FORM
5

Application No. :
Reference No. :
(For official use)

FORM 5
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

☑ No previous application for variation of an environmental permit.

☐ The environmental permit was previously amended.

Application No. : .....

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

Veolia Hong Kong Holding Limited

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. : (if applicable) [redacted]

B3. Correspondence Address : [redacted]

B4. Name of Contact Person : [redacted]

B5. Position of Contact Person : [redacted]

B6. Telephone No. : [redacted]

B7. Fax No. : [redacted]

B8. E-mail Address : (if any) .....

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

Veolia Hong Kong Holding Limited

C2. Application No. of the Current Environmental Permit : FEP-218/2023

C3. The Current Environmental Permit was Issued in : month / year

08 2023

Important Notes : Please submit the application together with

(a) 3 copies of this completed form; and

(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation

to the Environmental Protection Department at the following address :

The EIA Ordinance Register Office,
27th floor, Southorn Centre,130 Hennessy Road,
Wan Chai, Hong Kong.

RECEIVED
30 MAR 2026
EIAO Register Office, E.P.D.

☐ Tick (✓) the appropriate box

PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit :	D2. Proposed Variation(s) :	D3. Reason for Variation(s) :	D4. Describe the environmental changes arising from the proposed variation(s) :	D5. Describe how the environment and the community might be affected by the proposed variation(s) :	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Figures 1 to 3	See new Figures 1 to 3 in the attached ERR.	The NENTX site boundary demarcated in Figures 1 to 3 of the current EPs does not reflect the latest layout plan. Therefore, the existing Figures 1 to 3 of the current EPs should be replaced with the updated site boundary under "Enhanced Scheme".	No adverse environmental impacts are anticipated from the proposed variation. For details, please refer to the attached ERR.	The environmental and the community will not be affected by the proposed variation. For details, please refer to the attached ERR.	The environmental performance requirements set out in the EIA report previously approved for this project will not be affected by the proposed variation. For the details, please refer to the attached ERR.	No additional measure is required.

PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1. Condition(s) in the Current Environmental Permit :	D2. Proposed Variation(s) :	D3. Reason for Variation(s) :	D4. Describe the environmental changes arising from the proposed variation(s) :	D5. Describe how the environment and the community might be affected by the proposed variation(s) :	D6. Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7. Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
Part C, Clause 2.17 ***Liner System to Control Seepage of Leachate*** A composite liner system consisting of a layer of at least 2.0 mm thick high density polyethylene (HDPE) with a hydraulic conductivity of at least 1xE-9 meters per second and a layer of at least 6.0 mm thick bentonite matting with a hydraulic conductivity of at least 1xE-11 meters per second shall be provided over the entire area of the Project. 在整個工程項目範圍內需鋪設組合防漏墊層系統，其中包括一層最少為2.0毫米厚的高密度聚乙稀，其水力傳導性最多為每秒1xE-9米，以及一層最少為6.0毫米厚的膨潤土墊，其水力傳道性最多為每秒1xE-11米。	Part C, Clause 2.17 and a new Figure 4 attached in ERR. ***Liner System to Control Seepage of Leachate*** A Multi-layer Composite Liner System shall be provided in accordance with Figure 4 covering the entire area of the Project where waste will be deposited. 須按圖4所示設置一套多層合成墊層系統，覆蓋工程項目用作棄置廢物的全部範圍。	The variation is to reflect the contemporary landfill design of the multi-layer composite liner system, ensuring the engineering performance of the NENT Landfill Extension for protection of the surrounding environment.	No adverse environmental impacts are anticipated from the proposed variation. For details, please refer to the attached ERR.	The environmental and the community will not be affected by the proposed variation. For details, please refer to the attached ERR.	The environmental performance requirements set out in the EIA report previously approved for this project will not be affected by the proposed variation. For the details, please refer to the attached ERR.	No additional measure is required.

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.

[redacted] [redacted] [redacted]

Signature of Applicant | Full Name in Block Letters | Position

VEOLIA HONG KONG HOLDING LIMITED NENTX

on behalf of Veolia Hong Kong Holding Limited 30 MAR 2026

Company Name and Chop (as appropriate) | Date

NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of $5,000,000 and to a maximum imprisonment for 2 years.

2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of $5,000,000 and to a maximum imprisonment for 2 years.

North East New Territories (NENT) Landfill Extension

Environmental Review Report

March 2026

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Bringing ideas to life

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Contents

1 Introduction 4

1.1 Background 4
1.2 Purpose and Structure of this Report 5

2 Details of the Enhanced Scheme 6

2.1 Introduction 6
2.2 Update of Landfill Extension Boundary 6
2.3 Update of Landfill Infrastructures 7
2.4 Latest Engineering Design of the Liner System 7
2.5 Summary of Benefits of the Proposed Changes 9

3 Review on Air Quality Impact Assessment 11

3.1 Introduction 11
3.2 Environmental Legislation, Standards and Guidelines 11
3.3 Air Sensitive Receivers 11
3.4 Assessment Methodology 12
3.5 Prediction and Evaluation of Environmental Impacts 13
3.6 Impact due to change in Landfill extension boundary in Enhanced Scheme 17
3.7 Operational Phase Odour Assessment 17
3.8 Mitigation Measures 17
3.9 Conclusion 18

4 Review on Noise Impact Assessment 19

4.1 Introduction 19
4.2 Environmental Legislation, Standards, and Guidelines 19
4.3 Noise Sensitive Receivers 19
4.4 Construction Noise Impact Assessment 20
4.5 Review on Operational Road Traffic Noise 22
4.6 On-site Operation Noise Impact Assessment 22
4.7 Residual Environmental Impact 30
4.8 Conclusion 30

5 Review on Water Quality Impact Assessment 31

5.1 Introduction 31
5.2 Construction Phase 31
5.3 Operational Phase 31
5.4 Conclusion 32

6 Review on Waste Management Implications 33

6.1 Introduction 33
6.2 Construction and Operation Phase 33
6.3 Restoration and aftercare phase 33
6.4 Conclusion 33

7 Review on Landfill Gas Hazards Assessment 34

7.1 Introduction 34
7.2 Hazards due to changes in Landfill Extension Boundary under the Enhanced Scheme 34
7.3 Hazards due to changes in Gaseous Emissions 34
7.4 Conclusion 34

8 Review on Landscape and Visual Impact Assessment 35

8.1 Introduction 35
8.2 Impact due to changes in Landfill Extension Boundary under the Enhanced Scheme 35

8.3 Impact due to changes in Gaseous Emissions 35
8.4 Conclusion 36

9 Review on Cultural Heritage Impact Assessment 37
9.1 Introduction 37
9.2 Impacts due to changes in Landfill Extension Boundary under the Enhanced Scheme 39
9.3 Impacts due to changes in Gaseous Emissions under the Enhanced Scheme 40
9.4 Conclusion 40

10 Review on Ecological Impact Assessment 41
10.1 Introduction 41
10.2 Impact due to Changes in Landfill Extension Boundary under the Enhanced Scheme 41
10.3 Impact due to Changes in Gaseous Emissions 42
10.4 Conclusion 42

11 Review on EM&A Requirements 43
12 Conclusion 44

Appendix

Appendix 3.1 Quantitative Air Quality Impact Assessment
Appendix 4.1 Quantitative Noise Impact Assessment
Appendix 9.1 Photos of Current and Historic Land Use

Figures

Figure 1.1 Location Plan of the Project Site (“Original Scheme”)
Figure 1.2 Location Plan of the Project Site (“Enhanced Scheme”)
Figure 2.1 Update of Landfill Extension Boundaries under “Enhanced Scheme”
Figure 2.2 Multi-layer Composite Liner System adopted in the NENTX Project
Figure 3.1 Representative Air Sensitive Receivers
Figure 3.2 Locations of Gaseous Emissions under Original Scheme
Figure 3.3 Locations of Gaseous Emissions under Enhanced Scheme
Figure 4.1 Representative Noise Sensitive Receivers
Figure 4.2 Development Phasing
Figure 4.3 Locations of Fixed Noise Sources
Figure 9.1 Landfill Extension Boundary under Original Scheme and Enhanced Scheme
Figure 9.2 Study Area of Cultural Heritage Impact Assessment
Figure 9.3 Solid and Superficial Geology (Sheung Shui) Hong Kong Geological Survey

1 Introduction

1.1 Background

1.1.1 The North East New Territories Landfill Extension (the NENTX Project) is located adjacent to the existing North East New Territories (NENT) Landfill at Ta Kwu Ling. The extension site is located in a valley largely occupied with the existing NENT Landfill Stockpile and Borrow Area where has already been handed over to NENTX Project Team since Q4 2022 for development of NENTX Project.

1.1.2 The NENTX Project is a designated project (DP) under G.4, Part I of the Environmental Impact Assessment Ordinance, Cap. 499 (the EIAO). The Environmental Impact Assessment (EIA) Report (AEIAR-111/2007) and the Environmental Monitoring and Audit Manual were approved on 20 September 2007. The project is governed by an Environmental Permit (EP) (EP-292/2007) which was granted on 26 November 2007. After the NENTX Project tender awarded in 2022, Further of EPs (FEPs) were applied and the FEPs (FEP-01/292/2007 and FEP-02/292/2007) were subsequently granted to the Design-Build-Operate Contract of the NENTX Project in April 2022 and August 2023, respectively. The layout plan originated from the EIA Report (AEIAR-111/2007) forming EP figures of the EPs is shown in **Figure 1.1**. The EPs of the Project include:

- Site formation and preparation;
- Installation of liner system;
- Installation of leachate collection, treatment, and disposal facilities;
- Installation of gas collection, utilization, and management facilities;
- Utilities provisions and drainage diversion;
- Landfilling operation;
- Restoration and aftercare in subsequent stages; and
- Measures to mitigate environmental impacts as well as environmental monitoring devise and auditing to be implemented.

1.1.3 In February 2005, a detailed feasibility study for the NENT Landfill Extension (hereafter referred to “the Project") was undertaken, with the following key tasks: formulation and evaluation of layout options for the landfill extension; EIA study; and conceptual design of landfill facilities. The proposed NENTX Project covers about 70 hectares (ha) of land, comprising mainly the Stockpile and Borrow Area and the Waste Reception Area of the existing NENT Landfill with some additional land at the north-western side and south-western side of the Stockpile and Borrow Area. The NENTX Project could provide about 19 million cubic meters of additional landfill capacity to cope with the continuous need for final waste disposal in the north-eastern part of the territory. The estimated operating life of the proposed landfill extension is about 10 years, which may vary according to future developments such as the extent of waste reduction.

1.1.4 After the issuance of EP-292/2007, NENTX Project Team has devised the **“Enhanced Scheme” of the NENTX Project** as shown in **Figure 1.2**. In comparison with the “Original Scheme” of the NENTX Project in **Figure 1.1**, there are no increase in waste filling area and target void space (about 19 million cubic meters) of the NENTX Project. Instead, there are some slight adjustments of site

boundary of existing NENT Landfill and the NENTX Project, the increase in footprint of the northeastern side of "non-waste filling area" immediately adjoining to the existing NENT Landfill mainly for optimising the performance of the landfill infrastructures of the NENTX project, such as landfill gas (LFG) collection and management system, on-site leachate treatment system, etc. Also, significant portions of the increment of **"non-waste filling area"** are used for haul road & access road construction so as to improve connectivity and contract administration of the Project.

1.1.5 Besides, the latest landfill liner design specifications are incorporated and the respective EP clauses are also updated. More details will be further elaborated in upcoming chapters of this Environmental Review Report (ERR). Also, relevant environmental assessment will also be presented to ensure that the environmental performance would not exceed the requirements set out in the approved Project EIA Report (AEIAR-111/2007).

1.2 Purpose and Structure of this Report

1.2.1 In view of the formulation of "Enhanced Scheme" of NENTX Project, this ERR serves as the supporting document for the application of a Variation of Environmental Permit (VEP) for the EPs issued for the Project.

The structure of this ERR is as follows:

Section 1	Present the Project background, Project description, and purpose and structure of this document
Section 2	Present the latest development of "Enhanced Scheme"
Section 3	Review the potential air quality impact arising from Proposed Change Scenario
Section 4	Review the potential noise impact arising from Proposed Change Scenario
Section 5	Review the potential water quality impact arising from Proposed Change Scenario
Section 6	Review the waste management implications under Proposed Change Scenario
Section 7	Review the Landfill Gas Hazard under Proposed Change Scenario
Section 8	Review the Landscape and Visual Impact arising from Proposed Change Scenario
Section 9	Review the cultural heritage impact arising from Proposed Change Scenario
Section 10	Review the ecological impact arising from Proposed Change Scenario
Section 11	Review on EM&A requirements under Proposed Change Scenario
Section 12	Conclude the findings of this document

2 Details of the Enhanced Scheme

2.1 Introduction

2.1.1 The landfill extension boundary, and locations and specifications of gaseous emissions of the "Original Scheme" presented in the approved Project EIA Report (AEIAR-111/2007) are collectively referred as 'Base Case Scenario' hereinafter. The updated Landfill Extension Boundary and locations and specifications of gaseous emissions, and latest liner specifications of the "Enhanced Scheme" of the NENTX Project are collectively referred as 'Proposed Change Scenario' hereinafter.

2.2 Update of Landfill Extension Boundary

2.2.1 As mentioned in **Section 1.1.4**, the project boundary of NENT Landfill Extension for EIA is updated, in order to (i) clearly demarcate the common site boundary of the existing NENT Landfill and the NENT Landfill Extension, as well as (ii) to facilitate centralization and optimization of the landfill infrastructures, with a view to minimising the potential environmental impact to the surrounding area during the operation stage. **Figure 1.2** shows the "Enhanced Scheme" of the NENTX Project (also named as 'Proposed Change Scenario'). As illustrated in **Figure 2.1**, there is a minor reduction of project area (i.e. Area A) and a new land area (i.e. Area B, 5.81 hectares) under the "Enhanced Scheme" of the NENTX Project. The current and proposed uses of portions in Area A and Area B are summarized in **Table 2.1**.

2.2.2 Despite of the proposed changes, there is no increase in the waste filling boundary, filling height and landfill capacity, and no change in the development phasing with respect to 'Base Case Scenario', while the newly proposed Area B, which are located outside the waste boundary, will accommodate the centralised landfill infrastructures such as leachate and landfill gas management facilities, main haul roads to the NENT Landfill Extension and associated slope works. Additionally, Area B will not induce any increment in waste filling area and target void space (about 19 million cubic meters) of the NENTX Project.

2.2.3 Furthermore, the updated project boundary of NENT Landfill Extension in Area A, which aligns with the project limit of NENT Landfill Extension according to the land resumption plan approved by the Lands Department, will allow a clear demarcation of maintenance responsibility of the reinforced earth walls and slopes of the existing NENT Landfill, since the site boundary of the existing NENT Landfill is adopted as the common boundary with the NENT Landfill Extension.

Table 2.1 Current and proposed uses of Area A and Area B

	Current use	Proposed use in NENTX Project
Area A	A piece of land of the existing NENT Landfill (such as retaining wall and ground water borehole)	N/A (For sake of clear maintenance responsibility, Area A will be handed back to the Existing NENT Landfill and no longer form part of the NENTX Project)
Area B	Current access road (Wo Keng Shan Road) to the existing NENT Landfill	Landfill infrastructures – New haul road to the NENTX Landfill, associated slope works, leachate and landfill gas management facilities to achieve better environmental outcomes

Notes: There are no increase in the waste filling area and target void space of the NENTX Project.

2.2.4 The NENTX Project will only commence when the existing NENT Landfill has ceased operation. Depending on the actual waste disposal rate in the forthcoming period, NENT Landfill is tentatively scheduled to cease operation in Year 2026. The commencement year of NENTX is tentatively scheduled between Year 2026 to Year 2036. There will be 11.5 years of restoration period, tentatively starting from the mid of Year 2026, and 30 years of aftercare period, tentatively starting from Year 2039. Overlapping of restoration and aftercare period for the existing NENT Landfill and Phase 2 & 3 development of NENTX is expected. The cumulative environmental impact during the overlapping period was be assessed in this ERR.

2.3 Update of Landfill Infrastructures

2.3.1 Aiming to achieve better environmental outcome, the design parameters and the locations of major units of the LFG collection and management system and on-site leachate treatment system has been updated in “Enhanced Scheme”. The gaseous emissions of the major landfill infrastructures (including LFG Flare Systems, LFG Generator Sets & Thermal Destructor in Ammonia stripper in leachate treatment plant) in the approved EIA Report (AEIAR-111/2007) (i.e., “Original Scheme”) and the “Enhanced Scheme for the Project are shown and reviewed in **Section 3**.

2.4 Latest Engineering Design of the Liner System

2.4.1 The Multi-layer Composite Liner System for the NENTX forms a critical component of the landfill design for protection of the surrounding water body and environment. According to the EP Condition 2.19 (for EP-292/2007) and FEP Condition 2.17 (for FEP-02/292/2007), only two components of the Multi-layer Composite Liner System for NENTX, including high-density polyethylene (HDPE) geomembrane and bentonite matting layer are presented.

2.4.2 In fact, following the design principles of contemporary landfill liner system, the Multi-layer Composite Liner System, which comprises of the following key components, and each component performs an important function for achieving the engineering performance of the liner system and protection of the surrounding environment, are proposed for the NENTX Project (refer to **Figure 2.2**).

- The granular drainage layer for leachate collection when leachate inside the landfill drains to the bottom by gravity, it is intercepted and collected by this granular drainage layer and conveyed by pumps to leachate treatment plant for

treatment. A cushion geotextile is also placed immediately beneath the granular drainage layer to provide puncture resistance for the underlying layers.

- The high density polyethylene (HDPE) geomembrane (also known as Flexible Membrane liner) underlies the leachate collection layer and functions as the primary barrier to prevent any leachate leakage from the landfill. HDPE geomembrane exhibits an extremely low hydraulic conductivity and offers high resistance to both physical and chemical stresses under varying environmental conditions. As such, it is typically considered impermeable to liquid like leachate by landfill design engineers and international testing organizations.
- The Bentonite Matting (also known as Geosynthetic Clay Liner (GCL)) is placed beneath the primary HDPE geomembrane. The Bentonite Matting consists of a layer of natural bentonite soil enclosed between geotextile layers. The Bentonite Matting acts as a secondary and additional barrier to the HDPE geomembrane against leachate leakage. In the event punctures / small holes formed on the geomembrane during construction, the bentonite soil will swell and seal up the punctures or small holes on the geomembrane, offering a unique self-sealing property enhancing the reliability and containment function of the Multi-layer Composite Liner System.
- Depending on the surface condition and grading of the landfill area, geomembrane, spray concrete or cushion geotextile will be placed underneath the Bentonite Matting for additional resistance from any irregularities and small extruded objects on the site formation surface. A granular or geocomposite drainage layer will also be installed at the site formation surface where it is needed to reduce any build-up of hydraulic pressure due to groundwater.

2.4.3 In this connection, in order to properly reflect the latest design of the Multi-layer Composite Liner System for the NENTX Project, it is proposed that a drawing illustrating the typical sections of Multi-layer Composite Liner system could be included into the EP Condition 2.19 (for EP-292/2007) and FEP Condition 2.17 (for FEP-02-292/2007). With an aim to reflecting the latest liner system design of the NENTX Project, the environmental performance requirement set out in the approved EIA Report will not be violated. Prior agreement from EPD should be sought in the event of any variation in the design principle of the Multi-layer Composite Liner system.

2.5 Summary of Benefits of the Proposed Changes

2.5.1 Based on above proposed changes, the benefits of the proposed changes are summarised in **Table 2.2**.

Table 2.2 Benefits of the Proposed Changes

Proposed Changes	Benefits
Variation of Landfill Extension Boundary • Area A - Site Boundary of the project is set back to allow set up of a common boundary between existing landfill and the NENTX's project (Area A, with minor reduction of area) • Area B - An additional coverage of landfill extension boundary (Area B, 5.81 hectares)	✓ Minor reduction of NENTX's project area. ✓ No increase in the waste boundary, filling height and landfill capacity, and no change in the development phasing with respect to Base Case Scenario. There is also no change in the scale of the landfill extension (i.e., about 70 hectares with a target void space of at least 19 million cubic meters on the eastern side of the existing NENT landfill). ✓ The new land (Area B) will accommodate the centralised landfill infrastructures such as leachate and landfill gas management facilities, main haul roads to the NENT Landfill Extension and associated slope works to minimise the potential air quality and other potential environmental impact during operation. ✓ To allow a clear demarcation of maintenance responsibility of the reinforced earth walls and slopes of the existing NENT Landfill.
Variation of Locations and Gaseous Emission of LFG Flare System LFG Generator Sets & Thermal Destructor	✓ The overall environmental performance of thermal destructor in ASP, landfill gas flares and generator sets has significantly improved due to technological advancements, which enable these systems to achieve higher gaseous emission standards. ✓ The air modelling results also reveal that the proposed change scenario brings improvements to potential air quality at all the representative ASRs, and also minimise associated health risks. ✓ The thermal destructor in ASP as the major source of gaseous emissions is relocated further away from the nearest ASR Wo Keng Shan Tsuen. The distance between the thermal destructor and ASR in Wo Keng Shan Tsuen is expected to increase by approximately 60 meters (i.e. around increase 16 %) under the proposed change scenario.

Proposed Changes	Benefits
Proposed Amendments on EP Condition 2.19 and FEP Condition 2.17	✓ To align with the contemporary landfill design and standards of the composite liner system, ensuring the engineering performance of the composite liner system of the NENT Landfill Extension. ✓ To maintain consistency with other local landfill expansion projects, avoiding risks associated with varying specifications and ensuring the reliability of the composite liner system of the NENT Landfill Extension.

3 Review on Air Quality Impact Assessment

3.1 Introduction

3.1.1 This section presents the potential air quality impacts due to alteration of landfill extension boundary, and gaseous emissions from LFG Flare system, LFG Generator Sets and Thermal Destructor.

3.2 Environmental Legislation, Standards and Guidelines

3.2.1 Relevant environmental legislations, standards, and guidelines under the Air Pollution Control Ordinance have been reviewed. For other non-criteria air pollutants, the guidelines and reference listed in the approved Project EIA Report (AEIAR-111/2007), including World Health Organization (WHO), United States Environmental Protection Agency (USEPA)'s Integrated Risk Information System (IRIS), etc., have also been reviewed.

3.3 Air Sensitive Receivers

3.3.1 With reference to *Table 3.14* of the approved Project EIA Report (AEIAR-111/2007), 5 representative air sensitive receivers (ASRs) closest to the Project Boundary were selected and reviewed for the assessment. The representative ASRs are listed in **Table 3.1** and their respective locations are shown in **Figure 3.1**.

3.3.2 It is noted that there is an interfacing project titled "Remaining Phase Development of the New Territories North (NTN) - NTN New Town and Man Kam To". The Broad Land Use Concept Plan of NTN has been opened for public inspection since January 2025. The NENTX Project, which is outside the NTN project area, has been identified as one of the potential concurrent projects. The project proponent of NTN shall assess the cumulative emissions from chimneys and health impact regarding toxic air pollutants. It is recommended that the landuse and development plans under NTN should allow adequate buffer distances from NENTX.

Table 3.1 Selected Representative Air Sensitive Receivers

ASRs	Description	Land use	Assessment Height (mAG)	Shortest distance to Project Boundary (m)
ASR1	Wo Keng Shan Tsuen	Residential	1.5, 5, 10	88
ASR11	Tung Lo Hang	Residential	1.5, 5, 10	560
ASR13	Nga Yiu Ha	Residential	1.5, 5, 10	690
ASR14	Ping Yeung	Residential	1.5, 5, 10	630
ASR27	Tong To Shan Tsuen (derelict and vacant)	Derelict and vacant	1.5, 5, 10	400

3.4 Assessment Methodology

Assessment Scenarios

3.4.1 To assess the potential air quality impact associated with the changes in locations, emission rates, and stack parameters of gaseous emissions, **a comparative approach** was adopted to assess the changes in air quality impact and the associated health risks. As described in **Section 2**, two scenarios, (i) 'Base Case Scenario' (i.e., "Original Scheme") and (ii) 'Proposed Change Scenario' (i.e., "Enhanced Scheme", were identified and compared for changes in air quality impacts.

3.4.2 American Meteorological Society (AMS) and USEPA Regulatory Model (AERMOD), the HKEPD approved air dispersion model, is applied to predict the air quality impacts at the representative ASRs. Hourly meteorological conditions including wind data, temperature, relative humidity, pressure, cloud cover and mixing height of Year 2019 are extracted from the WRF meteorological data adopted in the PATH v3.0 system. The dataset by WRF should be intact and consistent among parameters. In order to avoid any hours misidentified as missing data by AERMOD and its associated components, the WRF met data are handled manually to set wind direction between 0° – 0.1° to be 360°. The height of the input data is assumed to be 8.5 metres above ground for the first layer of the WRF data as input.

3.4.3 According to S3.6.2.1 of the approved Project EIA Report (AEIAR-111/2007), there would be new planned plants for the Landfill Gas Export Scheme (LFGES). Based on latest information and confirmation by the Contractor, there will not be LFGES in the latest design for NENTX. Hence, 'Case 3 – LFGES Off' is no longer applicable. Besides, all 3 flare systems will be installed together at the beginning of the operation under the latest design. There is no more "new landfill gas flare at later stage". The modes of operation for NENT Extension under 'Proposed Change Scenario' are shown in **Table 3.2**.

Table 3.2 Modes of Operation for various LFG facilities

Source	Plants	Modes of operation	
		Case 1 – ASP On	Case 2 – ASP Off
NENT Extension	Thermal Destructor in Ammonia Stripping Plant	✓	✕
	Landfill Gas Flare system (one on duty and two standby)[1]	✕	✓
	LFG Generator Sets (Electricity Generation – A total of 3 units)	✓	✓

Notes:
[1] The stand-by chimney will start operating when the duty chimney is out of services. Based on the long-term monitoring data record, the flares system was not in operation all the time during the year (utilization rate is not high).

3.5 Prediction and Evaluation of Environmental Impacts

3.5.1 As described in **Section 2.2**, under the Proposed Change Scenario, there is no increase in landfill area, filling height and landfill capacity, and no change in the development phasing with respect to Base Case Scenario.

3.5.2 The change in air quality impact of criteria pollutants due to gaseous emissions from NENT Landfill Extension at the representative ASRs under Proposed Change Scenario and Base Case Scenario has been shown in **Figure 3.2 & Figure 3.3** and evaluated in **Appendix 3.1**. The predicted changes in air quality impact at the representative ASRs is summarized in **Table 3.3 – Table 3.6**.

Table 3.3 Predicted Change of Air Quality Impact of Criteria Pollutants at Representative Air Sensitive Receivers (Case 1 – ASP On) (Proposed Change Scenario – Base Case Scenario)

ASR	NO_2 Concentration ($\mu g/m^3$)			SO_2 Concentration ($\mu g/m^3$)		
	Max 1-hr averaged	Max 24-hr averaged	Annual Average	Max 1-hr averaged	Max 24-hr averaged	Annual Average
ASR1 (1.5mAG, 5mAG, 10mAG)	-18.59 to -17.66	-3.86 to -3.60	-0.27 to -0.25	-18.81 to -17.86	-3.65 to -3.41	-0.20 to -0.19
ASR11 (1.5mAG, 5mAG, 10mAG)	-2.86 to -2.53	-1.71 to -1.58	-0.58 to -0.50	-1.60 to -1.29	-0.94 to -0.93	-0.44 to -0.40
ASR13 (1.5mAG, 5mAG, 10mAG)	-4.85 to -4.69	-1.54 to -1.49	-0.67 to -0.63	-6.34 to -6.14	-1.19 to -1.15	-0.40 to -0.39
ASR14 (1.5mAG, 5mAG, 10mAG)	-2.86 to -2.76	-1.03 to -0.99	-0.19 to -0.16	-3.69 to -3.58	-0.98 to -0.94	-0.14 to -0.13
ASR27 (1.5mAG, 5mAG, 10mAG)	-12.63 to -10.49	-1.79 to -1.69	-0.15 to -0.14	-3.57 to -2.60	-0.92 to -0.85	-0.10

Note:
1. Negative values denote improvement of air quality.

Table 3.4 Predicted Change of Air Quality Impact of Criteria Pollutants at Representative Air Sensitive Receivers (Case 2 – ASP Off) (Proposed Change Scenario – Base Case Scenario)

ASR	NO_2 Concentration ($\mu g/m^3$)			SO_2 Concentration ($\mu g/m^3$)		
	Max 1-hr averaged	Max 24-hr averaged	Annual Average	Max 1-hr averaged	Max 24-hr averaged	Annual Average
ASR1 (1.5mAG, 5mAG, 10mAG)	-0.25 to -0.15	-0.44 to -0.42	-0.11 to -0.09	-0.41 to -0.38	-0.65 to -0.60	-0.09
ASR11 (1.5mAG, 5mAG, 10mAG)	-3.30 to -3.10	-1.39 to -1.26	-0.44 to -0.35	-2.29 to -2.19	-1.05 to -0.99	-0.32 to -0.28
ASR13 (1.5mAG, 5mAG, 10mAG)	-0.17 to -0.11	-0.48 to -0.46	-0.42 to -0.39	-3.72 to -3.57	-0.97 to -0.93	-0.32 to -0.30
ASR14 (1.5mAG, 5mAG, 10mAG)	-2.37 to -2.19	-0.59 to -0.56	-0.12 to -0.09	-1.31 to -1.29	-0.55 to -0.53	-0.10 to -0.09
ASR27 (1.5mAG, 5mAG, 10mAG)	-12.89 to -11.61	-1.55 to -1.42	-0.09	-7.34 to -5.86	-1.39 to -1.06	-0.10 to -0.09

Note:
1. Negative values denote improvement of air quality.

3.5.3 The change in health risks associated with non-criteria pollutants (benzene and vinyl chloride) under two scenarios has also been evaluated. It is anticipated that there is a decrease in health risks at the representative ASRs for both Case 1 and Case 2 because of the technological advancements in thermal destructor in ASP, landfill gas flares and generator sets, which enable these systems to achieve a generally lower emission of the concerned non-criteria pollutants.

Table 3.5 Predicted Change of Health Risks associated with Non-Criteria Pollutants at Representative Air Sensitive Receivers (Case 1 – ASP On) (Proposed Change Scenario – Base Case Scenario)

ASR	Vinyl chloride Concentration (µg/m^3)			Benzene Concentration (µg/m^3)		
	Max 1-hr averaged	Annual averaged	Predicted Individual Risk Level per Year for Vinyl Chloride Chronic Effect	Max 1-hr averaged	Annual averaged	Predicted Individual Risk Level per Year for Benzene Chronic Effect
ASR1 (1.5mAG, 5mAG, 10mAG)	-0.0265 to -0.0250	-0.0003	-4.03×10^{-12} to -3.72×10^{-12}	-0.0186 to -0.0176	-0.0001	-1.19×10^{-11} to -1.08×10^{-11}
ASR11 (1.5mAG, 5mAG, 10mAG)	-0.0027	-0.0005 to -0.0004	-6.76×10^{-12} to -6.04×10^{-12}	-0.0007	-0.0002	-2.02×10^{-11} to -1.74×10^{-11}
ASR13 (1.5mAG, 5mAG, 10mAG)	-0.0069 to -0.0067	-0.0006	-8.56×10^{-12} to -8.13×10^{-12}	-0.0033 to -0.0032	-0.0003	-2.39×10^{-11} to -2.26×10^{-11}
ASR14 (1.5mAG, 5mAG, 10mAG)	-0.0041 to -0.0040	-0.0002	-2.44×10^{-12} to -2.19×10^{-12}	-0.0020 to -0.0019	-0.0001	-8.05×10^{-12} to -6.99×10^{-12}
ASR27 (1.5mAG, 5mAG, 10mAG)	-0.0071 to -0.0056	-0.0001	-2.01×10^{-12} to -1.93×10^{-12}	-0.0044 to -0.0034	-0.0001	-6.33×10^{-12} to -6.22×10^{-12}

Note:
1. Negative values denote improvement of air quality.

Table 3.6 Predicted Change of Health Risks associated with Non-Criteria Pollutants at Representative Air Sensitive Receivers (Case 2 – ASP Off) (Proposed Change Scenario – Base Case Scenario)

ASR	Vinyl chloride Concentration (μg/m^3)			Benzene Concentration (μg/m^3)		
	Max 1-hr averaged	Annual averaged	Predicted Individual Risk Level per Year for Vinyl Chloride Chronic Effect	Max 1-hr averaged	Annual averaged	Predicted Individual Risk Level per Year for Benzene Chronic Effect
ASR1 (1.5mAG, 5mAG, 10mAG)	-0.0072 to -0.0067	-0.0003 to -0.0002	-3.76×10^{-12} to -3.47×10^{-12}	-0.0013 to 0.0000	-0.0001 to 0.0000	-1.09×10^{-11} to 0.0000
ASR11 (1.5mAG, 5mAG, 10mAG)	-0.0069 to -0.0062	-0.0006 to -0.0005	-8.45×10^{-12} to -7.49×10^{-12}	-0.0039 to -0.0035	-0.0004 to -0.0003	-3.27×10^{-11} to -2.85×10^{-11}
ASR13 (1.5mAG, 5mAG, 10mAG)	-0.0078 to -0.0075	-0.0007	-1.07×10^{-11} to -1.01×10^{-11}	-0.0045 to -0.0043	-0.0004	-3.68×10^{-11} to -3.45×10^{-11}
ASR14 (1.5mAG, 5mAG, 10mAG)	-0.0034	-0.0002	-2.73×10^{-12} to -2.44×10^{-12}	-0.0017	-0.0001	-9.37×10^{-12} to -1.03×10^{-11}
ASR27 (1.5mAG, 5mAG, 10mAG)	-0.0145 to -0.0099	-0.0002	-2.77×10^{-12} to -2.49×10^{-12}	0.0000	0.0000	0.0000

Note:
1. Negative values denote improvement of air quality.
2. The value "0.0000" indicates that there is no change in concentration (i.e. absolute zero in concentration).

3.5.4 Based on the above assessment results, no significant negative impact to the air quality due to the proposed changes is anticipated. Moreover, it is predicted that there is **no increase in concentrations of criteria pollutants and non-criteria pollutants and the associated health risks** at all representative ASRs. Therefore, with respect to the reduced horizontal distance from the nearest ASR under the Enhanced Scheme, it is expected that the Proposed Change Scenario will generally bring positive effects to the air quality and health risks to the representative ASRs. The thermal destructor in ASP as the major source of gaseous emissions is relocated further away from the nearest ASR Wo Keng Shan Tsuen. The distance between the thermal destructor and ASR in Wo Keng Shan Tsuen is expected to increase by approximately 60 meters (i.e. around increase 16 %) under the proposed change scenario.

3.5.5 Regular monitoring throughout the construction, operation, restoration and aftercare stages of the NENTX including monitoring of stack emissions from the ASP, Flare, and LFG Power generator for vinyl chloride, benzene, Total Organic Carbon (TOC), NOx, and SO_2 as precautionary measures shall also be conducted as recommended in the approved EM&A Manual. With implementation of good site practices and mitigation measures, no adverse residual air quality impact due to the proposed changes is anticipated.

3.6 Impact due to change in Landfill extension boundary in Enhanced Scheme

3.6.1 As shown in **Figure 2.1**, there is a reduction of landfill extension boundary at Area A and expansion of landfill extension boundary at Area B. A reduction of landfill extension boundary at Area A will not result in adverse air quality impact. For Area B, it is confirmed by the Contractor that it is mainly for the purpose of installation of main haul road for the future landfill extension. With the adoption of good site practices, dust suppression measures, and dust monitoring program, dust impact due to installation of main haul road is minimal. Therefore, no adverse air quality impact is expected as a result of change in landfill extension boundary. Construction dust assessment presented in the approved Project EIA Report (AEIAR-111/2007) is still valid.

3.7 Operational Phase Odour Assessment

3.7.1 As described in **Section 2.2,** under the Proposed Change Scenario, there is no increase in waste boundary with respect to Base Case Scenario. A quantitative odour impact assessment (OIA) was conducted for the latest design adopted in the Enhanced Scheme of NENTX, assuming the odour control measures set out in the approved Project EIA Report were adopted.

3.7.2 The OIA has considered the proposed change mentioned in **Section 2** of this ERR. Since there is no change to the major odour-releasing activities considered in the approved EIA Report under the Enhanced Scheme, namely waste tipping and leachate treatment, the assessment results presented in the OIA Report were considered applicable to the "proposed change scenario" in this ERR and no adverse cumulative odour impact was predicted. The odour control measures described in S3. 7.2.3 of the approved Project EIA Report shall be properly implemented. The Contractor shall implement appropriate mitigation measures in accordance with the updated EM&A manual.

3.8 Mitigation Measures

3.8.1 The precautionary measures stipulated in the approved Project EIA Report are still valid. These measures include:

<u>Construction Phase</u>

- Implementation of the procedures and requirements given in Cap. 311R Air Pollution Control (Construction Dust) Regulation
- Provision of watering facilities at every designated vehicular exit point
- Implementation of good site practice and covering inactive tipping area with impermeable sheet

- Carrying out periodic dust monitoring at the nearby ASRs as detailed in the updated EM&A manual

Operation Phase

- The maximum allowable discharge limit for ASP, Flare, and LFG Power generator should be specified in the Specification. Regular stack monitoring shall be carried out during the operation.
- All new raw leachate storage tanks, stripped leachate holding tanks, SBRs, treated leachate holding tanks, and sludge holding tanks shall be installed with covers and deodourisers. Emission will be extracted to suitable deodourisers and be discharged after proper treatment.
- Waste tipping faces shall be compacted and covered with soil, Posi-shell, or other alternative daily cover, where appropriate, at the end of each working day.
- Inactive phases of NENTX shall be covered with soil or alternative impermeable materials, where appropriate.

Restoration and aftercare phase

- Similar measures as in construction and operation phases will be applied.
- All tipping areas shall be gradually installed with final capping during the restoration and aftercare stage.

3.8.2 The Contractor shall follow the updated EM&A manual to monitor for adverse air quality or odour impact.

3.9 Conclusion

3.9.1 Potential air quality impact under Proposed Change Scenario and Base Case Scenario has been compared. Model results predicted that the Proposed Change Scenario would bring improvement to air quality. Odour impact has been reviewed and the results presented in the approved Project EIA Report (AEIAR-111/2007) are still valid. Therefore, adverse air quality impact is not expected.

4 Review on Noise Impact Assessment

4.1 Introduction

4.1.1 This section reviews potential noise impact brought by Proposed Change Scenario under the “Enhanced Scheme” of NENTX Project.

4.2 Environmental Legislation, Standards, and Guidelines

4.2.1 The legislation, standards, guidelines relevant and practice notes e.g. PN1/24 for minimizing noise from construction activities, GN9/2023 for preparing construction noise impact assessment, and GN16/2023 for preparing fixed noise sources impact assessment relevant to the construction noise and fixed noise impacts were reviewed.

4.2.2 Noise impact was assessed in accordance with the criteria and methodology described in EIAO-TM the Technical Memoranda and stipulated under the Noise Control Ordinance (NCO). The NCO and EIAO provide the statutory framework for noise control. Construction assessment methodology and standards are set out various Technical Memoranda:

- Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM);
- Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM);
- Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM); and
- Technical Memorandum on Noise from Percussive Piling (PP-TM).

4.3 Noise Sensitive Receivers

4.3.1 The noise sensitive receivers (NSRs) described in *Table 4.8* of the approved Project EIA Report (AEIAR-111/2007) have been reviewed through desktop survey and are considered valid.

4.3.2 The NSRs which were either worst affected or marginally comply with the relevant noise criteria were selected for construction noise impact assessment and on-site operation noise impact assessment. These NSRs were listed in **Table 4.1** and depicted in **Figure 4.1**.

Table 4.1 Worst affected Noise Sensitive Receivers

NSRs	Description	Land use	No. of Storey	Shortest horizontal distance to the Project Boundary, m	Construction Noise Impact Assessment	On-site Operation Noise Impact Assessment
SR1	Wo Keng Shan Tsuen	Residential	3	80	Yes	Yes
SR9	Lin Ma Hang	Residential	3	880	No	Yes
SR10	Tung Lo Hang	Pig Farm / Residential	2	560	Yes	Yes

4.4 Construction Noise Impact Assessment

4.4.1 The construction activities, construction plant inventory, and development phasing presented in the approved Project EIA Report (AEIAR-111/2007) have been reviewed. The construction of the landfill extension would include the following activities:

- Site clearance & formation;
- Installation of liner;
- Construction of leachate treatment facilities;
- Construction of ammonia stripping plant;
- Cumulative construction noise impact for construction activities associated with the construction/operation in the extension and restoration in the existing landfill; and
- Restoration & Aftercare

4.4.2 The development phasing of NENTX is presented in **Figure 4.2**.

4.4.3 Since the Project Boundary has been revised and locations of leachate treatment facilities, and location of ammonia stripping plant are proposed to be relocated, construction noise impact has been quantitatively reviewed. The assessment methodology is outlined below:

- Determine the assessment area;
- Identify and locate representative NSRs that may be affected by the works;
- Obtain the methodology and work sequence for the construction period;
- Obtain the plant items for each corresponding work sequence;
- Determine the sound power levels (SWLs) of the plant items according to the information stated in the GW-TM or other recognised sources of reference;
- Calculate the correction factors based on the distance between the NSRs and the notional noise source positions of the work sites. As a worst-case assumption, all NSRs were assumed at the same height as the worksites;
- Apply corrections for façade and distance;
- Assess the construction and restoration works noise impacts;
- Predict noise levels at the NSRs;
- Quantify the level of impact at the NSRs in accordance with GW-TM; and
- Predict the cumulative noise impacts for activities associated with the construction phasing and restoration works at the existing landfill.

4.4.4 The above construction activities would involve the use of Powered Mechanical Equipment (PME) including excavators, truck, crane truck, compactor, dozer,

generator, loader, concrete lorry mixer, etc. The plant inventory list and the notional source position are presented in **Appendix 4.1**.

4.4.5 Construction noise impacts of the Project during the normal daytime working hours have been assessed at the worst affected representative NSRs based on the construction plant inventory presented during non-restricted hours. The unmitigated noise assessment results are summarized in **Table 4.2**. Details of the unmitigated construction noise assessment are presented in **Appendix 4.1**.

Table 4.2 Predicted Maximum Construction Noise Levels at the Worst Affected NSRs (Unmitigated Scenario)

NSRs	Description	Land use	Criteria	Predicted maximum construction noise level, dB(A)	Compliance
SR1	Wo Keng Shan Tsuen	Residential	75	69	Yes
SR10	Tung Lo Hang	Pig Farm / Residential	75	66	Yes

4.4.6 The predicted maximum construction noise level at SR1 and SR10 complied with the relevant construction noise criteria.

4.4.7 Cumulative construction noise impact from the construction of landfill extension and restoration of existing NENT landfill has been reviewed. The tentative period of installation of final capping and planting & landscaping at the existing NENT is Year 2026 Q1 to Year 2027 Q4. Therefore, construction of Phase 1, Phase 2, and construction of access road, leachate treatment plant, and other landfill infrastructures in Area B will potentially overlap with the restoration period of the existing NENT landfill.

4.4.8 The restoration work at the existing NENT would involve the laying of a gas venting layer, an impermeable mineral layer, a drainage layer and top soil on the top of the waste body. The plant inventory list for installation of final capping and planting & landscaping at the existing NENT is shown in **Appendix 4.1**.

4.4.9 As a worst-case scenario, it is assumed that construction works for Phase 1 Development, Phase 2 Development, construction of access road, leachate treatment plant, and other landfill infrastructures in Area B, and installation of final capping and planting & landscaping at the existing NENT would take place concurrently. The predicted cumulative noise levels at the NSRs are summarised in **Table 4.3** below and detailed calculations are shown in **Appendix 4.1**.

Table 4.3 Predicted daytime cumulative construction noise level

NSR	Notional distance to the Existing Landfill, m	Criteria, dB(A)	Predicted Noise Level, dB(A)			Compliance
			NENT Landfill Extension	Existing NENT Landfill	Cumulative	
SR1	628	75	68	56	68	Yes
SR10	249	75	65	74	75	Yes

4.4.10 Based on the assessment results, no adverse cumulative construction noise impact was predicted due to revision of Project Boundary and relocation of landfill

infrastructures. The precautionary measures suggested in the approved Project EIA Report (AEIAR-111/2007) are listed below:

- Good site practices to limit noise emissions at source;
- Use of quality powered mechanical equipment (QPME) and quieter construction methods or equipment, whenever practicable;
- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;
- Machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;
- Silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;
- Mobile plant should be sited as far away from NSRs as possible and practicable; and
- Material stockpiles, site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.

4.5 Review on Operational Road Traffic Noise

4.5.1 The number of refuses vehicles presented in *Table 4.11* of the approved Project EIA Report (AEIAR-111/2007) has been reviewed and is still valid. Therefore, the predicted maximum traffic noise levels at the NSRs stated in *Table 4.12* of the approved Project EIA Report (AEIAR-111/2007) remain unchanged. No exceedance of operational road traffic noise at the NSRs was predicted.

4.6 On-site Operation Noise Impact Assessment

4.6.1 On-site operation noise due to change in Project Boundary and relocation of landfill facilities have been reviewed. On-site operation noise sources in NENTX Landfill include aeration process in the lagoon of the leachate treatment plant, operation of the ammonia stripping plant, operation of LFG generator sets, refuse vehicle movement, and waste filling.

4.6.2 A new access road to NENTX would be constructed as shown in **Figure 4.3**. The existing road would be embanked after the new road to NENTX is constructed. Refuse vehicle would commute to NENTX using this new access road during operation phase.

4.6.3 Cumulative operational noise sources of the Project include aeration lagoon of leachate treatment plant, ammonia stripping plant, and flare station at the existing NENT landfill. There is no change on the sources, locations, and SWLs of these fixed noise sources at the existing NENT. The locations of fixed noise sources at the existing NENT landfill are depicted in **Figure 4.3**.

4.6.4 During early stage of waste filling operation, all PMEs will operate at the bottom of valley such that natural topography will provide sufficient screening effect for the NSRs. The worst-case scenario will only occur at the later stage when the

bottom part of the valley is filled up. When there is a direct line of sight of the tipping face, the natural topography cannot provide sufficient screening for NSRs. The worst-affect period will be occurred during the daily cover operation when relatively large-scale compression is required.

4.6.5 The following general procedures will apply to the on-site operational noise assessment:

- Determine the assessment area;
- Identify and locate representative NSRs that may be affected by the works;
- Obtain the plant items;
- Determine the sound power levels (SWLs) of the plant for fixed noise sources and the vehicular movement SWLs on the haul roads in accordance with BS5228;
- Calculate the correction factors based on the distance between the NSRs and the noise source positions;
- Apply corrections for façade, distance, barrier attenuation, and acoustic reflection where applicable;
- Predict fixed source noise levels at the NSRs; and
- Quantify the level of impact at the NSRs in accordance with IND-TM.

4.6.6 As confirmed by the Contractor, there is no change in the PME used for waste filling. The number of refuse vehicle operating in the landfill remains unchanged according to **Section 4.5**. Hence, the Sound Power Levels (SWLs) of refuse vehicle and waste filling are considered valid.

4.6.7 The LFG generator sets are fully enclosed, and the engines are also equipped with exhaust gas silencer. Based on the information provided by the Contractor, the LFG generator has a sound power level (SWL) of 93 dB(A). The SWLs of the aeration lagoon of the proposed leachate treatment plant and ammonia stripping plant listed in Table 4.13 of the approved Project EIA Report (AEIAR-111/2007) are considered valid.

4.6.8 The location of fixed noise sources is presented in **Figure 4.3** and the noise inventory for existing NENT and NENTX landfill site operation is summarized in **Table 4.4**.

Table 4.4 Noise inventory for Existing NENT and NENTX landfill site operation

Description	Quantity	SWL, dB(A)	Subtotal SWL, dB(A)	Operation period [1]
Existing NENT Landfill				
Leachate Treatment Plant of Existing NENT Landfill (ES1)	1	75	75	Daytime, Evening time, and night time
Ammonia Stripping Plant of Existing NENT Landfill (ES2)	1	88	88	
Flare Station of Existing NENT Landfill (ES3)	1	98	98	
NENTX Landfill				
Leachate treatment plant of NENTX Landfill (S1)	1	75	75	Daytime, Evening time, and night time
Ammonia stripping plant of NENTX Landfill (S2)	1	88	88	
LFG generator sets of NENTX Landfill (S3)[2]	1	93	93	
Refuse vehicle Movement (S4)	90 per 30-min	97	117	Daytime
Waste filling in NENTX Landfill (S5)[3]				
Compactor (CNP 050)	2	105	119	Daytime
Dump truck, e.g., 5.5 tonne < gross vehicle weight ≤ 38 tonne, (CNP068)	1	105		
Bulldozer (CNP030)	2	115		
Backhoe (CNP081)	1	112		

Note:
[1] Daytime refers to 7AM to 7PM, evening time refers to 7PM to 11PM, and night time refers to 11PM to 7AM on the next day.
[2] The sound power level (SWL) for LFG generator sets was provided by the supplier.
[3] Reference of CNP refers to Table 3 of EPD's Technical Memorandum on Noise from Construction Work Other Than Percussive Piling.

4.6.9 The worst affected NSRs, namely SR1 and SR10, and NSR which marginally comply with the noise criteria, which is SR9, were selected for the quantitative review of on-site operation noise impact assessment.

4.6.10 For the purpose of determining the screening effect from natural topography, 10 dB(A) reduction was assumed for total screening from natural topography, whilst 5 dB(A) reduction was assumed for partial screening from hill slope.

4.6.11 Cumulative daytime on-site operational noise impact without mitigation during the early stage of tipping/daily covering when the effect of topography screening is adequate has been assessed and summarized in **Table 4.5**. According to **Table 4.5**, the operational noise impact will comply with the noise criteria during early stage of tipping/daily covering when the topography screening effect is adequate during daytime.

4.6.12 At the later stage of tipping/daily covering when the effect of topography screening is inadequate, on-site operation noise impact without mitigation as the

NSRs was assessed and summarized in **Table 4.6**. According to **Table 4.6**, exceedance at SR1 and SR9 would occur during daytime at the later stage of tipping/daily covering when the effect of topography screen is inadequate.

4.6.13 The predicted evening and night time noise levels will comply with the evening and night time noise criteria at all NSRs during the entire landfill operating period. No mitigation is required during evening and night time. The assessment results are summarized in **Table 4.7**. The detailed calculations for operational noise are shown in **Appendix 4.1**.

Table 4.5 Predicted cumulative daytime facade noise levels without mitigation measures during the early stage of tipping/daily covering when the effect of topography screening is adequate (Without mitigation)

NSR ID	Predicted façade Noise Levels, (Leq 30min dB(A))								Cumulative SPL, Leq (30min) dB(A)	Criteria, dB(A)	Compliance (Y/N)
	Leachate Treatment Plant of Existing NENT Landfill (ES1)	Ammonia Stripping Plant of Existing NENT Landfill (ES2)	Flare Station of Existing Landfill (ES3)	Leachate Treatment Plant of NENTX Landfill (S1)	Ammonia Stripping Plant of NENTX Landfill (S2)	LFG Generator Sets of NENTX Landfill (S3)	Refuse Vehicle Movement (S4)	Waste filling in NENTX Landfill (S5)			
SR1	<10	13	20	24	36	42	45	47	50	51	Y
SR9	<10	<10	12	<10	<10	15	27	42	42	44	Y
SR10	12	31	38	<10	20	24	27	42	44	53	Y

Table 4.6 Predicted daytime facade noise levels without mitigation measures during the later stage of tipping/daily covering when the effect of topography screening is inadequate

NSR ID	Predicted façade Noise Levels, (Leq 30min dB(A))								Cumulative SPL, Leq (30min) dB(A)	Criteria, dB(A)	Compliance (Y/N)
	Leachate Treatment Plant of Existing NENT Landfill (ES1)	Ammonia Stripping Plant of Existing NENT Landfill (ES2)	Flare Station of Existing Landfill (ES3)	Leachate Treatment Plant of NENTX Landfill (S1)	Ammonia Stripping Plant of NENTX Landfill (S2)	LFG Generator Sets of NENTX Landfill (S3)	Refuse Vehicle Movement (S4)	Waste filling in NENTX Landfill (S5)			
SR1	<10	13	20	24	36	42	45	52	53	51	N
SR9	<10	<10	12	<10	<10	15	27	47	47	44	N
SR10	12	31	38	<10	20	24	27	42	44	53	Y

Table 4.7 Predicted evening time and night time facade noise levels without mitigation measures

NSR ID	Predicted façade Noise Levels, (Leq 30min dB(A))						Cumulative SPL, Leq (30min) dB(A)	Criteria (Evening / Night time)	Compliance (Y/N)
	Leachate Treatment Plant of Existing NENT Landfill (ES1)	Ammonia Stripping Plant of Existing NENT Landfill (ES2)	Flare Station of Existing Landfill (ES3)	Leachate Treatment Plant of NENTX Landfill (S1)	Ammonia Stripping Plant of NENTX Landfill (S2)	LFG Generator Sets of NENTX Landfill (S3)			
SR1	<10	13	20	24	36	42	43	47 / 45	Y
SR9	<10	<10	12	<10	<10	15	18	40 / 39	Y
SR10	12	31	38	<10	20	24	39	49 / 45	Y

4.6.14 Assessment results indicate that the exceedance of noise criteria at SR1 & SR9 are caused by the daily covering activities involving the use of PMEs during the later stage of the landfill operation when the effect of topography screening is inadequate. Noise mitigation measures are therefore required to alleviate the noise impacts at that stage of the landfill development.

4.6.15 According to **Table 4.8**, exceedance of operational noise at SR1 and SR9 during later stage of tipping or daily covering when the effect of topography screening is inadequate. Noise mitigation measures such as adopting quieter PME are therefore required to alleviate the noise impacts at that stage of the landfill development. The Contractor(s) may be able to obtain particular models of plant that are quieter than the PMEs given in GW-TM. It is considered too restrictive to specify that a Contractor has to use specific items of plant for the construction operations. It is practical to specify the total SWL of all plant to be used on site so that the Contractor has the flexibility to select plant to suit his needs.

4.6.16 The use of quality PME associated with the construction works is prescribed in EPD's Quality Powered Mechanical Equipment (QPME) database, which contains the SWLs for quality/quiet PME of various types, brands and models. The SWL for Quality PME adopted during later stage of tipping or daily covering when the effect of topography screening is inadequate is shown in **Table 4.8**.

Table 4.8 Quality Powered Mechanical Equipment for Waste Filling

Equipment	QPME	SWL, dB(A)	QPME ID Code	Expiry Date
Dozer	Bulldozer, tracked	108	EPD-12694	09/2028
Backhoe	Excavator, wheeled/tracked	87	EPD-08247	05/2025

4.6.17 With the use of QPME in **Table 4.9**, the SWL of waste filling is reduced from 119 dB(A) to 113 dB(A). The noise inventory for existing NENT and NENTX landfill site operation in mitigated scenario is shown in **Table 4.9**.

Table 4.9 Mitigated noise inventory for Existing NENT and NENTX landfill site operation

Description	Quantity	SWL, dB(A)	Subtotal SWL, dB(A)	Operation period [1]
Existing NENT Landfill				
Leachate Treatment Plant of Existing NENT Landfill (ES1)	1	75	75	Daytime, Evening time, and night time
Ammonia Stripping Plant of Existing NENT Landfill (ES2)	1	88	88	
Flare Station of Existing NENT Landfill (ES3)	1	98	98	
NENTX Landfill				
Leachate treatment plant of NENTX Landfill (S1)	1	75	75	Daytime, Evening time, and night time
Ammonia stripping plant of NENTX Landfill (S2)	1	88	88	
LFG generator sets of NENTX Landfill (S3)[2]	1	93	93	
Refuse vehicle Movement (S4)	90 per 30-min	97	117	Daytime
Waste filling in NENTX Landfill (S5)[3][4]				
Compactor (CNP 050)	2	105	113	Daytime
Dump truck, e.g., 5.5 tonne < gross vehicle weight ≤ 38 tonne, (CNP068)	1	105		
Bulldozer, tracked (EPD-12694)	2	108		
Excavator, wheeled/tracked (EPD-08247)	1	87		

Note:
[1] Daytime refers to 7AM to 7PM, evening time refers to 7PM to 11PM, and night time refers to 11PM to 7AM on the next day.
[2] The sound power level (SWL) for LFG generator sets was provided by the supplier.
[3] Reference of CNP refers to Table 3 of EPD's Technical Memorandum on Noise from Construction Work Other Than Percussive Piling.
[4] Reference of QPME refers to the information relating to Quality Powered Mechanical Equipment (QPME) available at EPD's website.

4.6.18 The predicted cumulative daytime façade noise levels with mitigation measures are presented in **Table 4.10**. The results indicate that no adverse on-site operational noise impact is predicted during later stage of tipping or daily covering when the effect of topography screening is inadequate with mitigation measures are in place. The detailed calculations are shown in **Appendix 4.1**.

Table 4.10 Predicted daytime facade noise levels with mitigation measures during the later stage of tipping/daily covering when the effect of topography screening is inadequate

NSR ID	Predicted façade Noise Levels, (Leq 30min dB(A))								Cumulative SPL, Leq (30min) dB(A)	Criteria, dB(A)	Compliance (Y/N)
	Leachate Treatment Plant of Existing NENT Landfill (ES1)	Ammonia Stripping Plant of Existing NENT Landfill (ES2)	Flare Station of Existing Landfill (ES3)	Leachate Treatment Plant of NENTX Landfill (S1)	Ammonia Stripping Plant of NENTX Landfill (S2)	LFG Generator Sets of NENTX Landfill (S3)	Refuse Vehicle Movement (S4)	Waste filling in NENTX Landfill (S5)			
SR1	<10	13	20	24	36	42	45	47	50	51	Y
SR9	<10	<10	12	<10	<10	15	27	41	41	44	Y
SR10	12	31	38	<10	20	24	27	36	41	53	Y

4.7 Residual Environmental Impact

4.7.1 Cumulative construction noise impact is predicted to be within the relevant noise criteria. No residual environmental impact at the NSRs is anticipated.

4.7.2 Cumulative on-site operation noise is predicted to comply with the relevant noise criteria during early stage of tipping/daily covering and during evening and night time at all NSRs within the entire landfill operation. At the later stage of landfill operation, cumulative on-site operational noise from waste filling activities in NENTX Landfill would be mitigated by using QPME to control noise impact to within the criteria. With the implementation of proper mitigation measures, no residual environmental impact is predicted. The EM&A requirements and mitigation measures recommended in the approved Project EIA Report (AEIAR-111/2007) are still applicable.

4.8 Conclusion

4.8.1 Cumulative construction noise impact has been reviewed quantitatively. The assessment predicted that there is no adverse construction noise impact to the NSRs.

4.8.2 Operational traffic noise assessed in the approved Project EIA Report (AEIAR-111/2007) was reviewed. The number of refuses vehicles in the approved Project EIA Report (AEIAR-111/2007) is still valid. Therefore, the assessment results in the approved Project EIA Report (AEIAR-111/2007) are valid. No residual environmental impact is predicted.

4.8.3 Cumulative on-site operation noise is predicted to comply with the relevant noise criteria during early stage of tipping/daily covering and during evening and night time at all NSRs within the entire landfill operation. At the later stage of tipping when the topography is insufficient to screen the noise impact, assessment results indicate that the predicted noise levels at SR1 and SR9 would comply with relevant noise criteria with the adoption of QPME. No adverse environmental impact is predicted.

5 Review on Water Quality Impact Assessment

5.1 Introduction

5.1.1 This section reviews potential water quality impact under the Proposed Change Scenario.

5.2 Construction Phase

Construction Phase

Construction Site Runoff

5.2.1 Construction site runoff comprises runoff and erosion from excavation areas, drainage channels, and stockpiles, wash water from dust suppression sprays and wheel washing facilities, and fuel, oil, solvent and lubricants from maintenance of construction machinery and equipment. The Contractor shall follow the precautionary measures stated in S5.8.1.1 of the approved Project EIA Report (AEIAR-111/2007) to mitigate the impacts of construction site runoff.

Sewage from Workforce

5.2.2 As suggested in S5.8.1.2 of the approved Project EIA Report (AEIAR-111/2007), sanitary facilities and their disposal and maintenance shall be provided by a licensed contractor for on-site workforce throughout construction, operation, restoration and aftercare stages. Adverse water quality impact is not expected.

Drainage Diversion

5.2.3 As confirmed by the Contractor, all drainage diversion work is the same as described in the approved Project EIA Report (AEIAR-111/2007).

Groundwater seepage

5.2.4 As confirmed by the Contractor, there will be no deep excavation, tunnel boring, or other underground works. Groundwater seepage is, therefore, minimized.

5.3 Operational Phase

Seepage of Leachate

5.3.1 The composite liner system used in the Project will be the same as the liner materials presented in *Table 5.6* of the approved Project EIA Report (AEIAR-111/2007) under the Proposed Change Scenario. The updated landfilling area will have no encroachment on the Lin Ma Hang Stream and its catchment, Ping Yuen River, and Shenzhen River. Therefore, the findings on environmental risks due to seepage of leachate and impact to groundwater presented in the approved Project EIA Report (AEIAR-111/2007) is still valid. Good practice, management and regular inspection on site shall be taken to safeguard no significant leakage of the leachate. Should there be any noticeable seepage of leachate or defect in the geomembrane, contingency plan on accidental leakage of leachate shall be implemented to minimize the environmental risk due to seepage of leachate.

Leachate Collection and Treatment System

5.3.2 As confirmed by the Contractor, there is no change on the design, location, and operation of the on-site Leachate Collection and Treatment System. The results presented in the approved Project EIA Report (AEIAR-111/2007) is still valid.

5.4 Conclusion

5.4.1 The water quality impact under Proposed Change Scenario has been reviewed. The minor change in landfill extension boundary will not result in adverse water quality impact during construction phase. During operation phase, as there is no change on the design of the composite liner system and on-site leachate collection and treatment system, the results presented in the approved Project EIA Report (AEIAR-111/2007) is considered valid. Proper monitoring, EM&A manual, erosion plan, surface water drainage system and other mitigation measures suggested in the approved Project EIA Report (AEIAR-111/2007) are valid and shall be implemented to mitigate adverse water quality impact.

6 Review on Waste Management Implications

6.1 Introduction

6.1.1 This section reviews the waste management implications under Proposed Change Scenario.

6.2 Construction and Operation Phase

6.2.1 As confirmed by the Contractor, site formation works will be based on a material balance approach, which the construction materials will be used as fill materials, daily-cover and final capping. No import or export of soil materials is expected.

6.2.2 The type and quantities of chemical waste presented in Table 6.1 of the approved Project EIA Report (AEIAR-111/2007) is still valid, as confirmed by the Contractor.

6.2.3 The amount of general refuse and sludge generated during construction and operation phase described in the approved Project EIA Report (AEIAR-111/2007) is also valid under the Proposed Change Scenario, as confirmed by the Contractor.

6.2.4 Given there is no change in the type and quantity of waste generated during construction phase and operation phase, the findings, mitigation measures, and EM&A manual presented in the approved Project EIA Report (AEIAR-111/2007) is considered valid.

6.3 Restoration and aftercare phase

6.3.1 During restoration and aftercare phase, chemical waste, general refuse, and sludge will be the major types of waste generated. As confirmed by the Contractor, the waste quantities for chemical waste, general refuse, and sludge would be the same as the approved Project EIA Report (AEIAR-111/2007) under Proposed Change Scenario. The contractor shall follow the EM&A and mitigation measures suggested in the approved Project EIA Report (AEIAR-111/2007).

6.4 Conclusion

6.4.1 Waste management implications under Proposed Change Scenario have been reviewed and that the findings in the approved Project EIA Report (AEIAR-111/2007) are still considered valid. The contractor shall implement the mitigation measures and EM&A manual presented in the approved Project EIA Report (AEIAR-111/2007). No adverse environmental impact is predicted.

7 Review on Landfill Gas Hazards Assessment

7.1 Introduction

7.1.1 This sections reviews landfill gas (LFG) hazards under Proposed Change Scenario.

7.2 Hazards due to changes in Landfill Extension Boundary under the Enhanced Scheme

7.2.1 As presented in the approved Project EIA Report (AEIAR-111/2007), the NENT Landfill extension itself is a source of LFG, which may pose threats to front-line workers at the Project site. The NENT Landfill extension will be equipped with active gas extraction system and LFG control measures to ensure compliance of environmental and safety requirements. Therefore, the source hazard categorization presented in the approved Project EIA Report (AEIAR-111/2007) is still valid.

7.2.2 The locations of geological faults presented in the approved Project EIA Report (AEIAR-111/2007) are still within the updated Project Boundary. Thus, the pathways presented in the approved Project EIA Report (AEIAR-111/2007) is considered applicable.

7.2.3 The 250 m consultation zone of the combined boundary of existing NENT Landfill and NENT Landfill extension under Proposed Change Scenario would cover the same area of Green Belt Zoning and Agriculture Zoning under Plan No. S/NE-WKS/10 as in Base Case Scenario. No further receiver is identified under Proposed Change Scenario.

7.3 Hazards due to changes in Gaseous Emissions

7.3.1 The changes in gaseous emissions from Thermal Destructor in Ammonia Stripping Plant, LFG Flare system, and LFG Generator Sets do not induce changes in hazards of LFG.

7.3.2 Based on the above information, the source, pathway, and receiver under Proposed Change Scenario remain the same as in Base Case Scenario. Thus, the findings presented in the approved Project EIA Report (AEIAR-111/2007) are still applicable.

7.3.3 The Contractor shall follow the protective and precautionary measures, monitoring requirements in the relevant guidance notes, and EM&A manual to minimize LFG Hazard and mitigate adverse environmental impact.

7.4 Conclusion

7.4.1 The LFG Hazard, source, pathway, receivers, and risk level presented in the approved Project EIA Report (AEIAR-111/2007) is still valid under Proposed Change Scenario. The Contractor shall implement relevant measures stated in the approved Project EIA Report (AEIAR-111/2007) and EM&A manual to mitigate adverse environmental impact.

8 Review on Landscape and Visual Impact Assessment

8.1 Introduction

8.1.1 This section reviews the Landscape and Visual Impact Assessment under the Proposed Change Scenario.

8.2 Impact due to changes in Landfill Extension Boundary under the Enhanced Scheme

8.2.1 The Landscape Character Area (LCA) and Landscape Resources (LR) presented in Table 8.4 and Table 8.5 of the approved Project EIA Report (AEIAR-111/2007) have been reviewed. Given there is a slight decrease in the area of the Landfill Extension Boundary under the Proposed Change Scenario, the 500m study area is smaller as the approved Project EIA Report (AEIAR-111/2007). Based on desktop survey, there is no change in the landscape character area (LCA) and landscape resources (LR) within the study area.

8.2.2 The DEVB TC(W) No. 5/2020 on registration and preservation of old and valuable trees supersedes ETWB TC(W) No. 29/2004. According to DEVB TC(W) No. 5/2020, only trees on unleased Government land within built-up areas or tourist attraction spots in village areas are eligible for inclusion in the Register of Old and Valuable Trees. Upon checking against Appendix A (Location of Built-up Areas) of the technical circular, it has been verified that the Project area does not fall into the designated built-up areas. The tree survey presented in the approved Project EIA Report (AEIAR-111/2007) showed that no trees are eligible for inclusion in the Register of Old and Valuable Trees. Nevertheless, the Contractor shall submit a detailed tree survey report and a tree felling application to government for approval before site formation works commence.

8.2.3 The visual sensitive receivers (VSRs) and their associated sensitivity have been reviewed and are considered still applicable. As confirmed by the Contractor, the design, construction, and operation of the landfill extension remain unchanged under Proposed Change Scenario. Therefore, the potential sources of landscape and visual impacts, landscape impact assessment, and visual impact assessment presented in the approved Project EIA Report (AEIAR-111/2007) are still applicable.

8.2.4 The Contractor shall implement the mitigation measures presented in the Project EIA Report, such as tree planting, monitoring and maintenance, to ensure no adverse environmental impact is brought by the Project.

8.3 Impact due to changes in Gaseous Emissions

8.3.1 The relocation of gaseous emissions from Thermal Destructor of Ammonia Stripping Plant, LFG Flare system, and LFG Generator Sets is not considered as the source of Landscape and Visual Impact. Therefore, the landscape and visual impact due to changes in gaseous emissions is considered insignificant.

8.4 Conclusion

8.4.1 The Landscape and Visual Impact Assessment under Proposed Change Scenario has been reviewed. It is predicted that the findings in the approved Project EIA Report (AEIAR-111/2007) is still valid, and the Contractor shall implement the mitigation measures listed in the approved Project EIA Report (AEIAR-111/2007).

9 Review on Cultural Heritage Impact Assessment

9.1 Introduction

9.1.1 The Chapter reviews the cultural heritage impact assessment (CHIA) under the Proposed Change Scenario of the Project, identifying cultural heritage resources such as archaeological sites, built heritage structures and cultural and historical landscape features. The CHIA consists of Archaeological Impact Assessment (AIA) and Built Heritage Impact Assessment (BHIA).

9.2 Description of the Study Area

9.2.1 The project boundary under the Proposed Change Scenario is shown in **Figure 9.1**. There is a minor reduction of project area (Area A) and an additional coverage of landfill extension boundary (Area B, 5.81 hectares) under the "Enhanced Scheme" Scenario.

9.2.2 Due to part of project area belong the infrastructure area of the existing NENT Landfill starting from June 1995 (See **Figure 9.1** & See Aerial photographs in **Appendix 9.1**), the related areas were identified to the developed areas and no potential archaeological and built heritage in the related areas were found during past operational period. The study area for the cultural heritage impact assessment (CHIA) under this study is divided into five subsections, namely Ngong Tong, Tong To Shan, Shek Tsai Ha, Wo Keng Shan and Area B, which all are illustrated in **Figure 9.2**.

9.2.3 Under the Proposed Change Scenario, the Project Boundary along Shek Tsai Ha Road (north and west of Shek Tsai Ha Road) extends to the boundary of the existing NENT Landfill while other parts of the Project Boundary remain unchanged from the Base Case Scenario previously assessed in *the approved Project EIA Report (AEIAR-111/*2007*) ("the approved EIA Report")*. Thus, the archaeological potential for four subsections (Ngong Tong, Shek Tsai Ha, Wo Keng Shan, and Tong To Shan), as presented in *Table 9.1 and Table 9.2 of the approved EIA Report remains* valid.

9.2.4 However Extended Project Boundary near Ngong Tong (Area B) was not covered under the Archaeological Impact Assessment (AIA) of *the approved EIA Report*, the related assessment at Area B was carried out under this assessment.

Extended Project Boundary near Ngong Tong (Area B) (South and South-west of Shek Tsai Ha Road)

9.2.5 The Extended Project Boundary near Ngong Tong (Area B) is similar in nature to that of Ngong Tong. It was mainly hilly terrain with scrubby vegetation (Shown in Photos 7 & 8 of **Appendix 9.1**).

9.3 Assessment Methodology

Archaeology

9.3.1 The methodology of the Archaeological Impact Assessment (AIA) at Area B, which consists of Desk-based study, Preliminary Site Investigation, Field Evaluation Programme & Impact assessment and mitigation recommendations, is consistent with *Section 9.4.1 of the approved EIA Report*.

9.4 Assessment Results

Archaeology

9.4.1 As mentioned in Section 9.2.3, the mitigation recommendations for four subsections presented in *the approved EIA Report* are still valid and are listed in **Table 9.1**.

Table 9.1 Mitigation recommendations for archaeology

Locations	Archaeological Potential	Recommended Mitigation
Ngong Tong	Extremely low (based on desk-based study and preliminary site investigation)	No further investigation required
Shek Tsai Ha	Extremely low (based on desk-based study and preliminary site investigation)	No further investigation required
Wo Keng Shan	Extremely low (based on desk-based study and preliminary site investigation)	No further investigation required
Tong To Shan	Extremely low (based on desk-based study and preliminary site investigation)	No further investigation required

9.4.2 Due to Area B not covered under the AIA of *the approved EIA Report*, the related assessment at Area B was carried out under this assessment.

Desk-based study

9.4.3 The geology of Area B primarily consists of volcanic rocks, particularly undivided coarse ash crystal tuff. This terrain is typified by moderate to steep slopes with gently concave side slopes and narrow convex ridges (Shaw et al 2000). The superficial deposits consist of unsorted debris flow, a mix of gravel, clayey silt, sand, along with cobbles and boulders (see **Figure 9.3**).

9.4.4 Topographically, Area B is dominated by hilly terrain with scrubby vegetation. The maximum elevation is approximately +160 mPD. The lowest elevation associated with the study area is approximately +40 mPD and is located on the valley floors, as well as south and south-west of Shek Tsai Ha Road.

9.4.5 Aerial photographs taken in 1973, 1987, 1993, 2002, 2013, 2022 show no evidence of any past human settlement or activity at Area B. The above historic aerial photographs are presented in **Appendix 9.1**.

Preliminary Site Investigation

9.4.6 The surface field scan at Area B was carried out in 2022. No evidence of archaeological surface material, no land use features, no past human settlement and activity were identified at Area B under the surface field scan. It revealed that the area of the extended Project Boundary was mainly hilly terrain with scrubby vegetation. The potential for this area to contain any subsurface cultural deposits is extremely low. The reasons are the same as those stated for Ngong Tong. Photos of surface field scan, current and historic land use are presented in **Appendix 9.1**.

9.5 Impacts due to changes in Landfill Extension Boundary under the Enhanced Scheme

Archaeology

9.5.1 As mentioned in Section 9.2.3, the archaeological potential for four subsections (Ngong Tong, Shek Tsai Ha, Wo Keng Shan, and Tong To Shan) presented in *Table 9.1 and Table 9.2 of the approved EIA Report* is considered valid.

9.5.2 In summary of the above desk-based study and preliminary site investigation at Area B, no evidence of archaeological surface material, no land use features, no past human settlement and activity were identified at Area B. The potential for this area to contain any subsurface cultural deposits is extremely low. The reasons are the same as those stated for Ngong Tong. It concluded that the archaeological potential at Area B is considered extremely low and no further evaluation will be required in the Area B subsection. The mitigation recommendations for archaeology are shown in **Table 9.2**.

Table 9.2 Mitigation recommendations for archaeology

Locations	Archaeological Potential	Recommended Mitigation
Area B	Extremely low (based on desk-based study and preliminary site investigation)	No further investigation required

9.5.3 As the assessment results under this report and *the approved EIA Report*, five subsections (Ngong Tong, Shek Tsai Ha, Wo Keng Shan, Tong To Shan and Area B) were deemed to have extremely low archaeological potential and would require no mitigations.

9.5.4 As previously assessed in *the approved EIA Report*, construction activities associated with site formation for the NENT Landfill Extension will not impact any areas of archaeological potential. Archaeological resources identified in part of the Tong To Shan Archaeological Site (currently known as Tong To Shan Site of Archaeological Interest) in the previous investigations are now located outside the extension boundary and will not be impacted by the construction works.

Built Heritage

9.5.5 The Built Heritage Impact Assessment presented in *the approved EIA Report* has covered the extended Project Boundary at Ngong Tong (North and West of Shek Tsai Ha Road: western and central section). The Project will not affect any Heritage Sites, i.e., all declared monuments, proposed monuments, graded historic sites, buildings, or structures, all sites, buildings or structures in the new list of proposed grading items, and Government historic sites identified by the Antiquities and Monuments Office. Therefore, adverse impact to built heritage is not anticipated. The mitigation measures and EM&A manual presented in *the approved EIA Report* shall be implemented properly to mitigate built heritage impact.

9.6 Impacts due to changes in Gaseous Emissions under the Enhanced Scheme

9.6.1 The changes in locations and stack parameters for Thermal Destructor of Ammonia Stripping Plant, LFG Flare systems, and LFG Generator Sets are not considered as the source of cultural heritage impact. Therefore, the cultural heritage impact due to changes in gaseous emissions is considered minimal.

9.7 Conclusion

9.7.1 Cultural heritage impact under Proposed Change scenario has been reviewed. It was predicted that the findings presented in *the approved EIA Report* are still valid. The extended Project Boundary near Ngong Tong (Area B) was found to contain extremely low archaeological potential and no built heritage. Proper mitigation measures and EM&A described in *the approved EIA Report* shall be carried out to minimize adverse cultural heritage impact.

10 Review on Ecological Impact Assessment

10.1 Introduction

10.1.1 This Chapter reviews the Ecological Impact during design, construction, operation, restoration, and aftercare phases of the Project under Proposed Change Scenario.

10.2 Impact due to Changes in Landfill Extension Boundary under the Enhanced Scheme

10.2.1 Under the Proposed Change Scenario under the Enhanced Scheme, the landfilling area is revised as smaller and project works remain unchanged such that the study area is smaller under Proposed Change Scenario. Based on desktop survey, the habitat found within 500m from the landfilling area remains the same (i.e., natural woodland, man-made woodland, grassland with low shrub, stream/ channel, abandoned agricultural fields, and urbanised/ disturbed habitat). The overall ecological value presented in *Table 10.7 – 10.14* of the approved Project EIA Report (AEIAR-111/2007) for each habitat is considered applicable. The Contractor shall carry out a detailed vegetation survey covering the affected habitats located within the Project area in accordance with EP Conditions 2.5 and 2.7.

10.2.2 Under Proposed Change Scenario, there is a slight reduction of area of landfilling area such that the degree of habitat loss and removal of vegetation is reduced. There will not be direct impact to recognised sites of conservation importance such as Lin Ma Hang Lead Mines Site of Special Scientific Interests (SSSI), Lin Ma Hang Stream and its catchment, and Robin's Nest countryside. Wildlife will be disturbed to a less extent under Proposed Change Scenario.

10.2.3 The design and operation for impermeable liner system and leachate collection and treatment system remained unchanged under the Proposed Change Scenario. Therefore, the impact regarding changes in water quality, hydrology, accidental leakage of leachate described in the approved Project EIA Report (AEIAR-111/2007) remains valid.

10.2.4 The updated landfilling area does not encroach to Lin Ma Hang Stream catchment and thus no impact to the existing flow or sedimentation rate is expected.

10.2.5 Impacts due to potential collection of hazardous waste in the future was assessed in the approved Project EIA Report (AEIAR-111/2007). Under Proposed Change Scenario, the methods of collecting and disposing hazardous waste and its associated leachate remained unchanged. Potential ecological impact presented in the approved Project EIA Report (AEIAR-111/2007) is still applicable.

10.2.6 During restoration and aftercare phase, the landfill will be restored by tree planting such that no adverse ecological impact is expected. The landfill will be covered with a second impermeable barrier with surface drainage

channels for the collection of surface runoff. The ecological impacts during aftercare and restoration phase remain applicable.

10.2.7 The mitigation measures and ecological monitoring and audits specified in the approved Project EIA Report (AEIAR-111/2007) shall be followed to ensure no adverse environmental impact brought by the Project.

10.3 Impact due to Changes in Gaseous Emissions

10.3.1 The changes in locations and stack parameters of the gaseous emissions from Thermal Destructor in Ammonia Stripping Plant, LFG Flare system, and LFG Generator Sets are not considered as the source of ecological impact. Therefore, the ecological impact due to changes in gaseous emissions is considered insignificant.

10.4 Conclusion

10.4.1 Ecological impact under Proposed Change Scenario has been reviewed. The ecological impact identified in the approved EIA Report remains valid. The Contractor shall implement the mitigation measures and EM&A requirements presented in the approved Project EIA Report (AEIAR-111/2007) and EM&A manual. With the implementation of proper mitigation measures, no adverse environmental impact is expected.

11 Review on EM&A Requirements

11.1.1 **Sections 3** to **10** of this report presents the review findings and necessary change from Base Case Scenario to Proposed Change Scenario. Since it is found that the results and mitigation measures proposed in the approved Project EIA Reports (AEIAR-111/2007) for each aspect are still valid for the Proposed Change Scenario, the environmental monitoring and audit requirements recommended in the approved Project EIA Report (AEIAR-111/2007) are still applicable.

12 Conclusion

12.1.1 Three items under the Environmental Permit for North East New Territories (NENT) Landfill Extension have been varied. These include alteration of the Landfill Extension Boundary, gaseous emissions of on-site LFG Flare system, LFG generator sets, and Thermal Destructor and Proposed amendments on EP condition 2.19 and FEPs condition 2.17. An Environmental Review was conducted to evaluate potential environmental impact under this 'Proposed Change Scenario'. Evaluation of material changes to DP in accordance with *Section 6* of the EIAO-TM is summarized in **Table 12.1**.

Table 12.1 Elements of Proposed Amended may be Regarded as Material Changes to DP

Items	Responses
a change to physical alignment, layout or design of the project causing an adverse environmental impact likely to affect existing or planned community, ecologically important areas or sites of cultural heritage	Based on the assessment results presented in this report, reduction of Area A and encroachment of Area B has insignificant environmental impact, including ecology and cultural heritage.
a physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to adversely affect ecologically important areas, or disrupting sites of cultural heritage	No reclamation and dredging are required in this Project.
an increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum	Based on the assessment results in this report, there is a reduction of pollution emissions such that the air quality will be improved. The amount of waste generation remains unchanged. No violation of relevant guidelines or criteria is observed.
an increase in throughput or scale of the project leading to physical additions or alterations that are likely to violate the guidelines or criteria in this technical memorandum	There is no net change in the scope of the landfill (i.e., about 70 hectares with a target void space of 19 million meters cube). The environmental impact of the proposed amendments has been assessed. No adverse environmental impact is expected.
a change resulting in physical works that are likely to adversely affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage	The proposed changes, reduction of Area A, and encroachment of Area B would not affect rare, endangered or protected species, or any important ecological habitats, or sites of cultural heritage.

12.1.2 Based on the findings in this report, the environmental impacts for noise, water quality, waste, landfill gas hazards, landscape and visual, cultural heritage, and ecology perspectives remain unchanged as presented in the approved Project EIA Report (AEIAR-111/2007). The air quality model predicted that the Proposed Change Scenario will bring positive air quality impact to the surrounding sensitive receivers. With the recommended mitigation measures in place, no adverse environmental impact is predicted. And therefore, **no material change to DP** will be constitute.

Appendix 3.1

Quantitative Air Quality Impact Assessment

Appendix 3.1 Quantitative Air Quality Impact Assessment

Detailed Assessment Results

Northeast New Territories Landfill Extension

Comparison between Proposed Change Scenario and Base Case Scenario

Case 1

ASRs and Assessment Height (mAG)		Site	Difference in NO_2 Concentrations in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]			Difference in SO_2 Concentrations in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]			Difference in Vinyl Chloride Concentrations in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]				Difference in Benzene Concentrations in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]				Difference in Total Risks in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	-17.66	-3.60	-0.25	-17.86	-3.41	-0.19	-0.0250	-0.0003	-2.60E-10	-3.72E-12	-0.0176	-0.0001	-7.55E-10	-1.08E-11	-1.01E-09	-1.45E-11
ASR1	5	Wo Keng Shan Tsuen	-17.88	-3.67	-0.25	-18.06	-3.46	-0.19	-0.0253	-0.0003	-2.66E-10	-3.81E-12	-0.0178	-0.0001	-7.75E-10	-1.11E-11	-1.04E-09	-1.49E-11
ASR1	10	Wo Keng Shan Tsuen	-18.59	-3.86	-0.27	-18.81	-3.65	-0.20	-0.0265	-0.0003	-2.82E-10	-4.03E-12	-0.0186	-0.0001	-8.31E-10	-1.19E-11	-1.11E-09	-1.59E-11
ASR11	1.5	Tung Lo Hang	-2.53	-1.58	-0.50	-1.60	-0.94	-0.40	-0.0027	-0.0004	-4.23E-10	-6.04E-12	-0.0007	-0.0002	-1.22E-09	-1.74E-11	-1.64E-09	-2.34E-11
ASR11	5	Tung Lo Hang	-2.67	-1.62	-0.52	-1.50	-0.94	-0.41	-0.0027	-0.0004	-4.37E-10	-6.24E-12	-0.0007	-0.0002	-1.27E-09	-1.81E-11	-1.71E-09	-2.44E-11
ASR11	10	Tung Lo Hang	-2.86	-1.71	-0.58	-1.29	-0.93	-0.44	-0.0027	-0.0005	-4.73E-10	-6.76E-12	-0.0007	-0.0002	-1.41E-09	-2.02E-11	-1.89E-09	-2.69E-11
ASR13	1.5	Nga Yiu Ha	-4.69	-1.49	-0.63	-6.14	-1.15	-0.39	-0.0067	-0.0006	-5.69E-10	-8.13E-12	-0.0032	-0.0003	-1.58E-09	-2.26E-11	-2.15E-09	-3.07E-11
ASR13	5	Nga Yiu Ha	-4.75	-1.51	-0.64	-6.22	-1.16	-0.39	-0.0068	-0.0006	-5.78E-10	-8.26E-12	-0.0033	-0.0003	-1.61E-09	-2.30E-11	-2.19E-09	-3.12E-11
ASR13	10	Nga Yiu Ha	-4.85	-1.54	-0.67	-6.34	-1.19	-0.40	-0.0069	-0.0006	-5.99E-10	-8.56E-12	-0.0033	-0.0003	-1.67E-09	-2.39E-11	-2.27E-09	-3.25E-11
ASR14	1.5	Ping Yeung	-2.76	-0.99	-0.16	-3.58	-0.94	-0.13	-0.0040	-0.0002	-1.53E-10	-2.19E-12	-0.0019	-0.0001	-4.89E-10	-6.99E-12	-6.42E-10	-9.18E-12
ASR14	5	Ping Yeung	-2.80	-1.00	-0.17	-3.64	-0.95	-0.13	-0.0040	-0.0002	-1.58E-10	-2.25E-12	-0.0020	-0.0001	-5.08E-10	-7.25E-12	-6.65E-10	-9.50E-12
ASR14	10	Ping Yeung	-2.86	-1.03	-0.19	-3.69	-0.98	-0.14	-0.0041	-0.0002	-1.71E-10	-2.44E-12	-0.0020	-0.0001	-5.64E-10	-8.05E-12	-7.34E-10	-1.05E-11
ASR27	1.5	Tong To Shan Tsuen	-10.49	-1.69	-0.14	-3.57	-0.85	-0.10	-0.0056	-0.0001	-1.35E-10	-1.93E-12	-0.0034	-0.0001	-4.43E-10	-6.33E-12	-5.78E-10	-8.26E-12
ASR27	5	Tong To Shan Tsuen	-11.90	-1.74	-0.15	-3.55	-0.88	-0.10	-0.0064	-0.0001	-1.38E-10	-1.97E-12	-0.0039	-0.0001	-4.42E-10	-6.32E-12	-5.80E-10	-8.28E-12
ASR27	10	Tong To Shan Tsuen	-12.63	-1.79	-0.15	-2.60	-0.92	-0.10	-0.0071	-0.0001	-1.41E-10	-2.01E-12	-0.0044	-0.0001	-4.35E-10	-6.22E-12	-5.76E-10	-8.23E-12

Detailed Assessment Results

Northeast New Territories Landfill Extension
Comparison between Proposed Change Scenario and Base Case Scenario
Case 2

ASRs and Assessment Height (mAG)		Site	Difference in NO_2 Concentrations in µg/m^3 [Results of Proposed Change - Results of Base Case]			Difference in SO_2 Concentrations in µg/m^3 [Results of Proposed Change - Results of Base Case]			Difference in Vinyl Chloride Concentrations in µg/m^3 [Results of Proposed Change - Results of Base Case]				Difference in Benzene Concentrations in µg/m^3 [Results of Proposed Change - Results of Base Case]				Difference in Total Risks in µg/m^3 [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	-0.15	-0.43	-0.09	-0.38	-0.60	-0.09	-0.0067	-0.0002	-2.43E-10	-3.47E-12	-0.0013	-0.0001	-7.61E-10	-1.09E-11	-1.00E-09	-1.43E-11
ASR1	5	Wo Keng Shan Tsuen	-0.25	-0.44	-0.10	-0.41	-0.61	-0.09	-0.0069	-0.0002	-2.49E-10	-3.56E-12	0.0000	0.0000	0.00E+00	0.00E+00	-2.49E-10	-3.56E-12
ASR1	10	Wo Keng Shan Tsuen	-0.17	-0.42	-0.11	-0.39	-0.65	-0.09	-0.0072	-0.0003	-2.63E-10	-3.76E-12	0.0000	0.0000	0.00E+00	0.00E+00	-2.63E-10	-3.76E-12
ASR11	1.5	Tung Lo Hang	-3.10	-1.26	-0.35	-2.19	-0.99	-0.28	-0.0062	-0.0005	-5.24E-10	-7.49E-12	-0.0035	-0.0003	-2.00E-09	-2.85E-11	-2.52E-09	-3.60E-11
ASR11	5	Tung Lo Hang	-3.20	-1.31	-0.38	-2.21	-1.01	-0.29	-0.0064	-0.0005	-5.43E-10	-7.76E-12	-0.0036	-0.0003	-2.08E-09	-2.97E-11	-2.62E-09	-3.74E-11
ASR11	10	Tung Lo Hang	-3.30	-1.39	-0.44	-2.29	-1.05	-0.32	-0.0069	-0.0006	-5.92E-10	-8.45E-12	-0.0039	-0.0004	-2.29E-09	-3.27E-11	-2.88E-09	-4.11E-11
ASR13	1.5	Nga Yiu Ha	-0.11	-0.46	-0.39	-3.57	-0.93	-0.30	-0.0075	-0.0007	-7.05E-10	-1.01E-11	-0.0043	-0.0004	-2.42E-09	-3.45E-11	-3.12E-09	-4.46E-11
ASR13	5	Nga Yiu Ha	-0.12	-0.47	-0.39	-3.63	-0.94	-0.30	-0.0076	-0.0007	-7.17E-10	-1.02E-11	-0.0044	-0.0004	-2.46E-09	-3.52E-11	-3.18E-09	-4.54E-11
ASR13	10	Nga Yiu Ha	-0.17	-0.48	-0.42	-3.72	-0.97	-0.32	-0.0078	-0.0007	-7.48E-10	-1.07E-11	-0.0045	-0.0004	-2.57E-09	-3.68E-11	-3.32E-09	-4.75E-11
ASR14	1.5	Ping Yeung	-2.19	-0.56	-0.09	-1.29	-0.53	-0.09	-0.0034	-0.0002	-1.71E-10	-2.44E-12	-0.0017	-0.0001	-6.34E-10	-9.06E-12	-8.05E-10	-1.15E-11
ASR14	5	Ping Yeung	-2.22	-0.57	-0.10	-1.30	-0.54	-0.09	-0.0034	-0.0002	-1.76E-10	-2.51E-12	-0.0017	-0.0001	-6.56E-10	-9.37E-12	-8.32E-10	-1.19E-11
ASR14	10	Ping Yeung	-2.37	-0.59	-0.12	-1.31	-0.55	-0.10	-0.0034	-0.0002	-1.91E-10	-2.73E-12	-0.0017	-0.0001	-7.21E-10	-1.03E-11	-9.12E-10	-1.30E-11
ASR27	1.5	Tong To Shan Tsuen	-11.61	-1.42	-0.09	-5.86	-1.06	-0.09	-0.0099	-0.0002	-1.74E-10	-2.49E-12	0.0000	0.0000	0.00E+00	0.00E+00	-1.74E-10	-2.49E-12
ASR27	5	Tong To Shan Tsuen	-12.61	-1.49	-0.09	-6.69	-1.18	-0.09	-0.0118	-0.0002	-1.82E-10	-2.60E-12	0.0000	0.0000	0.00E+00	0.00E+00	-1.82E-10	-2.60E-12
ASR27	10	Tong To Shan Tsuen	-12.89	-1.55	-0.09	-7.34	-1.39	-0.10	-0.0145	-0.0002	-1.94E-10	-2.77E-12	0.0000	0.0000	0.00E+00	0.00E+00	-1.94E-10	-2.77E-12

Appendix 3.1 Quantitative Air Quality Impact Assessment

Detailed Assessment Results

Northeast New Territories Landfill Extension
Detailed AERMOD Assessment Results (Case 1)
Proposed Change Scenario

ASRs and Assessment Height (mAG)		Site	NO_2 Concentrations in $\mu g/m^3$			SO_2 Concentrations in $\mu g/m^3$			Vinyl Chloride Concentrations in $\mu g/m^3$				Benzene Concentrations in $\mu g/m^3$				Difference in Total Risks in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	4.22	1.37	0.14	4.93	1.55	0.11	0.0041	0.0001	1.21E-10	1.73E-12	0.0052	0.0002	1.04E-09	1.48E-11	1.16E-09	1.65E-11
ASR1	5	Wo Keng Shan Tsuen	4.32	1.40	0.15	5.06	1.59	0.11	0.0042	0.0001	1.23E-10	1.75E-12	0.0053	0.0002	1.06E-09	1.51E-11	1.18E-09	1.68E-11
ASR1	10	Wo Keng Shan Tsuen	4.57	1.47	0.15	5.33	1.68	0.12	0.0044	0.0001	1.26E-10	1.80E-12	0.0055	0.0002	1.09E-09	1.56E-11	1.21E-09	1.74E-11
ASR11	1.5	Tung Lo Hang	2.84	0.93	0.26	2.91	0.79	0.14	0.0031	0.0003	2.65E-10	3.78E-12	0.0038	0.0003	2.02E-09	2.88E-11	2.28E-09	3.26E-11
ASR11	5	Tung Lo Hang	2.90	0.96	0.26	3.07	0.82	0.14	0.0032	0.0003	2.69E-10	3.84E-12	0.0039	0.0003	2.05E-09	2.93E-11	2.32E-09	3.31E-11
ASR11	10	Tung Lo Hang	2.99	1.01	0.27	3.37	0.88	0.15	0.0033	0.0003	2.75E-10	3.93E-12	0.0040	0.0004	2.10E-09	3.01E-11	2.38E-09	3.40E-11
ASR13	1.5	Nga Yiu Ha	4.26	1.66	0.33	2.73	1.45	0.27	0.0047	0.0003	2.66E-10	3.80E-12	0.0057	0.0004	2.34E-09	3.35E-11	2.61E-09	3.73E-11
ASR13	5	Nga Yiu Ha	4.31	1.69	0.33	2.77	1.47	0.27	0.0047	0.0003	2.69E-10	3.84E-12	0.0057	0.0004	2.37E-09	3.39E-11	2.64E-09	3.78E-11
ASR13	10	Nga Yiu Ha	4.40	1.73	0.34	2.85	1.51	0.28	0.0048	0.0003	2.74E-10	3.92E-12	0.0059	0.0004	2.43E-09	3.48E-11	2.71E-09	3.87E-11
ASR14	1.5	Ping Yeung	2.43	0.48	0.07	1.51	0.30	0.05	0.0026	0.0001	7.14E-11	1.02E-12	0.0032	0.0001	5.67E-10	8.09E-12	6.38E-10	9.11E-12
ASR14	5	Ping Yeung	2.47	0.49	0.08	1.54	0.30	0.05	0.0026	0.0001	7.20E-11	1.03E-12	0.0032	0.0001	5.72E-10	8.17E-12	6.44E-10	9.20E-12
ASR14	10	Ping Yeung	2.53	0.50	0.08	1.60	0.31	0.05	0.0027	0.0001	7.32E-11	1.05E-12	0.0033	0.0001	5.82E-10	8.32E-12	6.55E-10	9.36E-12
ASR27	1.5	Tong To Shan Tsuen	1.94	0.59	0.06	2.02	0.56	0.05	0.0015	0.0001	5.05E-11	7.21E-13	0.0022	0.0001	4.29E-10	6.14E-12	4.80E-10	6.86E-12
ASR27	5	Tong To Shan Tsuen	1.97	0.61	0.06	2.65	0.56	0.05	0.0015	0.0001	5.15E-11	7.36E-13	0.0023	0.0001	4.47E-10	6.38E-12	4.98E-10	7.12E-12
ASR27	10	Tong To Shan Tsuen	2.60	0.64	0.07	4.18	0.58	0.06	0.0016	0.0001	5.37E-11	7.67E-13	0.0024	0.0001	4.80E-10	6.85E-12	5.33E-10	7.62E-12

Appendix 3.1 Quantitative Air Quality Impact Assessment

Detailed Assessment Results

Northeast New Territories Landfill Extension
Detailed AERMOD Assessment Results (Case 2)
Proposed Change Scenario

ASRs and Assessment Height (mAG)		Site	NO_2 Concentrations in $\mu g/m^3$			SO_2 Concentrations in $\mu g/m^3$			Vinyl Chloride Concentrations in $\mu g/m^3$				Benzene Concentrations in $\mu g/m^3$				Difference in Total Risks in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	11.24	2.84	0.14	6.79	1.97	0.12	0.0025	0.0000	2.48E-11	3.55E-13	0.0059	0.0001	5.00E-10	7.14E-12	5.25E-10	7.50E-12
ASR1	5	Wo Keng Shan Tsuen	11.49	2.91	0.14	6.96	2.02	0.13	0.0025	0.0000	2.54E-11	3.62E-13	0.0074	0.0002	1.29E-09	1.85E-11	1.32E-09	1.88E-11
ASR1	10	Wo Keng Shan Tsuen	12.14	3.09	0.15	7.34	2.14	0.13	0.0026	0.0000	2.66E-11	3.79E-13	0.0077	0.0002	1.36E-09	1.95E-11	1.39E-09	1.98E-11
ASR11	1.5	Tung Lo Hang	2.37	0.68	0.17	2.93	0.82	0.15	0.0004	0.0000	2.90E-11	4.14E-13	0.0016	0.0001	6.04E-10	8.62E-12	6.33E-10	9.04E-12
ASR11	5	Tung Lo Hang	2.49	0.70	0.17	3.10	0.86	0.16	0.0004	0.0000	2.94E-11	4.20E-13	0.0017	0.0001	6.15E-10	8.78E-12	6.44E-10	9.20E-12
ASR11	10	Tung Lo Hang	2.70	0.75	0.17	3.40	0.91	0.16	0.0004	0.0000	3.04E-11	4.34E-13	0.0018	0.0001	6.39E-10	9.12E-12	6.69E-10	9.56E-12
ASR13	1.5	Nga Yiu Ha	3.87	1.63	0.31	2.89	1.57	0.30	0.0008	0.0001	5.40E-11	7.71E-13	0.0021	0.0002	1.15E-09	1.64E-11	1.21E-09	1.72E-11
ASR13	5	Nga Yiu Ha	3.94	1.65	0.32	2.94	1.60	0.30	0.0008	0.0001	5.48E-11	7.83E-13	0.0022	0.0002	1.17E-09	1.67E-11	1.22E-09	1.75E-11
ASR13	10	Nga Yiu Ha	4.05	1.70	0.33	3.03	1.64	0.31	0.0008	0.0001	5.67E-11	8.10E-13	0.0022	0.0002	1.21E-09	1.73E-11	1.27E-09	1.81E-11
ASR14	1.5	Ping Yeung	2.35	0.49	0.06	1.70	0.36	0.05	0.0005	0.0000	1.19E-11	1.70E-13	0.0013	0.0000	2.26E-10	3.23E-12	2.38E-10	3.40E-12
ASR14	5	Ping Yeung	2.39	0.50	0.07	1.73	0.36	0.05	0.0005	0.0000	1.21E-11	1.73E-13	0.0013	0.0000	2.29E-10	3.26E-12	2.41E-10	3.44E-12
ASR14	10	Ping Yeung	2.46	0.51	0.07	1.77	0.37	0.06	0.0005	0.0000	1.24E-11	1.77E-13	0.0014	0.0000	2.34E-10	3.35E-12	2.47E-10	3.52E-12
ASR27	1.5	Tong To Shan Tsuen	2.02	0.57	0.06	2.17	0.60	0.05	0.0003	0.0000	8.79E-12	1.26E-13	0.0081	0.0001	8.62E-10	1.23E-11	8.71E-10	1.24E-11
ASR27	5	Tong To Shan Tsuen	2.58	0.58	0.06	2.86	0.61	0.06	0.0004	0.0000	9.46E-12	1.35E-13	0.0096	0.0002	9.01E-10	1.29E-11	9.11E-10	1.30E-11
ASR27	10	Tong To Shan Tsuen	3.87	0.64	0.07	4.50	0.63	0.06	0.0006	0.0000	1.07E-11	1.53E-13	0.0119	0.0002	9.64E-10	1.38E-11	9.74E-10	1.39E-11

Appendix 3.1 Quantitative Air Quality Impact Assessment

Detailed Assessment Results

Northeast New Territories Landfill Extension
Detailed AERMOD Assessment Results (Case 1)
Base Case Scenario

ASRs and Assessment Height (mAG)		Site	NO_2 Concentrations in $\mu g/m^3$			SO_2 Concentrations in $\mu g/m^3$			Vinyl Chloride Concentrations in $\mu g/m^3$				Benzene Concentrations in $\mu g/m^3$				Difference in Total Risks in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	21.88	4.97	0.39	22.79	4.95	0.30	0.0291	0.0004	3.81E-10	5.44E-12	0.0228	0.0003	1.79E-09	2.56E-11	2.17E-09	3.10E-11
ASR1	5	Wo Keng Shan Tsuen	22.21	5.07	0.40	23.13	5.05	0.30	0.0296	0.0004	3.89E-10	5.56E-12	0.0232	0.0003	1.83E-09	2.62E-11	2.22E-09	3.17E-11
ASR1	10	Wo Keng Shan Tsuen	23.15	5.34	0.42	24.15	5.32	0.32	0.0309	0.0004	4.08E-10	5.83E-12	0.0242	0.0003	1.92E-09	2.74E-11	2.33E-09	3.33E-11
ASR11	1.5	Tung Lo Hang	5.37	2.51	0.76	4.51	1.73	0.54	0.0058	0.0007	6.87E-10	9.82E-12	0.0045	0.0005	3.23E-09	4.62E-11	3.92E-09	5.60E-11
ASR11	5	Tung Lo Hang	5.57	2.59	0.79	4.57	1.76	0.55	0.0058	0.0007	7.06E-10	1.01E-11	0.0046	0.0006	3.32E-09	4.74E-11	4.02E-09	5.75E-11
ASR11	10	Tung Lo Hang	5.84	2.72	0.85	4.66	1.80	0.59	0.0060	0.0007	7.48E-10	1.07E-11	0.0047	0.0006	3.52E-09	5.02E-11	4.27E-09	6.09E-11
ASR13	1.5	Nga Yiu Ha	8.95	3.16	0.95	8.88	2.60	0.65	0.0113	0.0008	8.35E-10	1.19E-11	0.0089	0.0007	3.92E-09	5.61E-11	4.76E-09	6.80E-11
ASR13	5	Nga Yiu Ha	9.06	3.20	0.97	8.99	2.64	0.66	0.0115	0.0008	8.47E-10	1.21E-11	0.0090	0.0007	3.98E-09	5.69E-11	4.83E-09	6.90E-11
ASR13	10	Nga Yiu Ha	9.25	3.27	1.01	9.19	2.70	0.68	0.0117	0.0009	8.74E-10	1.25E-11	0.0092	0.0007	4.11E-09	5.87E-11	4.98E-09	7.12E-11
ASR14	1.5	Ping Yeung	5.19	1.47	0.24	5.09	1.23	0.18	0.0065	0.0002	2.25E-10	3.21E-12	0.0051	0.0002	1.06E-09	1.51E-11	1.28E-09	1.83E-11
ASR14	5	Ping Yeung	5.27	1.49	0.24	5.17	1.25	0.18	0.0066	0.0002	2.30E-10	3.28E-12	0.0052	0.0002	1.08E-09	1.54E-11	1.31E-09	1.87E-11
ASR14	10	Ping Yeung	5.39	1.53	0.27	5.30	1.28	0.19	0.0068	0.0002	2.44E-10	3.48E-12	0.0053	0.0002	1.15E-09	1.64E-11	1.39E-09	1.99E-11
ASR27	1.5	Tong To Shan Tsuen	12.43	2.29	0.20	5.59	1.41	0.15	0.0071	0.0002	1.86E-10	2.66E-12	0.0056	0.0001	8.72E-10	1.25E-11	1.06E-09	1.51E-11
ASR27	5	Tong To Shan Tsuen	13.87	2.35	0.21	6.20	1.45	0.15	0.0079	0.0002	1.89E-10	2.70E-12	0.0062	0.0001	8.89E-10	1.27E-11	1.08E-09	1.54E-11
ASR27	10	Tong To Shan Tsuen	15.23	2.43	0.22	6.78	1.49	0.15	0.0087	0.0002	1.95E-10	2.78E-12	0.0068	0.0002	9.15E-10	1.31E-11	1.11E-09	1.58E-11

Appendix 3.1 Quantitative Air Quality Impact Assessment

Detailed Assessment Results

Northeast New Territories Landfill Extension
Detailed AERMOD Assessment Results (Case 2)
Base Case Scenario

ASRs and Assessment Height (mAG)		Site	NO_2 Concentrations in $\mu g/m^3$			SO_2 Concentrations in $\mu g/m^3$			Vinyl Chloride Concentrations in $\mu g/m^3$				Benzene Concentrations in $\mu g/m^3$				Difference in Total Risks in $\mu g/m^3$ [Results of Proposed Change - Results of Base Case]	
			Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Max 24-hour Average	Annual Average	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per year	Max 1-hour Average	Annual Average	Predicted Individual Risk Level	Predicted Individual Risk Level per Year	Predicted Individual Risk Level	Predicted Individual Risk Level per Year
ASR1	1.5	Wo Keng Shan Tsuen	11.39	3.26	0.23	7.17	2.57	0.21	0.0092	0.0003	2.68E-10	3.83E-12	0.0072	0.0002	1.26E-09	1.80E-11	1.53E-09	2.18E-11
ASR1	5	Wo Keng Shan Tsuen	11.74	3.35	0.24	7.37	2.64	0.22	0.0094	0.0003	2.74E-10	3.92E-12	0.0074	0.0002	1.29E-09	1.85E-11	1.57E-09	2.24E-11
ASR1	10	Wo Keng Shan Tsuen	12.31	3.52	0.26	7.73	2.79	0.23	0.0099	0.0003	2.90E-10	4.14E-12	0.0077	0.0002	1.36E-09	1.95E-11	1.65E-09	2.36E-11
ASR11	1.5	Tung Lo Hang	5.47	1.94	0.52	5.12	1.82	0.43	0.0066	0.0006	5.53E-10	7.90E-12	0.0051	0.0004	2.60E-09	3.72E-11	3.16E-09	4.51E-11
ASR11	5	Tung Lo Hang	5.69	2.01	0.54	5.30	1.87	0.45	0.0068	0.0006	5.73E-10	8.18E-12	0.0053	0.0004	2.69E-09	3.85E-11	3.27E-09	4.66E-11
ASR11	10	Tung Lo Hang	6.00	2.14	0.61	5.69	1.96	0.49	0.0073	0.0006	6.22E-10	8.89E-12	0.0057	0.0005	2.93E-09	4.18E-11	3.55E-09	5.07E-11
ASR13	1.5	Nga Yiu Ha	3.98	2.09	0.70	6.46	2.50	0.59	0.0083	0.0008	7.59E-10	1.08E-11	0.0065	0.0006	3.57E-09	5.10E-11	4.33E-09	6.18E-11
ASR13	5	Nga Yiu Ha	4.06	2.13	0.71	6.57	2.54	0.60	0.0084	0.0008	7.72E-10	1.10E-11	0.0066	0.0006	3.63E-09	5.19E-11	4.40E-09	6.29E-11
ASR13	10	Nga Yiu Ha	4.21	2.19	0.75	6.75	2.61	0.63	0.0086	0.0008	8.05E-10	1.15E-11	0.0068	0.0006	3.78E-09	5.41E-11	4.59E-09	6.56E-11
ASR14	1.5	Ping Yeung	4.55	1.05	0.15	2.99	0.89	0.14	0.0038	0.0002	1.83E-10	2.61E-12	0.0030	0.0001	8.60E-10	1.23E-11	1.04E-09	1.49E-11
ASR14	5	Ping Yeung	4.61	1.07	0.16	3.03	0.90	0.15	0.0039	0.0002	1.88E-10	2.69E-12	0.0030	0.0001	8.84E-10	1.26E-11	1.07E-09	1.53E-11
ASR14	10	Ping Yeung	4.83	1.10	0.18	3.09	0.93	0.16	0.0039	0.0002	2.03E-10	2.90E-12	0.0031	0.0002	9.55E-10	1.36E-11	1.16E-09	1.66E-11
ASR27	1.5	Tong To Shan Tsuen	13.63	1.99	0.15	8.04	1.67	0.14	0.0103	0.0002	1.83E-10	2.62E-12	0.0081	0.0001	8.62E-10	1.23E-11	1.05E-09	1.49E-11
ASR27	5	Tong To Shan Tsuen	15.19	2.08	0.16	9.55	1.80	0.15	0.0122	0.0002	1.92E-10	2.74E-12	0.0096	0.0002	9.01E-10	1.29E-11	1.09E-09	1.56E-11
ASR27	10	Tong To Shan Tsuen	16.75	2.19	0.16	11.84	2.01	0.16	0.0151	0.0002	2.05E-10	2.93E-12	0.0119	0.0002	9.64E-10	1.38E-11	1.17E-09	1.67E-11

Appendix 4.1

Quantitative Noise Impact Assessment

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.1 Construction Plant Inventory

Phase 1 Development

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Site Clearance	2022 Q2 to 2023 Q2	Excavator	4	CNP 081	112	118
		Mower	1	[2]	112	112
		Lorry	4	CNP 141	112	118
		Crane truck	1	CNP 048	112	112
Excavation & Site Formation - installation of soil nail - excavation works on slopes - drainage works	2022 Q4 to 2025 Q3	Excavator	4	CNP 081	112	118
		Compactor	4	CNP 050	105	111
		Bulldozer	4	CNP 030	115	121
		Generator, silenced	5	CNP 102	100	107
		Crane truck	1	CNP 048	112	112
		Dump truck	4	CNP 067	117	123
		Mower	1	[2]	112	112
		Lorry	2	CNP 141	112	115
		Water pump	4	CNP 282	103	109
Installation of liner, leachate & LFG collection system	2023 Q4 to 2026 Q2	Excavator	1	CNP 081	112	112
		Compactor	1	CNP 050	105	105
		Generator, silenced	1	CNP 102	100	100
		Wheel loader	1	CNP 081	112	112
		Sweeper	1	[2]	107	107
		Roller	1	CNP 186	108	108
		Crane truck	1	CNP 048	112	112
		Dump truck	1	CNP 067	117	117
		Lorry	20	CNP 141	112	125
					Total	**130**

Phase 2 Development

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Site Clearance	2025 Q3 to 2026 Q3	Excavator	2	CNP 081	112	115
		Mower	1	[2]	112	112
		Lorry	2	CNP 141	112	115
		Crane truck	1	CNP 048	112	112
Excavation & Site Formation - installation of soil nail - excavation works on slopes - drainage works	2026 Q1 to 2026 Q3	Excavator	3	CNP 081	112	117
		Compactor	3	CNP 050	105	110
		Bulldozer	4	CNP 030	115	121
		Generator, silenced	5	CNP 102	100	107
		Crane truck	1	CNP 048	112	112
		Dump truck	4	CNP 067	117	123
		Mower	1	[2]	112	112
		Lorry	2	CNP 141	112	115
		Water pump	4	CNP 282	103	109
Installation of liner, leachate & LFG collection system	2027 Q4 to 2030 Q1	Excavator	1	CNP 081	112	112
		Compactor	1	CNP 050	105	105
		Generator, silenced	6	CNP 102	100	108
		Wheel loader	1	CNP 081	112	112
		Sweeper	1	[2]	107	107
		Roller	1	CNP 186	108	108
		Crane truck	1	CNP 048	112	112
		Dump truck	1	CNP 067	117	117
		Lorry	20	CNP 141	112	125
					Total	**130**

Phase 3 Development

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Site Clearance	2028 Q1 to 2029 Q1	Excavator	2	CNP 081	112	115
		Mower	1	[2]	112	112
		Lorry	2	CNP 141	112	115
		Crane truck	1	CNP 048	112	112
Excavation & Site Formation - installation of soil nail - excavation works on slopes - drainage works	2029 Q1 to 2031 Q3	Excavator	3	CNP 081	112	117
		Compactor	3	CNP 050	105	110
		Bulldozer	4	CNP 030	115	121
		Generator, silenced	5	CNP 102	100	107
		Crane truck	1	CNP 048	112	112
		Dump truck	4	CNP 067	117	123
		Mower	1	[2]	112	112
		Lorry	2	CNP 141	112	115
		Water pump	4	CNP 282	103	109
Installation of liner, leachate & LFG collection system	2033 Q3 to 2036 Q4	Excavator	1	CNP 081	112	112
		Compactor	1	CNP 050	105	105
		Generator, silenced	6	CNP 102	100	108
		Wheel loader	1	CNP 081	112	112
		Sweeper	1	[2]	107	107
		Roller	1	CNP 186	108	108
		Crane truck	1	CNP 048	112	112
		Dump truck	1	CNP 067	117	117
		Lorry	20	CNP 141	112	125
					Total	**130**

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.1 Construction Plant Inventory

Restoration & Aftercare Period of NENTX

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Installation of final capping	Year 2036 Q1 to Year 2037 Q4	Excavator	4	CNP 081	112	118
		Compactor	4	CNP 050	105	111
		Generator, silenced	6	CNP 102	100	108
		Wheel loader	2	CNP 081	112	115
		Sweeper	2	[2]	107	110
		Roller	2	CNP 186	108	111
		Crane truck	2	CNP 048	112	115
		Dump truck	2	CNP 067	117	120
		Lorry	10	CNP 141	112	122
Planting & Landscaping	Year 2037 Q1 to Year 2038 Q4	Excavator	4	CNP 081	112	118
		Compactor	4	CNP 050	105	111
		Generator, silenced	6	CNP 102	100	108
		Crane truck	2	CNP 048	112	115
					Total	**127**

Area B

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Construction of access road, leachate treatment plant, and other landfill infrastructures	2022 Q2 to 2026 Q2	Mobile crane	2	CNP 048	112	115
		Excavator	2	CNP 081	112	115
		Air compressor	2	CNP 002	102	105
		Generator, silenced	2	CNP 102	100	103
		Concrete lorry mixer	6	CNP 044	109	117
		Lorry	2	CNP 141	112	115
					Total	**122**

Restoration of existing NENT

Description	Tentative Period	PME	Unit[3]	Reference[1]	SWL, dB(A)	Sub-total, dB(A)
Installation of final capping	Year 2026 Q1 to Year 2027 Q4	Excavator	4	CNP 081	112	118
		Compactor	4	CNP 050	105	111
		Generator, silenced	6	CNP 102	100	108
		Wheel loader	2	CNP 081	112	115
		Sweeper	2	[2]	107	110
		Roller	2	CNP 186	108	111
		Crane truck	2	CNP 048	112	115
		Dump truck	2	CNP 067	117	120
		Lorry	10	CNP 141	112	122
Planting & Landscaping		Excavator	4	CNP 081	112	118
		Compactor	4	CNP 050	105	111
		Generator, silenced	6	CNP 102	100	108
		Crane truck	2	CNP 048	112	115
					Total	**127**

Note:

[1] Reference of CNP refers to Table 3 of EPD's Technical Memorandum on Noise from Construction Works Other Than Percussive Piling.

[2] Reference is made to the approved EIA Report on North East New Territories (NENT) Landfill Extension (EIA-133/2007).

[3] No. of PME required per peak half hour.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.2 Notional Source Position

Distance between Notional Source Position and NSRs (Horizontal Distance), m[4]

NSR	Worksite								
	Phase 1	Phase 2			Phase 3		Whole landfill extension site	Area B	Existing Landfill
	1	2[1]	3	4	5	6	7[2]	8[3]	9
SR1	586	807	957	1124	836	638	609	303	628
SR10	983	1608	1757	1830	1151	910	947	598	249

Distance attenuation, dB(A)[5]

NSR	Worksite								
	Phase 1	Phase 2			Phase 3		Whole landfill extension site	Leachate Treatment Plant	Existing Landfill
	1	2[1]	3	4	5	6	7[2]	8[3]	9
SR1	-63	-66	-68	-69	-66	-64	-64	-58	-64
SR10	-68	-72	-73	-73	-69	-67	-68	-64	-56

Note:

[1] Area of Worksite 2 is the sum of Area of Worksites 2a and 2b.

[2] Area of Worksite 7 is the sum Area of Worksites 1, 2, 3, 4, 5, and 6.

[3] Area of Worksite 8 is the sum Area of Worksites 8a, 8b, 8c.

[4] Assume the notional source position and NSRs are on the same level as a conservative approach.

[5] Distance attenuation is calculated by $-(20\log_{10}(D) + 8)$, where D is the notional source position between the NSRs and the worksites.

Legend:

Worksites

Worst-affected Representative NSRs

Notional Source Position

N

WANG LEK

缸窯
KONG YIU

Worksite 9

新界東北堆填區
North East New Territories Landfill

黃茅坑山
WONG MAU HANG SHAN

銅鑼坑
TUNG LO HANG

東風坳
TUNG FUNG AU

龍尾頂
LUNG MEI TENG

打鼓嶺
TA KWU LING

石澳
SHEK O

昂塘
NGONG TONG

石寨下
SHEK TSAI HA

水生塘
SHUI NGAU TSO

禾徑山
WO KENG SHAN

Worksite 6

Worksite 5

Worksite 8c

Worksite 8a

Worksite 8b

Worksite 1

Worksite 7

Worksite 2b

Worksite 4

Worksite 2a

Worksite 3

628 m

638 m

303 m

836 m

586 m

609 m

1124 m

807 m

957 m

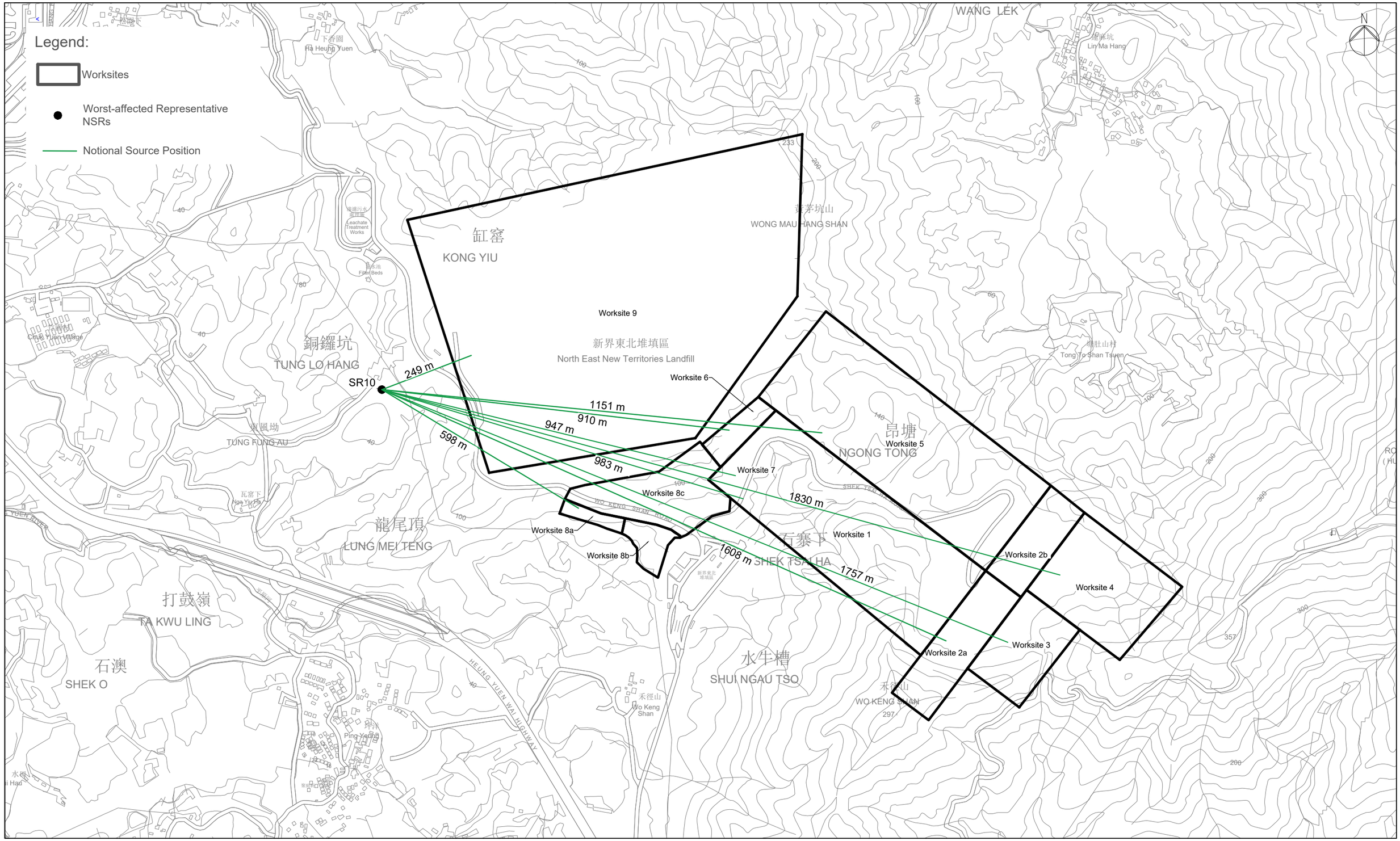
SR1

aurecon
Aurecon Hong Kong Limited

North-East New Territories (NENT) Landfill Extension
Notional Source Position of SR1

Appendix 4.1

Scale: 1:10000



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Notional Source Position of SR10	Appendix 4.1 Scale: 1:10000

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.3 Construction Noise Impact Assessment (Unmitigated Scenario)

Distance between Notional Source Position and NSRs (Horizontal Distance), m

Description	Worksite	SWL, dB(A)	NSR	
			SR1	SR10
Phase 1	1	130	586	983
Phase 2	2	130	807	1608
	3	130	957	1757
	4	130	1124	1830
Phase 3	5	130	836	1151
	6	130	638	910
Restoration and Aftercare of NENTX	7	127	609	947
Area B	8	122	303	598

Distance attenuation, dB(A)

Description	Worksite	SWL, dB(A)	NSR	
			SR1	SR10
Phase 1	1	130	-63	-68
Phase 2	2	130	-66	-72
	3	130	-68	-73
	4	130	-69	-73
Phase 3	5	130	-66	-69
	6	130	-64	-67
Restoration and Aftercare	7	127	-64	-68
Area B	8	122	-58	-64

Note:

Distance attenuation is calculated by -(20log D + 8), where D is the notional distance.

Screening by natural topography, dB(A)

Description	Worksite	SWL, dB(A)	NSR	
			SR1	SR10
Phase 1	1	130	-10	-10
Phase 2	2	130	-10	0
	3	130	-10	0
	4	130	-10	0
Phase 3	5	130	-10	0
	6	130	0	0
Restoration and Aftercare	7	127	-5	-5
Area B	8	122	0	0

Note:

10 dB(A) reduction for total screening by natural topography, while 5 dB(A) reduction for partial screening by hill slope.

Sound pressure level, Leq (30-minute) dB(A)

Description	Worksite	SWL, dB(A)	NSR	
			SR1	SR10
Phase 1	1	130	60	55
Phase 2	2	130	57	61
	3	130	55	60
	4	130	54	60
Phase 3	5	130	57	64
	6	130	69	66
Restoration and Aftercare	7	127	62	58
Area B	8	122	67	61

Sound pressure level, Leq (30-minute) dB(A) = Total SWL + Distance correction + Screening by natural topography + 3 dB(A) façade correction.

Maximum construction noise, Leq (30-minute) dB(A)

Description	NSR	
	SR1	SR10
Phase 1 + Phase 2 + Area B	68	65
Phase 2 (either worksite 2, 3, or 4 will operate)	57	61
Phase 3 (either worksite 5 or 6 will operate)	69	66
Restoration & Aftercare of NENTX	62	58
Maximum	**69**	**66**

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.4 Cumulative Construction Noise Impact Assessment (Unmitigated Scenario)

Cumulative daytime construction noise impact

Description	NSR	
	SR1	SR10
SWL of aftercare period of the existing NENT Landfill, dB(A)	127	127
Notional distance, m	628	249
Distance attenuation, dB(A) [1]	-64	-56
Screening by natural topography, dB(A) [2]	-10	0
Façade correction, dB(A)	3	3
SPL from the existing NENT Landfill, dB(A)	56	74
SPL during Phase 1, Phase 2 development and Area B of NENTX, dB(A)	68	65
Cumulative construction noise impact, Leq (30min) dB(A)	68	75

Note:

[1] Distance attenuation is calculated by -(20log D + 8), where D is the notional distance.

[2] 10 dB(A) reduction for total screening by natural topography, while 5dB(A) reduction for partial screening by hill slope.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR1 Wo Keng Shan Tsuen
Scenario: During earlier stage of landfill operation (Without mitigation)
Time Period: Daytime

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	361	-59.1	0	-1.1	-	6	3	100%	24
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	399	-60.0	0	-1.2	-	6	3	100%	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	343	-58.7	0	-1.0	-	6	3	100%	42
S5	Waste filling activities											
S5a	Phase 1	Notional	119	559	-63.0	-10	-1.7	-	0	3	100%	47
S5b	Phase 2	Notional	119	861	-66.7	-10	-2.6	-	0	3	100%	43
S5c	Phase 3	Notional	119	809	-66.2	-10	-2.4	-	0	3	100%	43

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	1452	-71.2	-10	-4.4	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	1283	-70.2	-10	-3.8	-	6	3	100%	13
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1029	-68.2	-10	-3.1	-	0	3	100%	20

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	116	94	19.5	-13.0	-20.7	-2.8	3	-5	-0.3	45

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	13
ES3	Flare Station of Existing NENT Landfill	Fixed	20
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	24
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	42
S4	Refuse Vehicle Movement	Fixed	45
S5	Waste filling activities[2]	Fixed	47
		Cumulative	50
		Criterion	51
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR9 Lin Ma Hang
Scenario: During earlier stage of landfill operation (Without mitigation)
Time Period: Daytime

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	1668	-72.4	-10	-5.0	-	6	3	100%	0
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	1676	-72.5	-10	-5.0	-	6	3	100%	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	1656	-72.4	-10	-5.0	-	6	3	100%	15
S5	Waste filling activities											
S5a	Phase 1	Notional	119	1211	-69.7	-10	-3.6	-	0	3	100%	39
S5b	Phase 2	Notional	119	1114	-68.9	-10	-3.3	-	0	3	100%	40
S5c	Phase 3	Notional	119	938	-67.4	-10	-2.8	-	0	3	100%	42

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	2022	-74.1	-10	-6.1	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	2024	-74.1	-10	-6.1	-	6	3	100%	7
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1838	-73.3	-10	-5.5	-	0	3	100%	12

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	888	62	19.5	-13.0	-29.5	-4.6	3	-10	-2.7	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	7
ES3	Flare Station of Existing NENT Landfill	Fixed	12
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	0
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	15
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	42
		Cumulative	42
		Criterion	44
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: **SR10** **Tung Lo Hang**
Scenario: **During earlier stage of landfill operation (Without mitigation)**
Time Period: **Daytime**

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	747	-65.5	-10	-2.2	-	6	3	100%	6
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	690	-64.8	-10	-2.1	-	6	3	100%	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	787	-65.9	-10	-2.4	-	6	3	100%	24
S5	Waste filling activities											
S5a	Phase 1	Notional	119	998	-68.0	-10	-3.0	-	0	3	100%	41
S5b	Phase 2	Notional	119	1672	-72.5	-10	-5.0	-	0	3	100%	35
S5c	Phase 3	Notional	119	953	-67.6	-10	-2.9	-	0	3	100%	42

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	432	-60.7	-10	-1.3	-	6	3	100%	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	246	-55.8	-10	0.0	-	6	3	100%	31
ES3	Flare Station of Existing NENT Landfill	Fixed	98	171	-52.7	-10	0.0	-	0	3	100%	38

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	742	55	19.5	-13.0	-28.7	-5.1	3	-10	-2.2	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	31
ES3	Flare Station of Existing NENT Landfill	Fixed	38
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	6
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	24
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	42
		Cumulative	44
		Criterion	53
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: **SR1** **Wo Keng Shan Tsuen**
Scenario: **During later stage of landfill operation (Without mitigation)**
Time Period: **Daytime**

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	361	-59.1	0	-1.1	-	6	3	100%	24
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	399	-60.0	0	-1.2	-	6	3	100%	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	343	-58.7	0	-1.0	-	6	3	100%	42
S5	Waste filling activities											
S5a	Phase 1	Notional	119	559	-63.0	-5	-1.7	-	0	3	100%	52
S5b	Phase 2	Notional	119	861	-66.7	-5	-2.6	-	0	3	100%	48
S5c	Phase 3	Notional	119	809	-66.2	-5	-2.4	-	0	3	100%	48

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	1452	-71.2	-10	-4.4	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	1283	-70.2	-10	-3.8	-	6	3	100%	13
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1029	-68.2	-10	-3.1	-	0	3	100%	20

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	116	94	19.5	-13.0	-20.7	-2.8	3	-5	-0.3	45

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	13
ES3	Flare Station of Existing NENT Landfill	Fixed	20
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	24
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	42
S4	Refuse Vehicle Movement	Fixed	45
S5	Waste filling activities[2]	Fixed	52
		Cumulative	53
		Criterion	51
		Compliance	No

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR9 Lin Ma Hang
Scenario: During later stage of landfill operation (Without mitigation)
Time Period: Daytime

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	1668	-72.4	-10	-5.0	-	6	3	100%	0
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	1676	-72.5	-10	-5.0	-	6	3	100%	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	1656	-72.4	-10	-5.0	-	6	3	100%	15
S5	Waste filling activities											
S5a	Phase 1	Notional	119	1211	-69.7	-5	-3.6	-	0	3	100%	44
S5b	Phase 2	Notional	119	1114	-68.9	-5	-3.3	-	0	3	100%	45
S5c	Phase 3	Notional	119	938	-67.4	-5	-2.8	-	0	3	100%	47

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	2022	-74.1	-10	-6.1	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	2024	-74.1	-10	-6.1	-	6	3	100%	7
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1838	-73.3	-10	-5.5	-	0	3	100%	12

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	888	62	19.5	-13.0	-29.5	-4.6	3	-10	-2.7	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	7
ES3	Flare Station of Existing NENT Landfill	Fixed	12
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	0
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	15
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	47
		Cumulative	47
		Criterion	44
		Compliance	No

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR10 Tung Lo Hang
Scenario: During later stage of landfill operation (Without mitigation)
Time Period: Daytime

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	747	-65.5	-10	-2.2	-	6	3	100%	6
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	690	-64.8	-10	-2.1	-	6	3	100%	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	787	-65.9	-10	-2.4	-	6	3	100%	24
S5	Waste filling activities											
S5a	Phase 1	Notional	119	998	-68.0	-10	-3.0	-	0	3	100%	41
S5b	Phase 2	Notional	119	1672	-72.5	-10	-5.0	-	0	3	100%	35
S5c	Phase 3	Notional	119	953	-67.6	-10	-2.9	-	0	3	100%	42

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	432	-60.7	-10	-1.3	-	6	3	100%	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	246	-55.8	-10	0.0	-	6	3	100%	31
ES3	Flare Station of Existing NENT Landfill	Fixed	98	171	-52.7	-10	0.0	-	0	3	100%	38

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)[3]	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	742	55	19.5	-13.0	-28.7	-5.1	3	-10	-2.2	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	31
ES3	Flare Station of Existing NENT Landfill	Fixed	38
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	6
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	24
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	42
		Cumulative	44
		Criterion	53
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR1 Wo Keng Shan Tsuen
Scenario: During earlier stage of landfill operation (Without mitigation)
Time Period: Evening time and night time

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	361	-59.1	0	-1.1	-	6	3	100%	24
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	399	-60.0	0	-1.2	-	6	3	100%	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	343	-58.7	0	-1.0	-	6	3	100%	42

Fixed plant noise and waste filling activities at existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	1452	-71.2	-10	-4.4	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	1283	-70.2	-10	-3.8	-	6	3	100%	13
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1029	-68.2	-10	-3.1	-	0	3	100%	20

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL during evening time, Leq (30min)	Cumulative SPL during night time, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	13	13
ES3	Flare Station of Existing NENT Landfill	Fixed	20	20
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	24	24
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	36	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	42	42
		Cumulative	43	43
		Criterion	47	45
		Compliance	Yes	Yes

Note:
[1] Distance attenuation for fixed plant and notional source is calculated by -(20$\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[2] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[3] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR9 Lin Ma Hang
Scenario: During earlier stage of landfill operation (Without mitigation)
Time Period: Evening time and night time

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	1668	-72.4	-10	-5.0	-	6	3	100%	0
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	1676	-72.5	-10	-5.0	-	6	3	100%	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	1656	-72.4	-10	-5.0	-	6	3	100%	15

Fixed plant noise and waste filling activities at existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	2022	-74.1	-10	-6.1	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	2024	-74.1	-10	-6.1	-	6	3	100%	7
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1838	-73.3	-10	-5.5	-	0	3	100%	12

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL during evening time, Leq (30min)	Cumulative SPL during night time, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	7	7
ES3	Flare Station of Existing NENT Landfill	Fixed	12	12
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	0	0
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	9	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	15	15
		Cumulative	18	18
		Criterion	40	39
		Compliance	Yes	Yes

Note:
[1] Distance attenuation for fixed plant and notional source is calculated by -(20$\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[2] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[3] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.5 On-site Operational Noise Assessment (Unmitigated Scenario)

Noise Sensitive Receiver: SR10 Tung Lo Hang
Scenario: During earlier stage of landfill operation (Without mitigation)
Time Period: Evening time and night time

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	747	-65.5	-10	-2.2	-	6	3	100%	6
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	690	-64.8	-10	-2.1	-	6	3	100%	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	787	-65.9	-10	-2.4	-	6	3	100%	24

Fixed plant noise and waste filling activities at existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[1]	Screening by natural topography, dB(A)[2]	Air absorption, dB(A)[3]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	432	-60.7	-10	-1.3	-	6	3	100%	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	246	-55.8	-10	0.0	-	6	3	100%	31
ES3	Flare Station of Existing NENT Landfill	Fixed	98	171	-52.7	-10	0.0	-	0	3	100%	38

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL during evening time, Leq (30min)	Cumulative SPL during night time, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	12	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	31	31
ES3	Flare Station of Existing NENT Landfill	Fixed	38	38
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	6	6
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	20	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	24	24
		Cumulative	39	39
		Criterion	49	45
		Compliance	Yes	Yes

Note:
[1] Distance attenuation for fixed plant and notional source is calculated by -(20$\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[2] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[3] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.6 On-site Operational Noise Assessment (Mitigated Scenario)

Noise Sensitive Receiver: **SR1** **Wo Keng Shan Tsuen**
Scenario: **During later stage of landfill operation (With mitigation)**
Time Period: **Daytime**

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	361	-59.1	0	-1.1	-	6	3	100%	24
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	399	-60.0	0	-1.2	-	6	3	100%	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	343	-58.7	0	-1.0	-	6	3	100%	42
S5	Waste filling activities											
S5a	Phase 1	Notional	113	559	-63.0	-5	-1.7	-	0	3	100%	47
S5b	Phase 2	Notional	113	861	-66.7	-5	-2.6	-	0	3	100%	42
S5c	Phase 3	Notional	113	809	-66.2	-5	-2.4	-	0	3	100%	43

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	1452	-71.2	-10	-4.4	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	1283	-70.2	-10	-3.8	-	6	3	100%	13
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1029	-68.2	-10	-3.1	-	0	3	100%	20

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	116	94	19.5	-13.0	-20.7	-2.8	3	-5	-0.3	45

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	13
ES3	Flare Station of Existing NENT Landfill	Fixed	20
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	24
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	36
S3	LFG Generator Sets of NENTX Landfill	Fixed	42
S4	Refuse Vehicle Movement	Fixed	45
S5	Waste filling activities[2]	Fixed	47
		Cumulative	50
		Criterion	51
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.6 On-site Operational Noise Assessment (Mitigated Scenario)

Noise Sensitive Receiver: **SR9** **Lin Ma Hang**
Scenario: **During later stage of landfill operation (With mitigation)**
Time Period: **Daytime**

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	1668	-72.4	-10	-5.0	-	6	3	100%	0
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	1676	-72.5	-10	-5.0	-	6	3	100%	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	1656	-72.4	-10	-5.0	-	6	3	100%	15
S5	Waste filling activities											
S5a	Phase 1	Notional	113	1211	-69.7	-5	-3.6	-	0	3	100%	38
S5b	Phase 2	Notional	113	1114	-68.9	-5	-3.3	-	0	3	100%	39
S5c	Phase 3	Notional	113	938	-67.4	-5	-2.8	-	0	3	100%	41

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	2022	-74.1	-10	-6.1	-	6	3	100%	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	2024	-74.1	-10	-6.1	-	6	3	100%	7
ES3	Flare Station of Existing NENT Landfill	Fixed	98	1838	-73.3	-10	-5.5	-	0	3	100%	12

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	888	62	19.5	-13.0	-29.5	-4.6	3	-10	-2.7	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	0
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	7
ES3	Flare Station of Existing NENT Landfill	Fixed	12
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	0
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	9
S3	LFG Generator Sets of NENTX Landfill	Fixed	15
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	41
		Cumulative	41
		Criterion	44
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 4.1 Quantitative Noise Impact Assessment
4.1.6 On-site Operational Noise Assessment (Mitigated Scenario)

Noise Sensitive Receiver: **SR10** **Tung Lo Hang**
Scenario: **During later stage of landfill operation (With mitigation)**
Time Period: **Daytime**

Fixed plant noise and waste filling activities at NENTX

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
S1	Leachate Treatment Plant of NENTX Landfill	Fixed	75	747	-65.5	-10	-2.2	-	6	3	100%	6
S2	Ammonia Stripping Plant of NENTX Landfill	Fixed	88	690	-64.8	-10	-2.1	-	6	3	100%	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	93	787	-65.9	-10	-2.4	-	6	3	100%	24
S5	Waste filling activities											
S5a	Phase 1	Notional	113	998	-68.0	-10	-3.0	-	0	3	100%	35
S5b	Phase 2	Notional	113	1672	-72.5	-10	-5.0	-	0	3	100%	29
S5c	Phase 3	Notional	113	953	-67.6	-10	-2.9	-	0	3	100%	36

Fixed plant noise at Existing NENT

Source ID	Description	Source Type	SWL, dB(A)	Distance, m	Distance attenuation, dB(A)[3]	Screening by natural topography, dB(A)[4]	Air absorption, dB(A)[5]	View angle, dB(A)	Tonality correction, dB(A)	façade correction, dB(A)	Utilization rate per 30-min interval	SPL, dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	75	432	-60.7	-10	-1.3	-	6	3	100%	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	88	246	-55.8	-10	0.0	-	6	3	100%	31
ES3	Flare Station of Existing NENT Landfill	Fixed	98	171	-52.7	-10	0.0	-	0	3	100%	38

Refuse vehicles[1]

Source ID	Description	Source Type	SWL, dB(A)	No. of vehicle per hour	No. of vehicle per 30-min	Vehicle speed, km/h	Distance, m	View angle, degree	No. of vehicle correction, dB(A)	Speed correction, dB(A)	Distance attenuation, dB(A)	View angle correction ,dB(A)	façade correction, dB(A)	Screening by topography, dB(A)	Air absorption, dB(A)	SPL, dB(A)
S4	Refuse Vehicle Movement	Mobile	97	180	90	20	742	55	19.5	-13.0	-28.7	-5.1	3	-10	-2.2	27

Cumulative on-site operational noise

Source ID	Description	Source type	Cumulative SPL, Leq (30min) dB(A)
ES1	Leachate Treatment Plant of Existing NENT Landfill	Fixed	12
ES2	Ammonia Stripping Plant of Existing NENT Landfill	Fixed	31
ES3	Flare Station of Existing NENT Landfill	Fixed	38
S1	Leachate Treatment Plant of NENTX Landfill	Mobile	6
S2	Ammonia Stripping Plant of NENTX Landfill	Notional	20
S3	LFG Generator Sets of NENTX Landfill	Fixed	24
S4	Refuse Vehicle Movement	Fixed	27
S5	Waste filling activities[2]	Fixed	36
		Cumulative	41
		Criterion	53
		Compliance	Yes

Note:
[1] Noise generated from haul road traffic is calculated by BS 5228-1:2009 F2.5
$L_{Aeq} = L_{WA} - 33 + 10\log_{10} Q - 10\log_{10} V - 10\log_{10} d + 10\log_{10} (A_v/180)$ + façade correction
where:
L_{WA} is the sound power level of the plant, in dB(A);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometers per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres;
A_v is the view angle to the haul road segment, in degrees;
façade correction of 3dB(A) is applied

[2] Since there is no overlapping between the 3 waste filling phases, predicted noise level at waste filling is based on the maximum SPL of S5a, S5b, and S5c.
[3] Distance attenuation for fixed plant and notional source is calculated by -($20\log_{10}$ d + 8) based on hemi-spherical radiation, where d is the distance.
[4] 10 dB(A) reduction for total screening from natural topography, 5 dB(A) reduction for partial screening from the hill slope.
[5] Assuming typical relative humidity is at 70% and temperature is at 25°C, based on ISO9613 "Method for calculation of the Absoprtion of Sound By the Atmosphere", air absorption is calculated by 3dB / km.

Appendix 9.1

Photos of Current and Historic Land Use

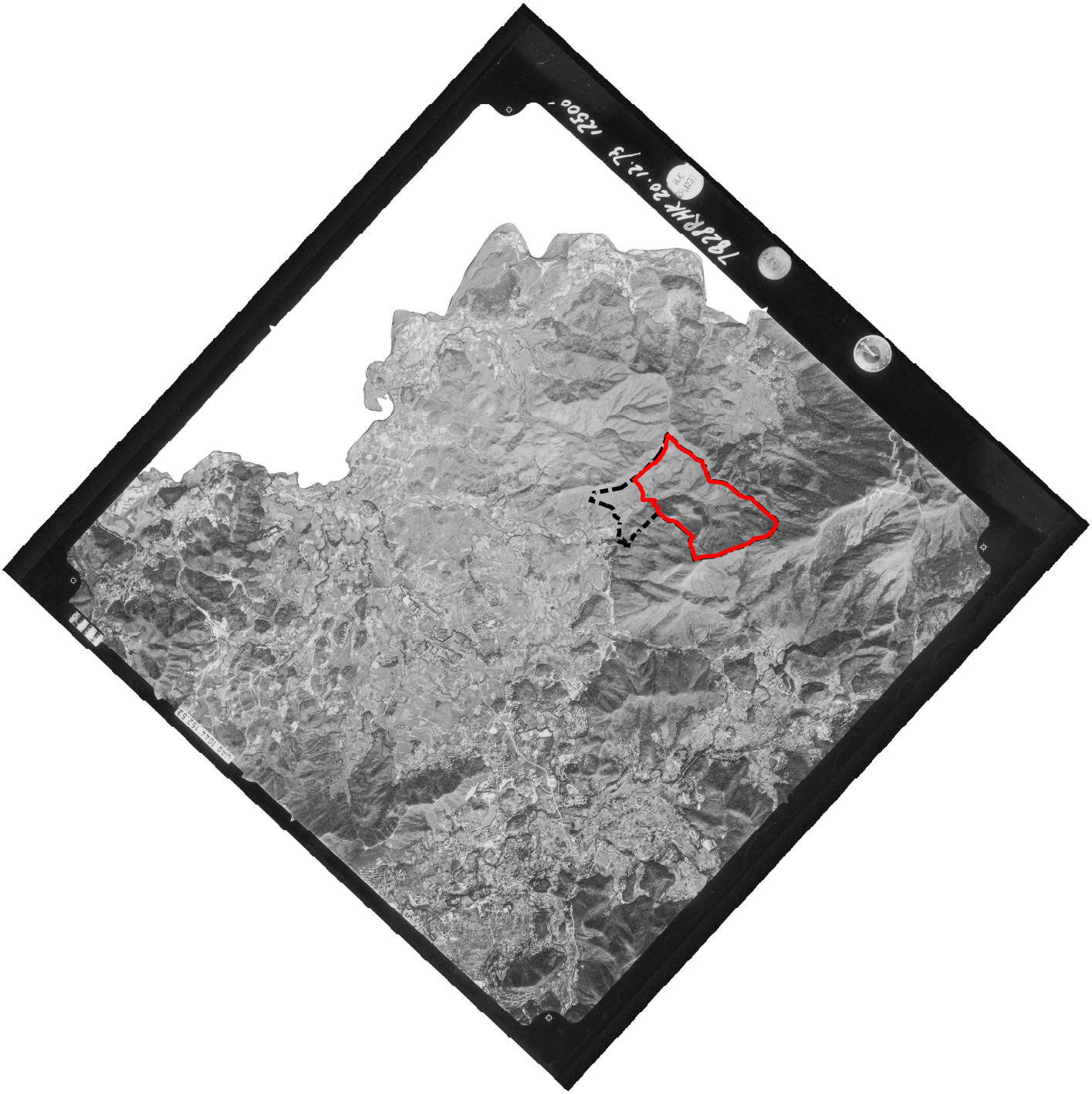


Photo 1: Aerial photograph in Year 1973
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

Photo 2: Aerial photograph in Year 1987
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

Photo 3: Aerial photograph in Year 1993
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

Photo 4: Aerial photograph in Year 2002
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

Photo 5: Aerial photograph in Year 2013
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

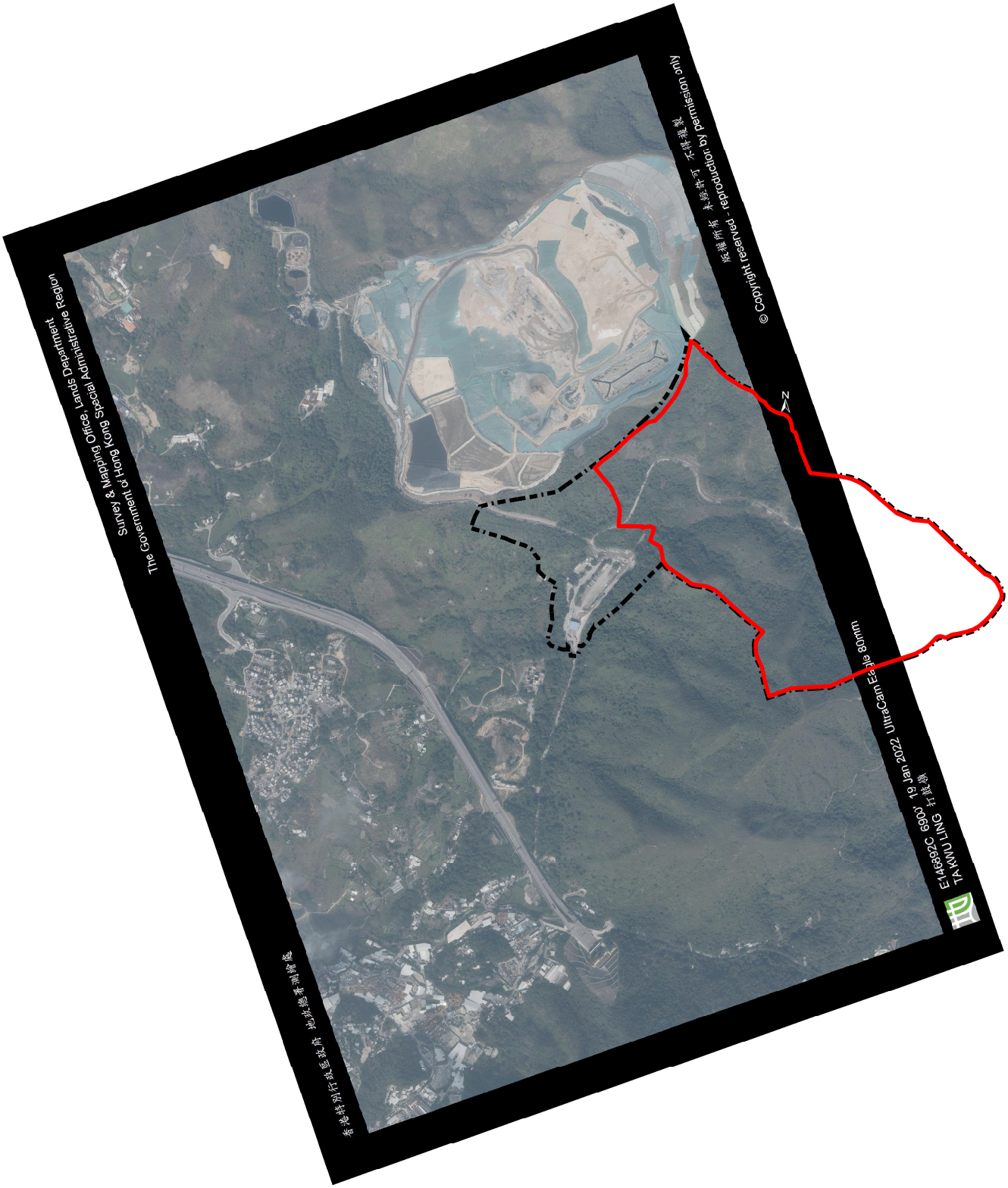
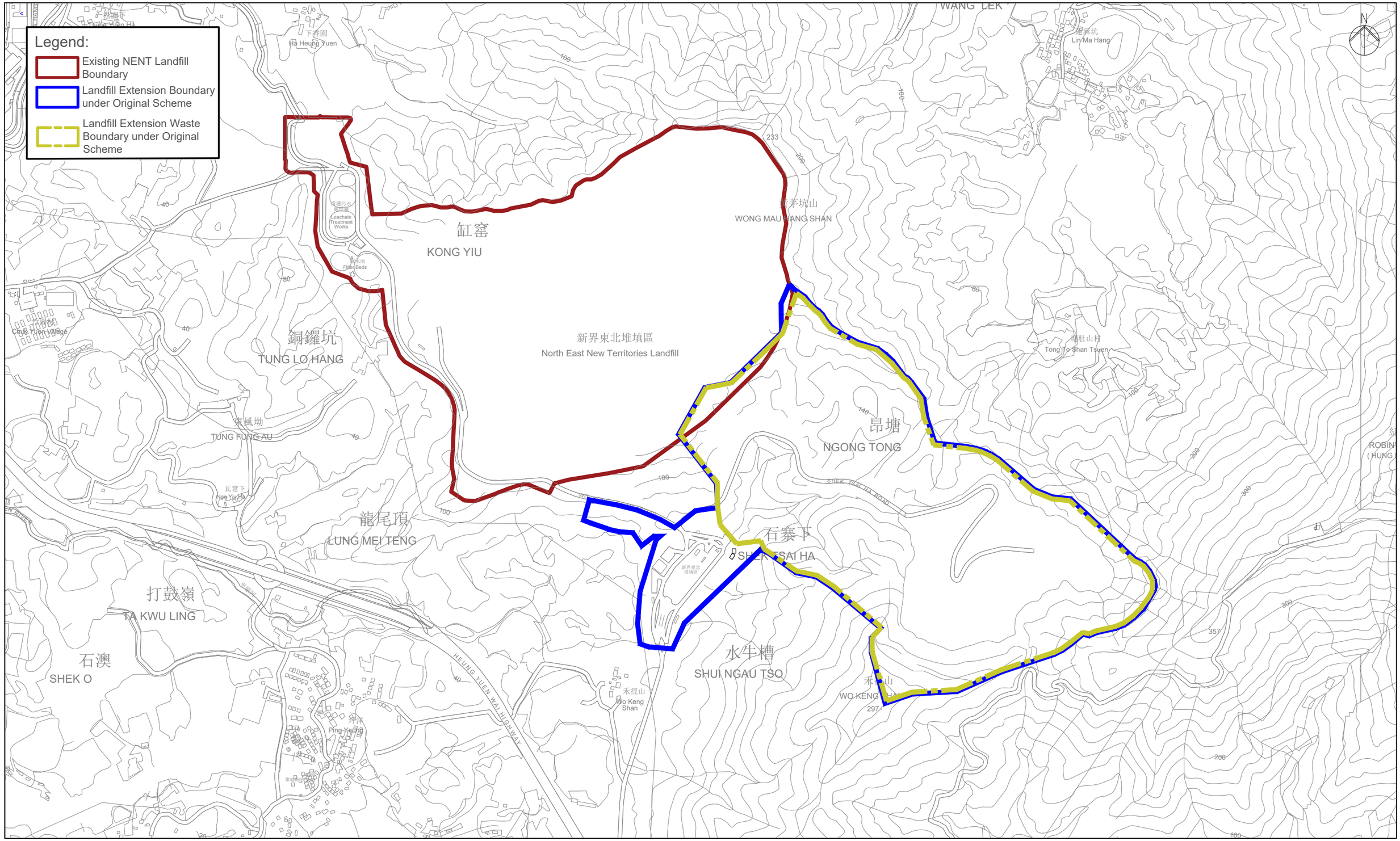


Photo 6: Aerial photograph in Year 2022
Solid red line: Proposed waste boundary
Dotted black line: Proposed project boundary

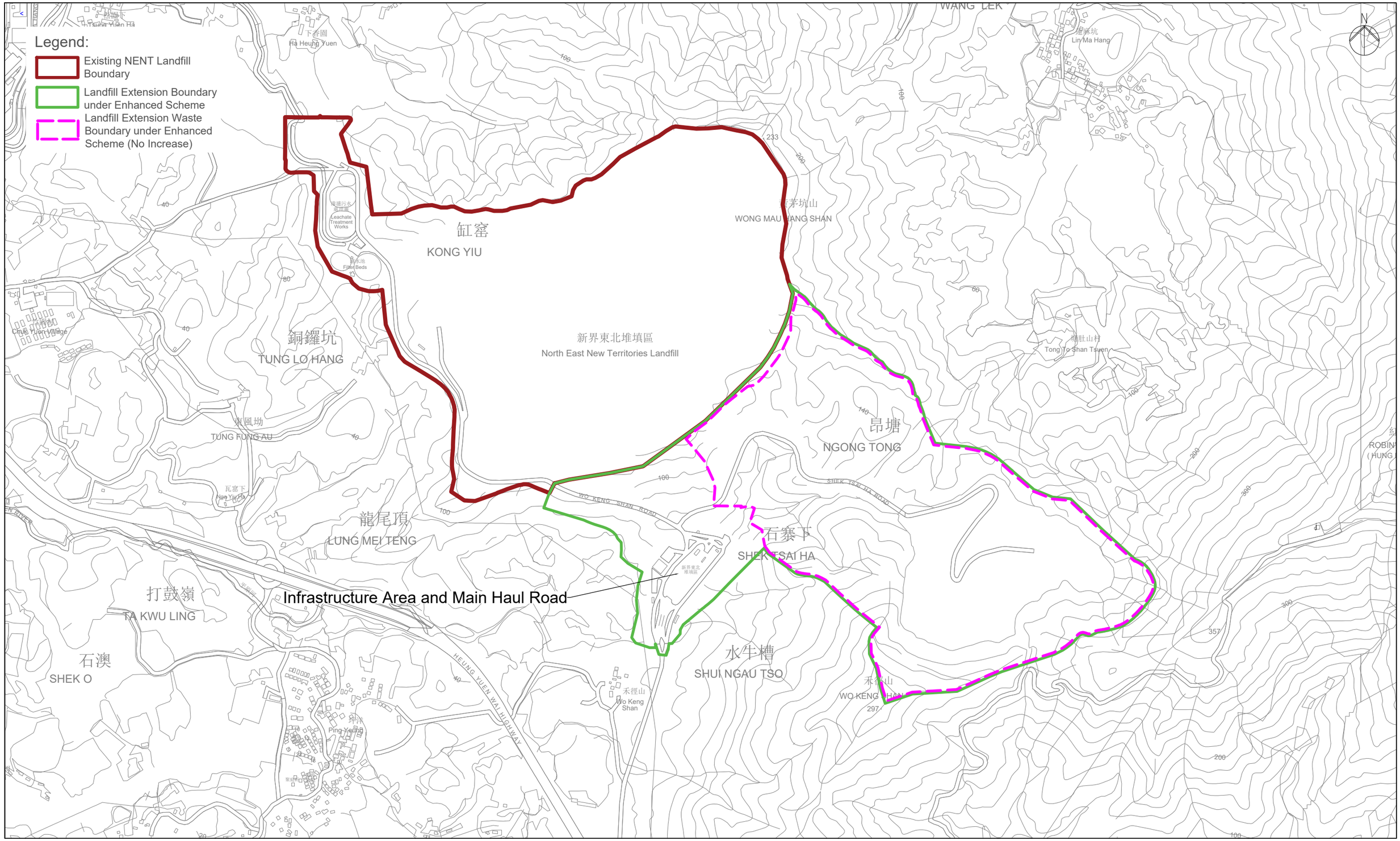
Photo 7: View of Area B

Photo 8: View of Area B

Figures



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Location Plan of the Project Site ("Original Scheme")	Figure 1.1 Scale: 1:10000



Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Location Plan of the Project Site ("Enhanced Scheme")	Figure 1.2 Scale: 1:10000

Legend:

- Existing NENT Landfill Boundary
- Landfill Extension Boundary under Original Scheme
- Landfill Extension Boundary under Enhanced Scheme
- Landfill Extension Waste Boundary under Enhanced Scheme (No Increase)
- Area A
- Area B

Area A
North East New Territories Landfill

Area B

缸窑
KONG YIU

銅鑼坑
TUNG LO HANG

東風坳
TUNG FUNG AU

龍尾頂
LUNG MEI TENG

打鼓嶺
TA KWU LING

石澳
SHEK O

黃茅坑山
WONG MAU HANG SHAN

昂塘
NGONG TONG

石寨下
SHEK TSAI HA

水牛槽
SHUI NGAU TSO

禾徑山
Wo Keng Shan

WANG LEK

Lin Ma Hang

Tong To Shan Tsuen

Chuk Yuen Village

Ha Heung Yuen

Leachate Treatment Works

Fish Ponds

Fish Beds

Ping Yeung

HEUNG YUEN WAI HIGHWAY

SHEK TSAI HA ROAD

N

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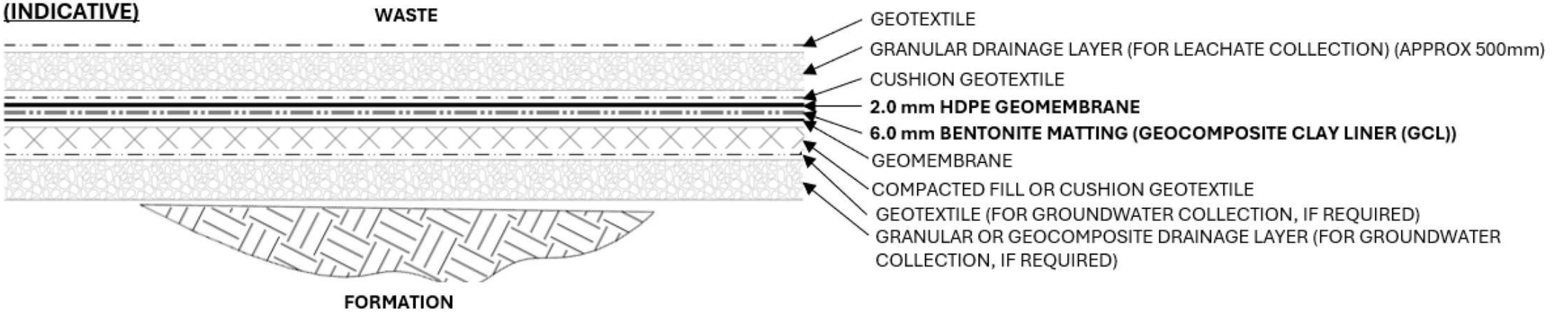
Aurecon Hong Kong Limited

North-East New Territories (NENT) Landfill Extension
Update of Landfill Extension Boundaries under "Enhanced Scheme"

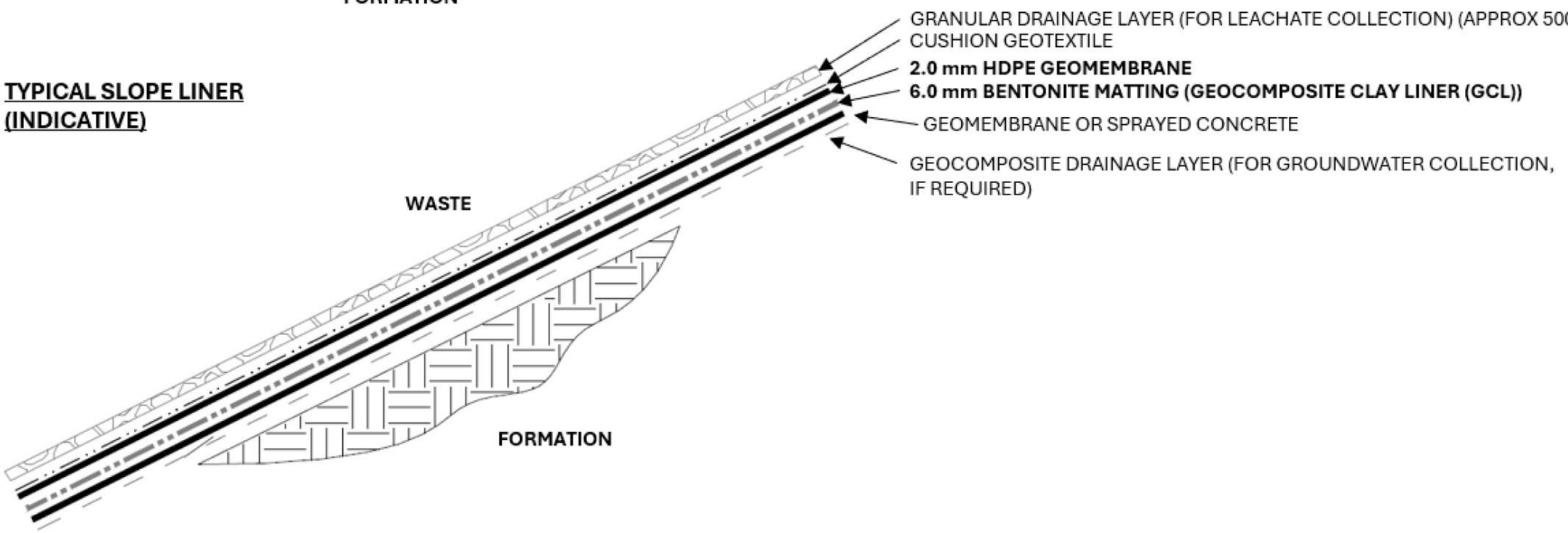
Figure 2.1

Scale: 1:10000

TYPICAL BASE LINER (INDICATIVE)



TYPICAL SLOPE LINER (INDICATIVE)



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Multi-layer Composite Liner System adopted in the NENTX Project	Figure 2.2

Legend:

- Landfill Extension under Enhanced Scheme
- Gaseous Emissions under Enhanced Scheme

新界東北堆填區

North East New Territories Landfill

Proposed Leachate Treatment Plant

INSET A

昂塘

NGONG TONG

石寨下

SHEK TSAI HA

水牛槽

SHUI NGAU TSO

禾徑山

Wo Keng Shan

WO KENG SHAN

297

SHEK TSAI HA ROAD

WO KENG SHAN ROAD

TUNG YUEN WAI HIGHWAY

新界東北堆填區

60

100

140

200

300

357

Thermal Destructor in Ammonia Stripping Plant (NEWS)

Generator Sets (NEG1)

Landfill Gas Flare at Start (on duty) (NEF1)

Landfill Gas Flare at Start (standby) (NEF2)

Landfill Gas Flare at Start (standby) (NEF3)

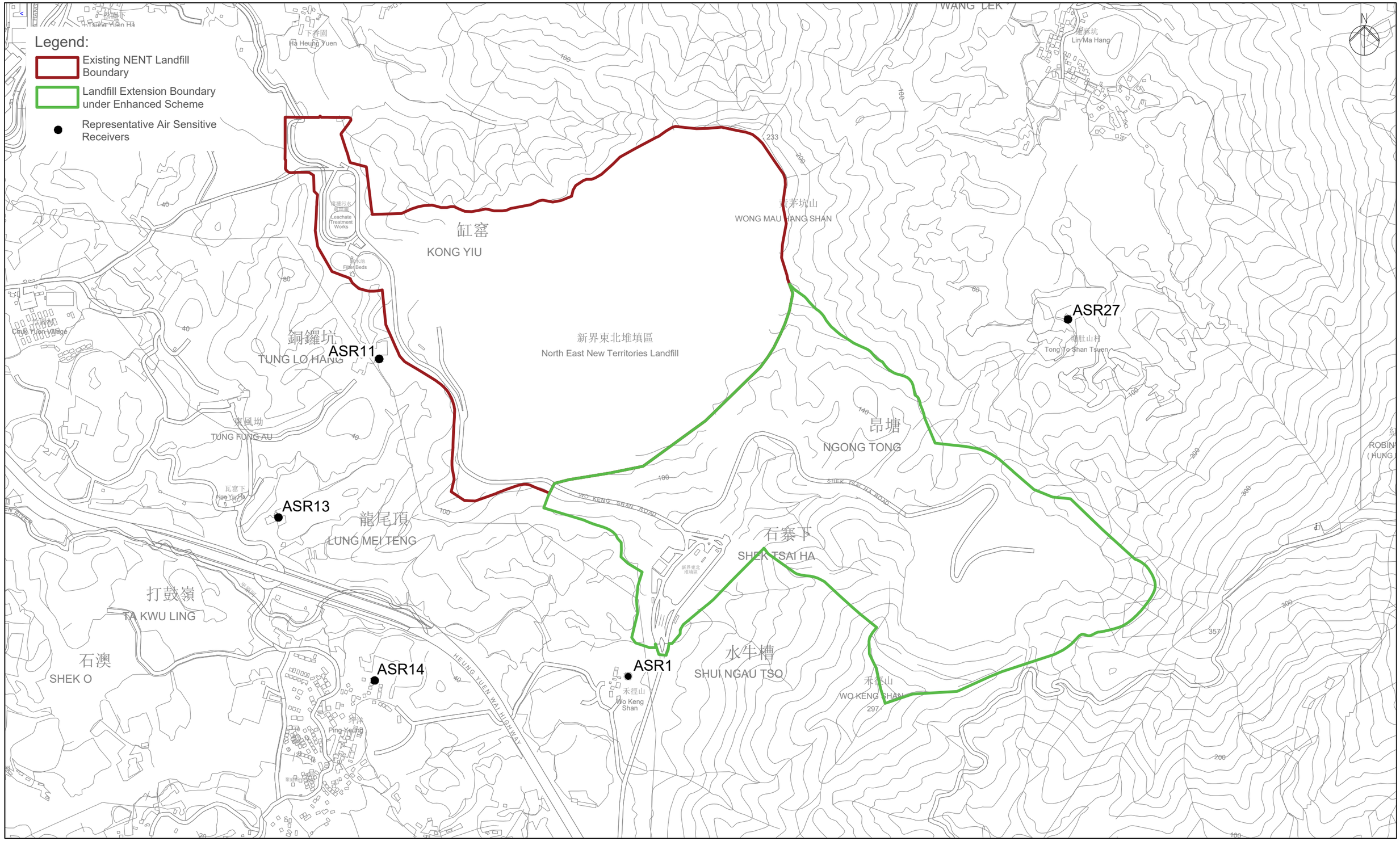
INSET A Scale: 1:2000

Aurecon Hong Kong Limited

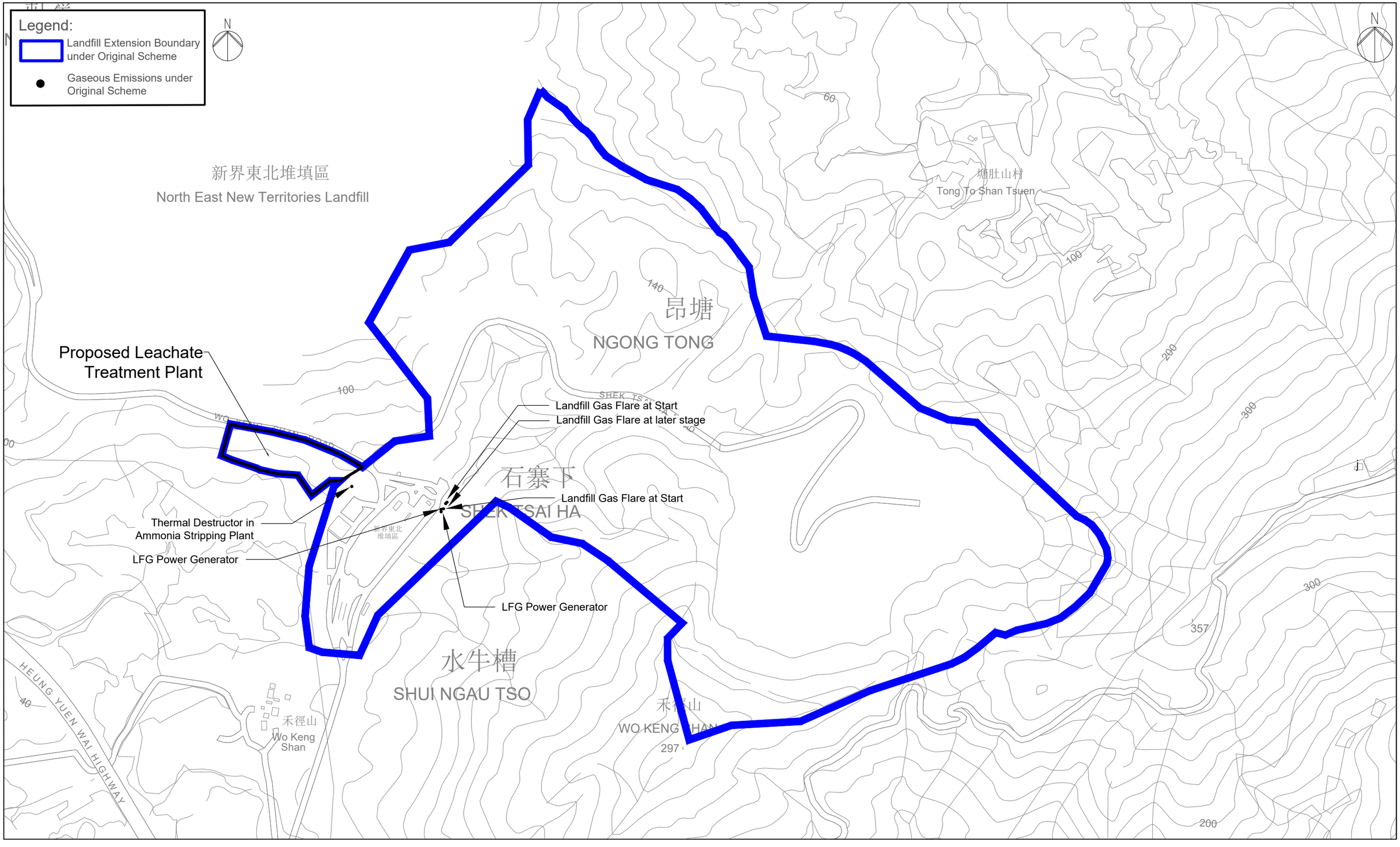
North-East New Territories (NENT) Landfill Extension
Locations of Gaseous Emissions under Enhanced Scheme

Figure 2.3

Scale: 1:6000



Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Representative Air Sensitive Receivers	Figure 3.1 Scale: 1:10000



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Locations of Gaseous Emissions under Original Scheme	Figure 3.2 Scale: 1:6000

Legend:

- Landfill Extension Boundary under Enhanced Scheme
- Gaseous Emissions under Enhanced Scheme

新界東北堆填區
North East New Territories Landfill

昂塘
NGONG TONG

塘肚山村
Tong To Shan Tsuen

Thermal Destructor in Ammonia Stripping Plant

Proposed Leachate Treatment Plant

Generator Sets

Landfill Gas Flare at Start (on duty)

Landfill Gas Flare at Start (standby)

Landfill Gas Flare at Start (standby)

龍尾頂
MEI TENG

石寨下
SHEK TSAI HA

水牛槽
SHUI NGAU TSO

禾徑山
Wo Keng Shan

WO KENG SHAN ROAD

SHEK TSAI HA ROAD

HEUNG YUEN WAI HIGHWAY

60 100 140 200 300 357 297 40 200

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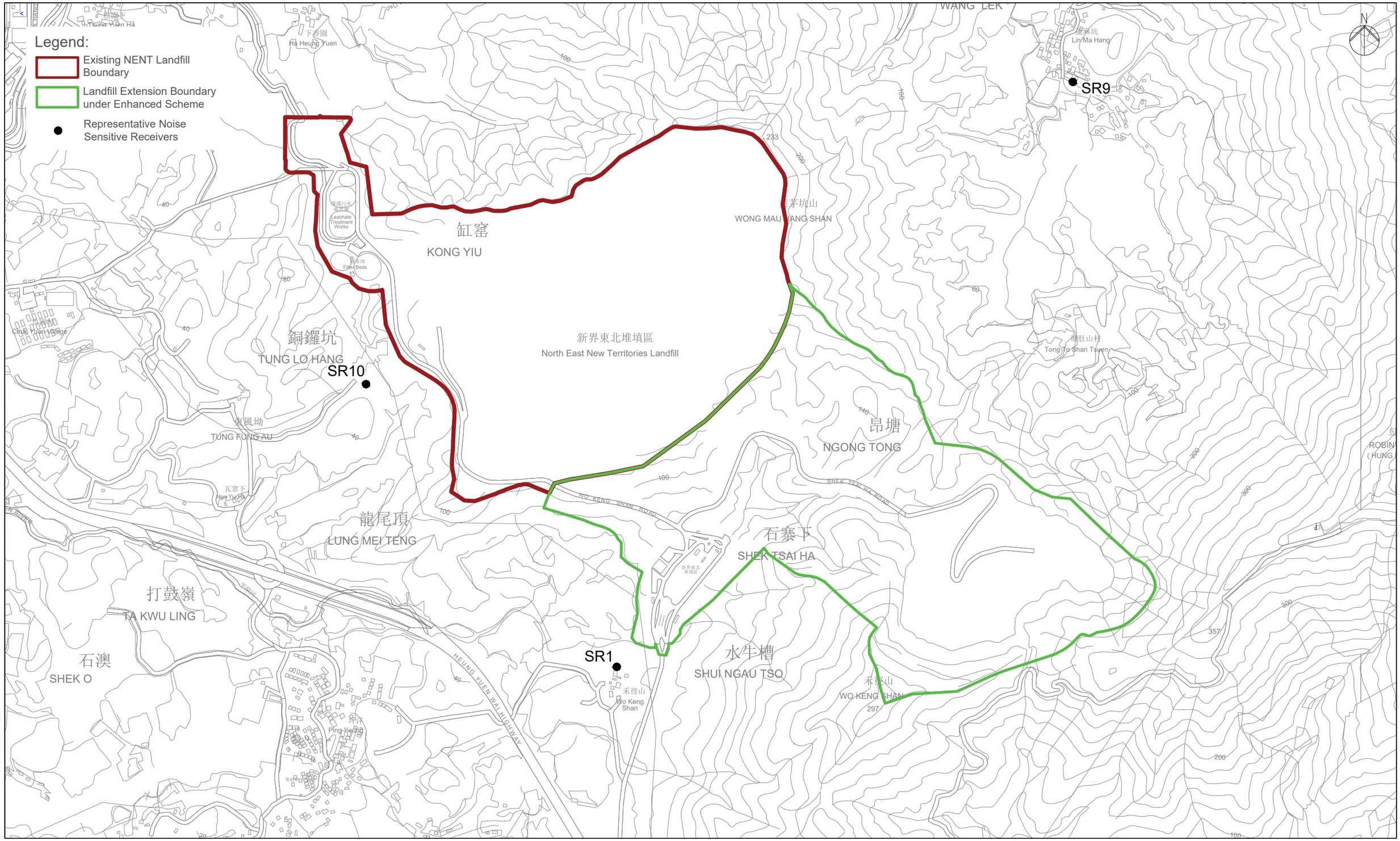
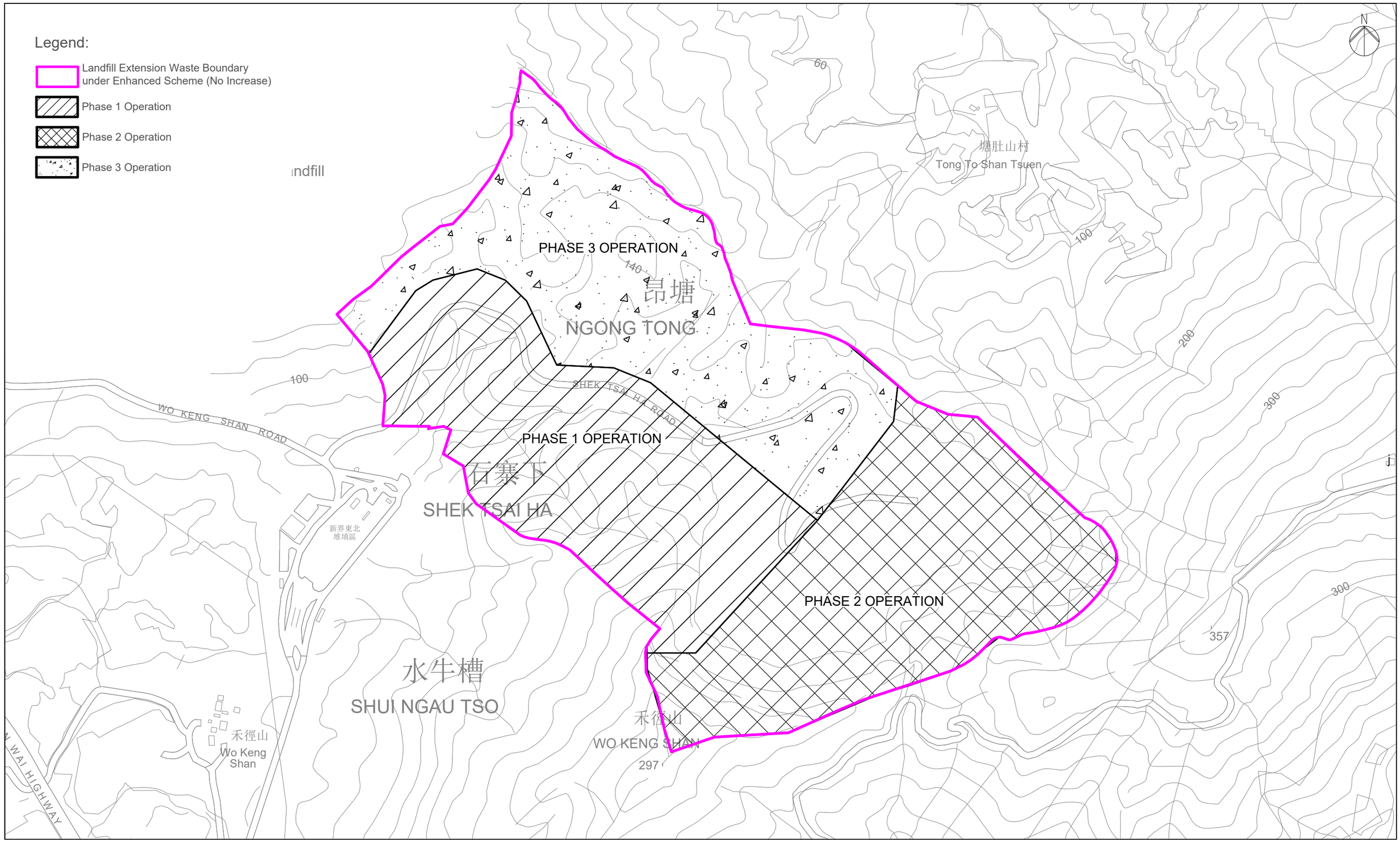
North-East New Territories (NENT) Landfill Extension
Locations of Gaseous Emissions under Enhanced Scheme

Figure 3.3

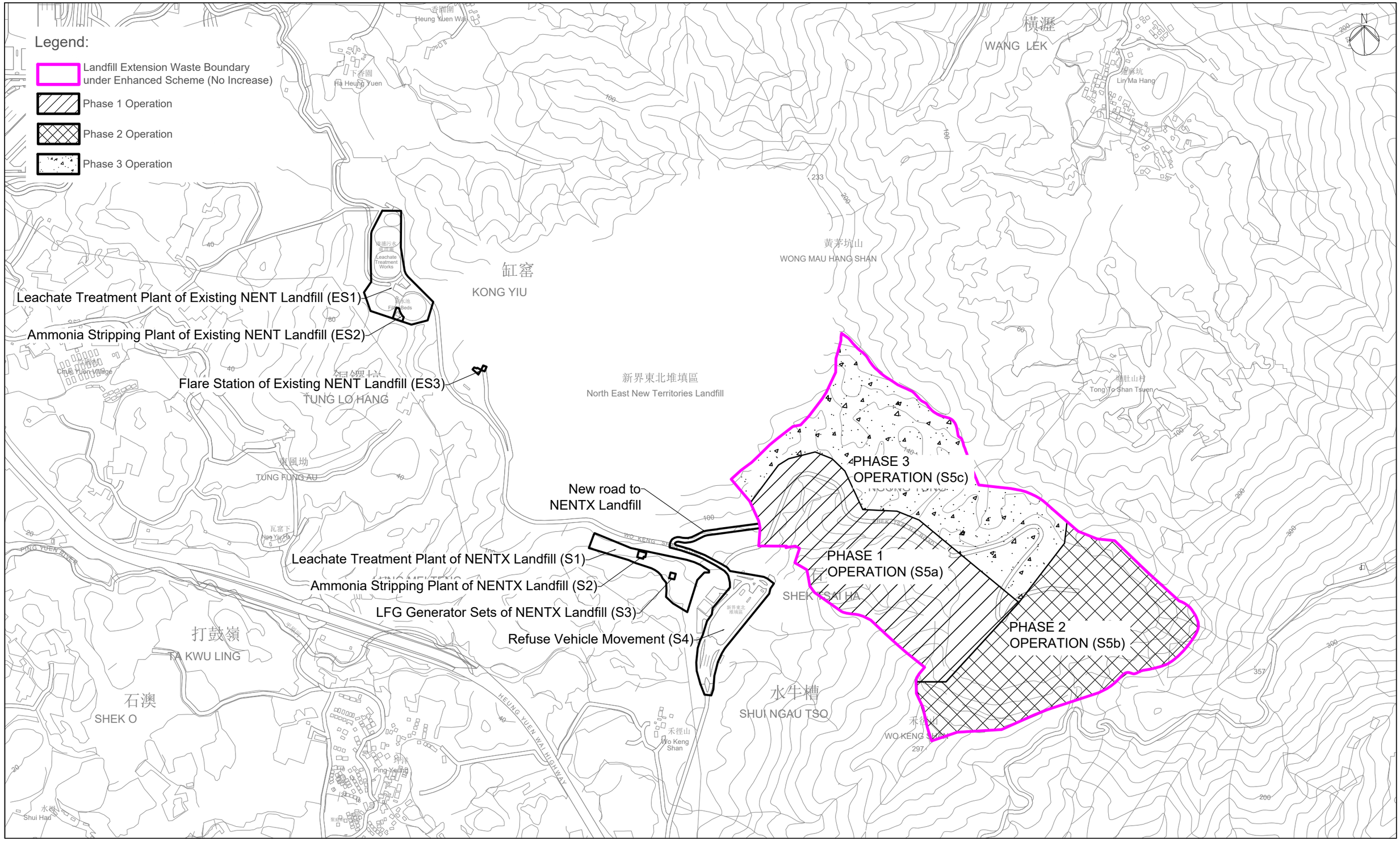
Scale: 1:6000



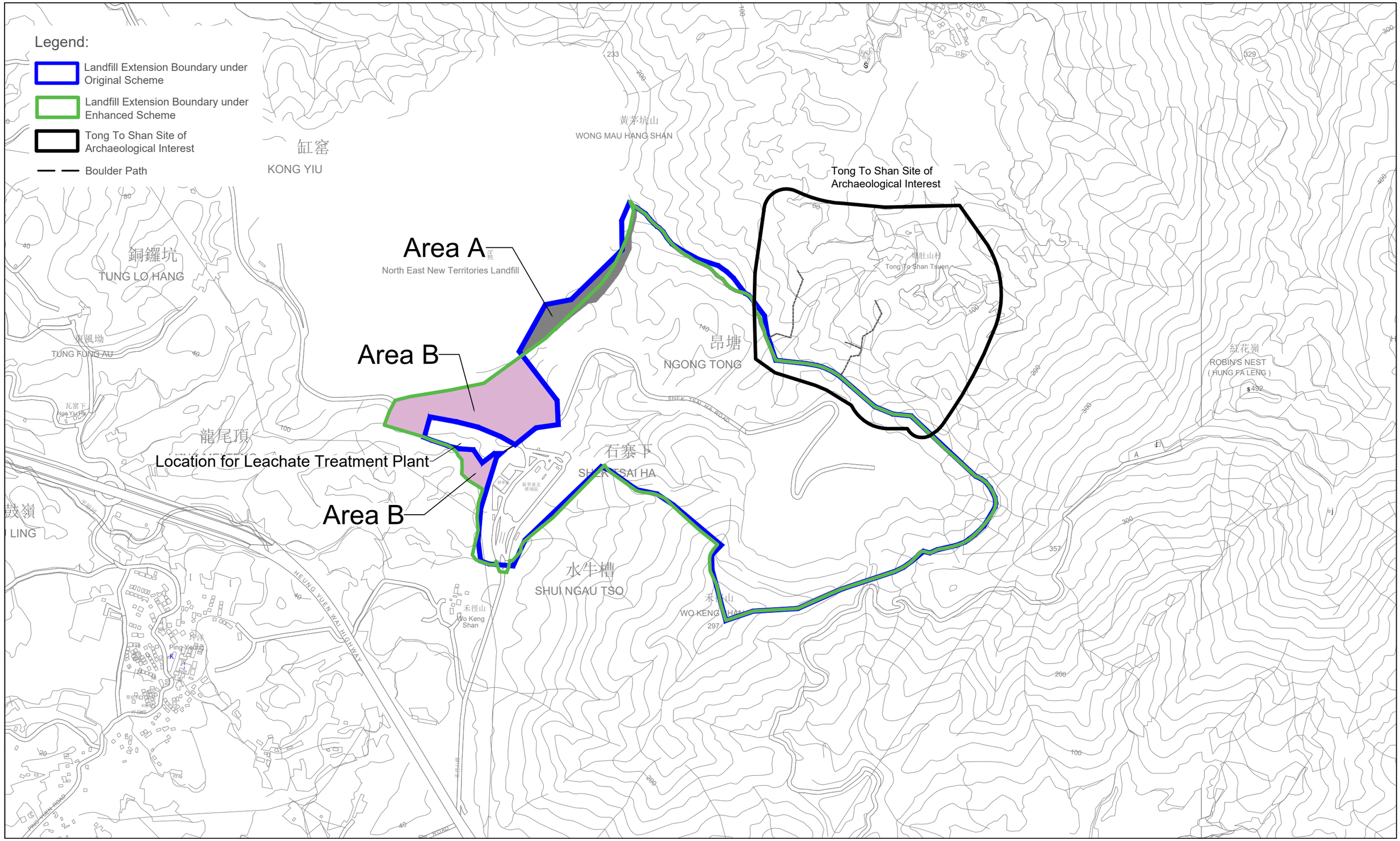
aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Representative Noise Sensitive Receivers	Figure 4.1 Scale: 1:10000



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Development Phasing	Figure 4.2 Scale: 1:6000



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Locations of Fixed Noise Sources	Figure 4.3 Scale: 1:10000



aurecon Aurecon Hong Kong Limited	North-East New Territories (NENT) Landfill Extension Landfill Extension Boundary under Original Scheme and Enhanced Scheme	Figure 9.1 Scale: 1:10000

缸窯

Legend:

- Landfill Extension Waste Boundary under Original Scheme
- Landfill Extension Waste Boundary under Enhanced Scheme (No Increase)
- Landfill Extension Boundary under Original Scheme
- Landfill Extension Boundary under Enhanced Scheme
- Ngong Tong sub-section
- Tong To Shan sub-section
- Shek Tsai Ha sub-section
- Wo Keng Shan sub-section
- Area B sub-section

新界東北堆填區
East New Territories Landfill

N

塘肚山村
Tong To Shan Tsuen

昂塘
NGONG TONG

SHEK TSAI HA ROAD

石寨下
SHEK TSAI HA

辦事處

新界東北堆填區

水牛槽
SHUI NGAU TSO

禾徑山
Wo Keng Shan

HEUNG YUEN WAI HIGHWAY

60
100
140
200
300
390
357
297
40

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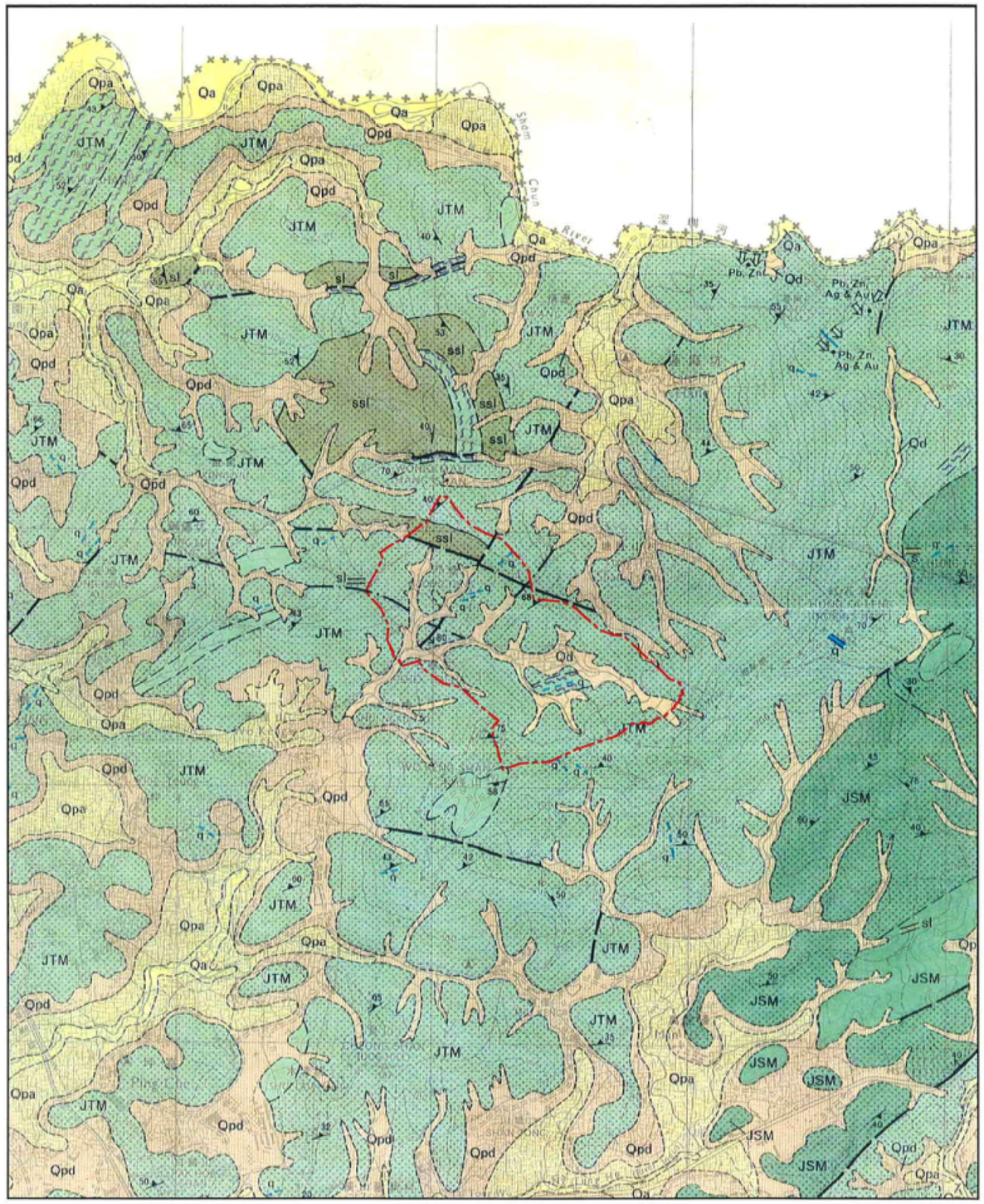
North-East New Territories (NENT) Landfill Extension
Study Area for Cultural Heritage Impact Assessment

Figure 9.2

Scale: 1:7500



LEGEND

Proposed Landfill Extension
Waste Boundary

JTM: Undivided coarse ash crystal tuff (Tai Mo Shan Formation).

Qd: Pleistocene and Holocene debris flow deposit (Unsorted sand, gravel, cobbles and boulders; clay / silt matrix).

Qpd: Pleistocene debris flow deposits (silt/sand, gravelly, clayey with cobbles and boulders; unsorted).

Qpa: Pleistocene Terraced Alluvium (clay/silt, gravelly, sandy, well sorted to semi-sorted).

Qa: Alluvium (Clay/silt, sand and gravel; well sorted to semi-sorted)

JSM: Undivided, fine ash to coarse ash tuffs, tuff-brecia and tufflites (Shing Mun Formation)

ssl: Sandstone and siltstone or mudstone

sl: Siltstone and mudstone

: Schist

: Slightly metamorphosed

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North-East New Territories (NENT) Landfill Extension
Solid and Superficial Geology (Sheung Shui) Hong Kong Geological Survey

Figure 9.3

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