



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

## South East New Territories (SENT) Landfill Extension

Quarterly Environmental Monitoring & Audit Report No.14

September 2022

**ERM**

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## South East New Territories (SENT) Landfill Extension

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

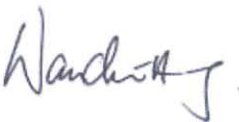
#### Reference Document/Plan

Document/Plan to be Certified/Verified:	Quarterly Environmental Monitoring & Audit Report No. 14 for South East New Territories (SENT) Landfill Extension
Date of Report:	9 September 2022


#### Reference EM&A Manual Requirement

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

#### ET Certification

I hereby certify that the above referenced document/plan complies with the above referenced EM&A Manual requirement.	
Frank Wan, Environmental Team Leader: (ERM Hong-Kong, Limited)	 Date: 9 September 2022

#### 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: 14 September 2022

# South East New Territories (SENT) Landfill Extension

## Quarterly Environmental Monitoring & Audit Report No.14

### Environmental Resources Management

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Client:  Green Valley Landfill Ltd.		Project No:  0465169			
Summary:  This document presents the Quarterly EM&A Report No.14 for <i>South East New Territories (SENT) Landfill Extension</i>		Date: 9 September 2022			
		Approved by:   Frank Wan Partner			
0	Quarterly EM&A Report No.14	AL	FW	FW	9 Sep 22
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p> 			

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## **EXECUTIVE SUMMARY**

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

This Quarterly EM&A report presents the EM&A works carried out during the period from 1 April to 30 June 2022 for the Project in accordance with the updated EM&A Manual.

### **Exceedance of Action and Limit Levels for Air Quality**

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

### **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)) and two exceedances of the Limit Level for surface water (suspended solid (SS)) were recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedances at MWX-4, MWX5 and MWX6 on 11 April 2022 were considered non Project-related upon further investigation. The SS exceedances at DP4 on 25 May 2022 and 30 June 2022 were found deemed to Project-related activities. Weekly surface water quality monitoring (SS) shall be continued at DP4 in the next reporting period until no exceedance of Limit Level.

### **Exceedance of Action and Limit Levels for Landfill Gas**

One exceedance of the Limit Level for methane was recorded for perimeter landfill gas monitoring in the reporting period. The methane exceedance at LFG6 on 17 May 2022 was considered non Project-related upon further investigation.

### **Environmental Complaints, Summons and Prosecutions**

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

### **Reporting Change**

There was no reporting change in the reporting period.

# 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 <sup>(1)</sup>, approved EIA Report <sup>(2)</sup> taking account of the latest design and other relevant statutory requirements.

## 1.2 PROJECT DESCRIPTION

The SENTX is a piggyback landfill, occupying the southern part of the existing SENT Landfill (including its infrastructure area) and 13 ha of Tseung Kwan O (TKO) Area 137. A layout plan of the SENTX is shown in *Figure 1.1*. Under the latest design, the SENTX has a net void capacity of about 6.5 Mm<sup>3</sup> and provides an additional lifespan of about 6 years, commencing operation upon exhaustion of the SENT Landfill. The SENTX will receive construction waste only.

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

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





Figure 1.1

Layout Plan of SENTX

File: T:\GIS\CONTRACT\0354924\Mxd\0354924\_Layout\_Plan\_of\_SENTX.mxd  
 Date: 5/9/2018

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

**Table 1.1** *Estimated Key Dates of Implementation Programme*

<b>Key Stage of the Project</b>	<b>Indicative Date</b>
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.

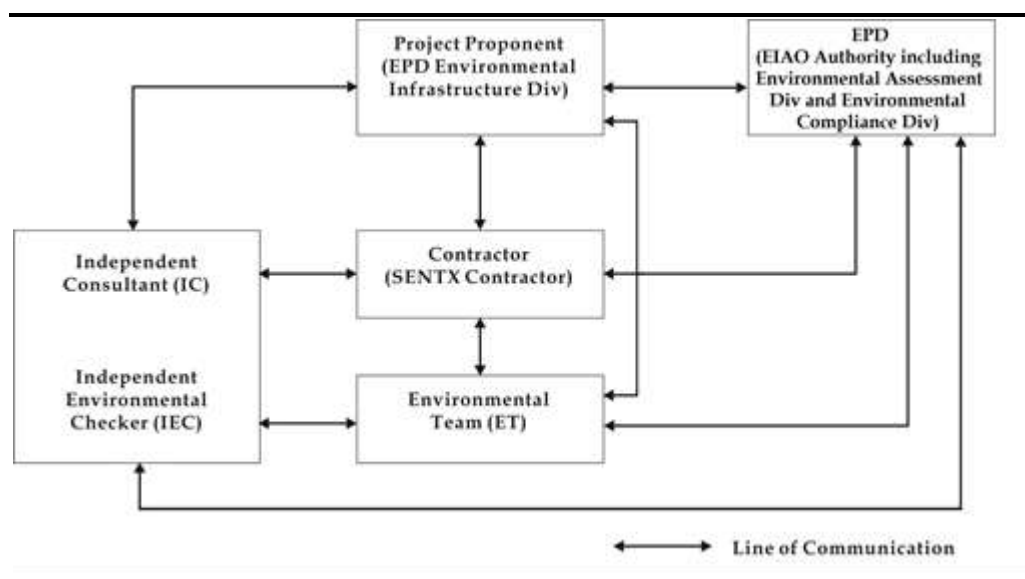
### **1.3** *SCOPE OF THE EM&A REPORT*

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 April to 30 June 2022 for the construction and operation works.

### **1.4** *PROJECT ORGANISATION*

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

Figure 1.2 Organisation Chart



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

Table 1.2 Contact Information of Key Personnel

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

### 1.5 SUMMARY OF CONSTRUCTION WORKS

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

#### April 2022

- Rectification of defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP), infrastructure area and waste reception area;
- Landscaping works at infrastructure area;
- Rectification of defects for underground utilities and pipe;
- Construction of MSE wall;
- Construction of retaining wall at Western boundary planting;

- Liner works at Cell 4X;
- Construction of perimeter channel X10A and X10C along Western bund of Cell 4X;
- Maintenance and improvement of temporary surface water drainage; and
- Utilities installation along Western bund of Cell 4X.

#### May 2022

- Rectification of defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP), infrastructure area and waste reception area;
- Landscaping works at infrastructure area;
- Rectification of defects for underground utilities and pipe, road pavement of EVA along Western Bund from main entrance to infrastructure;
- Construction of road pavement on top of the MSE wall;
- Construction of Cell 4X and SENT tie in area;
- Construction of perimeter channel X10A and X10C along Western bund of Cell 4X;
- Maintenance and improvement of temporary surface water drainage;
- Deployment of liner at Buttress Wall area;
- Equipment installation at Sump House 4; and
- Utilities installation along Western bund of Cell 4X.

#### June 2022

- Rectification of defects at Landfill Gas (LFG) Plant, Leachate Treatment Plant (LTP), infrastructure area and waste reception area;
- Landscaping works at infrastructure area;
- Rectification of defects for underground utilities and pipe;
- Construction of road pavement on top of the MSE wall;
- Construction of Cell 4X and SENT tie in area;
- Construction of perimeter channel X10A and X10C along Western bund of Cell 4X;
- Maintenance and improvement of temporary surface water drainage;

- Deployment of liner at Buttress Wall area;
- Equipment installation at Sump House 4; and
- Utilities installation along Western bund of Cell 4X.

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

## 1.6 SUMMARY OF EM&A PROGRAMME REQUIREMENTS

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

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

Parameters	Status
<b>Air Quality</b>	
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
<b>Noise</b>	
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
<b>Water Quality</b>	
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
<b>Landfill Gas</b>	
Impact Monitoring	On-going
<b>Waste Management</b>	
Waste Monitoring	On-going
<b>Landscape and Visual</b>	
Baseline Monitoring	The results of baseline landscape and visual monitoring were reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.3
Construction Phase Audit	On-going
<b>Site Environmental Audit</b>	
Regular Site Inspection	On-going
Complaint Hotline and Email Channel	On-going
Environmental Log Book	On-going

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

The EM&A programme also involved environmental site inspections and related auditing conducted by the ET for checking the implementation of the

required environmental mitigation measures recommended in the approved EIA Report and relevant EP submissions. To promote the environmental awareness and enhance the environmental performance of the contractors, environmental trainings and regular environmental management meetings were conducted during the reporting period, which are summarised as below:

- Three environmental management meetings were held with the Contractor, ER, ET, IEC and EPD on 21 April, 19 May and 23 June 2022; and
- Environmental toolbox trainings on the following topics were provided by the Contractor to the workers:
  - Persistent Organic Pollutants on 6 April 2022;
  - Mosquito Control on 20 April 2022;
  - Cut Down Construction Dust on 11 May 2022;
  - Indoor Air Quality on 25 May 2022;
  - Trip Ticket System on 8 June 2022; and
  - Wastewater Management on 22 June 2022 .

#### 1.7 STATUS OF STATUTORY ENVIRONMENTAL COMPLIANCE WITH THE ENVIRONMENTAL PERMIT

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

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

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

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*

<b>Description</b>	<b>Ref No.</b>	<b>Status</b>
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.: WT00036269-2020	Validity from 21 June 2020 to 16 June 2022
	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-RE1316-21	Validity from 5 January 2022 to 14 June 2022
	GW-RE0565-22	Validity from 15 June 2022 to 14 December 2022
Construction Noise Permit (Permit Holder: Paul Y.)	GW-RE0278-22	Validity from 31 March 2022 to 22 September 2022

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

## 2.1 AIR QUALITY MONITORING

### 2.1.1 Dust Monitoring

#### *Monitoring Requirements and Equipment*

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

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

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

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

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

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



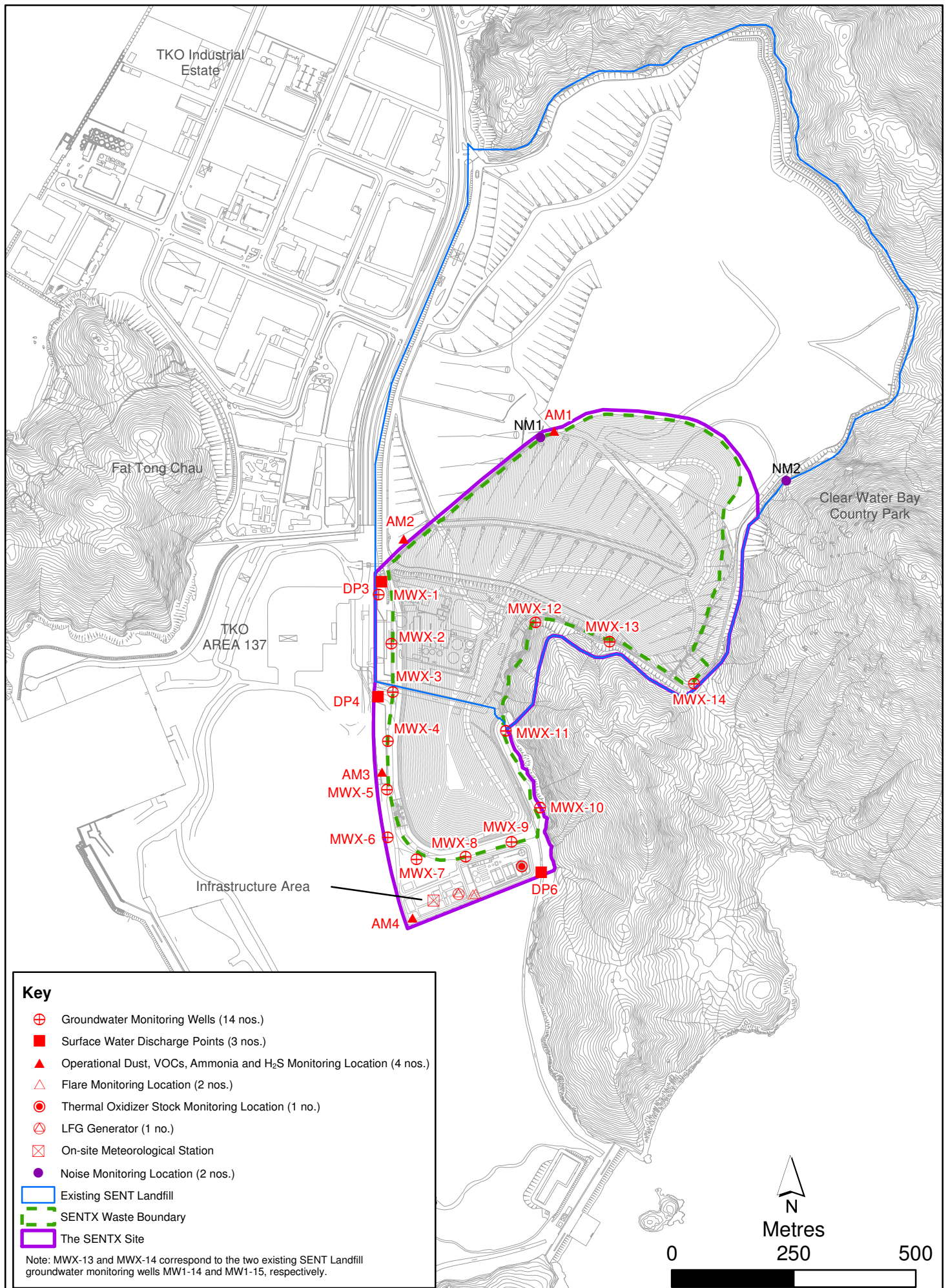


Figure 2.1

Environmental Monitoring Locations

**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 Apr 2022	Tisch TE-5170 (S/N: 1190)
AM2	SENTX Site Boundary (West, near DP3)			6, 12, 18, 24, 30 May 2022	Tisch TE-5170 (S/N: 1047)
AM3	SENTX Site Boundary (West, near RC15)			5, 11, 15, 17, 23, 29 June 2022	Tisch TE-5170 (S/N: 1258)
AM4	SENTX Site Boundary (West, near EPD building)				Tisch TE-5170 (S/N: 1101)

*Monitoring Schedule for the Reporting Period*

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

*Results and Observations*

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

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

Month	Monitoring Station	24-hr TSP Concentration ( $\mu\text{g m}^{-3}$ )		Action Level ( $\mu\text{g/m}^3$ )	Limit Level ( $\mu\text{g/m}^3$ )
		Average	Range		
April 2022	AM1	61	45 - 84	260	260
	AM2	57	46 - 78	260	260
	AM3	133	69 - 169	260	260
	AM4	92	58 - 142	260	260
May 2022	AM1	54	39 - 68	260	260
	AM2	49	24 - 69	260	260
	AM3	83	43 - 127	260	260
	AM4	54	34 - 72	260	260
June 2022	AM1	45	26 - 80	260	260
	AM2	90	56 - 123	260	260
	AM3	113	42 - 198	260	260
	AM4	92	41 - 218	260	260

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

All the 24-hour TSP results were below the Action and Limit Levels at the monitoring locations in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex D2*.

## Meteorological Data

Meteorological data obtained from the SENTX on-site meteorological monitoring station was used for the dust monitoring and is shown in *Annex D3*. It is considered that meteorological data obtained at the on-site meteorological monitoring station is representative of the Project area and could be used for the operation/ restoration phase dust monitoring programme for the Project.

### 2.1.2 Odour Monitoring

#### Monitoring Requirements

According to the updated EM&A Manual of the Project, odour patrol was carried out along the site boundary during the operation/ restoration phase. During the first month of operation, daily odour patrol (3 times per day) was conducted jointly by the ET and the IEC. The odour intensity detected was based on that determined by the IEC. In addition, an independent party (ALS Technichem (HK) Pty Ltd.) was appointed to undertake odour patrol together with the ET and IEC three times per week. During these patrols, the odour intensity detected was based on that determined by the independent third party.

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

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

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

**Table 2.4** *Action and Limit Levels for Odour Patrol*

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

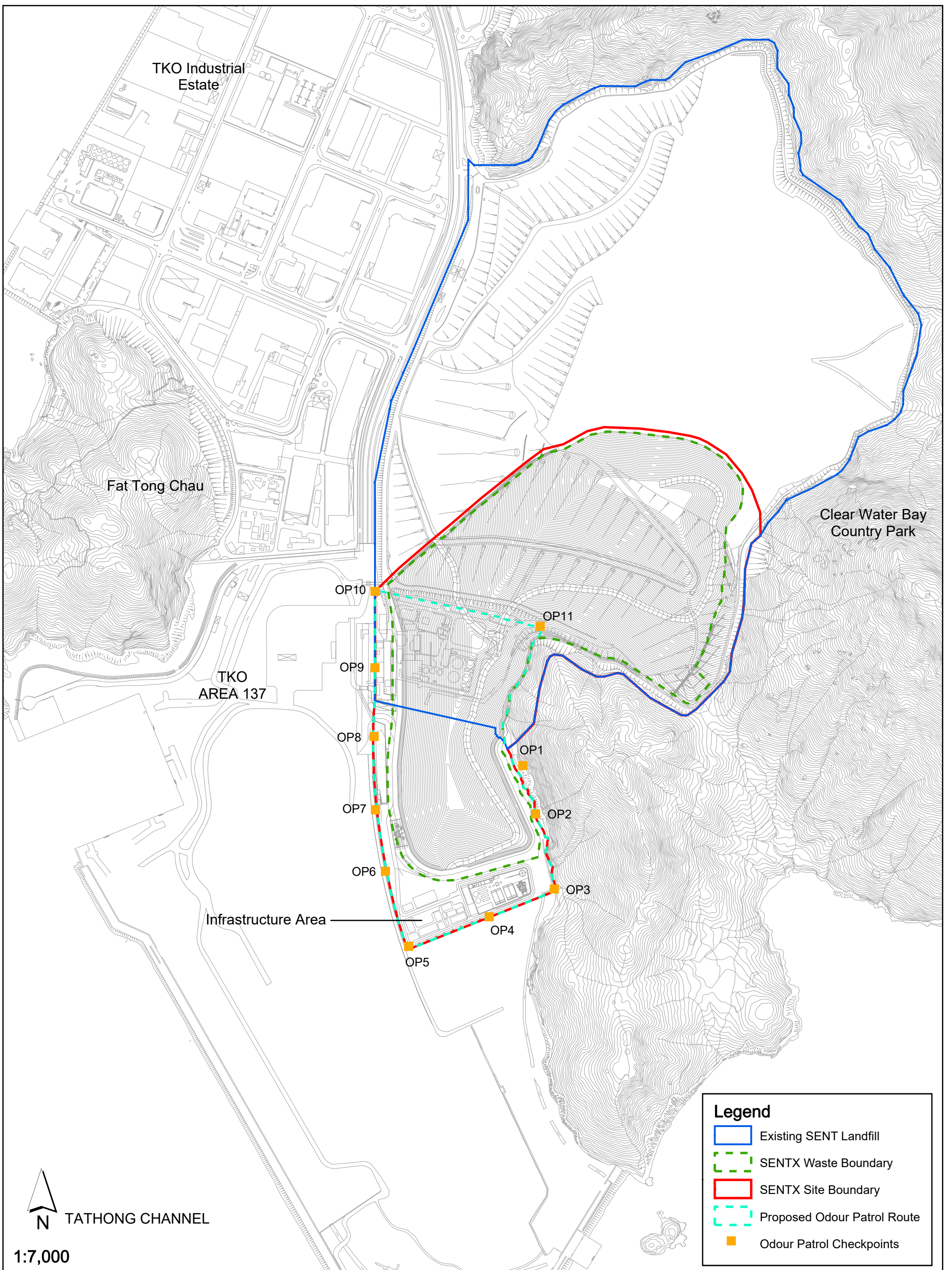
The odour monitoring programme and patrol route are summarised in *Table 2.5* and illustrated in *Figure 2.2* respectively.

**Table 2.5** *Odour Monitoring Details*

<b>Patrol Locations</b>	<b>Parameters</b>	<b>Patrol Frequency <sup>(a)</sup></b>	<b>Monitoring Dates and Time</b>
Patrol along the SENTX Site Boundary (Checkpoints OP1 – OP11 <sup>(d)</sup> )	Odour Intensity (see <i>Table 2.6</i> )	<u>Period 1 - First month of operation</u>	<u>Conducted by ET &amp; IEC:</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	12, 25 Apr 2022
		Three times per week on different days conducted by an independent third party together with the ET and IEC <sup>(b)</sup>	<u>Conducted by an independent third party, ET &amp; IEC:</u>
		<u>Period 2 - Three months following period 1 <sup>(c)</sup></u>	7, 22 Apr 2022
		Weekly conducted by the ET and the IEC	4, 17, 30 May 2022
		Once every two weeks conducted by an independent third party together with the ET and IEC <sup>(b)</sup>	28 Jun 2022
		<u>Period 3 - Throughout operation following period 2 <sup>(c)</sup></u>	
		Monthly conducted by the ET and the IEC	
		Quarterly conducted by an independent third party together with the ET and IEC <sup>(b)</sup>	

**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.
- (d) The revised odour patrol route with the addition of checkpoint OP11 was applied from 10 December 2021.



**Legend**

- Existing SEXTX Landfill
- - - SEXTX Waste Boundary
- SEXTX Site Boundary
- - - Proposed Odour Patrol Route
- Odour Patrol Checkpoints

**Figure 2.2**  
**Odour Patrol Route for Operation/ Restoration Phase Odour Monitoring**

**Table 2.6** *Odour Intensity Level*

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

*Monitoring Schedule for the Reporting Month*

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

*Results and Observations*

The odour monitoring results are summarised and provided in *Table 2.7* and *Annex D4*, respectively.

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

Odour Checkpoints	Odour Intensity Class (Range)	Action Level	Limit Level
OP1	0 – 1	Odour intensity ≥ Class 2 recorded	Odour intensity ≥ Class 3 recorded on 2 consecutive patrol
OP2	0 – 1		
OP3	0 – 1		
OP4	0		
OP5	0		
OP6	0 – 1		
OP7	0		
OP8	0 – 1		
OP9	0 – 1		
OP10	0		
OP11	0		

The potential odour sources in the reporting period included the paint from site work, heavy vehicles, tipping area and vegetation at SENTX, as well as nearby operations of the Leachate Treatment Plant.

All the odour monitoring results were below the Action and Limit Levels in the reporting period. No action is thus required to be undertaken in accordance with the Event and Action Plan presented in *Annex D2*.

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

*Monitoring Requirements and Equipment*

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

stack of the thermal oxidizer, landfill gas flare and landfill gas generator for laboratory analysis for NO<sub>2</sub>, CO, SO<sub>2</sub>, Benzene and Vinyl chloride and in-situ analysis for exhaust gas velocity at monthly 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 <sub>2</sub>	1.58 gs <sup>-1</sup>
CO	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	0.07 gs <sup>-1</sup>
Benzene	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	850°C (minimum)
Exhaust gas exit temperature	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**  
(a) Level under full load condition.

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

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

**Note:**  
(a) Level under full load condition.

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

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

**Note:**  
(a) Level under full load condition.

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

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

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

Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Thermal Oxidiser	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	11 Apr 2022, 16 May 2022, 16 Jun 2022
	• NO <sub>2</sub>		
	• CO		
	• SO <sub>2</sub>		
	• Benzene		
	• Vinyl chloride		
In-situ analysis for			
• Exhaust gas velocity			
Laboratory analysis for	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	16 May 2022	
• Non-methane organic compounds			
Laboratory analysis for	Quarterly	16 May 2022	
• Ammonia			
• Gas combustion temperature	Continuously	1 Apr – 30 Jun 2022	
• Exhaust temperature			
• Exhaust gas velocity <sup>(a)</sup>			
Stack of Landfill Gas Flare	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	11 Apr 2022, 17 May 2022, 17 Jun 2022
	• NO <sub>2</sub>		
	• CO		
	• SO <sub>2</sub>		
	• Benzene		
	• Vinyl chloride		
In-situ analysis for			
• Exhaust gas velocity			
Laboratory analysis for	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	17 May 2022	
• Non-methane organic compounds			
• Gas combustion temperature	Continuously	1 Apr – 30 Jun 2022	
• Exhaust temperature			
• Exhaust gas velocity <sup>(a)</sup>			



Monitoring Location	Parameter	Frequency	Monitoring Date
Stack of Landfill Gas Generator	Laboratory analysis for	Monthly for the first 12 months of operation and thereafter at quarterly intervals	12 Apr 2022, 16 May 2022, 16 Jun 2022
	• NO <sub>2</sub>		
	• CO		
	• SO <sub>2</sub>		
	In-situ analysis for	Quarterly for the 1 <sup>st</sup> year of operation <sup>(b)</sup>	16 May 2022
	• Exhaust gas velocity		
	Laboratory analysis for		
	• Non-methane organic compounds		
	• Exhaust temperature	Continuously	1 Apr – 30 Jun 2022
	• Exhaust gas velocity <sup>(a)</sup>		

**Note:**

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

*Monitoring Schedule for the Reporting Month*

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

*Results and Observations*

The thermal oxidizer, landfill gas flare and landfill gas generator stack emission monitoring results and detailed continuous monitoring results are summarised in *Tables 2.12 - 2.14* and provided in *Annex D5*, respectively.

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

Parameters	Monitoring Results (Range in Bracket)	Limit Level
April 2022		
NO <sub>2</sub>	0.63 gs <sup>-1</sup>	1.58 gs <sup>-1</sup>
CO	<0.01 gs <sup>-1</sup>	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>	0.07 gs <sup>-1</sup>
Benzene	<6 x 10 <sup>-4</sup> gs <sup>-1</sup>	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	954°C (920°C - 980°C)	850°C (minimum)
Exhaust gas exit temperature	1,232K (1,200K - 1,325K)	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	6.6 ms <sup>-1</sup> <sup>(b)</sup>	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>
May 2022		
NO <sub>2</sub>	0.11 gs <sup>-1</sup>	1.58 gs <sup>-1</sup>
CO	<0.02 gs <sup>-1</sup>	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	0.06 gs <sup>-1</sup>	0.07 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-5</sup> gs <sup>-1</sup>	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	<4 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	0.0048 gs <sup>-1</sup>	-
Ammonia (NH <sub>3</sub> )	0.01 gs <sup>-1</sup>	-(c)
Gas combustion temperature	934°C (901°C - 949°C)	850°C (minimum)
Exhaust gas exit temperature	1,201K (1,182K - 1,216K)	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	11 ms <sup>-1</sup> <sup>(b)</sup>	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>
June 2022		
NO <sub>2</sub>	0.39 gs <sup>-1</sup>	1.58 gs <sup>-1</sup>
CO	<0.01 gs <sup>-1</sup>	0.53 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>	0.07 gs <sup>-1</sup>
Benzene	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>	3.01 x 10 <sup>-2</sup> gs <sup>-1</sup>
Vinyl chloride	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.23 x 10 <sup>-3</sup> gs <sup>-1</sup>
Gas combustion temperature	926°C (915°C - 936°C)	850°C (minimum)
Exhaust gas exit temperature	1,176K (1,148K - 1,206K)	443K (minimum) <sup>(a)</sup>
Exhaust gas velocity	9.0 ms <sup>-1</sup> <sup>(b)</sup>	7.5 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

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

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

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

Parameters	Monitoring Results (Range in Bracket)	Limit Level
April 2022		
NO <sub>2</sub>	0.01 gs <sup>-1</sup>	0.97 gs <sup>-1</sup>
CO	0.04 gs <sup>-1</sup>	2.43 gs <sup>-1</sup>
SO <sub>2</sub>	0.06 gs <sup>-1</sup>	0.22 gs <sup>-1</sup>
Benzene	<1.8 x 10 <sup>-5</sup> gs <sup>-1</sup>	4.14 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<1.5 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.60 x 10 <sup>-4</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	<0.0014 gs <sup>-1</sup>	-
Gas combustion temperature	Flare 1: 890°C (820°C - 990°C) Flare 2: 860°C (820°C - 890°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 999K (943K - 1,073K) Flare 2: 1,094K (1,043K - 1,133K)	923 K (minimum) <sup>(a)</sup>
May 2022		
NO <sub>2</sub>	0.01 gs <sup>-1</sup>	0.97 gs <sup>-1</sup>
CO	0.04 gs <sup>-1</sup>	2.43 gs <sup>-1</sup>
SO <sub>2</sub>	0.06 gs <sup>-1</sup>	0.22 gs <sup>-1</sup>
Benzene	<1.8 x 10 <sup>-5</sup> gs <sup>-1</sup>	4.14 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<1.5 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.60 x 10 <sup>-4</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	<0.0014 gs <sup>-1</sup>	-
Gas combustion temperature	Flare 1: 890°C (820°C - 990°C) Flare 2: 860°C (820°C - 890°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 999K (943K - 1,073K) Flare 2: 1,094K (1,043K - 1,133K)	923 K (minimum) <sup>(a)</sup>
Exhaust gas velocity	2.7 ms <sup>-1</sup> <sup>(b)</sup>	9.0 m s <sup>-1</sup> (minimum) <sup>(a)</sup>
June 2022		
NO <sub>2</sub>	0.03 gs <sup>-1</sup>	0.97 gs <sup>-1</sup>
CO	0.098 gs <sup>-1</sup>	2.43 gs <sup>-1</sup>
SO <sub>2</sub>	0.11 gs <sup>-1</sup>	0.22 gs <sup>-1</sup>
Benzene	<3.6 x 10 <sup>-5</sup> gs <sup>-1</sup>	4.14 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<1.6 x 10 <sup>-5</sup> gs <sup>-1</sup>	2.60 x 10 <sup>-4</sup> gs <sup>-1</sup>
Gas combustion temperature	Flare 1: 887°C (822°C - 970°C) Flare 2: 867°C (830°C - 930°C)	815°C (minimum)
Exhaust gas exit temperature	Flare 1: 1,043K (983K - 1,143K) Flare 2: 1,093K (1,043K - 1,183K)	923 K (minimum) <sup>(a)</sup>
Exhaust gas velocity	8.3 ms <sup>-1</sup> <sup>(b)</sup>	9.0 m s <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

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

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

Parameters	Monitoring Results (Range in Bracket)	Limit Level
April 2022		
NO <sub>2</sub>	0.25 gs <sup>-1</sup>	1.91 gs <sup>-1</sup>
CO	0.094 gs <sup>-1</sup>	2.48 gs <sup>-1</sup>
SO <sub>2</sub>	<0.001 gs <sup>-1</sup>	0.528 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-6</sup> gs <sup>-1</sup>	2.47 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<2.3 x 10 <sup>-6</sup> gs <sup>-1</sup>	1.88 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas exit temperature	849K (841K - 870K)	723K (minimum) <sup>(a)</sup>
Exhaust gas velocity	13.3 ms <sup>-1</sup> <sup>(b)</sup>	30.0 ms <sup>-1</sup> (minimum) <sup>(a)</sup>
May 2022		
NO <sub>2</sub>	0.01 gs <sup>-1</sup>	1.91 gs <sup>-1</sup>
CO	0.099 gs <sup>-1</sup>	2.48 gs <sup>-1</sup>
SO <sub>2</sub>	0.004 gs <sup>-1</sup>	0.528 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-6</sup> gs <sup>-1</sup>	2.47 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<2.4 x 10 <sup>-6</sup> gs <sup>-1</sup>	1.88 x 10 <sup>-5</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	3 x 10 <sup>-4</sup> gs <sup>-1</sup>	-
Exhaust gas exit temperature	851K (845K - 857K)	723K (minimum) <sup>(a)</sup>
Exhaust gas velocity	11.6 ms <sup>-1</sup> <sup>(b)</sup>	30.0 ms <sup>-1</sup> (minimum) <sup>(a)</sup>
June 2022		
NO <sub>2</sub>	0.008 gs <sup>-1</sup>	1.91 gs <sup>-1</sup>
CO	0.043 gs <sup>-1</sup>	2.48 gs <sup>-1</sup>
SO <sub>2</sub>	<0.001 gs <sup>-1</sup>	0.528 gs <sup>-1</sup>
Benzene	<4.0 x 10 <sup>-6</sup> gs <sup>-1</sup>	2.47 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<2.2 x 10 <sup>-6</sup> gs <sup>-1</sup>	1.88 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas exit temperature	861K (848K - 879K)	723K (minimum) <sup>(a)</sup>
Exhaust gas velocity	9.7 ms <sup>-1</sup> <sup>(b)</sup>	30.0 ms <sup>-1</sup> (minimum) <sup>(a)</sup>

**Note:**

(a) Level under full load condition.

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

All thermal oxidizer, landfill gas flare and landfill gas generator stack emission 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*.

**2.1.4 Ambient VOCs, Ammonia and H<sub>2</sub>S Monitoring**

*Monitoring Requirements and Equipment*

According to the updated EM&A Manual of the Project, ambient VOCs, ammonia and H<sub>2</sub>S monitoring was carried out at the four designated locations along the site boundary (i.e. AM1, AM2, AM3 and AM4) during the operation/restoration phase, at quarterly interval.

The Limit Levels for ambient VOCs, ammonia and H<sub>2</sub>S monitoring is provided in *Table 2.15* below.

**Table 2.15** *Limit Levels for Ambient VOCs, Ammonia and H<sub>2</sub>S Monitoring*

<b>Parameters</b>	<b>Limit Level (µg m<sup>-3</sup>)</b>
Methane	NA <sup>(a)</sup>
Ammonia	180
H <sub>2</sub> S	42
Dichlorodifluoro-methane	NA <sup>(a)</sup>
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 <sup>(a)</sup>
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
Ethyl benzene	738
Nonane	11,540
Ethanethiol	13
Decanes	3,608
Limonene	212
Butyl benzene	47
Undecane	5,562
Butanethiol	4
Terpenes	NA <sup>(a)</sup>
Xylenes	534
Dichlorobenzene	120

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**Notes:**

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

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### VOCs

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

### *Methane*

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

### *Ammonia*

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

### *H<sub>2</sub>S*

H<sub>2</sub>S in air is collected in mid-ge impingers by aspirating a measured volume of air through an alkaline suspension of cadmium hydroxide (as the absorbing solution). The sulphide is precipitated as cadmium sulphide to prevent air oxidation of the sulphide. Arabinogalactan is added to the cadmium hydroxide slurry prior to sampling to minimize photo-decomposition of the precipitated cadmium sulphide. The solution is transported back to laboratory for analysis.

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

The ambient VOCs, ammonia and H<sub>2</sub>S monitoring programme and monitoring locations are summarised in *Table 2.16* and illustrated in *Figure 2.1*, respectively.

**Table 2.16** *Ambient VOCs, Ammonia and H<sub>2</sub>S Monitoring Details*

Monitoring Station	Location	Parameter	Frequency	Monitoring Date
AM1	SENTX Site Boundary (North)	• Methane	Quarterly	16 May 2022
AM2	SENTX Site Boundary (West, near DP3)	• Ammonia		
AM3	SENTX Site Boundary (West, near RC15)	• A suite of VOCs <sup>(a)</sup>		
AM4	SENTX Site Boundary (West, near EPD building)	• H <sub>2</sub> S		

**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  | • Dichlorodifluoro- |
| • Carbon disulphide     | • Propyl propionate | methane             |
| • Propyl benzene        | • Butyl acetate     | • Methane           |
| • Ethyl benzene         | • Ethyl butanoate   |                     |

*Monitoring Schedule for the Reporting Month*

The schedule for ambient VOCs, ammonia and H<sub>2</sub>S monitoring during the reporting period is provided in *Annex C*.

*Results and Observations*

The ambient VOCs, ammonia and H<sub>2</sub>S monitoring results are summarised in *Tables 2.17* and provided in *Annex D6*.

**Table 2.17 Summary of Ambient VOCs, Ammonia and H<sub>2</sub>S 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	<10	<10	<10	<10
H <sub>2</sub> S	42	<14	<14	<14	<14
Methane	NA <sup>(a)</sup>	0.00019% (v/v)	0.00017% (v/v)	0.00041% (v/v)	0.00018% (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	0.9	0.9	0.4	1.0
Benzene	33	1.0	0.8	<0.5	0.9
Butan-2-ol	667	<0.6	<0.6	<0.6	<0.6
Butanethiol	4	<1.2	<1.2	<1.2	<1.2
Carbon Disulphide	150	0.8	<0.5	<0.5	1.1
Carbon Tetrachloride	64	0.7	0.6	<0.6	0.6
Chloroform	99	<0.8	<0.8	<0.8	<0.8
Decanes	3,608	0.7	<0.7	1.1	0.7
Dichlorobenzene	120	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoro-methane	NA <sup>(a)</sup>	1.0	1.1	<0.6	0.9
Dimethylsulphide	8	<0.2	<0.2	<0.2	<0.2
Dipropyl ether	NA <sup>(a)</sup>	<0.8	<0.8	<0.8	<0.8
Limonene	212	1.1	1.2	4.0	1.1
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	1.0	1.0	1.3	2.0
Heptane	2,746	<0.8	<0.8	<0.8	0.8
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	29.4	13.7	<2.6	31.3
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	4.5	5.4	0.6	5.5
Butyl acetate	76	1.1	<1.0	<1.0	1.7
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 <sup>(a)</sup>	1.0	<0.8	1.8	2.2
Tetrachloroethylene	1,380	<0.7	<0.7	<0.7	<0.7
Toluene	1,244	3.5	3.6	2.6	5.4
Trichloroethylene	5,500	<1.1	<1.1	<1.1	<1.1
Undecane	5,562	<1.2	<1.2	1.5	<1.2
Vinyl Chloride	26	<0.3	<0.3	<0.3	<0.3
Xylenes	534	3.0	3.0	5.9	6.3

**Notes:**

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



All ambient VOCs, ammonia and H<sub>2</sub>S 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 <sup>(a)</sup>	Limit Level <sup>(b)</sup>
07:00 – 19:00 hrs on all days	When one documented complaint is received from any one of the noise sensitive receivers (NSRs) or	65 dB(A) at NSRs <sup>(c)</sup>
19:00 – 23:00 hrs on all days		65 dB(A) at NSRs <sup>(c)</sup>
23:00 – 07:00 hrs on all days	75 dB(A) recorded at the monitoring station	55 dB(A) at NSRs <sup>(c)</sup>

**Notes:**

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

Noise monitoring was performed by ALS Technichem (HK) Pty Ltd (HOKLAS Registration No. 066) using a sound level meter placed at the designated monitoring station NM1 (see *Figure 2.1*) in accordance with the requirements stipulated in the updated EM&A Manual. Acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. Details of the deployed equipment are provided in *Table 2.19*.

**Table 2.19 Noise Monitoring Details**

Monitoring Station <sup>(1)</sup>	Location	Parameter	Frequency and Duration	Monitoring Dates	Equipment
NM1	SENTX Site Boundary (North)	L <sub>eq</sub> (30 min) measurement between 07:00 and 19:00 hours on normal weekdays (Monday to Saturday)	Once per week for 30 mins during the operation period of the Project	7, 13, 19, 25 Apr 2022 3, 10, 19, 25, 31 May 2022 6, 13, 20, 30 Jun 2022	Sound Level Meter: Rion NL-52 (S/N: 00809405) Rion NL-52 (S/N: 00921191) Rion NL-52 (S/N: 00464681)  Acoustic Calibrator: Rion NC-74 (S/N: 34246492)  Bruel & Kjaer 4231 (S/N: 2713428)

**2.2.2 Monitoring Schedule for the Reporting Period**

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

**2.2.3 Results and Observations**

A total of 13 impact noise monitoring events were scheduled during the reporting period. However, noise monitoring on 10 May 2022, 6 and 30 June 2022 were cancelled due to adverse weather. The noise monitoring results are summarised in *Table 2.20* and graphically presented in *Annex E1*.

**Table 2.20 Summary of Noise Monitoring Results in the Reporting Period**

Month	Monitoring Station	Measured Noise Level L <sub>eq</sub> (30 min), dB(A)		
		Average	Range	Action and Limit Level
April 2022	NM1	51.1	49.5 – 51.7	75
May 2022	NM1	51.0	49.3 – 54.7	75
June 2022	NM1	57.8	57.4 – 58.2	75

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

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

## 2.3 WATER QUALITY MONITORING

### 2.3.1 Surface Water Quality Monitoring

#### *Monitoring Requirements and Equipment*

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

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

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

**Table 2.21** *Action and Limit Levels for Surface Water Quality*

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

The locations of the monitoring stations for the Project are shown in *Figure 2.1*. All *in situ* monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the surface water quality monitoring programme. Calibration for a DO meter was carried out before measurement according to the instruction manual of the equipment model. Details of the equipment used in the impact surface water quality monitoring works are provided in *Table 2.22*.

**Table 2.22 Impact Surface Water Quality Monitoring Details**

Monitoring Station	Location	Frequency	Monitoring Dates	Parameter	Equipment	
DP4	Surface water discharge point DP4	Monthly	25 Apr 2022, 25 May 2022, 24 Jun 2022	<ul style="list-style-type: none"> <li>• pH</li> <li>• Electrical conductivity (EC)</li> <li>• DO</li> <li>• SS</li> <li>• COD</li> <li>• BOD<sub>5</sub></li> <li>• TOC</li> <li>• Ammoniacal -nitrogen</li> <li>• Nitrate-nitrogen</li> <li>• Nitrite-nitrogen</li> <li>• TKN</li> <li>• TN</li> <li>• Phosphate</li> <li>• Sulphate</li> <li>• Sulphide</li> <li>• Carbonate</li> <li>• Oil &amp; Grease</li> </ul>	<ul style="list-style-type: none"> <li>• Bicarbonate</li> <li>• Chloride</li> <li>• Sodium</li> <li>• Potassium</li> <li>• Calcium</li> <li>• Magnesium</li> <li>• Nickel</li> <li>• Manganese</li> <li>• Chromium</li> <li>• Cadmium</li> <li>• Copper</li> <li>• Lead</li> <li>• Iron</li> <li>• Zinc</li> <li>• Mercury</li> <li>• Boron</li> </ul>	YSI Professional DSS (S/N: 17B100758)
DP6	Surface water discharge point DP6				YSI Professional DSS (S/N: 15H103928)	
DP4 (Additional Monitoring)	Surface water discharge point DP4	Weekly	30 June 2022	<ul style="list-style-type: none"> <li>• SS</li> </ul>	-	

Notes:

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

#### *Monitoring Schedule for the Reporting Period*

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

#### *Results and Observations*

Three monitoring events for impact surface water quality monitoring were scheduled at all designated monitoring stations and one additional surface water quality monitoring event was scheduled at DP4 during the reporting period. However, sampling could not be carried out at the monitoring events below due to insufficient flow.

- 25 April 2022 at all monitoring locations;
- 25 May 2022 at DP6; and
- 24 June 2022 at DP6.

Details of impact water quality monitoring event are provided in *Annex F1*. Limit Level exceedance (SS) was recorded for surface water quality impact monitoring on 25 May 2022 and the exceedance was found to be project-related upon further investigation. Actions in accordance with the Event and Action Plan in *Annex F2* were undertaken. Additional surface water monitoring at DP4 for SS was conducted on 30 June 2022. The results of the surface water monitoring are summarized in *Table 2.23* below. Investigation reports of the exceedances are presented in *Annex F6*.

**Table 2.23** *Details of Exceedances Recorded for Surface Water Quality Monitoring*

Date	Monitoring Location	Parameter	Result	Limit Level	Remarks
25 May 2022	DP3	SS	31.8 mg/L	20 mg/L	Project-related
30 June 2022	DP4	SS	28.2 mg/L	20 mg/L	Weekly monitoring shall be continued

The result of additional surface water quality monitoring on 30 June 2022 exceeded the Limit Level. The SS exceedance at DP4 on 30 June 2022 was found to be project-related upon further investigation. The weekly surface water quality monitoring (SS) shall be continued at DP4 in the next reporting period until no exceedance of Limit Level. The Contractor was reminded to implement all relevant mitigation measures for the construction 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*

#### *Monitoring Requirements and Equipment*

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

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

Temperature, pH and volume of the effluent discharged from the leachate treatment plant were measured in-situ whereas the parameters as listed in *Table 2.24* were determined by ALS Technichem (HK) Pty Ltd. (HOKLAS Registration No. 066).

The Limit Levels of the leachate monitoring are provided in *Table 2.24*.

**Table 2.24** *Limit Levels for Leachate Levels and Effluent Quality*

<b>Parameters</b>	<b>Limit Level</b>
<b>Leachate Levels</b>	
Leachate levels above the basal liner	1 m above the primary liner of the leachate containment system
<b>Effluent Quality</b>	
Temperature	> 43 °C
pH Value	6 - 10
Volume Discharged	>1,500 m <sup>3</sup>
Suspended Solids (SS)	> 800 mg/L
Phosphate	> 25 mg/L
Sulphate	> 900 mg/L
Total Inorganic Nitrogen <sup>(a)</sup>	> 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	> 7.5 mg/L
Cadmium	> 1 µg/L
Chromium	> 400 µg/L
Copper	> 1,000 µg/L
Nickel	> 800 µg/L
Zinc	> 800 µg/L
<b>Note:</b>	
(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 2.25*.

**Table 2.25 Leachate Levels and Effluent Quality Monitoring Details**

Location	Frequency	Parameter	Monitoring Dates	Equipment
Leachate levels above the basal liner	Continuous	Leachate Levels	1 Apr – 30 Jun 2022	Pairs of pressure transducers
Effluent discharged from LTP	Daily for the first 3 months upon full operation of the LTP at wet season (Apr to Sep) and dry season (Oct to Mar), respectively and reduce to monthly thereafter subject to the monitoring results of the first 3 months for each season and agreement with the EIAO Authority, IEC and IC. <sup>(a)</sup>	<i>On-site Measurements:</i> <ul style="list-style-type: none"> <li>• Volume</li> <li>• pH</li> <li>• Temperature</li> </ul> <i>Laboratory analysis:</i> <ul style="list-style-type: none"> <li>• Suspended Solids</li> <li>• COD</li> <li>• BOD<sub>5</sub></li> <li>• TOC</li> <li>• Ammoniacal-nitrogen</li> <li>• Nitrate-nitrogen</li> <li>• Nitrite-nitrogen</li> <li>• Total Nitrogen</li> <li>• Sulphate</li> <li>• Phosphate</li> <li>• Oil &amp; Grease</li> <li>• Alkalinity</li> <li>• Chloride</li> <li>• Calcium</li> <li>• Potassium</li> <li>• Magnesium</li> <li>• Iron</li> <li>• Zinc</li> <li>• Copper</li> <li>• Chromium</li> <li>• Nickel</li> <li>• Cadmium</li> <li>• Boron</li> </ul>	1 Apr – 30 Jun 2022	TOA HM-30P (S/N: 790332)  LUTRON WA-2017SD (S/N: T.016811)  HANNA H198103 (Eq No.: HK1561)  COMARK PDT300 (S/N: 03948681155)

Note:

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

*Monitoring Schedule for the Reporting Month*

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

*Results and Observations*

The leachate levels and effluent quality monitoring results are summarised in *Table 2.26* and *Table 2.27*, respectively. The detailed monitoring results are provided in *Annex F3* and *Annex F4*, respectively.

**Table 2.26 Summary of Leachate Levels in the Reporting Period**

<b>Monitoring Location</b>	<b>Average Leachate Head Levels (cm) (Range in Bracket)</b>	<b>Limit Level (cm)</b>
April 2022		
<b>Pump Station No. 1X (Cell 1X)</b>		
Meter No. X-1	53 (42 - 66)	> 178
Meter No. X-2	73 (62 - 86)	
<b>Average</b>	63 (52 - 76)	
<b>Pump Station No. 2X (Cell 2X)</b>		
Meter No. X-3	78 (62 - 88)	> 180
Meter No. X-4	79 (62 - 90)	
<b>Average</b>	78 (62 - 89)	
<b>Pump Station No. 3X (Cell 3X)</b>		
Meter No. X-5	71 (48 - 90)	> 175
Meter No. X-6	71 (48 - 90)	
<b>Average</b>	71 (48 - 90)	
May 2022		
<b>Pump Station No. 1X (Cell 1X)</b>		
Meter No. X-1	57 (42 - 101)	> 178
Meter No. X-2	76 (62 - 115)	
<b>Average</b>	67 (52 - 106)	
<b>Pump Station No. 2X (Cell 2X)</b>		
Meter No. X-3	79 (64 - 103)	> 180
Meter No. X-4	80 (66 - 104)	
<b>Average</b>	79 (65 - 104)	
<b>Pump Station No. 3X (Cell 3X)</b>		
Meter No. X-5	72 (53 - 110)	> 175
Meter No. X-6	72 (53 - 110)	
<b>Average</b>	72 (53 - 110)	
June 2022		
<b>Pump Station No. 1X (Cell 1X)</b>		
Meter No. X-1	58 (44 - 70)	> 178
Meter No. X-2	76 (61 - 88)	
<b>Average</b>	67 (54 - 77)	
<b>Pump Station No. 2X (Cell 2X)</b>		
Meter No. X-3	70 (57 - 88)	> 180
Meter No. X-4	74 (64 - 93)	
<b>Average</b>	72 (61 - 91)	
<b>Pump Station No. 3X (Cell 3X)</b>		
Meter No. X-5	75 (46 - 112)	> 175
Meter No. X-6	76 (55 - 115)	
<b>Average</b>	75 (55 - 114)	



**Table 2.27 Summary of Effluent Quality Monitoring Results in the Reporting Period**

<b>April 2022</b>		<b>Monitoring Results</b>			<b>Limit Level</b>
<b>Parameters</b>		<b>Average</b>	<b>Min</b>	<b>Max</b>	
Temperature	°C	29.5	21.2	35.3	> 43 °C
pH Value	pH unit	8.6	8.4	9.0	6 – 10
Volume Discharged	m <sup>3</sup>	616	88	1285	>1,500 m <sup>3</sup>
Suspended Solids (SS)	mg/L	27.6	11.7	56.4	> 800 mg/L
Phosphate	mg/L	9.1	7.8	10.2	> 25 mg/L
Sulphate	mg/L	144	121	164	> 900 mg/L
Total Inorganic Nitrogen <sup>(a)</sup>	mg/L	45.7	32.1	72.5	> 100 mg/L
BOD	mg/L	10	4	33	> 800 mg/L
COD	mg/L	1,138	1,010	1,350	> 2,000 mg/L
Oil & Grease	mg/L	<5.0	<5.0	<5.0	> 20 mg/L
Boron	µg/L	5,669	5,030	6,110	> 7,000 µg/L
Iron	mg/L	2.0	1.6	2.4	> 7.5 mg/L
Cadmium	µg/L	<1.0	<1.0	<1.0	> 1 µg/L
Chromium	µg/L	135	120	141	> 400 µg/L
Copper	µg/L	15.6	<10.0	53.0	> 1,000 µg/L
Nickel	µg/L	127.8	118.0	139.0	> 800 µg/L
Zinc	µg/L	84	69	111	> 800 µg/L
<b>May 2022</b>		<b>Monitoring Results</b>			<b>Limit Level</b>
<b>Parameters</b>		<b>Average</b>	<b>Min</b>	<b>Max</b>	
Temperature	°C	30.0	21.5	34.9	> 43 °C
pH Value	pH unit	8.2	7.8	8.4	6 – 10
Volume Discharged	m <sup>3</sup>	1076.6	130.0	1496.0	>1,500 m <sup>3</sup>
Suspended Solids (SS)	mg/L	29.9	4.2	79.8	> 800 mg/L
Phosphate	mg/L	4.7	0.2	8.9	> 25 mg/L
Sulphate	mg/L	335.1	124.0	650.0	> 900 mg/L
Total Inorganic Nitrogen <sup>(a)</sup>	mg/L	47.7	19.7	82.3	> 100 mg/L
BOD	mg/L	9.2	4.0	17.0	> 800 mg/L
COD	mg/L	762.2	410.0	1130.0	> 2,000 mg/L
Oil & Grease	mg/L	<5.0	<5.0	<5.0	> 20 mg/L
Boron	µg/L	4183.5	2570.0	5940.0	> 7,000 µg/L
Iron	mg/L	1.3	0.5	1.9	> 7.5 mg/L
Cadmium	µg/L	<1.0	<1.0	<1.0	> 1 µg/L
Chromium	µg/L	92.6	48.0	138.0	> 400 µg/L
Copper	µg/L	12.9	<10.0	40.0	> 1,000 µg/L
Nickel	µg/L	84.3	34.0	129.0	> 800 µg/L
Zinc	µg/L	85.9	55.0	168.0	> 800 µg/L
<b>June 2022</b>		<b>Monitoring Results</b>			<b>Limit Level</b>
<b>Parameters</b>		<b>Average</b>	<b>Min</b>	<b>Max</b>	
Temperature	°C	33.5	29.0	37.7	> 43 °C
pH Value	pH unit	8.3	8.1	8.5	6 – 10
Volume Discharged	m <sup>3</sup>	1128.0	34.0	1496.0	>1,500 m <sup>3</sup>
Suspended Solids (SS)	mg/L	34.8	6.5	307.0	> 800 mg/L
Phosphate	mg/L	3.6	1.2	7.1	> 25 mg/L
Sulphate	mg/L	312.9	156.0	517.0	> 900 mg/L

Total Inorganic Nitrogen <sup>(a)</sup>	mg/L	65.7	50.1	95.0	> 100 mg/L
BOD	mg/L	9.9	6.0	38.0	> 800 mg/L
COD	mg/L	766.7	316.0	1080.0	> 2,000 mg/L
Oil & Grease	mg/L	<5.0	<5.0	<5.0	> 20 mg/L
Boron	µg/L	3819.6	2000.0	5170.0	> 7,000 µg/L
Iron	mg/L	1.2	0.6	1.8	> 7.5 mg/L
Cadmium	µg/L	<1.0	<1.0	<1.0	> 1 µg/L
Chromium	µg/L	88.9	41.0	126.0	> 400 µg/L
Copper	µg/L	13.3	<10.0	50.0	> 1,000 µg/L
Nickel	µg/L	82.6	40.0	121.0	> 800 µg/L
Zinc	µg/L	89.1	48.0	161.0	> 800 µg/L

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

### 2.3.3 *Groundwater Monitoring*

#### *Monitoring Requirements and Equipment*

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

The Limit Levels for groundwater quality is provided in *Table 2.28* below.

**Table 2.28** *Limit Levels for Groundwater Quality*

Location	Limit Levels	
	Ammoniacal-nitrogen (mg L <sup>-1</sup> )	COD (mg L <sup>-1</sup> )
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 2.29 and illustrated in Figure 2.1, respectively.

**Table 2.29 Groundwater Monitoring Details**

Monitoring Location	Frequency	Parameter	Monitoring Dates	Equipment
All groundwater monitoring wells (MWX-1 to MWX-14)	Monthly	• Water level	11, 12 Apr 2022 10, 11, 18 May 2022, 6, 14 Jun 2022	YSI Professional
		• pH		
		• EC		DSS (S/N: 17B102764)
		• COD		
		• BOD5		YSI Professional
		• TOC		
		• Ammoniacal-nitrogen		DSS (S/N: 15H103928)
		• Nitrate-nitrogen		
		• Nitrite-nitrogen		
		• TKN		
		• TN		
		• Sulphate		
		• Sulphide		
		• Carbonate		
		• Bicarbonate		
		• Phosphate		

*Monitoring Schedule for the Reporting Month*

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

*Results and Observations*

The groundwater quality monitoring results and detailed monitoring results are summarised in *Table 2.30* and provided in *Annex F5*, respectively.

**Table 2.30 Summary of Groundwater Monitoring Results in the Reporting Period**

Location	Ammoniacal-nitrogen (mg L <sup>-1</sup> )				COD (mg L <sup>-1</sup> )			
	Monitoring Results			Limit Levels	Monitoring Results			Limit Levels
	Average	Min	Max		Average	Min	Max	
MWX-1	0.11	0.06	0.15	5.00	4.67	4	5	30
MWX-2	1.88	<0.01	3.46	5.00	17.67	4	29	30
MWX-3	1.23	0.91	1.45	5.00	15.33	12	19	30
MWX-4	3.33	2.2	5.2	7.63	27.33	18	40	36
MWX-5	1.91	0.32	4.71	5.00	24.67	15	43	30
MWX-6	3.77	3.35	4.14	5.00	44.33	29	60	46
MWX-7	5.97	5.76	6.32	6.55	14.67	10	24	36
MWX-8	9.38	7.41	13	15.85	39.33	35	47	50
MWX-9	0.95	0.37	1.89	7.30	38.67	16	68	71
MWX-10	0.02	<0.01	0.02	5.00	12.33	8	17	30
MWX-11	0.06	<0.01	0.16	5.00	4.00	<2	6	30
MWX-12	0.01	<0.01	0.02	5.00	3.33	<2	5	30
MWX-13	0.02	<0.01	0.03	5.00	6.33	<2	12	30
MWX-14	0.03	<0.01	0.06	5.00	2.00	<2	2	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 exceedance was conducted and the investigation report is 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 quality (COD) exceedances at MWX-4, MWX5 and MWX6 on 11 April 2022 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 2.31* below.

**Table 2.31** *Limit Levels for Landfill Gas Constituents*

Parameters	Monitoring Location	Limit Level (% (v/v))	
<b>Perimeter Landfill Gas Monitoring Wells (a)</b>			
Methane & Carbon Dioxide		Methane	Carbon Dioxide
	LFG1	1.0	2.2
	LFG2	1.0	4.2
	LFG3	1.0	6.3
	LFG4	1.0	7.0
	LFG5	1.0	3.4
	LFG6	1.0	9.1
	LFG7	1.0	1.5
	LFG8	1.0	1.7
	LFG9	2.5	1.7
	LFG10	1.0	1.6
	LFG11	3.0	2.0
	LFG12	13.2	1.5
	LFG13	22.5	2.7
	LFG14	1.0	1.6
	LFG15	18.2	2.0
	LFG16	1.0	1.7
	LFG17	10.5	2.1
	LFG18	2.3	1.9
	LFG19	6.3	3.1
	LFG20	1.0	4.2
	LFG21	1.0	4.3
	LFG22	1.0	3.9
	LFG23	1.0	10.3
	LFG24	1.0	4.0
	GP1	1.0	8.5
	GP2 (shallow)	1.0	11.4
	GP2 (deep)	1.0	10.4
	GP3 (shallow)	1.0	3.9
	GP3 (deep)	1.0	1.9
	GP4 (shallow)	1.0	2.3
	GP4 (deep)	1.0	5.6
	GP5 (shallow)	1.0	9.5
	GP5 (deep)	1.0	7.5
	GP6	1.0	7.8
	GP7	1.0	4.5
	GP12	1.0	2.3
	GP15	1.0	2.2
	P7	1.0	2.5
	P8	1.0	1.7
	P9	1.0	2.7
<b>Service Voids, Utilities Pits and Manholes</b>			
Methane (or flammable gas)	Service voids, utilities pits and manholes	1% by volume	

Parameters	Monitoring Location	Limit Level (% (v/v))
<b>Permanent Gas Monitoring System</b>		
Methane (or flammable gas)	Permanent Gas Monitoring System	1% by volume (20% LEL)
<b>Area Between the SENTX Site Boundary and Waste Boundary (Surface Emission)</b>		
Flammable gas	Area between SENTX site boundary and waste boundary	30 ppm
<b>Notes:</b>		
(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 2.32*. The landfill gas monitoring locations for perimeter landfill gas monitoring wells and service voids, utilities and manholes along the Site boundary and within the SENTX site are illustrated in *Figure 2.3 - 2.4* and *Annex G1*, respectively.

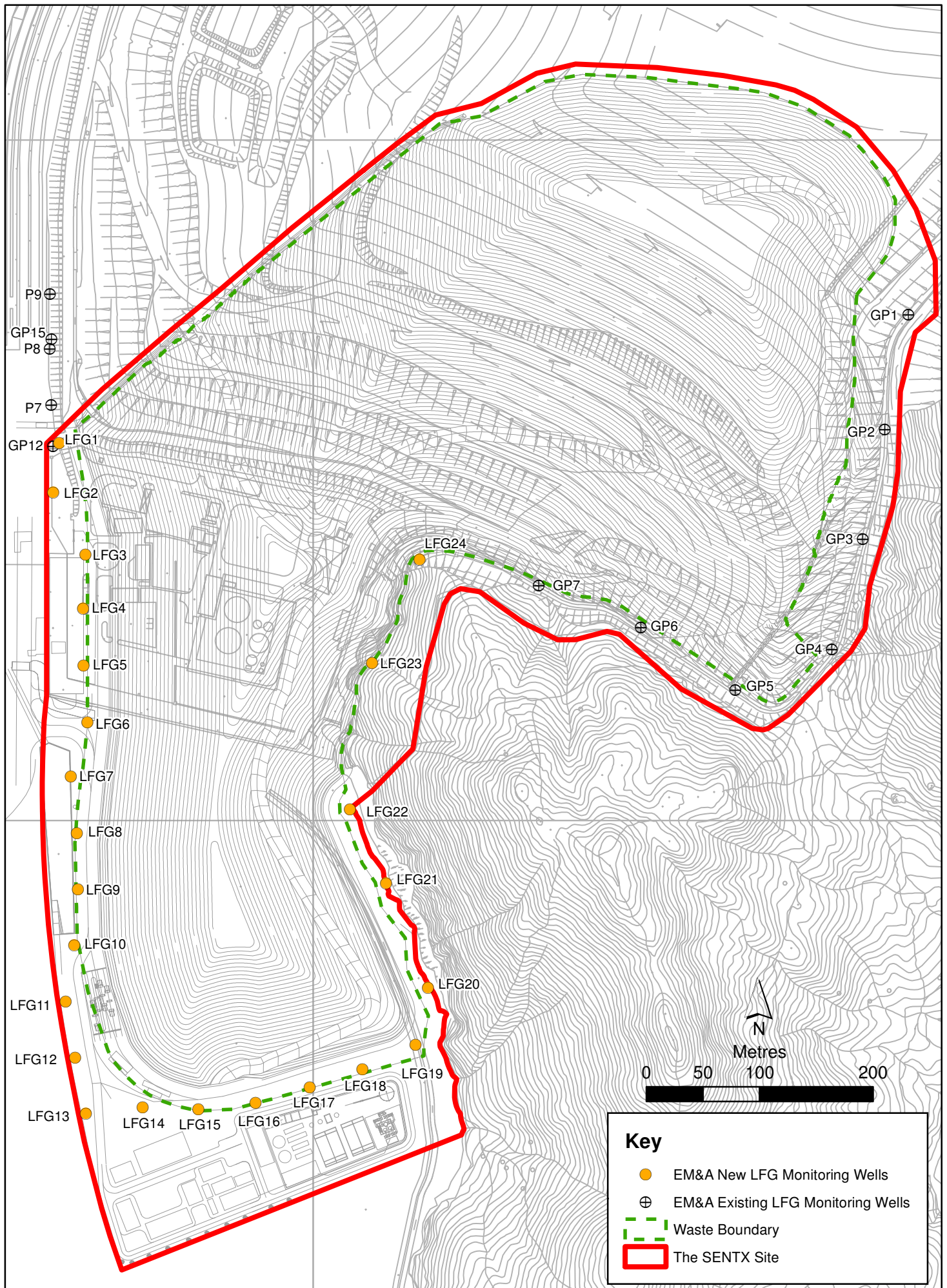


Figure 2.3

Location of Landfill Gas Monitoring Wells



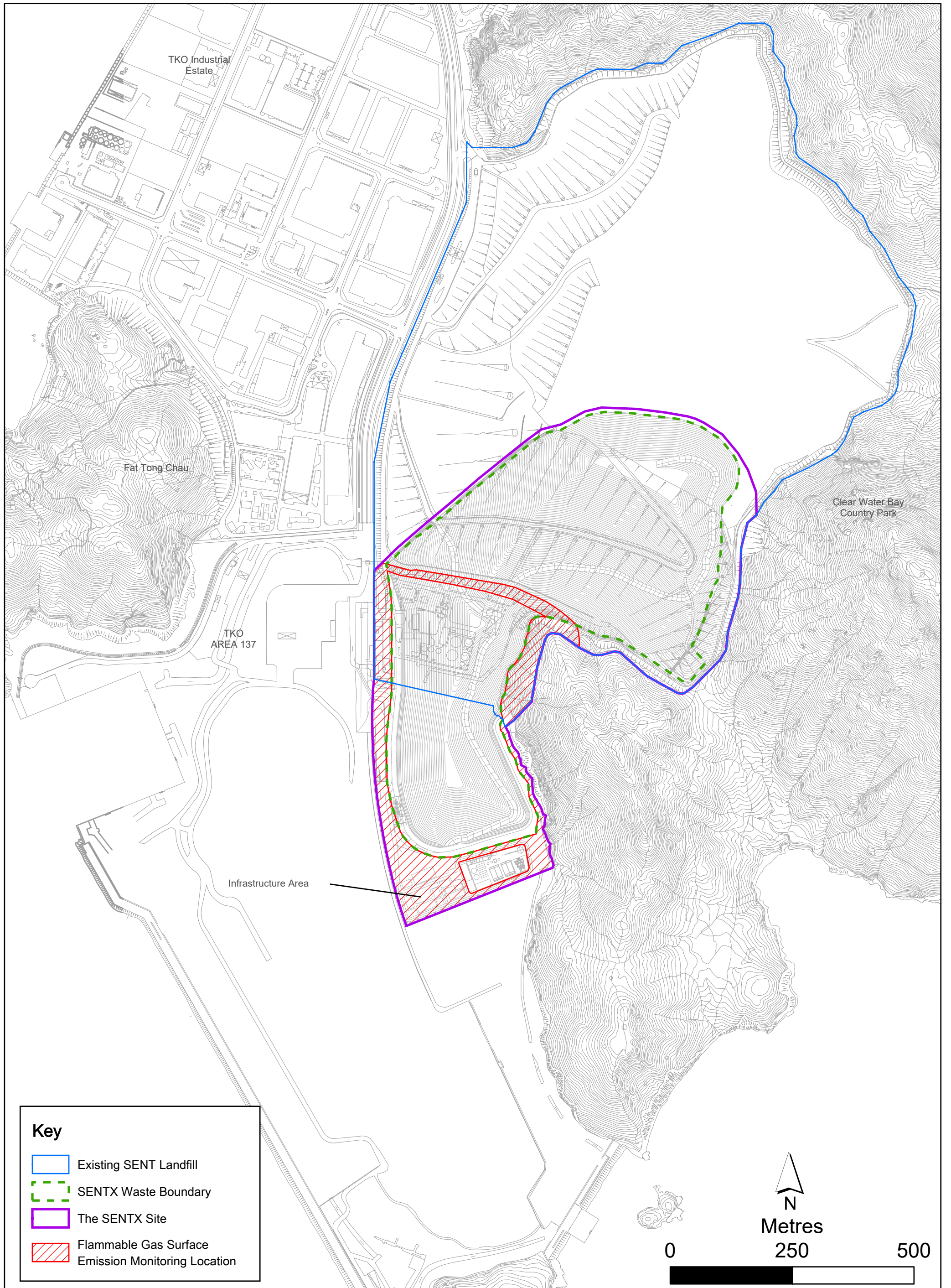


Figure 2.4

Flammable Gas Surface Emission Monitoring Locations

**Table 2.32 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"> <li>• Methane</li> <li>• Carbon dioxide</li> <li>• Oxygen</li> <li>• Atmospheric pressure</li> </ul>	7 Apr 2022, 17 May 2022, 12 Jun 2022	GA5000 (S/N: G507306)
Service voids, utilities and manholes along the Site boundary and within the SENTX Site (UU1 to UU28)	Monthly	<ul style="list-style-type: none"> <li>• Methane</li> <li>• Carbon dioxide</li> <li>• Oxygen</li> </ul>	8 Apr 2022, 16 May 2022, 13 Jun 2022	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 Apr - 30 Jun 2021	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	18 May 2022	GMI Leak Surveyor (S/N: 554846)
Bulk gas sampling at least 2 of the perimeters LFG monitoring wells	Quarterly	<ul style="list-style-type: none"> <li>• Methane</li> <li>• Carbon dioxide</li> <li>• Oxygen</li> <li>• Nitrogen</li> <li>• Carbon monoxide</li> <li>• Other flammable gas</li> </ul>	17 May 2022	Gas sampling pump and Tedlar bags

*Monitoring Schedule for the Reporting Month*

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

*Results and Observations*

The landfill gas monitoring results are summarised and provided in *Tables 2.33 - 2.36 and Annex G2*, respectively.

**Table 2.33 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	Monitoring Results			Limit
	Average	Min	Max	Level <sup>(a)</sup>	Average	Min	Max	Level <sup>(a)</sup>
LFG1	0.0	0.0	0.0	1.0	0.2	0.1	0.3	3.2
LFG2	0.0	0.0	0.0	1.0	0.4	0.0	0.7	4.3
LFG3	0.0	0.0	0.0	1.0	0.4	0.0	1.3	6.3
LFG4	0.0	0.0	0.0	1.0	0.3	0.0	0.7	7.0
LFG5	0.0	0.0	0.0	1.0	0.2	0.1	0.2	3.4
LFG6	0.6	0.0	1.8	1.0	0.9	0.0	2.1	9.1
LFG7	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.5
LFG8	4.1	0.0	8.9	12.6	0.2	0.0	0.5	2.4
LFG9	0.8	0.0	1.5	2.5	0.0	0.0	0.1	1.7
LFG10	1.8	0.0	2.9	3.5	0.1	0.0	0.1	1.6
LFG11	0.3	0.0	0.8	3.0	0.0	0.0	0.1	2.0
LFG12	0.0	0.0	0.0	13.2	0.0	0.0	0.0	1.5
LFG13	1.7	0.0	5.1	22.5	0.0	0.0	0.1	2.7
LFG14	0.9	0.0	2.4	5.2	0.0	0.0	0.0	1.8
LFG15	2.0	0.0	4.1	18.2	0.1	0.0	0.3	2.0
LFG16	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.0
LFG17	5.8	0.1	15.9	17.8	0.2	0.0	0.5	2.4
LFG18	0.0	0.0	0.0	2.3	0.0	0.0	0.0	2.1
LFG19	0.0	0.0	0.0	6.3	0.0	0.0	0.0	3.1
LFG20	0.0	0.0	0.0	1.0	0.1	0.0	0.3	4.6
LFG21	0.0	0.0	0.0	1.0	0.7	0.0	2.1	4.8
LFG22	0.0	0.0	0.0	1.0	0.0	0.0	0.0	4.0
LFG23	0.0	0.0	0.0	1.0	2.8	1.3	4.2	10.3
LFG24	0.0	0.0	0.0	1.0	0.9	0.8	1.0	4.7
GP1	0.0	0.0	0.0	1.0	0.1	0.1	0.1	10.6
GP2 (shallow)	0.0	0.0	0.0	1.0	0.1	0.0	0.1	11.4
GP2 (deep)	0.0	0.0	0.0	1.0	0.1	0.0	0.2	10.4
GP3 (shallow)	0.0	0.0	0.0	1.0	1.4	0.1	2.1	6.9
GP3 (deep)	0.0	0.0	0.0	1.0	0.4	0.1	1.0	5.6
GP4 (shallow)	0.0	0.0	0.0	1.0	0.1	0.1	0.1	11.6
GP4 (deep)	0.0	0.0	0.0	1.0	0.2	0.1	0.4	7.7
GP5 (shallow)	0.0	0.0	0.0	1.0	2.4	0.1	3.8	10.8
GP5 (deep)	0.0	0.0	0.0	1.0	0.1	0.0	0.1	7.5
GP6	0.0	0.0	0.0	1.0	3.9	0.1	6.1	8.4
GP7	0.0	0.0	0.0	1.0	0.3	0.0	0.6	4.5
GP12	0.0	0.0	0.0	1.0	0.2	0.1	0.3	2.3
GP15	0.0	0.0	0.0	1.0	0.0	0.0	0.1	2.2
P7	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.5
P8	0.0	0.0	0.0	1.0	0.0	0.0	0.1	1.7
P9	0.0	0.0	0.0	1.0	0.0	0.0	0.1	2.7

**Notes:**

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

**Table 2.34 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	0.0	1.0
UU02	0.0	0.0	0.0	1.0
UU03	0.0	0.0	0.1	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	0.1	1.0
UU08	0.0	0.0	0.0	1.0
UU09	Inaccessible due to on-going construction work			1.0
UU10	0.0	0.0	0.0	1.0
UU11	0.0	0.0	0.0	1.0
UU12	Voided due to latest site programme and on-going operation work			1.0
UU13	0.0	0.0	0.0	1.0
UU14	0.0	0.0	0.0	1.0
UU15	0.0	0.0	0.0	1.0
UU16	0.0	0.0	0.0	1.0
UU17	Voided due to latest site programme and on-going operation work			1.0
UU18	0.0	0.0	0.0	1.0
UU19	0.0	0.0	0.1	1.0
UU20	0.1	0.0	0.1	1.0
UU21	0.0	0.0	0.0	1.0
UU22	0.0	0.0	0.1	1.0
UU23	0.0	0.0	0.1	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 2.35 Summary of Landfill Gas Bulk Gas Sampling Monitoring Results in the Reporting Period**

Parameters	Limit Level (LFG12) <sup>(a)</sup>	LFG12	Limit Level (LFG24) <sup>(a)</sup>	LFG24
Methane (% (v/v))	13.2	0.415	1.0	<0.020
Carbon Dioxide (% (v/v))	1.5	0.038	4.7	1.03
Oxygen (% (v/v))	-	19.9	-	19.6
Nitrogen (% (v/v))	-	78.7	-	79.0
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 2.36 Summary of Flammable Gas Surface Emission Monitoring Results in the Reporting Period**

GPS Coordinates		Monitoring Results (ppm)	Limit Level (ppm)
Latitude (N)	Longitude (E)		
22°16'33"	114°16'17"	3	30
22°16'16"	114°27'78"	6	
22°16'15"	114°16'33"	12	
22°16'14"	114°16'28"	8	
22°16'23"	114°16'26"	8	
22°16'30"	114°16'26"	21	
22°16'37"	114°16'27"	15	
22°16'37"	114°16'31"	12	

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 April to June 2022.

Limit Levels exceedance was recorded for perimeter landfill gas monitoring in the reporting period and actions in accordance with the Event and Action Plan presented in *Annex G3* were undertaken. Investigation of the Limit Levels exceedance was conducted and the investigation report is presented in *Annex G4*.

Based on the investigation conducted for the monitoring event with potential Limit Levels exceedance with the Contractor and the IEC, the landfill gas (methane) exceedance at LFG6 on 17 May 2022 was considered non Project-related. The Contractor was reminded to implement all relevant mitigation measures for the construction and operation works and maintain good site practice. The ET will keep track on the monitoring data and ensure Contractor's compliance of the environmental requirements.

## 2.5 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 22 April, 25 May and 24 June 2022 to monitor the implementation of the landscape and visual mitigation measures during operation/ restoration phase.

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

### 2.5.2 Results and Observations

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

Regarding the landscape and visual audit, the Contractor was reminded to maintain the advance screen planting works as soon as possible to ensure effective screening of views of project works from the High Junk Peak Trail. The Contractor has considered the mitigation measures during the design phase, including the preparation of the Construction Drawings and Detailed Landscape Design Drawings.

## 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 for air quality, noise, surface water quality and waste management under the Project. In the reporting period, 13 site inspections were carried out on 7, 14, 21 and 28 April 2022 and 5, 12, 19 and 25 May 2022 and 2, 9, 16, 23 and 30 June 2022.

Key observations during the site inspections are summarized in *Table 2.37*.

**Table 2.37** *Key Observations Identified during the Site Inspections in this Reporting Period*

Inspection Date	Environmental Observations and Recommendations
7 April 2022	<ul style="list-style-type: none"> <li>The Contractor shall remove the general refuse accumulated near DP3 and at the channel near sump house 3 and dispose of the waste regularly to minimise odour and pest issues.</li> <li>The Contractor shall remove the stagnant water accumulated in the drip tray for generator at Cell 4X.</li> </ul>
14 April 2022	<ul style="list-style-type: none"> <li>The Contractor shall clean up the oil spillage near sump house 3 and handle the clean-up materials as chemical waste.</li> <li>The Contractor shall provide drip tray for the chemical stored near sump house 4.</li> <li>The Contractor shall maintain the drainage system near VWF and remove the stagnant water accumulated at DP6 channel and the sediment tank regularly, and spray larvicides for mosquito control, if necessary.</li> </ul>
21 April 2022	<ul style="list-style-type: none"> <li>The Contractor shall cover the stockpile of dusty materials near sediment trap to minimise dust impact.</li> <li>The Contractor shall replace the NRMM labels displayed on the excavator near Cell 4X and roller near sump house 3 in accordance with the COP.</li> <li>The Contractor shall remove the deposited silt and grit and refuse accumulated at DP3 sediment pit, channel near sump house 3 and DP6 regularly, to ensure they are functioning properly at all times.</li> <li>The Contractor shall clean up the oil spillage at the excavator near guardhouse, near sediment trap and maintenance workshop and handle the clean-up materials as chemical waste.</li> </ul>
28 April 2022	<ul style="list-style-type: none"> <li>The Contractor shall remove the general refuse accumulated near Town gas plant and Sump house 3.</li> <li>The Contractor shall remove the concrete residue accumulated near EPD building and designate an area for concrete truck washing.</li> <li>The Contractor shall provide drip tray for the chemical stored near EPD building.</li> <li>The Contractor shall clean up the oil spillage on the road between biogas plant and LTP and handle the clean-up as chemical waste.</li> </ul>

Inspection Date	Environmental Observations and Recommendations
5 May 2022	<ul style="list-style-type: none"> <li>• The Contractor shall replace the faded NRMM label displayed on the generator near sediment trap.</li> <li>• The Contractor shall provide drip trays for the chemicals stored near X10a channel and sump house 4.</li> <li>• The Contractor shall remove the stagnant water accumulated at the channel near sump house 3.</li> <li>• The Contractor shall remove the general refuse accumulated at channel X10a, near sediment trap and guard house and dispose of the waste regularly.</li> </ul>
12 May 2022	<ul style="list-style-type: none"> <li>• The Contractor shall plug the drip tray for the generator near Cell4X to avoid leakage.</li> <li>• The Contractor shall review the treatment capacity of the Wetsep near DP4 and DP6 to ensure all surface water is treated before discharge.</li> <li>• The Contractor shall enhance surface water management around the site and remove the stagnant water accumulated at the channel near sump house 3.</li> <li>• The Contractor shall remove the general refuse accumulated at channel X10a and dispose of the waste regularly.</li> </ul>
19 May 2022	<ul style="list-style-type: none"> <li>• The Contractor shall replace the NRMM label displayed on the electric generator near sump house 3 in accordance with COP.</li> <li>• The Contractor shall operate the Wetsep near DP4 and review its' treatment capacity to prevent non-compliance with the standard in WPCO licence and EM&amp;A requirement.</li> <li>• The Contractor shall clean up the oil spillage on the road between biogas plant and LTP and handle the clean-up as chemical waste.</li> <li>• The Contractor shall remove the general refuse accumulated near sump house 3, DP4T and RC15 and dispose of the waste regularly to minimize odour and pest issue.</li> <li>• The contractor shall remove the stagnant water accumulated in the drip tray for the electric generator near LTP.</li> </ul>

Inspection Date	Environmental Observations and Recommendations
25 May 2022	<ul style="list-style-type: none"> <li>• The Contractor shall replace the NRMM label displayed on telescopic handler near buttress wall in accordance with COP.</li> <li>• The Contractor shall provide drip trays for the chemicals stored near cell 4X, at channel x10c, bar bending area and Paul Y container area. The Contractor shall also remove the stagnant water and chemical accumulated in the drip trays near Paul Y container area and treat the clean-up materials as chemical waste.</li> <li>• The Contractor shall clean up the oil spillage at channel x10c, Paul Y container area, near town gas plant and around LTP and handle the clean-up materials as chemical waste.</li> <li>• The contractor shall remove the stagnant water accumulated near DP6 and spray larvicides for mosquito control, if necessary.</li> <li>• The Contractor shall review Wetsep treatment efficiency to prevent non-compliance with the WPCO standard and EM&amp;A requirement.</li> <li>• The Contractor shall remove the general refuse accumulated near town gas plant, bar bending area, Paul Y container area and RC15 and remove the gravel along the road near MSE wall and dispose of the waste regularly to maintain site cleanliness and tidiness.</li> <li>• The Contractor shall remove the concrete residue accumulated near X10C and designate an area for concrete truck washing.</li> <li>• The contractor shall remove the deposited silt and refuse accumulated at the surface water channels near Paul Y container area and town gas plant to ensure they are functioning properly at all times.</li> <li>• The contractor shall ensure that the wheel washing facilities are functioning properly at all times and all trucks shall pass the wheel washing facilities before leaving the site to keep the public road clear of muddy materials.</li> </ul>
2 June 2022	<ul style="list-style-type: none"> <li>• The Contractor shall display a NRMM label on the excavator near Cell 4X.</li> <li>• The Contractor shall clean up the oil spillage near the drip tray at Paul Y container area and handle the clean-up materials as chemical waste.</li> <li>• The Contractor shall remove the stagnant water accumulated at the lifting eyes of the concrete blocks near Paul Y container area, and spray larvicides for mosquito control, if necessary.</li> <li>• The Contractor shall maintain site tidiness and remove the general refuse accumulated near Paul Y container area and at the temporary drain near GVL container area.</li> </ul>
9 June 2022	<ul style="list-style-type: none"> <li>• The Contractor shall provide surface water management around the site (especially at DP3 upstream) and review the treatment capacity of the Wetsep near DP4 and DP6 to ensure all surface water is treated before discharge.</li> <li>• The Contractor shall clean up the oil spillage near buttress wall and Paul Y container area and handle the clean-up materials as chemical waste.</li> <li>• The Contractor shall remove the stagnant water accumulated at the drip tray near Paul Y container area.</li> <li>• The Contractor shall remove the concrete residue near Paul Y container area and designate an area for concrete truck washing.</li> <li>• The Contractor shall remove the general refuse and vegetation at the temporary drain near Paul Y container area and site entrance.</li> </ul>



Inspection Date	Environmental Observations and Recommendations
16 June 2022	<ul style="list-style-type: none"> <li>The Contractor shall replace the faded NRMM label displayed on the excavator near sump house 4 in accordance with the COP.</li> <li>The Contractor shall provide surface water management at DP3 upstream (e.g. cover the exposed area and surface water diversion) to ensure that all surface water is treated before discharge.</li> <li>The Contractor shall clean up the oil spillage near Paul Y container area and handle the clean-up materials as chemical waste.</li> <li>The Contractor shall remove the stagnant water accumulated at the drip tray near Paul Y container area.</li> <li>The Contractor shall remove the general refuse and stagnant water accumulated at the channel near sump house 3 and dispose of the waste regularly.</li> </ul>
23 June 2022	<ul style="list-style-type: none"> <li>The Contractor shall cover the stockpile of dusty materials near DP3 to minimise dust impact.</li> <li>The Contractor shall remove the deposited silt and grit accumulated at the sediment pits at DP3 and DP6 regularly to ensure they are functioning properly at all times.</li> <li>The Contractor shall cover the exposed soil area at DP3 upstream to minimise muddy surface runoff to DP3 channel.</li> <li>The Contractor shall remove the stagnant water accumulated at the drip tray near Paul Y container area and treat the contaminated water as chemical waste.</li> </ul>
30 June 2022	<ul style="list-style-type: none"> <li>The Contractor shall remove/ cover the stockpile of dusty materials near buttress wall to minimise dust impact.</li> <li>The Contractor shall seal the baffle plates at DP3 channel and outlet and maintain the silt fencing along DP3 channel to minimise SS runoff to the channel.</li> <li>The Contractor shall clean up the oil spillage near Towngas plant and handle the clean-up materials as chemical waste.</li> <li>The Contractor shall remove the stagnant water accumulated at the drip tray near Paul Y container area.</li> <li>The Contractor shall maintain site tidiness and remove the general refuse accumulated around Paul Y container area.</li> </ul>

The Contractor has rectified all of the observations identified during environmental site inspections in the reporting period. Key environmental deficiencies identified and the corresponding rectification actions are presented in *Table 2.38*.

**Table 2.38 Summary of Environmental Deficiencies Identified and Corresponding Additional Control Measures**

Deficiencies	Rectifications Implemented	Proposed Additional Control Measures
<b>Surface Water</b>		
Intercepting channels & drainage system	<ul style="list-style-type: none"> <li>Reviewed drainage plan.</li> </ul>	<ul style="list-style-type: none"> <li>Provision of additional drainage channels.</li> <li>Expedite the construction of permanent sediment trap and discharge culverts.</li> </ul>
DP channels (design & regular silt removal)	<ul style="list-style-type: none"> <li>Carried out regular maintenance and cleaning of channels.</li> <li>DP4 channel: Area near the channel was paved with concrete and a bund was built.</li> <li>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.</li> <li>DP6: Pipes through the gravel piles between different channel sections were covered with geotextiles to block debris and silt.</li> </ul>	N.A.
Stockpiles & exposed soil	<ul style="list-style-type: none"> <li>Installed silt fencing near surface water channel along DP6 channel.</li> </ul>	<ul style="list-style-type: none"> <li>Improve soil covering.</li> <li>Compaction and cover for stockpiles and soil slopes.</li> </ul>
Wetsep (treatment capacity & number)	<ul style="list-style-type: none"> <li>Reviewed Wetsep capacity.</li> <li>Chemicals dosage of the Wetsep was increased to enhance the efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Install additional Wetsep.</li> </ul>
Backflow / ponding during heavy rainfall	<ul style="list-style-type: none"> <li>Raised with EPD (LDG) and CEDD.</li> </ul>	N.A.

**2.7 WASTE MANAGEMENT STATUS**

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

As informed by the Contractor, waste generated during this reporting period include mainly non-inert Construction Waste and chemical wastes. Reference has been made to the waste flow table prepared by the Contractor. The quantities of different types of wastes and imported fill materials are summarised in *Table 2.39*.

**Table 2.39 Quantities of Different Waste Disposed and Imported Fill Materials**

Month/ Year	Inert C&D Materials <sup>(a)</sup> (in '000m <sup>3</sup> )	Imported Fill (in '000kg) <sup>(b)</sup>		Inert Construction Waste Re- used (in '000m <sup>3</sup> )	Non-inert Construction Waste <sup>(c)</sup> (in '000m <sup>3</sup> )	Recyclable Materials <sup>(d)</sup> (in '000kg)	Chemical Wastes (in '000kg)
		Rock	Soil				
1 - 30 Apr 2022	0	0	0	0	0.013	0	0.800
1 - 31 May 2022	0	0	0	0	0.002	0	0.800
1 - 30 June 2022	0	0	0	0	0	0	0.800

**Notes:**

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

## 2.8 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

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

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

Three exceedances of the Limit Level for groundwater (COD) and two exceedances of the Limit Level for surface water (SS) were recorded for water quality impact monitoring in the reporting period. The groundwater (COD) exceedances at MWX-4, MWX-5 and MWX-6 on 11 April 2022 were considered non Project-related upon further investigation. The surface water (SS) exceedance at DP4 on 25 May 2022 and 30 June 2022 were found deemed to Project-related activities. Weekly surface water quality monitoring (SS) shall be continued at DP4 in the next reporting period until no exceedance of Limit Level.

One exceedance of the limit level of perimeter landfill gas (methane) was recorded for landfill gas monitoring in the reporting period. The perimeter landfill gas (methane) exceedance at LFG6 on 17 May 2022 was considered non 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 and successful prosecutions are summarised in *Annex H*.

This Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 April to 30 June 2022 in accordance with the updated EM&A Manual and the requirements of the Environmental Permit (EP-308/2008/B).

Air quality quality (24-hour TSP, odour, thermal oxidiser, landfill gas flare and landfill gas generator stack emission, ambient VOCs , ammonia and H<sub>2</sub>S), noise, water quality (surface water, leachate and groundwater) and landfill gas monitoring were carried out in the reporting period. Results for air quality and noise monitoring complied with the Action and Limit Levels in the reporting period. Three exceedances of the Limit Level for groundwater (COD), two exceedances of the Limit Level for surface water and one exceedance of the Limit Level for perimeter landfill gas 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 w/d, SENT	300	13-Apr-19	06-Feb-20	96															
355	5.03.01	53-1100 Characterise SENT Landfill Gas Pipe	45	07-Feb-20	23-Mar-20	96															
356	5.03.01	53-1200 Section at Cell 4	400	02-Mar-19	04-Apr-20	83															
357	5.03.01	53-1300 Install Landfill Gas Pipe on Butress Wall	75	05-Apr-20	18-Jun-20	83															
358	SA2.5.03.01	Landfill Cell 1	503	13-Jan-19	29-May-20	214															
359	5.03.01	53-1400 Earth bund (Eastern)	90	04-Aug-19	01-Nov-19	9															
360	5.03.01	53-1500 Earth bund (Southern)	90	26-Apr-19	24-Jul-19	314															
361	5.03.01	53-1600 Earth bund (Western)	90	13-Jan-19	12-Apr-19	417															
362	5.03.01	53-1700 Interfill bund (Cell 1G)	75	13-Jan-19	28-Mar-19	432															
363	5.03.01	53-1800 Site Formation	90	13-Jan-19	12-Apr-19	217															
364	5.03.01	53-1900 Pump Station (PS#1X)	45	13-Apr-19	27-May-19	507															
365	5.03.01	53-2000 Lining Works	135	02-Nov-19	15-Mar-20	214															
366	5.03.01	53-2100 Protective Store Laying & Leachate Collection Pipe	75	16-Mar-20	29-May-20	214															
367	5.03.01	53-2200 Install Leachate Force Main	75	25-Jul-19	07-Oct-19	449															
368	5.03.01	53-2300 Install Landfill Gas Pipe on earth bund	55	03-Nov-19	26-Dec-19	258															
369	5.03.01	53-2400 Leachate Pipe Connection (Cell 1 to LTP)	30	09-Mar-20	07-Apr-20	266															
370	SA2.5.03.01	Landfill Cell 4	30	09-Jul-20	07-Aug-20	144															
371	5.03.01	53-2500 Provide Temporary Leachate Pipe on Cell 4 Area	30	09-Jul-20	07-Aug-20	144															
372	SA2.5.03.02	Drainage - Surface Run-Off	740	16-Jan-19	31-May-21	859															
373	5.03.02	53-2600 Construct Cut-Off Channel 12A	60	16-Jan-19	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-20	29-Dec-20	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 Buttress Wall	120	07-Sep-21	04-Jan-22	494	62-1000 FS																			
532	6.03.4	63-2900 Earth bund (Western) incl. MSE Wall	120	07-Sep-21	04-Jan-22	239	62-1000 FS	63-3000 FS, 63-3100 FS, 63-3200 FS, 63-3400 FS, 63-3800 FS, 63-3000 FS, 63-4100 FS, 63-4100 FS, 55-40, M, 6, 6 FS, 60, M, 9, 7 FS, 30, M, 9, 8 FS																		
533	6.03.4	63-3000 Site Formation	120	05-Jan-22	04-May-22	239	62-1000 FS, 62-1100 FS, 62-1200 FS, 63-2900 FS	63-3100 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 (X0A) 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 Buttress 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 MH-1 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 MH-1 to TC-1	5	27-Oct-21	31-Oct-21	529	63-4300 FS	63-4500 FS, M, 9, 9 FS																		
550	6.03.6	63-4500 Reconstruct 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 FS	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	54-2000 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	68-1																		



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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks	
						D	C	O/R	A			
<i>Air Quality – Construction Phase</i>												
4.8.1	AQ1	<u>Blasting</u> <ul style="list-style-type: none"> <li>The area within 30m of the blasting area will be wetted prior to blasting.</li> <li>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.</li> <li>loose material and stones in the Site will be removed prior to the blast operation</li> <li>During blasting, blast nets, screens and other protective covers will be used to prevent the projection of flying fragments and material resulting from blasting</li> </ul>	To minimise potential dust nuisance	Blasting area and 30m of blasting area	SENTX Contractor					✓	<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Blasting is not required in the latest landfill design
4.8.1	AQ2	<u>Rock Drilling</u> <ul style="list-style-type: none"> <li>Watering will be carried out at the rock drilling activities to avoid fugitive dust emissions.</li> </ul>	To minimise potential dust nuisance	Rock drilling area	SENTX Contractor					✓	<i>Air Pollution Control (Construction Dust) Regulations</i>	Not applicable. Rock drilling is not required in the latest landfill design
4.8.1	AQ3	<u>Site Access Road</u>	To minimise	Main haul	SENTX					✓	<i>Air Pollution Control</i>	Implemented

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

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						D	C	O/R	A		
		<ul style="list-style-type: none"> <li>The main haul road will be kept clear of dusty materials or sprayed with water.</li> <li>The main haul road will be paved with aggregate or gravel.</li> <li>Vehicle speed will be limited to 10kph.</li> </ul>	potential dust nuisance	road	Contractor					(Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	
4.8.1	AQ4	<u>Stockpiling of Dusty Materials</u> <ul style="list-style-type: none"> <li>Any stockpile of dusty materials will be covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides or sprayed with water so as to ensure that the entire surface is wet.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	Deficiency of mitigation measures but rectified by the Contractor
4.8.1	AQ5	<u>Loading, unloading or transfer of dusty materials</u> <ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	Implemented
4.8.1	AQ6	<u>Site Boundary and Entrance</u> <ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential dust nuisance	Site boundary and entrance	SENTX Contractor	✓				Air Pollution Control (Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	Not applicable
4.8.1	AQ7	<u>Excavation Works</u>	To minimise	All	SENTX	✓				Air Pollution Control	Implemented

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						D	C	O/R	A		
		<ul style="list-style-type: none"> <li>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.</li> </ul>	potential dust nuisance	construction works area	Contractor					(Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	
4.8.1	AQ8	<u>Building Demolition</u> <ul style="list-style-type: none"> <li>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.</li> <li>Any dusty materials remaining after a stockpile is removed will be wetted with water and cleared from the surface of roads or street.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor			✓		Air Pollution Control (Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	Implemented
4.8.1	AQ9	<u>Construction of the Superstructure of Building</u> <ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential dust nuisance	All construction works area	SENTX Contractor			✓		Air Pollution Control (Construction Dust) Regulations  HKAQO and EIAO-TM Annex 4	Implemented
4.8.1	AQ10	Should a stone crushing plant be needed on site, the control measures recommended in the <i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i> should be implemented.	To minimise potential dust nuisance	Stone crushing plant/ construction phase	SENTX Contractor			✓		<i>Best Practicable Means Requirement for Mineral Works (Stone Crushing Plants) BPM 11/1</i>	Not applicable. Stone crushing plant is not required in the latest landfill design

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

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						D	C	O/R	A		
		before leaving the tipping face									only, which is relatively dry, the amount of liquor generated is expected to minimal
4.8.2	AQ16	<ul style="list-style-type: none"> <li>Washing down the area where spillage of RCV liquor is discovered promptly</li> </ul>	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"> <li>Reminding operators to properly maintain their RCVs and ensure that liquor does not leak from the vehicles</li> </ul>	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"> <li>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</li> </ul>	To minimise odour nuisance	SENTX Site	SENTX Contractor	✓	✓	✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ19	<ul style="list-style-type: none"> <li>Progressive restoration of the areas which</li> </ul>	To minimise	SENTX Site	SENTX	✓	✓	✓		<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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent landfill gas extraction system	odour nuisance		Contractor						
4.8.2	AQ20	<ul style="list-style-type: none"> <li>Installing deodorizers along the site boundary adjacent to the ASRs</li> </ul>	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"> <li>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</li> </ul>	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"> <li>Maintaining the size of the active tipping face not greater than 1,200 m<sup>2</sup></li> </ul>	To minimise odour nuisance	Active tipping face	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented
4.8.2	AQ23	<ul style="list-style-type: none"> <li>Promptly covering the MSW with soil or selected inert materials to control odour emissions</li> </ul>	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"> <li>Maintaining the size of the special waste trench not greater than 6m (l) × 2.5m (w)</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		EIAO-TM Annex 4	Not Applicable. SENTX will not have

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						D	C	O/R	A		
											any special waste trench.
4.8.2 and SENTX latest design	AQ25	<ul style="list-style-type: none"> <li>Covering daily covered area with a tarpaulin sheet or 300mm of soil after the landfill operating hours</li> </ul>	To minimise odour nuisance	Daily covered area	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ26	<ul style="list-style-type: none"> <li>Covering special waste trench with 600 mm of soil and an impervious liner after 5 pm</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not have any special waste trench.
4.8.2	AQ27	<ul style="list-style-type: none"> <li>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</li> </ul>	To minimise odour nuisance	Intermediate cover	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ28	<ul style="list-style-type: none"> <li>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</li> </ul>	To minimise odour nuisance	Active tipping face and special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. As SENTX will receive construction waste only which is significantly less odorous, installation of deodorizers is not necessary. Moreover, SENTX will not have any special waste



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						D	C	O/R	A		
											trench.
4.8.2	AQ29	<ul style="list-style-type: none"> <li>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</li> </ul>	To minimise odour nuisance	Special waste trench	SENTX Contractor			✓		<i>EIAO-TM Annex 4</i>	Not Applicable. SENTX will not have any special waste trench.
4.8.2 and SENTX latest design	AQ30	<ul style="list-style-type: none"> <li>Providing a thermal oxidizer for the leachate treatment plant</li> </ul>	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"> <li>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</li> </ul>	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"> <li>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</li> </ul>	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

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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
											odorous, rescheduling of waste filling activities is not necessary.
4.8.2 and SENTX latest design	AQ33	<u>Dust, Gaseous Emission and LFG including Volatile Organic Compounds (VOCs)</u>  • Keeping the main haul road to the waste filling area wet by regular watering ;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ34	• Compacting the exposed daily and intermediate covered areas well to avoid fugitive dust emission;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ35	• Limiting the vehicle speed within SENTX site boundary;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ36	• Providing vehicle washing bay to avoid vehicles carrying dust to public roads;	To minimise dust nuisance	SENTX Site	SENTX Contractor			✓		<i>HKAQO and EIAO-TM Annex 4</i>	Implemented
4.8.2	AQ37	• Switching off the engine when the diesel-driven equipment is idling;	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ38	• Maintaining the construction equipment properly to avoid any black smoke emissions;	To minimise gaseous emissions	SENTX Site	SENTX Contractor			✓	✓	-	Implemented
4.8.2	AQ39	Providing sufficient underground landfill gas collection system to capture the landfill gas	To minimise gaseous	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 4</i>	Implemented

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						D	C	O/R	A		
		generated as much as possible; and	emissions, including LFG and VOCs								
4.8.2	AQ40	Periodic inspections of the final cover should be undertaken to ensure that the capping layer is in good conditions at all times.	To minimise gaseous emissions, including LFG and VOCs	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 4	Implemented
4.10.2	AQ41	Monitoring of ambient TSP once every 6 days	Ensure the dust emission from the project meets the dust requirement	At monitoring locations shown in <i>Figure 11.3a</i>	SENTX Contractor			✓	✓	HKAQO and EIAO-TM Annex 4	Implemented
4.10.2	AQ42	Monitoring of ambient VOCs, ammonia and H <sub>2</sub> S, 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
4.10.2 and SENTX latest	AQ43	Monitoring of parameters for thermal oxidizer, flares and generator in accordance with requirements stated in Tables 3.4a, 3.5a and 3.6a of the EM&A Manual respectively.	Ensure the gaseous emission from the project meets the air	At the flares and thermal oxidizer stacks when they are	SENTX Contractor			✓	✓ <sup>(1)</sup>	Emission Limits specified in Contract	Implemented

(1) For LFG flare and LFG generator only.

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						D	C	O/R	A		
design			quality requirement	in operation							
4.10.2	AQ44	To confirm design assumption of ammonia, it is recommended that the ammonia concentration in the flue gas of the thermal oxidiser be monitored during the commissioning stage of the thermal oxidiser. If required, an emission standard will be set for ammonia for the thermal oxidiser based on the monitoring results. If no ammonia is detected in the flue gas during the decommissioning stage, the monitoring of ammonia in the flue gas of the thermal oxidiser could be discontinued.	Ensure the gaseous emission from the project meets the air quality requirement	At the thermal oxidizer stack during commissioning . If ammonia is detected during commissioning stage, the monitoring will continue.	SENTX Contractor			✓		Emission Limits determined during commissioning stage	Implemented
4.10.2 and SENTX latest design	AQ45	Odour patrol in accordance with requirements stated in Table 3.7a of the EM&A Manual.	Ensure the odour emission from the project meets the odour requirement	Along SENTX Site boundary	SENTX Contractor			✓		EIAO-TM Annex 4	Implemented
4.10.2	AQ46	Monitoring of meteorological station, continuously	Collect site specific meteorological data	At meteorological station shown in Figure 11.3a	SENTX Contractor		✓	✓	✓	-	Implemented
<b>Noise - Construction Phase</b>											
5.7.1	N1	Adopt good site practice listed below: <ul style="list-style-type: none"> <li>Only well-maintained plant will be</li> </ul>	To minimise potential construction	All construction	SENTX Contractor			✓		Noise Control Ordinance (NCO) and	Implemented

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						D	C	O/R	A		
		<p>operated on-site and plant should be serviced regularly during the construction program;</p> <ul style="list-style-type: none"> <li>• Silencers or mufflers on construction equipment should be utilized and will be properly maintained during the construction program;</li> <li>• Mobile plant, if any, will be sited as far from NSRs as possible;</li> <li>• 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;</li> <li>• 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</li> <li>• Material stockpiles and other structures will be effectively utilised, wherever practicable, in screening noise from on-site construction activities.</li> </ul>	noise nuisance.	works area						<i>EIAO-TM Annex 5</i>	
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		
<i>Noise - Operation/Restoration Phase</i>											
5.7.2	N3	Adopt good site practice listed below: <ul style="list-style-type: none"> <li>Choose quieter PME;</li> <li>Include noise levels specification when ordering new plant items;</li> <li>Locate fixed plant items or noise emission points away from the NSRs as far as practicable;</li> <li>Locate noisy machines in completely enclosed plant rooms or buildings; and</li> <li>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.</li> </ul>	To minimise potential operational noise nuisance.	Within the SENTX Site	SENTX Contractor			✓		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented
									-		Implemented
									-		Implemented
									-		Implemented
									-		Implemented
5.8	N4	Weekly noise monitoring	Ensure noise generated from the project meets the criteria	At monitoring locations shown in Figure 6.4a	SENTX Contractor			✓		<i>Noise Control Ordinance (NCO) and EIAO-TM Annex 5</i>	Implemented
<i>Water Quality - Construction Phase</i>											
6.8.1	WQ1	<u>Construction Runoff</u> <ul style="list-style-type: none"> <li>Exposed soil areas will be minimised to</li> </ul>	To minimise	All	SENTX			✓		<i>ProPECC PN 1/94</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		reduce the contamination of runoff and erosion.	potential water quality impacts arising from the construction works	construction works area	Contractor					<i>EIAO-TM Annex 6</i>	
6.8.1	WQ2	<ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor	✓	✓			<i>ProPECC PN 1/94</i> <i>Water Pollution Control Ordinance (WPCO)</i> <i>EIAO-TM Annex 6</i>	Implemented
6.8.1	WQ3	<ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor			✓		<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>EIAO-TM Annex 6</i>	Deficiency of mitigation measures but rectified by the Contractor
6.8.1	WQ4	<ul style="list-style-type: none"> <li>Temporary covers such as tarpaulin will also be provided to minimise the generation of high SS runoff.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor			✓		<i>ProPECC PN 1/94</i> <i>WPCO</i>	Implemented
6.8.1	WQ5	<ul style="list-style-type: none"> <li>The surface runoff contained any oil and grease will pass through the oil interceptors.</li> </ul>	To minimise potential water quality impacts arising from the construction works	All construction works area	SENTX Contractor			✓		<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>EIAO-TM Annex 6</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
6.8.1	WQ6	<ul style="list-style-type: none"> <li>All sewer and drains will be sealed to prevent building debris, soil etc from entering public sewers/drains before commencing any demolition works</li> </ul>	To minimise potential water quality impacts arising from the demolition works	Infrastructure area at existing SENT Landfill	SENTX Contractor		✓			<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>EIAO-TM Annex 6</i>	Not applicable
6.8.1	WQ7	<ul style="list-style-type: none"> <li>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.</li> </ul>	To minimise potential water quality impacts arising from the tunnel works	Tunnel boring sites	SENTX Contractor		✓			<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>EIAO-TM Annex 6</i>	Not applicable. Excavation of drainage tunnels is not required in the latest landfill design.
6.8.1	WQ8	<ul style="list-style-type: none"> <li>The fuel and waste lubricant oil from the on-site maintenance of machinery and equipment will be collected by a licensed chemical waste collector.</li> </ul>	To minimise potential water quality impacts arising from improper handling of fuel and oil	SENTX Site	SENTX Contractor		✓			<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>Waste Disposal Ordinance (WDO)</i>	Implemented
6.8.1	WQ9	<ul style="list-style-type: none"> <li>Implementation of excavation schedules, lining and covering of excavated stockpiles</li> </ul>	To minimise contaminated stormwater run-off from the SENTX Site	All construction works	SENTX Contractor		✓			<i>ProPECC PN 1/94</i> <i>WPCO</i> <i>EIAO-TM Annex 6</i>	Implemented
6.13	WQ10	<ul style="list-style-type: none"> <li>Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&amp;A Manual.</li> </ul>	To minimise potential water quality impacts on surface water arising from the	SENTX Site	SENTX Contractor		✓			<i>WPCO</i> <i>Water-TM</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
			construction works								
6.8.2	WQ11	<u>Sewage Effluents</u>  • Sufficient chemical toilets will be provided for the construction workforce.	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor			✓		WPCO	Implemented
6.8.2	WQ12	• Untreated sewage will not be allowed to discharge into the surrounding water body.	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor			✓		WPCO WDO	Deficiency of mitigation measures but rectified by the Contractor
6.8.2	WQ13	• A licensed waste collector will be employed to clean the chemical toilets on a regular basis.	To minimise potential water quality impacts arising from the sewage effluents	SENTX Site	SENTX Contractor			✓		WPCO WDO	Implemented
<b>Water Quality – Operation/Restoration and Aftercare Phases</b>											
6.9.1	WQ14	<u>Surface Water Management</u>  • Inspections of the drainage system, sand traps, settlement ponds and surface water channels will be performed regularly to identify areas necessary for maintenance, cleaning or repair.	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		WPCO  <i>Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Inshore Waters (Water-TM)</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
6.9.1	WQ15	<ul style="list-style-type: none"> <li>Regular maintenance and replacement, if required, of the HDPE liner will be conducted to prevent degradation from affecting the performance of the capping system.</li> </ul>	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 6</i> <i>WPCO</i> <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
6.9.1	WQ16	<ul style="list-style-type: none"> <li>Monitoring of surface water quality will be conducted on a regular basis as stated in the EM&amp;A Manual.</li> </ul>	To minimise potential water quality impacts on surface water arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	<i>WPCO</i> <i>Water-TM</i>	Implemented
6.9.2 and SENTX latest design	WQ17	<u>Groundwater Management</u> <ul style="list-style-type: none"> <li>The groundwater management facilities including the groundwater monitoring wells will be inspected regularly during routine groundwater monitoring programme.</li> </ul>	To minimise potential water quality impacts on groundwater arising from the landfill operations.	SENTX Site	SENTX Contractor			✓	✓	<i>WPCO</i> <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
6.9.2	WQ18	<ul style="list-style-type: none"> <li>Monitoring of groundwater water quality will be conducted on a regular basis as stated in the EM&amp;A Manual.</li> </ul>	To minimise potential water quality impacts on groundwater arising from the	SENTX Site	SENTX Contractor			✓	✓	<i>WPCO</i> <i>Water-TM</i> <i>EIAO-TM Annex 6</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
			landfill operations.								
SENTX latest design	WQ19	<u>Sewage</u> <ul style="list-style-type: none"> <li>All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available.</li> </ul>	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"> <li>The leachate pump houses and related ancillary equipment will be inspected regularly and repairs, if necessary.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.	Leachate pump houses and related ancillary equipment	SENTX Contractor		✓	✓	WPCO Water-TM EIAO-TM Annex 6		Implemented
6.9.3	WQ21	<ul style="list-style-type: none"> <li>For equipment such as pumps that require routine scheduled maintenance, the maintenance will be performed following manufacturer's recommended frequency.</li> </ul>	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"> <li>Preventive maintenance will be implemented so that the possibility for forced shutdown during wet season will be kept to minimal.</li> </ul>	To minimise potential water quality impacts on surrounding water bodies	Leachate treatment plant	SENTX Contractor		✓	✓	WPCO Water-TM EIAO-TM Annex 6		Implemented

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						D	C	O/R	A		
6.9.3	WQ23	<ul style="list-style-type: none"> <li>Emergency procedures or a contingency plan will be established when the LTP is malfunctioned.</li> </ul>	<p>arising from the landfill operations.</p> <p>To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.</p>	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
6.9.3 and SENTX latest design	WQ24	<ul style="list-style-type: none"> <li>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.</li> </ul>	<p>To minimise potential water quality impacts on surrounding water bodies arising from the landfill operations.</p>	Leachate treatment plant	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i> <i>EIAO-TM Annex 6</i>	Implemented
6.13	WQ25	<ul style="list-style-type: none"> <li>Monitor the quality of effluent discharged from the LTP</li> </ul>	<p>To ensure discharge quality comply with WPCO requirement</p>	Leachate treatment plant discharge point	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i>	Implemented
6.10.1	WQ26	<p><u>Potential Leakage of Leachate</u></p> <ul style="list-style-type: none"> <li>Regular groundwater quality monitoring will be carried out to monitor the performance of the leachate containment system.</li> </ul>	<p>To minimise potential water quality impacts on surrounding</p>	SENTX Site	SENTX Contractor			✓	✓	WPCO <i>Water-TM</i>	Implemented

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						D	C	O/R	A		
6.10.1	WQ27	<ul style="list-style-type: none"> <li>Maintenance and replacement of the capping system should be carried out, if necessary, to prevent control infiltration and leachate seepage from any damaged cap.</li> </ul>	<p>water bodies arising from the landfill operations.</p> <p>To minimise potential water quality impacts on surrounding water bodies arising from the leachate leakage.</p>	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
6.10.1	WQ28	<ul style="list-style-type: none"> <li>Maintaining control of the leachate level through extraction</li> </ul>	<p>To minimise potential water quality impacts on surrounding water bodies arising from surface breakout of leachate.</p>	SENTX Site	SENTX Contractor			✓	✓	WPCO Water-TM EIAO-TM Annex 6	Implemented
<b>Waste Management – Construction Phase</b>											
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	<p><u>Management of Waste Disposal</u></p> <p>The construction contractor will open a billing account with the EPD. Every construction waste or public fill load to be</p>	To ensure that adverse environmental	SENTX Site	SENTX Contractor				✓	WDO Waste Disposal (Charges for Disposal)	Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		transferred to the Government waste disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid "chit" which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping. The trip-ticket system will be included as one of the contractual requirements and implemented by the contractor.  A recording system for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established.	impacts are prevented							<i>of Construction Waste) Regulation;</i>  <i>Works Bureau Technical Circular No.31/2004; and</i>  <i>Annex 5 and Annex 6 of Appendix G of ETWBTC No. 19/2005)</i>	
7.6.1	WM3	<u>Measures for the Reduction of Construction Waste Generation</u>  Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the work site will be designated for such segregation and storage if immediate use is not practicable.	To reduce construction waste generation	SENTX Site	SENTX Contractor			✓		WDO  EIAO-TM Annex 7	Implemented
7.6.1	WM4	<u>Chemical Waste</u>						✓		WDO	

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						D	C	O/R	A		
		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					<i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	Implemented
7.6.1	WM5	<u>Sewage</u>  An adequate number of portable toilets will be provided at the site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a specialist contractor.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Deficiency of mitigation measures but rectified by the Contractor
7.6.1 and SENTX latest design	WM6	<u>General Refuse</u>  General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to a transfer station or other landfill, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts.  Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Deficiency of mitigation measures but rectified by the Contractor
7.6.1	WM7	<u>Staff Training</u>  At the commencement of the construction	To ensure that	SENTX Site	SENTX			✓			Implemented

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						D	C	O/R	A		
		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.	adverse environmental impacts are prevented		Contractor						
7.8	WM8	<u>Environmental Monitoring &amp; Audit Requirements</u>  Weekly audits of the waste management practices will be carried out during the construction phase. The audits examine all aspects of waste management including waste generation, storage, recycling, transport and disposal.	To ensure that adverse environmental impacts are prevented	SENTX Site	SENTX Contractor			✓		WDO	Implemented
<b>Waste Management - Operation/Restoration Phase</b>											
7.6.2 and SENTX latest design	WM9	<u>Sludge</u>  In case off-site disposal is required, the Contractor will ensure that sludge generated from the LTP will be delivered in closed container to other waste disposal facility e.g. other landfills or a sludge treatment facility, for proper disposal on a daily basis.	To ensure proper handling of sludge	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	Implemented
7.6.2	WM10	<u>Chemical Waste</u>  The construction contractor will register as a chemical waste producer with the EPD. Chemical waste will be handled in	To ensure proper handling of chemical waste	SENTX Site	SENTX Contractor			✓		WDO EIAO-TM Annex 7	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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		accordance with the <i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i> .								<i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>	
7.6.2	WM11	<u>Sewage</u>  All sewage from the operation staff will be diverted to the LTP for treatment or public sewer, if available.	To ensure proper handling of sewage	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Moved to mitigation measure under water quality WQ19. It is a measure for water quality rather than waste management.
7.6.2 and SENTX latest design	WM12	<u>General Refuse</u>  General refuse will be stored in enclosed bins and disposed of at other landfills or transfer station on a daily basis to reduce odour, pest and litter impacts.  Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the SENTX Site. Materials recovered will be sold for recycling.	To ensure proper handling of general refuse	SENTX Site	SENTX Contractor			✓		WDO <i>EIAO-TM Annex 7</i>	Implemented
<b><i>Landfill Gas Hazards – Design and Construction Phase</i></b>											
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> .	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</i>  <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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
8.6.2	LFG2	<p>Those precautionary measures applicable to the SENTX will be confirmed in the detailed Qualitative Landfill Gas Hazard Assessment to be submitted by the contractor.</p> <p>Monitoring will be undertaken when construction works are carried out in confined space within the consultation zone with reference to the monitoring requirements and procedures specified in Paragraphs 8.23 to 8.28 of EPD's <i>Guidance Note</i> will be followed.</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>	To protect workers from landfill gas risk	Confined space within the construction works area	SENTX Contractor		✓				Implemented
8.6.3	LFG4	Implementation of engineering measures according to Contract Specification requirements. These measures will include the placement of liner and installation of landfill gas management system to contain, manage and control landfill gas.	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor	✓	✓	✓	✓	<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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
8.6.3	LFG5	<p>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>).</p> <p>Landfill gas monitoring boreholes will be installed at the edge of the waste slope between the waste and the new infrastructure area to monitor the migration of landfill gas, if any.</p>	To protect workers from landfill gas risk	Infrastructure Area	SENTX Contractor	✓	✓			<p><i>EPD's Landfill Gas Hazards Assessment Guidance Note</i></p> <p><i>EIAO-TM Annex 7</i></p>	Implemented
<p><b>Landfill Gas Hazards - Operation, Restoration and Aftercare Phases</b></p>											
8.6.4	LFG7	<p>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.</p> <p>A permanent gas monitoring system with alarm will be installed and operated in all occupied on-site buildings.</p>	To protect workers from landfill gas risk	SENTX Site	SENTX Contractor		✓	✓		<p><i>Landfill Gas Hazards Assessment Guidance Note</i></p>	Implemented
8.7 and SENTX latest design	LFG8	<p><u>Environmental Monitoring &amp; Audit Requirements</u></p> <p>Undertake regular monitoring of landfill gas</p>	To protect workers from landfill gas risk	Within the SENTX and along the SENTX	SENTX Contractor		✓	✓			Implemented

EIA Ref.	EM&A Ref	Environmental Protection Measures/ Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Location of the Measures	Who to implement the measure?	When to implement the measure? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		within the SENTX and along the SENTX boundary as required by the Contract Specification.		boundary						<i>Landfill Gas Hazards Assessment Guidance Note</i>	
<b>Ecology – Construction Phase</b>											
9.10.2	EC1	Measures to control construction runoff: <ul style="list-style-type: none"> <li>Exposed soil areas will be minimised to reduce the contamination of runoff and erosion;</li> <li>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;</li> <li>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;</li> <li>Temporary covers such as tarpaulin will also be provided to minimise the generation of high suspended solids</li> </ul>	To minimise potential water quality impacts affecting ecological resources	All construction works area	SENTX Contractor			✓		<i>EIAO-TM Annex 16</i> <i>ProPECC PN 1/94</i> <i>Water Pollution Control Ordinance (WPCO)</i> <i>EIAO-TM Annex 6</i>	Implemented
										-	Implemented
										-	Implemented
										-	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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		runoff;									
		<ul style="list-style-type: none"> <li>The surface runoff contained any oil and grease will pass through the oil interceptors; and,</li> </ul>							-		Implemented
		<ul style="list-style-type: none"> <li>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.</li> </ul>							-		Implemented
9.10.2 and SENTX latest design	EC2	<u>Good Construction Practice:</u>									
		<ul style="list-style-type: none"> <li>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.</li> <li>The work site boundaries will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas.</li> </ul>	To minimise potential ecological impacts arising from the Project	SENTX Site	SENTX Contractor			✓		<i>EIAO-TM Annex 16</i>	Implemented
<b>Ecology - Operation, Restoration and Aftercare Phases</b>											
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	To minimise potential water quality impact affecting the	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 16</i> <i>WPCO</i> <i>Water-TM</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		installation of drainage system to prevent potential migration of leachate to habitats in the vicinity.	ecological resources							<i>EIAO-TM Annex 6</i>	
9.10.2	EC4	<u>Measures for Controlling Migration of Landfill Gas</u> Disturbance to habitat in the vicinity and associated wildlife due to migration of landfill gas will be prevented by proper management of the landfill gas generated from the SENTX. Ignition fires will be prohibited to occur within the boundary of the SENTX Site. Surface emission and off-site migration of landfill gas will be regularly monitored.	To minimise potential landfill gas migration affecting ecological resources	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 16</i>	Implemented
9.10.3 and SENTX latest design	EC5	The following compensation planting is recommended as the mitigation measures for the habitat affected due to the SENTX: <ul style="list-style-type: none"><li>Provision of 6 ha of mixed woodland planting to compensate the loss of shrubland; and</li><li>Provision of a mosaic of grassland and shrubland in the remaining areas of the SENTX Site.</li></ul> Compensatory planting and restoration of the SENTX can be implemented progressively according to the filling plan of SENTX.	Compensation of habitat loss due to the Project	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 16</i>	Implemented
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	To diversify habitats	SENTX Site	SENTX Contractor			✓	✓	<i>EIAO-TM Annex 16</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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
9.10.3	EC7	herpetofauna and blend into the existing undisturbed ecological environment. Indigenous plant species of shallow root system, softwood in nature and adaptive to sea shore habitat are recommended to be used in the restoration plan, which can establish well in coastal area with exposure to strong wind and salt spray, with sand soil base. Taking consideration of the relative poor substrate and the difficulties of establishment of some native trees in Hong Kong, it is recommended to include approximately 20% of non-native tree species in the compensatory woodland. The non-native tree species can serve as a nurse species to facilitate the establishment of the native tree species, especially the shading, and it can be replaced by established native tree species progressively. Plant species can also make reference to food plants of butterfly species (in particularly butterfly species of conservation interests recorded within the CWBCP).	To enhance ecological value of the habitats	SENTX Site	SENTX Contractor			✓	✓	EIAO-TM Annex 16	Implemented
9.10.3	EC8	It is also recommended that a trial nursery for native plant species be set up to fine tune the planting matrix and management intensity of the recommended indigenous tree species for 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	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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		successfully be established on the existing SENT Landfill should be reviewed before the preparation of the compensatory planting list. Special care and intensive management of native plant should be implemented in order to ensure proper establishment of the native plants.									
9.12.1	EC9	<u>Environmental Monitoring &amp; Audit Requirements</u> The implementation of the ecological mitigation measures should be checked as part of the environmental monitoring and audit procedures during the construction period.	To ensure that adverse ecological impacts are prevented	SENTX	SENTX Contractor	✓	✓	✓	EIAO-TM Annex 16		Implemented
<b>Landscape and Visual – Construction Phase</b>											
10.6.5	LV1	CM1 - The construction area and area allowed for the contractor's office, leachate treatment plant and laboratory areas will be minimised to a practical minimum, to avoid impacts on adjacent landscape.	To minimise the landscape and visual impacts	SENTX Site	SENTX Contractor	✓			EIAO-TM Annex 18 and ETWBC 3/2006		Implemented
10.6.5	LV2	CM2 - Topsoil, where identified, will be stripped and stored for re-use in the construction of the soft landscape works, where practical. The Contract Specification will include storage and reuse of topsoil as appropriate.	To minimise the landscape and visual impacts	All construction works area	SENTX Contractor	✓			EIAO-TM Annex 18		Not applicable
10.6.5	LV3	CM3 - All existing trees at the edges of the landfill will be carefully protected during	To minimise the landscape and	Potential impacted area	SENTX Contractor	✓			EIAO-TM Annex 18 and ETWBC 3/2006		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? <sup>(1)</sup>				What requirements or standards for the measure to achieve?	Implementation Status and Remarks
						D	C	O/R	A		
		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.	visual impacts								
10.6.5	LV4	CM4 - Trees unavoidably affected by the works will be transplanted, where necessary and practical. A detailed Tree Transplanting Specification will be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods will be allowed in the project programme.	To minimise the landscape and visual impacts	Potential impacted area	SENTX Contractor	✓	✓		<i>EIAO-TM Annex 18 and ETWBC 3/2006</i>	Implemented	
10.6.5 and SENTX latest design	LV5	CM5 - Within 3 months of taking possession of the SENTX Site, the Contractor will plant advance screen planting of native species at Light Standard size at 1.5m centres along the High Junk Peak Trail so as to screen views of the Works from the trail. Tree planting locations will be agreed with AFCD. Works will be completed within 9 months of taking possession of the SENTX Site.	To minimise the landscape and visual impacts	At High Junk Peak Hiking Trail	SENTX Contractor		✓		<i>EIAO-TM Annex 18</i>	Implemented	
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	To minimise the landscape and visual impacts	Infrastructure area	SENTX Contractor	✓	✓		<i>EIAO-TM Annex 18</i>	Implemented	

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

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

Annex C

## Monitoring Schedule for This Reporting Period

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

April 2022

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

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

May 2022

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

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

June 2022

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			Leachate Monitoring 1	Leachate Monitoring 2	Leachate Monitoring 3	Leachate Monitoring 4
Dust Monitoring 5 Leachate Monitoring	Groundwater Monitoring 6 Leachate Monitoring Noise Monitoring	Leachate Monitoring 7	Leachate Monitoring 8	Leachate Monitoring 9	Leachate Monitoring 10	Dust Monitoring (AM1,AM3,AM4) 11 Leachate Monitoring
Leachate Monitoring 12	Perimeter LFG Monitoring 13 Leachate Monitoring Noise Monitoring	Groundwater Monitoring 14 Leachate Monitoring	Dust Monitoring (AM2) 15 Service Void LFG Monitoring Leachate Monitoring	Stack Monitoring 16 Leachate Monitoring	Dust Monitoring 17 Stack Monitoring Leachate Monitoring	Leachate Monitoring 18
Leachate Monitoring 19	Leachate Monitoring 20 Noise Monitoring	Leachate Monitoring 21	Leachate Monitoring 22	Dust Monitoring 23 Leachate Monitoring	Leachate Monitoring 24 Surface Water Monitoring	Leachate Monitoring 25
Leachate Monitoring 26	Leachate Monitoring 27	Leachate Monitoring 28 Odour Monitoring	Dust Monitoring 29 Leachate Monitoring	Leachate Monitoring 30 Additional Surface Water Monitoring Noise Monitoring		

Annex D

## Air Quality



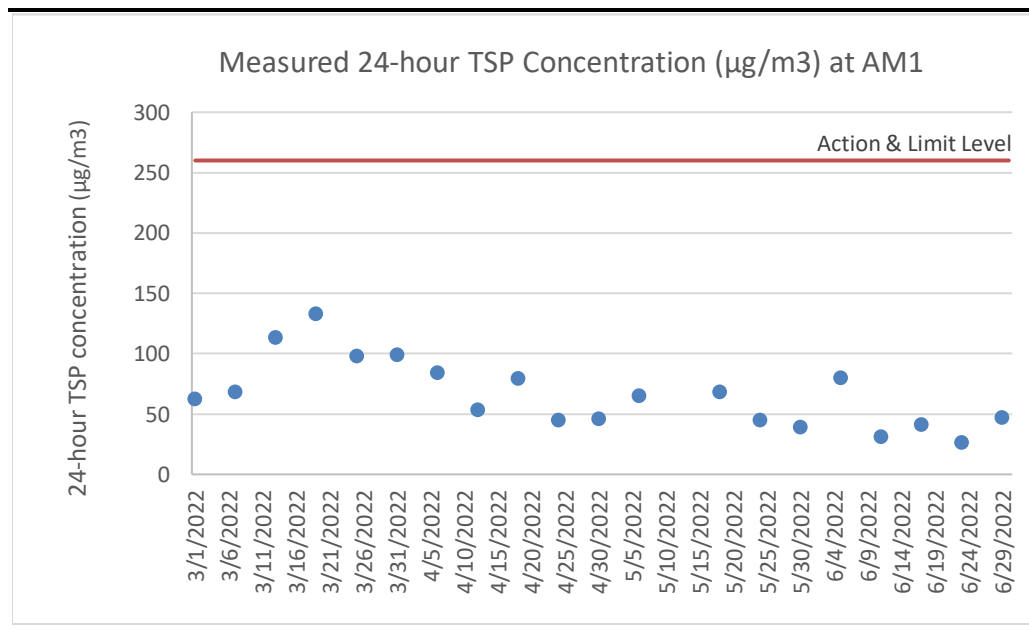
Annex D1

## 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 ( $\mu\text{g}/\text{m}^3$ )
6 Apr 22	9:00	7 Apr 22	8:43	Fine	84
12 Apr 22	9:00	13 Apr 22	8:12	Fine	53
18 Apr 22	9:00	19 Apr 22	8:45	Fine	79
24 Apr 22	9:00	25 Apr 22	8:17	Fine	45
30 Apr 22	9:00	1 May 22	8:46	Fine	46
6 May 22	9:00	7 May 22	8:38	Fine	65
12 May 22	NA	NA	NA	No monitoring was carried out due to power failure.	
18 May 22	9:00	19 May 22	8:41	Fine	68
24 May 22	9:00	25 May 22	8:42	Fine	45
30 May 22	9:00	31 May 22	9:21	Fine	39
5 Jun 22	9:00	6 Jun 22	8:39	Fine	80
11 Jun 22	9:00	12 Jun 22	8:39	Rainy	31
17 Jun 22	9:00	18 Jun 22	8:41	Fine	41
23 Jun 22	9:00	24 Jun 22	8:50	Fine	26
29 Jun 22	9:00	30 Jun 22	9:19	Fine	47
<b>Average</b>					54
<b>Min</b>					26
<b>Max</b>					84

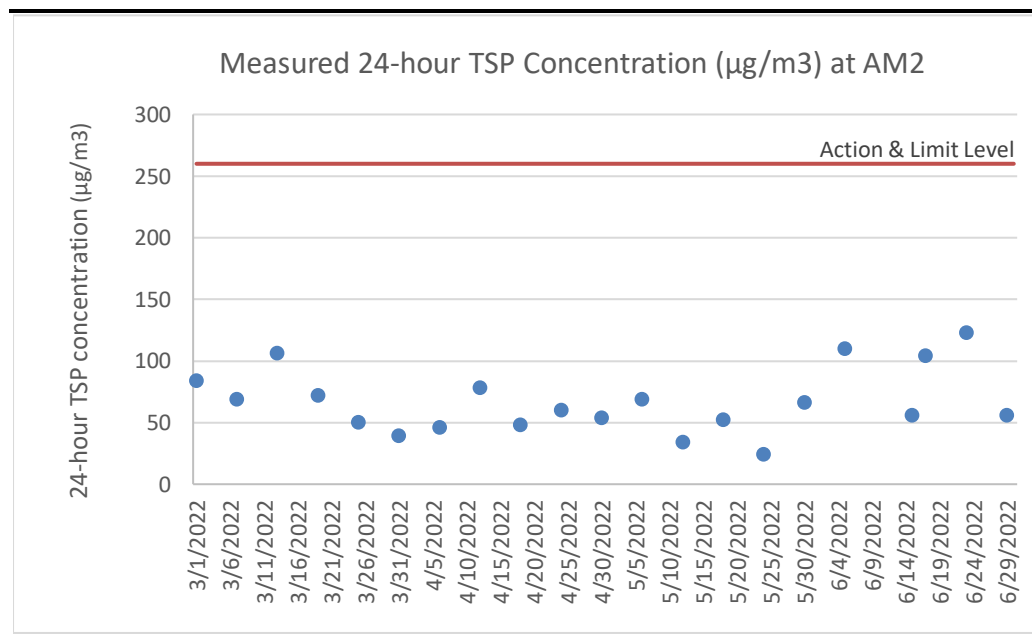
**Figure D1.1 Graphical Presentation for 24-hr TSP Monitoring at AM1**



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

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
6 Apr 22	9:00	7 Apr 22	8:44	Fine	46
12 Apr 22	9:00	13 Apr 22	8:42	Fine	78
18 Apr 22	9:00	19 Apr 22	8:44	Fine	48
24 Apr 22	9:00	25 Apr 22	8:44	Fine	60
30 Apr 22	9:00	1 May 22	8:45	Fine	54
6 May 22	9:00	7 May 22	8:45	Fine	69
12 May 22	9:00	13 May 22	8:45	Rainy	34
18 May 22	9:00	19 May 22	8:44	Fine	52
24 May 22	9:00	25 May 22	8:44	Fine	24
30 May 22	9:00	31 May 22	8:48	Fine	66
5 Jun 22	9:00	6 Jun 22	8:45	Fine	110
15 Jun 22	11:15	16 Jun 22	11:00	Fine	56
17 Jun 22	9:00	18 Jun 22	8:39	Fine	104
23 Jun 22	9:00	24 Jun 22	8:25	Fine	123
29 Jun 22	9:00	30 Jun 22	9:04	Fine	56
<b>Average</b>					65
<b>Min</b>					24
<b>Max</b>					123

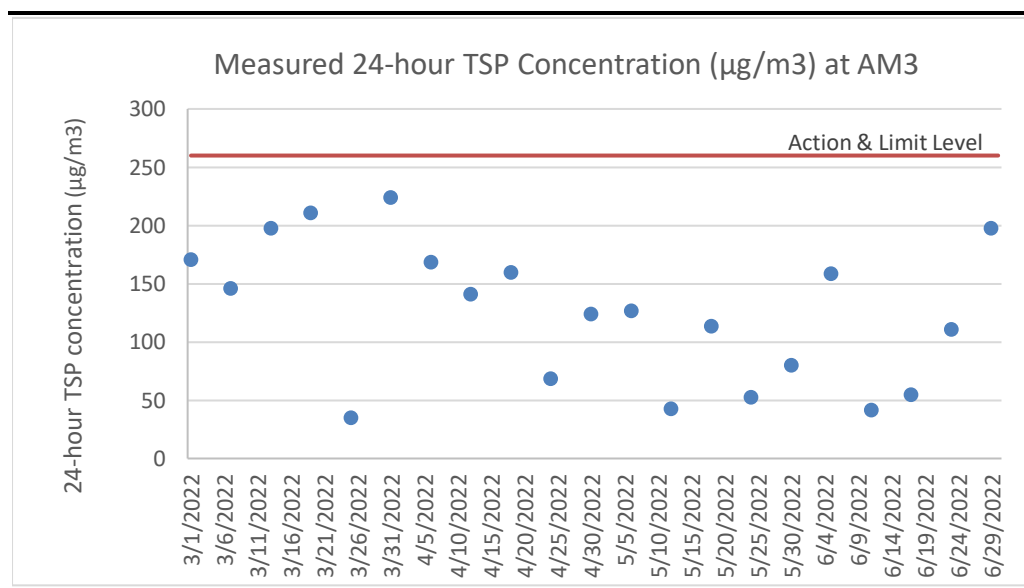
**Figure D1.2 Graphical Presentation for 24-hr TSP Monitoring at AM2**



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

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
6 Apr 22	9:00	7 Apr 22	8:56	Fine	169
12 Apr 22	9:00	13 Apr 22	8:23	Fine	141
18 Apr 22	9:00	19 Apr 22	8:20	Fine	160
24 Apr 22	9:00	25 Apr 22	8:17	Fine	69
30 Apr 22	9:00	1 May 22	8:27	Fine	124
6 May 22	9:00	7 May 22	8:28	Fine	127
12 May 22	9:00	13 May 22	8:28	Rainy	43
18 May 22	9:00	19 May 22	8:32	Fine	114
24 May 22	9:00	25 May 22	8:32	Fine	53
30 May 22	9:00	31 May 22	8:27	Fine	80
5 Jun 22	9:00	6 Jun 22	8:24	Fine	159
11 Jun 22	9:00	12 Jun 22	8:27	Rainy	42
17 Jun 22	9:00	18 Jun 22	8:28	Fine	55
23 Jun 22	9:00	24 Jun 22	8:32	Fine	111
29 Jun 22	9:00	30 Jun 22	8:23	Fine	198
<b>Average</b>					110
<b>Min</b>					42
<b>Max</b>					198

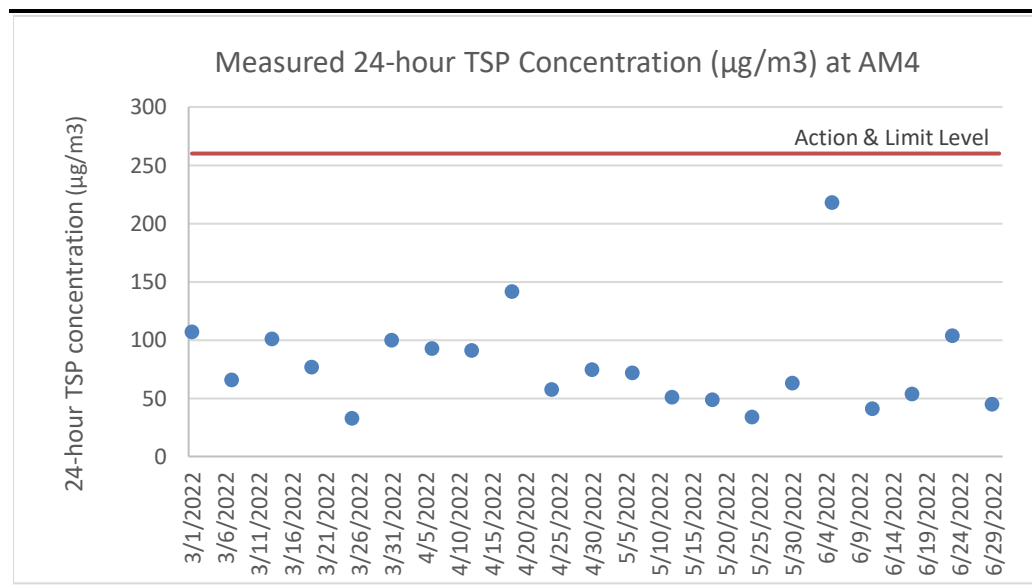
**Figure D1.3 Graphical Presentation for 24-hr TSP Monitoring at AM3**



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

Start Date	Start Time	Finish Date	Finish Time	Weather	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )
6 Apr 22	9:00	7 Apr 22	8:30	Fine	93
12 Apr 22	9:00	13 Apr 22	8:53	Fine	91
18 Apr 22	9:00	19 Apr 22	8:26	Fine	142
24 Apr 22	9:00	25 Apr 22	8:23	Fine	58
30 Apr 22	9:00	1 May 22	8:23	Fine	75
6 May 22	9:00	7 May 22	8:25	Fine	72
12 May 22	9:00	13 May 22	8:24	Rainy	51
18 May 22	9:00	19 May 22	8:29	Fine	49
24 May 22	9:00	25 May 22	8:26	Fine	34
30 May 22	9:00	31 May 22	8:36	Fine	63
5 Jun 22	9:00	6 Jun 22	8:21	Fine	218
11 Jun 22	9:00	12 Jun 22	8:23	Rainy	41
17 Jun 22	9:00	18 Jun 22	8:24	Fine	54
23 Jun 22	9:00	24 Jun 22	8:26	Fine	104
29 Jun 22	9:00	30 Jun 22	8:37	Fine	45
<b>Average</b>					79
<b>Min</b>					34
<b>Max</b>					218

**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*

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

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



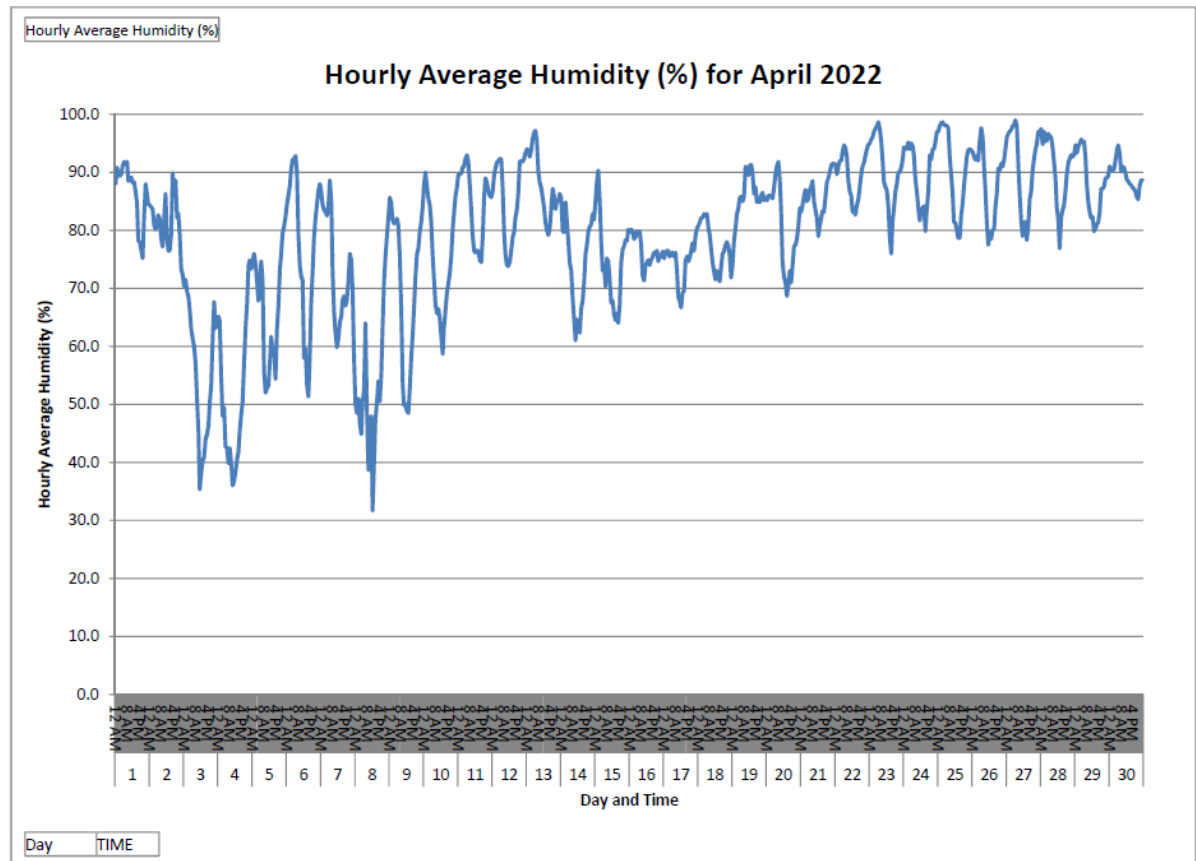
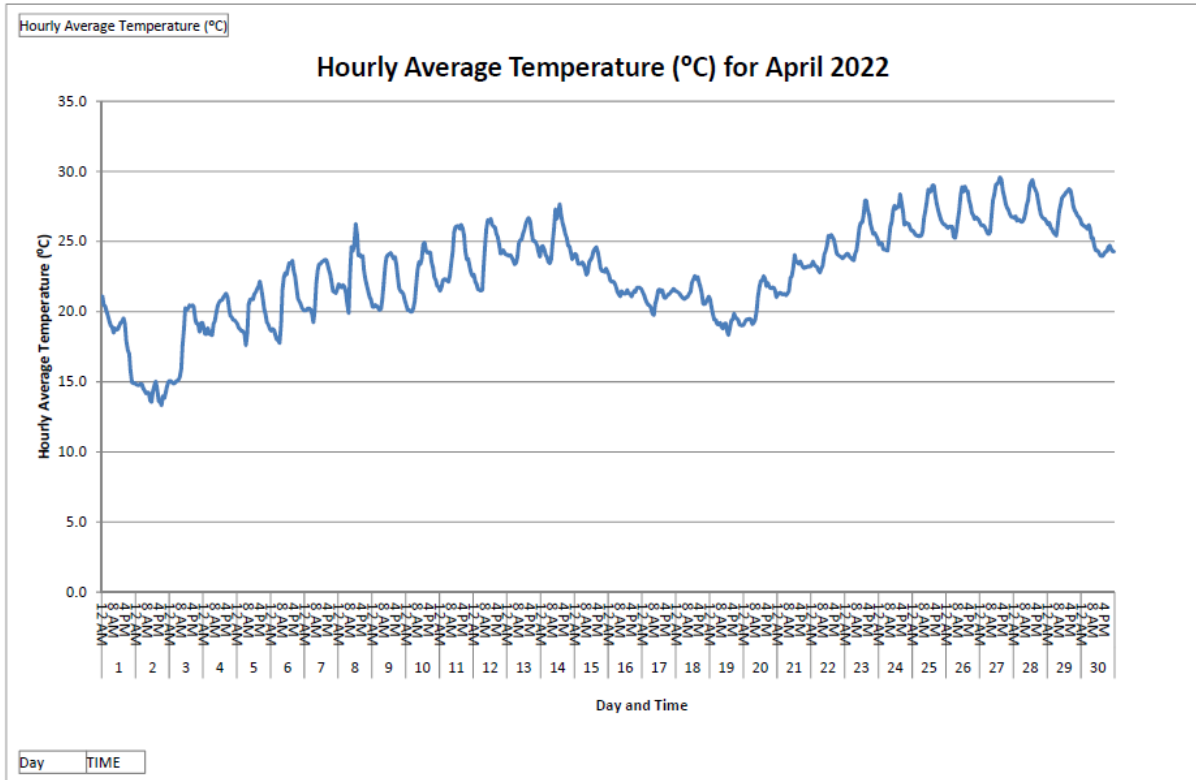
<b>Action</b>			
<b>Event</b>	<b>ET</b>	<b>IEC</b>	<b>Contractor</b>
Exceedance of Limit Level of stack emission of the thermal oxidizer, flares and generator	<ul style="list-style-type: none"> <li>• Identify source(s) and investigate the cause(s) of exceedance</li> <li>• Prepare the Notification of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

Annex D3

## Meteorological Data

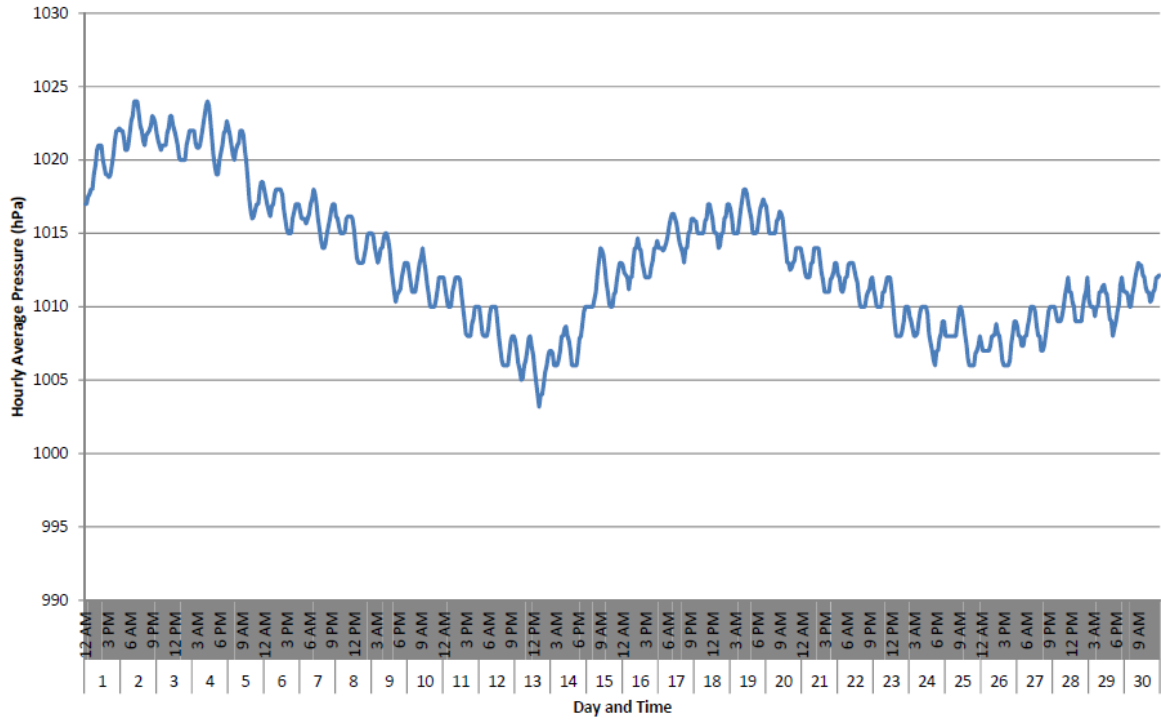
Annex D3 Meteorological Data

Apr 2022



Hourly Average Pressure (hPa)

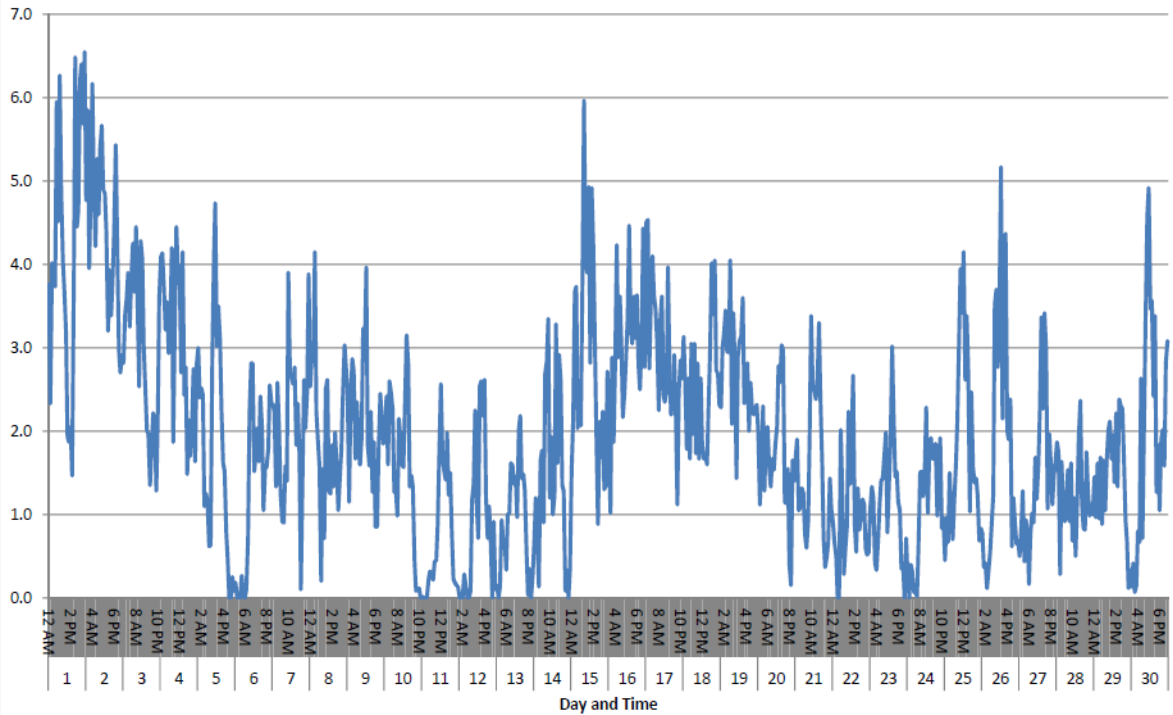
### Hourly Average Pressure (hPa) for April 2022



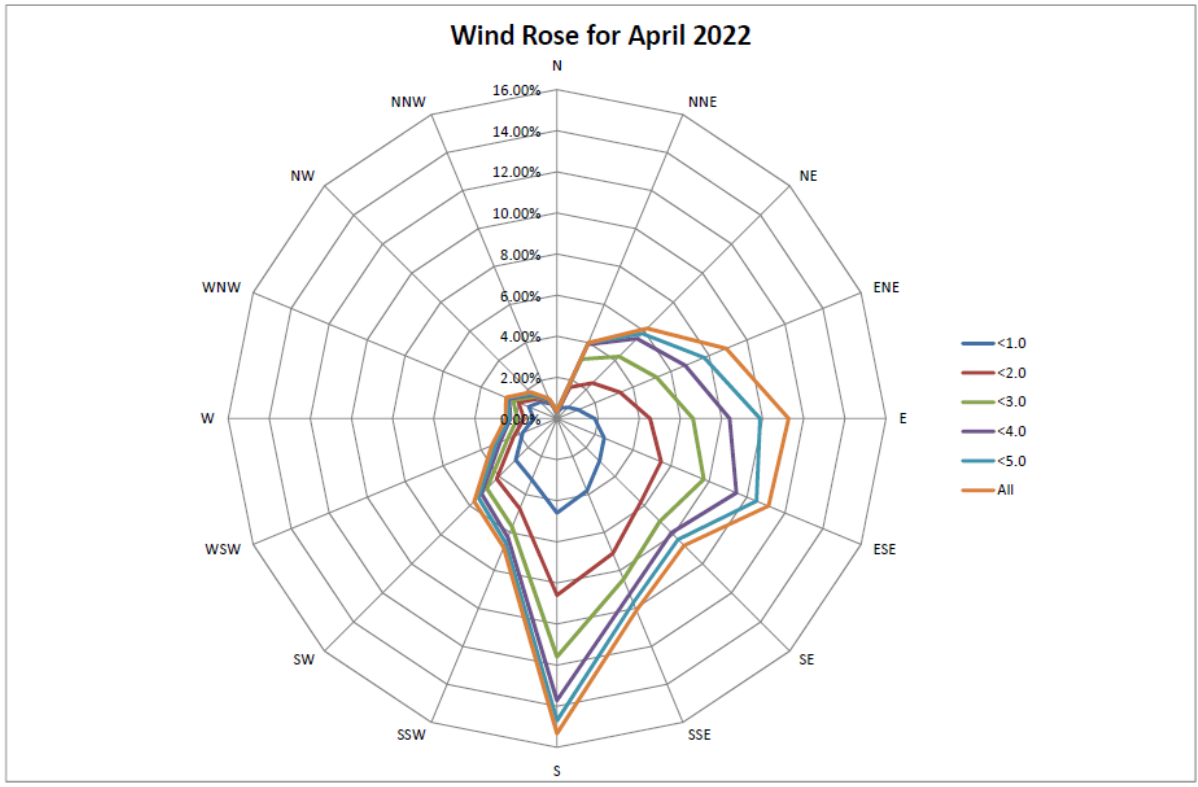
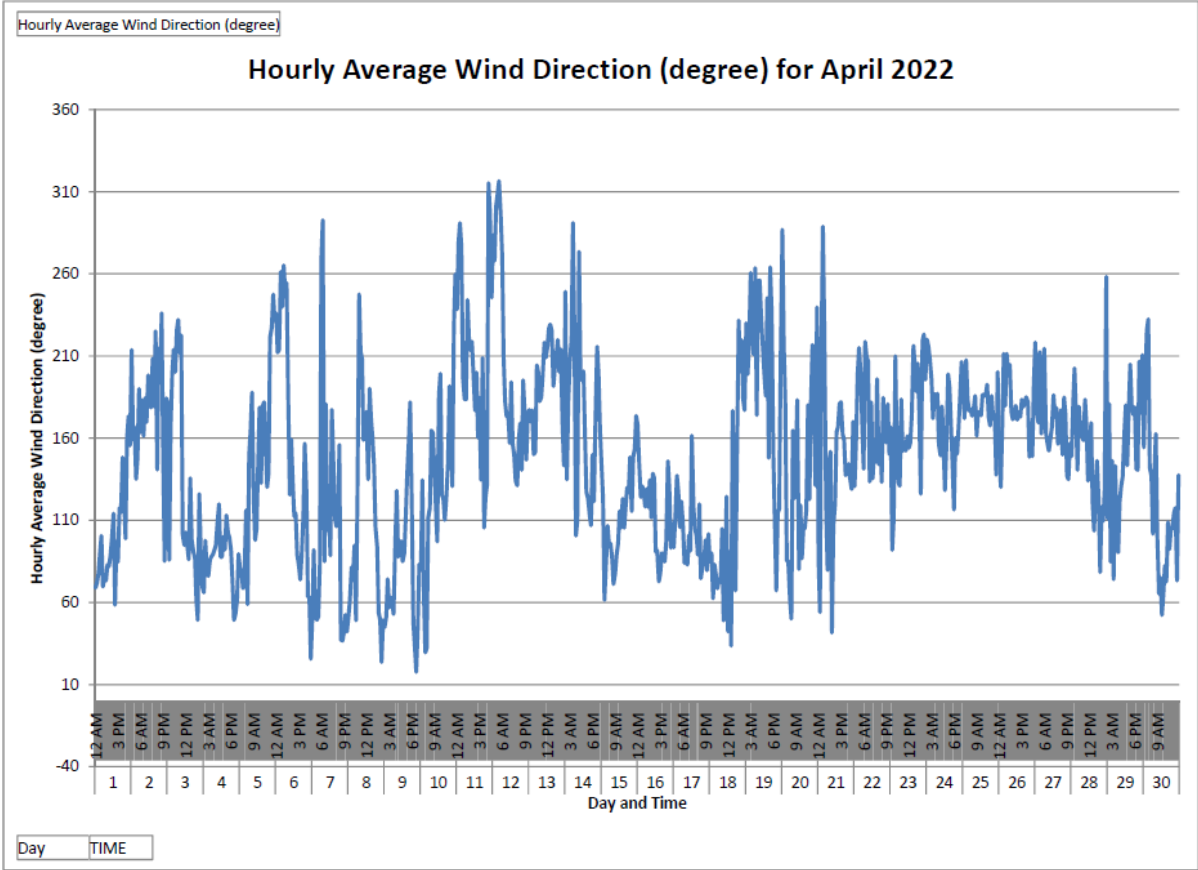
Day TIME

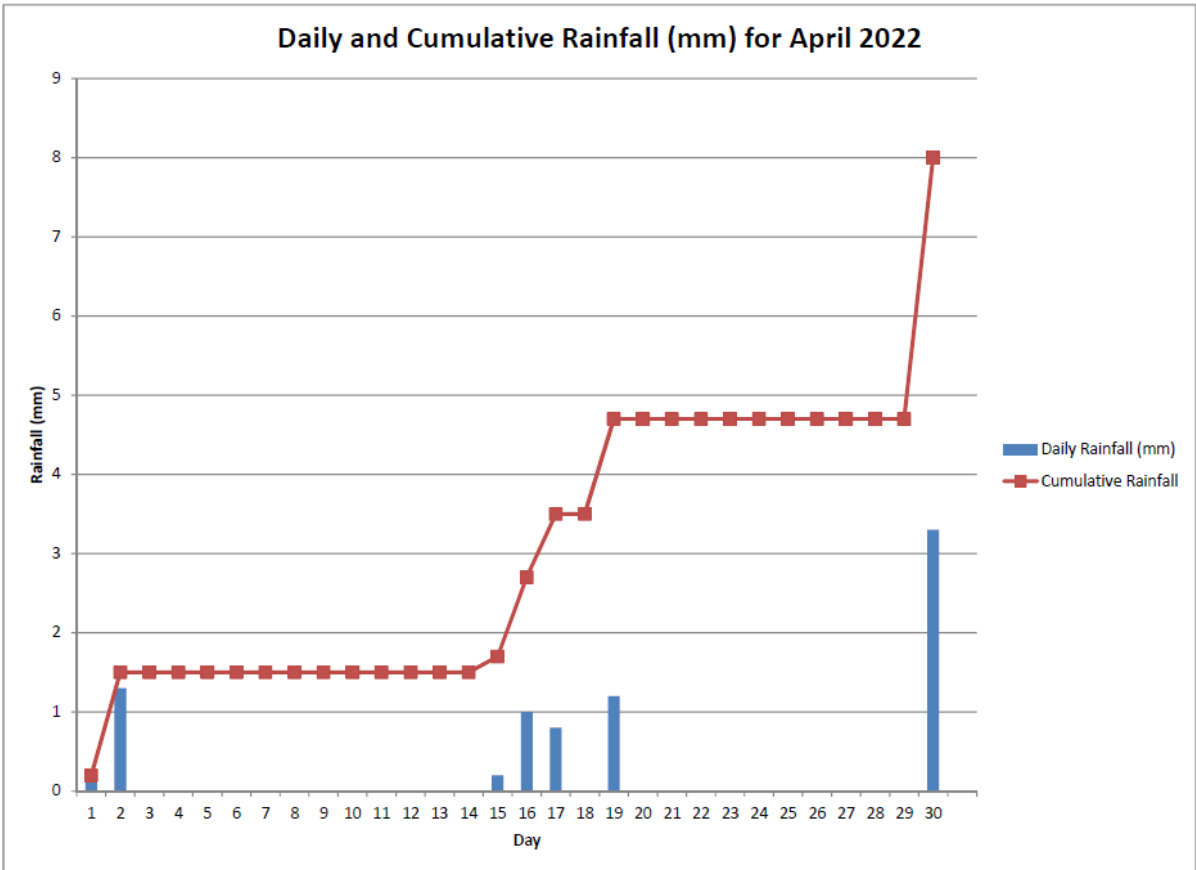
Hourly Average Wind Speed (m/s)

### Hourly Average Wind Speed (m/s) for April 2022

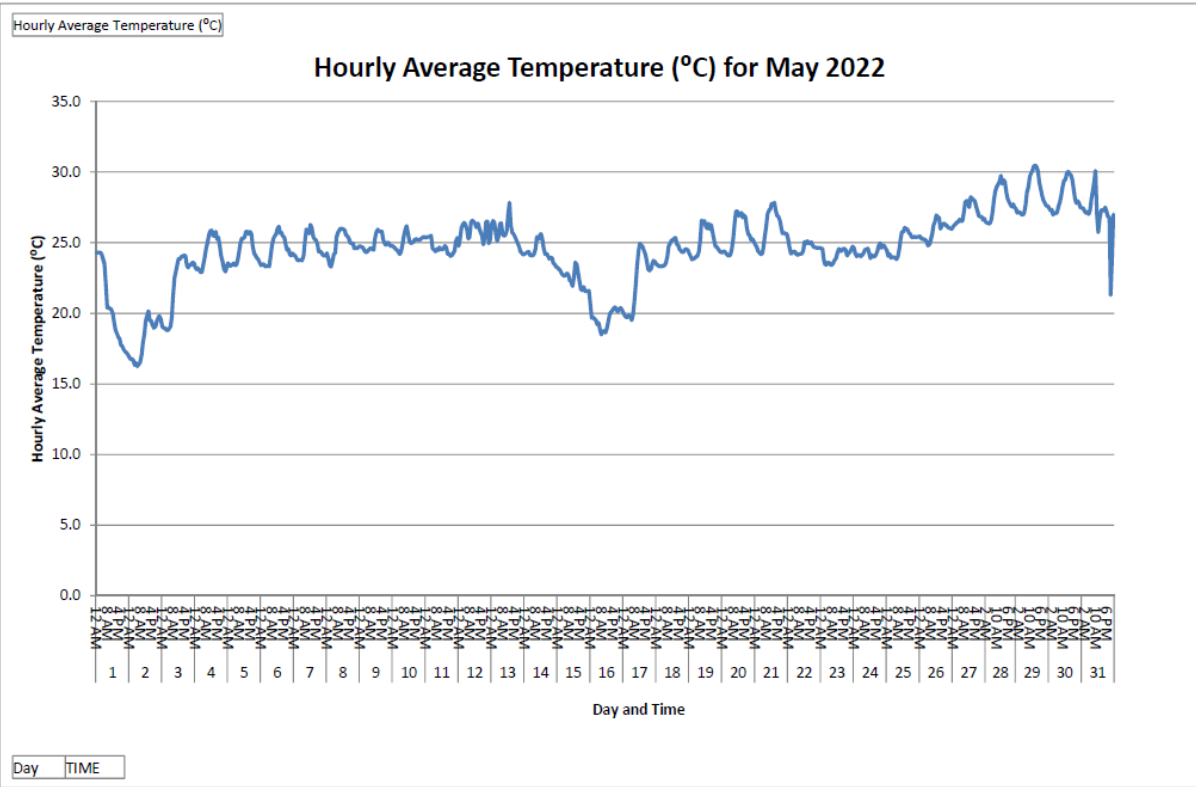


Day TIME



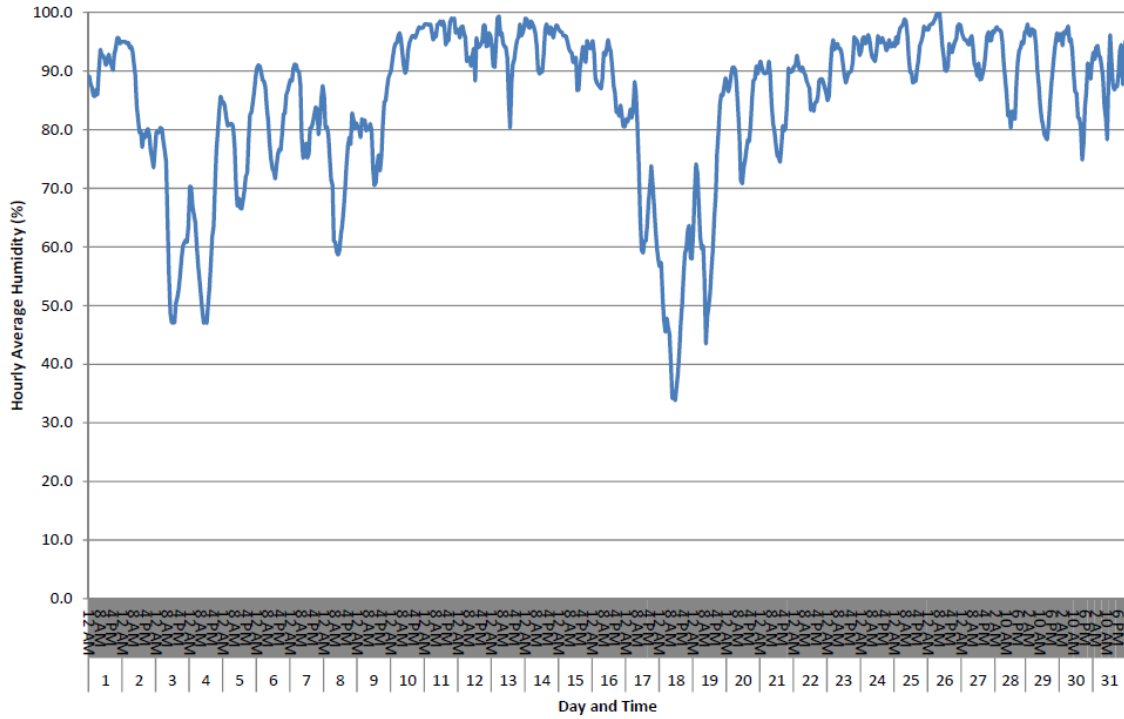


May 2022



Hourly Average Humidity (%)

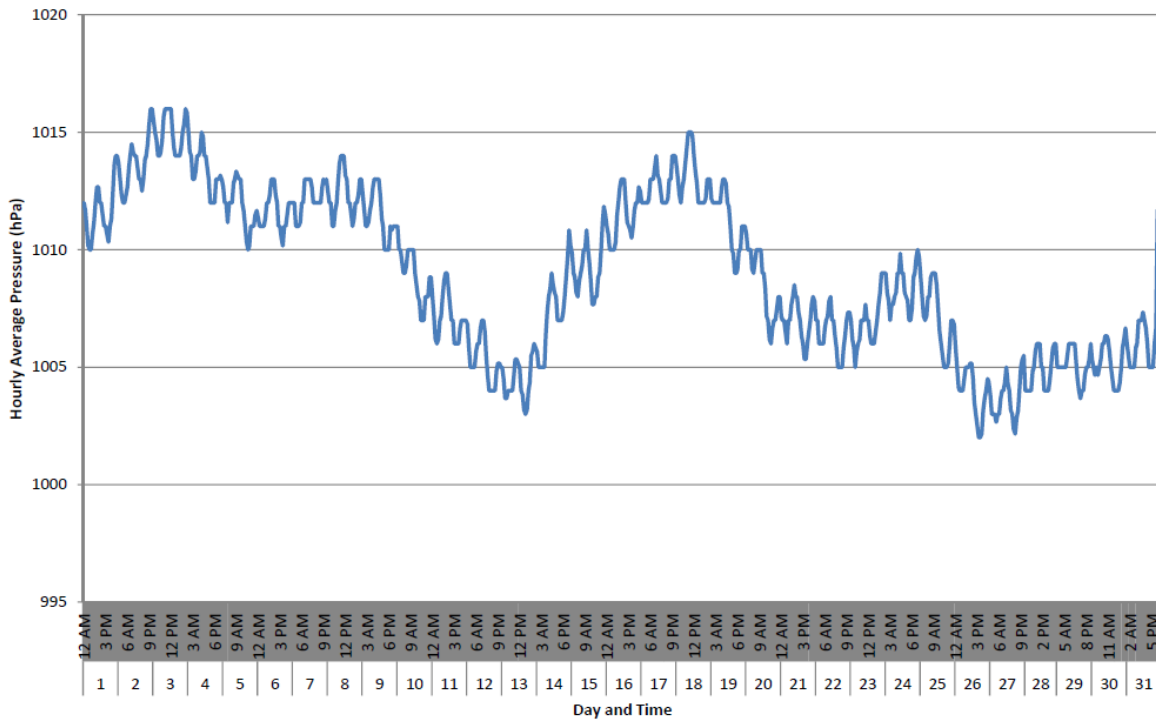
### Hourly Average Humidity (%) for May 2022



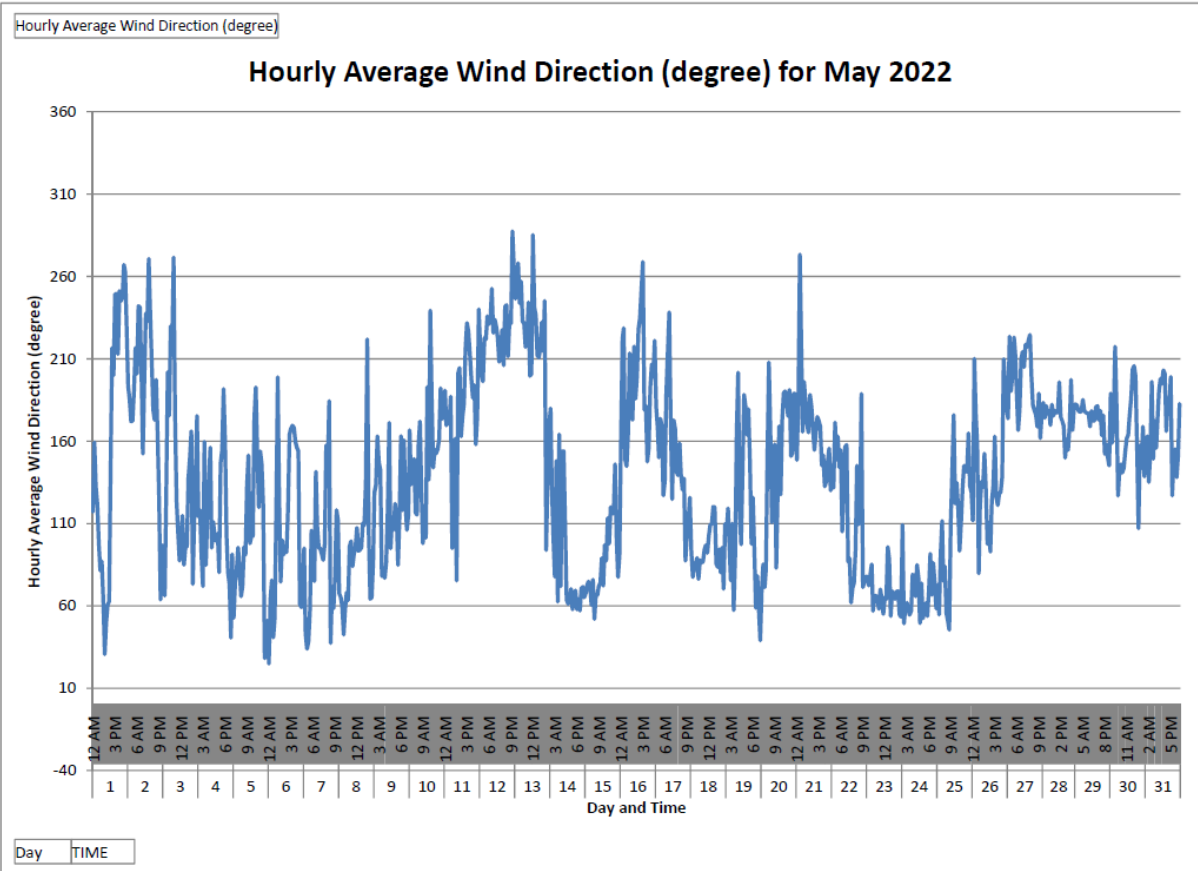
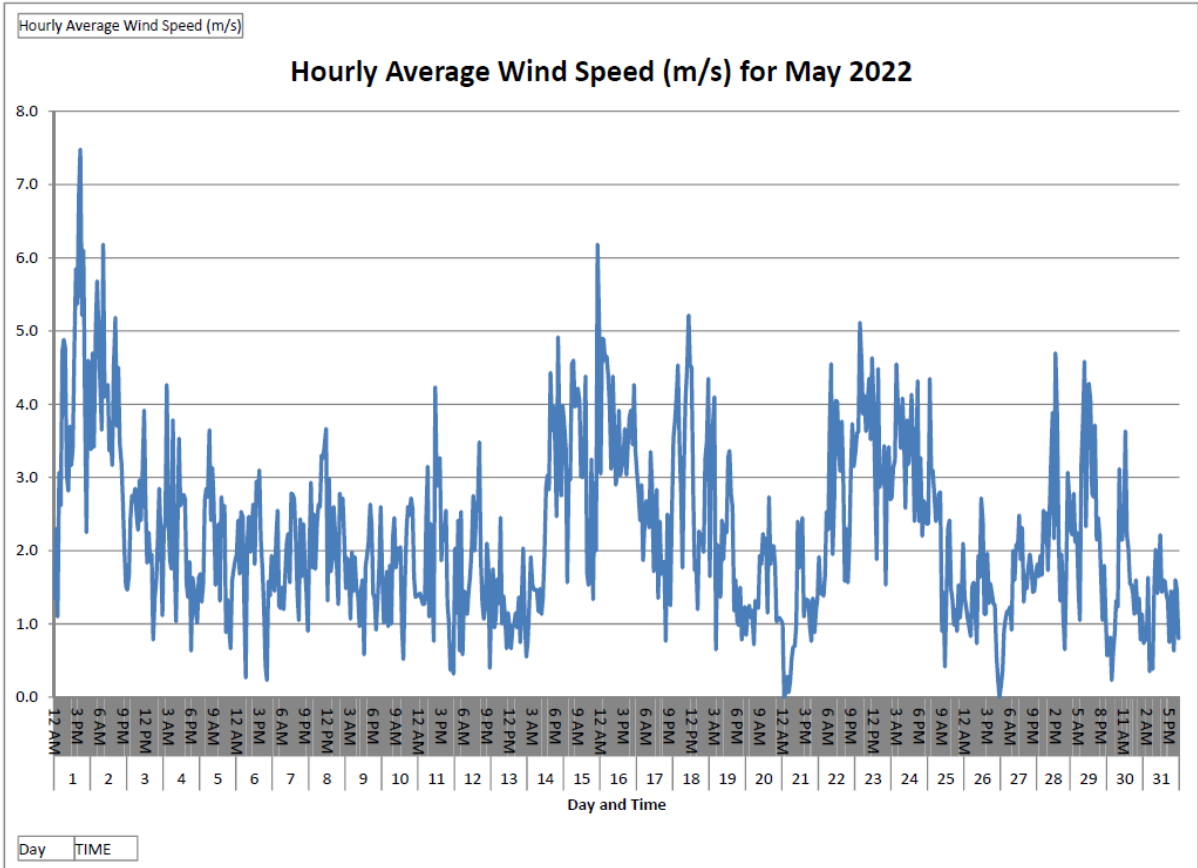
Day TIME

Hourly Average Pressure (hPa)

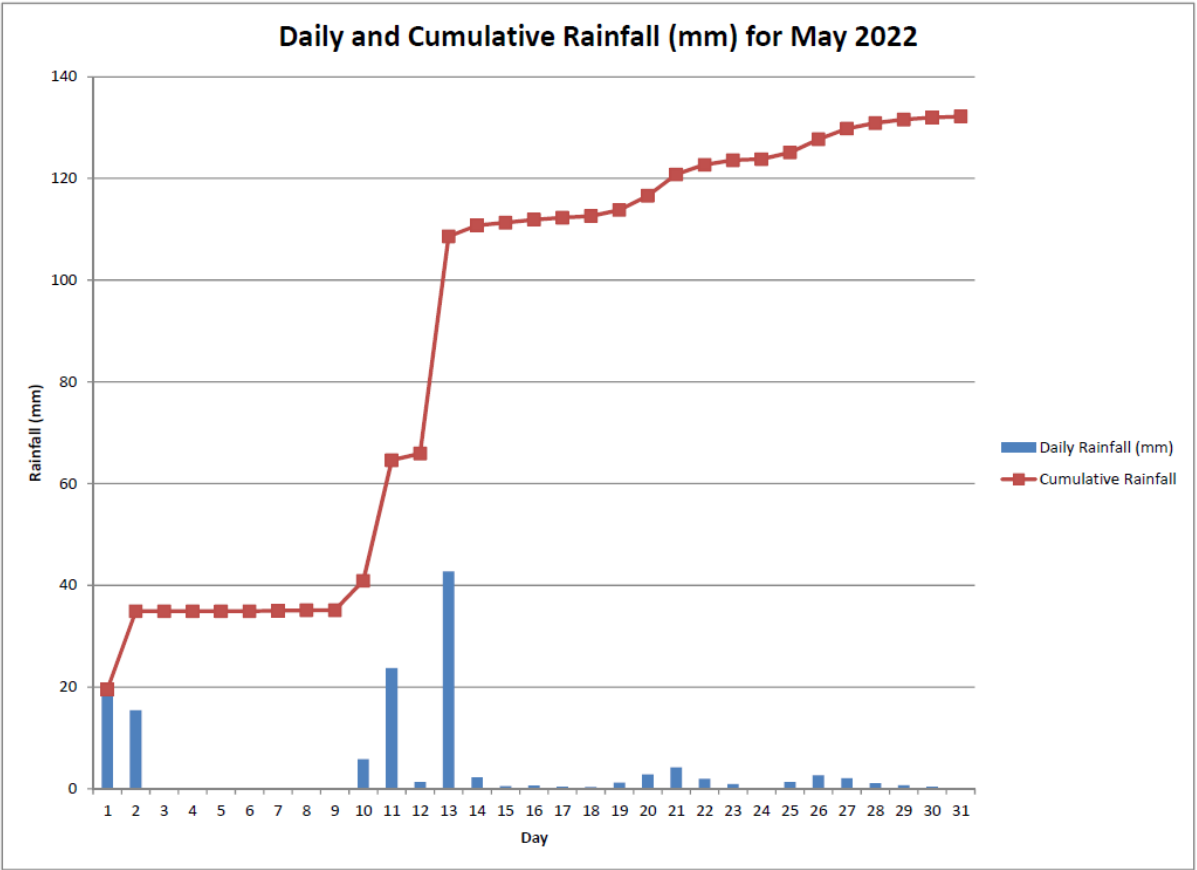
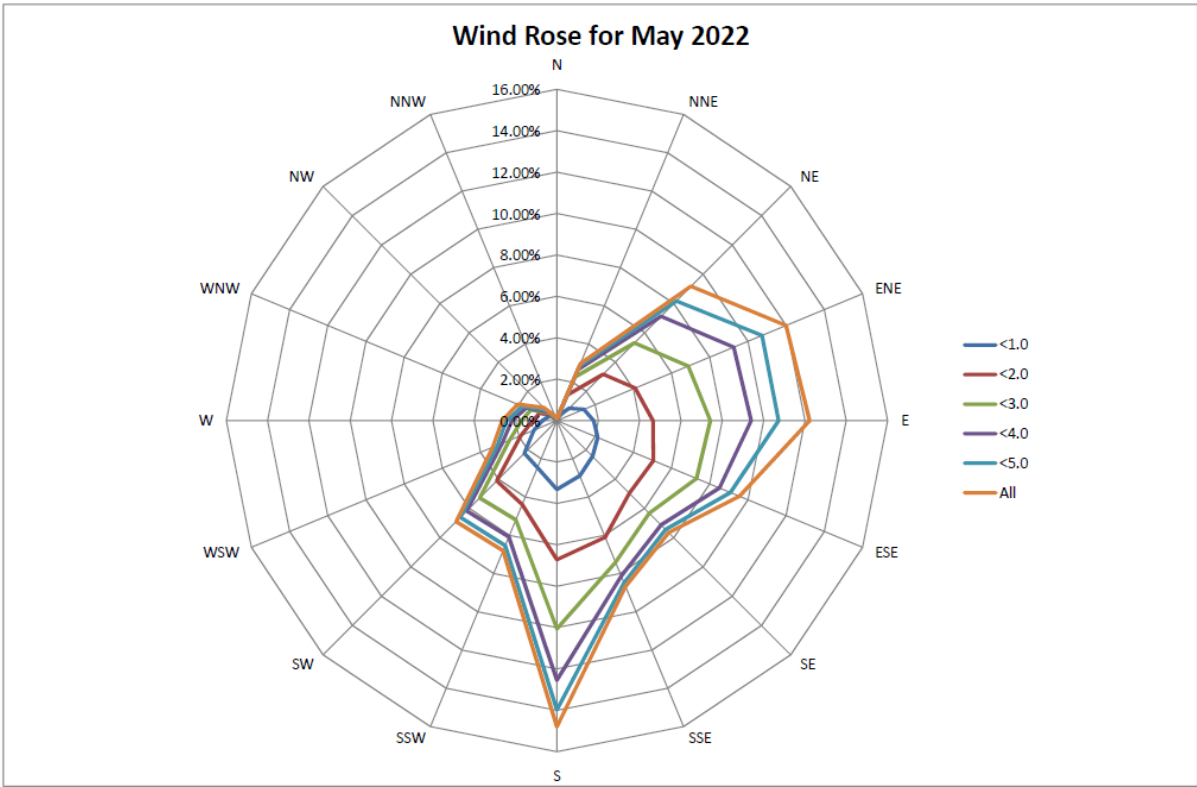
### Hourly Average Pressure (hPa) for May 2022

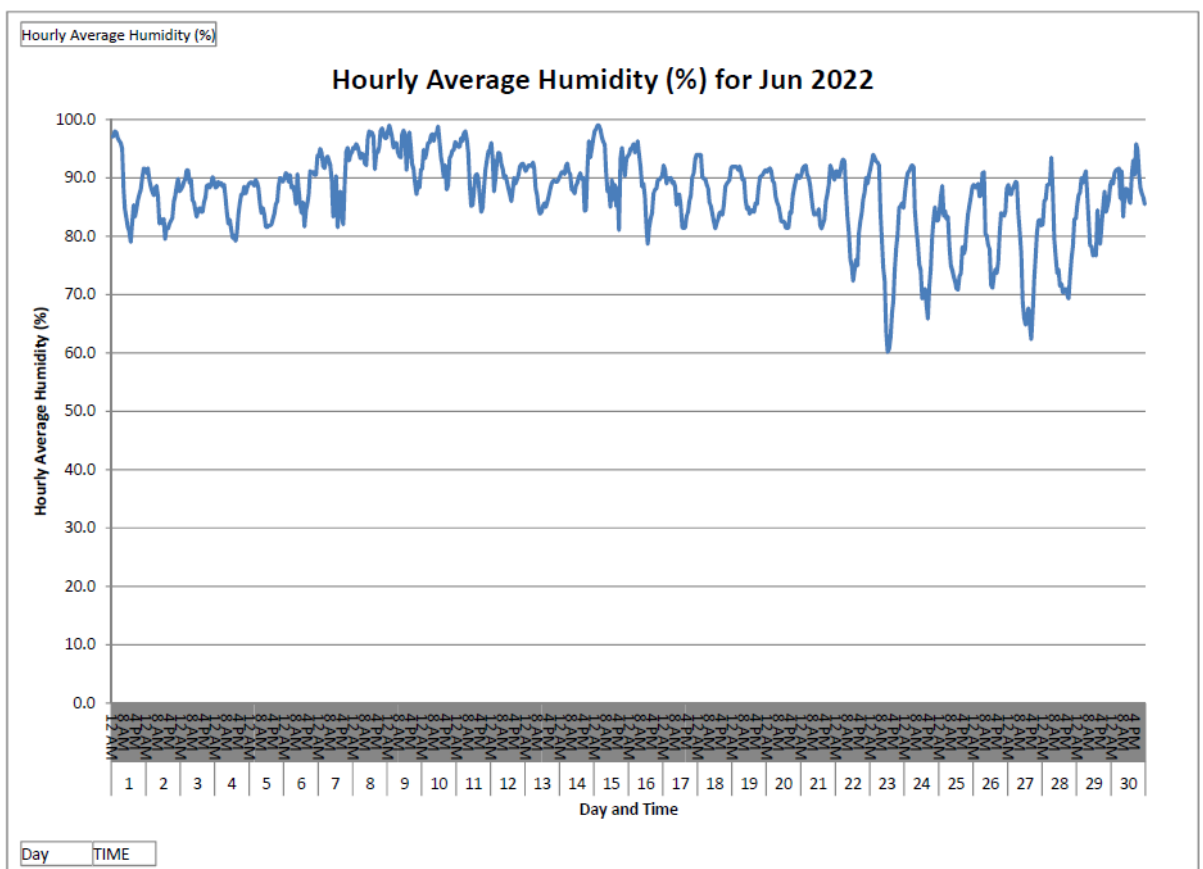
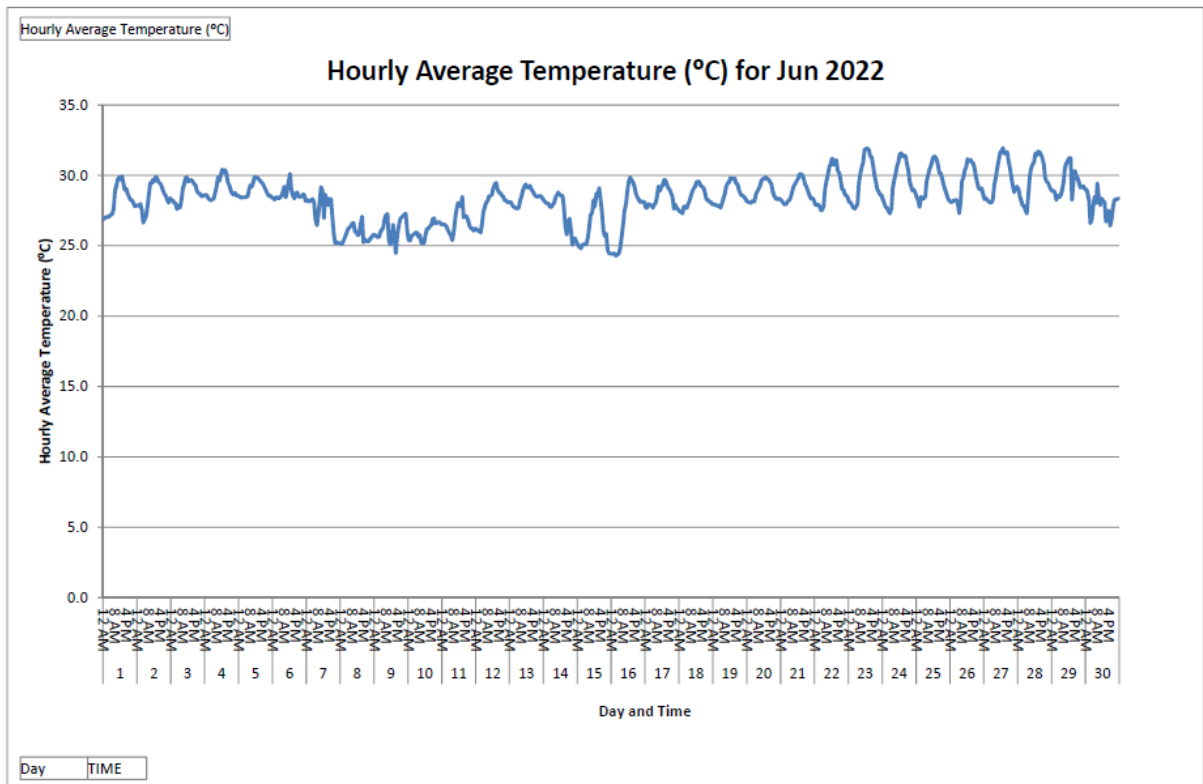


Day TIME





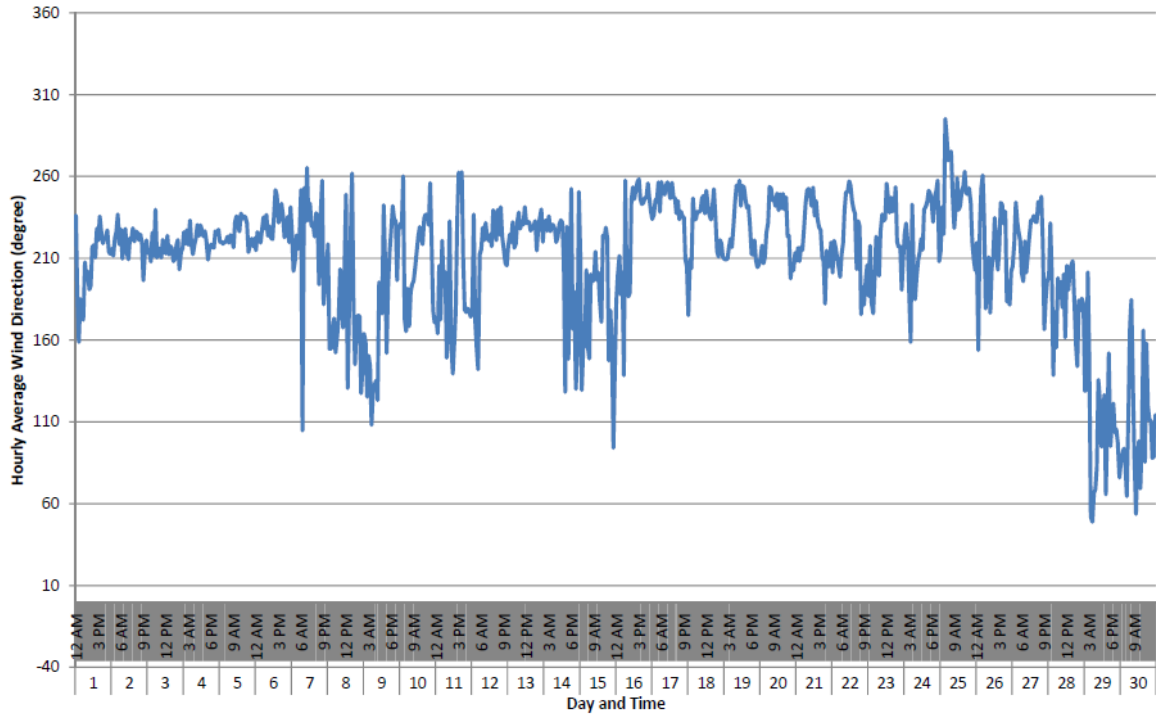






Hourly Average Wind Direction (degree)

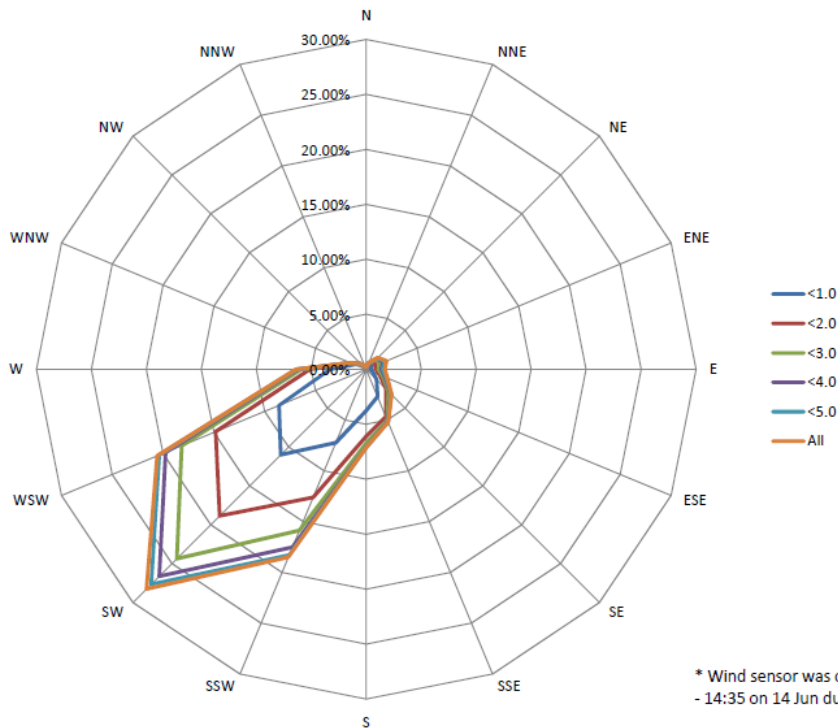
### Hourly Average Wind Direction (degree) for Jun 2022



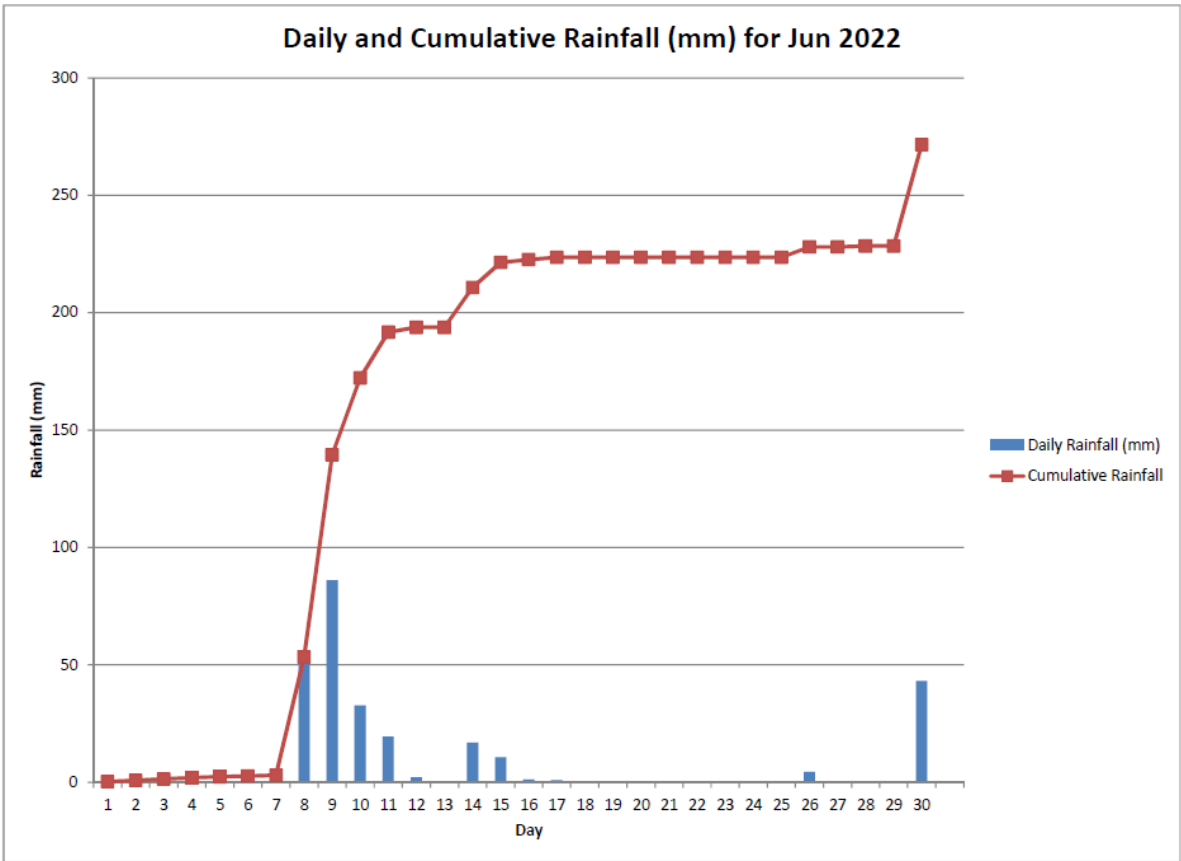
Day TIME

\* Wind sensor was offline during 13:40 - 14:35 on 14 Jun due to maintenance

### Wind Rose for Jun 2022



\* Wind sensor was offline during 13:40 - 14:35 on 14 Jun due to maintenance



Annex D4

## Odour Monitoring Results

**Table D4.1 Odour Monitoring Results**

Date	Weather	Location	Time	Temperature (oC)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
7-Apr-22	Sunny	OP1	14:07	26.3	1.4	S	No	1	Grassy	Nearby Vegetation	N/A
7-Apr-22	Sunny	OP2	14:12	26.2	1.9	S	No	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP3	14:14	26.2	0.9	N	Yes	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP4	14:17	26.3	0.5	N	Yes	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP5	14:21	25.7	0.9	E	No	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP6	14:23	26.4	1.5	SE	Yes	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP7	14:27	26.6	1.0	SE	Yes	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP8	14:30	24.8	2.0	S	No	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP9	14:33	25.2	2.2	SE	Yes	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP10	14:35	24.9	2.9	S	No	0	N/A	N/A	N/A
7-Apr-22	Sunny	OP11	14:44	26.0	1.6	SE	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP1	13:27	27.6	3.2	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP2	13:29	27.3	4.7	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP3	13:32	27.0	5.3	SW	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP4	13:34	28.0	5.5	E	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP5	13:37	29.0	3.4	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP6	13:40	28.5	5.8	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP7	13:43	28.4	5.2	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP8	13:46	28.7	4.4	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP9	13:50	31.0	2.5	S	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP10	13:52	32.5	1.2	N	No	0	N/A	N/A	N/A
12-Apr-22	Sunny	OP11	14:02	32.2	3.4	E	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP1	14:40	27.5	1.6	S	No	1	Grassy	Nearby Vegetation	N/A
22-Apr-22	Sunny	OP2	14:49	25.6	1.3	SW	Yes	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP3	14:53	25.4	1.8	SW	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP4	14:56	28.0	0.4	SW	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP5	15:00	28.2	1.7	SE	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP6	15:02	27.1	2.2	SW	No	1	Paint	Painting Site Work	N/A
22-Apr-22	Sunny	OP7	15:06	26.6	1.8	SW	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP8	15:10	28.3	1.2	SW	No	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP9	15:13	27.8	1.1	NE	Yes	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP10	15:15	26.1	2.3	E	Yes	0	N/A	N/A	N/A
22-Apr-22	Sunny	OP11	15:25	26.2	2.8	SE	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP1	9:39	28.5	3.6	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP2	9:43	28.1	1.2	S	No	0	N/A	N/A	N/A

Date	Weather	Location	Time	Temperature (oC)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
25-Apr-22	Sunny	OP3	9:46	28.7	2.0	SW	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP4	9:49	31.3	0.0	N/A	N/A	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP5	9:52	31.3	1.4	SW	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP6	9:55	29.5	1.3	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP7	9:57	29.7	5.2	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP8	10:02	28.3	7.3	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP9	10:06	29.2	5.2	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP10	10:08	32.7	1.5	S	No	0	N/A	N/A	N/A
25-Apr-22	Sunny	OP11	10:21	29.9	5.5	W	Yes	0	N/A	N/A	N/A
4-May-22	Sunny	OP1	9:23	25.9	1.0	S	No	1	Grassy	Nearby Vegetation	N/A
4-May-22	Sunny	OP2	9:27	26.7	0.0	NA	NA	0	N/A	N/A	N/A
4-May-22	Sunny	OP3	9:29	26.1	1.9	SW	No	0	N/A	N/A	N/A
4-May-22	Sunny	OP4	9:31	26.4	0.6	SW	No	0	N/A	N/A	N/A
4-May-22	Sunny	OP5	9:35	26.9	1.8	E	No	0	N/A	N/A	N/A
4-May-22	Sunny	OP6	9:38	27.2	2.2	S	No	0	N/A	N/A	N/A
4-May-22	Sunny	OP7	9:41	27.4	1.1	NE	Yes	0	N/A	N/A	N/A
4-May-22	Sunny	OP8	9:44	27.0	1.2	E	Yes	1	Exhaust	Heavy Vehicles	N/A
4-May-22	Sunny	OP9	9:47	27.0	2.2	E	Yes	0	N/A	N/A	N/A
4-May-22	Sunny	OP10	9:50	26.6	5.9	E	Yes	0	N/A	N/A	N/A
4-May-22	Sunny	OP11	10:00	27.7	0.7	SE	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP1	13:25	26.0	1.0	S	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP2	13:29	28.7	0.8	S	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP3	13:32	28.2	1.2	N	Yes	0	N/A	N/A	N/A
10-May-22	Rainy	OP4	13:34	27.8	1.8	W	Yes	0	N/A	N/A	N/A
10-May-22	Rainy	OP5	13:38	26.0	1.8	W	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP6	13:41	26.1	4.3	N	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP7	13:44	26.2	2.2	N	Yes	0	N/A	N/A	N/A
10-May-22	Rainy	OP8	13:48	25.9	4.5	N	No	0	N/A	N/A	N/A
10-May-22	Rainy	OP9	13:52	26.4	3.3	E	Yes	1	Town Gas	Town Gas Plant	N/A
10-May-22	Rainy	OP10	13:57	26.5	4.5	E	Yes	0	N/A	N/A	N/A
10-May-22	Rainy	OP11	14:07	26.3	0.0	N/A	N/A	0	N/A	N/A	N/A
17-May-22	Sunny	OP1	14:40	27.5	3.0	SE	No	1	Grassy	Nearby Vegetation	N/A
17-May-22	Sunny	OP2	14:43	24.8	1.1	SE	No	1	Grassy	Nearby Vegetation	N/A
17-May-22	Sunny	OP3	14:46	25.0	3.2	SW	No	0	N/A	N/A	N/A
17-May-22	Sunny	OP4	14:48	25.6	1.8	SW	No	0	N/A	N/A	N/A
17-May-22	Sunny	OP5	14:51	28.6	1.1	SE	No	0	N/A	N/A	N/A
17-May-22	Sunny	OP6	14:53	27.3	1.2	S	No	0	N/A	N/A	N/A
17-May-22	Sunny	OP7	14:56	26.3	1.6	SW	No	0	N/A	N/A	N/A



Date	Weather	Location	Time	Temperature (oC)	Wind Speed (m/s)	Wind Direction	From Project Site	Odour Intensity	Odour Characteristic	Possible Source	Remarks
17-May-22	Sunny	OP8	14:59	26.4	1.3	S	No	0	N/A	N/A	N/A
17-May-22	Sunny	OP9	15:01	25.3	5.0	E	Yes	1	Fragrance	Town Gas Plant	N/A
17-May-22	Sunny	OP10	15:06	27.7	0.8	E	Yes	0	N/A	N/A	N/A
17-May-22	Sunny	OP11	15:14	26.2	0.0	N/A	N/A	0	N/A	N/A	N/A
23-May-22	Shower	OP1	9:46	24.1	7.2	S	No	1	Grassy	Nearby Vegetation	N/A
23-May-22	Shower	OP2	9:49	24.6	1.2	S	No	1	Grassy	Nearby Vegetation	N/A
23-May-22	Shower	OP3	9:54	24.0	4.4	E	No	0	N/A	N/A	N/A
23-May-22	Shower	OP4	10:01	24.4	2.4	SW	No	0	N/A	N/A	N/A
23-May-22	Shower	OP5	10:04	24.7	3.8	N	No	0	N/A	N/A	N/A
23-May-22	Shower	OP6	10:06	24.7	5.9	N	No	0	N/A	N/A	N/A
23-May-22	Shower	OP7	10:08	24.6	2.2	N	Yes	0	N/A	N/A	N/A
23-May-22	Shower	OP8	10:12	24.5	8.8	E	Yes	1	Waste	Tipping Area	N/A
23-May-22	Shower	OP9	10:21	24.6	3.9	E	Yes	1	Dead mouse	Town Gas Plant	N/A
23-May-22	Shower	OP10	10:26	25.3	2.3	W	No	0	N/A	N/A	N/A
23-May-22	Shower	OP11	10:35	25.7	2.2	S	Yes	0	N/A	N/A	N/A
30-May-22	Sunny	OP1	13:48	30.6	2.7	S	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP2	13:51	30.4	1.1	S	No	1	Grassy	Nearby Vegetation	N/A
30-May-22	Sunny	OP3	13:54	30.9	1.4	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP4	13:55	31.7	1.4	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP5	13:58	32.8	1.0	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP6	14:00	30.6	3.1	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP7	14:03	31.2	4.1	S	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP8	14:05	32.0	1.8	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP9	14:07	32.0	1.5	SE	Yes	0	N/A	N/A	N/A
30-May-22	Sunny	OP10	14:12	32.4	1.4	SW	No	0	N/A	N/A	N/A
30-May-22	Sunny	OP11	14:19	31.5	2.3	W	Yes	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP1	13:22	32.2	1.5	S	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP2	13:25	31.8	1.3	SE	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP3	13:27	31.8	1.9	SW	No	1	Biogas	TCU	N/A
28-Jun-22	Sunny	OP4	13:33	34.2	0.7	SE	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP5	13:36	34.6	1.1	NE	Yes	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP6	13:38	32.3	2.6	S	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP7	13:41	34.1	1.8	S	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP8	13:44	33.1	1.2	SW	No	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP9	13:46	32.7	2.7	NE	Yes	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP10	13:50	34.0	1.7	E	Yes	0	N/A	N/A	N/A
28-Jun-22	Sunny	OP11	13:57	32.5	0.7	NE	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**

<b>Parameters</b>	<b>Monitoring Results (April 2022)</b>
NO <sub>2</sub>	0.63 gs <sup>-1</sup>
CO	<0.01 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>
Benzene	<6 x 10 <sup>-4</sup> gs <sup>-1</sup>
Vinyl chloride	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas velocity	6.6 ms <sup>-1</sup>
<b>Parameters</b>	<b>Monitoring Results (May 2022)</b>
NO <sub>2</sub>	0.11 gs <sup>-1</sup>
CO	<0.02 gs <sup>-1</sup>
SO <sub>2</sub>	0.06 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-5</sup> gs <sup>-1</sup>
Vinyl chloride	<4 x 10 <sup>-5</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	0.0048 gs <sup>-1</sup>
Ammonia (NH <sub>3</sub> )	0.01 gs <sup>-1</sup>
Exhaust gas velocity	11 ms <sup>-1</sup>
<b>Parameters</b>	<b>Monitoring Results (June 2022)</b>
NO <sub>2</sub>	0.39 gs <sup>-1</sup>
CO	<0.01 gs <sup>-1</sup>
SO <sub>2</sub>	<0.01 gs <sup>-1</sup>
Benzene	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>
Vinyl chloride	<2 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas velocity	9.0 ms <sup>-1</sup>

**Table D5.2 Thermal Oxidiser Stack Continuous Monitoring Results**

<b>Date</b>	<b>Gas Combustion Temperature (°C)</b>	<b>Exhaust temperature (K)</b>	<b>Exhaust gas velocity (ms<sup>-1</sup>) (a)</b>
1-Apr-22	980	1238	
2-Apr-22	964	1242	
3-Apr-22	955	1236	
4-Apr-22	973	1224	
5-Apr-22	956	1231	
6-Apr-22	980	1216	
7-Apr-22	955	1233	
8-Apr-22	956	1217	
9-Apr-22	972	1200	
10-Apr-22	950	1244	
11-Apr-22	974	1234	
12-Apr-22	949	1220	
13-Apr-22	Under Maintenance		
14-Apr-22	961	1232	
15-Apr-22	946	1242	
16-Apr-22	935	1225	6.6
17-Apr-22	942	1225	
18-Apr-22	965	1231	
19-Apr-22	928	1235	
20-Apr-22	920	1214	
21-Apr-22	958	1213	
22-Apr-22	978	1247	
23-Apr-22	929	1237	

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)
24-Apr-22	928	1225	
25-Apr-22	970	1215	
26-Apr-22	972	1325	
27-Apr-22	944	1241	
28-Apr-22	Under Maintenance		
29-Apr-22	955	1215	
30-Apr-22	930	1234	
1-May-22	937	1201	
2-May-22	926	1193	
3-May-22	948	1215	
4-May-22	Under Maintenance	1221	
5-May-22	Under Maintenance	1232	
6-May-22	Under Maintenance	1227	
7-May-22	936	1205	
8-May-22	935	1205	
9-May-22	928	1197	
10-May-22	Under Maintenance	1228	
11-May-22	935	1201	
12-May-22	940	1205	
13-May-22	935	1194	11.0
14-May-22	943	1202	
15-May-22	949	1199	
16-May-22	927	1188	
17-May-22	930	1197	
18-May-22	935	1196	
19-May-22	Under Maintenance	1235	
20-May-22	912	1182	
21-May-22	933	1197	
22-May-22	944	1209	
23-May-22	921	1197	
24-May-22	928	1197	
25-May-22	933	1203	
26-May-22	931	1207	
27-May-22	943	1211	
28-May-22	901	1190	
29-May-22	946	1210	
30-May-22	944	1211	
31-May-22	948	1216	
1-Jun-22	930	1202	
2-Jun-22	924	1199	
3-Jun-22	929	1203	
4-Jun-22	936	1206	
5-Jun-22	927	1198	
6-Jun-22	926	1196	
7-Jun-22	929	1195	
8-Jun-22	927	1185	
9-Jun-22	927	1173	
10-Jun-22	924	1157	
11-Jun-22	924	1167	
12-Jun-22	931	1169	9.0
13-Jun-22	925	1165	
14-Jun-22	929	1164	
15-Jun-22	926	1167	
16-Jun-22	930	1169	
17-Jun-22	930	1171	
18-Jun-22	922	1165	
19-Jun-22	925	1168	
20-Jun-22	918	1166	

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)
21-Jun-22	915	1162	
22-Jun-22	927	1168	
23-Jun-22	924	1170	
24-Jun-22	921	1167	
25-Jun-22	920	1170	
26-Jun-22	Under Maintenance	1236	
27-Jun-22	Under Maintenance	1223	
28-Jun-22	Under Maintenance	1234	
29-Jun-22	Under Maintenance		
30-Jun-22	923	1148	
<b>Average</b>	939	1204	8.9
<b>Min</b>	901	1148	6.6
<b>Max</b>	980	1325	11.0

**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 (April 2022)
	Flare 1 - F601
NO <sub>2</sub>	0.03 gs <sup>-1</sup>
CO	<0.005 gs <sup>-1</sup>
SO <sub>2</sub>	<0.005 gs <sup>-1</sup>
Benzene	<1.3 x 10 <sup>-5</sup> gs <sup>-1</sup>
Vinyl chloride	<1 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas velocity	4.5 ms <sup>-1</sup>
Parameters	Monitoring Results (May 2022)
	Flare 2 - F602
NO <sub>2</sub>	0.01 gs <sup>-1</sup>
CO	0.04 gs <sup>-1</sup>
SO <sub>2</sub>	0.06 gs <sup>-1</sup>
Benzene	<1.8 x 10 <sup>-5</sup> gs <sup>-1</sup>
Vinyl chloride	<1.5 x 10 <sup>-5</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	<0.0014 gs <sup>-1</sup>
Exhaust gas velocity	2.7 ms <sup>-1</sup>
Parameters	Monitoring Results (June 2022)
	Flare 1 - F601
NO <sub>2</sub>	0.03 gs <sup>-1</sup>
CO	0.098 gs <sup>-1</sup>
SO <sub>2</sub>	0.11 gs <sup>-1</sup>
Benzene	<3.6 x 10 <sup>-5</sup> gs <sup>-1</sup>
Vinyl chloride	<1.6 x 10 <sup>-5</sup> gs <sup>-1</sup>
Exhaust gas velocity	8.3 ms <sup>-1</sup>

**Table D5.4 Landfill Gas Flare Stack Continuous Monitoring Results**

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status
<b>Flare 1 - F601</b>				
1 Apr 22	-	-		Standby
2-Apr-22	-	-		Standby
3-Apr-22	870	1113		In Operation
4-Apr-22	-	-		Standby
5-Apr-22	-	-		Standby
6-Apr-22	-	-		Standby
7-Apr-22	-	-		Standby
8-Apr-22	840	1093		In Operation
9-Apr-22	-	-		Standby
10-Apr-22	-	-		Standby
11-Apr-22	-	-		Standby
12-Apr-22	860	1103		In Operation
13-Apr-22	860	1103		In Operation
14-Apr-22	-	-		Standby
15-Apr-22	-	-		Standby
16-Apr-22	-	-	4.5	Standby
17-Apr-22	880	1123		In Operation
18-Apr-22	-	-		Standby
19-Apr-22	-	-		Standby
20-Apr-22	850	1113		In Operation
21-Apr-22	-	-		Standby
22-Apr-22	900	1093		In Operation
23-Apr-22	920	1123		In Operation
24-Apr-22	-	-		Standby
25-Apr-22	988	1203		In Operation
26-Apr-22	930	1103		In Operation
27-Apr-22	820	1078		In Operation
28-Apr-22	870	1093		In Operation
29-Apr-22	840	1083		In Operation
30-Apr-22	860	1033		In Operation
1-May-22	940	983		In Operation
2-May-22	860	953		In Operation
3-May-22	850	973		In Operation
4-May-22	850	953		In Operation
5-May-22	990	1053		In Operation
6-May-22	990	1063		In Operation
7-May-22	980	1023		In Operation
8-May-22	890	983		In Operation
9-May-22	940	983		In Operation
10-May-22	-	-		Standby
11-May-22	-	-		Standby
12-May-22	-	-		Standby
13-May-22	850	983		In Operation
14-May-22	-	-		Standby
15-May-22	-	-	2.7	Standby
16-May-22	930	983		In Operation
17-May-22	880	973		In Operation
18-May-22	847	1063		In Operation
19-May-22	830	1063		In Operation
20-May-22	-	-		Standby
21-May-22	880	1053		In Operation
22-May-22	820	943		In Operation
23-May-22	850	953		In Operation
24-May-22	870	983		In Operation

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status
25-May-22	950	1003		In Operation
26-May-22	880	953		In Operation
27-May-22	860	1073		In Operation
28-May-22	830	953		In Operation
29-May-22	910	1033		In Operation
30-May-22	870	983		In Operation
31-May-22	900	1013		In Operation
1 Jun 22	867	993		In Operation
2 Jun 22	940	1083		In Operation
3 Jun 22	920	1083		In Operation
4 Jun 22	890	1023		In Operation
5 Jun 22	880	1033		In Operation
6 Jun 22	940	1033		In Operation
7 Jun 22	822	1013		In Operation
8 Jun 22	880	1053		In Operation
9 Jun 22	930	1123		In Operation
10 Jun 22	870	1053		In Operation
11 Jun 22	890	1143		In Operation
12 Jun 22	970	1033		In Operation
13 Jun 22	870	1013		In Operation
14 Jun 22	-	-		Standby
15 Jun 22	840	1043	8.3	In Operation
16 Jun 22	-	-		Standby
17 Jun 22	940	1083		In Operation
18 Jun 22	-	-		Standby
19 Jun 22	-	-		Standby
20 Jun 22	-	-		Standby
21 Jun 22	-	-		Standby
22 Jun 22	900	1013		In Operation
23 Jun 22	830	983		In Operation
24 Jun 22	900	1003		In Operation
25 Jun 22	860	1063		In Operation
26 Jun 22	842	1073		In Operation
27 Jun 22	850	1043		In Operation
28 Jun 22	900	1023		In Operation
29 Jun 22	886	1024		In Operation
30 Jun 22	878	993		In Operation
<b>Average</b>	886	1093	5.1	
<b>Min</b>	820	943	2.7	
<b>Max</b>	990	1203	8.3	
<b>Flare 2 - F602</b>				
1 Apr 22	873	1083		In Operation
2 Apr 22	876	1073		In Operation
3 Apr 22	870	1123		In Operation
4 Apr 22	880	1093		In Operation
5 Apr 22	950	1203		In Operation
6 Apr 22	844	1093		In Operation
7 Apr 22	-	-		Standby
8 Apr 22	-	-		Standby
9 Apr 22	-	-		Standby
10 Apr 22	880	1123		In Operation
11 Apr 22	850	1073		In Operation
12 Apr 22	870	1133		In Operation
13 Apr 22	850	1103		In Operation
14 Apr 22	860	1103		In Operation
15 Apr 22	890	1123		In Operation
16 Apr 22	880	1103	4.5	In Operation
17 Apr 22	870	1103		In Operation

Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status
18 Apr 22	850	1073		In Operation
19 Apr 22	840	1073		In Operation
20 Apr 22	870	1128		In Operation
21 Apr 22	875	1103		In Operation
22 Apr 22	-	-		Standby
23 Apr 22	850	1093		In Operation
24 Apr 22	-	-		Standby
25 Apr 22	880	1103		In Operation
26 Apr 22	840	1093		In Operation
27 Apr 22	850	1103		In Operation
28 Apr 22	870	1113		In Operation
29 Apr 22	910	1143		In Operation
30 Apr 22	875	1113		In Operation
1-May-22	875	1093		In Operation
2-May-22	860	1113		In Operation
3-May-22	870	1103		In Operation
4-May-22	860	1103		In Operation
5-May-22	870	1113		In Operation
6-May-22	880	1133		In Operation
7-May-22	840	1083		In Operation
8-May-22	840	1083		In Operation
9-May-22	860	1113		In Operation
10-May-22	850	1063		In Operation
11-May-22	850	1053		In Operation
12-May-22	870	1093		In Operation
13-May-22	880	1103		In Operation
14-May-22	870	1083		In Operation
15-May-22	860	1093		In Operation
16-May-22	880	1093	2.7	In Operation
17-May-22	840	1063		In Operation
18-May-22	870	1093		In Operation
19-May-22	860	1043		In Operation
20-May-22	880	1123		In Operation
21-May-22	880	1103		In Operation
22-May-22	870	1103		In Operation
23-May-22	890	1123		In Operation
24-May-22	840	1083		In Operation
25-May-22	830	1073		In Operation
26-May-22	850	1083		In Operation
27-May-22	870	1123		In Operation
28-May-22	870	1123		In Operation
29-May-22	850	1103		In Operation
30-May-22	840	1093		In Operation
31-May-22	820	1073		In Operation
1 Jun 22	860	1103		In Operation
2 Jun 22	830	1093		In Operation
3 Jun 22	850	1093		In Operation
4 Jun 22	880	1093		In Operation
5 Jun 22	880	1103		In Operation
6 Jun 22	870	1093		In Operation
7 Jun 22	830	1063		In Operation
8 Jun 22	840	1083		In Operation
9 Jun 22	880	1113		In Operation
10 Jun 22	840	1073	8.3	In Operation
11 Jun 22	880	1103		In Operation
12 Jun 22	840	1073		In Operation
13 Jun 22	880	1103		In Operation
14 Jun 22	880	1073		In Operation



Date	Gas Combustion Temperature (°C)	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status
15 Jun 22	870	1043		In Operation
16 Jun 22	870	1073		In Operation
17 Jun 22	870	1053		In Operation
18 Jun 22	870	1073		In Operation
19 Jun 22	860	1073		In Operation
20 Jun 22	880	1093		In Operation
21 Jun 22	880	1083		In Operation
22 Jun 22	860	1093		In Operation
23 Jun 22	880	1093		In Operation
24 Jun 22	880	1103		In Operation
25 Jun 22	840	1093		In Operation
26 Jun 22	860	1123		In Operation
27 Jun 22	870	1123		In Operation
28 Jun 22	930	1183		In Operation
29 Jun 22	877	1118		In Operation
30 Jun 22	860	1103		In Operation
<b>Average</b>	865	1098	5.1	
<b>Min</b>	820	1043	2.7	
<b>Max</b>	950	1203	8.3	

**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 (April 2022)
NO <sub>2</sub>	0.25 gs <sup>-1</sup>
CO	0.094 gs <sup>-1</sup>
SO <sub>2</sub>	<0.001 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-6</sup> gs <sup>-1</sup>
Vinyl chloride	<2.3 x 10 <sup>-6</sup> gs <sup>-1</sup>
Exhaust gas velocity	13.3 ms <sup>-1</sup>
Parameters	Monitoring Results (May 2022)
NO <sub>2</sub>	0.01 gs <sup>-1</sup>
CO	0.099 gs <sup>-1</sup>
SO <sub>2</sub>	0.004 gs <sup>-1</sup>
Benzene	<3 x 10 <sup>-6</sup> gs <sup>-1</sup>
Vinyl chloride	<2.4 x 10 <sup>-6</sup> gs <sup>-1</sup>
Non-Methane Organic Carbons	3 x 10 <sup>-4</sup> gs <sup>-1</sup>
Exhaust gas velocity	11.6 ms <sup>-1</sup>
Parameters	Monitoring Results (June 2022)
NO <sub>2</sub>	0.008 gs <sup>-1</sup>
CO	0.043 gs <sup>-1</sup>
SO <sub>2</sub>	<0.001 gs <sup>-1</sup>
Benzene	<4.0 x 10 <sup>-6</sup> gs <sup>-1</sup>
Vinyl chloride	<2.2 x 10 <sup>-6</sup> gs <sup>-1</sup>
Exhaust gas velocity	9.7 ms <sup>-1</sup>

**Table D5.6 Landfill Gas Generator Stack Continuous Monitoring Results**

Date	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status (Landfill Gas Generator in Operation)
01-Apr-22	843		In Operation (ENGB)
02-Apr-22	841		In Operation (ENGB)
03-Apr-22	844		In Operation (ENGB)
04-Apr-22	843		In Operation (ENGB)
05-Apr-22	842		In Operation (ENGB)
06-Apr-22	846		In Operation (ENGB)
07-Apr-22	843		In Operation (ENGB)
08-Apr-22	848		In Operation (ENGB)
09-Apr-22	847		In Operation (ENGB)
10-Apr-22	845		In Operation (ENGB)
11-Apr-22	847		In Operation (ENGB)
12-Apr-22	849		In Operation (ENGB)
13-Apr-22	848		In Operation (ENGB)
14-Apr-22	851		In Operation (ENGB)
15-Apr-22	850		In Operation (ENGB)
16-Apr-22	845	13.3	In Operation (ENGB)
17-Apr-22	846		In Operation (ENGB)
18-Apr-22	846		In Operation (ENGB)
19-Apr-22	846		In Operation (ENGB)
20-Apr-22	848		In Operation (ENGB)
21-Apr-22	851		In Operation (ENGB)
22-Apr-22	852		In Operation (ENGB)
23-Apr-22	853		In Operation (ENGB)
24-Apr-22	852		In Operation (ENGB)
25-Apr-22	854		In Operation (ENGB)

Date	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status (Landfill Gas Generator in Operation)
26-Apr-22	862		In Operation (ENGB)
27-Apr-22	855		In Operation (ENGB)
28-Apr-22	843		In Operation (ENGB)
29-Apr-22	870		In Operation (ENGB)
30-Apr-22	851		In Operation (ENGB)
1-May-22	848		In Operation (ENGB)
2-May-22	849		In Operation (ENGB)
3-May-22	848		In Operation (ENGB)
4-May-22	849		In Operation (ENGB)
5-May-22	850		In Operation (ENGB)
6-May-22	850		In Operation (ENGB)
7-May-22	850		In Operation (ENGB)
8-May-22	852		In Operation (ENGB)
9-May-22	851		In Operation (ENGB)
10-May-22	857		In Operation (ENGB)
11-May-22	855		In Operation (ENGB)
12-May-22	853		In Operation (ENGB)
13-May-22	854		In Operation (ENGB)
14-May-22	852		In Operation (ENGB)
15-May-22	849		In Operation (ENGB)
16-May-22	847		In Operation (ENGB)
17-May-22	847		In Operation (ENGB)
18-May-22	845	11.6	In Operation (ENGB)
19-May-22	852		In Operation (ENGB)
20-May-22	851		In Operation (ENGB)
21-May-22	851		In Operation (ENGB)
22-May-22	850		In Operation (ENGB)
23-May-22	851		In Operation (ENGB)
24-May-22	851		In Operation (ENGB)
25-May-22	852		In Operation (ENGB)
26-May-22	857		In Operation (ENGB)
27-May-22	-		Under Maintenance
28-May-22	855		In Operation (ENGB)
29-May-22	855		In Operation (ENGB)
30-May-22	854		In Operation (ENGB)
31-May-22	855		In Operation (ENGB)
01-Jun-22	848		In Operation (ENGB)
02-Jun-22	853		In Operation (ENGB)
03-Jun-22	858		In Operation (ENGB)
04-Jun-22	856		In Operation (ENGB)
05-Jun-22	856		In Operation (ENGB)
06-Jun-22	856		In Operation (ENGB)
07-Jun-22	859		In Operation (ENGB)
08-Jun-22	853		In Operation (ENGB)
09-Jun-22	850		In Operation (ENGB)
10-Jun-22	855		In Operation (ENGB)
11-Jun-22	856		In Operation (ENGB)
12-Jun-22	854		In Operation (ENGB)
13-Jun-22	856		In Operation (ENGB)
14-Jun-22	856		In Operation (ENGB)
15-Jun-22	850		In Operation (ENGB)
16-Jun-22	863		In Operation (ENGA)
17-Jun-22	857		In Operation (ENGA)
18-Jun-22	866	9.7	In Operation (ENGA)
19-Jun-22	866		In Operation (ENGA)
20-Jun-22	867		In Operation (ENGB)
21-Jun-22	868		In Operation (ENGB)
22-Jun-22	864		In Operation (ENGB)

Date	Exhaust temperature (K)	Exhaust gas velocity (ms <sup>-1</sup> ) (a)	Operation Status (Landfill Gas Generator in Operation)
23-Jun-22	874		In Operation (ENGB)
24-Jun-22	875		In Operation (ENGB)
25-Jun-22	865		In Operation (ENGB)
26-Jun-22	867		In Operation (ENGB)
27-Jun-22	868		In Operation (ENGA)
28-Jun-22	867		In Operation (ENGA)
29-Jun-22	879		In Operation (ENGA)
30-Jun-22	868		In Operation (ENGA)
<b>Average</b>	854	11.5	
<b>Min</b>	841	9.7	
<b>Max</b>	879	13.3	

**Notes:**

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

Annex D6

## Ambient VOCs, Ammonia and H<sub>2</sub>S Monitoring Results

**Table D6.1 Ambient VOCs, Ammonia and H<sub>2</sub>S Monitoring Results**

Parameters	Limit Level	Monitoring Results ( $\mu\text{g m}^{-3}$ )			
		AM1	AM2	AM3	AM4
Ammonia	180	<10	<10	<10	<10
H <sub>2</sub> S	42	<14	<14	<14	<14
Methane	NA <sup>(a)</sup>	0.00019% (v/v)	0.00017% (v/v)	0.00041% (v/v)	0.00018% (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	0.9	0.9	0.4	1.0
Benzene	33	1.0	0.8	<0.5	0.9
Butan-2-ol	667	<0.6	<0.6	<0.6	<0.6
Butanethiol	4	<1.2	<1.2	<1.2	<1.2
Carbon Disulphide	150	0.8	<0.5	<0.5	1.1
Carbon Tetrachloride	64	0.7	0.6	<0.6	0.6
Chloroform	99	<0.8	<0.8	<0.8	<0.8
Decanes	3,608	0.7	<0.7	1.1	0.7
Dichlorobenzene	120	<1.0	<1.0	<1.0	<1.0
Dichlorodifluoro-methane	NA <sup>(a)</sup>	1.0	1.1	<0.6	0.9
Dimethylsulphide	8	<0.2	<0.2	<0.2	<0.2
Dipropyl ether	NA <sup>(a)</sup>	<0.8	<0.8	<0.8	<0.8
Limonene	212	1.1	1.2	4.0	1.1
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	1.0	1.0	1.3	2.0
Heptane	2,746	<0.8	<0.8	<0.8	0.8
Methanethiol	10	<0.4	<0.4	<0.4	<0.4
Methanol	2,660	29.4	13.7	<2.6	31.3
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	4.5	5.4	0.6	5.5
Butyl acetate	76	1.1	<1.0	<1.0	1.7
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 <sup>(a)</sup>	1.0	<0.8	1.8	2.2
Tetrachloroethylene	1,380	<0.7	<0.7	<0.7	<0.7
Toluene	1,244	3.5	3.6	2.6	5.4
Trichloroethylene	5,500	<1.1	<1.1	<1.1	<1.1
Undecane	5,562	<1.2	<1.2	1.5	<1.2
Vinyl Chloride	26	<0.3	<0.3	<0.3	<0.3
Xylenes	534	3.0	3.0	5.9	6.3

**Notes:**

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

Annex E

## Noise



Annex E1

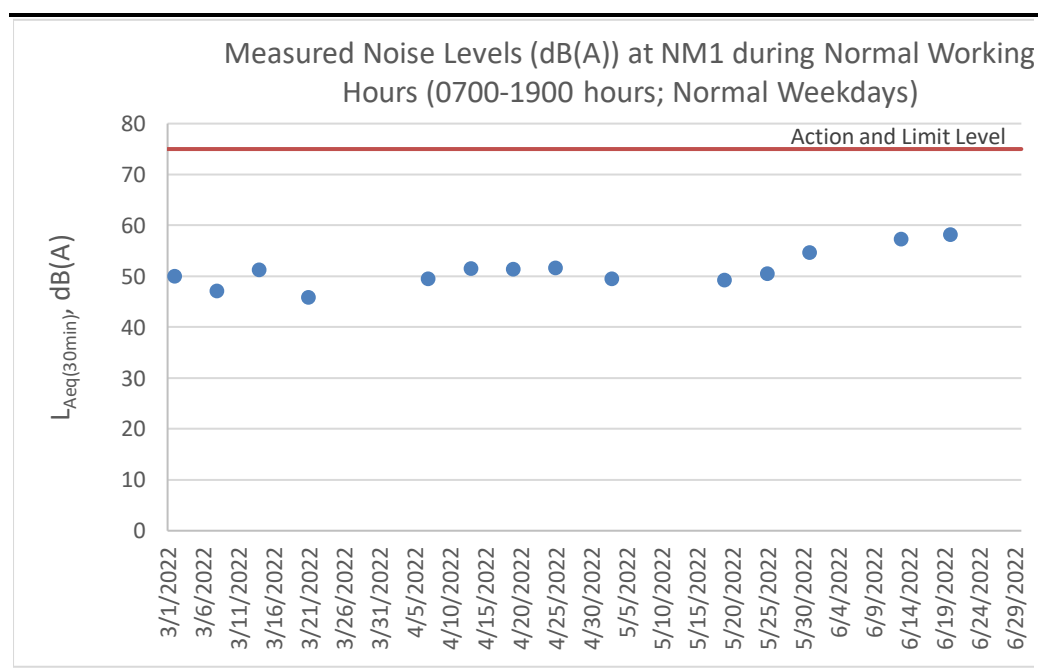
## Noise Monitoring Results

**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 <sub>10</sub> (30min)	L <sub>90</sub> (30min)	L <sub>eq</sub> (30min)
7 Apr 22	15:17	15:47	Sunny	51.6	45.4	49.5
13 Apr 22	15:00	15:30	Sunny	52.8	50.0	51.6
19 Apr 22	14:49	15:19	Sunny	52.4	49.7	51.4
25 Apr 22	11:06	11:36	Sunny	53.0	48.9	51.7
3 May 22	15:00	15:30	Sunny	52.0	45.2	49.5
10 May 22	NA	NA	Pouring	Monitoring was cancelled due to adverse weather.		
19 May 22	14:50	15:20	Sunny	51.2	46.7	49.3
25 May 22	15:48	16:18	Cloudy	53.2	46.9	50.6
31 May 22	14:39	15:39	Cloudy	57.7	50.7	54.7
6 June 22	NA	NA	Pouring	Monitoring was cancelled due to adverse weather.		
13 June 22	14:14	14:44	Cloudy	57.1	52.3	57.4
20 June 22	14:22	14:52	Cloudy	56.1	51.8	58.2
30 June 22	NA	NA	Drizzle	Monitoring was cancelled due to adverse weather.		
						<b>Average</b> 51.3
						<b>Min</b> 45.9
						<b>Max</b> 58.2

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

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



Annex E2

## Event and Action Plan for Noise Monitoring

**Annex E2**      *Event and Action Plan for Operational Noise Monitoring*

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

Annex F

## Water Quality

Annex F1

## Surface Water Quality Monitoring Results

**Table F1.1 Surface Water Quality Monitoring Results at DP4**

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (oC)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
25 Apr 22	13:37	Sunny		Unable to collect water sample due to insufficient flow					-
25 May 22	14:46	Overcast	Light Yellow	Semi-clear	26.8	0.18	9	31.8	-
25 May 22	14:58	Overcast	Light Yellow	Semi-clear	26.9	0.18	10	30.9	Duplicate
24 Jun 22	13:30	Sunny		Unable to collect water sample due to insufficient flow					-
30 Jun 22	11:15	Sunny	Light Yellow	Semi-clear	-	-	-	28.2	-
<b>Average</b>						-	-	30.3	
<b>Min</b>						-	-	28.2	
<b>Max</b>						-	-	31.8	

**Table F1.2 Surface Water Quality Monitoring Results at DP6**

Date	Time	Weather Condition	Water Appearance	Water Condition	Water Temperature (oC)	Ammoniacal-nitrogen (mg/L)	COD	Suspended Solids (SS) (mg/L)	Remarks
25 Apr 22	13:48	Sunny		Unable to collect water sample due to insufficient flow					-
25 May 22	15:15	Overcast		Unable to collect water sample due to insufficient flow					-
24 Jun 22	13:19	Sunny		Unable to collect water sample due to insufficient flow					-
<b>Average</b>						-	-	-	
<b>Min</b>						-	-	-	
<b>Max</b>						-	-	-	

Annex F2

## Event and Action Plan for Water Quality Monitoring



*Annex F2 Event and Action Plan for Water Quality Monitoring During Operation/Restoration Phase*

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

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

Annex F3

## Leachate Levels Monitoring Results

**Table F3.1 Leachate Levels Monitoring Results (Pump Station No.1X (Cell 1X))**

<b>Date</b>	<b>Meter No.X1 (cm)</b>	<b>Meter No.X2 (cm)</b>	<b>Average (cm)</b>
<b>Pump Station No. 1X (Cell 1X)</b>			
1-Apr-22	44	64	54
2-Apr-22	53	73	63
3-Apr-22	53	73	63
4-Apr-22	53	73	63
5-Apr-22	53	73	63
6-Apr-22	64	84	74
7-Apr-22	44	64	54
8-Apr-22	55	75	65
9-Apr-22	46	66	56
10-Apr-22	46	66	56
11-Apr-22	55	75	65
12-Apr-22	64	84	74
13-Apr-22	44	64	54
14-Apr-22	53	73	63
15-Apr-22	62	82	72
16-Apr-22	48	68	58
17-Apr-22	48	68	58
18-Apr-22	57	77	67
19-Apr-22	64	84	74
20-Apr-22	44	64	54
21-Apr-22	53	73	63
22-Apr-22	59	79	69
23-Apr-22	44	64	54
24-Apr-22	44	64	54
25-Apr-22	53	70	62
26-Apr-22	57	79	68
27-Apr-22	64	84	74
28-Apr-22	42	62	52
29-Apr-22	48	70	59
30-Apr-22	66	86	76
1-May-22	66	86	76
2-May-22	66	86	76
3-May-22	48	70	59
4-May-22	44	66	55
5-May-22	62	82	72
6-May-22	48	68	58
7-May-22	57	77	67
8-May-22	57	77	67
9-May-22	57	77	67
10-May-22	68	88	78
11-May-22	93	115	104
12-May-22	101	110	106
13-May-22	84	83	84
14-May-22	42	62	52
15-May-22	42	62	52
16-May-22	55	75	65
17-May-22	46	64	55
18-May-22	50	70	60
19-May-22	48	68	58
20-May-22	53	73	63
21-May-22	62	82	72
22-May-22	62	82	72
23-May-22	44	64	54
24-May-22	44	64	54
25-May-22	55	75	65

Date	Meter No.X1 (cm)	Meter No.X2 (cm)	Average (cm)
26-May-22	44	64	54
27-May-22	62	82	72
28-May-22	48	68	58
29-May-22	48	68	58
30-May-22	46	68	57
31-May-22	68	88	78
1-Jun-22	50	70	60
2-Jun-22	57	77	67
3-Jun-22	57	77	67
4-Jun-22	66	88	77
5-Jun-22	66	88	77
6-Jun-22	53	73	63
7-Jun-22	68	86	77
8-Jun-22	70	61	66
9-Jun-22	62	82	72
10-Jun-22	66	84	75
11-Jun-22	62	82	72
12-Jun-22	62	82	72
13-Jun-22	55	70	63
14-Jun-22	44	64	54
15-Jun-22	62	82	72
16-Jun-22	50	66	58
17-Jun-22	62	79	71
18-Jun-22	48	68	58
19-Jun-22	48	68	58
20-Jun-22	66	82	74
21-Jun-22	66	68	67
22-Jun-22	66	86	76
23-Jun-22	53	73	63
24-Jun-22	55	75	65
25-Jun-22	57	77	67
26-Jun-22	57	77	67
27-Jun-22	46	66	56
28-Jun-22	59	79	69
29-Jun-22	50	70	60
30-Jun-22	55	75	65
<b>Average</b>	56	75	65
<b>Min</b>	42	61	52
<b>Max</b>	101	115	106

**Table F3.2 Leachate Levels Monitoring Results (Pump Station No.2X (Cell 2X))**

<b>Date</b>	<b>Meter No.X3 (cm)</b>	<b>Meter No.X4 (cm)</b>	<b>Average (cm)</b>
<b>Pump Station No. 2X (Cell 2X)</b>			
1-Apr-22	79	79	79
2-Apr-22	73	73	73
3-Apr-22	73	73	73
4-Apr-22	88	88	88
5-Apr-22	88	88	88
6-Apr-22	68	68	68
7-Apr-22	73	73	73
8-Apr-22	79	79	79
9-Apr-22	88	90	89
10-Apr-22	88	90	89
11-Apr-22	68	70	69
12-Apr-22	75	75	75
13-Apr-22	79	82	81
14-Apr-22	84	86	85
15-Apr-22	88	88	88
16-Apr-22	70	70	70
17-Apr-22	70	70	70
18-Apr-22	75	77	76
19-Apr-22	79	82	81
20-Apr-22	84	84	84
21-Apr-22	86	88	87
22-Apr-22	62	62	62
23-Apr-22	70	73	72
24-Apr-22	70	73	72
25-Apr-22	75	77	76
26-Apr-22	79	79	79
27-Apr-22	82	84	83
28-Apr-22	86	86	86
29-Apr-22	88	88	88
30-Apr-22	70	73	72
1-May-22	70	73	72
2-May-22	70	73	72
3-May-22	88	88	88
4-May-22	73	73	73
5-May-22	79	79	79
6-May-22	86	86	86
7-May-22	77	77	77
8-May-22	77	77	77
9-May-22	77	77	77
10-May-22	86	86	86
11-May-22	70	70	70
12-May-22	99	98	99
13-May-22	103	104	104
14-May-22	101	101	101
15-May-22	101	101	101
16-May-22	86	85	86
17-May-22	82	84	83
18-May-22	88	88	88
19-May-22	64	66	65
20-May-22	84	86	85
21-May-22	66	68	67
22-May-22	66	68	67
23-May-22	64	66	65
24-May-22	64	66	65
25-May-22	77	77	77
26-May-22	75	77	76

Date	Meter No.X3 (cm)	Meter No.X4 (cm)	Average (cm)
27-May-22	64	66	65
28-May-22	77	79	78
29-May-22	77	79	78
30-May-22	64	66	65
31-May-22	82	82	82
1-Jun-22	73	75	74
2-Jun-22	75	75	75
3-Jun-22	75	75	75
4-Jun-22	70	70	70
5-Jun-22	70	70	70
6-Jun-22	70	73	72
7-Jun-22	66	66	66
8-Jun-22	67	70	69
9-Jun-22	57	64	61
10-Jun-22	88	93	91
11-Jun-22	57	64	61
12-Jun-22	57	64	61
13-Jun-22	77	84	81
14-Jun-22	82	86	84
15-Jun-22	57	64	61
16-Jun-22	66	70	68
17-Jun-22	70	75	73
18-Jun-22	66	73	70
19-Jun-22	66	73	70
20-Jun-22	68	73	71
21-Jun-22	64	70	67
22-Jun-22	86	90	88
23-Jun-22	77	84	81
24-Jun-22	66	70	68
25-Jun-22	68	73	71
26-Jun-22	68	73	71
27-Jun-22	82	86	84
28-Jun-22	64	70	67
29-Jun-22	84	88	86
30-Jun-22	64	66	65
<b>Average</b>	76	78	77
<b>Min</b>	57	62	61
<b>Max</b>	103	104	104

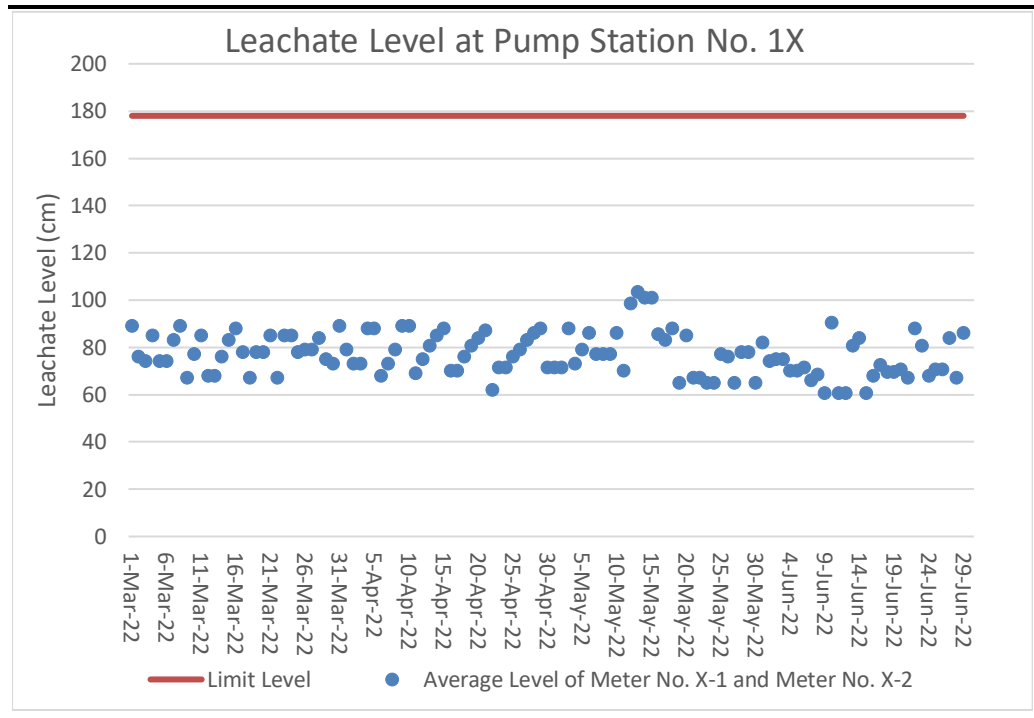
**Table F3.3 Leachate Levels Monitoring Results (Pump Station No.3X (Cell 3X))**

<b>Date</b>	<b>Meter No.X5 (cm)</b>	<b>Meter No.X6 (cm)</b>	<b>Average (cm)</b>
<b>Pump Station No. 3X (Cell 3X)</b>			
1-Apr-22	75	75	75
2-Apr-22	66	66	66
3-Apr-22	66	66	66
4-Apr-22	90	90	90
5-Apr-22	90	90	90
6-Apr-22	62	62	62
7-Apr-22	70	70	70
8-Apr-22	90	90	90
9-Apr-22	82	82	82
10-Apr-22	82	82	82
11-Apr-22	70	70	70
12-Apr-22	79	79	79
13-Apr-22	62	62	62
14-Apr-22	74	74	74
15-Apr-22	82	82	82
16-Apr-22	59	59	59
17-Apr-22	59	59	59
18-Apr-22	68	70	69
19-Apr-22	48	48	48
20-Apr-22	57	57	57
21-Apr-22	90	90	90
22-Apr-22	75	75	75
23-Apr-22	53	53	53
24-Apr-22	53	53	53
25-Apr-22	64	64	64
26-Apr-22	73	73	73
27-Apr-22	82	82	82
28-Apr-22	88	88	88
29-Apr-22	55	55	55
30-Apr-22	59	59	59
1-May-22	59	59	59
2-May-22	59	59	59
3-May-22	55	55	55
4-May-22	79	79	79
5-May-22	53	53	53
6-May-22	70	70	70
7-May-22	68	68	68
8-May-22	68	68	68
9-May-22	68	68	68
10-May-22	75	75	75
11-May-22	55	55	55
12-May-22	96	96	96
13-May-22	104	104	104
14-May-22	110	110	110
15-May-22	110	110	110
16-May-22	91	89	90
17-May-22	61	61	61
18-May-22	82	82	82
19-May-22	75	75	75
20-May-22	90	90	90
21-May-22	57	57	57
22-May-22	57	57	57
23-May-22	59	59	59
24-May-22	57	55	56
25-May-22	79	79	79
26-May-22	64	64	64

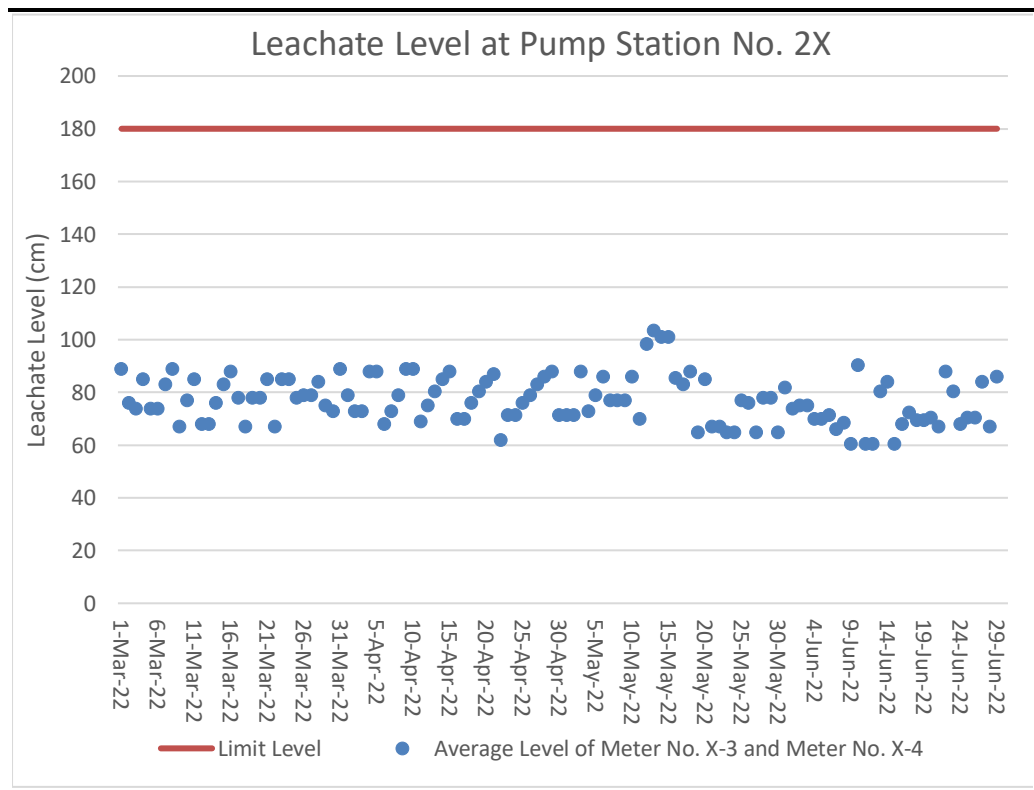


Date	Meter No.X5 (cm)	Meter No.X6 (cm)	Average (cm)
27-May-22	73	73	73
28-May-22	68	68	68
29-May-22	68	68	68
30-May-22	55	55	55
31-May-22	73	73	73
1-Jun-22	86	86	86
2-Jun-22	77	77	77
3-Jun-22	77	77	77
4-Jun-22	86	88	87
5-Jun-22	86	88	87
6-Jun-22	62	62	62
7-Jun-22	55	55	55
8-Jun-22	59	59	59
9-Jun-22	112	115	114
10-Jun-22	104	100	102
11-Jun-22	112	115	114
12-Jun-22	112	115	114
13-Jun-22	79	73	76
14-Jun-22	76	65	71
15-Jun-22	64	64	64
16-Jun-22	64	64	64
17-Jun-22	46	68	57
18-Jun-22	73	73	73
19-Jun-22	73	73	73
20-Jun-22	73	73	73
21-Jun-22	70	70	70
22-Jun-22	68	68	68
23-Jun-22	73	73	73
24-Jun-22	70	70	70
25-Jun-22	66	66	66
26-Jun-22	66	66	66
27-Jun-22	73	73	73
28-Jun-22	73	73	73
29-Jun-22	50	66	58
30-Jun-22	53	73	63
<b>Average</b>	73	73	73
<b>Min</b>	46	48	48
<b>Max</b>	112	115	114

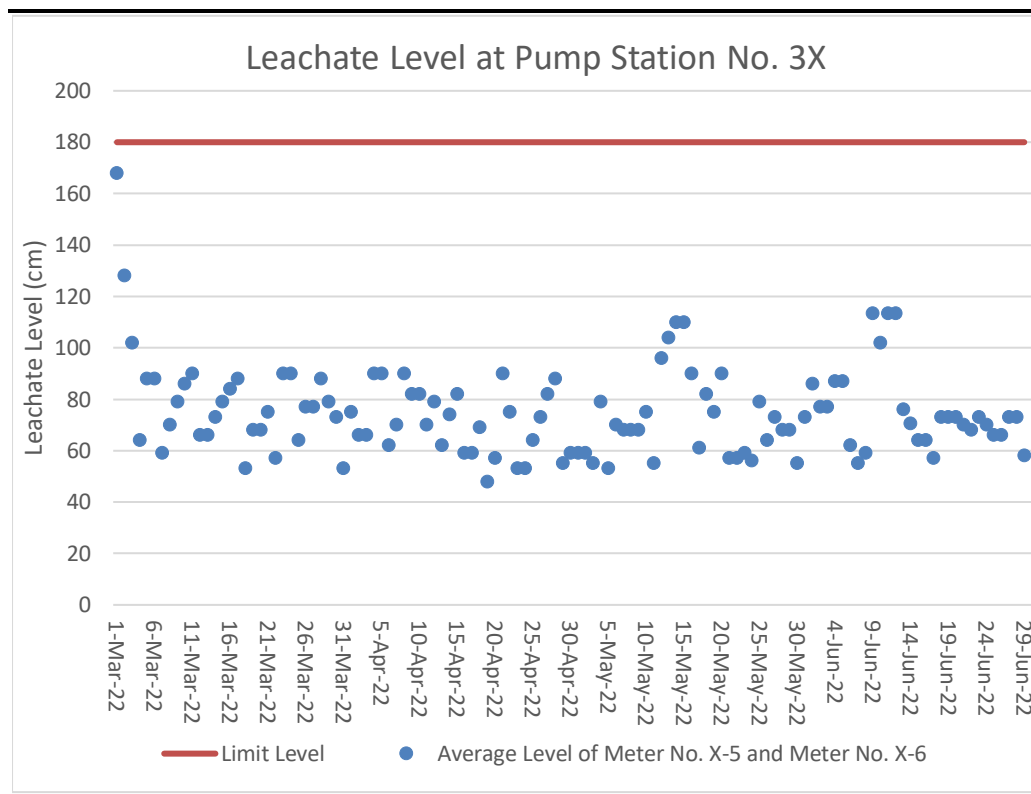
**Figure F3.1 Graphical Presentation for Leachate Levels Monitoring (Pump Station No.1X (Cell 1X))**



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



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



Annex F4

## Effluent Quality Monitoring Results

**Table F4.1 Effluent Monitoring Results**

		1 Apr 22	2 Apr 22	3 Apr 22	4 Apr 22	5 Apr 22	6 Apr 22	7 Apr 22	8 Apr 22	9 Apr 22	10 Apr 22	11 Apr 22
<b>On-site Measurements</b>												
Temperature	°C	28.7	21.2	22.6	27.8	26.7	28.6	29.9	32	26.8	27.4	30.9
pH Value	pH Unit	8.6	8.7	8.7	8.6	8.7	8.6	8.6	8.7	8.6	8.6	8.6
Volume Discharged	m³	952	1109	865	438	869	374	1285	695	88	299	443
<b>Laboratory Analysis</b>												
Suspended Solids (SS)	mg/L	30.6	56.4	52.6	21.8	37.3	20.4	26.4	23.5	19.1	53.6	32.7
Alkalinity	mg/L	2220	2180	2120	2230	2190	2340	2280	2280	2400	2350	2320
Ammoniacal-nitrogen	mg/L	0.3	0.26	0.3	0.52	0.3	0.47	0.31	0.31	0.39	0.94	0.58
Chloride	mg/L	2210	2070	1850	1930	1910	2010	2350	2380	2210	2560	2480
Nitrite-nitrogen	mg/L	0.17	0.19	0.14	0.45	0.21	0.45	0.21	0.19	0.38	0.26	0.47
Phosphate	mg/L	9.6	8.84	8.41	9.35	7.83	9.53	8.08	9.5	10.2	9.6	9.28
Sulphate	mg/L	151	147	123	123	133	121	150	152	144	152	155
Total Nitrogen	mg/L	103	116	127	119	113	93.9	103	98.4	91.7	108	99.2
Nitrate-nitrogen	mg/L	51	57.3	72.1	64.6	57.9	41.7	48.6	45.1	42.8	47.9	45.4
Total Inorganic Nitrogen	mg/L	51.47	57.75	72.54	65.57	58.41	42.62	49.12	45.6	43.57	49.1	46.45
Biochemical Oxygen Demand (BOD)	mg/L	14	14	33	9	15	9	10	10	6	12	9
Chemical Oxygen Demand (COD)	mg/L	1200	1140	1180	1180	1010	1040	1160	1230	1200	1350	1160
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	428	484	362	475	349	350	453	449	466	445	439
Boron	µg/L	5160	5030	5040	5150	5460	5650	5640	5540	5790	5790	5410
Calcium	mg/L	28.2	33.1	27.3	25.2	30.3	26.6	32.1	28.5	27.3	26	25.9
Iron	mg/L	1.71	1.77	1.6	1.63	1.68	1.79	2.11	2.09	2.04	2	2.05
Magnesium	mg/L	30	30.7	25.3	26.4	28	26.5	31.4	31	31.3	28.6	29.6
Potassium	mg/L	898	955	785	846	836	816	932	921	947	885	892
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	131	135	137	136	120	129	132	135	132	134	134
Copper	µg/L	<10	<10	44	<10	<10	<10	<10	<10	<10	24	<10
Nickel	µg/L	120	122	121	122	118	126	124	129	127	130	128
Zinc	µg/L	75	88	111	69	88	70	81	80	71	95	82

		12 Apr 22	13 Apr 22	14 Apr 22	15 Apr 22	16 Apr 22	17 Apr 22	18 Apr 22	19 Apr 22	20 Apr 22	21 Apr 22	22 Apr 22	23 Apr 22
<b>On-site Measurements</b>													
Temperature	°C	32.4	30.3	31.5	27.3	27.7	27.3	26.7	26.5	29.2	29	32	29.4
pH Value	pH Unit	8.6	8.5	8.6	8.5	8.5	8.6	8.6	8.6	8.7	8.6	9	8.5
Volume Discharged	m <sup>3</sup>	580	227	242	1225	1064	648	368	1001	265	337	815	1137
<b>Laboratory Analysis</b>													
Suspended Solids (SS)	mg/L	39.6	17.6	16.5	18.9	23.7	19.9	30.2	11.7	15.4	12.7	36.1	41
Alkalinity	mg/L	2320	2350	2430	2320	2360	2320	2360	2440	2440	2400	2410	2390
Ammoniacal-nitrogen	mg/L	0.34	0.82	0.46	0.38	0.4	0.31	0.37	0.34	0.35	0.51	0.24	0.2
Chloride	mg/L	2120	2110	2120	2150	2190	2160	2190	2160	2220	2170	2620	2510
Nitrite-nitrogen	mg/L	0.18	0.61	0.55	0.22	0.23	0.23	0.32	0.21	0.21	0.46	0.17	0.17
Phosphate	mg/L	8.93	9.23	9.9	8.98	8.87	8.94	8.92	8.85	8.98	9.02	9.58	9.21
Sulphate	mg/L	161	157	144	164	154	144	144	136	140	130	140	142
Total Nitrogen	mg/L	101	96.4	84.6	95	97.8	110	105	87.4	83.1	79	85.1	89.2
Nitrate-nitrogen	mg/L	45.1	42.8	34.8	42.7	46.8	55	53.7	36.6	32.7	31.1	33.1	34.5
Total Inorganic Nitrogen	mg/L	45.62	44.23	35.81	43.3	47.43	55.54	54.39	37.15	33.26	32.07	33.51	34.87
Biochemical Oxygen Demand (BOD)	mg/L	14	5	6	12	10	10	8	7	6	10	5	5
Chemical Oxygen Demand (COD)	mg/L	1210	1090	1070	1230	1150	1120	1070	1070	1040	1120	1160	1150
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	457	420	553	426	431	409	530	441	425	438	439	391
Boron	µg/L	5940	6110	5640	5660	5900	5980	6080	6080	5830	5700	5630	5700
Calcium	mg/L	25	26.1	22.2	24.5	22.8	21.5	20.6	19.9	21.5	21.8	23	23.3
Iron	mg/L	2	2.29	2.05	2.29	2.21	2.04	1.92	2.05	1.95	1.92	2.06	2.19
Magnesium	mg/L	32	32.9	31.1	32.8	33.8	33.3	33.8	32.6	31.6	32.2	31.6	34.6
Potassium	mg/L	911	920	916	908	926	936	954	922	908	914	891	970
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	138	134	140	139	139	140	139	141	140	137	136	140
Copper	µg/L	40	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	47
Nickel	µg/L	131	133	136	132	133	136	134	139	128	126	127	132
Zinc	µg/L	97	84	79	93	91	91	80	86	80	80	74	96

		24 Apr 22	25 Apr 22	26 Apr 22	27 Apr 22	28 Apr 22	29 Apr 22	30 Apr 22
<b>On-site Measurements</b>								
Temperature	°C	32.1	33.6	35.3	35.2	33.9	33.6	29.9
pH Value	pH Unit	8.6	8.5	8.5	8.4	8.4	8.4	8.4
Volume Discharged	m <sup>3</sup>	627	244	757	216	277	218	806
<b>Laboratory Analysis</b>								
Suspended Solids (SS)	mg/L	52.8	12	30.7	16	16.3	14.6	27.5
Alkalinity	mg/L	2400	2450	2430	2400	2400	2380	2410
Ammoniacal-nitrogen	mg/L	0.29	0.54	0.34	0.36	0.56	0.5	0.22
Chloride	mg/L	2480	2390	2200	2230	2080	2180	2300
Nitrite-nitrogen	mg/L	0.19	0.4	0.18	0.19	0.63	0.49	0.3
Phosphate	mg/L	9.32	9.44	9.07	9.14	8.73	9.06	9.35
Sulphate	mg/L	153	139	145	149	143	146	150
Total Nitrogen	mg/L	96.1	90.5	92.4	92.5	90.9	97.3	96.4
Nitrate-nitrogen	mg/L	39.2	37.3	39.8	40.9	41.4	44.3	44.4
Total Inorganic Nitrogen	mg/L	39.68	38.24	40.32	41.45	42.59	45.29	44.92
Biochemical Oxygen Demand (BOD)	mg/L	10	4	7	8	6	9	10
Chemical Oxygen Demand (COD)	mg/L	1040	1150	1200	1150	1110	1070	1080
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	466	382	356	382	394	396	374
Boron	µg/L	5520	5680	5980	5650	5620	5860	5850
Calcium	mg/L	21.2	22.5	23.7	24.1	23.4	23.4	22.8
Iron	mg/L	1.95	1.81	1.91	1.81	1.84	1.86	1.8
Magnesium	mg/L	32.5	31.6	35.2	33.6	32.3	33.4	33.2
Potassium	mg/L	914	924	1000	958	924	949	942
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	137	130	134	135	134	132	130
Copper	µg/L	53	<10	<10	<10	19	<10	<10
Nickel	µg/L	131	123	131	125	124	124	122
Zinc	µg/L	105	69	76	77	86	76	77

		1 May 22	2 May 22	3 May 22	4 May 22	5 May 22	6 May 22	7 May 22	8 May 22	9 May 22	10 May 22	11 May 22
<b>On-site Measurements</b>												
Temperature	°C	27.1	21.5	27.8	29.4	30.2	27.7	27.7	31.0	30.2	29.3	27.2
pH Value	pH Unit	8.4	8.4	8.4	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.2
Volume Discharged	m <sup>3</sup>	970	948	665	196	130	235	976	1,219	456	390	767
<b>Laboratory Analysis</b>												
Suspended Solids (SS)	mg/L	26.6	52.0	49.8	14.5	11.1	10.9	11.5	26.8	17.0	10.5	14.8
Alkalinity	mg/L	2490	2390	2230	2250	2240	2260	2210	2320	2310	2320	2330
Ammoniacal-nitrogen	mg/L	0.27	0.26	0.33	0.29	0.34	0.28	0.30	0.27	0.23	0.30	0.44
Chloride	mg/L	2440	2380	2150	2070	2020	2140	2200	2140	2420	2300	1980
Nitrite-nitrogen	mg/L	0.19	0.15	0.23	0.21	0.28	0.26	0.28	0.16	0.17	0.28	0.21
Phosphate	mg/L	8.91	8.73	8.28	8.11	7.95	8.30	8.43	8.38	7.73	7.87	7.84
Sulphate	mg/L	143	151	143	143	144	124	142	131	127	131	150
Total Nitrogen	mg/L	80.1	89.1	94.9	95.1	87.2	97.6	88.0	71.2	81.1	80.4	76.0
Nitrate-nitrogen	mg/L	30.0	36.4	43.4	45.8	40.3	40.4	37.8	19.3	28.6	27.0	27.2
Total Inorganic Nitrogen	mg/L	30.46	36.81	43.96	46.30	40.92	40.94	38.38	19.73	29.00	27.58	27.85
Biochemical Oxygen Demand (BOD)	mg/L	9	11	7	11	4	5	8	8	9	10	5
Chemical Oxygen Demand (COD)	mg/L	1130	1100	978	971	863	935	989	836	980	941	1030
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	381	384	353	340	385	379	464	404	4340	407	405
Boron	µg/L	5790	5660	5940	5240	5090	5240	5170	5460	5660	5820	5540
Calcium	mg/L	23.3	22.0	24.3	27.9	30.0	28.3	28.1	28.3	27.5	27.1	25.3
Iron	mg/L	1.92	1.86	1.72	1.72	1.66	1.78	1.75	1.94	1.88	1.87	1.77
Magnesium	mg/L	35.0	31.1	30.9	30.1	31.6	34.5	34.5	35.6	38.2	37.3	32.1
Potassium	mg/L	951	874	851	824	860	842	826	838	902	880	882
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	133	133	124	123	118	123	121	138	137	137	130
Copper	µg/L	<10	40	40	<10	<10	<10	<10	<10	<10	<10	<10
Nickel	µg/L	127	124	114	111	107	111	108	124	129	126	122
Zinc	µg/L	79	100	129	88	84	83	81	75	72	72	68



		12 May 22	13 May 22	14 May 22	15 May 22	16 May 22	17 May 22	18 May 22	19 May 22	20 May 22	21 May 22	22 May 22	23 May 22
<b>On-site Measurements</b>													
Temperature	°C	30.4	33.0	29.0	22.8	28.1	33.5	33.5	34.9	32.4	32.1	28.4	34.4
pH Value	pH Unit	8.3	8.1	8.0	8.0	8.1	7.9	7.8	8.0	7.8	8.0	7.9	7.9
Volume Discharged	m³	1,479	1,496	1,495	1,495	1,496	1,492	1,496	1,496	1,495	1,490	1,495	1,496
<b>Laboratory Analysis</b>													
Suspended Solids													
(SS)	mg/L	22.8	17.3	14.7	47.8	4.2	18.0	20.7	24.1	23.2	22.7	30.2	53.4
Alkalinity	mg/L	1950	1610	1270	1060	937	856	766	767	784	783	816	962
Ammoniacal-													
nitrogen	mg/L	0.54	0.36	0.39	0.35	0.36	0.61	0.58	0.64	0.47	0.57	0.01	0.40
Chloride	mg/L	1760	1510	1190	1190	1100	863	857	925	924	889	1270	1160
Nitrite-nitrogen	mg/L	0.13	0.13	0.26	0.07	0.09	0.06	0.08	0.05	0.04	<0.10	<0.10	<0.10
Phosphate	mg/L	6.56	4.69	2.90	1.61	0.79	0.47	0.20	0.57	0.92	0.99	1.02	1.95
Sulphate	mg/L	181	230	320	429	455	492	604	634	632	650	627	548
Total Nitrogen	mg/L	70.8	88.0	95.5	136.0	100.0	110.0	108.0	105.0	100.0	96.1	107.0	127.0
Nitrate-nitrogen	mg/L	25.2	39.8	48.4	53.9	61.0	64.4	64.9	62.6	59.7	57.4	68.4	81.8
Total Inorganic													
Nitrogen	mg/L	25.87	40.29	49.05	54.32	61.45	65.07	65.56	63.29	60.21	58.07	68.51	82.30
Biochemical Oxygen													
Demand (BOD)	mg/L	7	13	14	12	9	4	8	8	8	8	9	11
Chemical Oxygen													
Demand (COD)	mg/L	802	762	629	576	516	436	424	410	427	444	495	615
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic													
Carbon (TOC)	mg/L	335	297	272	229	211	182	163	177	151	171	192	220
Boron	µg/L	4540	4140	3550	3180	2880	2570	2580	2600	2840	2680	2740	3190
Calcium	mg/L	44.1	61.6	96.8	133.0	158.0	183.0	182.0	188.0	200.0	176.0	156.0	135.0
Iron	mg/L	1.53	1.20	1.49	0.81	0.61	0.63	0.50	0.49	0.52	0.47	0.58	0.87
Magnesium	mg/L	26.3	26.6	26.0	30.0	32.9	36.8	35.8	37.3	39.4	35.8	35.7	35.1
Potassium	mg/L	679	603	505	465	423	417	365	384	395	359	402	471
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	114	96	78	68	59	57	51	53	50	48	56	65
Copper	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	11
Nickel	µg/L	104	88	70	58	50	45	38	37	36	34	47	56
Zinc	µg/L	79	81	71	66	62	63	56	56	56	55	72	93

		24 May 22	25 May 22	26 May 22	27 May 22	28 May 22	29 May 22	30 May 22	31 May 22
<b>On-site Measurements</b>									
Temperature	°C	29.1	28.6	31.5	30.5	32.6	31.5	33.6	32.5
pH Value	pH Unit	8.0	8.1	8.3	8.2	8.2	8.3	8.3	8.4
Volume Discharged	m <sup>3</sup>	1,434	1,275	1,186	798	569	1,046	1,035	1,160
<b>Laboratory Analysis</b>									
Suspended Solids									
(SS)	mg/L	37.5	35.2	44	44	79.8	67.2	40.2	34.6
Alkalinity	mg/L	1130	1270	1360	1430	1490	1490	1660	1750
Ammoniacal-									
nitrogen	mg/L	0.43	0.38	0.37	0.3	0.75	0.24	0.22	0.59
Chloride	mg/L	1200	1300	1400	1500	1570	1750	1880	1730
Nitrite-nitrogen	mg/L	0.10	0.13	0.07	0.13	0.31	0.12	0.12	0.11
Phosphate	mg/L	2.53	2.56	2.83	3.13	4.93	5.05	5.23	5.75
Sulphate	mg/L	527	508	400	377	338	342	290	275
Total Nitrogen	mg/L	117.0	102.0	90.9	98.9	104.0	96.8	98.1	101.0
Nitrate-nitrogen	mg/L	67.5	46.2	41.5	43.6	52.7	45.6	48.7	51.5
Total Inorganic									
Nitrogen	mg/L	68.03	46.71	41.94	44.03	53.76	45.96	49.04	52.20
Biochemical Oxygen									
Demand (BOD)	mg/L	9	10	9	9	17	13	10	10
Chemical Oxygen									
Demand (COD)	mg/L	632	748	682	825	856	790	883	922
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic									
Carbon (TOC)	mg/L	247	278	271	298	298	315	329	336
Boron	µg/L	3320	3770	3670	3810	4160	3800	4460	4600
Calcium	mg/L	118.0	121.0	109	98.6	87.2	81.2	65.4	57.8
Iron	mg/L	0.96	1.20	1.28	1.43	1.41	1.34	1.32	1.28
Magnesium	mg/L	32.3	35.5	34.5	34.4	33.5	29.2	27.8	27
Potassium	mg/L	499	576	591	647	674	644	693	712
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	68	76	79	80	86	88	89	94
Copper	µg/L	<10	<10	11	14	23	17	13	11
Nickel	µg/L	61	70	73	77	81	88	96	101
Zinc	µg/L	98	102	105	129	168	116	104	99

		1 Jun 22	2 Jun 22	3 Jun 22	4 Jun 22	5 Jun 22	6 Jun 22	7 Jun 22	8 Jun 22	9 Jun 22	10 Jun 22	11 Jun 22
<b>On-site Measurements</b>												
Temperature	°C	34.8	34.3	34.2	36.6	33.1	31.1	33.8	31.2	29.4	29.4	29.4
pH Value	pH Unit	8.4	8.4	8.4	8.4	8.5	8.5	8.4	8.4	8.3	8.3	8.3
Volume Discharged	m³	1,048	1,027	990	1,200	1,136	1,133	1,091	1,496	1,495	1,496	1,495
<b>Laboratory Analysis</b>												
Suspended Solids (SS)	mg/L	39.9	30.1	23.3	109.0	14.1	16.2	19.2	28.0	33.7	307.0	23.7
Alkalinity	mg/L	1760	1810	1820	1900	2010	2010	2050	1970	1550	1610	1260
Ammoniacal-nitrogen	mg/L	0.45	0.33	0.41	0.48	0.42	0.35	0.28	0.31	0.25	0.43	0.40
Chloride	mg/L	1830	1970	1910	1940	1950	1900	1830	1700	1650	1710	1360
Nitrite-nitrogen	mg/L	0.13	0.14	0.14	0.13	0.14	0.15	0.16	0.14	0.12	0.13	0.08
Phosphate	mg/L	5.93	5.79	5.92	6.14	6.71	6.85	7.05	5.88	5.49	4.76	2.89
Sulphate	mg/L	228	228	227	198	194	177	174	156	208	214	321
Total Nitrogen	mg/L	111.0	115.0	118.0	110.0	74.7	127.0	126.0	101.0	112.0	136.0	102.0
Nitrate-nitrogen	mg/L	57	65.2	64.7	52.7	59.2	68.6	69.6	57.9	64.6	68.7	55.6
Total Inorganic Nitrogen	mg/L	57.58	65.67	65.25	53.31	59.76	69.10	70.04	58.35	64.97	69.26	56.08
Biochemical Oxygen Demand (BOD)	mg/L	6	7	8	24	10	9	7	9	7	38	8
Chemical Oxygen Demand (COD)	mg/L	910	930	906	1010	966	1080	934	957	836	1020	689
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic Carbon (TOC)	mg/L	329	345	355	414	388	390	400	400	314	329	258
Boron	µg/L	3980	4430	4430	5060	5170	4960	5010	5030	3480	3720	3230
Calcium	mg/L	47.5	44.4	43.8	38.7	41.3	39.1	32.8	31.8	43.0	43.8	59.4
Iron	mg/L	1.40	1.40	1.38	1.66	1.49	1.58	1.59	1.61	1.33	1.76	1.03
Magnesium	mg/L	25.6	24.6	25.3	25.0	25.4	25.0	23.5	22.4	22.2	23.2	23.8
Potassium	mg/L	703	712	725	788	828	846	816	790	689	709	587
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	102	103	104	119	126	124	126	113	92	113	81
Copper	µg/L	11	11	11	10	<10	10	<10	<10	<10	50	<10
Nickel	µg/L	103	105	105	114	121	118	118	109	87	97	74
Zinc	µg/L	102	102	100	112	98	94	87	108	86	161	79

		12 Jun 22	13 Jun 22	14 Jun 22	15 Jun 22	16 Jun 22	17 Jun 22	18 Jun 22	19 Jun 22	20 Jun 22	21 Jun 22	22 Jun 22	23 Jun 22
<b>On-site Measurements</b>													
Temperature	°C	35.0	31.7	32.4	35.1	33.0	34.6	29.0	31.9	34.1	35.7	35.1	37.7
pH Value	pH Unit	8.2	8.3	8.2	8.1	8.1	8.1	8.5	8.2	8.2	8.2	8.3	8.3
Volume Discharged	m³	1,495	1,496	1,495	1,495	1,347	1,033	1,108	1,152	1,177	1,107	1,048	1,043
<b>Laboratory Analysis</b>													
Suspended Solids													
(SS)	mg/L	19.0	11.2	16.7	18.7	20.6	21.6	11.2	24.0	12.8	20.5	18.6	15.3
Alkalinity	mg/L	917	847	706	626	680	676	765	911	545	1210	1430	1510
Ammoniacal-													
nitrogen	mg/L	0.26	0.42	0.46	0.50	0.77	0.53	0.31	0.49	0.31	0.40	0.39	0.25
Chloride	mg/L	1070	999	930	941	831	863	975	1170	633	1380	1500	1570
Nitrite-nitrogen	mg/L	0.09	0.07	0.11	0.14	0.10	0.08	0.05	0.08	0.12	0.11	0.11	0.11
Phosphate	mg/L	1.80	1.48	1.34	1.21	1.25	1.38	1.40	1.60	1.28	2.49	2.21	2.70
Sulphate	mg/L	394	419	472	478	491	477	517	412	219	336	322	313
Total Nitrogen	mg/L	90.1	87.3	98.7	103.0	109.0	108.0	119.0	132.0	74.8	133.0	114.0	113.0
Nitrate-nitrogen	mg/L	52.7	51.5	65.4	67.9	72.9	76.1	76.8	94.4	51.1	89.6	69.8	67.6
Total Inorganic													
Nitrogen	mg/L	53.05	51.99	65.97	68.54	73.77	76.71	77.16	94.97	51.53	90.11	70.30	67.96
Biochemical Oxygen													
Demand (BOD)	mg/L	7	6	7	6	7	7	7	9	6	12	10	7
Chemical Oxygen													
Demand (COD)	mg/L	509	427	464	431	537	463	524	563	316	774	761	774
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Organic													
Carbon (TOC)	mg/L	198	201	166	163	192	203	222	256	129	306	328	310
Boron	µg/L	2420	2320	2430	2250	2810	2910	3050	3370	2000	4110	4290	4480
Calcium	mg/L	86.6	91.8	80.7	78.8	69.2	72.5	66.6	57.3	40.5	48.2	45.5	42.1
Iron	mg/L	0.71	0.58	0.55	0.60	0.67	0.73	0.80	1.04	0.66	1.44	1.50	1.53
Magnesium	mg/L	28.7	29.3	27.6	28.0	26.2	28.8	28.3	25.8	15.2	26.0	26.4	23.7
Potassium	mg/L	483	450	418	403	427	436	458	487	311	624	664	677
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	59	54	51	51	56	57	58	72	41	87	89	97
Copper	µg/L	19	15	<10	<10	<10	15	<10	19	21	<10	<10	<10
Nickel	µg/L	51	46	43	41	45	48	51	66	40	82	85	92
Zinc	µg/L	85	59	55	55	66	91	77	109	48	89	88	87

		24 Jun 22	25 Jun 22	26 Jun 22	27 Jun 22	28 Jun 22	29 Jun 22	30 Jun 22
<b>On-site Measurements</b>								
Temperature	°C	35.0	34.4	35.1	36.1	31.9	34.6	30.2
pH Value	pH Unit	8.2	8.4	8.3	8.3	8.4	8.3	8.4
Volume Discharged	m³	1,098	677	34	44	44	49	708
<b>Laboratory Analysis</b>								
Suspended Solids								
(SS)	mg/L	16.1	50.2	13.4	6.5	15.2	12.2	22.5
Alkalinity	mg/L	1540	1720	1670	1790	1760	1800	1790
Ammoniacal-								
nitrogen	mg/L	0.36	0.33	0.28	1.04	0.51	0.98	0.75
Chloride	mg/L	1610	1650	1640	1750	1710	1770	1670
Nitrite-nitrogen	mg/L	0.13	0.12	0.12	0.56	1.05	0.97	0.7
Phosphate	mg/L	2.75	3.53	2.92	3.58	3.69	3.52	4.24
Sulphate	mg/L	335	337	284	318	305	291	291
Total Nitrogen	mg/L	111.0	109.0	114.0	96.8	99.4	98.8	99.4
Nitrate-nitrogen	mg/L	67.8	57.7	64.2	48.5	47.6	46	46.8
Total Inorganic								
Nitrogen	mg/L	68.29	58.15	64.60	50.10	49.16	47.95	48.25
Biochemical Oxygen								
Demand (BOD)	mg/L	6	14	12	12	6	8	8
Chemical Oxygen								
Demand (COD)	mg/L	942	1040	983	955	839	876	847
Oil & Grease	mg/L	<5	<5	<5	<5	<5	<5	<5
Total Organic								
Carbon (TOC)	mg/L	322	327	335	347	558	340	342
Boron	µg/L	4370	4970	4370	4480	4480	4600	4810
Calcium	mg/L	42.2	38.5	40.9	40.6	40.8	40.8	38.8
Iron	mg/L	1.45	1.65	1.62	1.72	1.82	1.95	1.76
Magnesium	mg/L	24.7	24.3	25.4	26.5	26.9	27.3	24.1
Potassium	mg/L	706	734	751	787	786	836	760
Cadmium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chromium	µg/L	98	110	109	107	107	106	104
Copper	µg/L	<10	17	<10	<10	<10	<10	<10
Nickel	µg/L	91	101	99	99	104	103	96
Zinc	µg/L	89	112	84	82	84	92	93

Annex F5

## Groundwater Monitoring Results

**Table F5.1 Groundwater Monitoring Results (April 2022)**

Parameters	Units	MWX-1	MWX-2	MWX-3	MWX-4	MWX-5	MWX-6	MWX-7	MWX-8	MWX-9	MWX-10	MWX-11	MWX-12	MWX-13	MWX-14
Water Level	mPD	2.41	2.53	2.49	2.52	2.51	2.48	2.24	2.37	2.45	2.36	2.72	6.16	35.09	40.74
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	132	328	123	<1	<1	<1	70	<1	89	204	239	57	15	11
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<1	<1	<1	93	101	157	4	109	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO <sub>3</sub>	mg/L	132	328	123	121	129	189	74	120	89	204	239	57	15	11
pH Value	pH Unit	8	8.1	8	11	11.1	11.3	8.4	10.7	8.1	7.9	8.1	7.1	5.5	5.3
Electrical Conductivity	µS/cm	905	972	1150	1010	1330	1240	3030	1700	1590	1890	977	326	98	104
Ammonia as N	mg/L	0.15	<0.01	1.45	5.2	4.71	4.14	6.32	7.74	1.89	0.02	0.16	<0.01	0.01	<0.01
Chloride	mg/L	150	35	197	190	214	173	798	331	300	292	88	21	14	17
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.01	0.01	0.01	0.05	0.01	<0.01
Sulphate as SO <sub>4</sub> - Turbidimetric	mg/L	69	135	90	58	131	92	42	179	210	287	114	59	3	5
Sulphide as S <sub>2</sub>	mg/L	0.2	<0.1	<0.1	7.3	8.7	9.1	0.7	4.9	0.2	<0.1	0.1	0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	0.1	1.7	5.8	4.9	5	6.4	8.1	2.1	0.2	0.3	<0.1	<0.1	<0.1
Nitrate as N	mg/L	<0.01	0.68	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.09	0.07
Total Nitrogen as N	mg/L	0.2	0.8	1.7	5.8	4.9	5	6.4	8.1	2.1	0.2	0.3	<0.1	0.2	0.1
Boron	µg/L	120	220	200	170	180	180	670	170	290	210	70	20	10	10
Calcium	mg/L	47.7	69.8	73	49.9	47.2	35	31	30.5	82	144	117	28.1	0.8	1.07
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	7.07	58.6	4.13	<0.05	<0.05	<0.05	14.5	<0.05	6.12	11.3	8.17	4.16	0.86	0.8
Sodium	mg/L	102	42.7	126	125	174	173	477	260	235	244	63.6	28	13.9	13.8
Iron	mg/L	0.12	<0.04	0.18	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.45	<0.04	<0.04
Potassium	mg/L	20.1	11.6	27.3	32.7	57.8	57.5	47.5	63.8	34.7	17.3	12.1	3.34	4.24	3.7
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	2	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	2	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	890	359	895	<1	<1	<1	9	<1	41	985	814	764	38	14
Nickel	µg/L	<1	<1	<1	1	2	2	<1	4	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	1070	68	18
Biochemical Oxygen Demand	mg/L	<2	<2	2	2	3	6	<2	2	2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	5	4	15	40	43	60	10	36	16	12	6	5	12	<2
Total Organic Carbon	mg/L	4	5	12	9	10	12	5	12	7	8	5	3	5	2

**Table F5.2 Groundwater Monitoring Results (May 2022)**

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	3.38	3.32	3.59	3.63	3.70	2.36	2.27	2.37	2.46	4.72	4.77	5.96	35.15	40.87
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	95	147	163	<1	34	<1	70	<1	52	202	138	56	15	12
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<1	<1	<1	86	<1	98	6	73	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO <sub>3</sub>	mg/L	95	147	163	123	69	209	76	110	52	202	138	56	15	12
pH Value	pH Unit	8.0	7.9	7.8	11.0	9.6	11.4	8.5	10.7	7.8	7.5	7.7	6.7	5.7	5.6
Electrical Conductivity	µS/cm	459	12600	1070	907	941	1510	3060	1850	2840	1580	566	339	101	106
Ammonia as N	mg/L	0.06	3.46	0.91	2.59	0.70	3.82	5.83	7.41	0.59	0.01	<0.01	0.01	0.03	0.06
Chloride	mg/L	50	4140	144	126	125	185	740	342	486	250	45	22	15	17
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	0.33	<0.01	<0.01	<0.01	1.36	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.03	0.02	0.08	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.02	<0.01	0.04	<0.01	<0.01
Sulphate as SO <sub>4</sub> - Turbidimetric	mg/L	36	433	102	65	127	89	41	170	558	168	54	58	3	5
Sulphide as S <sub>2</sub>	mg/L	<0.1	<0.1	<0.1	4.4	0.9	8.2	1.4	3.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	3.5	1.0	2.7	1.0	5.4	6.7	8.7	<10.0	0.1	0.1	0.1	0.1	<0.1
Nitrate as N	mg/L	0.07	0.01	0.77	0.01	0.38	<0.01	<0.01	<0.01	21.6	0.02	0.36	<0.01	0.09	0.05
Total Nitrogen as N	mg/L	0.2	3.6	1.8	2.7	1.7	5.4	6.7	8.7	26.4	0.2	0.5	0.1	0.2	0.1
Boron	µg/L	70	1460	240	200	200	170	710	180	340	310	100	30	20	20
Calcium	mg/L	25.4	144	80	36.6	20.9	54.5	30.5	29.9	200	102	58.6	27	0.77	1.19
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	3.25	178.00	4.29	0.11	0.36	<0.05	14.8	<0.05	3.39	8.13	3.46	4.25	0.93	0.84
Sodium	mg/L	46.0	2110.0	100.0	103.0	117.0	161.0	457.0	266.0	316.0	174.0	35.3	24.7	13.4	14.2
Iron	mg/L	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.50	<0.04	<0.04
Potassium	mg/L	12.70	79.90	24.50	27.70	47.60	57.40	46.40	68.70	58.40	17.20	7.90	2.84	3.79	3.64
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	2	<1	<1	<1	2	1	1	<1	2	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	334	609	731	2	2	<1	11	<1	66	405	8	771	18	8
Nickel	µg/L	<1	<1	<1	<1	<1	2	<1	4	1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	<10	<10	<10	<10	<10	<10	28	12	<10	<10	20	56	14
Biochemical Oxygen Demand	mg/L	<2	<2	<2	6	<2	3	<2	<2	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	5	<20	12	24	15	44	10	35	32	17	4	<2	<2	<2
Total Organic Carbon	mg/L	4	<10	7	8	8	14	6	13	15	6	6	2	3	3



**Table F5.3 Groundwater Monitoring Results (June 2022)**

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	3.63	3.70	3.86	3.87	3.95	4.05	3.47	3.68	4.73	4.87	4.91	6.73	37.29	45.18
Bicarbonate Alkalinity as CaCO <sub>3</sub>	mg/L	95	192	172	<1	52	<1	16	<1	175	180	123	55	14	8
Carbonate Alkalinity as CaCO <sub>3</sub>	mg/L	<1	<1	<1	71	14	110	47	79	<1	<1	<1	<1	<1	<1
Total Alkalinity as CaCO <sub>3</sub>	mg/L	95	192	172	93	66	160	63	106	175	180	123	55	14	8
pH Value	pH Unit	7.9	8.0	7.9	10.9	8.9	11.2	9.7	10.6	8.2	7.7	7.6	6.3	5.4	5.2
Electrical Conductivity	µS/cm	466	6860	1140	992	826	1310	2280	3100	14600	1440	411	341	100	107
Ammonia as N	mg/L	0.13	2.16	1.32	2.20	0.32	3.35	5.76	13.0	0.37	0.02	<0.01	0.02	0.01	<0.01
Chloride	mg/L	55	2160	184	180	119	212	714	1010	5260	252	33	22	15	19
Nitrite as N	mg/L	<0.01	0.02	<0.01	0.16	0.43	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Reactive Phosphorus as P	mg/L	0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.02	0.01	0.06	0.02	<0.01	0.05	0.01	<0.01
Sulphate as SO <sub>4</sub> - Turbidimetric	mg/L	42	269	125	116	131	131	66	37	911	192	36	61	2	2
Sulphide as S <sub>2</sub>	mg/L	<0.1	<0.1	<0.1	2.9	<0.1	4.3	1.8	14.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen as N	mg/L	0.2	2.2	1.8	2.5	0.8	4.1	6.4	13.8	0.5	0.1	0.2	<0.1	<0.1	<0.1
Nitrate as N	mg/L	0.01	0.14	0.02	0.02	1.02	0.13	<0.01	<0.01	0.01	<0.01	0.31	<0.01	0.12	0.11
Total Nitrogen as N	mg/L	0.2	2.4	1.8	2.7	2.2	4.2	6.4	13.8	0.5	0.1	0.5	<0.1	0.2	0.1
Boron	µg/L	80	900	160	190	190	180	470	490	2940	210	70	20	10	10
Calcium	mg/L	32.2	97.8	86.3	39.7	18.6	31.8	27.2	63.9	94.4	101	43.7	27.7	0.88	1.01
Mercury	µg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Magnesium	mg/L	3.63	107	5.96	0.9	0.38	<0.05	1.37	0.25	233	9.66	2.69	4.21	0.94	0.94
Sodium	mg/L	47.3	1160	109	124	110	158	394	540	2540	158	26.3	27	13	13.2
Iron	mg/L	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.41	<0.04	<0.04
Potassium	mg/L	13.6	52.8	26.9	29.9	46.1	57.1	60.1	56.9	124	13.7	6.39	2.9	3.87	3.82
Cadmium	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<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	2	<1	<1	<1	<1	<1	<1	<1	1	<1
Lead	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Manganese	µg/L	419	511	1000	1	<1	<1	<1	<1	238	310	7	791	18	8
Nickel	µg/L	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	µg/L	<10	162	<10	<10	<10	<10	11	<10	<10	<10	<10	609	<10	10
Biochemical Oxygen Demand	mg/L	<2	2	<2	<2	<2	<2	<2	3	<2	<2	<2	<2	<2	<2
Chemical Oxygen Demand	mg/L	4	29	19	18	16	29	24	47	68	8	<2	3	5	2
Total Organic Carbon	mg/L	4	7	10	7	7	12	7	11	7	7	4	4	5	4

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

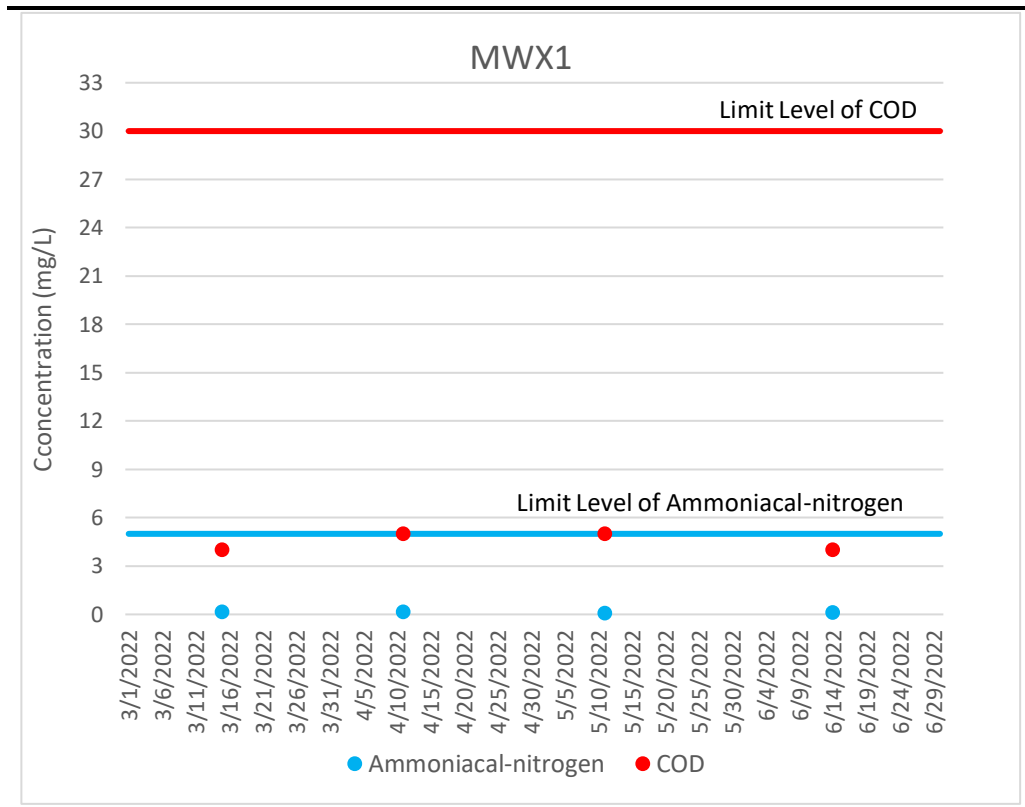


Figure F5.2 Graphical Presentation for Groundwater Monitoring (MWX-2)

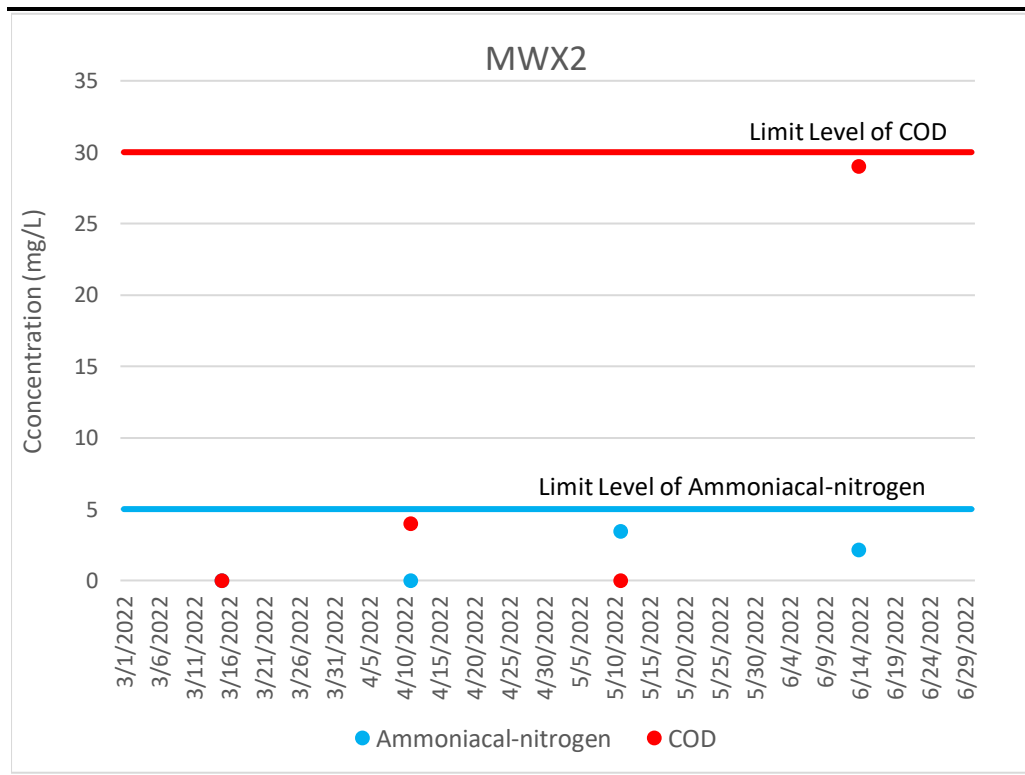


Figure F5.3 Graphical Presentation for Groundwater Monitoring (MWX-3)

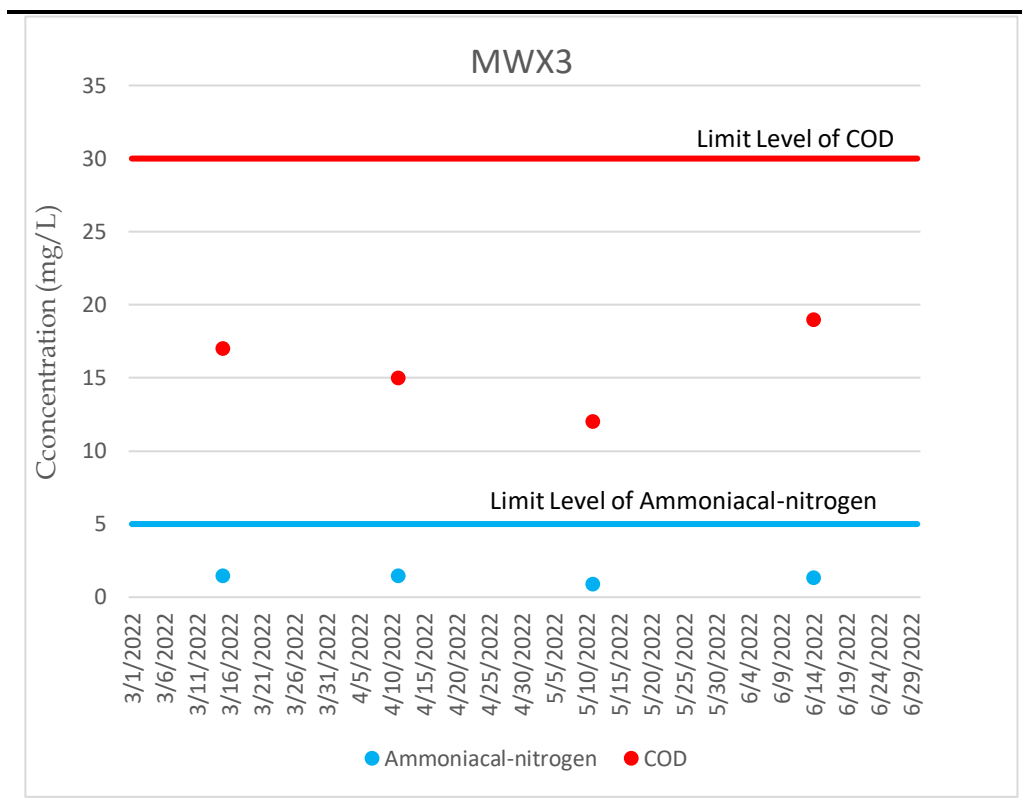


Figure F5.4 Graphical Presentation for Groundwater Monitoring (MWX-4)

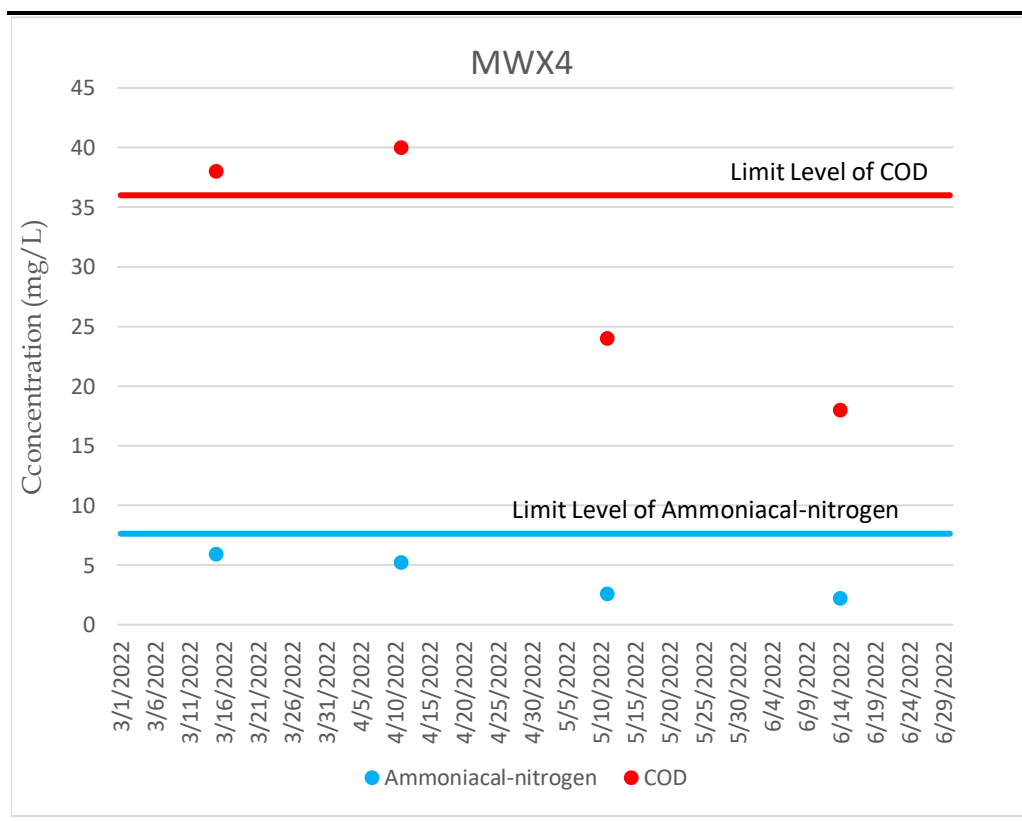


Figure F5.5 Graphical Presentation for Groundwater Monitoring (MWX-5)

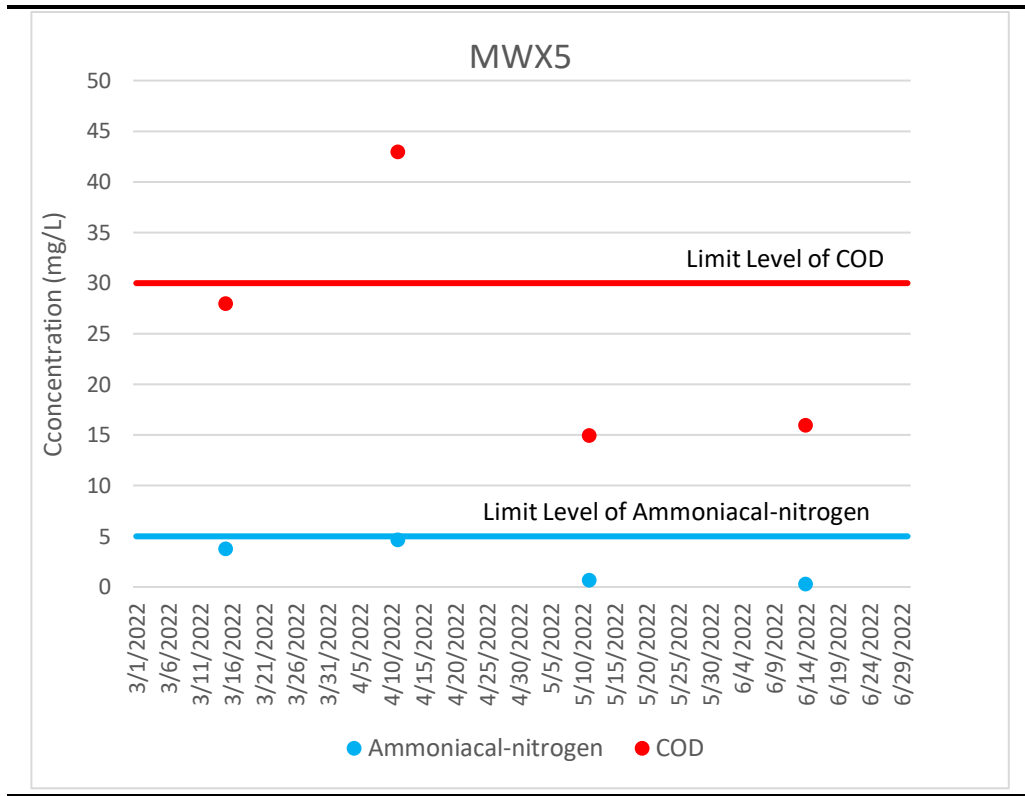


Figure F5.6 Graphical Presentation for Groundwater Monitoring (MWX-6)

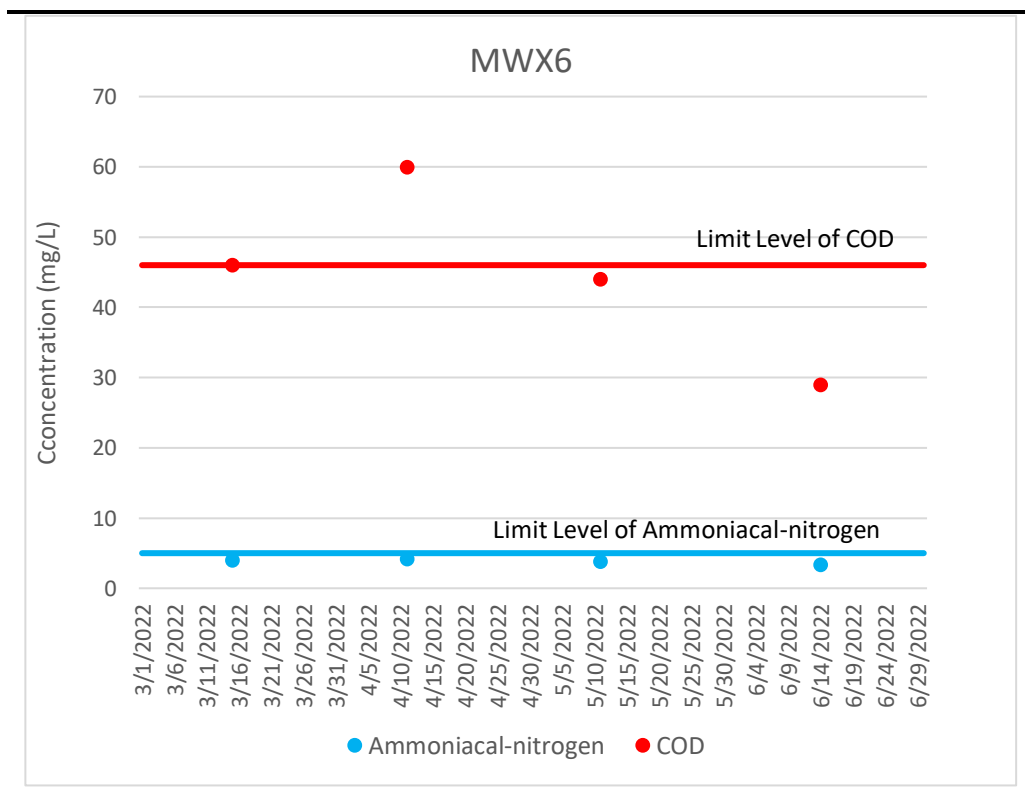


Figure F5.7 Graphical Presentation for Groundwater Monitoring (MWX-7)

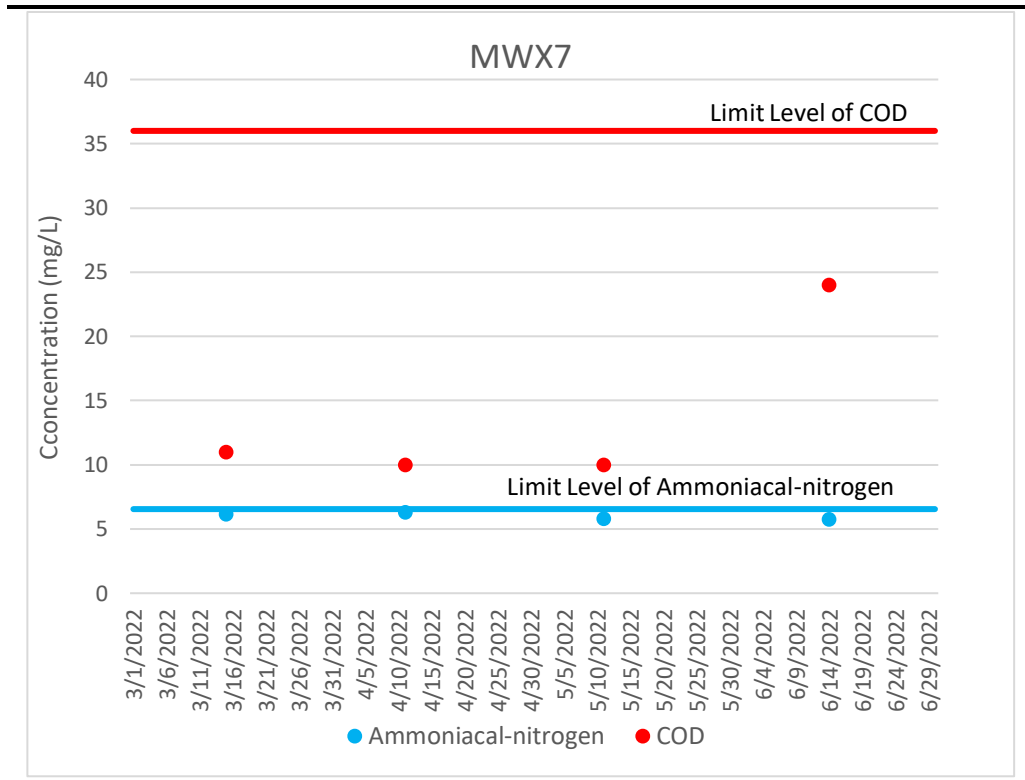


Figure F5.8 Graphical Presentation for Groundwater Monitoring (MWX-8)

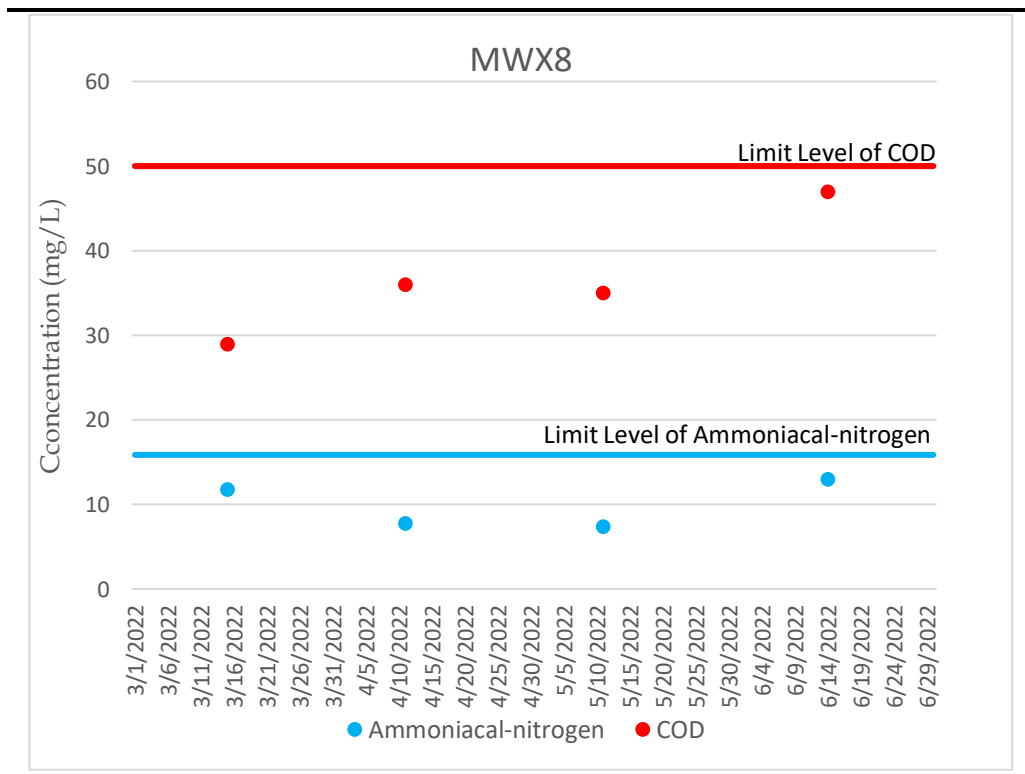


Figure F5.9 Graphical Presentation for Groundwater Monitoring (MWX-9)

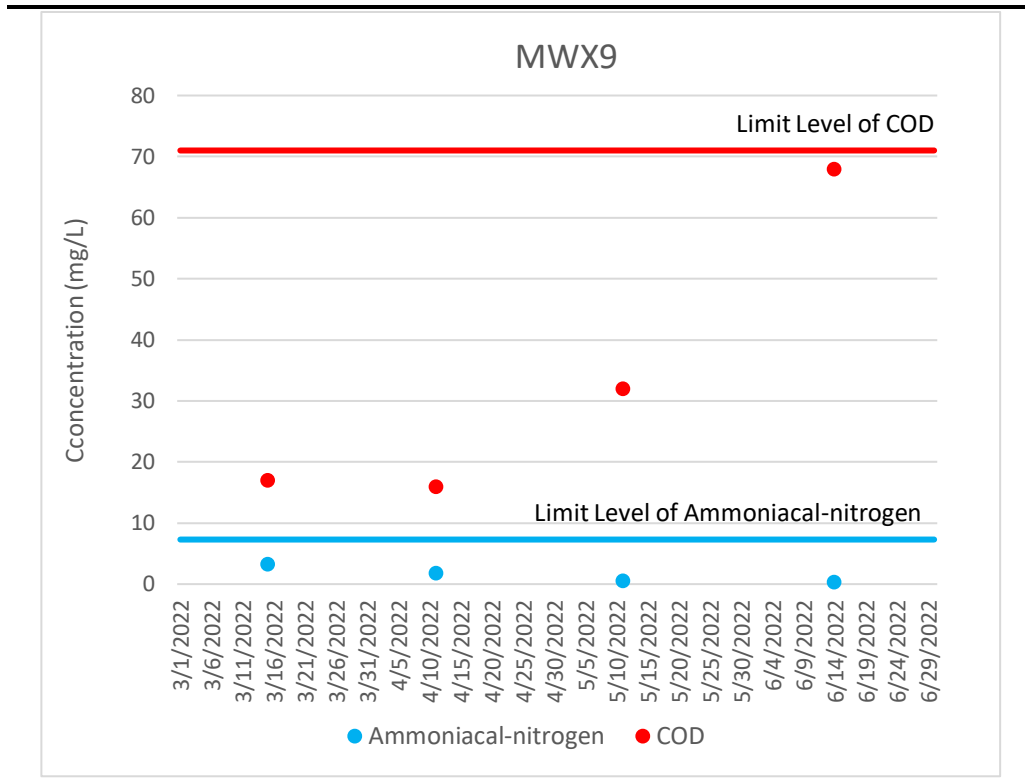


Figure F5.10 Graphical Presentation for Groundwater Monitoring (MWX-10)

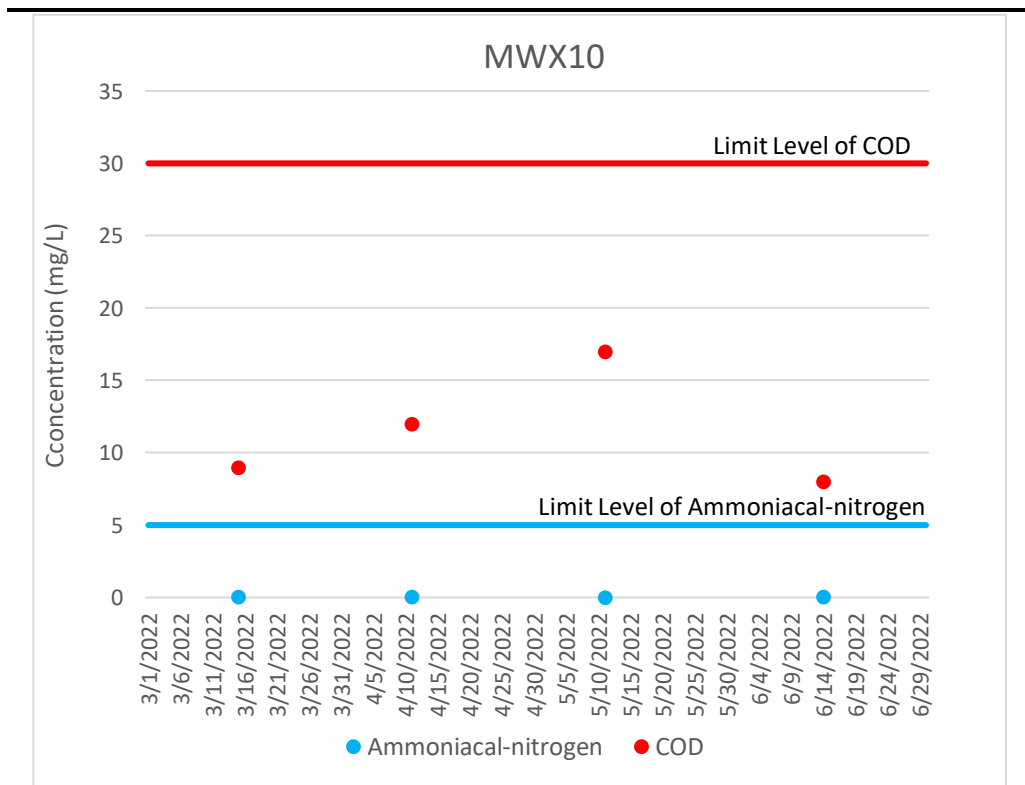


Figure F5.11 Graphical Presentation for Groundwater Monitoring (MWX-11)

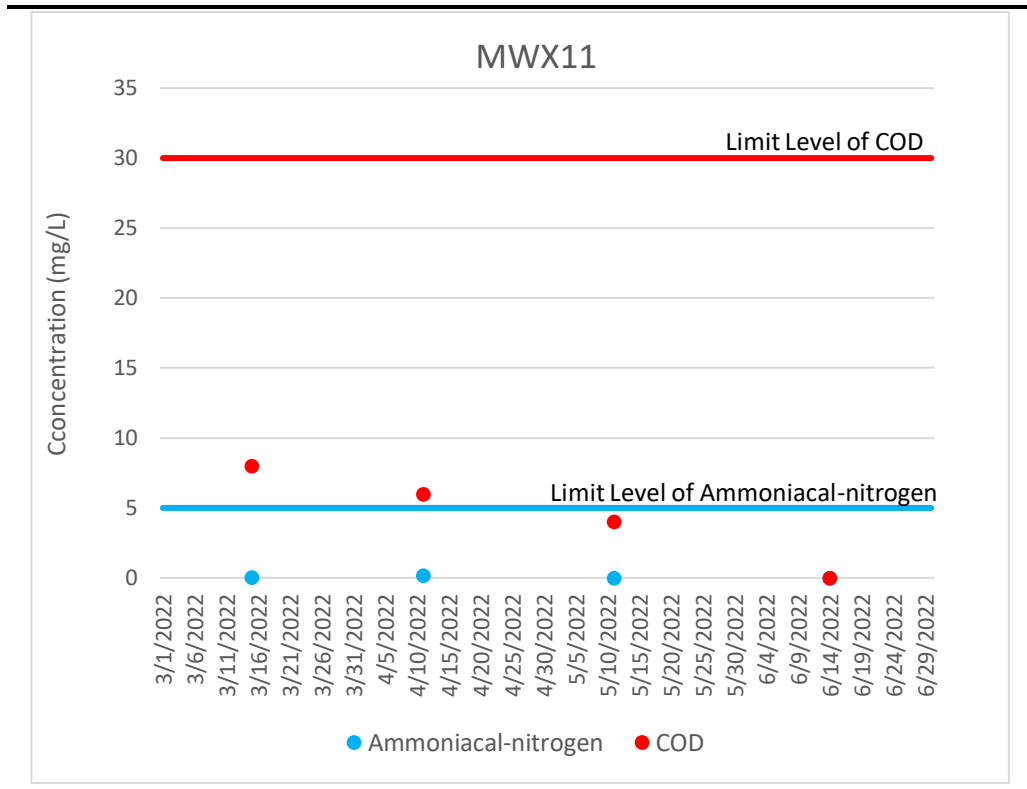


Figure F5.12 Graphical Presentation for Groundwater Monitoring (MWX-12)

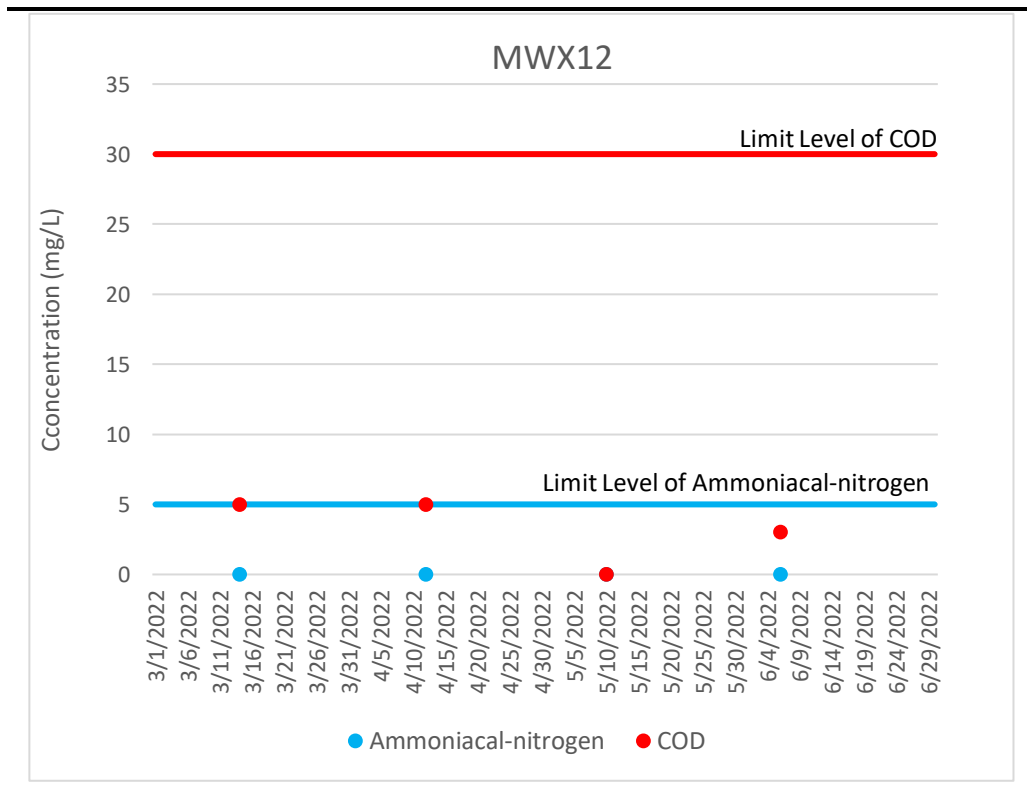


Figure F5.13 Graphical Presentation for Groundwater Monitoring (MWX-13)

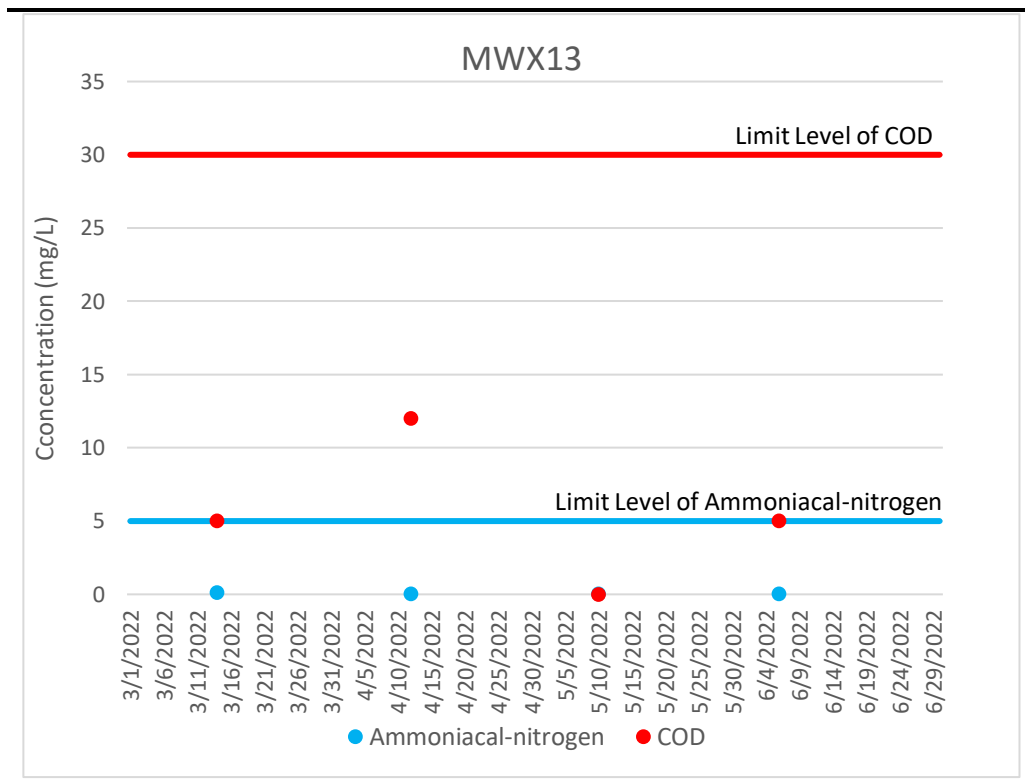
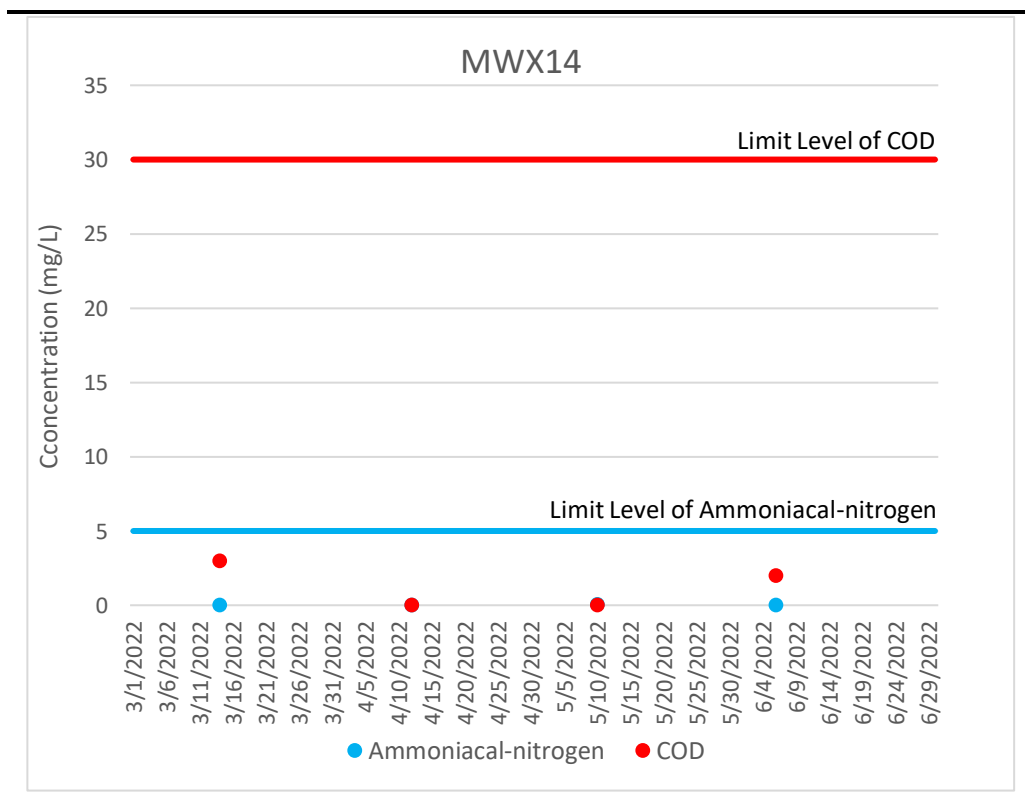


Figure F5.14 Graphical Presentation for Groundwater Monitoring (MWX-14)





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 April 2022
Time	MWX-4: 14:52 MWX-5: 14:30 MWX-6: 10:02
Monitoring Location	MWX-4, MWX-5, MWX-6
Parameter	Chemical Oxygen Demand (COD)
Limit Levels	MWX-4: >36 mg /L MWX-5: >30 mg /L MWX-6: >46 mg /L
Measured Level	MWX-4: 40 mg /L MWX-5: 43 mg /L MWX-6: 60 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 groundwater quality (ammoniacal-nitrogen) monitoring results at MWX-4 (5.20 mg/L), MWX-5 (4.71 mg/L) and MWX-6 (4.14 mg/L) are well within the respective limit levels (MWX-4: 7.63 mg/L, MWX-5: 5.00 mg/L, MWX-6: 5.00 mg/L). Hence, there is a low possibility that the elevation of COD level at MWX-4, MWX-5 and MWX-6 are due to leachate contamination from SENTX operation or at least it is not conclusive to base on these results to demonstrate exceedances were due to leachate contamination.</p> <p>In accordance with Table 4.5b of the updated EM&amp;A Manual, repeat measurement was conducted on 11 and 18 May 2022 to confirm findings. COD concentrations of 24 mg/L, 15 mg/L and 44 mg/L (below the respective Limit Level) were measured at MWX-4, MWX-5 and MWX-6, respectively during the sampling event, which demonstrate no consecutive groundwater quality impact at the monitoring locations.</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 concentrations measured at MWX-4 (with detection of elevated levels of methane (up to 11.6% v/v)), MWX-5 (with detection of elevated levels of methane (up to 2.5% v/v)) and MWX-6 (with detection of elevated levels of methane (up to 12.2% v/v) and in close proximity to LFG13, which shows elevated methane levels continuously) on 11 April 2022</p>

	<p>could be due to localised organic matters within or around the monitoring wells and background fluctuation.</p> <p>Due to the presence of influencing factor from non-project source and the subsequent month monitoring results at MWX-4, MWX-5 and MWX-6 did not show any exceedances, there is no adequate evidence showing that the COD level exceedances measured at MWX-4, MWX-5 and MWX-6 on 11 April 2022 were deemed to Project-related activities.</p> <p>It should also be noted that although the COD level exceeded the limit level of the EM&amp;A programme, it is still well within the WPCO effluent discharge limit of COD (80 mg/L) and the standard for effluents discharged into the inshore waters of the Junk Bay Water Control Zone as stipulated under Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (80 mg/L). The slight exceedances of COD at MWX-4, MWX-5 and MWX-6 on 11 April 2022 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&amp;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 June 2022

## Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	25 May 2022
Time	14:46 and 14:58 (Duplicate)
Monitoring Location	DP4
Parameter	Surface Water (Suspended Solids (SS))
Limit Level	>20 mg/L
Measured Level	DP4: 31.8 mg /L DP4 (Duplicate): 30.9 mg /L
Possible reason	<p>From the on-site rainfall record of May 2022, heavy rainfall events were recorded on 22 to 24 May 2022 before the sampling event.</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>Site surface runoff at DP4 channel was treated by the Wetsep prior to discharge. Yet during the weekly site inspection in the morning and the sampling event, it was observed that the Wetsep was not functioning properly with reference to the on-site checking of the treated water at the outlet of the processing chamber of the Wetsep.</p> <p>During the sampling event, no raining was recorded and no other sources (e.g. Clearwater Bay Country Park, other project sites) was identified in the vicinity of surface water channel leading to DP4T which might cause the SS exceedance at DP4. 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>
Action Taken / Action to be Taken	<p>The monitoring frequency shall be increased to weekly in accordance with Table 4.5b of the updated EM&amp;A Manual until no exceedance of Limit Level.</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&amp;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	-
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Prepared by: Abbey Lau

Designation: Environmental Team

Date: 20 June 2022

## Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	30 June 2022
Time	11:15
Monitoring Location	DP4
Parameter	Surface Water (Suspended Solids (SS))
Limit Level	>20 mg/L
Measured Level	28.2 mg /L
Possible reason	<p>From the on-site rainfall record of June 2022, heavy rainfall events were recorded on 29 and 30 June 2022 before the sampling event.</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>Site surface runoff at DP4 channel was treated by the Wetsep prior to discharge. 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. Contaminated runoff from the unpaved areas during the previous rainfall events could be the potential source of SS contributing to the exceedance. The SS exceedance at DP4 was therefore deemed to Project-related activities.</p> <p>It should be noted that although the measured SS level exceeded the limit level of the EM&amp;A programme, it is still within the WPCO effluent discharge limit of SS for the Junk Bay Water Control Zone (30 mg/L). The discharge of surface water with this SS level from DP4 will not cause adverse water quality impact to the Junk Bay Water Control Zone.</p>
Action Taken / Action to be Taken	<p>Weekly surface water quality monitoring (SS) shall be continued at DP4 until no exceedance of Limit Level in accordance with Table 4.5b of the updated EM&amp;A Manual.</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&amp;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	-
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Prepared by: Abbey Lau

Designation: Environmental Team

Date: 19 July 2022

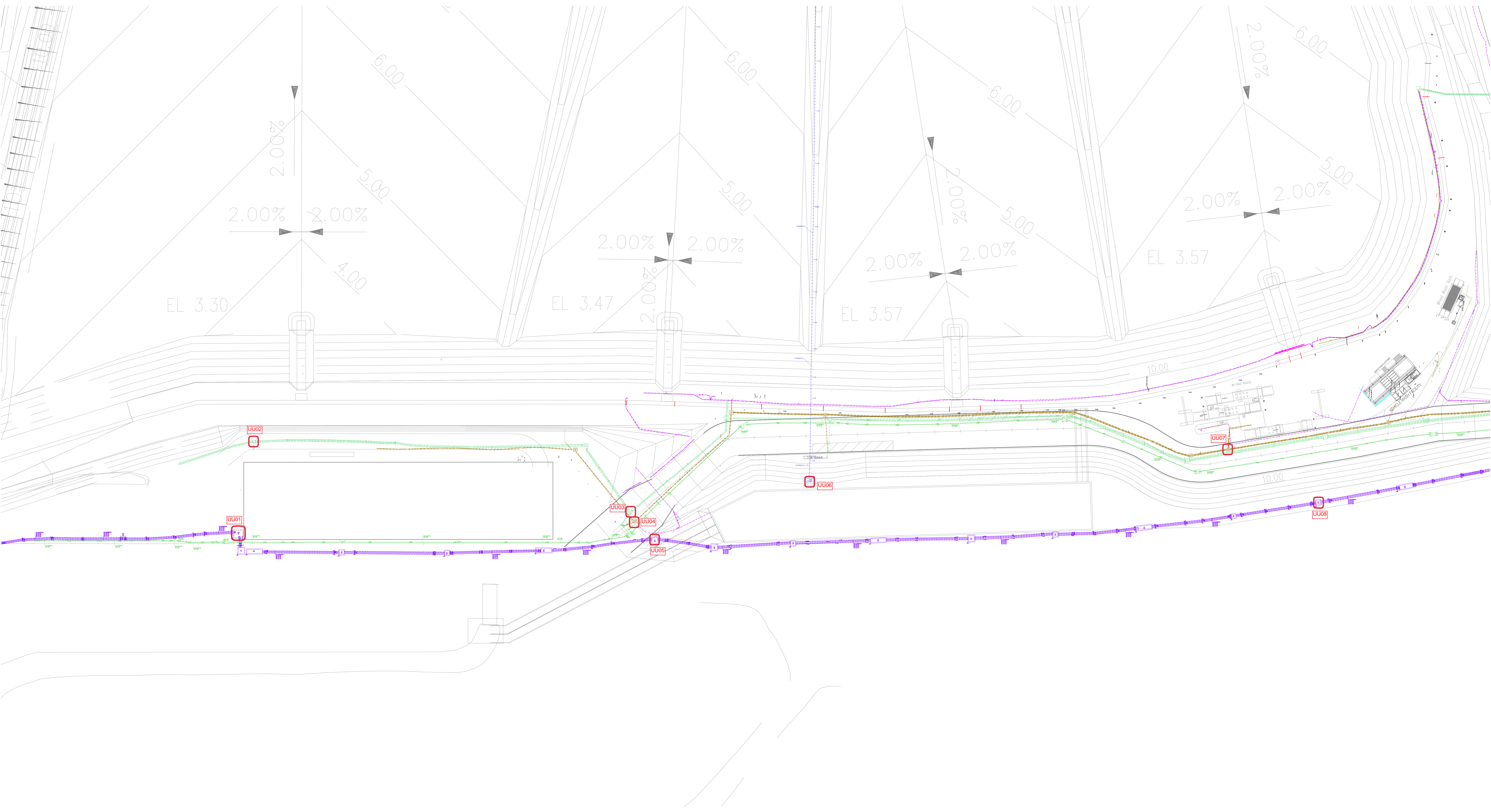
Annex G

## 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 (April 2022)**

<b>Location</b>	<b>Water Level (mPD)</b>	<b>Methane (% (v/v))</b>	<b>Carbon Dioxide (% (v/v))</b>	<b>Oxygen (% (v/v))</b>
LFG1	2.19	0.0	0.1	19.3
LFG2	2.12	0.0	0.4	18.7
LFG3	2.25	0.0	1.3	17.9
LFG4	2.08	0.0	0.0	19.8
LFG5	2.39	0.0	0.1	9.5
LFG6	2.08	0.0	0.0	20.0
LFG7	2.38	0.0	0.0	20.0
LFG8	2.29	0.0	0.0	20.2
LFG9	2.23	0.0	0.1	10.8
LFG10	1.97	0.0	0.0	16.5
LFG11	2.19	0.0	0.1	8.6
LFG12	2.12	0.0	0.0	20.2
LFG13	2.11	5.1	0.1	1.8
LFG14	1.86	0.0	0.0	15.9
LFG15	2.06	0.0	0.3	16.8
LFG16	2.18	0.0	0.0	19.8
LFG17	2.25	0.1	0.5	12.1
LFG18	2.35	0.0	0.0	20.0
LFG19	2.43	0.0	0.0	20.0
LFG20	2.38	0.0	0.3	19.2
LFG21	2.53	0.0	2.1	11.0
LFG22	2.30	0.0	0.0	20.0
LFG23	12.52	0.0	1.3	18.3
LFG24	5.92	0.0	0.8	18.4
GP1	Probe bent	0.0	0.1	20.5
GP2 (shallow)	Probe bent	0.0	0.1	20.5
GP2 (deep)	Probe bent	0.0	0.0	20.5
GP3 (shallow)	Probe bent	0.0	2.1	18.9
GP3 (deep)	Probe bent	0.0	0.1	20.4
GP4 (shallow)	Probe bent	0.0	0.1	20.2
GP4 (deep)	Probe bent	0.0	0.1	20.2
GP5 (shallow)	Probe bent	0.0	0.1	20.1
GP5 (deep)	37.86	0.0	0.0	20.2
GP6	36.00	0.0	6.1	14.5
GP7	35.78	0.0	0.0	19.8
GP12	1.63	0.0	0.3	19.2
GP15	2.17	0.0	0.0	20.5
P7	2.13	0.0	0.0	20.4
P8	2.25	0.0	0.0	20.4
P9	2.13	0.0	0.0	20.5

**Table G2.2 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells (May 2022)**

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	3.16	0.0	0.1	19.6
LFG2	3.05	0.0	0.7	16.6
LFG3	3.19	0.0	0.0	20.1
LFG4	2.82	0.0	0.3	8.0
LFG5	2.9	0.0	0.2	3.3
LFG6	3.13	1.8	2.1	0.2
LFG7	3.29	0.0	0.0	18.8
LFG8	3.34	8.9	0.0	3.2
LFG9	3.22	1.5	0.0	13.5
LFG10	3.05	2.9	0.1	0.2
LFG11	3.61	0.8	0.0	18.7
LFG12	3.24	0.0	0.0	19.8
LFG13	3.05	0.0	0.0	19.7
LFG14	2.71	2.4	0.0	13.0
LFG15	2.86	4.1	0.0	12.3
LFG16	3.26	0.0	0.0	19.7
LFG17	2.83	15.9	0.1	0.2
LFG18	4.41	0.0	0.0	20.8
LFG19	5.02	0.0	0.0	19.9
LFG20	4.89	0.0	0.0	19.9
LFG21	4.78	0.0	0.0	20.1
LFG22	4.39	0.0	0.0	19.7
LFG23	12.9	0.0	3.0	16.2
LFG24	6.13	0.0	1.0	18.2
GP1	Probe bent	0.0	0.1	20.3
GP2 (shallow)	Probe bent	0.0	0.1	20.2
GP2 (deep)	Probe bent	0.0	0.0	20.2
GP3 (shallow)	Probe bent	0.0	2.1	15.2
GP3 (deep)	Probe bent	0.0	0.1	20.1
GP4 (shallow)	Probe bent	0.0	0.1	20.1
GP4 (deep)	Probe bent	0.0	0.4	19.4
GP5 (shallow)	Probe bent	0.0	3.8	14.9
GP5 (deep)	44.82	0.0	0.1	20.0
GP6	43.03	0.0	5.4	14.6
GP7	37.11	0.0	0.6	18.3
GP12	2.59	0.0	0.1	20.0
GP15	4.15	0.0	0.0	20.2
P7	3.08	0.0	0.0	20.1
P8	3.16	0.0	0.0	20.0
P9	3.14	0.0	0.0	20.4

**Table G2.3 Landfill Gas Monitoring Results at Perimeter LFG Monitoring Wells (June 2022)**

Location	Water Level (mPD)	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
LFG1	3.37	0.0	0.3	17.3
LFG2	3.25	0.0	0.0	20.1
LFG3	3.36	0.0	0.0	20.0
LFG4	3.21	0.0	0.7	5.8
LFG5	3.47	0.0	0.2	1.0
LFG6	3.43	0.0	0.5	13.1
LFG7	3.63	0.0	0.0	19.4
LFG8	3.6	3.3	0.5	8.6
LFG9	3.46	1.0	0.0	12.9
LFG10	3.37	2.6	0.1	1.6
LFG11	3.93	0.0	0.0	18.1
LFG12	3.61	0.0	0.0	19.7
LFG13	3.24	0.0	0.0	17.3
LFG14	2.93	0.3	0.0	19.1
LFG15	3.09	1.9	0.0	15.7
LFG16	3.47	0.0	0.0	19.6
LFG17	3.38	1.3	0.0	16.5
LFG18	4.67	0.0	0.0	19.8
LFG19	5.28	0.0	0.0	19.8
LFG20	5.02	0.0	0.1	19.3
LFG21	4.99	0.0	0.0	19.9
LFG22	4.62	0.0	0.0	19.8
LFG23	13.08	0.0	4.2	13.7
LFG24	6.71	0.0	0.8	18.6
GP1	Probe bent	0.0	0.1	18.8
GP2 (shallow)	Probe bent	0.0	0.0	20.0
GP2 (deep)	Probe bent	0.0	0.2	19.9
GP3 (shallow)	Probe bent	0.0	0.1	19.8
GP3 (deep)	Probe bent	0.0	1.0	19.1
GP4 (shallow)	Probe bent	0.0	0.1	19.8
GP4 (deep)	Probe bent	0.0	0.1	19.8
GP5 (shallow)	Probe bent	0.0	3.2	13.9
GP5 (deep)	45.76	0.0	0.1	19.8
GP6	44.68	0.0	0.1	19.8
GP7	37.23	0.0	0.4	18.2
GP12	2.81	0.0	0.3	19.6
GP15	3.35	0.0	0.1	20.0
P7	3.31	0.0	0.0	20.0
P8	3.43	0.0	0.1	20.1
P9	3.31	0.0	0.1	20.0

**Table G2.4 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (April 2022)**

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	20.5
UU02	0.0	0.0	20.6
UU03	0.0	0.0	20.3
UU04	0.0	0.0	20.1
UU05	0.0	0.0	20.1
UU06	0.0	0.0	20.4
UU07	0.0	0.0	21.1
UU08	0.0	0.0	20.6
UU09	Inaccessible due to on-going construction work		
UU10	0.0	0.0	20.0
UU11	0.0	0.0	19.9
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	20.9
UU14	0.0	0.0	21.3
UU15	0.0	0.0	20.4
UU16	0.0	0.0	19.2
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	19.3
UU19	0.0	0.0	21.9
UU20	0.1	0.0	20.4
UU21	0.0	0.0	20.1
UU22	0.1	0.1	20.3
UU23	0.1	0.1	19.7
UU24	0.0	0.0	19.3
UU25	0.0	0.0	19.5
UU26	0.0	0.0	19.3
UU27	0.0	0.0	19.8
UU28	0.0	0.0	20.0



**Table G2.5 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (May 2022)**

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	21.0
UU02	0.0	0.0	21.0
UU03	0.1	0.0	20.4
UU04	0.0	0.0	21.0
UU05		Unmeasurable due to overflow of water	
UU06	0.0	0.0	21.1
UU07	0.1	0.0	21.1
UU08		Unmeasurable due to overflow of water	
UU09		Inaccessible due to on-going construction work	
UU10	0.0	0.0	21.1
UU11	0.0	0.1	21.1
UU12		Voided due to latest site programme and on-going operation work	
UU13	0.0	0.1	21.1
UU14	0.0	0.1	21.1
UU15	0.0	0.1	21.1
UU16	0.0	0.0	21.1
UU17		Voided due to latest site programme and on-going operation work	
UU18	0.0	0.1	21.0
UU19	0.1	0.0	21.2
UU20	0.1	0.0	20.9
UU21	0.0	0.0	20.9
UU22	0.0	0.1	20.8
UU23	0.0	0.1	20.7
UU24	0.0	0.1	21.0
UU25	0.0	0.1	21.1
UU26	0.0	0.1	21.1
UU27	0.0	0.1	20.5
UU28	0.0	0.1	21.0

**Table G2.6 Landfill Gas Monitoring Results at Service Voids, Utilities Pits and Manholes (June 2022)**

Location	Methane (% (v/v))	Carbon Dioxide (% (v/v))	Oxygen (% (v/v))
UU01	0.0	0.0	19.8
UU02	0.0	0.0	19.6
UU03	0.0	0.0	19.5
UU04	0.0	0.0	19.6
UU05	Unmeasurable due to overflow of water		
UU06	0.0	0.0	19.8
UU07	0.0	0.0	19.9
UU08	0.0	0.0	19.8
UU09	Inaccessible due to on-going construction work		
UU10	0.0	0.0	20.5
UU11	0.0	0.0	19.9
UU12	Voided due to latest site programme and on-going operation work		
UU13	0.0	0.0	20.1
UU14	0.0	0.0	20.2
UU15	0.0	0.0	20.4
UU16	0.0	0.0	20.4
UU17	Voided due to latest site programme and on-going operation work		
UU18	0.0	0.0	20.4
UU19	0.0	0.0	20.1
UU20	0.0	0.0	20.1
UU21	0.0	0.0	19.8
UU22	0.0	0.0	19.8
UU23	0.0	0.0	19.8
UU24	0.0	0.0	20.0
UU25	0.0	0.0	20.0
UU26	0.0	0.0	20.3
UU27	0.0	0.0	20.0
UU28	0.0	0.0	20.0

**Table G2.7 Landfill Gas Bulk Gas Sampling Monitoring Results**

Parameters	LFG12	LFG24
Methane (% (v/v))	0.415	<0.020
Carbon Dioxide (% (v/v))	0.038	1.03
Oxygen (% (v/v))	19.9	19.6
Nitrogen (% (v/v))	78.7	79.0
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)
10:55	22°16'33"	114°16'17"	Fine	26.4	040	4.5	3
11:12	22°16'16"	114°27'78"	Fine	27.5	300	2.7	6
11:28	22°16'15"	114°16'33"	Fine	25.8	317	3.1	12
11:36	22°16'14"	114°16'28"	Fine	26.9	275	2.5	8
11:50	22°16'23"	114°16'26"	Fine	29.3	309	1.1	8
11:58	22°16'30"	114°16'26"	Fine	28.5	316	1.1	21
12:13	22°16'37"	114°16'27"	Fine	29.7	313	1.5	15
12:30	22°16'37"	114°16'31"	Fine	27.2	305	0.6	12

Annex G3

## Event and Action Plan for Landfill Gas Monitoring

**Annex G3 Event and Action Plan for Landfill Gas Monitoring**

Event	Action		
	ET	IEC	Contractor
Limit Level being exceeded for field monitoring at the perimeter monitoring wells	<ul style="list-style-type: none"> <li>Investigate the cause(s) of exceedance</li> <li>Prepare the Notification of Exceedance within 24 hours</li> <li>Check monitoring data, all plant, equipment and the Contractor’s working methods</li> <li>Inform Contractor, IEC, Project Proponent and EPD (EIAO Authority) whether the cause of exceedance is due to the Project</li> <li>Discuss with Contractor and IEC for remedial measures required</li> <li>Ensure remedial measures are properly implemented</li> <li>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</li> </ul>	<ul style="list-style-type: none"> <li>Verify the Notification of Exceedance</li> <li>Discuss with ET and Contractor on proposed remedial measures</li> <li>Review proposals on remedial measures</li> <li>Audit the implementation of the remedial measures</li> <li>Audit the effectiveness of the implemented remedial measures</li> </ul>	<ul style="list-style-type: none"> <li>Repeat field measurement to confirm findings</li> <li>Check the performance of landfill gas management system</li> <li>Rectify unacceptable practice</li> <li>Discuss with the ET and IEC and submit proposals for remedial measures to IEC</li> <li>Implement the agreed proposals</li> <li>Amend proposal if appropriate</li> </ul>
Limit Level being exceeded for the bulk gas sampling at the perimeter monitoring wells	<ul style="list-style-type: none"> <li>Check and compare the results of field monitoring and laboratory analyse of bulk samples</li> <li>If the results of field monitoring also show exceedance, the action(s) for limit level being exceeded for field monitoring would have been triggered</li> <li>If the results of field monitoring does not show exceedance, the sampling procedures should be checked and if deems necessary, to repeat the monitoring and recalibrate the portable monitoring instruments</li> <li>Notify the above findings to Contractor and IEC</li> </ul>	<ul style="list-style-type: none"> <li>Verify the findings by ET</li> </ul>	<ul style="list-style-type: none"> <li>Nil</li> </ul>

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

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

Annex G4

Investigation Reports of  
Environmental Quality  
Limit Exceedance



## Investigation Report of Environmental Quality Limit Exceedance

Project	South East New Territories (SENT) Landfill Extension
Date	17 May 2022
Time	14:51
Monitoring Location	LFG6
Parameter	Methane
Limit Levels	1.0 %
Measured Level	1.8%
Possible reason	<p>During the landfill gas monitoring event, methane was not detected at the landfill gas monitoring wells adjacent to LFG6 (LFG5 and LFG7: 0%). In addition, no exceedance of Limit Levels for landfill gas monitoring at service voids, utilities pits and manholes (conducted on 17 May 2022) and flammable gas surface emission monitoring (conducted on 18 May 2022) was recorded in the reporting period. Hence, there is a low possibility that the elevation of methane level at LFG6 is due to landfill gas migration from SENTX operation or at least it is not conclusive to base on these results to demonstrate that the exceedance was due to landfill gas migration.</p> <p>Repeat measurement was conducted on 1 and 2 June 2022 to confirm findings. Methane was not detected at LFG6 and its adjacent monitoring wells (LFG5 and LFG7) during the sampling events, which demonstrate no consecutive landfill gas hazard at the monitoring locations.</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 level of methane detected at LFG6 on 17 May 2022 could be due to localised organic matters within or around the monitoring wells and background fluctuation with relevance to the installation of liner system at nearby Cell 4X which avoid the escape of methane gas into the atmosphere.</p> <p>Due to the presence of influencing factor from non-project source and the subsequent monitoring results at LFG6 did not show any exceedances, there is no adequate evidence showing that the methane exceedance measured at LFG6 on 17 May 2022 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

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

Prepared by: Abbey Lau  
 Designation: Environmental Team  
 Date: 21 June 2022

Annex H

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

**Table H1** *Cumulative Statistics on Exceedances*

		Total No. recorded in this reporting period	Total No. recorded since project commencement
Air Quality (Dust)	Action	0	0
	Limit	0	1
Air Quality (Odour)	Action	0	0
	Limit	0	0
Air Quality (Emissions of Thermal Oxidiser)	Limit	0	0
Air Quality (Emissions of Landfill Gas Flare)	Limit	0	1
Air Quality (Emissions of Landfill Gas Generator)	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality (Surface Water)	Limit	2	59
Water Quality (Leachate)	Limit	0	0
Water Quality (Groundwater)	Limit	3	7
Landfill Gas (Perimeter Landfill Gas Monitoring Wells)	Limit	1	1
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 April - 30 June 2022)	0	0	0
Total no. received since project commencement	1	0	0