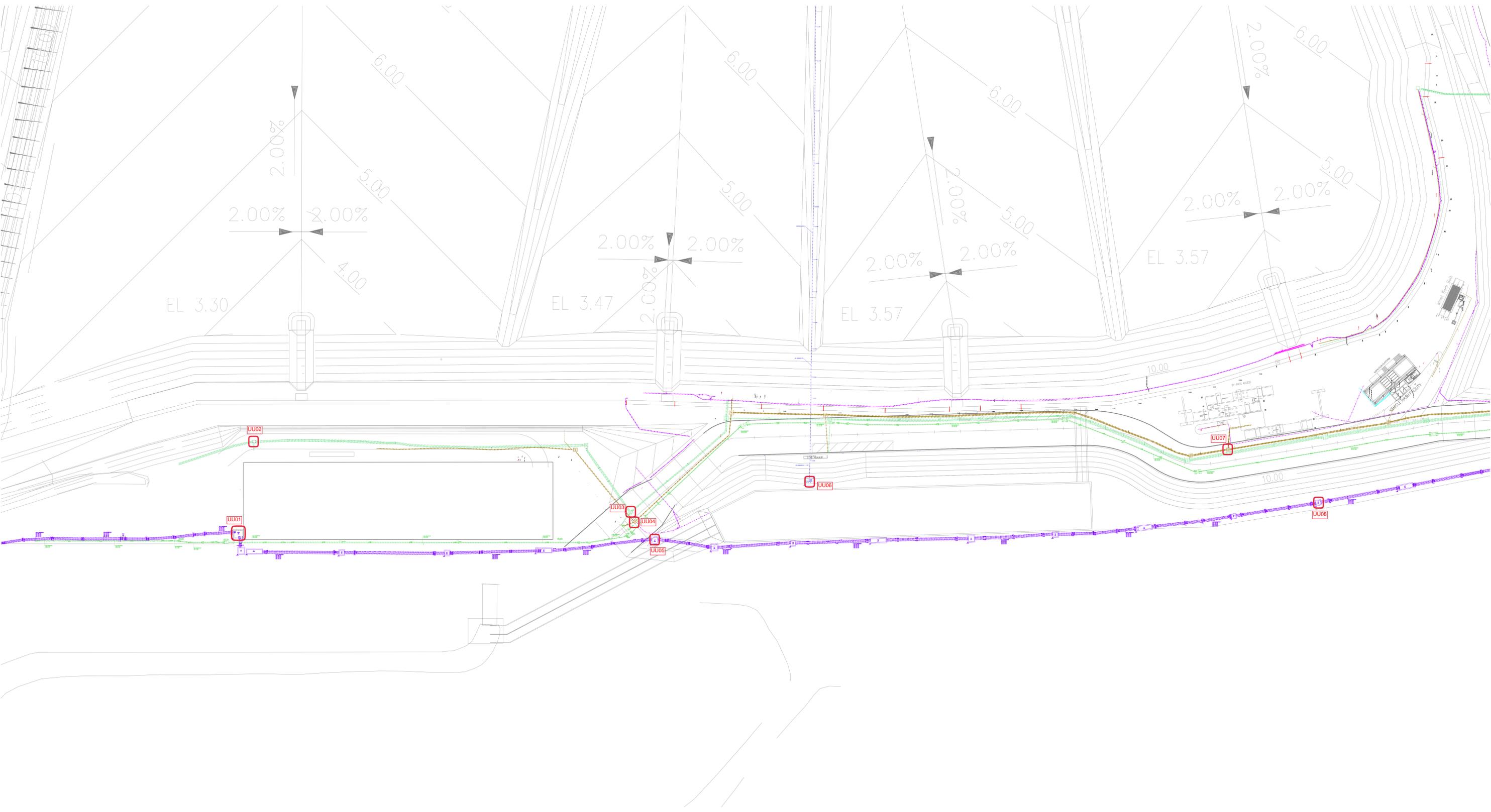
ANNEX G

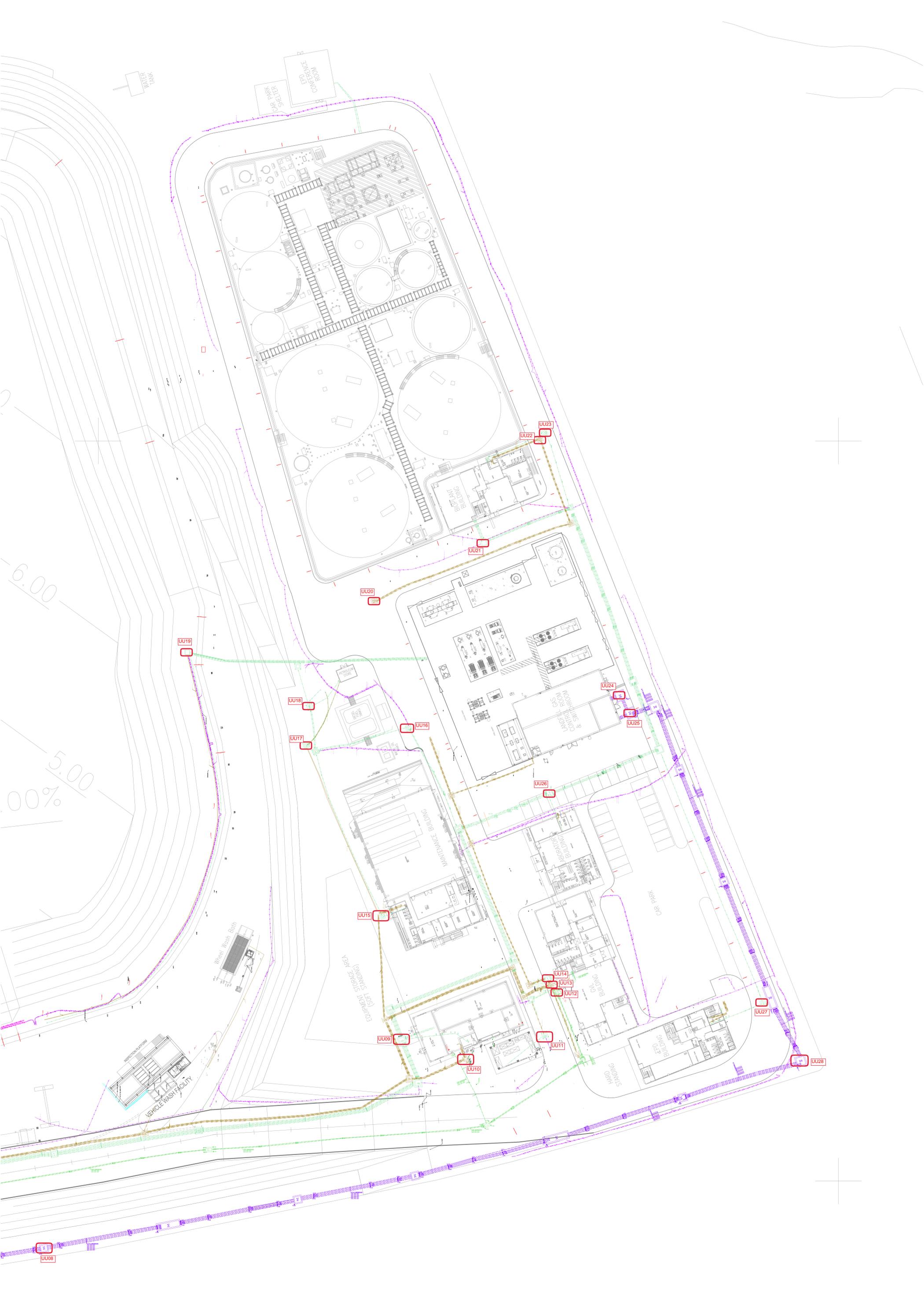
LANDFILL GAS



ANNEX G1

LANDFILL GAS MONITORING
LOCATIONS FOR SERVICE VOIDS,
UTILITIES AND MANHOLES ALONG THE
SITE BOUNDARY AND WITHIN THE
SENTX SITE







ANNEX G2

LANDFILL GAS MONITORING RESULTS

TABLE G2.1 LANDFILL GAS MONITORING RESULTS AT PERIMETER LFG MONITORING WELLS (JULY 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	2.8	0.2	1.8	16.8
LFG2	2.86	0.2	1.7	17.4
LFG3	3.22	0.1	0.0	19.2
LFG4	3.12	0.1	0.0	18.9
LFG5	4.23	0.1	0.2	7.5
LFG6	3.02	0.1	0.1	19.2
LFG7	3.7	0.1	0.0	14.5
LFG8	3.41	0.0	0.0	19.1
LFG9	3.35	0.0	0.1	16.5
LFG10	3.08	0.0	0.0	19.2
LFG11	3.2	0.0	0.3	8.3
LFG12	3.42	0.0	0.0	19.3
LFG13	3.14	0.5	0.0	18.8
LFG14	3.58	0.0	0.0	19.6
LFG15	2.48	0.0	0.0	19.5
LFG16	3.73	0.0	0.0	19.3
LFG17	3.22	0.0	0.0	19.4
LFG18	4.15	0.0	0.0	19.4
LFG19	5.02	0.0	0.1	19.1
LFG20	4.59	0.0	0.1	19.2
LFG21	4.25	0.0	0.7	18.2
LFG22	0.31	0.0	0.0	19.0
LFG23	13.8	0.0	0.0	19.2
LFG24	7.02	0.0	0.1	19.2
GP1	Probe Bent	0.1	8.0	4.9
GP2 (shallow)	Probe Bent	0.1	0.2	19.8
GP2 (deep)	Probe Bent	0.1	8.2	8.4
GP3 (shallow)	Probe Bent	0.1	1.6	17.6
GP3 (deep)	Probe Bent	0.1	0.6	19.1
GP4 (shallow)	Probe Bent	0.1	0.4	19.3
GP4 (deep)	Probe Bent	0.1	0.2	19.3
GP5 (shallow)	Probe Bent	0.1	0.9	19.2
GP5 (deep)	39.77	0.1	0.1	19.3
GP6	38.83	0.0	1.7	19.0

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
GP7	37.55	0.0	0.0	19.3
GP12	1.22	0.2	0.1	19.2
GP15	3.12	0.2	0.1	19.2
P7	2.81	0.2	0.0	20.0
P8	2.90	0.2	0.1	20.2
P9	2.61	0.2	0.1	20.4

TABLE G2.2 LANDFILL GAS MONITORING RESULTS AT PERIMETER LFG MONITORING WELLS (AUGUST 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	3.29	0.0	1.5	16.8
LFG2	1.93	0.0	2.2	16.3
LFG3	3.03	0.0	0.0	18.9
LFG4	2.65	0.0	0.0	18.8
LFG5	3.08	0.0	0.0	18.5
LFG6	3.12	0.0	0.1	18.2
LFG7	4.56	0.0	0.0	18.7
LFG8	2.85	0.0	0.0	20.1
LFG9	3.14	0.0	0.0	19.1
LFG10	3.72	0.0	0.0	15.6
LFG11	3.1	0.0	0.2	6.5
LFG12	2.78	0.0	0.0	20.0
LFG13	2.63	16.0	0.1	5.0
LFG14	3.11	0.0	0.0	18.0
LFG15	2.66	0.0	0.2	16.6
LFG16	4.16	0.0	0.0	19.9
LFG17	2.92	0.0	0.4	4.5
LFG18	4.23	0.0	0.0	19.8
LFG19	3.48	0.0	0.1	19.4
LFG20	3.16	0.0	3.2	13.0
LFG21	3.26	0.0	0.5	18.2
LFG22	2.86	0.0	0.1	18.8
LFG23	12.9	0.0	0.0	19.4
LFG24	6.35	0.0	0.0	19.4
GP1	Probe Bent	0.3	10.6	6.3
GP2 (shallow)	Probe Bent	0.2	0.8	18.8
GP2 (deep)	Probe Bent	0.2	0.3	18.8
GP3 (shallow)	Probe Bent	0.1	3.5	14.5
GP3 (deep)	Probe Bent	0.1	0.0	19.1
GP4 (shallow)	Probe Bent	0.1	0.4	18.1
GP4 (deep)	Probe Bent	0.1	0.2	18.9
GP5 (shallow)	Probe Bent	0.0	6.3	11.2
GP5 (deep)	39.33	0.0	0.6	18.6
GP6	38.56	0.0	2.7	16.0

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
GP7	36.86	0.0	0.0	19.1
GP12	2.45	0.0	0.0	18.1
GP15	3.08	0.0	0.1	19.7
P7	3.22	0.0	0.1	19.3
P8	2.81	0.0	0.1	19.5
P9	2.74	0.0	0.1	20.0

TABLE G2.3 LANDFILL GAS MONITORING RESULTS AT PERIMETER LFG MONITORING WELLS (SEPTEMBER 2023)

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	2.89	0.1	1.1	14.9
LFG2	3.85	0.1	1.5	16.4
LFG3	3.35	0.0	0.0	19.6
LFG4	3.31	0.0	0.0	19.3
LFG5	2.79	0.0	0.0	19.4
LFG6	3.08	0.0	0.3	17.9
LFG7	3.68	0.0	0.0	19.1
LFG8	3.46	0.0	0.0	18.1
LFG9	2.94	0.0	0.0	18.2
LFG10	2.99	0.0	0.0	18.9
LFG11	2.91	0.0	0.0	18.8
LFG12	3.07	0.1	0.0	18.9
LFG13	2.63	1.0	0.0	18.1
LFG14	3.16	0.1	0.0	18.1
LFG15	2.49	0.0	0.0	18.2
LFG16	3.52	0.1	0.0	19.8
LFG17	2.92	0.1	0.0	19.8
LFG18	4.14	0.1	0.0	19.9
LFG19	4.21	0.1	0.0	19.5
LFG20	5.12	0.2	0.1	19.2
LFG21	4.26	0.2	0.2	18.7
LFG22	4.16	0.2	0.2	18.3
LFG23	12.91	0.1	0.0	20.1
LFG24	6.75	0.1	0.0	20.2
GP1	No safe access due to tree falling blocked the road access			
GP2 (shallow)	No safe access due to tree falling blocked the road access			
GP2 (deep)	No safe access due to tree falling blocked the road access			
GP3 (shallow)	No safe access due to tree falling blocked the road access			
GP3 (deep)	No safe access due to tree falling blocked the road access			
GP4 (shallow)	No safe access due to tree falling blocked the road access			
GP4 (deep)	No safe access due to tree falling blocked the road access			
GP5 (shallow)	No safe access due to tree falling blocked the road access			
GP5 (deep)	No safe access due to tree falling blocked the road access			
GP6	No safe access due to tree falling blocked the road access			

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
GP7	No safe access due to tree falling blocked the road access			
GP12	2.45	0.1	0.3	18.1
GP15	No safe access due to tree falling blocked the road access			
P7	2.98	0.0	0.1	19.9
P8	No safe access due to tree falling blocked the road access			
P9	No safe access due to tree falling blocked the road access			

TABLE G2.4 LANDFILL GAS MONITORING AT SERVICE VOIDS, UTILITIES PITS AND MANHOLE (JULY 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.2	0.0	19.2
UU02	0.1	0.0	19.1
UU03	0.1	0.0	19.3
UU04	0.1	0.0	19.4
UU05	0.0	0.0	19.4
UU06	0.0	0.0	19.5
UU07	0.1	0.0	19.2
UU08	0.0	0.0	19.2
UU09	0.0	0.0	19.8
UU10	0.0	0.0	19.6
UU11	0.0	0.0	19.6
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	19.5
UU14	0.0	0.0	19.4
UU15	0.0	0.0	19.6
UU16	0.0	0.0	19.5
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	19.5
UU19	0.0	0.0	19.3
UU20	0.0	0.0	19.4
UU21	0.0	0.0	19.4
UU22	0.0	0.0	19.4
UU23	0.0	0.0	19.4
UU24	0.0	0.0	19.5
UU25	0.0	0.0	19.5
UU26	0.0	0.0	19.5
UU27	0.0	0.0	19.5
UU28	0.0	0.0	19.6

TABLE G2.5 LANDFILL GAS MONITORING AT SERVICE VOIDS, UTILITIES PITS AND MANHOLE (AUGUST 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	18.8
UU02	0.0	0.0	18.8
UU03	0.1	0.0	18.4
UU04	0.0	0.0	18.4
UU05	0.0	0.0	18.5
UU06	0.0	0.0	18.6
UU07	0.0	0.0	18.8
UU08	0.0	0.0	18.9
UU09	0.1	0.0	20.1
UU10	0.1	0.0	20.0
UU11	0.2	0.0	20.1
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.2	0.0	20.2
UU14	0.2	0.1	20.2
UU15	0.1	0.0	19.8
UU16	0.1	0.0	19.7
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.1	0.0	19.5
UU19	0.0	0.0	18.9
UU20	0.1	0.0	19.4
UU21	0.1	0.0	19.3
UU22	0.1	0.0	19.2
UU23	0.0	0.0	19.2
UU24	0.0	0.0	18.9
UU25	0.0	0.0	19.0
UU26	0.0	0.0	18.8
UU27	0.0	0.0	18.6
UU28	0.0	0.0	18.6

TABLE G2.6 LANDFILL GAS MONITORING AT SERVICE VOIDS, UTILITIES PITS AND MANHOLE (SEPTEMBER 2023)

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	19.5
UU02	0.0	0.0	19.4
UU03	0.0	0.0	19.4
UU04	0.0	0.0	19.4
UU05	0.0	0.0	19.4
UU06	0.0	0.0	19.3
UU07	0.2	0.0	20.4
UU08	0.0	0.0	19.4
UU09	0.0	0.0	19.6
UU10	0.0	0.0	19.6
UU11	0.0	0.0	19.5
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	19.4
UU14	0.0	0.0	19.5
UU15	0.0	0.0	19.5
UU16	0.1	0.0	20.1
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	19.4
UU19	0.1	0.0	20.2
UU20	0.0	0.0	19.5
UU21	0.0	0.0	19.5
UU22	0.0	0.0	19.5
UU23	0.0	0.0	19.6
UU24	0.0	0.0	19.4
UU25	0.0	0.0	19.5
UU26	0.0	0.0	19.6
UU27	0.0	0.0	19.5
UU28	0.0	0.0	19.4

TABLE G2.7 LANDFILL GAS BULK GAS SAMPLING MONITORING RESULTS

Parameters	LFG2	LFG8
Methane (% (v/v))	<0.020	<0.020
Carbon Dioxide (% (v/v))	<0.020	<0.020
Oxygen (% (v/v))	20.6	20.5
Nitrogen (% (v/v))	76.5	76.4
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 (°C)	Wind Direction (Deg)	Wind Speed (m/s)	Monitoring Results (ppm)
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No flammable gas surface emission detected in the reporting period.



ANNEX G3

EVENT AND ACTION PLAN FOR
LANDFILL GAS MONITORING

ANNEX G3 EVENT AND ACTION PLAN FOR LANDFILL GAS MONITORING

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

Action			
Event	ET	IEC	Contractor
	<p>procedures should be checked and if deems necessary, to repeat the monitoring and recalibrate the portable monitoring instruments</p> <ul style="list-style-type: none"> Notify the above findings to Contractor and IEC 		
Limit Level being exceeded at the permanent gas monitoring system	<ul style="list-style-type: none"> Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check the methane gas level at the perimeter monitoring wells, manholes or utilities duct Check monitoring data, all plant, equipment and the Contractor's working methods Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project Discuss with Contractor and IEC for remedial measures required Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Evacuate all staff in the concerned building Open the doors and window of all rooms on the ground floor Do not allow staff to go back to the room if methane level is higher than 1% gas Check the performance of the landfill gas management system Rectify unacceptable practice Consider changes of working methods Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate
Limit Level being exceeded during surface emission monitoring	<ul style="list-style-type: none"> Repeat the measurement to confirm findings Investigate the cause(s) of exceedance Prepare the Notification of Exceedance within 24 hours Check monitoring data, all plant, equipment and the Contractor's working methods 	<ul style="list-style-type: none"> Verify the Notification of Exceedance Discuss with ET and Contractor on proposed remedial measures Review proposals on remedial measures Audit the implementation of the remedial measures Audit the effectiveness of the implemented remedial measures 	<ul style="list-style-type: none"> Check landfill gas management system Rectify unacceptable practice Consider changes of working methods Discuss with the ET and IEC and submit proposals for remedial measures to IEC Implement the agreed proposals Amend proposal if appropriate

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



ANNEX H

CUMULATIVE STATISTICS ON
EXCEEDANCES, ENVIRONMENTAL
COMPLAINTS, NOTIFICATION OF
SUMMONS AND STATUS OF
PROSECUTION

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	2	16
Air Quality (Odour)	Action	0	0
	Limit	0	0
Air Quality (Emissions of Thermal Oxidiser)	Limit	1	2
Air Quality (Emissions of Landfill Gas Flare)	Limit	0	5
Air Quality (Emissions of Landfill Gas Generator)	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality (Surface Water)	Limit	1	61
Water Quality (Leachate)	Limit	0	1
Water Quality (Leachate Level)	Limit	35	57
Water Quality (Groundwater)	Limit	3	16
Landfill Gas (Perimeter Landfill Gas Monitoring Wells)	Limit	0	4
Landfill Gas (Service Void, Utilities and Manholes)	Limit	0	0
Landfill Gas (Permanent Gas Monitoring System)	Limit	0	0

TABLE H2 CUMULATIVE STATISTICS ON COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Prosecutions
This Reporting Period (1 Jul – 30 Sep 2023)	0	0	0
Total no. received since project commencement	1	0	0



ERM HAS OVER 160 OFFICES ACROSS THE FOLLOWING COUNTRIES AND TERRITORIES WORLDWIDE

Argentina	The Netherlands
Australia	New Zealand
Belgium	Peru
Brazil	Poland
Canada	Portugal
China	Puerto Rico
Colombia	Romania
France	Senegal
Germany	Singapore
Ghana	South Africa
Guyana	South Korea
Hong Kong	Spain
India	Switzerland
Indonesia	Taiwan
Ireland	Tanzania
Italy	Thailand
Japan	UAE
Kazakhstan	UK
Kenya	US
Malaysia	Vietnam
Mexico	
Mozambique	

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