

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. : VEP-461/2014

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

MTR Corporation 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)

B3. Correspondence Address :

B4. Name of Contact Person :

B5. Position of Contact Person :

B6. Telephone No. :

B7. Fax No. :

B8. E-mail Address : (if any)

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

MTR Corporation Limited

C2. Application No. of the Current Environmental Permit : FEP-06/129/2002/H

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

01 | 2015

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.

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 :
<ul style="list-style-type: none"> • Vary scale and scope of Designated Project in Part B • Vary Figure 1A • Add Figure 1C 	<p>➤ Construction of railway station at Kwu Tung</p> <p>The key modifications required are given below:</p> <ul style="list-style-type: none"> • Excavation of the fill material above the existing tunnel box; • Modification of existing tunnel box structures; • Construction of concourse and platform areas; • Construction of back-of-house areas; • Construction of entrances, VB and FRS; • Modification of existing EAP/EEP; • Relocation of existing EVA and associated facilities; and 	<p>In order to facilitate the implementation of the new town at Kwu Tung, the existing tunnel box structure at Kwu Tung in the LMC Spur Line will be modified to a functional railway station so as to cater for the population intake of the new town.</p>	<p>Please refer to the Section 4 to Section 13 of the Environmental Review Report.</p>	<p>Please refer to the Section 4 to Section 13 of the Environmental Review Report.</p> <p>The proposed variation would not affect the extent of environmental impacts as predicated in the approved EIA Report. The proposed variation would comply with the requirements in the Technical Memorandum on EIA Process (EIAO – TM) with mitigation measures in place.</p>	<p>The environmental performance requirements set out in the approved EIA Report will be maintained. The proposed variation would not change the extent of environmental impacts predicted in the approved EIA Report.</p>	<p>No additional mitigation measures required.</p>

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 :
	<ul style="list-style-type: none"> • Construction of other station associated facilities and underground adit. ➤ Operation of railway station at Kwu Tung 					

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.



Signature of Applicant



Full Name in Block Letters



Position

on behalf of MTR Corporation Limited
Company Name and Chop (as appropriate)



30 Nov 2021
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.

MTR Corporation Limited
**Variation of Environmental
Permit (VEP) of Sheung Shui to
Lok Ma Chau Spur Line**
Environmental Review Report

281521-REP-005-05

Revision E | 29 November 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 281521

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Contents

	Page
1 Introduction	1
1.1 Background	1
1.2 Need for the Proposed Amendments	1
1.3 Tentative Construction Methodology and Programme	3
1.4 Concurrent Projects	6
1.5 Purpose of This Environmental Review Report (ERR)	7
1.6 Structure of the Report	8
2 Proposed Amendments	10
2.1 Proposed Amendments	10
3 Environmental Changes arising from the Proposed Amendments	11
3.1 Hydrology	11
3.2 Ecology	11
3.3 Fisheries	11
3.4 Air Quality	11
3.5 Noise	12
3.6 Water Quality	12
3.7 Waste Management	12
3.8 Contaminated Land	12
3.9 Cultural Heritage	13
3.10 Landscape and Visual	13
4 Review of Hydrology	15
4.1 Review of Approved EIA for LMC Spur Line	15
4.2 Review of Potential Impact on Hydrology	15
4.3 Conclusion	15
5 Review of Ecology	16
5.1 Review of Approved EIA for LMC Spur Line	16
5.2 Methodology	16
5.3 Ecological Baseline Condition	18
5.4 Evaluation of Habitats and Species of Conservation Importance	24
5.5 Review of Ecological Impact and Mitigation Measures	26
5.6 Conclusion	28
5.7 Reference	28
6 Review of Fisheries	30
6.1 Review of Approved EIA for LMC Spur Line	30

6.2	Identification of Potential Fisheries Impact	30
6.3	Conclusions	30
7	Review of Air Quality	31
7.1	Review of Approved EIA for LMC Spur Line	31
7.2	Description of the Environment	31
7.3	Construction Programme	32
7.4	Representative Air Sensitive Receivers	32
7.5	Construction Phase	35
7.6	Operational Phase	40
7.7	Conclusion	40
8	Review of Noise	41
8.1	Review of Approved EIA for LMC Spur Line	41
8.2	Baseline Condition	41
8.3	Construction Programme	41
8.4	Construction Phase	42
8.5	Operational Phase	49
8.6	Conclusion	51
9	Review of Water Quality	53
9.1	Review of Approved EIA for LMC Spur Line	53
9.2	Representative Water Sensitive Receivers	53
9.3	Construction Phase	54
9.4	Operational Phase	58
9.5	Conclusion	60
10	Review of Waste Management	61
10.1	Review of Approved EIA for LMC Spur Line	61
10.2	Construction Phase	61
10.3	Operational Phase	69
10.4	Conclusion	70
11	Review of Contaminated Land	72
11.1	Review of Approved EIA for LMC Spur Line	72
11.2	Evaluation of Land Contamination Impact	72
11.3	Conclusion	76
12	Review of Cultural Heritage	77
12.1	Review of Approved EIA for LMC Spur Line	77
12.2	Description of the Environment	77
12.3	Identification and Evaluation of Impact	77
12.4	Conclusions	78
13	Review of Landscape and Visual	79

13.1	Review of Approved EIA for LMC Spur Line	79
13.2	Assessment Methodology of Landscape and Visual Impact	79
13.3	Review of Planning and Control Framework	79
13.4	Review of Landscape Resources	80
13.5	Review of Landscape Character Areas	83
13.6	Possible Mitigation Measures for Landscape	84
13.7	Review of Visual Impacts	86
13.8	Conclusion	93
14	Change of Environmental Monitoring & Audit (EM&A) Scope	94
14.1	Review of Approved EIA for LMC Spur Line	94
14.2	Environmental Monitoring & Audit (EM&A) Scope	94
14.3	EM&A Requirements	94
15	Justification on Material Change	123
16	Conclusion	125
16.1	Impact Summary	125
16.2	Proposed Variations to the Conditions in Current Environmental Permit	125

Figures

- Figure 1.1** Tentative Works Sites and Works Areas of Railway Station at Kwu Tung
- Figure 1.2** Existing and Proposed Above-ground Structures at Kwu Tung of LMC Spur Line
- Figure 2.1** Location of the Project
- Figure 2.2** Location Plan of the Railway Station at Kwu Tung
- Figure 5.1** Tentative Works Area of Railway Station at Kwu Tung, 500m Study Area and Recognised Site of Conservation Importance
- Figure 5.2** Ecological Site Appraisal Area and Transect
- Figure 5.3** Habitat Map and Locations of Species of Conservation Importance
- Figure 7.1** Location of Representative Existing Air and Noise Sensitive Receivers
- Figure 7.2** Location of Representative Planned Air and Noise Sensitive Receivers
- Figure 9.1** Location of Existing Water Sensitive Receivers
- Figure 11.1** Site Survey Photos
- Figure 11.2** Location of Potentially Contaminated Sites from the approved EIA for NENT NDA
- Figure 12.1** Locations of Built Heritages and Spot of Archaeological Interest
- Figure 13.1** Landscape Resources Plan
- Figure 13.2** Location of Visually Sensitive Receivers
- Figure 14.1** Location of Construction Dust and Construction Noise Monitoring

Appendices

- Appendix 1.1** Demarcation of Kwu Tung Station in Approved EIA for LMC Spur Line
- Appendix 5.1** Representative Photos of Habitats
- Appendix 8.1** Calculation of Maximum Allowable SWLs for Planned Fixed Noise Sources
- Appendix 11.1** Historical Aerial Photos
- Appendix 13.1** Tree Survey Plan
- Appendix 14.1** Sample Data Sheet for TSP Monitoring
- Appendix 14.2** Sample Data Sheet for Construction Noise Monitoring
- Appendix 14.3** Sample Template for Interim Notification

1 Introduction

1.1 Background

The Environmental Impact Assessment (EIA) report for “Sheung Shui to Lok Ma Chau Spur Line” (Register No.: AEIAR-052/2002) (i.e. hereafter called the approved EIA for LMC Spur Line) conducted by Kowloon-Canton Railway Corporation (KCRC) was approved in 2002, and addressed the environmental impacts caused by the LMC Spur Line. As far as the railway station at Kwu Tung is concerned, the approved EIA for LMC Spur Line had considered the potential construction and operational impacts for the railway station at Kwu Tung enabling works including the station box structure. Sensitive receivers in the vicinity of the railway station at Kwu Tung at that time included village houses along Ma Tso Lung Road and Ho Sheung Heung Road, Fairy Park, Dills Corner Garden. **Appendix 1.1** shows the demarcation of the station box structure of railway station at Kwu Tung structure adopted in the approved EIA Report for LMC Spur Line.

Civil Engineering and Development Department (CEDD) / Planning Department (PlanD) subsequently conducted an EIA for North East New Territories New Development Areas which was approved in 2013 (i.e. hereafter called EIA for NENT NDA). This EIA for NENT NDA covered a total of 2 new development areas (NDAs) including the one in Kwu Tung North (KTN). Unlike the EIA for LMC Spur Line, the EIA for NENT NDA proposed new developments including high-rise public and private housings, educational institutes, social welfare facilities, open space, etc in the vicinity of the railway station at Kwu Tung. Subsequent to the approval of EIA for NENT NDA, the respective project proponent (i.e. CEDD) is currently implementing the site formation works for the NDAs and other infrastructures, including those at KTN.

In December 2020, the MTR Corporation Limited (i.e. MTRCL, hereafter called the Project Proponent) was invited by the Government to commence the detail planning and design of the railway station at Kwu Tung (i.e. hereafter called the Project).

1.2 Need for the Proposed Amendments

As discussed in **Section 1.1**, the entire tunnel box and the enabling works had been completed and it only requires some modifications to the existing tunnel box and enabling works to transform to a functional railway station to serve the KTN NDA. A summary of the key modifications required is given below.

- Excavation of the fill material above the existing tunnel box;
- Modification of existing tunnel box structures;
- Construction of concourse and platform areas;
- Construction of back-of-house areas;

- Construction of entrances, Ventilation Buildings (VB) and Fire Rescue Stairs (FRS);
- Modification of existing Emergency Access Point (EAP)/ Emergency Egress Point (EEP);
- Relocation of existing EVA and associated facilities; and
- Construction of other station associated facilities and underground adit.

As there is already an existing tunnel box accommodating the platform space, the existing diaphragm wall (D-wall) would be used for Excavation and Lateral Support (ELS) during the modification works for railway station at Kwu Tung. The works would be mainly excavation and construction within the existing D-wall in order to limit the extent of land required.

In order to facilitate the modification works, some work sites and works areas would be required. Works site for station construction is the area that some excavation works may be required (i.e. major construction works). Other works sites and works areas are those for construction site offices, site access and storage areas (see **Figure 1.1** shows the existing tunnel box, the tentative works sites and works areas).

Other than the above key modifications that would need to be conducted, there would also be some minor works such as Temporary Traffic Management (TTM), underground utilities, site investigation, small-scale grouting, street furniture, etc. that would need to be conducted beyond works sites/works areas. Given the small scale of these minor works, their associated environmental impacts would not be significant. However, all relevant good site practices as discussed in this report would also be implemented as far as practicable.

The construction and operation of the LMC Spur Line constitutes to Item A.2 Designated Project (DP) “A railway and its associated stations”, under Part I Schedule 2 of Environmental Impact Assessment Ordinance (EIAO). KCRC had applied for and had been granted numbers of Environmental Permits (EPs) and Further Environmental Permits (FEP) for its construction and operation of LMC Spur Line, including the existing tunnel box and enabling works.

The EP (EP No. EP-129/2002/H) held by KCRC includes the construction and operation of a railway and its associated stations while that of the FEP held by MTRCL (EP No. FEP-06/129/2002/H) includes the operation of a railway and its associated stations.

The proposed railway station at Kwu Tung will be constructed and operated by MTRCL under the ownership approach. As such, unlike in the case of the existing LMC Spur Line which MTRCL operates through a service concession granted by KCRC, there is no service concession involved and MTRCL will be solely responsible for construction and operation of this proposed railway station at Kwu Tung and ultimately own it.

Since MTRCL is the sole project owner of the proposed railway station at Kwu Tung, the EP conditions in KCRC’s EP would not be affected, and no variation of this EP is required. On the other hand, in order to expand the scope of the FEP (No.

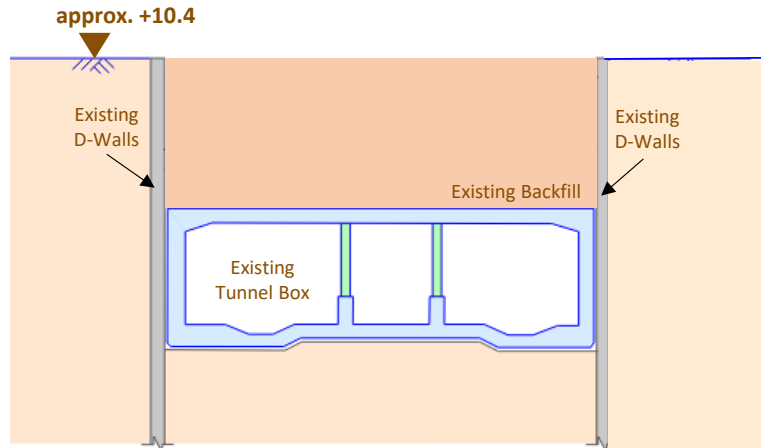
FEP-06/129/2002/H) held by MTRCL to cover the construction and operation of the proposed railway station at Kwu Tung, variation of this FEP would be required.

1.3 Tentative Construction Methodology and Programme

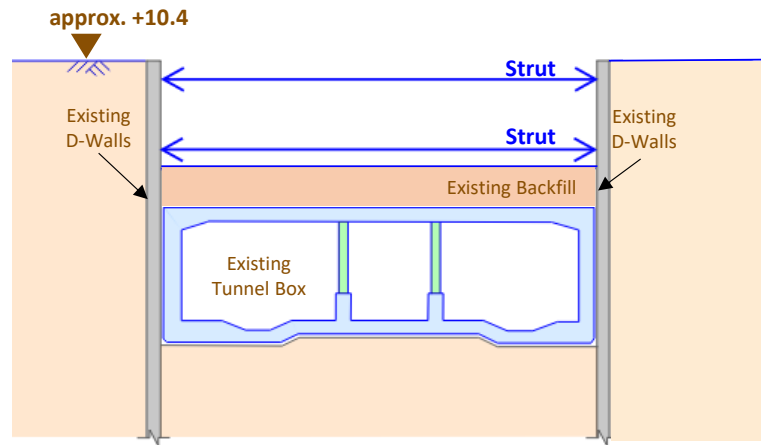
A summary of the key construction activities of the construction methodology for the proposed modification works of the railway station at Kwu Tung is given below. **Image 1.1** shows the schematic sequence of the tentative construction methodology which would be subject to continuous evolution during the detailed design stage when more engineering information and interfacing requirements become available.

- Remove the existing fill material above the existing tunnel box;
- Install a temporary enforcement for the existing D-wall structures (e.g. strut);
- Make necessary enforcement for the existing structures;
- Construct the platform and concourse structures;
- Site reinstatement to future ground level (range from approx. +10.4 to +13.4mPD);
- Construct/ modify the above-ground structures (e.g. entrances, VB, FRS, and EAP/EEPs); and
- Install suitable landscape elements on top of the new station box.

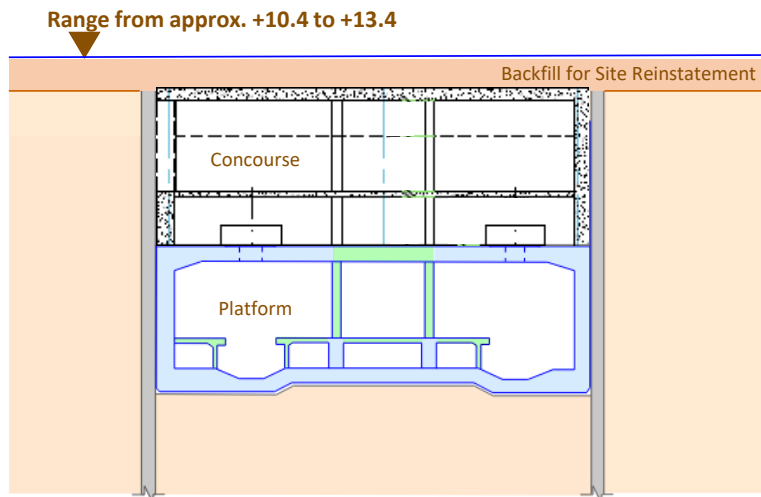
Image 1.1 Tentative Construction Methodology



- Existing tunnel box at Kwu Tung to be excavated



- Existing backfill on tunnel box at Kwu Tung to be excavated
- Temporary struts to be installed



- New station box at Kwu Tung to be installed on top of the existing tunnel box at Kwu Tung
- Backfilling to upgrade the ground level for site reinstatement
- Above-ground works would be required for entrances, VBs, FRS and EAP/EEPs

Apart from the construction works within the existing D-wall, an underground adit is also proposed at the south of the station at concourse level for the connection to the future developments at KTN NDA. The dimension of the adit is approx. 12m wide and approx. 40m long, with minimized footprint within the existing KCRC vested land (see **Figure 1.1**). In order to avoid future constraints of above-ground constructions (e.g. EVA) at the south of the railway station, the adit shall be constructed at this stage before the above-ground constructions to be carried out.

While the railway station of Kwu Tung is underground, it would need the following above-ground structures. The approximate dimensions of the above-ground structures are summarised in **Table 1.1**. The actual dimensions are subject to detail design. The layout of the Project under preliminary design is shown in **Appendix 1.2**.

Table 1.1 Above-ground Structures for Railway Station at Kwu Tung

Above-ground Structures	Approx. Dimensions (L x W x H)
Proposed West Entrance (incorporated with VB)	90m x 30m x 17m
Proposed East Entrance (incorporated with VB)	75m x 30m x 14m
Proposed FRS	30m x 8m x 8m
Existing EAP/EEP (East) (also known as EAP3)	25m x 22m x 10m
Existing EAP/EEP (West) (also known as EAP4)	10m x 13m x 10m

Typical construction activities (i.e. from ground floor to roof) of above-ground station entrances, FRS and VBs is given below. The entrances and VBs would be constructed from ground floor to roof.

- Construction of ground level slab;
- Construction of walls; and
- Construction of internal structures and roof slab.

As discussed in **Section 1.2**, there are existing D-wall at the Project Site and no modification on the D-walls will be required. The new concourse will be built atop of the existing tunnel box. This would minimise the land required and the construction period of the Project, and hence the associated environmental impacts as well.

The programme of the modification works for the railway station at Kwu Tung are tentatively scheduled to commence in Q3 2023 and be completed by 2028. The main activities from Q3 2023 to Q4 2023 will be site clearance and preparation on the existing KCRC vested land and nearby vacant lands. The major construction works including site mobilization, excavation and piling works for adit would be commence in Q1 2024 and completed with the first 1.5 years i.e. by Q2 2025. Starting from Q3 2025, the remaining works would be mainly structural works, site reinstatements and inspection and trial run, which are considered as minor construction works that would not cause any significant environmental impacts. For the purpose of this ERR, “commencement of construction” does not include works relating to site clearance and preparation.

1.4 Concurrent Projects

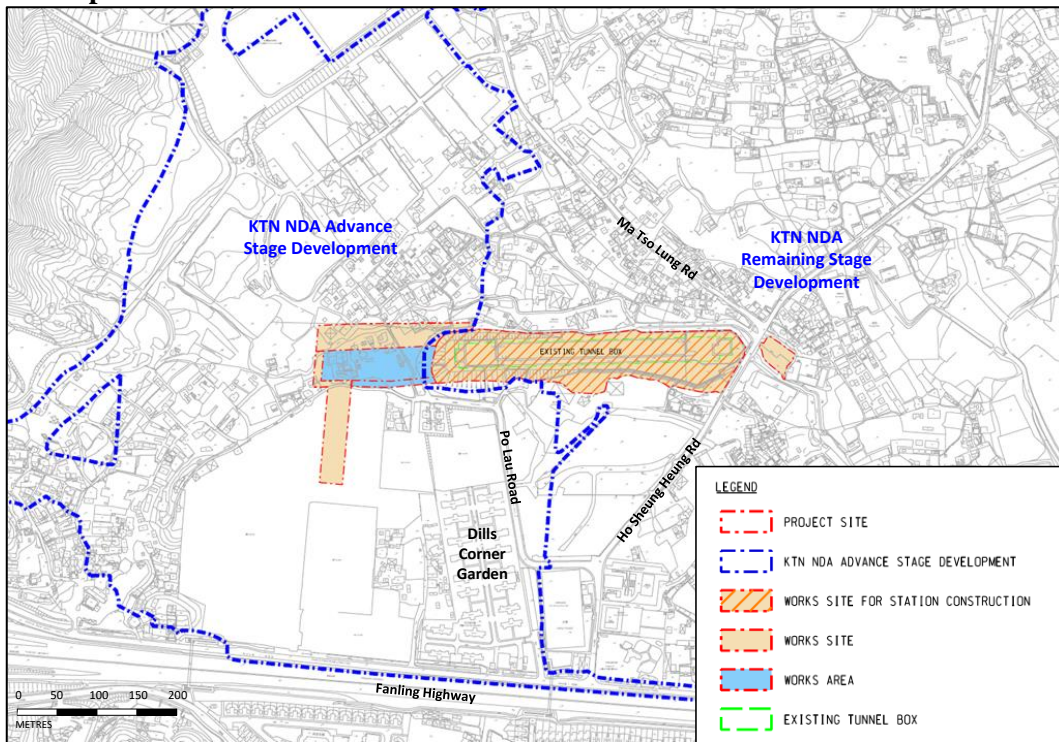
The concurrent projects within 500m from the Project have been reviewed. North East New Territories (NENT) New Development Areas (NDAs) and Northern Link (NOL) are the concurrent projects.

North East New Territories (NENT) New Development Areas (NDAs)

Since the approval of the EIA Report for NENT NDA (AEIAR-175/2013), development in Kwu Tung North (KTN) and Fanling North (FLN) NDA are being implemented by CEDD.

According to the information provided by CEDD, the construction program of the KTN NDA is divided into 2 phases, namely Advance Stage Development and Remaining Stage Development (see **Image 1.2** for demarcation). As shown in **Image 1.2**, the permanent railway station at Kwu Tung is within the Remaining Stage Development, while the temporary works sites and works areas are located within both the Advance Stage Development and the Remaining Stage Development. It should be noted that the boundaries of the works areas and works sites shown in **Image 2** are tentative at this stage and would be subject to continuous evolvments during the detailed design stage as necessary. Beyond the boundaries of works areas and work sites, some minor activities such as Temporary Traffic Management, installation of street furniture, landscaping, reinstatement etc may still be required to suit actual circumstances.

Image 1.2 Location of KTN NDA Advance Stage Development and Remaining Stage Development



According to the latest information provided by CEDD, the construction period of the Advance Stage Development will be from Q3 2020 to 2026 and the first population intake (for a private housing) site will be in mid-2025. In addition, there

will be a multi welfare service complex located to the south of the Project to be operated starting from 2022/2023.

For the Remaining Stage Development, the construction period will be from 2024 to 2031 and the population intake year will be after 2033.

Hence, the existing receivers at Kwu Tung should have been removed due to the land resumption of KTN NDA development by 2024, to ensure the population intake in 2025. Therefore, only one planned receiver will exist during the major construction works as discussed in **Section 1.3** (i.e. from early 2024 to mid-2025). More discussion on planned sensitive receivers within KTN NDA are given in **Section 7** and **Section 8**.

Northern Link (NOL)

The NOL is one of the seven recommended railway schemes in the Railway Development Strategy 2014. NOL will be a railway line of about 10.7km connecting between Kam Sheung Road Station of Tuen Ma Line and the proposed railway station at Kwu Tung. It will connect the East Rail Line and the Tuen Ma Line, forming a loop in the northern New Territories. According to the Project Profile of NOL (application no. ESB-346/2021), the construction of NOL is tentatively to commence in mid-2025 for completion in 2034.

1.5 Purpose of This Environmental Review Report (ERR)

This Environmental Review Report (ERR) provides information to identify and describe the potential impacts on the environment and the communities due to the Project and evaluate the potential impacts, and to confirm the compliance of relevant environmental standards.

The information presented herein forms part of the submission to the Environmental Protection Department (EPD) for an Application for VEP. The purpose of this ERR is to demonstrate that no unacceptable impacts will be resulted from the Project. In addition, it will also demonstrate no exceedance or violation of environmental performance requirement as set out in the approved EIA for LMC Spur Line and hence a VEP can be granted.

1.6 Structure of the Report

The Report comprises the following elements:

- Section 1** Introduces the project background, purposes and objectives of this supporting document. Describes the reasons of the proposed amendments.
- Section 2** Describes the details of the amendments, as well as the proposed variation to the EP condition.
- Section 3** Identifies and reviews the relevant environmental impacts arising from the proposed amendments, including hydrology, ecology, fisheries, air quality, noise, water quality, waste, contaminated land, cultural heritage, landscape and visual, and environmental monitoring and audit.
- Section 4** Identifies and reviews the hydrological impacts arising from the proposed amendments during construction and operational phases.
- Section 5** Identifies and reviews the ecological impacts arising from the proposed amendments during construction and operational phases.
- Section 6** Identifies and reviews the fisheries impacts arising from the proposed amendments during operational phase.
- Section 7** Identifies and reviews the air quality impacts arising from the proposed amendments during construction and operational phases.
- Section 8** Identifies and reviews the noise impacts arising from the proposed amendments during construction and operational phases.
- Section 9** Identifies and reviews the water quality impacts arising from the proposed amendments during construction and operational phases.
- Section 10** Identifies and reviews the waste management implications arising from the proposed amendments during construction and operational phases.

- Section 11** Identifies and reviews the contaminated land impacts arising from the proposed amendments during construction and operational phases.
- Section 12** Identifies and reviews the cultural heritage impacts arising from the proposed amendments during construction and operational phases.
- Section 13** Identifies and reviews the landscape and visual impacts arising from the proposed amendments during construction and operational phases.
- Section 14** Identifies and reviews the changes in the environmental monitoring and auditing scope arising from the proposed amendments.
- Section 15** Reviews and justifies whether there are any material changes to the designated project
- Section 16** Summarises and concludes the findings.

2 Proposed Amendments

2.1 Proposed Amendments

As discussed in **Section 1.2**, amendment to the existing FEP held by MTRCL to include the construction and operation of the proposed railway station at Kwu Tung would be required. Those proposed amendments are presented in **Table 2.1**.

Table 2.1 Proposed Amendment Items

Proposed Amendments	Relevant figure/ appendix in this ERR	Relevant figure/ table/ condition to be varied in FEP-06/129/2002/H
<p>➤ Construction of railway station at Kwu Tung</p> <p>The key modifications required are given below:</p> <ul style="list-style-type: none"> • Excavation of the fill material above the existing tunnel box; • Modification of existing tunnel box structures; • Construction of concourse and platform areas; • Construction of back-of-house areas; • Construction of entrances, VB and FRS; • Modification of existing EAP/EEP; • Relocation of existing EVA and associated facilities; and • Construction of other station associated facilities and underground adit. <p>➤ Operation of railway station at Kwu Tung</p>	<ul style="list-style-type: none"> • Figure 2.1 – Location of the Project; and • Figure 2.2 – Location Plan of the railway station at Kwu Tung 	<ul style="list-style-type: none"> • Vary Part B of FEP-06/129/2002/H to include the construction and operation of the proposed railway station at Kwu Tung; • Vary Figure 1a of FEP-06/129/2002/H by Figure 2.1 in this ERR; • Add Figure 1c of FEP-06/129/2002/H by Figure 2.2 in this ERR.

3 Environmental Changes arising from the Proposed Amendments

Section 2.1 has presented the proposed amendment items under this VEP application. All the environmental aspects considered in the approved LMC Spur Line EIA report are revisited to identify any environmental changes arising from the proposed amendments. Detailed discussions are provided in the following sections.

3.1 Hydrology

The hydrology assessment in the approved EIA for LMC Spur Line focused on the surface and sub-surface hydrological regime presenting within the Long Valley area and the potential impacts from the use of Earth Pressure Balance Tunnel Boring Machine (EPB TBM). As discussed in **Section 1**, the Project Site only includes the modifications of the tunnel box and enabling works at Kwu Tung and the Project is more than 800m away from the Long Valley area. The location of the Project would not affect the hydrological regime within the Long Valley area. Further review on hydrology is provided in **Section 4**.

3.2 Ecology

Based on the approved EIA for LMC Spur Line, major habitats were identified and neither habitat nor associated species recorded were considered rare. However, since the ecological survey of the approved EIA for LMC Spur Line was conducted in 2001, the habitat and species at the Project Site would be altered in the past two decades. Therefore, a 2-month ecological site appraisal has been conducted from July to August 2021, during wet season. Special attention was given on the Project Site and the site appraisal area at its immediate vicinity. The ecological site appraisal covered habitat, vegetation and all major fauna groups. A review of the ecological impacts is provided in **Section 5**.

3.3 Fisheries

There are some inactive or abandoned fishponds located approximately 400m away from the Project Site, and hence will not be directly impacted by the Project. Further review on fisheries is provided in **Section 6**.

3.4 Air Quality

As discussed in **Section 1**, the Project Site only includes the modifications of the tunnel box and enabling works at Kwu Tung such that this ERR would review the air quality impact at the representative Air Sensitive Receivers (ASRs) at Kwu Tung. However, some of these ASRs (e.g. Fairy Park, Dills Corner Garden, Ku Tung Public Oi Wah School and some village houses) as identified in the approved EIA for LMC Spur Line are no longer in use or not occupied. The relatively small scale of works would demand less construction activities throughout the entire construction period and hence would generate less fugitive dust. In consideration

of the proposed amendments, further review of the construction air quality impacts at the revised ASRs is provided in **Section 7**.

3.5 Noise

As discussed in **Section 1**, the Project Site only includes the modifications of the tunnel box and enabling works at Kwu Tung such that this ERR would review the noise impact at the representative Noise Sensitive Receives (NSRs) at Kwu Tung. However, some of these NSRs (e.g. Fairy Park, Dills Corner Garden, Ku Tung Public Oi Wah School and some village houses) as identified in the approved EIA for LMC Spur Line are no longer in use or not occupied. The relatively small scale of works would demand less construction activities throughout the entire construction period and hence the construction noise impact would be minimized. In consideration of the proposed amendments, further review of the construction noise impacts at the revised NSRs is provided in **Section 8**.

3.6 Water Quality

As discussed in **Section 1**, the Project Site only includes the modifications of the tunnel box and enabling works at Kwu Tung such that this ERR would review the water quality impact at the representative Water Sensitive Receives (WSRs) at Kwu Tung during construction phase and operational phase. Further review of the water quality impacts is provided in **Section 9**.

3.7 Waste Management

The amount of construction and demolition (C&D) materials should be estimated for the modification of the railway station at Kwu Tung. Nonetheless, most of the good practices and mitigation measures recommended in the approved EIA for LMC Spur Line remains valid and would be reviewed for the proposed modifications in **Section 10**.

During operational phase, as discussed in **Section 1.3**, since a new concourse level would be constructed above the existing tunnel box at Kwu Tung, it is estimated that the amount of general refuse would be slightly increased due to the operation of railway station at Kwu Tung. A review of waste management impacts during operational phase is provided in **Section 10**.

3.8 Contaminated Land

A contaminated land assessment had been conducted as part of the approved EIA for LMC Spur Line. It is confirmed that the assessment had been completed according to the Section 3.9 of the EP-129/2002/H by the permit holder (i.e. KCRC).

During the construction of the existing tunnel box at Kwu Tung, excavation of the spoil at the works site of station construction had been conducted. The works site of station box structure is currently covered by fill material and occupied by LMC Spur Line. The Project Site consist of works site for station construction that

excavation would be required, as well as other works sites and works areas for construction site offices, site access and storage areas.

According to the land contamination assessment conducted under the approved EIA for NENT NDA, only 1 potentially contaminated site (i.e. KTN-77 & 78) was identified to be partially encroached into western part of the works sites and works area. Other works sites and works area under the Project were not identified as potentially contamination site.

Site re-appraisal including review the historical landuse and site survey of the Project Site has been conducted in order to update the latest information for the current landuse of the Project Site. No potentially land contamination activities was identified at the works site for station construction and eastern works site. Thus, no further mitigation measure and action is required. The land contamination impact is not anticipated.

The western part of the works sites and works area are located within the KTN NDA (Advance Stage) and CEDD is responsible for the site formation work. Hence, CEDD confirmed to review the land contamination status and implement any remediation measures required before the land is handed over to the Project Proponent. A review of land contamination is provided in **Section 11**.

3.9 Cultural Heritage

Cultural heritage impact assessment (CHIA), including surface field scans and auger testing was conducted as part of the approved EIA for LMC Spur Line. As discussed in **Section 1.3**, the existing tunnel box at Kwu Tung is currently covered by fill material, which is the backfill of the construction of LMC Spur Line. The construction works of the Project are relatively minor as compared to the construction of the existing tunnel box and enabling works under the LMC Spur Line. The impact of archaeological impact should not be worse.

After the CHIA conducted during the approved EIA for LMC Spur Line, CHIA was also conducted during the preparation of the approved EIA for NENT NDA. Further review on terrestrial archaeology, built heritage and landscape features referencing from the approved EIA for NENT NDA is also provided in **Section 12**. If there are any buildings / structures both at grade level and underground which were built on or before 1969 within the works sites/ works areas during the construction, the Project Proponent will alert AMO in an early stage or once identified.

3.10 Landscape and Visual

The impact of the Landscape Resources (LRs), Landscape Characters (LCAs) and Visually Sensitive Receivers (VSRs) at Kwu Tung has been reviewed and assessed as negligible to slight adverse at KTN from the approved EIA for LMC Spur Line. Subsequent to the approved EIA for LMC Spur Line in 2002, the approved EIA for NENT NDA also covered the Project Site. As discussed in **Section 1**, the Project Site only includes the modifications of the tunnel box at Kwu Tung. The review on landscape and visual impact in **Section 13** provides updated information to identify and describe the potential landscape and visual impacts associated with the

construction works for the proposed modification works for the railway station at Kwu Tung.

4 Review of Hydrology

4.1 Review of Approved EIA for LMC Spur Line

Under the approved EIA for LMC Spur Line, the tunnel alignment passed underneath Long Valley. Thus, a hydrology assessment focusing on the surface and sub-surface hydrological regime presenting within the Long Valley area and the potential impacts from the use of Earth Pressure Balance Tunnel Boring Machine (EPB TBM) was carried out. During construction phase at that time, geology of Long Valley was tested and mitigation measures (including groundwater monitoring and provision of additional pumping) were proposed in that EIA.

4.2 Review of Potential Impact on Hydrology

Since the Project only includes the modifications of the tunnel box and enabling works at Kwu Tung, and will not affect the hydrological regime within the Long Valley area, the hydrological impact due to EPB TBM as discussed in the approved EIA Report for LMC Spur Line is not anticipated in this Project.

As discussed in **Section 1**, as the existing tunnel box at Kwu Tung and the enabling works had been constructed, the modification works include removing the existing fill materials above the existing tunnel box, constructing the new concourse and adit above existing tunnel box, and constructing above-ground structures such as entrances, ventilation buildings etc. Hence, there would not be any construction works below the existing tunnel box structure. The footprint of the railway station at Kwu Tung to be constructed would also be very similar to that of the existing tunnel box.

On this basis, it is considered that the proposed modification works above the existing tunnel box would not adversely affect the hydrology. It is also anticipated that the changes in the underground water level due to the modification works would be much smaller than the construction of the existing tunnel box under the approved EIA for LMC Spur Line. Considering the smaller construction scale and insignificance of the impact, mitigation measures are therefore not required.

4.3 Conclusion

Considering the minor construction scale of the Project, as compared to the construction of existing tunnel box under the approved EIA for LMC Spur Line, adverse impact on hydrology is not anticipated.

5 Review of Ecology

5.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line reviewed the ecological resources within the area affected by that project, identified habitats and species of conservation importance, identified the potential impacts from the construction and operation of the LMC Spur Line, and potential mitigation measures to reduce the potential impacts of the construction and operation of the Spur Line.

As stated in Section 4 of the approved EIA for LMC Spur Line, major habitats at the railway station of Kwu Tung include plantation forest, orchard and development area. Neither habitat nor associated species recorded were considered rare.

5.2 Methodology

5.2.1 Project Site and Study Area

As discussed in **Section 1.3**, the Project Site consists of the following:

- Works site for station construction, including the existing tunnel box;
- Works site surrounding the station for stockpiling and access road;
- Works areas to the left of the station for site office and material storage; and
- An underground adit to the south of concourse.

The Study Area for ecology consists of area within the 500m from the boundary of the Project Site (**Figure 5.1** refers).

5.2.2 Literature Review Methodology

A literature review was conducted to determine the existing ecological baseline conditions within the Study Area, to identify habitat resources and species of potential conservation importance, and potential information gaps in the baseline conditions of the habitats. The reviewed literature comprises the following:

- Civil Engineering and Development Department (2013) AEIAR-175/2013 – North East New Territories New Development Areas EIA;
- Civil Engineering and Development Department (2013) AEIAR-176/2013 – Development of Lok Ma Chau Loop EIA;
- Civil Engineering and Development Department (2009) AEIAR-133/2009 – Construction of Cycle Tracks and the associated Supporting Facilities from Sha Po Tsuen to Shek Sheung River EIA; and
- Kowloon-Canton Railway Corporation (2002) AEIAR-052/2002 – Sheung Shui to Lok Ma Chau Spur Line EIA.

5.2.3 Ecological Site Appraisal Methodology

Subsequent to the approval of the EIA for LMC Spur Line, the approved EIA for NENT NDA (AEIAR-175/2013) also covered the Project Site. The purpose of this ecological site appraisal is to provide an update to the ecological baseline information and verify the information from literature review since the approval of the EIAs.

As discussed in **Section 1.3** and **1.4**, site formation works for the neighbouring areas are being implemented progressively by the project proponent of NENT NDA. After the site formation works, superstructure, utilities and landscaping works would be commenced to transform into the new town at Kwu Tung. According to the Revised Recommended Outline Development Plan (RODP) of the approved EIA for NENT NDA, the major land uses within the concerned area of the Project include residential, government / institution and community, open space, other specific uses and green belt. As the ecological impact of the development of KTN NDA, which covered the Project Site and Study Area of the Project, had already been assessed in the approved EIA for NENT NDA with appropriate mitigation measures recommended, additional ecological site appraisal for the area in the vicinity of the Project Site is considered unnecessary. The ecological site appraisal would therefore focus on the Project Site and its immediate vicinity (i.e. within 100m from the Project Site) (hereafter as “site appraisal area”), where direct / indirect impact is anticipated. Other areas within the Study Area would be mainly covered by literature review. The ecological site appraisal area and transects are shown in **Figure 5.2**.

Ecological characteristics of each habitat type, including size, vegetation type, species present, dominant species found, species diversity and abundance, community structure, ecological value and inter-dependence of the habitats and species, and presence of any features of ecological importance were defined and characterised. Representative photographs of the habitat types and/or any important ecological features identified were taken.

For general distribution status of the species in Hong Kong, references were made to Fellowes *et al.* (2002) and the Hong Kong Biodiversity Database (AFCD, 2020).

The site appraisal methodology had made reference to EIAO Guidance Notes (No. 7/2010 and No. 10/2010) (EPD, 2011a and 2011b) and had covered active seasons of the flora and fauna groups. The criteria and guidelines as stated in Annexes 8 and 16 of the EIAO-TM would be followed for evaluating and assessing the potential ecological impact arising from the construction and operation of the proposed works. All site appraisals were carried out in such ways that would not cause any unnecessary stress or damage to the existing habitats and wildlife.

5.2.4 Ecological Site Appraisal Programme

The ecological site appraisals were conducted during July to August 2021 including day and night site appraisals which had covered the Project Site and site appraisal area as shown in **Table 5.1** below.

Table 5.1: Ecological Site Appraisal Schedule

	Jul 2021	Aug 2021
Habitat and vegetation	D	D
Mammal	D&N	D&N
Bird	D&N	D&N
Herpetofauna	D&N	D&N
Butterfly and dragonfly	D	D
Freshwater communities	D&N	D&N

Note: D=day appraisal; N=night appraisal

5.3 Ecological Baseline Condition

5.3.1 Literature Review – Recognised Site of Conservation Importance and Habitats

Figure 5.1 shows the location of the Project and the recognised sites of conservation importance in the vicinity. The recognised sites of conservation importance near the Project include Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation and Ho Sheung Heung Fung Shui Wood.

5.3.1.1 Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation

Covering an extensive area of about 150ha (CEDD, 2013a), Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation was identified as one of the twelve Priority Sites for Enhanced Conservation under the New Nature Conservation Policy (NNCP) by the government (AFCD, 2004). This Priority Site is partly located within eastern portion of the Study Area. The nearest distance between the Project Site and the Priority Site is about 90m.

There are areas in the Priority Site that are under active agricultural use and highly modified by humans. Three major habitat types were identified within the Priority Site, i.e. fishpond, wet agricultural land (including marsh as abandoned wet agricultural land) and *Fung Shui* wood. The Priority Site supports moderate diversity of five taxa groups, i.e. mammal, bird, amphibian, butterfly and dragonfly (AFCD, 2004). Moreover, populations of rare species of three taxa groups, i.e. mammal, bird and butterfly, are found within the site (AFCD, 2004), including:

- Mammal: Lesser Club-footed Bat (*Tylonycteris pachypus*);
- Bird: Asian Dowitcher, Greater Spotted Eagle, Imperial Eagle, Japanese Yellow Bunting, Manchurian Reed Warbler, Baikal Teal, Bonelli's Eagle, Osprey, Crested Goshawk, Greater Coucal, Lesser Coucal and Black-winged Kite; and
- Butterfly: *Caltores bromus*, *Castalius rosimon*, *Catochrysops strabo*, *Halpe porus*, *Horaga albimacula*, *Taraka hamada* and *Vagrans egista*.

The Priority Site has been managed under the Nature Conservation Management Agreement (MA) Scheme submitted by the Conservancy Association (CA) in association with the Hong Kong Bird Watching Society (HKBWS) since 2005 to enhance the conservation, landscape and biodiversity of Long Valley and Ho Sheung Heung through partnership with local landowners and farmers. The MA project has demonstrated success in the management of important freshwater habitats particularly shallow water habitats, paddy rice fields, freshwater marshes and water flea ponds, as well as the conservation of birds. Over 50% of local bird species could be found in Long Valley, including globally threatened Japanese Paradise Flycatcher, the rare Crested Bunting and Chestnut Munia (AFCD and EPD, 2011).

Apart from the core fishponds, wet agricultural lands and *Fung Shui* wood areas where the ecological value is higher, there are also some areas of relatively lower or limited ecological value especially in the southwest of the Priority Site (CEDD, 2013a). As part of the proposed developments in the NENT NDA, the conservation value of much of the Priority Site will be safeguarded and enhanced in the long term by the creation of the Long Valley Nature Park (LVNP) (CEDD, 2013a).

5.3.1.2 Ho Sheung Heung *Fung Shui* Wood

Ho Sheung Heung *Fung Shui* wood is located within the Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation and is currently managed by the Nature Conservation MA Scheme. The southern tip of the *fung shui* wood is within the 500m Study Area and located about 460m from the Project Site. Previous study has recorded moderate diversity of fauna, especially birds and butterflies (KCRC, 2002 and CEDD, 2013a).

5.3.1.3 Habitats

The approved EIA for NENT NDA had identified habitats within the 500m Study Area of the Project, including urbanized area, waste ground, village area, orchard, plantation, *fung shui* wood, grassland, shrubland, dry agriculture, pond, channelised / natural watercourse, and mitigation wetland. (CEDD, 2013a)

Mitigation wetland was identified at the eastern edge of the Study Area. Together with other mitigation wetlands along Sheung Yue River, these were the retained meander sections of the river before the river training works in around early 2000s. Ho Sheung Heung *fung shui* wood was identified at the north-eastern edge of the Study Area, which was of ecological value and supports diverse understorey and overstorey dominated by *Celtis sinensis*, *Cinnamomum camphora* and *Microcos paniculata*. Sheung Yue River, located along the eastern edge of the Study Area, was a large, channelised river with relatively low species diversity, albeit of ecological value due to its importance as a foraging area for waterbirds of conservation significance. (CEDD, 2013a)

5.3.2 Literature Review – Species of Conservation Importance

No record of fauna species of conservation importance was previously reported within the Project Site by the literature reviewed.

Previously recorded species of conservation importance within the Study Area include freshwater crab species of conservation importance, *Sommaniathelphusa zanklon*, at the minor channelised watercourse (> 140m away) north of the Project Site, Chinese Bullfrog at the village area and pond (> 350m away) near Pak Shek Au, and an Indo-Chinese Rat Snake (dead and in unsuitable habitat) at the channelised Ho Sheung Heung watercourse (> 200m away). A floral species of conservation importance, *Gnetum luofuense*, was also found (> 450m away) at the Ho Sheung Heung *fung shui* wood within the Study Area. (CEDD, 2013a)

5.3.3 Ecological Site Appraisal Results – Habitat and Vegetation

Figure 5.3 presents the habitat map of the Project Site and the site appraisal area at its immediate vicinity. The habitats within the Project Site include plantation, developed area, village/orchard and modified watercourse. The habitats in the vicinity of the Project Site consist of plantation, developed area, village/orchard and modified watercourse. Habitat size within the Project Site and site appraisal area is shown in **Table 5.2**. The habitat photos are shown in **Appendix 5.1**.

Table 5.2 Habitat Size within the Site Appraisal Area

Habitat types	Project Site		Site Appraisal Area ^[1]	
	Area (ha)	Length (m)	Area (ha)	Length (m)
Plantation	1.32	\	0.79	\
Developed Area	2.30	\	12.31	\
Village/Orchard	0.80	\	6.12	\
Modified Watercourse	0.097	323	0.31	931

Note:

[1] Exclude Project Site.

The habitats within the Project Site generally support a very low to low diversity of flora. The habitat and vegetation of the Project Site and site appraisal area are discussed in detail in the below sections.

5.3.3.1 Habitats and Flora within the Project Site

Plantation – The plantation habitat within the Project Site is located on the engineered slope surrounding the flood retention area in the works site for station construction and the works site to the east. It is dominated by *Acacia confusa*, *Celtis sinensis*, *Ficus hispida*, *Melaleuca cajuputi cumingiana* with some invaded *Leucaena leucocephala*. A low species diversity was recorded. A few individuals of *Lagerstroemia speciosa* was recorded in this habitat. Although *Lagerstroemia speciosa* is protected under Forestry Regulations of Cap. 96, all recorded individuals are planted and are commonly used for landscaping in Hong Kong and hence not considered as species of conservation importance.

Developed Area – Developed area within the Project Site mainly comprises the existing tunnel box within the works site for station construction, existing road network and construction site. Within the tunnel box area, a strip of roadside plantation along the paved road, which is dominated by the planted *Melaleuca*

cajuputi cumingiana and a flood retention area dominated by *Cyclosorus interruptus* were recorded. Besides, the invasive tree *Leucaena leucocephala* and the exotic weed *Bidens alba* are found typically within developed area. The vegetation diversity of this habitat is very low. No flora species of conservation importance was recorded.

Village/orchard – Village/orchard within the Project Site comprises a very small portion of area to the northwest and west of the works site. Vegetation including *Cordyline fruticosa*, *Desmodium tortuosum*, etc. are found. No flora species of conservation importance was recorded.

Modified Watercourse – A section of modified watercourse within the Project Site is located in northwestern part of the works site. This modified watercourse appeared to have low water flow and the water was turbid with high suspended solid content. Besides, a section of channelised nullah is located at the southeastern side of the Project Site. The total length of modified watercourses within the Project Site is about 323m long. Vegetation including *Alocasia macrorrhizos*, *Asystasia micrantha*, *Syngonium podophyllum* etc. are commonly found along the riverbanks. A very low flora diversity was recorded with no flora species of conservation importance.

5.3.3.2 Habitats and Flora within the Site Appraisal Area (Excluding the Project Site)

Plantation – Plantation within the site appraisal area is mainly located in areas to the southwest of the existing tunnel box and the construction site to the east of the works area for access road. A low species diversity was recorded. A few individuals of *Dimocarpus longan* were recorded in this habitat. Although *Dimocarpus longan* is listed under Category II in the list of Wild Plant under State Protection, all recorded individuals are cultivated and this species is commonly planted in Hong Kong and hence not considered as species of conservation importance.

Developed Area – Developed area within the site appraisal area mainly comprises open storage area, warehouses, construction sites and existing roads i.e. Ho Sheung Heung Road and village roads, etc. Sparse vegetation cover is recorded and the vegetation diversity of this habitat is very low. No flora species of conservation importance was recorded.

Village/orchard – Village/orchard within the site appraisal area include village houses near Tung Fong. A low to moderate flora diversity was recorded with a large number of cultivated species. A number of individuals of *Dimocarpus longan* and *Litchi chinensis* were recorded in this habitat. Although *Dimocarpus longan* and *Litchi chinensis* are listed under Category II in the list of Wild Plant under State Protection, all recorded individuals are planted and are commonly used for landscaping in Hong Kong and hence not considered as species of conservation importance.

Modified Watercourse – The modified watercourse within the site appraisal area runs from west to east across the area and along the northeastern edge of the Project Site boundary. It is a 930m long drainage channel with vertical concrete banks and

bottom. A very low flora diversity was recorded with no flora species of conservation importance.

5.3.3.3 Fauna Within the Project Site

Avifauna – A low diversity of avifauna was recorded within the Project Site. Only ten locally common species were recorded including Hair-crested Drongo (*Dicrurus hottentottus*), Barn Swallow (*Hirundo rustica*), Masked Laughingthrush (*Garrulax perspicillatus*) and Japanese White-eye (*Zosterops japonicus*) etc. In terms of relative abundance, Hair-crested Drongo, Masked Laughingthrush and Japanese White-eye are the most commonly recorded species within the Project Site. No species of conservation importance was recorded.

Butterfly and Odonate – A low diversity and abundance of butterflies and odonata were recorded within the Project Site. Eight common species of butterfly were recorded in the site appraisal, e.g. Lemon Emigrant (*Catopsilia pomona pomona*) and Common Grass Yellow (*Eurema hecabe hecabe*). Eight species of odonata were recorded in the site appraisal, which comprise locally common species e.g. Marsh Dancer (*Onychargia atrocyana*), Russet Percher (*Neurothemis fulvia*) and Variegated Flutterer (*Rhyothemis variegata arria*). No species of conservation importance was recorded.

Herpetofauna – Seven species of amphibian were recorded e.g. Butler's Pigmy Frog (*Microhyla butleri*) and Paddy Frog (*Fejervarya limnocharis*) within the Project Site, while only one species of reptile, i.e. Long-tailed Skink (*Eutropis longicaudata*) was recorded within the Project Site. One species of conservation importance, i.e. Spotted Narrow-mouthed Frog was recorded in very low abundance within the plantation habitat within the Project Site. (**Figure 5.3** refers) Spotted Narrow-mouthed Frog is listed "Near Threatened" in Red List of China's Vertebrates, yet widely distributed in the New Territories. In general, low diversity of herpetofauna were recorded.

Mammal – Japanese Pipistrelle (*Pipistrellus abramus*) is the only species of mammal recorded within the Project Site, which is of conservation importance. A few individuals were recorded in developed area (**Figure 5.3** refers). Japanese Pipistrelle is listed in Wild Animals Protection Ordinance (Cap. 170), yet very common in Hong Kong.

Freshwater Communities – No freshwater fauna was recorded within the Project Site.

5.3.3.4 Fauna within the Site Appraisal Area (Excluding the Project Site)

The site appraisal area had been previously covered in the ecological survey conducted for the NENT EIA. In the current site appraisal, the fauna within the site appraisal area consist of mainly locally common and widespread species e.g., Masked Laughing thrush, Japanese White-eye, Black-collared Starling etc. A low abundance and diversity of common butterfly and odonate species were recorded with the Great Egg-fly and Wandering Glider being relatively more common. Recorded amphibians included Asia Painted Frog, Butler's Pigmy Frog and Paddy

Frog etc. Recorded reptile species included Bowring's Gecko and Brook's Gecko. Recorded freshwater fauna included Apple Snail and Water Strider (*Ptilomera tigrina*).

Two common and widespread species of conservation importance were recorded i.e., Japanese Pipistrelle (*Pipistrellus abramus*) and Greater Coucal (*Centropus sinensis*).

Besides, few individuals of a locally common firefly species i.e. *Pyrocoelia analis*, were recorded in village and near channel. This species is not considered to be of particular conservation concern.

5.4 Evaluation of Habitats and Species of Conservation Importance

5.4.1 Evaluation of Habitats within the Project Site

The ecological importance of the Project Site is presented in **Table 5.3** with reference made to the guidelines of Annex 8 of the EIAO-TM.

Table 5.3 Ecological Evaluation of the Project Site

Criteria	Plantation	Developed Area	Village / Orchard	Modified Watercourse
Naturalness	Artificial habitat	Artificial habitat	Artificial habitat	Artificial habitat
Size (ha)	1.32	2.30	0.80	0.097
Diversity	Low	Very low	Very low	Very low
Rarity	Very common, with one amphibian species of conservation importance	Very common, with one mammal species of conservation importance	Very common	Very common
Re-creatability	Easy to recreate	Easy to recreate	Easy to recreate	Easy to recreate
Fragmentation	Low	Low	Low	Low
Ecological Linkage	No significant linkage with any important habitat nor site of conservation importance	No significant linkage with any important habitat nor site of conservation importance	No significant linkage with any important habitat nor site of conservation importance	No significant linkage with any important habitat nor site of conservation importance
Potential Value	Low	Low	Low	Low
Nursery/ Breeding Ground	None recorded	None recorded	None recorded	None recorded
Age	~ 10 years	Uncertain	Uncertain	Uncertain
Abundance/ Richness of wildlife	Low	Very low	Very low	Very low
Ecological Value	Low	Low	Low	Low

5.4.2 Evaluation of Species of Conservation Importance

The ecological importance of species of conservation importance recorded within the Project Site and the site appraisal area is presented in **Table 5.4**.

Table 5.4 Evaluation of Species of Conservation Importance Recorded

Species	Habitat(s)	Recorded within Project Site	Conservation Status	Distribution/Rarity in Hong Kong
Spotted Narrow-mouthed Frog	Plantation	Yes	Red List of China's Vertebrates: "Near Threatened"	Widely distributed from low to moderate altitudes in northern and central New Territories
Greater Coucal	Village/Orchard	No	Cap. 170, Class 2 Protected Animal of China; China Red Data Book: "Vulnerable"	Common resident. Widely distributed in Hong Kong.
Japanese Pipistrelle	Developed Area	Yes	Cap. 170	Very common and widely distributed throughout Hong Kong
	Developed Area, Village/Orchard	No		

5.5 Review of Ecological Impact and Mitigation Measures

5.5.1 Construction Phase

5.5.1.1 Direct Loss of Habitats and Vegetation

The habitats within the Project Site are of low ecological value including plantation, developed area, village/orchard and two short sections of modified watercourse. With reference to the evaluation in **Table 5.3**, the affected habitats are all of low ecological value and are readily re-creatable. Besides, they are also subject to human and traffic disturbance as they are close to village and vehicle roads. The potential ecological impact of the habitat loss is therefore considered to be **low**.

The Project Site had been covered by the RODP of the approved EIA for NENT NDA. According to the approved EIA, no insurmountable residual ecological issue was identified neither within nor in the vicinity of the Project Site.

The vegetation within the Project Site would be cleared and lost permanently. The affected vegetation is dominated by the invasive exotic species *Leucaena leucocephala* and fast-growing exotic species *Acacia confusa*. Apart from the flood retention area which was overgrown by common native herb species *Cyclosorus interruptus* and exotic weed *Bidens alba*, and the plantation on engineered slope that dominated by common plantation species, the Project Site is mostly paved and had a low vegetation coverage. No flora species of conservation importance was recorded nor impacted. The loss of the vegetation is therefore considered to be of **low** ecological impact. No mitigation measure is required.

5.5.1.2 Potential Direct Impact to Fauna

In general, a very low diversity and low abundance of fauna were recorded at the Project Site. There were two fauna species of conservation importance recorded within the Project Site, i.e., Spotted Narrow-mouthed Frog and Japanese Pipistrelle.

Spotted Narrow-mouthed Frog

Spotted Narrow-mouthed Frog (*Kalophrynus interlineatus*) is listed as “Near Threatened” in the Red List of China’s Vertebrates. Spotted Narrow-mouthed Frog is widely distributed from low to moderate altitudes in northern and central New Territories. A low number of this species was recorded in the plantation habitat within the Project Site, which is evaluated as low ecological value. The whole area and habitat will be lost due to the modification at existing Kwu Tung tunnel box. Consider that the Project Site is not a typical habitat for Spotted Narrow-mouthed Frog, only low number of individuals recorded and the wide distribution of this species, the level of ecological impact is considered to be **low**. No mitigation measure is required.

Japanese Pipistrelle

Japanese Pipistrelle is protected and listed in Wild Animals Protection Ordinance (Cap. 170). They are very common and widely distributed throughout Hong Kong. This species was recorded in developed area within the Project Site, which is evaluated as low ecological value. As Japanese Pipistrelle is highly mobile and no roost was found within the Project Site during the ecological site appraisal, the potential direct impact to Japanese Pipistrelle is not significant and considered to be **low**. Therefore, no mitigation measures are required.

5.5.1.3 Potential Ecological Indirect Impact

The two fauna species of conservation importance, i.e., Japanese Pipistrelle and Greater Coucal, were recorded outside the Project Site but within the site appraisal area. Japanese Pipistrelle is a locally common and widespread bat species; Greater Coucal is a common bird species in Hong Kong. As they are not located within the Project Site, no direct impact is anticipated.

In general, the construction nuisance e.g. noise generated by excavation within the Project Site would be of **low** ecological impact to these two species.

With the good practices in place, the general construction disturbance would be limited. While the low abundance of birds and bats, which are disturbance sensitive, occur in the nearby village/orchard habitat, the potential indirect impact to the nearby habitats would be **minor**.

Construction phase water quality impact mainly includes the surface runoff with suspended solid content and the potential accidental leakage of oil and grease from mechanical equipment. The construction period of the Project would last for 4-5 years. The main waterbody within the site appraisal area is a modified watercourse with low ecological value, and no species of conservation importance was recorded.

As a standard site practice, any surface runoff would be diverted by temporary drain or pumped away and treated by sedimentation tanks before discharge. A discharge license would be applied by the Contractor if considered necessary. Adequate standby pumps would be provided on-site to prepare for emergency situations such as heavy rain. Exposed earth would be covered by tarpaulin to minimise erosion and generation of runoff during rain. With the implementation of the standard site practise, the potential ecological impact due to water quality deterioration is minor, and hence no mitigation would be required.

5.5.2 Operational Phase

During the operation of the Project, the traffic volume would be higher than the existing traffic. Also, human activities and disturbance would be more frequent than current conditions. As the Project Site and its surrounding areas had been covered by the RODP in the approved EIA of NENT NDA, all of these areas would be eventually developed and the potential ecological impacts had been identified, evaluated and assessed in the approved EIA of NENT NDA. No insurmountable residual ecological impact was identified for the proposed development in and around the Project Site.

5.6 Conclusion

The ecological review has identified several habitats and species of conservation importance potentially impacted by the Project including Long Valley and Ho Sheung Heung Priority Site for Enhanced Conservation, Ho Sheung Heung *fung shui* wood, Spotted Narrow-mouthed Frog, Japanese Pipistrelle, Greater Coucal and the freshwater crab *Somanniathelphusa zanklon*.

The directly affected habitats comprise low valued plantation, developed area, village/orchard and two small sections of modified watercourse. The impact is considered minor and thus no significant ecological impact is anticipated for both construction and operational phase. For the species of conservation importance recorded within Project Site, as the Project Site is not a typical habitat for Spotted Narrow-mouthed Frog, and only low number of individuals recorded and the wide distribution of this species, the level of ecological impact is considered to be **low**. As Japanese Pipistrelle is highly mobile and no roost was found within the Project Site during the ecological site appraisal, the potential direct impact to Japanese Pipistrelle is not significant and considered to be **low**. Mitigation measures are therefore not required.

5.7 Reference

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6 Review of Fisheries

6.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line had assessed the potential fisheries impacts for the construction and operational phase of the LMC Spur Line. It provided description on the fishponds aquacultural practices undertaken within the Study Area and area of permanent loss of inactive and active ponds, followed by mitigation measures to be carried out during construction and operational phase of LMC Spur Line.

As stated in Section 5 of the approved EIA for LMC Spur Line, the majority of the ponds lie within the Lok Ma Chau and San Tin area and the wetland conservation area located near the Lok Ma Chau Station, which was not within the study area of the current Project at Kwu Tung. The inactive fishpond at Ho Sheung Heung is located approximately at 500m away from the Project Site, beside River Beas.

6.2 Identification of Potential Fisheries Impact

As shown in Figure 4.1b of LMC Spur Line EIA Report, there were no fishpond within at the Project Site. The recent site inspections have also confirmed the same. The majority of the ponds lie within the Lok Ma Chau and San Tin area and the wetland conservation area located near the Lok Ma Chau Station.

The inactive fishpond presents at Ho Sheung Heung is located at approximately 500m away from the Project Site, beside River Beas. In addition, two abandoned fishponds near Fung Kong are also located at approximately 400m away from the Project Site. Therefore, there will not be directly impacted by the Project. Location of fishponds within 500m of the Project Site are presented in **Figure 9.1**.

As discussed in **Section 1.3**, the construction works for the Project would involve the removal of spoil on top of the existing tunnel box and the construction of concourse structure and above-ground structures (e.g., entrances and FRS, etc.). Besides, all the existing landuses within the works sites/ areas are mainly KCRC vested lands and vacant lands. Hence, that would be neither impacts on fisheries resources nor operation. Mitigation measures are therefore not necessary.

6.3 Conclusions

No adverse fisheries impact is expected in both construction and operational phase. Therefore, mitigation measure is not required for the Project.

7 Review of Air Quality

7.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line identified the representative Air Sensitive Receivers (ASRs) affected, reviewed the air quality impacts arising from the construction and operation of the LMC Spur Line and proposed mitigation measures to minimise the potential impacts of construction of the LMC Spur Line.

As stated in Section 6 of the approved EIA for LMC Spur Line, the major earthwork in which construction dust impact arose was the earthworks in cut and cover tunnel sections, which had been completed.

7.2 Description of the Environment

7.2.1 Existing Ambient Air Quality Conditions

Among all EPD's air quality monitoring stations, the North Station is the closest one to the Project. However, the North Station has only started commissioning since July 2020. Monitoring data of less than one year is available and therefore is not presented in the ERR. In this connection, the existing ambient air quality could refer to the air quality monitoring station at Tai Po which is the second closest to the Project with more historical monitoring data. Air quality at the Tai Po Station is representative of the existing air quality.

The latest 5 years air quality monitoring data (available up to 2020) of the various air pollutants monitored at the Tai Po Station operated by EPD are shown in **Table 7.1** and compared with the AQOs for information.

Table 7.1: Air Quality Monitoring Data (Tai Po Station, 2016 – 2020)

Pollutant	Parameter	Concentrations ($\mu\text{g}/\text{m}^3$)					5-Year Mean	AQOs ($\mu\text{g}/\text{m}^3$)
		2016	2017	2018	2019	2020		
RSP	10 th highest 24-hour	74	82	69	65	58	70 [70%]	100 (9)
	Annual	29	32	31	31	24	29 [59%]	50
FSP	10 th highest 24-hour	55	55	47	47	38	48 [65%]	75 (9)
	Annual	20	22	19	20	15	19 [55%]	35

Notes:

- [1] Number of exceedance allowed under the AQO is shown in (), % of the AQO is shown in []. The 5-year mean is the average of the yearly maximum.
- [2] Monitoring results exceeding the AQO are bolded and underlined.
- [3] Only RSP and FSP monitoring data is presented as the construction of the Project would mainly generate particulates, and there would be no emission during operational phase (see Section 7.6 and Section 7.7).

The 10th highest daily RSP levels had decreased from 82µg/m³ in 2017 to 58µg/m³ in 2020, which were within the AQO of 100µg/m³. The annual RSP levels also exhibited a downward trend from 32µg/m³ in 2017 to 24µg/m³ in 2020, which were all within the AQO of 50µg/m³.

The 10th highest daily FSP levels had decreased from 55µg/m³ in 2016 to 38µg/m³ in 2020, which were within the AQO of 75µg/m³. The annual FSP levels were ranged from 15 to 22µg/m³, where were all within the AQO of 35µg/m³.

7.3 Construction Programme

As discussed in **Section 1.3**, the Project will tentatively commence construction in Q3 2023 for completion by 2028. The main activities from Q3 2023 to Q4 2023 will be site clearance of the existing KCRC vested lands and nearby vacant lands. Major construction works including site mobilisation and excavation will be started in Q1 2024 and completed by Q2 2025. Starting from Q3 2025, the remaining works would only include structural works, site reinstatements and inspection and trial run, which are considered as minor construction works that would not cause any significant air quality impacts.

The major construction works will be conducted within the works site for station construction as shown in **Figure 1.1**. The other works sites and works areas are those for construction site offices, site access and material storage areas which are not significant dusty sources.

7.4 Representative Air Sensitive Receivers

In accordance with Annex 12 of the EIAO-TM, Air Sensitive Receivers (ASRs) include domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre. Any other premises or places with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the afore listed premises and places would also be considered as a sensitive receiver.

Existing and planned representative ASRs within the boundary of the Assessment Area (i.e. 500m from the Project Site) have been reviewed and identified. The locations of the representative ASRs are summarised in **Table 7.2** and shown in **Figure 7.1** and **Figure 7.2**. Existing ASRs are identified by means of reviewing topographic maps, aerial photos, building plans, relevant approved EIA Studies (the approved EIA for LMC Spur Line and the approved EIA for NENT NDA) and verified by site visits.

7.4.1 Existing ASRs

The approved EIA for LMC Spur Line identified and considered a number of existing ASRs such as the village houses along Ma Tso Lung Road and Ho Sheung Heung Road, temporary structures near Tung Fong, residential buildings in Fairy Park and Dills Corner Garden, Sheung Shui Pui Yau Kindergarten and Kwu Tung

Public Oi Wah School in the vicinity of the railway station at Kwu Tung. Site visits have been conducted and it is noted that some of these ASRs (e.g. Fairy Park, Ku Tung Public Oi Wah School and some village houses) are no longer in use or not occupied.

It is noted that the existing ASRs to the west of the Project fall within the project site of concurrent KTN NDA (Advance Stage Development). According to the latest programme provided by CEDD, land resumption and construction of these areas is in progress. Land resumption for the remaining areas within the KTN NDA (Advance Stage Development) site will be conducted by phases and completed before the construction of the Project. Therefore, the existing ASRs would not be air sensitive uses anymore during the major construction works.

The existing ASRs to the east of the Project also fall within the project site of concurrent KTN NDA (Remaining Stage Development). Based on the latest programme provided by CEDD, the construction works of the KTN NDA (Remaining Stage Development) will commence progressively from 2024. It is anticipated that land resumption will be completed by 2024. Therefore, these ASRs will move out before the major construction works of the Project and will not be air sensitive uses anymore.

7.4.2 Planned/Committed ASRs

Planned/committed ASRs are identified by making reference to relevant Outline Zoning Plans (OZP) (S/KTN/2 - Kwu Tung North), Outline Development Plans, Layout Plans, other published plans in the vicinity of the development and relevant approved EIA Study (EIA for NENT NDA).

The approved EIA for NENT NDA identified a number of planned residential, educational and government, institution & community uses. Based on the latest implementation programme provided by CEDD, the tentative population intake years of KTN NDA (Advance Stage Development) for most of the development sites including private housing are between 2025 and 2028. In addition, a planned multi welfare service complex (PA2) which is located far from the major construction works at a distance of approximately 210m to the south of the Project will start operation from 2022/2023.

For KTN NDA (Remaining Stage Development), the tentative population intake year will start from 2033. Since the major construction works with major dust emission will be completed by Q2 2025, potential dust impact on the planned ASRs under KTN NDA (Remaining Stage Development) is not anticipated and therefore these planned ASRs are not considered in this report.

Table 7.2: Representative ASRs

ASR ID	Description	Use ^[1]	Approximate Distance (m)		To be Removed before Construction of the Project
			From the Project Site	From Major Construction Works	
Existing ASRs					

ASR ID	Description	Use ^[1]	Approximate Distance (m)		To be Removed before Construction of the Project
			From the Project Site	From Major Construction Works	
A1	Village Houses along Ho Sheung Heung Road	R	~50	~120	Yes
A2	Village Houses along Ho Sheung Heung Road	R	~40	~80	Yes
A3	Village Houses along Ma Tso Lung Road	R	~50	~50	Yes
A4	Temporary Structures with residential use along Ma Tso Lung Road	R	~100	~100	Yes
A5	Village Houses near Tung Fong	R	~20	~20	Yes
A6	Temporary Structures with residential use near Tung Fong	R	~20	~120	Yes
A7	Temporary Structures with residential use near Pak Shek Au	R	~150	~320	Yes
A8	Temporary Structures with residential use near Dills Corner Garden	R	~90	~230	Yes
A9	Kwu Tung Grass Soccer Pitch	RC	~270	~270	Yes
A10	Village Houses near Shek Tsai Leng	R	~150	~150	Yes
A11	Sheung Shui Pui Yau Kindergarten	E	~50	~50	Yes
A12	Village Houses along Ho Sheung Heung Road	R	~20	~20	Yes
A13	Europa Garden Phase 1	R	~300	~480	No
A14	Valais Phase 1	R	~400	~480	No
A15	Dills Corner Garden	G/IC	~140	~140	Yes
Planned ASRs					
PA1 ^[2]	Planned Private Housing	R	~60	~100	No
PA2 ^[3]	Planned Multi Welfare Service Complex	G/IC	~65	~210	No

Notes:

- [1] R- Residential premises; E- Education; RC- Recreational; and G/IC- Government, Institution & Community
- [2] Based on the latest information provided by CEDD, a private housing (PA1) which is located far from the major construction works at a distance of approximately 100m to the south of the major construction works to be operated in mid-2025.
- [3] Based on the latest information provided by CEDD, a multi welfare service complex (PA2) which is located far from the major construction works at a distance of approximately 210m to the south of the major construction works to be operated in 2022/2023.

7.5 Construction Phase

7.5.1 Identification and Evaluation of Impact

7.5.1.1 Dust Emission Arising from the Project

In general, air quality impact during construction phase may arise from fugitive dust emission from construction activities including excavation for construction of station box and adit, VBs, FRS and wind erosion from the exposed work fronts.

To construct the station box on top of the existing tunnel box and the adit, the construction will include excavation of the existing fill material (with dimensions of approx. 30m (W) x 340 (L) and a depth of approx. 8m), construction of concourse area and then followed by minor backfilling above the concourse box and adit. The excavation works will be carried out in stages where necessary to minimise the dust impact generated.

Moreover, with the use of the existing D-wall for ELS, the extent of works will be limited. As the proposed concourse will be constructed on top of the existing tunnel box, only a shallower depth of excavation will be required (i.e. 8m depth) when compared to the construction of the tunnel box (i.e. 20m depth) at the time of construction for LMC Spur Line.

However, small-scale sheet piling and H-piling works will also be involved in construction of the underground adit with the area approx. 12m (W) x 40m (L), the construction dust impact generated will be limited with suitable mitigation measures implemented.

The scale of cut-and-cover and the amount of spoil generated will therefore be significantly smaller. In addition, only a small amount of excavated materials will be needed to be stockpiled locally for back-filling processes, while the majority of the excavated materials will be exported to suitable sites for final off-site disposal.

Other than the construction of concourse and the adit, two integrated buildings with the entrance and VB, as well as FRS will be constructed above ground. However, the construction of these superstructure works would not cause significant dust impact with suitable mitigation measures implemented.

Reinstatement to ground level with thickness ranging from 1.5m (reinstatement to original ground level for the eastern part of the station box) to around 3m (reinstatement to future ground level for the western part of the station box) will be required after the major construction works of the station box is completed. Given that some structures such as integrated buildings with the entrance and VB, as well as FRS will be erected above ground, the amount and extent of backfilling are considered minor and thus the construction dust impact is expected to be limited.

Fuel combustion from the use of powered mechanical equipment (PME) during construction works would be a source of air emission. To improve air quality, EPD has introduced the Air Pollution Control (NRMMS) (Emission) Regulation, which came into operation in 2015 to regulate emissions from machines and non-road vehicles. Under the Regulation, NRMMS, except those exempted, are required to

comply with the prescribed emission standards. All regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites.

The construction of the Project is further compared with the construction of the existing tunnel box at Kwu Tung carried out under the approved EIA for LMC Spur Line in **Table 7.3**.

Table 7.3: Comparisons of the Construction Details between the Construction of the Existing Tunnel Box at Kwu Tung and the Construction of the Project

	Construction of the Existing Tunnel Box under the Approved EIA for LMC Spur Line	The Project
Key Construction Activities	<ul style="list-style-type: none"> • Site Clearance • D-Wall • Break out Treatment • Excavation • Construction • Shaft for TBM 	<ul style="list-style-type: none"> • Site Clearance • Excavation • Structural Works
Duration of Construction	<ul style="list-style-type: none"> • Site Clearance & D-wall: 14 months • Excavation: 20 months • Construction: 21 months 	<ul style="list-style-type: none"> • Site Clearance: 6 months • Excavation: 18 months • Structural: 18 months
Approx. Distance of Nearest ASR	<20m ^[1] (ASR14)	210m ^[2] (PA2)
Approx. Amount of Spoil Generated	256,000 m ³	134,600 m ³

Notes:

[1] Approximate distance between the construction works area and ASR14 (Village house) which measured from Figure 6.1 of approved LMC Spur Line EIA.

[2] Approximate distance between the major construction works and PA2.

As shown in **Table 7.3**, only 3 out of 6 of the major construction activities of the existing tunnel box would be carried out in the Project and only about half of the amount of spoil would be generated in the Project. The duration of construction of the Project is also shorter than the construction of the existing tunnel box. Most of the construction works of the Project will be carried out below ground level. According to the approved EIA for LMC Spur Line, construction dust impact arising from the construction of the existing tunnel box was anticipated insignificant with the implementation of proper mitigation measures.

In addition, the nearest ASR identified in the Project, i.e. PA2, would be located at a distance of approximately 210 m from the major construction works of the Project, which is much farther than ASR14 (less than 20m from the construction of the existing tunnel box) identified in the approved EIA for LMC Spur Line. Considering the sufficient buffer distance between the Project and the ASRs, no significant construction dust impact arising from the Project is anticipated with the implementation of proper mitigation measures.

Construction Dust Impacts on the Existing ASRs

As presented in **Table 7.2**, most of the identified existing ASRs will be removed before the construction of the Project, except A13 and A14. The nearest concerned representative existing ASRs during construction phase, i.e. A13 and A14, are located far and at a distance of approximately 480m from the major dusty works and the scale. Besides, duration of the Project are much smaller and shorter than that of the construction of the existing tunnel box, adverse dust impact arising from the Project is limited with suitable mitigation measures in place.

Construction Dust Impacts on the Planned/Committed ASR

While the planned ASR (PA1) will start operation from mid-2025 where the major construction works of the Project will have been completed, the planned ASR (PA2) will be located at a distance of around 210m from the major dusty construction works and will start operation from 2022/2023. Considering that the scale and duration of the Project are much smaller and shorter than that of the construction of the existing tunnel box according to **Table 7.3**, it is anticipated that the construction dust impacts on the planned ASR (PA2) would be minor with the implementation of suitable good site practices and mitigation measures mentioned in **Section 7.5.3**.

7.5.2 Cumulative Impacts

Apart from the project-induced dust emissions, dust emissions also arises from other pollution sources including KTN NDA etc.

KTN NDA

As discussed in **Section 1.4**, the tentative construction programme of the Project will overlap with the KTN NDA (Advance Stage Development) and the KTN NDA (Remaining Stage Development). The construction period of the KTN NDA (Advance Stage Development) will be from Q3 2020 to 2026, and the first population intake will be in mid-2025 for a private housing site. In addition, a planned multi welfare service complex located to the south of the Project will start operation from 2022/2023. For the KTN NDA (Remaining Stage Development), the construction period will be from 2024 to 2031 and the population intake will be after 2033.

Although the Project will overlap with the construction of KTN NDA, the Project scale is small as compared to the development of KTN NDA. According to the approved EIA for NENT NDA, in which construction works would be taken place at the existing tunnel box, the predicted construction dust impacts (i.e. the 1st highest 1-hr TSP concentration) of the identified ASRs near PA2 were well below the relevant criterion of $500\mu\text{g}/\text{m}^3$. Besides, proper dust control measures such as frequent watering would be implemented to minimise construction dust impact at the construction of the project. Considering the relatively minor scale of works in term of size and complexity comparing with KTN NDA, it is therefore anticipated that the cumulative construction dust impact due to the Project is not significant with the proper implementation of the recommended mitigation measures. Hence, the cumulative construction dust impact together with the development of KTN

NDA would comply with the construction dust criteria with the implementation of suitable good site practices and mitigation measures mentioned in **Section 7.5.3**.

Northern Link (NOL)

Based on the latest information provided by the CEDD, the target commencement year of the construction of NOL is mid-2025. As discussed in **Section 1.3**, the major construction works of the Project including site mobilisation and excavation will start in Q1 2024 and will be completed by Q2 2025. Starting from Q3 2025 to 2028, the construction works for the Project would be mainly structural works, site reinstatement and inspection and trial run. Therefore, no significant dust impact nor cumulative impact due to the Project are anticipated during this period. Cumulative construction dust impacts from NOL should be further reviewed in the EIA stage of NOL.

7.5.3 Mitigation Measures

As the air quality would remain similar to those of the approved EIA for LMC Spur Line, the mitigation measures suggested in the approved EIA for LMC Spur Line, as listed below, would be adequate to protect the ASRs.

The following dust control measures as part of good construction site practice should be incorporated as far as practicable in the Contract Specification and implemented to minimise dust nuisance arising from the works to within acceptable levels:

- The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. Effective dust suppression measures, as necessary, should be installed to minimise air quality impacts, at the boundary of the site and at any sensitive receivers.
- The Contractor shall frequently clean and water the site to minimise fugitive dust emissions.
- Effective water sprays shall be used during the delivery and handling of all raw sand, aggregate and other similar materials, when dust is likely to be created, to dampen all stored materials during dry and windy weather.
- Watering of exposed surfaces shall be conducted as often as possible depending on the circumstances.
- Areas within the site where there is a regular movement of vehicles shall have an approved hard surface, be kept clear of loose surface materials and / or regularly watered.
- Where dusty materials are being discharged to vehicle from a conveying system at fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust fans shall be provided for this enclosure and vented to a suitable fabric filter system.
- The Contractor shall confine haulage and delivery vehicles to designated roadways inside the site. If in the opinion of the Engineer, any motorised vehicle is causing dust nuisance, the Engineer may require that the vehicle be restricted to a maximum speed of 15 km per hour while within the site area.

- Wheel cleaning facilities shall be installed and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel cleaning facilities shall be usable prior to any earthwork excavation activity on site. The Contractor shall provide a hard-surfaced road between any cleaning facility and the public road.
- Any stockpile of dusty material shall be either: a) covered entirely by impervious sheeting; b) placed in an area sheltered on the top and the three sides; or c) sprayed with water so as to maintain the entire surface wet.
- Chemical wetting agents shall only be used on completed cuts and fills to reduce wind erosion.
- All site vehicular exhausts should be directed vertically upwards or directed away from ground to minimise dust nuisance.
- Ventilation system, equipped with proprietary filters, should be provided to ensure the safe working environment inside the tunnel. Particular attention should be paid to the location and direction of the ventilation exhausts. The exhausts should not be allowed to face any sensitive receivers directly. Consideration should also be given to the location of windows, doors and direction of prevailing winds in relation to the nearby sensitive receivers.

In addition, based on the Air Pollution Control (Construction Dust) Regulation, any works involved regulatory and notifiable works, such as stockpiling, loading and unloading of dusty materials, shall take precautions to suppress dust nuisance. Examples of dust suppression methods are:

- The working area of any excavation or earthmoving operation shall spray with water immediately before, during and immediately after the operation so as to maintain the entire surface wet;
- Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies;
- Any stockpile of dusty materials shall be either covered entirely by impervious sheeting or placed in an area sheltered on the top and three sides; and sprayed with water so as to maintain the entire surface wet; and
- Other suitable dust control measures as stipulated in the Air Pollution Control (Construction Dust) Regulation, where appropriate, should be adopted.

The following good site practices that can control and reduce the emission from the use of non-road mobile machinery from the Project are recommended:

- Regulated machines shall be used and exempted NRMMs should be avoided where practicable.
- Use cleaner fuel such as Ultra Low Sulphur Diesel (ULSD) in diesel-operated construction plant to reduce sulphur dioxide emission.

- Use of electric PME's where practicable.
- Use power supplied from power utilities when practicable (e.g. to replace generators).
- Switch off the engine of PME's when idling.
- Implement regular and proper maintenance for plant and equipment.
- Employ plant and equipment of adequate size and power output and avoid overloading of the plant.
- Locate the PME's away from sensitive receivers as far as possible.
- Erect screen to shield the emission source from sensitive receivers where necessary and practicable.
- Any potential dust impact and watering would be subject to actual site conditions. The dust levels would be monitored and managed under the Environmental Monitoring and Audit as specified in Section 14.3.3.4.

7.6 Operational Phase

7.6.1 Identification and Evaluation of Impact

Since trains to be operated in the Project are electrified, there is no air emission during normal operation. Adverse air quality impact arising from normal operation of the Project is not anticipated and therefore mitigation measures are not required.

7.7 Conclusion

Air quality impacts due to the proposed amendments during construction phase have been reviewed. Potential construction dust impact may arise from fugitive dust emission from construction activities such as excavation and backfilling for construction of station box, adit, FRS, backfilling for the site reinstatement and wind erosion from the exposed work fronts. Given the relatively small scale of works and with the proper implementation of recommended mitigation measures, the construction dust impact during the construction phase is anticipated to be insignificant.

Air quality impacts due to the proposed amendments during operational phase have been reviewed. Adverse air quality impact arising from normal operation of the Project is not anticipated.

8 Review of Noise

8.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line identified the representative Noise Sensitive Receivers (NSRs) affected by the Project, reviewed noise impact arising from the construction and operation of the Spur Line and proposed mitigation measures to minimise the potential impacts of construction of the Spur Line.

As stated in Section 7 of the approved EIA for LMC Spur Line, the construction noise impact arising from the major components of construction works at Kwu Tung area were the construction of the tunnel box and the TBM inspection shaft, which had been completed. The approved EIA for LMC Spur Line reviewed the construction noise impact of these major components of construction works at Kwu Tung area and railway noise and fixed plant noise impacts during operational phase.

8.2 Baseline Condition

8.2.1 Description of Existing Environment

The Project is located near the centre of KTN NDA Development. The Project requires excavation, modification of existing tunnel box structures, construction of concourse and platform areas, adit, above-ground structures including entrances, VB and FRS, as well as modification of EAP/EEP.

8.3 Construction Programme

As discussed in **Section 1.3**, the Project will tentatively commence construction in Q3 2023 for completion by 2028. The main activities from Q3 2023 to Q4 2023 will be site clearance of the existing KCRC vested lands and nearby vacant lands. Major construction works including site mobilisation and excavation will be started in Q1 2024 and completed within the first 1.5 years, i.e. by Q2 2025. Starting from Q3 2025, the remaining works would only include structural works, site reinstatements and inspection and trial runs, which are considered as minor construction works that would not cause any significant construction noise impacts.

The major construction works will be conducted within the works site for station construction as shown in **Figure 1.1**. The other works sites and works areas are those for construction site offices, site access and material storage areas which are not significant construction noise sources and therefore not considered in the noise assessment.

According to **Section 1.3**, the tentative construction programme of the Project will overlap with the KTN NDA (Advance Stage Development) and the KTN NDA (Remaining Stage Development). The construction period of the KTN NDA (Advance Stage Development) will be from Q3 2020 to 2026, and the first population intake will be in mid-2025 for a private housing site. In addition, a planned multi welfare service complex located at the south will start operation from

2022/2023. For the KTN NDA (Remaining Stage Development), the construction period will be from 2024 to 2031 and the population intake will be after 2033.

8.4 Construction Phase

8.4.1 Identification of Representative Noise Sensitive Receivers

With reference to Annex 13 of the EIAO-TM, NSRs include residential uses (all domestic premises including temporary housing), institutional uses (educational institutions including kindergarten and nurseries), hospitals, medical clinics, homes for the aged, convalescent homes, places of worship, libraries, court of law, performing arts centres, auditoria and amphitheatres, country park and others.

Representative NSRs within 300m from the Project Site have been reviewed and identified with the first layer of NSRs selected for assessment. The locations of the representative NSRs are summarised in **Table 8.1** and shown in **Figure 7.1** and **Figure 7.2**. Existing NSRs are identified by means of reviewing topographic maps, aerial photos, building plans, relevant approved EIA Studies (the approved EIA for LMC Spur Line and the approved EIA for NENT NDA) and verified by site visits. For the planned NSRs, it is identified according to the approved EIA for NENT NDA, RODP and the latest development program provided by CEDD.

8.4.1.1 Existing NSRs

The approved EIA for LMC Spur Line identified and considered a number of existing NSRs such as the village houses along Ma Tso Lung Road and Ho Sheung Heung Road, temporary structures near Tung Fong, residential buildings in Fairy Park and Dills Corner Garden and Sheung Shui Pui Yau Kindergarten in the vicinity of the railway station at Kwu Tung. Site visits have been conducted and it is noted that some of these NSRs (e.g. Fairy Park, Dills Corner Garden, Ku Tung Public Oi Wah School and some village houses) are no longer in use or not occupied.

It is noted that the existing NSRs to the west of the Project fall within the project site of concurrent KTN NDA Development (Advance Stage). According to the latest programme provided by CEDD, land resumption and construction of these areas is in progress. Land resumption for the remaining areas within the KTN NDA (Advance Stage Development) site will be conducted by phases and completed before the construction of the Project. Therefore, the existing NSRs would not be noise sensitive uses anymore during the major construction works.

The existing NSRs to the east of the Project also fall within the project boundary of concurrent KTN NDA (Remaining Stage Development). Based on the latest programme provided by CEDD, the construction works of the KTN NDA (Remaining Stage Development) will commence progressively from 2024. It is anticipated that land resumption will be completed by 2024. Therefore, these NSRs will move out before the construction of the Project and will not be noise sensitive uses anymore.

8.4.1.2 Planned/ Committed NSRs

Planned/committed NSRs are identified by making reference to relevant Outline Zoning Plans (OZP) (S/KTN/2 - Kwu Tung North), Outline Development Plans, Layout Plans, other published plans in the vicinity of the development and relevant approved EIA Study (EIA for NENT NDA).

The approved EIA for NENT NDA identified a number of planned residential, educational and government, institution & community uses. Based on the latest implementation programme provided by CEDD, the tentative population intake years of KTN NDA (Advance Stage Development) for most of the development sites including private housings are between 2025 and 2028. In addition, a planned multi welfare service complex (PA2) which is located far from the major construction works at a distance of approximately 210m to the south of the Project will start operation from 2022/2023.

For KTN NDA (Remaining Stage Development), the tentative population intake year will start from 2033. Since the major construction works with major construction noise impact will be completed by Q2 2025, potential construction noise impact on the planned NSRs under KTN NDA (Remaining Stage Development) is not anticipated and therefore these planned NSRs are not considered in this report.

Table 8.1: Representative NSRs

NSR ID	Description	Use ^[1]	Approximate Distance (m)		To be Removed before Construction of the Project
			from the Project Site	from Major Construction Works	
Existing NSRs					
A1	Village Houses along Ho Sheung Heung Road	R	~50	~120	Yes
A2	Village Houses along Ho Sheung Heung Road	R	~40	~80	Yes
A3	Village Houses along Ma Tso Lung Road	R	~50	~50	Yes
A4	Temporary Structures with residential use along Ma Tso Lung Road	R	~100	~100	Yes
A5	Village Houses near Tung Fong	R	~20	~20	Yes
A6	Temporary Structures with residential use near Tung Fong	R	~20	~120	Yes
A7	Temporary Structures with residential use near Pak Shek Au	R	~150	~320	Yes
A8	Temporary Structures with residential use near Dills Corner Garden	R	~90	~230	Yes
A10	Village Houses near Shek Tsai Leng	R	~150	~150	Yes
A11	Sheung Shui Pui Yau Kindergarten	E	~50	~50	Yes
A12	Village Houses along Ho Sheung Heung Road	R	~20	~20	Yes
A13	Europa Garden Phase 1	R	~300	~480	No
A15	Dills Corner Garden	G/IC	~140	~140	Yes
Planned NSRs					
PA1 ^[2]	Planned Private Housing	R	~60	~100	No
PA2 ^[3]	Planned Multi Welfare Service Complex	G/IC	~65	~210	No

Notes:

[1] R- Residential premises; E- Education; and G/IC- Government, Institution & Community

[2] Based on the latest information provided by CEDD, a private housing (PA1) which is located far from the major construction works at a distance of approximately 100m at the south of the major construction works to be operated in mid-2025.

[3] Based on the latest information provided by CEDD, a multi welfare service complex (PA2) which is located far from the major construction works at a distance of approximately 210m at the south to be operated in 2022/2023.

8.4.2 Identification and Evaluation of Impact

As discussed in **Section 1**, key modification required for the Project have been identified and summarized below:

- Excavation of the fill material above the existing tunnel box;

- Modification of existing tunnel box structures;
- Construction of concourse and platform areas;
- Construction of back-of-house areas;
- Construction of the underground adit;
- Construction of entrances, Ventilation Buildings (VB), Fire Rescue Stairs (FRS);
- Modification of existing EAP/EEPs;
- Relocation of existing EVA and associated facilities; and
- Construction of other station associated facilities.

As discussed in **Section 1**, there are existing tunnel box and D-wall underground at the Project Site. Thus, the major construction works of the Project will be the excavation of the fill material within the existing D-wall above the tunnel box, which is within the works site for station construction. Other works sites and works areas are for construction site offices, site access and storage areas only. Since no additional D-wall and only minor above-ground construction is required, the airborne construction noise impact of the Project is minimized and the period of construction impact is therefore be significantly shorter.

With the use of the existing D-wall for ELS, the extent of works will be limited. As the proposed concourse will be constructed on top of the existing tunnel box, only a shallower depth of excavation will be required (i.e. 8m depth) when compared to the construction of the tunnel box (i.e. 20m depth) at the time of construction for LMC Spur Line. The scale of cut-and-cover will therefore be significantly smaller.

However, small scale sheet piling and H-piling works will also be involved in construction of the underground adit with the area approx. 12m (W) x 40m (L), the construction noise impact generated will be limited with suitable mitigation measures implemented.

Moreover, since most of the construction works will be carried out underground, the airborne construction noise could be greatly reduced by sufficient implementation of good site practices and mitigation measures (see **Section 8.6.2**).

Other than the construction of underground concourse and the adit, two integrated buildings with the entrance and VB, as well as FRS will be constructed above ground. However, the construction of these superstructure works would not cause significant airborne noise impact with suitable mitigation measures implemented.

As discussed in **Section 1**, the construction period of Advance Stage Development and Reminding Stage Development of KTN NDA will be from Q3 2020 to 2026 and from 2024 to 2031 respectively. Cumulative impacts from concurrent projects (i.e. KTN NDA Development) including the site clearance/ formation activities and the construction of superstructure / internal roads / sewerage were considered.

8.4.2.1 Construction Noise Impacts on the Existing NSRs

As presented in **Table 8.1**, most of the identified existing NSRs will be removed before the construction of the Project, except A13. Given that the nearest concerned representative existing NSRs during construction phase, i.e. A13, is located far at a distance of approximately 480m from the major construction works, potential construction noise impact arising from the Project is limited with suitable mitigation measures in place.

8.4.2.2 Construction Noise Impacts on the Planned/Committed NSR

The planned NSR (PA2) will be located at a distance of around 210m from the major construction works and will start operation from 2022/2023.

With reference to the approved EIA for LMC Spur Line, the distance between NSR 11 and the previous workforce of the tunnel box at Kwu Tung is similar to the distance between PA2 and the area of major construction works of the Project. The construction noise assessment of the tunnel box at Kwu Tung carried out under the approved EIA for LMC Spur Line is referenced and compared with the construction of the Project (see **Table 8.2**).

Table 8.2: Comparisons of the Construction Details between the Construction of the Existing Tunnel Box at Kwu Tung and the Construction of the Project

	Existing Tunnel Box under the approved EIA for LMC Spur Line	The Project
Key Construction Activities	<ul style="list-style-type: none"> • Site Clearance • D-Wall • Break out Treatment • Excavation • Construction • Shaft for TBM 	<ul style="list-style-type: none"> • Site Clearance • Excavation • Structural Works
Duration of Construction	<ul style="list-style-type: none"> • Site Clearance & D-wall: 14 months • Excavation: 20 months • Construction: 21 months 	<ul style="list-style-type: none"> • Site Clearance: 6 months • Excavation: 18 months • Structural: 18 months
Approx. Notional Distance of respective NSR	290m (NSR 11)	380m (PA2)
Approx. Amount of Spoil Generated	256,000 m ³	134,600 m ³

As shown in **Table 8.2**, only 3 out of 6 of the major construction activities of the existing tunnel box would be carried out in the Project. Besides, the duration of construction of the Project is also shorter than that of the existing tunnel box. Most of the construction works of the Project will be carried out below ground level.

In addition, according to the construction noise impact assessment of NSR 11 under the approved EIA for LMC Spur Line, the predicted mitigated construction noise level of NSR 11 was 68dB(A), which was well within the construction noise

criterion (75dB(A)). Besides, based on the EM&A Reports of the approved EIA for LMC Spur Line from Dec 2002 to Jan 2005, no exceedance was recorded at NSR11. As the notional distance of PA2 is longer than the notional distance of NSR 11, it is anticipated that the predicted mitigated construction noise level at PA2 should be further lower than 68dB(A) and the construction noise level would comply with the construction noise criteria with the implementation of suitable good site practices and mitigation measures mentioned in **Section 8.4.4**.

Considering that the scale and duration of the Project is much smaller than that of the previous construction of the existing tunnel box, and both of the predicted and measured construction noise level at NSR 11 were within the noise criterion, it is anticipated that the construction noise impact on planned NSR (PA2) would be minor with the implementation of suitable good site practices and mitigation measures mentioned in **Section 8.4.4**.

In addition, construction works of concurrent KTN NDA will be carried out in between the planned NSRs and the Project. Considering that the construction scale and the construction period of the major construction works of the Project is relatively minor when compared to the site formation and superstructure works of KTN NDA Development, it is therefore anticipated that the construction noise impact arising from the Project on these planned NSRs will be insignificant.

8.4.3 Cumulative Impacts

KTN NDA

The construction period of the Project will overlap with KTN NDA (in 2 phases, i.e. Advance Stage Development and Remaining Stage Development) as described in **Section 1.4**. Based on the latest information provided by CEDD, the construction period of the Advance Stage Development will be from Q3 2020 to 2026 and that of the Remaining Stage Development will be from 2024 to 2031.

Although the Project will overlap with the construction of KTN NDA, the Project scale is small as compared to the development of KTN NDA. According to the approved EIA for NENT NDA, in which construction works would be taken place at the existing tunnel box, the predicted construction noise impact of the identified NSRs near PA2 were well below the relevant construction noise criteria. Besides, good practices to minimise construction noise impact would be implemented at the construction of KTN NDA. It is therefore anticipated that the cumulative construction noise impact due to KTN NDA is not significant with the proper implementation of the recommended mitigation measures.

Northern Link (NOL)

Based on the latest information provided by CEDD, the target commencement year of the construction of NOL is mid-2025. As discussed in **Section 1.3**, the major construction works of the Project including site mobilisation and excavation will be started in Q1 2024 and completed by Q2 2025. Starting from Q3 2025, the construction works for the Project would be mainly structural works, site reinstatement and inspection and trial run. Therefore, no significant construction noise impact nor cumulative impact due to the Project are anticipated during this

period. Cumulative construction noise impacts from NOL should be further reviewed in the EIA stage of NOL.

8.4.4 Mitigation Measures of Construction Noise Impact

Although insignificant construction noise impact is anticipated, it is still recommended to minimise the construction noise impact as far as practicable. As such, the following mitigation measures are recommended:

- Good site practices to limit noise emissions at the source;
- Use of quality powered mechanical equipment (QPME); and
- Use of temporary noise barriers and noise enclosure to screen noise from relatively static PMEs.

The above mitigation measures would need to be implemented in works sites as good practices where appropriate.

8.4.4.1 Good Site Management Practices

Good site practice and noise management techniques with reference to EPD's "Recommended Pollution Control Clauses for Construction Contracts" could considerably reduce the noise impact from construction site activities on nearby NSRs. The following measures should be practised during each phase of construction:

- 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 which available on construction equipment should be properly fitted and maintained during the construction works;
- spoil transportation routes should be directed away from NSRs as far as practicable;
- mobile plant should be sited as far away from NSRs as possible and practicable;
- material stockpiles, site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities;
- noise monitoring at selected NSRs should be conducted as far as practicable; and
- provide designated unloading areas away from the NSR as far as possible.

The uses and benefits of these techniques can vary according to specific site conditions and operations. The environmental noise climate would certainly be

improved with these control practices, although the improvement can only be quantified during implementation when specific site parameters are known.

8.4.4.2 Use of Quality Powered Mechanical Equipment (QPME)

The use of quiet plant associated with the construction works is made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in Environmental Protection Department (EPD) web pages as far as possible which includes the SWLs for specific quiet PME. It is generally known (supported by field measurement) that particular models of construction equipment are quieter than standard types given in the GW-TM.

8.4.4.3 Use of Movable Noise Barrier and Full Enclosure

Movable temporary noise barriers that can be located close to noisy plant and be moved concurrently with the plant along a worksite can be very effective for screening noise from NSRs. This measure is particularly effective for low level zone of NSRs. A cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs.

Movable temporary noise barriers will be used for some PME (e.g. excavator). It is anticipated that suitably designed barriers with material surface density of 10kg/m² could achieve at least 5dB(A) reduction for movable plant and 10dB(A) for stationary plant.

The use of standard enclosure has been considered in this review to shelter relatively fixed plant including air compressor and generator, etc. These standard enclosures can provide at least 15dB(A) noise reduction.

8.5 Operational Phase

8.5.1 Railway Noise

Since the operation of LMC Spur Line will remain unchanged during the operational phase of the Project, the operational railway noise impact assessed by the Project are still valid. Considering the mitigation measures proposed in approved EIA Report for LMC Spur Line have been implemented, no additional mitigation measure is required.

8.5.2 Fixed Noise

8.5.2.1 Identification and Evaluation of Impact

As shown in **Figure 1.2**, the two existing EAP/EEPs are the existing fixed noise sources within the Project. It is also noted that there will be typical planned fixed noise sources for railway station at the proposed entrances (incorporated with VB) and proposed FRS, including ventilation fans, smoke extraction fans, chillers etc. All these noise sources would be accommodated within plant rooms with fresh air

louvres, exhaust air louvres, smoke discharge louvres, etc. to be constructed in the Project which give rise to potential fixed noise impact to the future NSRs at KTN.

However, considering the existing environment of the Project Site is being affected by the construction works operated at KTN NDA, prevailing noise measurements would not be representative for the future new town which is still being implemented.

It is therefore proposed to conduct a detail quantitative assessment to determine the maximum allowable sound power level (SWL) during detailed design stage which the plantroom layout would be finalised and neighbouring design of KTN NDA would progress further¹.

Nevertheless, a preliminary broad brush estimation of the maximum allowable sound power levels (SWLs) of the fixed noise sources has been conducted in this ERR based on the best available information². As the two existing EAP/EEPs are considered as existing sources, the noise impact from operation of existing EAP/EEPs would be reflected in prevailing noise measurement conducted in future. As such, the two existing EAP/EEPs would not be considered in the maximum sound power levels (SWLs) assessment for planned fixed noise source. The summary of the preliminary calculation of maximum SWLs of the fixed noise sources is shown in **Table 8.3** and the preliminary calculations is shown in **Appendix 8.1**.

Table 8.3: Summary of the Preliminary Calculation of Maximum Allowable Sound Power Levels

Source Location	Description	Maximum Allowable SWL, dB(A) ^[1]
Proposed West Entrance (Incorporated with VB)	North façade	82
	East façade	82
	South façade	80
	West façade	82
	Roof	82
FRS	North façade	88
	South façade	88
Proposed East Entrance (Incorporated with VB)	North façade	82
	East façade	82
	South façade	84
	West façade	82
	Roof	82

Note:

¹ According to Table 4.15 of the approved EIA for NENT NDA, the Area Sensitivity Ratings (ASRs) of all the identified NSRs at Kwu Tung, except for B1-3 which is located beyond the Project Site of the Project, were identified as B rating. (Reference from: https://www.epd.gov.hk/eia/register/report/eiareport/eia_2132013/eia/html/eia_index.htm)

² Since the latest building layout of at KTN is not available during the preparation of this ERR while the building layout provided in the approved EIA for NENT NDA does not align with the latest OZP, planned/ committed NSRs (see Appendix 8.1) are identified according to the latest OZP.

[1] A detail quantitative assessment would be conducted to determine the maximum allowable sound power level (SWL) during detailed design stage.

Nevertheless, it is still recommended to implement the proposed noise mitigation measures (e.g. housing all noisy equipment inside the plantroom with sufficient sound insulation and sound attenuators for all air louvers) to minimize the fixed noise impact arising from the planned fixed noise sources. Typical noise mitigation measures are provided in the following sections. With the properly selection of the equipment and installation of acoustic attenuators, the maximum allowable SWL can be achieved.

8.5.2.2 Good Practices on Fixed Noise Sources

Since the Project will be surrounded by noise sensitive receivers with residential uses, the positioning of the equipment and the direction of louvers should be properly considered. According to “Good Practices on Ventilation System Noise Control” issued by EPD, the following good practices shall be considered as far as practicable to minimise any potential impacts:

- Equipment should be placed in a plant room with thick walls or at a much greater distance from the receiver or behind some large enough obstruction (e.g. a building or a barrier);
- Quieter plant should be chosen as far as practicable;
- Noise levels specification should be included when ordering new plant items;
- All openings, including louvers for ventilation and machine room doors should be oriented away from the NSRs as far as practicable;
- Silencers, acoustic louvers or acoustic doors should be used where necessary; and
- Regularly scheduled plant maintenance programme should be developed and implemented so that plant items are properly operated and serviced.

With proper selection of equipment and adoption of good practices, adverse noise impact from the planned fixed plant noise sources due to the operation of the Project is anticipated to be insignificant.

8.6 Conclusion

8.6.1 Construction Phase

Construction noise impacts due to the proposed amendments during construction phase have been reviewed. Potential construction noise impacts may arise from the construction works of the Project, such as excavation, construction of underground works and construction of above-ground structures. Given relatively small scale of works and with proper implementation of recommended mitigation measures, the construction noise impact is anticipated to be insignificant.

8.6.2 Operational Phase

Since the operation of LMC Spur Line will remain unchanged during the operational phase of the Project, the operational railway noise impact assessed by the approved EIA Report are still valid. No additional mitigation measure is required.

For fixed noise sources impact, the typical fixed noise sources for railway station are identified. With proper implementation of the recommended good practices and noise mitigation measures, the planned fixed noise sources impact is anticipated to be insignificant.

9 Review of Water Quality

9.1 Review of Approved EIA for LMC Spur Line

According to the approved EIA for LMC Spur Line, the tunnel alignment would run underneath a number of watercourses within Long Valley, Kwu Tung, Chau Tau and Lok Ma Chau areas. Water Sensitive Receivers (WSRs) identified included water bodies near Long Valley, River Beas (Sheung Yue Ho), minor streams near Kwu Tung and Lok Ma Chau watercourses and fishponds. For construction phase, water quality impacts due to different construction activities (including the excavation works and construction of D-wall at the existing tunnel box at Kwu Tung) were discussed. For operational phase, water quality impacts of that Project focused on the footbridge piers in Shenzhen River, tunnel below wetland areas, stormwater run-off from the railway tracks and trains, and sewage generated by staff and passengers at Lok Ma Chau station. No specific water quality impact of the operational phase of the existing tunnel box at Kwu Tung was discussed.

9.2 Representative Water Sensitive Receivers

The Water Sensitive Receivers (WSRs) in the vicinity (i.e. within 500m from the Project Site) have been reviewed and identified in **Table 9.1** and shown in **Figure 9.1**.

Table 9.1: WSRs Identified within 500m from the Project Site

WSR	Description	Status
W1	Pond at Ho Sheung Heung	Abandoned fishpond
W2	River Beas (also known as “Sheung Yue River”)	Channelised nullah
W3	Fung Kong watercourse	Channelised nullah
W4	Kwu Tung watercourse	Channelised nullah ^[1]
W5 ^[1]	Tung Fong/Shek Tsai Ling watercourse	Largely channelised nullah ^[1]
W6 ^[1]	Watercourse at the south of LMC Spur Line	Channelised nullah ^[1]
W7	Pak Shek Au watercourse	Channelised nullah
W8	Ponds near Fung Kong	Abandoned fishponds
W9	Watercourse at the north of Fanling Highway	Channelised nullah
W10	Watercourse at the south of Fanling Highway	Channelised nullah

Notes:

^[1] W5 & W6 passes underneath Ho Sheung Heung Road and continued as W4 at the east.

The WSRs in close proximity to the Project Site are W5– Tung Fong/Shek Tsai Ling watercourse and W6– Nullah near Shek Tsai Ling which are channelised nullahs located along the northern boundary of the Project Site and at the south of the Project Site respectively.

W5 passes underneath Ho Sheung Heung Road and continues as W4 at the east. W5 is located within both the Advance Stage Development and the Remaining

Stage Development under the KTN NDA Development. It was evaluated as low ecological importance according to the approved EIA Report for NENT NDA.

In addition, W6 is located within the Project Site, and it also passes underneath Ho Sheung Heung Road and continues as W4 at the east. As discussed in **Section 5**, the ecological importance of W6 is low.

9.3 Construction Phase

9.3.1 Review of Potential Impact on Water Quality

The existing tunnel box at Kwu Tung was constructed using cut-and-cover method during the construction of LMC Spur Line and soil of approximately 20m thick was excavated. As discussed in **Section 1.3**, excavation of the backfill of approximately 8m thick above the existing tunnel box is required for the modification of the railway station at Kwu Tung. The excavation scale of the Project is much smaller than that of the construction of the existing tunnel box at Kwu Tung.

The construction of the railway station at Kwu Tung is inland and is bounded by the channelised nullah (i.e. W5) along the northern boundary of the Project Site and a channelised nullah (i.e. W6) at the south of the Project Site.

W5 will not be removed but will be covered by boxed culverts by CEDD before the construction of the Project while W6 will be demolished during the construction of the Project.

Hence, potential water pollution sources are mainly induced from land-based construction activities of the Project. The potential water pollution sources of construction activities are as follows:

- Demolition of watercourse;
- Construction runoff;
- Effluent discharge from excavation;
- Sewage effluent due to workforce; and
- Accidental spillage.

9.3.1.1 Demolition of Watercourse

A channelised nullah (i.e. W6) at the south of the Project Site will be demolished during the construction of the Project. Construction runoff would come from the nearby area after the watercourse being demolished and might be polluted by site activities which are elaborated in **Section 9.3.1.2**.

9.3.1.2 Construction Runoff

Construction runoff would come from all over the works sites/ areas, roads and slopes during construction phase for the development. The construction runoff might be polluted by:

- Runoff and erosion from site surfaces, drainage channels, earth working areas and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Chemicals spillage such as fuel, oil, solvents and lubricants from maintenance of construction machinery and equipment.

9.3.1.3 Effluent Discharge from Excavation

As discussed in **Section 11**, the majority of the works area have no potential for land contamination. Only a small part of land was identified as potentially contaminated. Nonetheless, CEDD would be responsible for remediating any land contamination at the Advance Phase Development of NENT NDA before handing over to the Project Proponent. Therefore, no land contamination impact would be anticipated when the Project Proponent takes over the land. However, the groundwater pumped out would have a high content of suspended solids and on-site treatment would be required as a good site practice prior to discharge.

9.3.1.4 Sewage Effluent due to Workforce

Sewage arising from the on-site construction work force is likely to cause water pollution if it is discharged improperly. The sewage is characterised by high levels of biochemical oxygen demand (BOD), ammonia, E. coli and oil/ grease. The watercourses polluted by sewage would have aesthetic and odour problem and may become hypoxic due to decay of large amount of oxygen demanding material. Given that temporary sanitary facilities, e.g. portable chemical toilets, and sewage holding tanks will be provided, neither adverse nor cumulative water quality impact is anticipated.

9.3.1.5 Accidental Spillage

The use of chemicals such as engine oil and lubricants, and their storage as waste materials has the potential to create impacts on the water quality if spillage occurs and enters adjacent water environment. Waste oil may infiltrate into the surface soil layer, or runoff into the nearby water environment, increasing hydrocarbon levels. The potential impacts could however be mitigated by practical mitigation measures and good site practices.

9.3.2 Mitigation Measures

9.3.2.1 Demolition of Watercourse

As a standard site practice, any surface runoff would be diverted by temporary drain or pumped away and treated by sedimentation tanks before discharge. A discharge license would be applied by the Contractor if considered necessary. In addition, mitigation measures for construction runoff from general site operation (refers to **Section 9.3.2.2**) should also be applied during the demolition works.

9.3.2.2 Construction Runoff from General Site Operation

To reduce the potential water quality impact due to construction site runoff, the following good site practices in accordance to Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN 1/94) should be implemented to avoid potential adverse water quality impacts.

- The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of the sand/silt traps should be undertaken by the contractor prior to the commencement of construction;
- Schedule construction works to minimise surface construction works during the rainy seasons (April to September). If excavation of spoil cannot be avoided in these months or at any time of year when rainstorms are likely, for the purpose of preventing soil erosion, temporary exposed slope surfaces shall be covered e.g. by tarpaulin, and temporary access roads shall be protected by crushed stone or gravel, as excavation proceeds. Intercepting channels shall be provided (e.g. along the crest / edge of excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements shall always be in place in such a way that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm;
- Inspect and maintain all drainage facilities and erosion and sediment control structures regularly to ensure proper and efficient operation at all times and particularly following rainstorms;
- Cover all construction materials at temporary storage area with tarpaulin or similar fabric, and temporary access roads shall be protected by crushed stone or gravel, as excavation proceeds during rainstorms and implementation of measures to prevent the washing away of construction materials, soil, silt or debris into any drainage system;
- Intercepting channels shall be provided (e.g. along the crest / edge of excavation) to prevent storm runoff from washing across exposed soil surfaces during rainstorm;
- Cover manholes (including newly constructed ones), if any, adequately and seal temporarily to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers;
- Take precautions at any time of year when rainstorms are likely. The actions to be taken based on the guidelines in Appendix A2 of ProPECC PN 1/94;
- Collect, handle and dispose construction solid waste, debris and rubbish on site to avoid water quality impacts;
- Provide locks for all fuel tanks and storage areas and locate on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby; and
- Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous

locations to remind the workers not to discharge any sewage or wastewater into the water bodies, marsh and ponds.

9.3.2.3 Effluent Discharge from Excavation

Wastewater with a high level of suspended solids should be filtered before discharge by settlement in tanks with sufficient retention time. Oil interceptors would be required to remove any oil, lubricants, and grease from wastewater. A discharge licence under the Water Pollution Control Ordinance (WPCO) would be required for discharge to the stormwater drain. The Contractor would be required under the discharge license to monitor the quantity and quality of effluent discharge to ensure compliance with the conditions of the discharge license.

9.3.2.4 Sewage Effluent due to Workforce

No discharge of sewage to the stormwater system and watercourses will be allowed. Adequate and sufficient portable chemical toilets should be provided in the works areas to handle sewage from the construction workforce. A licensed waste collector should be employed to clean and maintain the chemical toilets as necessary.

Notices should be posted at conspicuous locations to remind the workforce not to discharge any sewage or wastewater into the surrounding environment. Regular environmental audit of the construction site should be conducted to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site.

9.3.2.5 Accidental Spillage

Contractor must register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes. The Contractor is also recommended to develop management procedures for chemicals used and prepare an emergency spillage handling procedure to deal with chemical spillage in case of an accident occurs.

Any services and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with the potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.

Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling, and Storage of Chemical Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows:

- Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling, and transport.

- Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.
- Storage area should be selected at a safe location on-site and adequate space should be allocated to the storage area.

9.4 Operational Phase

9.4.1 Review of Potential Impact on Water Quality

During the operational phase, potential sources of water quality impact associated with the operation of the Project include:

- Stormwater runoff; and
- Sewage from sanitary fitment and foul water from washing facilities and track.

9.4.1.1 Stormwater Runoff

The proposed station is completely enclosed and therefore run-off will be limited to wash-off from the outside of the at-grade structures including the proposed entrances and VBs, EAP/EEPs. Sources of potentially polluted stormwater that may arise from the station run-off include the dust from roof of the at-grade buildings.

Under the NENT NDA Development, a Civic Plaza will be developed above the proposed railway station at Kwu Tung. The land atop the proposed railway station at Kwu Tung will be handed over from the Project Proponent to the government after the completion of the Project. Thus, the surface runoff from the land atop the proposed railway station at Kwu Tung should be considered by the future project proponent during the development of the Civic Plaza. For the time period before hand over of land and after the construction phase, the drainage system would be maintained/ provided to discharge the stormwater surface runoff to the nearby government drainage system. In view of such stormwater surface runoff from the land atop the proposed railway station, no adverse water quality impact is anticipated.

9.4.1.2 Sewage from Sanitary Fitment and Foul Water from Washing Facilities and Track

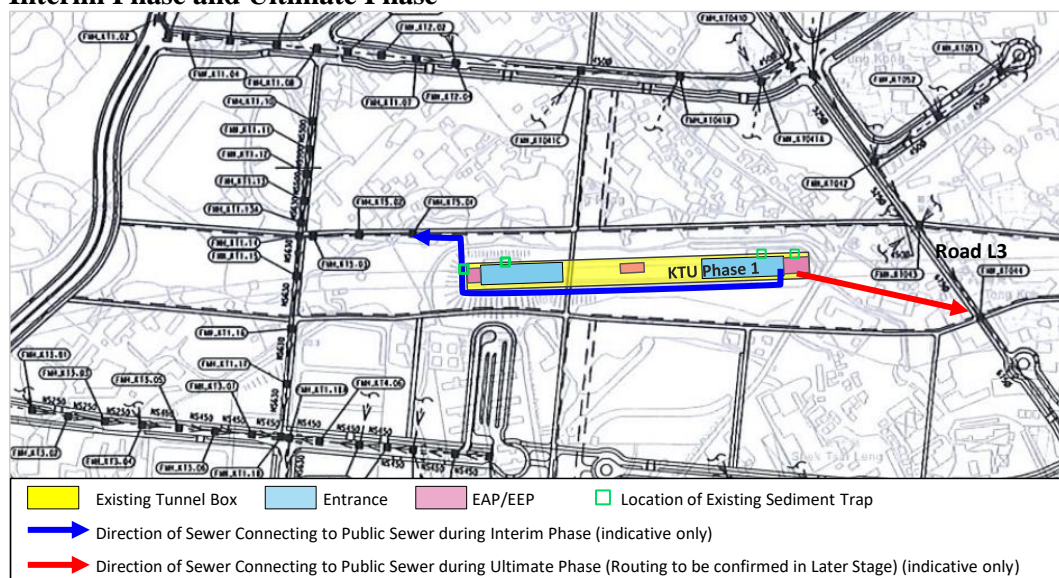
Sewage and wastewater effluents will be generated from passengers and staff at the proposed railway station at Kwu Tung. Ultimately, all the sewage generated from the proposed railway station at Kwu Tung will be conveyed to a new public sewer along Road L3 located at the east of the Project and within the Remaining Stage under the KTN NDA Development (direction as indicated in red arrow in **Image 9.3**, and the routing of sewer would be confirmed in the detail design stage).

However, since the proposed new public sewer along Road L3 is located within the Remaining Stage Development under the KTN NDA Development, there is a possibility that the proposed public sewer may not be ready before the operation of the proposed railway station at Kwu Tung in 2028.

In case of this circumstance, the sewage generated from the proposed railway station should be connected to the public sewer at the west (as shown in blue arrow in **Image 9.3**) as an interim measure. Once the public sewer along Road L3 commences operation, the sewer at the west will be decommissioned and the sewage will be conveyed to the public sewer along Road L3. Hence, there would not be any adverse water quality impacts from sewage produced during operational phase.

The drainage system for the existing track is that the foul water from washing facilities and trackside water would pass through the sediment traps and be discharged to the nearby channel. After the modification of the tunnel box, all the trackside water would be conveyed to the sewage system and be discharged to public sewer. Hence, there would not be any adverse impacts for foul water from track areas.

Image 9.3 Location of Existing Sediment Traps and Directions of Sewer During Interim Phase and Ultimate Phase



9.4.2 Mitigation Measures

9.4.2.1 Stormwater Runoff

Stormwater surface runoff generated should be discharged to the nearby government drainage system. The rainwater runoff from station structures (e.g. ventilation building, entrance, etc.) is provided with peripheral drain conveying to government drainage.

9.4.2.2 Sewage from Sanitary Fitment and Foul Water from Washing Facilities and Track

Sewage effluents including the sewage from the sanitary fitment and the foul water from washing facilities and track of the proposed railway station at Kwu Tung should be conveyed to the public sewers. During the interim phase, the sewage will

be connecting to the public sewer at the west. As for the ultimate phase, the sewage will be conveyed to the public sewer along Road L3.

Standard oil/grit interceptors/chambers should be provided where necessary to remove the oil, lubricants, grease, silt, and grit from wastewater generated from facilities washing before discharge to public sewers. A discharge licence for the discharge of commercial and industrial effluent is needed and the discharge quality must satisfy all the standards listed in the DSS-TM and meet the requirements specified in the discharge licence.

The practices outlined in ProPECC PN 5/93 for handling, treatment, and disposal of operational stage effluent should also be adopted where applicable.

9.5 Conclusion

9.5.1 Construction Phase

The potential sources of water quality impact during the construction phase are mainly from land-based construction activities including demolition of watercourse, construction runoff, effluence from excavation, sewage effluent due to workforce, and accidental spillage. Construction water quality impacts are not anticipated with the implementation of good site management practices and mitigation measures.

9.5.2 Operational Phase

The potential sources of water quality impact during the operational phase are mainly from stormwater runoff and sewage from the operation of the proposed railway station at Kwu Tung. All sewage and wastewater generated from the Project would be discharged to the public sewers at the west and the east during interim and ultimate phases respectively and would not cause adverse water quality impact.

10 Review of Waste Management

10.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line has considered the waste management implication for the construction of existing tunnel box at Kwu Tung and the associated facilities. A package of good practices and mitigation measures were recommended and implemented during the construction at that time. As discussed in **Section 1.3**, the proposed modification works for the Railway Station at Kwu Tung would require the removal of the fill material atop the existing tunnel box and the construction of superstructures. The waste management implications have been further reviewed and assessed for the proposed modification in this section as follows.

10.2 Construction Phase

10.2.1 General

The main activities which would potentially result in the generation of waste include:

- Site clearance and slope modification;
- Excavation of fill materials on existing tunnel box at Kwu Tung;
- Excavation and piling works of the underground adit; and
- Superstructure construction (e.g. platform and concourse, FRS, entrances, etc.).

The construction of the Project would generate the following categories of wastes:

- Construction and Demolition (C&D) material;
- Chemical waste; and
- General refuse.

10.2.1.1 C&D Material

The major waste source of the Project during construction phase is expected to be C&D materials. The quantities of the materials generated from each development of the Project during construction phase are estimated and summarised in **Table 10.2**. As the sites for the Project are formed, generation of large amount of rock and non-inert C&D materials are not anticipated.

As discussed in **Section 1.3**, the Project includes the removal of existing fill materials above the existing tunnel box, modification of the new station box and required superstructure. Due to the nature of the Project, it is primarily anticipated that only minor part of the inert soft C&D materials could be reused as backfill, the remaining inert soft C&D materials would be delivered to the Public Fill Reception Facility.

Small portion of Artificial Hard Material (AHM) (e.g. broken concrete and tiles) can be reused off-site as much as practicable and the remaining AHM will be delivered to the Public Fill Reception Facility, while non-inert C&D materials (e.g. timber and steel) should be recycled as much as practicable.

Summary of estimated amount of C&D materials to be generated during construction phase **Table 10.2** below.

Table 10.2: Summary of Estimated Amount of C&D Materials to be Generated during Construction Phase

Waste Type	Estimated Amount of C&D Material to be Generated, m ³ ^[5]					
	Inert C&D Material ^[1]		Non-inert C&D Material ^[2]			
	Soft Inert Material ^[3]	AHM ^[4]	Top Soil	Vegetation	Timber	Steel
Site Clearance and slope modification	11,600	5,300	1,000	1,800	0	400
Excavation (including ELS)	116,700	0	0	0	0	500
Station construction (including above ground structure, concourse and adit)	0	0	0	0	8,600	100
Modification of existing tunnel box to platform	0	1,000	0	0	1,700	4,800
Sub-Total	128,300	6,300	1,000	1,800	10,300	5,800
Total	134,600		18,900			

Note:

- [1] “Inert C&D Material”, also known as public fill, includes debris, rubble, excavated soil and broken concrete which is suitable for land reclamation and site formation.
- [2] “Non-inert C&D Material” involved in the Project includes top soil, vegetation, timber and steel. In contrast to public fill, non-inert waste is not suitable for land reclamation and subject to recovery of reusable/ recyclable items, is disposed of at landfills.
- [3] “Inert Soft C&D Material” mainly refers to excavated soil, etc.
- [4] “AHM” includes, but not limited to, broken concrete, asphalt, bitumen, granular materials, debris, and rubble, etc.
- [5] In-situ volume is used.

According to Section 4.1.3 of Project Administration Handbook for Civil Engineering Works (PAH), the Construction and Demolition Material Management Plan (C&DMMP) will be prepared at the feasibility study or preliminary design stage for the Project which generates more than 50,000 m³ of C&D materials. More detailed waste quantity estimations and the corresponding management options will be documented in the C&DMMP for submission to Public Fill Committee for approval.

With proper implementation of good construction site practice, the on-site handling and reuse of inert C&D materials would not cause adverse environmental impacts.

Fill materials are required for the backfilling the ground level for site reinstatement and estimated amount of imported fill required is around 18,000m³. Nevertheless, this amount of imported filling materials would be consulted with fill management authority of CEDD.

10.2.1.2 Chemical Waste

Chemical wastes are likely to be generated from the construction activities and associated facilities may include:

- Scrap batteries or spent acid/ alkali from their maintenance;
- Used paint, engine oils, hydraulic fluids and waste fuel;
- Spent mineral oils/ cleansing fluids from mechanical machinery; and
- Spent solvents/ solutions, some of which may be halogenated, from equipment cleansing activities.

Chemical waste may pose serious environmental, health and safety hazards if not stored and disposed of in an appropriate manner as outlined in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste*. These hazards may include:

- Toxic effects to workers;
- Adverse effects on water quality from spills; and
- Fire hazards.

It is difficult to quantify the amount of chemical waste as it will be highly dependent on the Contractor's on-site maintenance practice and the quantities of plant and vehicles utilised. Nevertheless, it is anticipated that the quantity of chemical waste, such as lubricating oil and solvent produced from plant maintenance, will be small and in the order of few hundred litres per month.

Mitigation measures for chemical wastes are detailed in **Section 10.2.2**. Provided that the handling, storage and disposal of chemical wastes are in accordance with these requirements, adverse environmental impacts are not expected.

10.2.1.3 General Refuse

The construction workforce would generate refuse comprising of food waste, waste paper, aluminium cans and plastic bottles during the construction period.

The storage of general refuse may give rise to adverse environmental impacts. These could include water quality, odour and visual impact in the form of windblown litter. The construction site may also attract pests and vermin if the storage areas are not well maintained and cleaned regularly. In addition, disposal of waste at sites other than the approved disposal facilities could also lead to similar adverse impacts at those sites.

The exact number of workforce to be employed for the Project is not available at this stage, but is anticipated to be up to 450 workforce at peak time for works sites/ areas at Kwu Tung. Based on the generation rate of 0.65 kg/person/day, the total refuse generated per day would be about 292.5 kg/day at peak time. It is estimated that approximately 403 tonnes of general refuse would be generated during construction phase.

Mitigation measures for general refuse are detailed in **Section 10.2.2**. Provided that the mitigation measures are adopted, the potential environmental impacts caused by the storage, handling transport and disposal of general refuse are expected to be minimal, and adverse environmental impacts caused by the storage, handling transport and disposal of general refuse are not expected.

A summary of construction waste with total quantities of each type of construction waste to be generated, reused and disposed of as well as recommendation for outlets is presented in **Table 10.3**.

Table 10.3: Summary of Total Quantities for Each Type of Waste to be Generated, Reused and Disposed of during Construction Phase

Waste Type		Amount to be Generated (m ³) ^[5]	On-site Reuse (m ³)	Off-site Reuse /Recycle (m ³)	Total Disposed (m ³)	Disposal Outlets
Inert C&D Materials ^[1]	Inert soft C&D materials ^[3]	128,300	10,000 ^[7]	0	118,300	Excavated soil to be reused on-site for backfilling; Remaining to be disposed of at public fill facilities
	AHM ^[4]	6,300	0	0	6,300	To be disposed of at public fill facilities
Non-inert C&D Materials ^[2]	Top soil	1,000	0	0	1,000	To be disposed of at landfill
	Vegetation	1,800	0	0	1,800	
	Timber	10,300	0	0	10,300	
	Steel	5,800	0	5,800	0	To be collected by recycler
Chemical Waste		Few hundred L/kg per month	0	0	Few hundred L/kg per month	To be collected by a licensed chemical waste collector and disposed of at a licensed chemical waste treatment and disposal facility
General Refuse ^[6]		403,100 kg	0	0	403,100 kg	Recycling facilities for recyclable resources and

Waste Type	Amount to be Generated (m ³) [5]	On-site Reuse (m ³)	Off-site Reuse /Recycle (m ³)	Total Disposed (m ³)	Disposal Outlets
					landfill disposal for the rest of refuse

Notes:

- [1] “Inert C&D Material”, also known as public fill, includes debris, rubble, excavated soil and broken concrete which is suitable for land reclamation and site formation.
- [2] “Non-inert C&D Material” involved in the Project includes top soil, vegetation, timber and steel. In contrast to public fill, non-inert waste is not suitable for land reclamation and subject to recovery of reusable/ recyclable items, is disposed of at landfills.
- [3] “Inert Soft C&D Material” mainly refers to excavated soil, etc.
- [4] “AHM” includes, but not limited to, broken concrete, asphalt, bitumen, granular materials, debris, and rubble, etc.
- [5] In-situ volume is used.
- [6] The number of work force (clerical and workers) to be employed for the Project is not available at this stage, but is anticipated not to be over 450 workforce. The waste generation rate of general refuse is assumed to be 0.65 kg/person/day while the number of working days is assumed to be 26 days per month.
- [7] Inert C&D materials would be reused on-site as far as practicable subject to the review of detailed design stage before exported to public fill reception facilities.

10.2.2 Good Site Practices and Mitigation Measures

The general practices for construction phase are recommended based on the waste management hierarchy principles. Recommendations of good site practices, waste reduction measures as well as waste transportation, storage and collection are described in following sub-sections.

10.2.2.1 Good Site Practices

Adverse waste management implications are not anticipated, provided that good site practices are strictly implemented. The following good site practices are recommended throughout the construction activities.

- Nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all waste generated at the site;
- Training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling;
- Provision of sufficient waste disposal points and regular collection for disposal;
- Appropriate measures to minimise windblown litter and dust during transportation of waste by transporting waste in enclosed containers;
- Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; and
- A Waste Management Plan (WMP) as part of the Environmental Management Plan (EMP) should be prepared by the Contractor in accordance with ETWB

TC(W) No.19/2005 and submitted to the Engineer for approval before construction works.

10.2.2.2 Waste Reduction Measures

Amount of waste generation can be significantly reduced through good management and control. Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction:

- Segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal;
- Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste;
- Sort out demolition debris from demolition works to recover reusable/recyclable portions (i.e. Soil, broken concrete, metal etc.); and
- Provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling.

In addition to the above recommendations, specific reduction measures are recommended for the specific waste types so as to minimise environmental impacts during handling, transportation and disposal of waste.

10.2.2.3 Storage, Collection and Transportation of Waste

Storage of waste on site may induce adverse environmental implications if not properly managed. The following recommendation should be implemented to minimise the impacts.

- Non-inert C&D materials (if any) should be handled and stored well to ensure secure containment;
- Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; and
- Different locations should be designated to stockpile each material to enhance reuse.

The collection and transportation of waste from works area to respective disposal sites may also induce adverse environmental impacts if not properly managed.

- Remove waste in timely manner;
- Employ the trucks with cover or enclosed containers for waste transportation;
- Obtain relevant waste disposal permits from the appropriate authorities; and
- Disposal of waste should be done at licensed waste disposal facilities.

In addition to the above measures, other specific mitigation measures on handling the excavated C&D materials, chemical waste and materials generated from construction phase are recommended in the following subsections.

10.2.2.4 C&D Materials

Wherever practicable, C&D materials should be segregated from other waste to avoid contamination and ensure acceptability at Public Fill Reception Facilities (PFRFs) areas or reclamation sites. The following reduction measures should be implemented in handling the C&D materials:

- Carry out on-site sorting;
- Allow and promote the use of recycled aggregates where appropriate; and
- Implement a trip-ticket system in accordance with DEVB TC(W) No. 6/2010 Trip Ticket System for Disposal of Construction and Demolition Materials, if dumping trucks are required, for each works contract to ensure that the disposal of C&D materials is properly documented and verified.

Details of the recommended on-site sorting and reuse of C&D materials is given below:

On-site Sorting of C&D Materials

Storage areas would be located within the site during construction phase for temporary storage of inert C&D materials.

All C&D materials arising from the construction would be sorted on-site to recover the inert C&D materials and reusable and recyclable materials prior to disposal off-site. Non-inert portion of C&D materials should also be reused whenever possible and be disposed of at landfills as a last resort.

The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly remove all sorted and processed material arising from the construction activities to minimise temporary stocking on-site. It is recommended that the system should include the identification of the source of generation, estimated quantity, arrangement for on-site sorting and/ or collection, temporary storage areas, and frequency of collection by recycling Contractors or frequency of removal off-site.

Reuse of C&D Materials

The following potential measures should be explored to maximize the reuse/ recycle of C&D materials generated from the Project:

- Reuse suitable excavated rock by reworking at approved quarries (e.g. crushed as aggregates);
- Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (e.g. soil, broken concrete, metal); and
- Protect recyclable material to keep it in usable condition.

Specification of Inert C&D Materials to be Disposed off-site

In case there are surplus inert C&D materials generated in the Project and are required to be disposed of at the PFRFs, the inert C&D materials should fulfil the following requirements:

- Reclaimed asphalt pavement should not be mixed with other materials when delivered to the PFRFs;
- Moisture content of inert C&D materials should be lowered to 25% max. when delivered to the PFRFs;
- Inert C&D materials delivered to the PFRFs should be of a size less than 250mm; and
- Inert construction waste should not be in liquid form such that it can be contained and delivered by dump truck instead of tanker truck. Inert C&D materials in liquid form should be solidified before delivering to the PFRFs.

Nevertheless, the acceptance criteria of inert C&D materials to PFRFs are subject to the fill management authority of CEDD.

10.2.2.5 Chemical Waste

For those processes which generate chemical waste, it may be possible to find alternatives to eliminate the use of chemicals, to reduce the generation quantities or to select a chemical type of less impact on environment, health and safety as far as possible. Wherever possible, opportunities for the reuse and recycling of materials will be taken.

If chemical waste is produced at the construction site, the Contractors should register with EPD as chemical waste producers and follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Chemical waste should be stored in appropriate containers and collected by a licensed chemical waste collector. Chemical waste (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre (CWTC), or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.

Any unused chemicals or those with remaining functional capacity should be collected for reuse as far as practicable.

10.2.2.6 General Refuse

General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. A reputable waste collector should be employed to remove general refuse on a regular basis. Arrangements should be made with the recycling companies to collect the recycle waste as required. It is expected that such arrangements would minimize potential environmental impacts.

The Contractor should implement an education programme for workers relating to avoiding, reducing, reusing and recycling general waste. Participation in a local collection scheme should be considered by the Contractor to facilitate waste reduction.

10.3 Operational Phase

10.3.1 General

The operation of the Project would generate the following categories of wastes:

- General refuse; and
- Chemical waste.

Summary of estimated amount for each type of waste to be generated during operational phase is shown in **Table 10.2**.

10.3.1.1 General Refuse

General refuse would arise from the public, station employees and commercial operators within the stations. Waste would include food, paper, wood, plastic, office waste, metal containers, etc. The storage and handling of these wastes may cause adverse environmental impacts.

The amount of general refuse that would arise during operation phase of the project cannot be confirmed at this stage since it would be subject to operational needs and the number of passengers, staff and any commercial operators in the future. However, by making reference to other MTR stations, it is anticipated that approximately a hundred kg of general refuse per day would be generated during operation phase. Therefore, the total quantity of municipal solid waste to be generated will not be significant.

10.3.1.2 Chemical Waste

Maintenance of the stations, tracks, FRS and EAP/EEP would generate chemical waste including used fluorescent tubes, cleansing materials, discarded electronic equipment, lubricants, paints, used batteries, mineral oil, coolants, and solvents etc. during the operational phase. These wastes may pose adverse environmental, health and safety hazard if not properly managed. Considering the quantity of chemical waste to be generated during the operational phase would be in a range of very small amount to a few hundred litres/kg per month, subject to future operational needs, no adverse environmental impact is anticipated with proper storage, handling and disposal of this waste.

Table 10.4: Summary of Estimated Amount for Each Type of Waste to be Generated during Operational Phase

Waste Type	Amount to be Generated (m ³) ^[5]	Disposal Outlets
General Refuse	A hundred kg per day	Recycling facilities for recyclable resources and landfill disposal for the rest of refuse
Chemical Waste	Few hundred litres/kg per month	To be collected by a licensed chemical waste collector and disposed of at a licensed chemical waste treatment and disposal facility

10.3.2 Good Site Practices and Mitigation Measures

10.3.2.1 General Refuse

Recycling of waste paper, aluminium cans and plastic bottles should be encouraged. It is recommended to place clearly labelled recycling bins at designated locations which could be accessed conveniently. General refuse should be separated from chemical waste by providing separated bins for storage to maximize the recyclable volume as far as practicable.

A reputable waste collector should be employed to remove general refuse regularly to minimize odour, pest and litter impacts. Arrangements should be made with the recycling companies to collect the recycle waste as required. It is expected that such arrangements would minimize potential environmental impacts.

10.3.2.2 Chemical Waste

Subject to operational needs, if chemical waste is to be produced, the Project Proponent shall register with EPD as chemical waste producers as appropriate in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. Chemical waste should be collected and disposed of at appropriate facility like CWTC by licensed collectors.

The requirements given in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes should be followed, where applicable, in handling of these chemical wastes. The requirements for the collection and disposal of chemical waste as stipulated in the Waste Disposal (Chemical Waste) (General) Regulation should be followed to monitor all movements of chemical wastes which will be collected by a licensed collector to a licensed facility for final treatment and disposal.

Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately.

Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc.

Non-recyclable chemical waste (e.g. spent lubricant oil) should be disposed of at appropriate facility like CWTC by licensed collectors. Recyclable chemical waste (e.g. used fluorescent tubes) should be collected and transported off-site by licensed collectors.

10.4 Conclusion

10.4.1 Construction Phase

Potential waste management implications from the generation of waste during the construction phase have been evaluated. Approximately 134,600m³ of inert materials and 18,900 m³ of non-inert materials would be generated during the

construction phase of the Project. Measures, including the opportunity for on-site sorting, reusing C&D materials etc., are devised in the construction methodology to minimize the surplus materials to be disposed. According to the PAH, C&DMMP will be prepared during the feasibility study or preliminary design stage for the Project. Recommendations have been made for implementation by the Contractor during the construction period to minimize waste generation and off-site disposal. Adverse impacts would not be anticipated if the mitigation measures are strictly followed.

10.4.2 Operational Phase

Potential waste management implications from the generation of waste during the operational phase have been evaluated. A hundred kg per day of general refuse and few hundred litre per month of chemical waste would be generated during the operation phase of the Project. Recommendations have been made to ensure proper treatment and disposal of these wastes. Adverse impacts would not be anticipated if the mitigation measures are strictly implemented.

Year 1963 and 2008) are considered valid. Additional aerial photographs of Year 2014 and 2020 are also reviewed to fill the gap after Year 2008. The historical aerial photos of Year 2014 and 2020 are shown in **Appendix 11.1**. Summary of the observation are given in **Table 11.1**.

Table 11.1: Historical Landuse of the Project Site

Year	Observation
2014	<ul style="list-style-type: none"> • The majority is same as that in Year 2008 in the approved EIA of NENT NDA, and no significant change is observed. <ul style="list-style-type: none"> - LMC Spur Line EAP/EEPs has been constructed. - Two EAP/EEP buildings, detention pond are located at the eastern, western and centre area respectively. - The southern area is vacant and covered by vegetation and trees. - Village houses, vegetation and grass land are scattered throughout the western area. • Parts of east southern area near Ho Sheung Heung Road become the paved access road.
2020	<ul style="list-style-type: none"> • Same as that in Year 2014, no significant change observed.

11.2.1.2 Site Survey

Site surveys have been conducted in July 2021 to identify the current status of the Project Site. Location of the surveyed sites and photos records are shown in **Figure 11.1**, and the observations are summarized in **Table 11.2**.

Works site for station construction

The works site for station construction is located above the existing tunnel box at Kwu Tung. As mentioned in **Section 11.1.1**, during the construction of the existing tunnel box at Kwu Tung, excavation of the spoil at the works site of station construction had been conducted. The works site of station box structure is currently covered by fill material and occupied by LMC Spur Line.

The works site for station construction consists of areas of LMC Spur Line EAP/EEPs and vacant land at the southern owned by KCRC and government. The area of LMC Spur Line EAP/EEPs is occupied since the operation of LMC Spur Line in 2007. Other than the existing tunnel box, two EAP/EEP buildings (Photos 2 & 5) with emergency use stairs, fire services plant rooms and control rooms are located in the eastern and western area respectively, and the detention pond (Photos 3 & 4) is located at the centre. The landscape areas are located at the southern and western areas (Photo 1). No potentially land contamination activities was identified at the area of LMC Spur Line EAP/EEPs.

For the remaining areas of vacant land by KCRC and government, which has been fenced and vacant, and are covered by the vegetation and trees (Photo 6). Parts of this area near Ho Sheung Heung Road is the paved access road of nearby kindergarten (Photo 6). No potentially land contamination activities was identified at these areas of vacant land.

According to the approved EIA for NENT NDA, the works site for station construction were identified as surveyed sites KTN-29,30,30a and KTN-30b, the landuse was recorded as “MTR Spur Line EAP No.3 and No.4” and “Fenced off area” respectively, while other areas was identified as unnumbered areas/ sites (Details refer to **Table 11.2**). No potential land contamination issue has been identified of these surveyed sites and unnumbered areas/ sites during the NENT NDA EIA.

There are no changes of the landuse after the land contamination assessment of the EIA for NENT NDA, and no potentially land contamination activities was identified within the works site for station construction during site survey and the NENT NDA EIA. Thus, no further mitigation measure and action is required. In addition, both EAP/EEP buildings would be maintained for future use.

Other works sites and works area

Apart from the works site for station construction, the Project Site also includes additional work sites and works area beyond the existing tunnel box at Kwu Tung. These areas can be divided into “Eastern works site” and “Western works sites and works area”.

Eastern works site

As mentioned in **Section 11.1.1**, the potential contaminated lands that were within the construction footprint of LMC Spur Line had been suitably managed during the construction of LMC Spur Line. This site is currently vacant and covered by vegetation and trees (Photo 7). No potentially land contamination activities was identified during the site survey.

According to the approved EIA for NENT NDA, this area was identified as unnumbered areas/ sites (Details refer to **Table 11.2**) and no potential land contamination issue has been identified during the NENT NDA EIA .

There are no changes of the landuse after the land contamination assessment of the EIA for NENT NDA, and no potentially land contamination activities was identified during site survey and the NENT NDA EIA. Thus, no further mitigation measure and action is required at the eastern works site.

Western works sites and works area

Village houses, vacant land and vegetation are scattered throughout this area (Photos 8 - 13). It should also be noted that this part of the Project Site is located within the KTN NDA (Advance Stage) and CEDD is responsible for the site formation works and land contamination.

According to the land contamination assessment conducted as part of the EIA for NENT NDA, there would be numbers of potentially contaminated sites in the vicinity as shown in **Figure 11.2**. It can be seen that the Project Site would only partially encroach into 1 potentially contaminated site (i.e. KTN-77,78) at the west. For other areas was identified as unnumbered areas/ sites (Details refer to **Table 11.2**), which no potential land contamination issue has been identified during the NENT NDA EIA.

As mentioned in above paragraph, this part of the Project Site is located within the KTN NDA (Advance Stage) and CEDD is responsible for the site formation work. Hence, CEDD confirmed to review the land contamination status and implement any remediation measures required before KTN-77 & 78 are handed over to the Project Proponent.

On this basis, it is considered that there would be no land contamination impacts and mitigation measures are not required by this Project.

Table 11.2: Summary of the Observations during Site Survey

Surveyed Site	Existing Landuse	Landuse Identified in NENT NDA EIA	Observation	Proposed Mitigation Measures Required by the Project
Works site for station construction	LMC Spur Line EAP/EEPs	<ul style="list-style-type: none"> MTR Spur Line EAP No.3 and No.4^{[1][4]} 	<ul style="list-style-type: none"> Fenced area, two EAP/EEP buildings, detention pond are located at the eastern, western and centre area respectively. The landscape areas are located at the southern and western area. No potentially land contamination activities was identified. 	No further mitigation measure and action is required.
	Southern area – vacant land	<ul style="list-style-type: none"> Fenced-off Area (within the vicinity of LMC Spur Line)^{[2][4]} 	<ul style="list-style-type: none"> Fenced area, vacant and covered by vegetation and trees. Parts of the area near Ho Sheung Heung Road is the paved access road of nearby kindergarten. No potentially land contamination activities was identified 	
Eastern works site	Vacant land	<ul style="list-style-type: none"> Unnumbered areas / sites^[4] 	<ul style="list-style-type: none"> Fenced area, vacant and covered by vegetation and trees. No potentially land contamination activities was identified. 	No further mitigation measure and action is required.
Western works sites and works area	Village house, vacant land, vegetation	<ul style="list-style-type: none"> Heavy vehicle parking and repairing, painting of metal on 	<ul style="list-style-type: none"> Partially encroach into 1 potentially contaminated site (i.e. KTN-77 & 78) Village houses, vacant land and vegetation are 	This part of the Project Site is located within the KTN NDA (Advance Stage) and CEDD confirmed to

Surveyed Site	Existing Landuse	Landuse Identified in NENT NDA EIA	Observation	Proposed Mitigation Measures Required by the Project
		unpaved ground ^{[3][4]}	scattered throughout this area.	review the land contamination status and implement any remediation measures, if required, before handing over to the MTRC.

Note:

- [1] Surveyed site KTN-29,30,30a, no potential land contamination issue has been identified during the NENT NDA EIA.
- [2] Surveyed site KTN-30b, no potential land contamination issue has been identified during the NENT NDA EIA.
- [3] Surveyed site KTN-77 & 78, identified potentially contaminated site during the NENT NDA EIA.
- [4] The other areas was identified as unnumbered areas / sites, which were surveyed and no potentially contaminating activity was found during the NENT NDA EIA.

11.3 Conclusion

Site-reappraisal including review the historical landuse and site survey of the Project Site has been conducted in order to update the latest information for the current landuse of the Project Site. No potentially land contamination activities was identified at most of the works sites and works area and no further mitigation measure and action is required at these areas.

However 1 potentially contaminated site as identified in the approved EIA for NENT NDA is partially located within the western works sites. This potentially contaminated site is within the Advance Stage Development of KTN NDA and CEDD confirmed to review the land contamination status and implement any land contamination remediation works required before the concerned lands are handed over to the Project Proponent. Additional mitigation measures are not required.

12 Review of Cultural Heritage

12.1 Review of Approved EIA for LMC Spur Line

Under the approved EIA for LMC Spur Line, a CHIA, including baseline data collection, historical building and structures survey, archaeological field evaluation, etc. was carried out and mitigation recommendations were made. As discussed in Section 11.8.9 of the approved EIA for LMC Spur Line, archaeological field evaluation was carried out for the NENT Study (Maunsell 2001). Surface field scan and approximating 19 auger testing were conducted at the existing tunnel box. Three Song celadon sherds were found on the surface. The works site of station construction is covered by the fill material i.e. the spoil from the LMC Spur Line Project.

As discussed in **Section 1.3**, the construction works for the Project only require some modifications to the existing tunnel box and enabling works to serve the KTN NDA. All these works are relative minor when compared to construction of the existing tunnel box and enabling works under the LMC Spur Line.

This section will review the cultural heritage impact on any Site of Archaeological Interest (SAI), built heritage and spots of archaeological interest within 300m from the Project.

12.2 Description of the Environment

The surrounding of the Project in Kwu Tung is rural in character and comprises villages and rural industrial uses (e.g. storage of construction materials, vehicle repair, open storage etc.). In mid-1980s, a territory wide archaeological survey was conducted by Antiquities and Monuments Office (AMO) in Hong Kong but no site of archaeological interest (SAI) was identified at Kwu Tung.

12.3 Identification and Evaluation of Impact

12.3.1.1 General

Previous archaeological discovery, built heritage and landscape features as identified in the approved EIA for NENT NDA were shown in **Figure 12.1**. As shown in **Figure 12.1**, none of the spot of archaeological interest, built heritage or spot of archaeological interest is located within the Project Site.

12.3.1.2 Previous Archaeological Discovery

According to the latest site inspection carried out in July 2021, Spot A (as shown in **Figure 12.1**) was occupied with construction trucks and storage of construction materials. Besides, the archaeological significance of Spot A was identified as low and the Project would not encroached into Spot A. Direct/ indirect impact on areas and spots of archaeological interest related to construction and operation of the

Project is not anticipated. Spot A would be cleared under the NENT NDA Development by CEDD.

As the Project Site are partially fall within the area of low archaeological potential as identified in the approved EIA for NENT NDA, the recommended mitigation measure in the approved EIA for NENT NDA should be implemented during the excavation works in construction phase as follow:

- Pursuant to the Antiquities and Monuments Ordinance, the construction contractor should inform the AMO immediately in case of discovery of antiquities or supposed antiquities in the course of soil excavation works in construction stage.

12.3.1.3 Built Heritage

No declared monument is identified within 300m from the Project Site. The graded building and the non-graded building/ structure identified around the Project Site are located 60-260m away from the boundary of Project Site. Besides, some of the non-graded building/ structure would be removed according to the approved EIA for NENT NDA by CEDD. Direct/ indirect impact on built heritage related to construction and operation of the Project is not anticipated.

12.3.1.4 Landscape Features

As shown in **Figure 12.1**, 15 clan graves and 1 shrine are identified within 300m from the Project Site but they would not be encroached by the Project Site. Nonetheless, since the removal of the identified 15 clan graves and 1 shrine will be carried out under the NENT NDA Development prior to the construction of the Project, adverse impact on the landscape features is not anticipated and no mitigation will be required.

12.4 Conclusions

No spot with archaeological interest, declared monument or graded building identified in the approved EIA for NENT NDA is located within the Project Site. Besides, landscape features identified in the approved EIA for NENT NDA are not located within the Project Site and they would be removed by CEDD under the NENT NDA Development. Due to the small scale of the Project and the large separation between the Project Site and the cultural heritages, adverse impact on the cultural heritages is not anticipated and no mitigation will be required. In addition, if there are any buildings / structures both at grade level and underground which were built on or before 1969 within the works sites/ works areas during the construction, the Project Proponent will alert AMO in an early stage or once identified.

13 Review of Landscape and Visual

13.1 Review of Approved EIA for LMC Spur Line

In terms of landscape impacts, for the large part the predicted impacts would not have a significant effect on the landscape resources found in the Study Area, except for the small area at Lok Ma Chau Control Point, which is located more than 2km from the Project Site.

In terms of visual impacts, 5 visually sensitive receivers (VSRs) near the railway station at Kwu Tung, including high rise and low rise residential development at KTN NDA, were identified in the approved EIA for LMC Spur Line. Since the construction of LMC Spur Line would be completed prior to the first population intake of KTN NDA, the visual impacts of these VSRs were considered negligible during construction phase. With the implementation of mitigation measures proposed for the above-ground structures, the visual impacts were considered slightly adverse to negligible during operational phase.

Subsequent to the approved EIA for LMC Spur Line in 2002, the approved EIA for NENT NDA also covered the Project Site. This assessment provides updated information to identify and describe the potential landscape and visual impacts associated with the construction works for the proposed modification works for the railway station at Kwu Tung.

13.2 Assessment Methodology of Landscape and Visual Impact

The assessment of landscape impacts has adopted the same approach as that in the Chapter 12 – Landscape and Visual Impact Assessment of the approved EIA for LMC Spur Line.

As discussed in **Section 1.3**, site formation works and infrastructure works for the KTN NDA Development would be carried out concurrently with the Project. Since the landscape and visual impact of the development of KTN NDA, which covered the Project Site and Study Area of the Project, had already been assessed in the approved EIA for NENT NDA with appropriate mitigation measures recommended, in this connection, the survey would therefore focus on the Project Site and the immediate vicinity (i.e. within 100m from the Project Site), in which direct / indirect impact is anticipated.

13.3 Review of Planning and Control Framework

The existing and planned development framework context for the proposed amendments has been reviewed to identify existing landscape resources, compatibility of the development with local planning goals. The assessment area is covered by Approved Kwu Tung North Outline Zoning Plan No. S/KTN/2. The proposed amendments sit within an area zoned ‘other specified uses’ (Railway Associated Facilities). The planning intentions of this zone is primarily for the planned railway associated facilities serving the needs of the general public. In view

of the above, it is considered that the proposed amendments, therefore, is in accordance with the planning goals and objective for the assessment area.

13.4 Review of Landscape Resources

13.4.1 Identification of Landscape Resources

Landscape resources mapping of the proposed amendments compared with that in the approved EIA for LMC Spur Line can be seen in the **Table 13.1**. The number of trees affected due to the proposed amendments is summarized in **Table 13.2**

The landscape resources affected by the proposed amendments within 100m of the Project Site have been identified and mapped in **Figure 13.1**. For ease of reference an identity number has been assigned for each LR which has been used consistently in tables and figures in this section.

- LR1 – Plantation
- LR2 – Development Area (DA)
- LR3 – Orchard
- LR4 – Modified Watercourse

Based on the Landscape Resources Plan (Drawing no.:12.2b under the Chapter 12 – Landscape and Visual Impact Assessment) under the approved EIA for LMC Spur Line, the location in the vicinity of the existing tunnel box is dominated by Development Area (DA) and orchard. Under the proposed amendments, the location in the vicinity of the existing tunnel box is dominated by plantation (LR1) and Development Area (DA) (LR2). The proposed amendment works would affect areas including **LR 1** – Plantation, and **LR2** – Development Area.

Table 13.1 Comparison of Landscape Resources in this VEP and the Approved EIA Report for LMC Spur Line

ID no.	Landscape Resources	Area/ Length of the LR to be affected by the Project identified in the approved EIA for LMC Spur Line	Area/ Length of the LR to be affected by the proposed amendments of the Project	Environmental Changes
LR 1	Plantation	a small portion of plantation (approx. 0.09 ha) will be directly affected by the railway station at Kwu Tung	12.5 ha	LR loss would be increased.
LR 2	Development area	small portion of this LR will be affected (approx. 21 ha) by the railway station at Kwu Tung.	15.5 ha	LR loss would be reduced.
LR 3	Orchard	small portion of this LR will be affected (approx. 6 ha) by the railway station at Kwu Tung.	Not applicable	Not applicable

ID no.	Landscape Resources	Area/ Length of the LR to be affected by the Project identified in the approved EIA for LMC Spur Line	Area/ Length of the LR to be affected by the proposed amendments of the Project	Environmental Changes
LR 4	Modified Watercourse	nil	Not applicable	Not applicable

The most significant change is the increase in the loss of plantation area (LR1). It can be seen from **Figure 13.1** that the proposed amendments in the landscape resource plan would be similar to those in the approved EIA report for LMC Spur Line, in which orchard, plantation, and development area are within the 100m of the project site.

13.4.2 Trees Affected

According to Section 12.10.29 and Figure 12.7h of the approved EIA Report for LMC Spur Line, the landscape mitigation measure, i.e. tree compensation within the project boundary for LMC Spur Line was proposed. The tree and shrub planting on the proposed embankment were proposed at the westside of the proposed railway station at Kwu Tung. These approved mitigation measures were proposed for landscape and screening purposes and aimed to mitigate the visual impact from the superstructures.

The approved EIA for LMC Spur Line was approved in nearly 20 years ago, during which there are lots of changes due to human factors. Information of exact quantities and species of tree planted in proposed KTU station is limited. It is therefore difficult to assess the Landscape Resources Plan, number and species of the trees from the approved EIA for LMC Spur Line. Therefore, it is more practicable to examine the conditions of existing trees. According to the tree survey undertaken in August 2021, there will be around 606 nos. trees that would be affected due to the proposed amendment (**Table 13.2** refers). The actual number of trees to be affected will be presented in the Tree Preservation and Removal Proposals (TPRP) in later stage.

Table 13.2 Number of Trees Affected by the Proposed Amendments

ID no.	Landscape Resources	Approximate Quantity of Trees Affected by the Proposed Amendment
LR 1	Plantation	526
LR 2	Development Area	80
LR 3	Orchard	0
LR 4	Modified Watercourse	0
Total approx. quantity of trees affected		606

A set of broad tree survey plans is enclosed in **Appendix 13.1**. Approximately more than half of the affected trees are exotic plantation species e.g. *Acacia mangium*, *Acacia auriculiformis*, *Acacia confusa*, *Lophostemon confertus*, *Melaleuca cajuputi* subsp. *cumingiana*, *Senna siamea*, *Ficus benjamina*, *Melia*

azedarach, *Bombax ceiba*. Other affected trees include mostly native wild growth e.g. *Macaranga tanarius* var. *tomentosa*, *Ficus hispida*, *Ficus virens*, *Celtis sinensis*, *Liquidambar formosana*, *Cinnamomum camphora*, *Morus alba* and some amenity plantings e.g. *Bauhinia* spp. and *Lagerstroemia speciosa* and small amount of fruit trees e.g. *Averrhoa carambola*.

There is no registered Old and Valuable Tree within the project site. No Trees are regarded as “Trees of Particular Interest (TPI)³” nor stonewall tree.

Formal Tree Preservation and Removal Proposal will be prepared and submitted separately in accordance with the requirements as stipulated in DEVB TCW No. 4/2020 – Tree Preservation and LandsD Practice Note No. 2/2020 – Tree Preservation and Removal Proposals for Building Development in Private Projects.

In addition, the affected trees are mainly located in the detection pond and engineering slopes within the Project Site. All of the affected trees are replanted after the construction of LMC Spur Line. As described in the above paragraphs, there is no registered Old and Valuable Tree and no Trees are regarded as “Trees of Particular Interest (TPI)” nor stonewall tree within the project site. As described in Chapter 5 Ecology, the recorded individuals are planted and are commonly used for landscaping in Hong Kong and hence not considered as species of conservation importance, as well as no significant linkage with any important habitat nor site of conservation importance. Therefore, the landscape value of the affected trees is low.

13.4.3 Tree Compensation

Tree felling is inevitable for the Project due to the extent of excavation of the fill material above the existing tunnel box for the construction of station and associated facilities. Since the trees to be felled could possibly be the compensatory tree of the mitigation measures for landscape and screening purpose and to mitigate the loss of landscape resources under the EIA for LMC Spur Line, both on-site and off-site tree compensation methods are considered and are under investigation. The number of trees to be compensated shall be in a ratio of 1:1 in terms of quantity of the number of trees to be felled, as required by the TPRP, as far as practicable.

Sufficient space should be provided for planting of trees taking into account the minimum space required to cater for the establishment, healthy growth and mature size of the trees. Relevant guidelines published by GLTMS of DEVB should be followed, e.g.:

- Proper Planting Practice - Provide Adequate Growing Space for Future Growth of Canopy
- Proper Planting Practice - Provide Sufficient Growing Space Between Trees and Adjacent Buildings / Structures

Furthermore, relevant standards and requirements (e.g. Building Department Practice Note for Authorized Persons APP-152 – “Sustainable Building Design

³ In accordance with DEVB TCW No. 04/2020, TPI are defined in paragraph 2.6.1 of the Guidelines for Tree Risk Assessment and Management Arrangement promulgated by the Development Bureau.

Guidelines” and “Hong Kong Planning Standards and Guidelines”) shall ensure the greening provisions within the developments are maximized as far as practicable.

13.4.3.1 On-site Tree Compensation

Under the NENT NDA Development, the Civic Plaza will be developed above the proposed railway station at Kwu Tung. The land atop the proposed railway station at Kwu Tung will be handed over from the Project Proponent to the government after the completion of the Project. However, the responsible department has not confirmed on the time being of ERR preparation. Since the land atop the proposed railway station at Kwu Tung will not be managed by the Project Proponent, on-site compensatory tree planting to be carried out under this Project could not be confirmed. Besides, the Project Proponent is still exploring the possibility of on-site tree compensation. Any future tree plantings atop the proposed railway station at Kwu Tung would be subject to agreement with the responsible departments.

13.4.3.2 Off-site Tree Compensation

The Project Proponent has been actively looking for locations of off-site tree compensation. The process of identifying and confirming the land allocation for trees compensation extensive desktop study, site visit and liaison with different government departments such as CEDD, LCSD, LandsD and AFCD etc., especially with the magnitude of the affected trees involved. In addition, the affected trees will require further identification of the future maintenance department(s) for the compensatory trees. Due to the amount of stakeholders involved, the processes of reaching agreement with various government departments on the compensatory planting proposal shall take a considerable long time frame and it is rendered not feasible for completing the compensation proposal before the application of VEP. Nonetheless, the Project Proponent commits to compensate in accordance with the future approved TPRP, and would identify and agree with the respective department on the compensation location(s) prior to the commencement of construction.

As discussed in **Section 13.4.2**, the compensatory trees from the mitigation measures of the EIA for LMC Spur Line were proposed to mitigate the landscape and visual impact by screening the above-ground structures (e.g. EAP/EEP) and to mitigate the loss of landscape resources rather than ecological purposes. Other on-site landscape and visual mitigation measures should be implemented for both construction and operational phase prior to tree compensation and will be further elaborated in **Section 13.6**.

13.5 Review of Landscape Character Areas

13.5.1 Identification and review of Landscape Character Areas

The approved EIA for LMC Spur Line was approved in nearly 20 years ago, during which there are lots of changes due to human factors. It is therefore difficult to assess the Landscape Character Area (LCA) (Drawing no.:12.3b under the Chapter 12 – Landscape and Visual Impact Assessment). However, the Landscape Character & Quality Assessment mapping in the approved EIA for LMC Spur Line

indicated the proposed railway station at Kwu Tung is included in the planning of future KTN NDA. A separate approved EIA for NENT NDA had identified the LCA and reference could be made to it. Further to the Recommended Outline Development Plan (RODP) in the approved EIA for NENT NDA, the proposed amendments is set within the Town Centre & North Residential Area ('A sites') in which the impact was discussed. It is therefore envisaged that no significant change of impact to the LCA to those in the approved EIA for NENT NDA within the Project Site.

13.6 Possible Mitigation Measures for Landscape

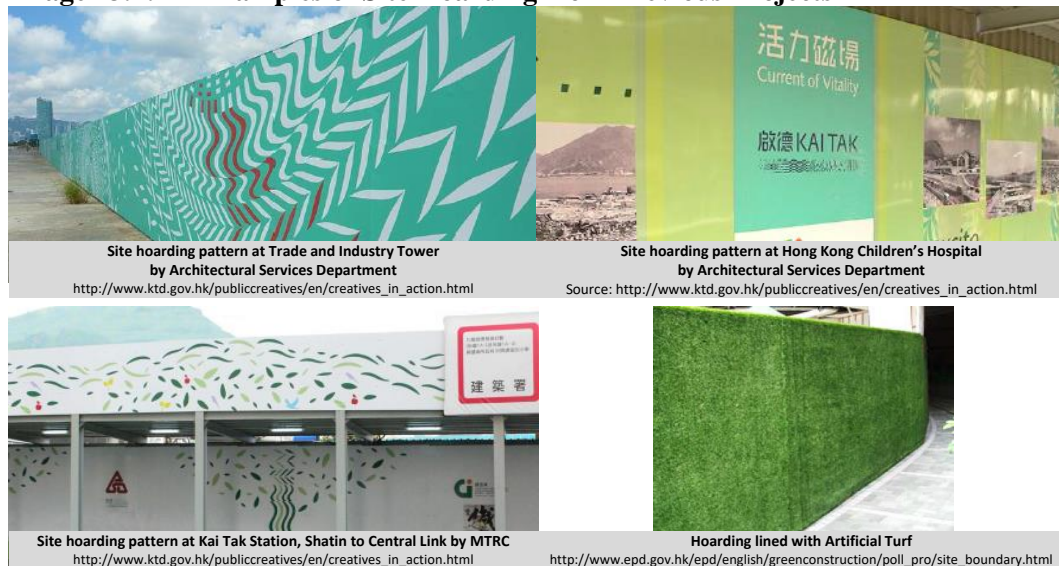
As discussed in **Section 13.4.3**, tree compensation could not be carried out before the application of VEP. Considering that the tree compensation serves as landscape and visual screening purpose and to mitigate the loss of landscape resources for the Project, possible interim mitigation measures and permanent measures are proposed to be implemented prior to tree compensation.

13.6.1 Possible Interim Measures for Construction Phase

13.6.1.1 Decorative Site Hoarding

With reference to previous construction sites (see **Image 13.1**), decorative site hoardings with aesthetic designs could be provided at the construction sites such that the construction site could be compatible with the surroundings and mitigate the visual impact.

Image 13.1: Examples of Site Hoarding from Previous Projects



Potted Plants

Considering that the Project Site is mainly covered by trees prior to the construction, it is also possible to place potted plants around the Project Site to mitigate the visual impact of the construction site as far as practicable. **Image 13.2** below presents some potted plant examples that could be placed at the Project Site.

Image 13.2: Examples of Potted Plant

13.6.2 Possible Permanent Measures for Operational Phase

13.6.2.1 Screen Planting/ Vertical Greening

Screen planting/ vertical greening could effectively constitute a fascinating landscape and blend the building with the surrounding greenery (as shown in **Image 13.3**). With appropriate greenery designs, screen planting/ vertical greening could enhance the cityscape and possibly bring extra positive impacts such as thermal insulation, filtration of dust pollutants, noise reduction and enhancement of biodiversity, etc.

Image 13.3: Examples of Screen Planting/ Vertical Greening

13.6.2.2 Tree Compensation

As discussed in **Section 13.4.3**, both on-site and off-site tree compensation methods are being considered. The Project Proponent is still exploring the possible locations including the new development area at KTN NDA, LCSD park etc. of tree compensation and would continue to liaise with different government departments such as CEDD, LCSD, LandsD and AFCD etc. on the details for tree compensation. The following potential locations for tree compensation were identified and the actual locations are subject to further liaison with relevant parties:

- Town Plaza in KTN NDA;
- LCSD sitting-out areas, parks, roadside tree pits and landscape areas in North District;

- Hillside in the North District for whip tree planting; and
- Any other locations to be agreed with government departments.

The potential sites, approximate number of trees and the potential maintenance party of tree compensation are summarised in **Table 13.3**.

Table 13.3 Approximate Number of Compensation Trees for Potential Sites

Potential Sites ^[1]	Potential Maintenance Party ^[1]	Approximate number of Trees ^[1]
Town Plaza in KTN NDA	Future town plaza owner	Few to hundreds
LCSO sitting-out areas, parks, roadside tree pits and landscape areas in North District	LCSO/HyD	About a hundred
Hillside in the North District for whip tree planting	AFCD/ Maintenance free	500 – 600 ^[2]

Note:

[1] Preliminary information on new tree plantings. The actual location, number of trees and maintenance party subject to further liaison with relevant parties and the approved TPRP.

[2] Whip tree planting

13.7 Review of Visual Impacts

13.7.1 Identification of Visual Sensitive Receives

Based on the Visual Impact Assessment (Drawing no.:12.6a-b under the Chapter 12 – Landscape and Visual Impact Assessment) under the approved EIA Report for LMC Spur Line, the location in the vicinity of the existing tunnel box is dominated by the local mix of buildings, workshops and open storage.

Under the proposed amendments, the location in the vicinity of the existing tunnel box is dominated by a core of high-rise development, which is graded towards the periphery of the KTN NDA utilising the stepped building height principle, with the peripheral blocks ranging from 10 to 20 blocks in height.

These new Visually Sensitive Receivers (VSRs) will be largely characterised by high-rise development with the upland areas beyond forming a green backdrop. The VSRs under the approved EIA for LMC Spur Line which are located in the vicinity of the Project Site have been identified and mapped in **Figure 13.2**. The description and sensitivity of VSRs are shown in **Table 13.4**.

Table 13.4 Description of VSRs and their Sensitivities

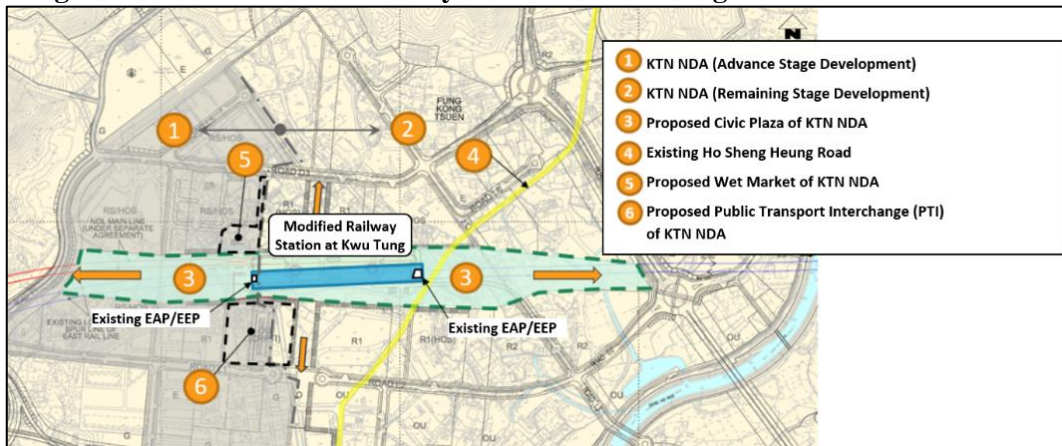
VSR ID. (ID no. under the approved EIA Report for LMC Spur Line)	Location	Approximate Viewing Distance (m)	Type of VSRs	Existing View	Sensitivity (Low, Medium, High)
VSR1 (no.32)	High Rise Residential Development, KTN NDA	30	High-rise residential	Views to the south will be dominated by the proposed high-rise development associated with the NDA with the natural hill slopes of the Kai Kung	High

VSR ID. (ID no. under the approved EIA Report for LMC Spur Line)	Location	Approximate Viewing Distance (m)	Type of VSRS	Existing View	Sensitivity (Low, Medium, High)
	(north of the LMC Spur Line)			Leng forming a green backdrop. There will also be filtered views of the New Territories Circular Road (Fanling Highway).	
VSR2 (no.33)	Low-rise Development, KTN NDA (north of the LMC Spur Line)	30	Low and medium-rise residential	Views to the south will be dominated by the proposed high-rise development associated with the NDA with the natural hill slopes of the Kai Kung Leng forming a green backdrop. Views of the New Territories Circular Road will be screened by the proposed development.	Medium to low
VSR3 (no.34)	High-rise Residential Development, KTN NDA (south of the LMC Spur Line)	30	High-rise residential	Views to the north will be dominated by the proposed high-rise development associated with the NDA with the natural hill slopes of the Fung Kong Shan forming a green backdrop.	High
VSR4	Town Plaza at Kwu Tung (west of the proposed railway station at Kwu Tung)	<10	Users at Town Plaza	Views to the north and south will be dominated by the proposed high-rise development associated with the NDA with the natural hill slopes of the Fung Kong Shan at the north and Harden Hill at the south forming a green backdrop.	Medium to low
VSR5	Town Plaza at Kwu Tung (east of the proposed railway station at Kwu Tung)	<10	Users at Town Plaza	Views to the north and south will be dominated by the proposed high-rise development associated with the NDA with the natural hill slopes of the Fung Kong Shan at the north and Harden Hill and at the south forming a green backdrop.	Medium to low

13.7.2 Visual Impact between the Proposed Above-ground Structures and Landscape

The Project will be located at the Civic Plaza of KTN NDA, which is designated as pedestrianised landscape. The location overview of the railway station at Kwu Tung and the KTN NDA can be referred to **Image 13.4**.

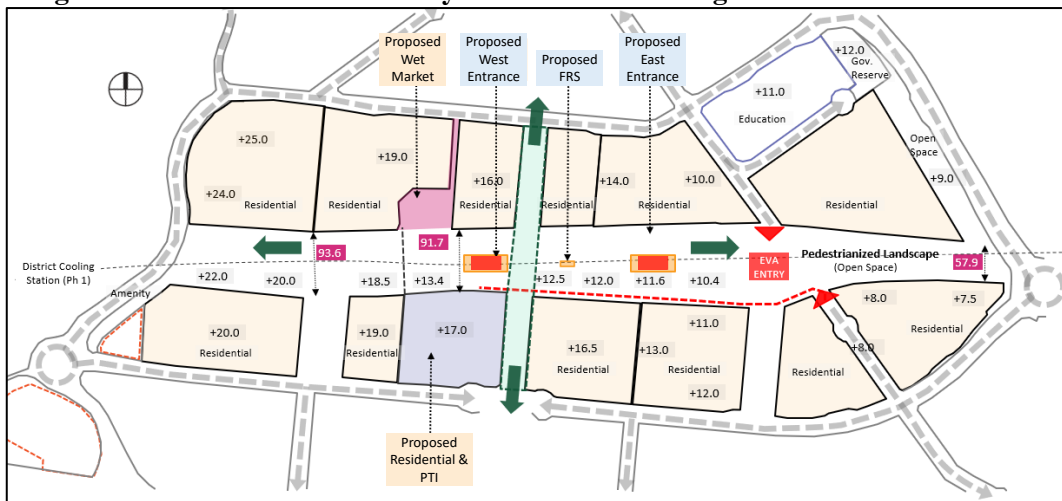
Image 13.4 Overview of the Railway Station at Kwu Tung



13.7.2.1 Visual Corridor

The above-ground structures will be positioning at the key East-West visual corridor, visually connecting to the Long Valley Natural Park to the east. The pedestrianised landscape will be gently sloping down from west +13.4mPD to east +10.4mPD. The above-ground structures will also maintain North-South corridor unobstructed for future landscape design development by others as reflected in **Image 13.5**.

Image 13.5 Overview of the Railway Station at Kwu Tung and the Visual Corridors



13.7.2.2 Railway Station at Kwu Tung

The railway station at Kwu Tung will be comprised of two underground levels, namely platform level and concourse level. At the platform level, the island platform typology will be constructed within the constraints of the existing tunnel box of LMC Spur Line. For the concourse level, a new underground concourse structure will be built on top of the existing tunnel box with 2 entrances on eastern and western end of the station concourse connecting to ground level. There will be 2 above-ground structures (i.e. the proposed west and east entrances) at grade on either end (See **Figure 1.2**).

Platform and Concourse Levels

The platform will be housed within the structure of existing tunnel box, so as to minimise the impact to the operating LMC Spur Line. The existing plantrooms serving LMC Spur Line at the station ends will be integrated with the new plantroom layouts.

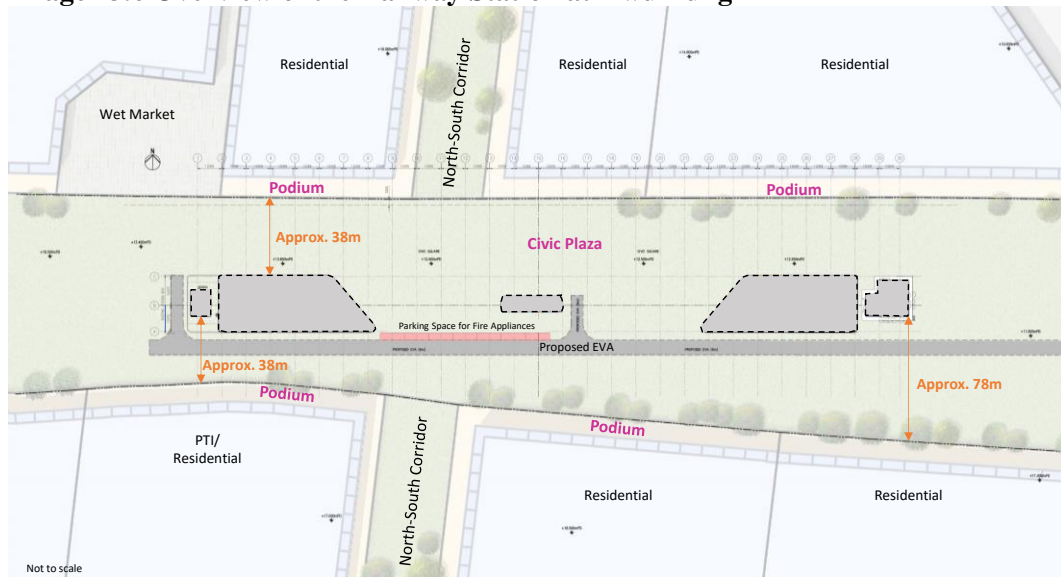
The concourse will be built in a new concourse box above the existing tunnel box and the two levels will be connected vertically via stairs, escalator banks and accessible lifts.

Above-ground Structures

The two entrances will be located at east and west ends of the concourse, where plantrooms and operation facilities are also located. A proposed FRS will be located above the centre of the station box, for fireman's access to each station levels underground.

KTN NDA is using this Civic Plaza as the NDA urban node, where creates retail opportunities at the northern and southern podiums stretching from east to west and sandwiching the centralised railway station at Kwu Tung. The proposed EVA covering the station will be entered from the future public road at the east of the Civic Plaza with a dual function of station maintenance access as shown in **Image 13.6**.

Image 13.6 Overview of the Railway Station at Kwu Tung



The above-ground structures are approx. 38m away from the northern podium; approx. 38m from west and approx. 78m from east away from the southern podium. This offers adequate separation between the above-ground structures to the adjacent north south residential zones to the station from potential noise from plantrooms, clear from smoke and ventilation exhaust.

The above-ground structures will follow the government initiatives of maximizing green area for the residents, maximise the greenery provision on new buildings and provide good connectivity from the station to surrounding functions such as, PTI, wet market, Civic Square, and retail shop front.

13.7.2.3 Design Objectives

The design objectives are as follows:

- To minimise the visual impact within a densely populated residential area by creating a simple and elegant design;
- To create a lean building massing, maximise the at grade green landscaping area to locals and minimise the visual impact; and
- To introduce biophilic orientated design as far as practicable. It is aimed to integrate the above-ground structures to the future landscape design by others and contributes to the immediate surroundings, such as green roofing, green wall, green fifth elevation design and environmentally sustainable architecture.

13.7.2.4 Visual Impact

The view-out from the residential development above the podiums adjacent to the Railway Station at Kwu Tung would be characterised by other high-rise development on the opposite side with adequate separation and offer partial views to the green backdrop of the hills beyond. The residents would be subject to a negligible to low level of impact arising from the presence of the proposed above-ground structures. With the proposed design objectives employed, they will tremendously digest the impact to the adjacent residential plots.

For the users at the planned Town Plaza, they have a close proximity to the proposed above-ground structures of the Project. Nonetheless, since the planned Town Plaza will be a pedestrianized area for travel-through and recreational purpose, it is anticipated that the duration of stay would be short. In addition, the Town Plaza is planned to be covered with greenery and trees according to public such that the visual impact could be greatly minimised. The users would be subject to a low to moderate level of impact arising from the presence of the proposed above-ground structures. With the proposed design objectives employed, they will tremendously digest the impact to the users at the planned Town Plaza

The potential visual impacts during the construction and operational phases of the project are summarized in **Table 13.5**.

Table 13.5 Potential Visual Impacts on VSRs

VSR ID. (ID no. under the approved EIA Report for LMC Spur Line)	Location	Approx. Viewing Distance (m)	Type of VSRs	Sensitivity (Low, Medium; high)	Magnitude of Change (Operation) (Negligible / Small / Intermediate / Large)	Primary Source of Impact	Impact Significant Threshold (Unmitigated)		Mitigation Measures	Impact Significant Threshold (Mitigated)	
							Construction	Operation		Construction	Operation
VSR1 (no.32)	High Rise Residential Development, KTN NDA (north of the LMC Spur Line)	30	High-rise residential	High	Negligible / Small to negligible	Construction: The major construction works will be completed prior to the first population intake. Operation: Introduction of proposed station entrance and EAP/FRS above-ground structures.	Negligible impact	Negligible to low impact	Construction: The major construction works will be completed prior to the first population intake. The possible mitigation measures in Section 13.6.1 would also be implemented as far as practicable. Operation: To implement the design objectives in Section 13.7.2 for the station at Kwu Tung. The possible mitigation measures in Section 13.6.2 would also be implemented as far as practicable.	Negligible impact	Negligible to low impact
VSR2 (no.33)	Low-rise Development, KTN NDA (north of the LMC Spur Line)	30	Low and medium-rise residential	Medium to low	Negligible / Small to negligible	Construction: The major construction works will be completed prior to the first population intake. Operation: Introduction of proposed station entrance and EAP/FRS above-ground structures.	Negligible impact	Negligible to low impact	Construction: The major construction works will be completed prior to the first population intake. The possible mitigation measures in Section 13.6.1 would also be implemented as far as practicable. Operation: To implement the design objectives in Section 13.7.2 for the station at Kwu Tung. The possible mitigation measures in Section 13.6.2 would also be implemented as far as practicable.	Negligible impact	Negligible to low impact
VSR3 (no.34)	High-rise Residential Development, KTN NDA (south of the LMC Spur Line)	30	High-rise residential	High	Negligible / Small to negligible	Construction: The major construction works will be completed prior to the first population intake. Operation: Introduction of proposed station entrance and EAP/FRS above-ground structures.	Negligible impact	Negligible to low impact	Construction: The major construction works will be completed prior to the first population intake. The possible mitigation measures in Section 13.6.1 would also be implemented as far as practicable. Operation: To implement the design objectives in Section 13.7.2 for the station at Kwu Tung. The possible mitigation measures in Section 13.6.2 would also be implemented as far as practicable.	Negligible impact	Negligible to low impact

VSR ID. (ID no. under the approved EIA Report for LMC Spur Line)	Location	Approx. Viewing Distance (m)	Type of VSRs	Sensitivity (Low, Medium; high)	Magnitude of Change (Operation) (Negligible / Small / Intermediate / Large)	Primary Source of Impact	Impact Significant Threshold (Unmitigated)		Mitigation Measures	Impact Significant Threshold (Mitigated)	
							Construction	Operation		Construction	Operation
VSR4	Town Plaza at Kwu Tung (west of the proposed railway station at Kwu Tung)	<10	Users at Town Plaza	Medium to low	Intermediate	<p>Construction: The construction works will be completed prior to the commencement of operation of the Town Plaza.</p> <p>Operation: Introduction of proposed station entrances and EAP/FRS above-ground structures. Since the Town Plaza is for recreational and travel-through purpose, the duration of view to the Project is short.</p>	Negligible impact	Low to moderate impact	<p>Construction: The construction works will be completed prior to the commencement of operation of the Town Plaza. The possible mitigation measures in Section 13.6.1 would also be implemented as far as practicable.</p> <p>Operation: To implement the design objectives in Section 13.7.2 for the station at Kwu Tung. The possible mitigation measures in Section 13.6.2 would also be implemented as far as practicable.</p>	Negligible impact	Negligible to low impact
VSR5	Town Plaza at Kwu Tung (east of the proposed railway station at Kwu Tung)	<10	Users at Town Plaza	Medium to low	Intermediate	<p>Construction: The construction works will be completed prior to the commencement of operation of the Town Plaza.</p> <p>Operation: Introduction of proposed station entrances and EAP/FRS above-ground structures. Since the Town Plaza is for recreational and travel-through purpose, the duration of view to the Project is short.</p>	Negligible impact	Low to moderate impact	<p>Construction: The construction works will be completed prior to the commencement of operation of the Town Plaza. The possible mitigation measures in Section 13.6.1 would also be implemented as far as practicable.</p> <p>Operation: To implement the design objectives in Section 13.7.2 for the station at Kwu Tung. The possible mitigation measures in Section 13.6.2 would also be implemented as far as practicable.</p>	Negligible impact	Negligible to low impact

13.8 Conclusion

Overall, there are no significant and unacceptable landscape and visual impacts in this project during construction and operational phases.

13.8.1 Landscape Impact

Approximately 606 nos of trees will be affected under the Project and tree compensation is required. It is noted that part of the trees would possibly be the compensatory trees proposed in the approved EIA for LMC Spur Line.

Due to the land owner issue and limited time, on-site and off-site tree compensation could not be carried out before the application of VEP. Considering that the compensatory trees at the Project Site are serving the landscape and visual screening purposes and to mitigate the loss of landscape resources rather than ecological purposes, other possible interim and permanent mitigation measures for construction phase and operational phase are proposed respectively. With implementing the aforementioned mitigation measures and aesthetic structure design, it is anticipated that the landscape and visual impacts from the construction site and the above-ground structures would be greatly minimized and can serve similar purposes of the existing trees located at the Project Site.

13.8.2 Visual Impact

With the proposed design objectives employed will tremendously digest the impact to the adjacent residential plots.

14 Change of Environmental Monitoring & Audit (EM&A) Scope

14.1 Review of Approved EIA for LMC Spur Line

The approved EIA for LMC Spur Line has recommended the EM&A requirements for construction and operation of the LMC Spur Line. EM&A on hydrological monitoring, ecology, air quality, noise, water quality, contaminated land, landscape and visual were discussed in that approved EIA Report.

As discussed in **Section 1.3**, the proposed modification works for the Railway Station at Kwu Tung would require the removal of the fill material atop the existing tunnel box and the construction of superstructures. Considering the scale of the works of the Project being much smaller as compared to that of the LMC Spur Line Project, EM&A on the key environmental issues specific to the Project would be proposed in the following sections.

14.2 Environmental Monitoring & Audit (EM&A) Scope

Based on the potential environmental issues identified in **Section 3** and subsequent review for hydrology, ecology, fisheries, air quality, noise, water quality, waste management, contaminated land, cultural heritage and landscape and visual, the proposed amendments would not result in significant environmental impacts as compared with those recommended in the approved EIA report for LMC Spur Line.

As discussed in **Section 7.3**, according to the latest programme, land resumption and construction of the area within the KTN NDA (Advance Stage Development) is in progress. Land resumption in these areas will be implemented by phases and completed before the construction of the Project according to the latest implementation programme. Therefore, the existing sensitive receivers would not be in use anymore during the major construction works.

However, a planned receiver, a multi welfare service complex, which is located approximately 210m at the south of the Project will start operation from 2022/2023 before site clearance and preparation of the Project commence in Q3 2023.

With the implementation of the recommended mitigation measures, no adverse environmental impact anticipated during the construction phase. However, environmental monitoring and audit (EM&A) of air quality and noise are also recommended during the construction phase to ascertain that there would be no adverse impacts at this sensitive receiver.

14.3 EM&A Requirements

The Contractor and Project Proponent will be requested to implement an environmental monitoring programme throughout the Project. In case exceedance is found, the Contractor, Project Proponent and ET should take immediate actions

to implement remediation measures following the procedures specified in this report. Details are presented in following sub-sections.

Measurements and activities that shall be conducted in accordance with the requirements in this report are summarised as follows:

- Baseline monitoring (construction dust and noise);
- Impact monitoring (construction dust and noise);
- Remedial actions in accordance with the Event and Action Plans within the timeframe in case the specified criteria in this report were exceeded;
- Logging and keeping records of monitoring results; and
- Preparation and submission of Baseline, Monthly and Final EM&A Reports.

14.3.1 Project Organization

A project organisation consisting of the Engineer's Representative (ER), Independent Environmental Checker (IEC), Environmental Team (ET), and Contractor should be established to take on the responsibilities for environmental protection for the Project. The responsibilities of respective parties are:

14.3.1.1 Engineer or Engineer's Representative

The Engineer is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contractual requirements. The duties and responsibilities of the Engineer with respect to EM&A may include:

- Supervise the Contractor's activities and ensure that the requirements in the EM&A Manual are fully complied with;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Participate in joint site inspections and audits undertaken by the ET; and
- Adhere to the procedures for carrying out exceedance and complaint investigations.

14.3.1.2 The Contractor

The Contractor should report to the ER. The duties and responsibilities of the Contractor are:

- Implement the ERR recommendations and requirements;
- Provide assistance to ET in carrying out monitoring and auditing;
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event and Action Plans;

- Implement measures to reduce impact where Action and Limit levels are exceeded; and
- Adhere to the agreed procedures for carrying out exceedance and complaint investigations.

14.3.1.3 Environmental Team

The leader of the Environmental Team (ET) shall be an independent party from the Contractor and has relevant professional qualifications, or have sufficient relevant EM&A experience subject to approval of the Engineer's Representative (ER).

The ET should conduct the EM&A programme and ensure the Contractor's compliance with the Project's environmental performance requirements during construction. The ET should be an independent party from the Contractor.

The ET should be led and managed by the ET leader. The ET leader should possess at least 7 years of experience in EM&A. The ET should monitor the mitigation measures implemented by the Contractor on a regular basis to ensure the compliance with the intended aims of the measures.

- Set up the environmental monitoring stations as required in this ERR;
- Monitor various environmental parameters as required in this ERR;
- Analyse the EM&A data and review the success of EM&A programme to cost-effectively confirm the adequacy of mitigation measures implemented and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractors' site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and take proactive actions to pre-empt problems;
- Audit and prepare audit reports on the environmental monitoring data and site environmental conditions;
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans;
- Undertake regular and ad-hoc on-site audits / inspections and report to the Contractor and the ER of any potential non-compliance; and
- Follow up and close out non-compliance actions;
- Advice to the Contractor on environmental improvement, awareness, enhancement matters, etc. on site;
- Timely submission of the EM&A report to the Project Proponent and the EPD; and
- Adhere to the procedures for carrying out complaint investigation in accordance with **Section 14.3.6** of this ERR.

14.3.1.4 Independent Environmental Checker

The IEC should advise the ER on environmental issues related to the Project. The IEC should possess at least 7 years of experience in EM&A. The duties and responsibilities of the IEC are:

- Review the EM&A works performed by the ET (at not less than monthly intervals);
- Audit the monitoring activities and results (at not less than monthly intervals);
- Report the audit results to the ER;
- Review the EM&A reports submitted by the ET;
- Review the proposal on mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures submitted by the Contractor in accordance with the Event and Action Plans;
- Check the mitigation measures that have been recommended in the ERR, and ensure they are properly implemented in a timely manner, when necessary;
- Report the findings of site inspections and other environmental performance reviews to ER;
- Verify the investigation results of environmental complaint cases and the effectiveness of corrective measures;
- Verify EM&A report that has been certified by the ET leader; and
- Provide feedback on the audit results to the ET, the ER or the EP holder according to Event and Action Plans in the ERR.

14.3.2 Environmental Mitigation Implementation Schedule

Detailed review of the Project has been conducted and presented in this ERR. Mitigation measures during the construction and operational phases have also been identified and recommended. It specifies the extent, locations, time frame and responsibilities for the implementation of the environmental mitigation measures identified.

14.3.3 Environmental Monitoring and Audit (EM&A) Programme

The EM&A programme are summarized in **Table 14.1**, and details are given the following sub-sections.

Table 14.1 EM&A Programme Summary

Discipline	EM&A Programme	
	Construction Phase	Operational Phase
Air Quality	Yes	No
Noise	Yes	Commissioning test of fixed plant noise
Hydrology, Fisheries, Water Quality, Ecology, Waste, Contaminated Land, Cultural Heritage, Landscape and Visual	No	No

14.3.3.1 Hydrology

It is anticipated that there would be no adverse impacts on hydrology during construction and operational phases, and thus monitoring and audit are considered not required.

14.3.3.2 Ecology

Construction Phase

Consider that the Project Site is not a typical habitat for Spotted Narrow-mouthed Frog, only low number of individuals recorded and the wide distribution of this species, the level of ecological impact is considered to be **low**. No mitigation measure is required. Both direct and indirect ecological impacts in construction phase were considered as low. Ecological mitigation measures, monitoring and audit are therefore not required.

Operational Phase

Both direct and indirect ecological impacts in operational phase were considered insignificant. Ecological mitigation measures, monitoring and audit are therefore not required.

14.3.3.3 Fisheries

It is anticipated that there would be no adverse impacts on fisheries during construction and operational phases, and thus monitoring and audit are considered not required.

14.3.3.4 Air Quality

Construction Phase

The major dusty construction activities of the Project would mainly be related to fugitive dust from excavation, piling, materials handling, spoil removal, backfilling and wind erosion which would generate insignificant amount of small size particulates, hence, no significant Respirable Suspended Particulates (RSP) or Fine Suspended Particulates (FSP) impacts would be anticipated. Monitoring of 24-hour RSP and 24-hour FSP levels are not proposed. Therefore, 1-hour Total Suspended Particulates (TSP) is recommended to be monitored and audited at the proposed monitoring locations during construction phase.

Below sub-section presents the requirements, methodology, equipment, monitoring locations, criteria for the monitoring and audit of construction dust during the construction phase of the Project.

Monitoring Parameters and Equipment

The 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50). Upon approval of the IEC, 1-hour TSP levels can be measured by direct reading method with using handheld dust particle measuring device which is capable of producing comparable results as that by the high volume sampling method, to indicate short event impacts.

All relevant data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and any other local atmospheric factors affecting or affected by site conditions, etc., shall be recorded down in detail.

High volume samplers (HVSs) in compliance with the following specifications shall be used for carrying out the 1-hour TSP monitoring:

- 0.6 – 1.7 m³ per minute adjustable flow range;
- Equipped with a timing / control device with +/- 5 minutes accuracy for 24 hours operations;
- Installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406cm² ;
- Flow control accuracy: +/-2.5% deviation over 24-hour sampling period; Separate equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices; Separate equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet; Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;

- Easily changeable filter; and
- Capable of operating continuously for a 24-hour period.

The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. They shall ensure that sufficient number of HVSs with an appropriate calibration kit is available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. The HVSs shall be equipped with an electronic mass flow controller and be calibrated against a traceable standard at regular intervals. All the equipment, calibration kit, filter papers, etc., shall be clearly labelled.

Initial calibration of HVSs with mass flow controller should be conducted upon installation and thereafter every six months. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data should be properly documented for future reference by the IEC.

The flow-rate of the sampler before and after the sampling exercise with the filter in position shall be verified to be constant and be recorded in the data sheet as shown in **Appendix 14.1**.

If the ET proposed to use a direct reading method with using handheld dust particle measuring device to measure 1-hour TSP levels, they shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable results to the HVS. The instrument shall also be calibrated regularly following the requirements specified by the equipment manufacturers.

Wind data monitoring equipment shall also be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- The wind sensors should be installed 10m above ground so that they are clear of obstructions or turbulence caused by buildings;
- The wind data should be captured by a data logger, the data shall be downloaded for analysis at least once a month;
- The wind data monitoring equipment should be re-calibrated at least once every six months; and
- Wind direction should be divided into 16 sectors of 22.5 degrees each.

If the ET Leader proposes alternative dust monitoring equipment / methodology (e.g. direct reading methods) after the approval of this ERR, agreement from the IEC should be sought. The instrument should also be calibrated regularly following the requirements specified by the equipment manufacturers.

Laboratory Measurement / Analysis

A clean laboratory with constant temperature and humidity control, and equipped with necessary measuring and conditioning instruments to handle the dust samples

collected, shall be available for sample analysis, and equipment calibration and maintenance. The laboratory shall be Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited or other internationally accredited laboratory.

If a site laboratory is set up or a non-HOKLAS accredited laboratory is hired for carrying out the laboratory analysis, the laboratory equipment shall be verified by IEC. Measurement performed by the laboratory shall be demonstrated to the satisfaction of the ER and the IEC and EPD.

IEC shall conduct regular audit to the measurement performed by the laboratory to ensure the accuracy of measurement results. The ET Leader shall provide the ER with one copy of the Title 40 of Code of Federal Regulations, Chapter 1 (Part 50), Appendix B for his reference.

Filter paper of size 8" X 10" shall be labelled before sampling. It shall be a clean filter paper with no pinholes, and shall be conditioned in a humidity-controlled chamber for over 24-hours and be pre-weighed before use for the sampling.

After sampling, the filter paper loaded with dust shall be kept in a clean and tightly sealed plastic bag. The filter paper shall then be returned to the laboratory for reconditioning in the humidity-controlled chamber followed by accurate weighing by an electronic balance with readout down to 0.1 mg. The balance shall be regularly calibrated against a traceable standard.

All the collected samples shall be kept in a good condition for 6 months before disposal.

Dust Monitoring Station

The proposed dust monitoring station is listed in **Table 14.2** and is shown in **Figure 14.1**.

Table 14.2 Proposed Construction Dust Monitoring Station

ASR ID ^[2]	Description	Use ^[1]
A5	Village Houses near Tung Fong	R
A11	Sheung Shui Pui Yau Kindergarten	E
A12	Village Houses along Ho Sheung Heung Road	R
PA1	Planned Private Housing	R
PA2	Planned Multi Welfare Service Complex	G/IC

Notes:

[1] R- Residential premises; E- Education; and G/IC- Government, Institution & Community

[2] The dust monitoring station and monitoring period is subject to the actual land resumption and status of existing ASR, operation of planned ASR and construction programme of the Project. Representative monitoring station and monitoring period will be selected and reviewed in carrying out baseline and impact monitoring given that the ASR is in still in use or operation during construction phase of the Project.

The status and locations of the air quality sensitive receivers may change after issuing this ERR. In such case, the ET shall propose updated monitoring locations and seek agreement from IEC and EPD.

When alternative monitoring locations are proposed, the following criteria, as far as practicable, shall be followed:

- Monitoring at ASRs close to the major site activities which are likely to have air quality impacts;
- Monitoring as close as possible to the ASRs as defined in the EIAO-TM;
- Assurance of minimal disturbance to the occupants and working under a safe condition during monitoring ; and
- Take into account the prevailing meteorological conditions.

The ET shall agree with the ER in consultation with the IEC on the position of the HVS for the installation of the monitoring equipment. When positioning the HVS, the following points shall be noted:

- A horizontal platform with appropriate support to secure the samplers against gusty wind should be provided;
- No two samplers should be placed less than 2 meters apart;
- The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler;
- A minimum of 2 meters of separation from walls, parapets and penthouses is required for rooftop samplers;
- A minimum of 2 meters separation from any supporting structure, measured horizontally is required;
- No furnace or incinerator flue is nearby;
- Airflow around the sampler is unrestricted;
- The sampler is more than 20 meters from the dripline;
- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
- Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
- A secured supply of electricity is needed to operate the samplers

Baseline Monitoring

TSP baseline monitoring should be carried out for a continuous period of at least two weeks with three sets of 1-hour ambient measurements taken daily at each monitoring station prior to the commissioning of major construction works.

Before commencing baseline monitoring, the ET shall inform the IEC of the baseline monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

During the baseline monitoring, there should not be any dust generation activities in the vicinity of the monitoring stations. General meteorological conditions (wind speed, direction and precipitation) and notes regarding any significant adjacent dust

producing sources should also be recorded throughout the baseline monitoring period. A summary of baseline monitoring is presented in **Table 14.3**.

In case the baseline monitoring cannot be carried out at the designated monitoring locations, the ET Leader shall carry out the monitoring at alternative locations that can effectively represent the baseline conditions at the impact monitoring locations. The alternative baseline monitoring locations shall be agreed with the IEC prior to commencement of baseline monitoring.

In exceptional cases, when insufficient baseline monitoring data or questionable results are obtained, the ET Leader shall liaise with the IEC to agree on an appropriate set of data to be used as a baseline reference and submit to EPD for approval.

Impact Monitoring

The ET shall carry out impact monitoring at all designated monitoring locations for construction dust during construction period. For 1-hour TSP monitoring, the sampling frequency of 3 times in every 6 days should be undertaken when the highest dust impact occurs. The impact monitoring programme is summarized in **Table 14.3**.

Table 14.3 Summary of Construction Dust Monitoring Programme

Monitoring Period	Duration	Sampling Parameter	Frequency
Baseline Monitoring	At least 14 consecutive days prior to the commissioning of major construction works	1-hour TSP	3 times per day
Impact Monitoring	Throughout the construction phase	1-hour TSP	3 times in every 6 days

The monthly schedule of the impact monitoring programme should be drawn up by the ET one month prior to the commencement of the scheduled construction period. Before commencement of the monitoring, the ET should inform the IEC of the impact monitoring programme such that the IEC can conduct an on-site audit.

Action / Limit Levels

The baseline monitoring results form the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the construction dust impact monitoring results with air quality criteria set up for 1-hour TSP. **Table 14.4** shows the air quality criteria, namely Action and Limit levels to be used.

Table 14.4: Action and Limit Levels for Construction Dust Monitoring

Parameters	Action Level	Limit Level
1-hour TSP	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$, Action level = $(\text{baseline level} * 1.3 + \text{Limit level})/2$; For baseline level $> 384 \mu\text{g}/\text{m}^3$, Action level = Limit level	$500 \mu\text{g}/\text{m}^3$

Event and Action Plan

Should non-compliance of the air quality criteria occur, actions in accordance with the Action Plan in **Table 14.5** shall be carried out.

Table 14.5: Event / Action Plan for Construction Dust

Event	Action			
	ET	IEC	ER	Contractor
Action Level exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. If exceedance is confirmed, inform ER, IEC and Contractor; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance; 2. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify sources and investigate the cause of exceedance; 2. Implement the agreed proposals; 3. Amend working methods agreed with the ER as appropriate.
Action Level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source and investigate the cause of exceedance; 2. If exceedance is confirmed, inform ER, IEC and Contractor; 3. Advise the ER, IEC on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency; 6. Discuss with ER, IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with ER, IEC and contractor to discuss the 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Review and advise the ET and ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance; 2. In consultation with the ET and IEC agree with the Contractor on the remedial measures to be implemented; and 3. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Identify sources and investigate the cause of exceedance; 2. Submit proposals for remedial to ET, ER and IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.

Event	Action			
	ET	IEC	ER	Contractor
	remedial measures to be taken; and 8. If exceedance stops, cease additional monitoring			
Limit Level exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the cause of exceedance and propose remedial measures; 2. If exceedance is confirmed, inform ER, IEC, contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency; 5. Discuss with the ER, IEC and Contractor on the remedial measures and assess effectiveness. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET, ER and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance; 2. Review and agree on the remedial measures proposed by the Contractor; and 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Identify sources and investigate the cause of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ET, ER and IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Amend proposal if appropriate.
Limit Level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source, investigate the cause of exceedance and propose remedial measures; 2. If exceedance is confirmed, inform ER, IEC, contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance; 2. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 3. Ensure remedial measures properly implemented; 4. If exceedance continues, consider what portion of the work is 	<ol style="list-style-type: none"> 1. Identify sources and investigate the cause of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial actions to ET, ER and IEC within 3 working days of notification; 4. Implement the agreed proposals; 5. Revise and resubmit proposals if

As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed should be checked with a portable wind speed meter capable of measuring wind speeds in m/s.

The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment and shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

Noise Monitoring Locations

The locations of construction airborne noise monitoring stations are summarised in **Table 14.6** and is shown in **Figure 14.1**.

Table 14.6 Proposed Construction Noise Monitoring Station

NSR ID	Description	Use
PA2	Multi Welfare Service Complex	G/IC

The status and location of noise sensitive receivers (NSRs) may change after approval of this Manual. In such case, and if changes to the monitoring locations are considered necessary, the ET should propose alternative monitoring stations and seek approval from the ER and agreement from the IEC and EPD on the proposal. If alternative monitoring stations are proposed, these stations should be chosen based on the following criteria:

- Monitoring at NSRs close to the major site activities of the Project that are likely to arise noise impacts;
- Monitoring as close as possible to the NSRs as defined in the EIAO-TM; and
- Assurance of minimal disturbance to the occupants and working under a safe condition during monitoring.

The monitoring station shall normally be at a point 1 m from the exterior of the sensitive receiver building facade and be at a position 1.2 m above the ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made. For reference, a correction of +3 dB(A) shall be made to the free field measurements.

The ET shall agree with the IEC on the monitoring position and the corrections adopted. Once the positions for the monitoring stations are chosen, the baseline monitoring and the impact monitoring shall be carried out at the same positions.

If changes to the monitoring stations are required upon commencing the baseline monitoring or thereafter, the ET should propose alternative locations based on the above-mentioned criteria and seek approval from the ER and agreement from the IEC and EPD on the proposal.

Baseline Monitoring

The ET should carry out baseline noise monitoring prior to the commencement of the construction of the Project for the Project Proponent's reference. The baseline noise levels should be measured for a continuous period of at least 14 consecutive days at a minimum logging interval of 30 minutes for daytime (between 0700 and 1900 hours of normal weekdays) and 15 minutes (as three consecutive Leq, (5 minutes) readings) for evening time (between 1900 and 2300 hours on normal weekdays), general holidays including Sundays (between 0700 and 2300 hours) and night-time (between 2300 and 0700 on all days). The Leq, L₁₀ and L₉₀ should be recorded at the specified interval. Before commencing the baseline monitoring, the ET should inform the IEC of the baseline monitoring programme such that the IEC can conduct on-site audit to ensure accuracy of the baseline monitoring results.

There shall not be any construction activities in the vicinity of the stations during the baseline monitoring. Any non-project related construction activities in the vicinity of the monitoring stations during the baseline monitoring should be noted and the source and location of such activities should be recorded.

Impact Monitoring

Noise monitoring should be carried out at all the designated monitoring stations when there are Project-related construction activities being undertaken within a radius of 300m from the monitoring stations. The monitoring should obtain one set of 30-minute measurement at each station between 0700 and 1900 hours on normal weekdays at a frequency of once a week when construction activities within 300m from respective monitoring station are underway.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Event and Action Plan in **Table 14.8**, shall be carried out. This additional monitoring shall be continued until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

Action / Limit Levels

The Action and Limit levels for construction noise are defined in **Table 14.7**. Should non-compliance of the noise quality criteria occur actions in accordance with the Event and Action Plan in **Table 14.8** shall be taken.

Table 14.7 Action and Limit Levels for Construction Noise Monitoring

Time Period	Action Level	Limit Level
0700 - 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) for residential premises
		70 dB(A) for schools and 65 dB(A) during examination period

Note:

If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

To account for cases in which ambient noise levels, as identified by baseline monitoring, approach or exceed the stipulated Limit Levels prior to the commencement of construction, a Maximum Acceptable Impact Level, which incorporates the baseline noise levels and the identified construction noise Limit Level, may be defined and agreed with the EPD. The amended level will be greater than 75 dB(A) and will represent the maximum acceptable noise level at a specific monitoring station. Correction factors for the effects of acoustic screening and/or architectural features of NSRs may also be applied as specified in the Technical Memorandum on Noise from Construction Work other than Percussive Piling (TM-GW).

Event and Action Plan

Should non-compliance of the noise criteria occur, actions in accordance with the Event and Action Plan in **Table 14.8** shall be carried out.

Table 14.8: Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> Investigate the complaint and propose remedial measures; Discuss with the ER and Contractor on the remedial measures required; and Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> Review the investigation results submitted by the Contractor; and Review and advise the ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> Notify the Contractor, ET, IEC and Confirm receipt of notification of complaint in writing; Review and agree on the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> Investigate the complaint and propose remedial measures; Report the results of investigation to the IEC, ET and ER; Submit noise mitigation proposals to the ER, IEC and ET within three working days of notification for agreement; and Implement noise mitigation proposals.
Limit Level exceedance	<ol style="list-style-type: none"> Repeat measurement to confirm exceedance; If exceedance is confirmed, notify the Contractor, IEC, EPD and ER; 	<ol style="list-style-type: none"> Check monitoring data submitted by the ET; Check the Contractor's working method; Discuss with the ER, ET and Contractor on the 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be 	<ol style="list-style-type: none"> Identify source and investigate the causes of exceedance; Take immediate action to avoid further exceedance; Submit proposals for

Event	Action			
	ET	IEC	ER	Contractor
	3. Identify source and investigate the causes of exceedance; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with the IEC and ER to discuss the remedial measures to be taken; 7. Review the effectiveness of Contractor's remedial measures and keep IEC, EPD and ER informed of the results; and 8. If exceedance stops, cease additional monitoring.	potential remedial measures; and 4. Review and advise the ET and ER on the effectiveness of the remedial measures proposed by the Contractor.	implemented; and 4. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	remedial measures to the ER, IEC and ET within three working days of notification for agreement; 4. Implement the agreed proposals; 5. Revise and resubmit proposals if problem still not under control; and 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Operational Phase – Fixed Plant

Commissioning Test

It is anticipated that the Project would provide ventilation fans, smoke extraction fans, chillers etc. at the ventilation building. As discussed in **Section 8.5.2**, a preliminary estimation of the maximum allowable sound power level (SWL) of the fixed noise sources has been conducted in this ERR. A detail quantitative assessment should be conducted to determine the maximum allowable SWL during detailed design stage. If necessary, the Operator/Project Proponent should implement and refine the specified sound power levels as appropriate to ensure compliances with the noise standards stipulated in the EIAO-TM and NCO for the fixed plant operation.

Prior to the operation of railway station at Kwu Tung, noise commissioning tests for planned fixed noise sources shall be conducted by independent qualified

person(s) possessing at least 7 years of noise control experience and a corporate membership of Hong Kong Institute of Acoustics or equivalent. The noise commissioning test report should be submitted to the ER, ET and IEC for agreement. The purpose of the commissioning test is to demonstrate that the maximum allowable SWL of the planned fixed plant noise sources could be achieved during operational phase.

Operational Phase – Railway Noise

No adverse railway noise impact is expected during the operation of the Project, and therefore railway noise monitoring would not be required.

14.3.3.6 Water

Construction Phase

With the implementation of good site practices to control construction site runoff, no adverse environmental impact is anticipated during the construction phase. Effluent discharge from the works areas to the public drain would be required to comply with the terms and conditions of a discharge licence issued by EPD under the WPCO. Although regular quality impact monitoring is not required, regular site environmental inspection at least once per week shall be carried out during construction phase to ensure that the recommended best management practices as recommended in this ERR are properly implemented.

Operational Phase

With proper connection to the public drainage and sewerage systems, no adverse impact on the watercourse in proximity to the Project is anticipated during the operational phase. Hence, water quality impact monitoring is not required.

14.3.3.7 Waste

Construction Phase

Regular audits and site inspections should be carried out during construction phase to ensure that the recommended good site practices and other recommended mitigation measures are properly implemented by the Contractor.

Operational Phase

During operational phase, sufficient number of trash bins and recycling bins would be provided for collection of general refuse by users at designated locations. A licensed collector should be employed for the collection of chemical waste. Reputable waste collector should be employed to remove general refuse regularly. In addition, chemical waste which cannot be recycled should be disposed of at Chemical Waste Treatment Centre (CWTC).

14.3.3.8 Land Contamination

It is anticipated that there would be no adverse impacts on land contamination during construction and operational phases, and thus monitoring and audit are considered not required.

14.3.3.9 Cultural Heritage

It is anticipated that there would be no adverse impacts on cultural heritage during construction and operational phases, and thus monitoring and audit are considered not required.

14.3.3.10 Landscape and Visual

Construction Phase

The landscape and visual mitigation measures proposed should be incorporated in the landscape and engineering design. Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the construction period. Site inspections should be undertaken at least once per month during the construction period to ensure that the mitigation measures recommended in this report are properly implemented.

Operational Phase

With the mitigation measures recommended in the ERR implemented, specific auditing during the operational phase of the Project is not required.

14.3.4 Site Inspection

Site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area by providing a direct mean to trigger and enforce specified environmental protection and pollution control measures. Site inspection should be undertaken regularly during the construction phase to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented for the activities associated with the Project.

The ET Leader shall be responsible for formulating the environmental site inspection programme as well as the deficiency and action reporting system, and for carrying out the site inspections. The proposal for rectification, if any, should be prepared and submitted to the ET Leader and IEC by the Contractor.

Regular site inspections shall be carried out and led by the ER and attended by the Contractor and ET at least once per week during the construction phase. The areas of inspection shall not be limited to the environmental situation, pollution control and mitigation measures within the site. It should also review the environmental situations outside the works area which is likely to be affected, directly or indirectly, by the construction site activities of the Project. The ET shall make reference to the following information in conducting the inspection. During the inspection, the following information should be referred to:

The ERR recommendations on environmental protection and pollution control mitigation measures;

- The ERR recommendations on environmental protection and pollution control mitigation measures;
- Ongoing results of the EM&A programme;
- Works progress and programme;
- Individual works methodology proposals (which shall include the proposal on associated pollution control measures);
- Contract specifications on environmental protection;
- Relevant environmental protection and pollution control legislations; and
- Previous site inspection results.

The Contractor shall keep the ER and ET Leader updated with all relevant environmental related information on the construction contract necessary for him to carry out the site inspections. Site inspection results and associated recommendations for improvements to the environmental protection and pollution control efforts should be recorded and followed up by the Contractor in an agreed time-frame. The Contractor shall follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET, to report on any remedial measures subsequent to the site inspections.

The ER, ET and the Contractor should also carry out ad-hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of a valid environmental complaint, or as part of the investigation work, as specified in the Event and Action Plan for the EM&A programme.

14.3.5 Environmental Compliance

There are statutory requirements on environmental protection and pollution control with which construction activities must comply.

In order that the works are in compliance with the contractual requirements, the works method statements (where relevant to environmental measures) submitted by the Contractor to the ER for approval and to the ET leader to ensure sufficient environmental protection and pollution control measures have been included.

The ET Leader shall also review the progress and programme of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating laws can be prevented.

The Contractor should provide the update of the relevant documents to the ET Leader so that works checking could be carried out effectively. The document should at least include the updated Works Progress Reports, updated Works Programme, method statements, any application letters for licences / permits under the environmental protection legislations, and copies of all valid licences / permits. The site diary should also be available for the inspection by the relevant parties.

After reviewing the document, the ET Leader shall advise the IEC and Contractor of any non-compliance with legislative requirements on environmental protection and pollution control for them to take follow-up actions as appropriate. If the follow-up actions may still result in violation of environmental protection and pollution control requirements, the ER and ET should provide further advice to the Contractor to take remedial action to resolve the problem.

Upon receipt of the advice, the Contractor shall undertake immediate action to correct the situation. The ER and ET shall follow up to ensure that appropriate action has been taken in order to satisfy contractual and legal requirements.

14.3.6 Environmental Complaints

The following procedures should be undertaken upon receipt of any environmental complaint:

- The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- The Contractor to investigate, with the ER and ET, the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency and stations, if necessary;
- The Contractor to identify remedial measures in consultation with the IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures;
- The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;
- The ET to undertake additional monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;
- If the complaint is referred by the EPD, the Contractor to prepare interim report on the status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and additional monitoring identified or already taken, for submission to EPD within the time frame assigned by the EPD; and
- The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports.

14.3.7 Reporting

14.3.7.1 Baseline Monitoring Report

The ET should prepare and submit a Baseline Environmental Monitoring Report at least one month before commencement of construction of the Project. Copies of the Baseline Environmental Monitoring Report should be submitted to the IEC, ER and EPD. The ET should liaise with the relevant parties on the exact number of copies require.

The Baseline Monitoring Report shall include at least the following:

- Up to half a page executive summary;
- Brief project background information;
- Drawings showing locations of the baseline monitoring stations;
- Monitoring results (in both hard and soft copies) together with the following information:
 - monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - parameters monitored;
 - monitoring locations;
 - monitoring date, time, frequency and duration; and
 - quality assurance (QA) / quality control (QC) results and detection limits;
- Details of influencing factors, including:
 - major activities, if any, being carried out on the site during the period;
 - weather conditions during the period; and
 - other factors which might affect monitoring results;
- Determination of the Action and Limit Levels for each monitoring parameter and statistical analysis of the baseline data;
- Revisions for inclusion in the ERR; and
- Comments, recommendations and conclusions.

14.3.7.2 Monthly EM&A Report

The results and findings of all EM&A work required in the Manual shall be recorded in the monthly EM&A reports prepared by the ET and endorsed by the IEC. The EM&A report shall be prepared and submitted to EPD within 10 working days of the end of each reporting month, with the first report within the month after construction commences. Copies of each monthly EM&A report shall be submitted to the following parties: the IEC, the ER and EPD. Before submission of the first

EM&A report, the ET shall liaise with the parties on the required number of copies and format of the monthly reports in both hard copy and electronic medium.

The ET shall review the number and location of monitoring stations and parameters on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

First Monthly EM&A Report

The first monthly EM&A report shall include at least the following:

- a) Executive
 - breaches of Action and Limit levels;
 - compliant log
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- b) Basic project information:
 - project organization including key personnel contact names and telephone numbers;
 - programme;
 - management structure; and
 - works undertaken during the month.
- c) Environmental status:
 - advice on the status of statutory environmental compliance such as the status of compliance with the environmental permit (EP) conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
 - works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
 - drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring and control stations (with co-ordinates of the monitoring locations).
- d) A brief summary of EM&A requirements including:
 - all monitoring parameters;
 - environmental quality performance limits (Action and Limit levels);
 - Event-Action Plans;

- environmental mitigation measures, as recommended in the project EIA study final report; and
 - environmental requirements in contract documents.
- e) Implementation status
- advice on the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the project EIA Report.
- f) Monitoring results (in both hard and soft copies) together with the following information:
- monitoring methodology;
 - name of laboratory and types of equipment used and calibration details;
 - monitoring parameters;
 - monitoring locations;
 - monitoring date, time, frequency, and duration;
 - weather conditions during the period;
 - any other factors which might affect the monitoring results; and
 - QA / QC results and detection limits.
- g) Report on non-compliance, complaints, and notifications of summons and successful prosecutions:
- record of all non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
 - record of all complaints received (written or verbal) for each media, including locations and nature of complaints investigation, liaison and consultation undertaken, actions and follow-up procedures taken, results and summary;
 - record of all notification of summons and successful prosecutions for breaches of current environmental protection / pollution control legislation, including locations and nature of the breaches, investigation, follow-up actions taken, results and summary;
 - review of the reasons for and the implications of non-compliances, complaints, summons and prosecutions including review of pollution sources and working procedures; and
 - description of the actions taken in the event of non-compliance and deficiency reporting and any follow-up procedures related to earlier non-compliance.
- h) Others

- an account of the future key issues as reviewed from the works programme and work method statements;
- advice on the solid and liquid waste management status;
- record of any project changes from the originally proposed as described in the EIA (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for examples, any improvement in the EM&A programme) and conclusions.

Subsequent monthly EM&A Reports

Subsequent monthly EM&A reports shall include at least the following:

- i) Executive summary (1-2 pages):
 - breaches of Action and Limit levels;
 - compliant log
 - notifications of any summons and successful prosecutions;
 - reporting changes; and
 - future key issues.
- j) Basic project information:
 - project organization including key personnel contact names and telephone numbers;
 - programme;
 - management structure; and
 - works undertaken during the month; and
 - any updates as needed to the scope of works and construction methodologies.
- k) Environmental status:
 - advice on the status of statutory environmental compliance such as the status of compliance with the environmental permit (EP) conditions under the EIAO, submission status under the EP and implementation status of mitigation measures;
 - works undertaken during the month with illustrations (such as location of works, daily excavation rate, etc.); and
 - drawings showing the project area, any environmental sensitive receivers and the locations of the monitoring stations.

- record of any project changes from the originally proposed as described in the ERR (e.g. construction methods, mitigation proposals, design changes, etc.); and
- comments (for examples, effectiveness and efficiency of the mitigation measures), recommendations (for examples, any improvement in the EM&A programme) and conclusions.

p) Appendices

- Action and Limit levels;
- graphical plots of trends of the monitoring parameters at key stations over the past four reporting periods for representative monitoring stations annotated against the following:
 - major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors that might affect the monitoring results.
- monitoring schedule for the present and next reporting period;
- cumulative statistics on complaints, notifications of summons and successful prosecutions; and
- outstanding issues and deficiencies.

Final EM&A Review Reports

The EM&A programme should be terminated upon the completion of the construction activities that have the potential to result in significant environmental impacts.

Prior to the proposed termination, the proposed termination should only be implemented after the proposal has been endorsed by the IEC followed by approval from the Director of Environmental Protection.

The final EM&A report should contain at least the following information:

- a) Executive summary (1-2 pages):
- b) Drawings showing the project are, any environmental sensitive receivers and the locations of the monitoring and control stations;
- c) Basic project information including a synopsis of the project organization, contacts of key management, and a synopsis of work undertaken during the course of the project or past twelve months;
- d) A brief summary of EM&A requirements including:
 - environmental mitigation measure, as recommended in the ERR;
 - environmental quality performance limits (Action and Limit levels);

- all monitoring parameters;
 - Event and Action Plans;
- e) A summary of the implementation status of environmental protection and pollution control / mitigation measures, as recommended in the ERR, summarised in the updated implementation schedule;
- f) Graphical plots and the statistical analysis of the trends of monitoring parameter over the course of the project, including the post-project monitoring for all monitoring stations annotated against:
- the major activities being carried out on site during the period;
 - weather conditions during the period; and
 - any other factors which might affect the monitoring results;
- g) A summary of non-compliance (exceedances) of the environmental quality performance limits (Action and Limit levels);
- h) A review of the reasons for and the implications of non-compliance including review of pollution sources and working procedures as appropriate;
- i) A description of the actions taken in the event of non-compliance;
- j) A summary record of all complaints received (written or verbal) for each media, liaison and consultation undertaken, actions and follow-up actions taken and results;
- k) A review of the validity of ERR predictions and identification of shortcomings in EIA recommendations;
- l) Comments (for examples, a review of the effectiveness and efficiency of the mitigation measures and of the performance of the environmental management system, that is, of the overall EM&A programme); and
- m) Recommendations and conclusions (for example, a review of success of the overall EM&A programme to cost-effectively identify deterioration and to initiate prompt effective mitigatory action when necessary).

14.3.7.3 Data Keeping

No site-based documents (such as monitoring field records, laboratory analysis records, site inspection forms, etc.) are required to be included in the monthly EM&A reports. However, any such document shall be well kept by the ET and be ready for inspection upon request. All relevant information shall be clearly and systematically recorded in the document. Monitoring data shall also be recorded in electronic format, and the software copy must be available upon request. All documents and data shall be kept for at least one year following completion of the construction phase EM&A.

14.3.7.4 Interim Notifications of Environmental Quality Limit Exceedances

With reference to the Event and Action Plans, when the environmental quality performance limits are exceeded and if they are proven to be valid, the ET should immediately notify the IEC, ER, contractor and EPD, as appropriate. The notification should be followed up with advice to the IEC and EPD on the results of the investigation, proposed actions and success of the actions taken, with any necessary follow-up proposals. A sample template for the interim notification is presented in **Appendix 14.3**.

15 Justification on Material Change

Details of the proposed amendments under the VEP application have been listed below in **Table 2.1**, which evaluates if there are material changes to DP in accordance with Section 6 of the EIAO-TM.

Table 15.1: Elements of the Proposed Amendments Which May Be Regarded as Material Changes to the DP

Items	Responses
A change to physical alignment layout or design of the project causing an environmental impact likely to affect existing or planned community, ecologically important areas \or sites of cultural heritage.	<p>The modification works is to transform the existing tunnel box into a functional railway station. As there is already an existing tunnel box housing the platform space, the existing D-wall would be used for Excavation and Lateral Support (ELS) during the modification works for railway station at Kwu Tung works. There has been no change in physical alignment layout of the modification works.</p> <p>In addition, the proposed above-ground structures including entrances, Ventilation Buildings (VB), Emergency Access Point (EAP)/ Emergency Egress Point (EEP)/Fire Rescue Stair (FRS) will not encroach onto any ecological important areas or sites of cultural heritage.</p> <p>Based on the assessment results in this report, the proposed amendments will not cause adverse environmental impacts on the existing or planned communities during construction and operational phases.</p>
A physical change resulting in an increase in the extent of reclamation or dredging affecting water flow or quality likely to affect ecologically important areas, or disrupting sites if cultural heritage.	Neither reclamation nor dredging is required.
An increase in pollution emissions or discharges or waste generation likely to violate guidelines or criteria in this technical memorandum without mitigation measures in place.	The modification works of the existing tunnel box at Kwu Tung will not lead to an increase in pollution emission, discharges or waste generation that will result in violation of guidelines or criteria in the EIAO-TM.
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 without mitigation measures in place.	There will be no increase in throughput or scale of the project. Although there are physical modification works of the existing tunnel box at Kwu Tung, the environmental impacts of these proposed amendments have already been thoroughly assessed for different environmental aspects, and it is anticipated that there will no violation of the guidelines or criteria in the EIAO-TM.
A change resulting in physical works that are likely to affect a rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.	The proposed amendments will involve physical works that will not affect rare, endangered or protected species, or an important ecological habitat, or a site of cultural heritage.

Based on the review shown in **Table 15.1** above, the proposed amendments do not constitute material changes to the DP.

In addition, with the mitigation measures in place as proposed in the approved EIA report and in **Section 4** to **Section 13** of this report, the proposed amendments would not lead to exceedance or violation of environmental performance requirement as set out in the approved EIA report of LMC Spur Line and EIAO-TM. As such, the proposed amendment would not constitute a material change in terms of the environmental performance requirement compared to the approved EIA report of LMC Spur Line.

16 Conclusion

16.1 Impact Summary

This document has discussed the possible environmental changes that may result from changes including the following items:

- Modification of the tunnel box at Kwu Tung to a functional railway station; and
- Operation of railway station at Kwu Tung.

An environmental review has been conducted for the proposed variation on various environmental aspects, including hydrology, ecology, fisheries, air quality, noise, water quality, waste management, contaminated land, cultural heritage and landscape and visual. Evaluation results indicate that there is no adverse environmental impact arising from the proposed amendments with the implementation of good site practices and mitigation measures proposed in this ERR.

Hence, there will be no material change to the environmental impact even with the proposed amendments. The project will remain in compliance with the EIAO-TM requirements, and no deterioration of the surrounding environment is anticipated.

16.2 Proposed Variations to the Conditions in Current Environmental Permit

The EP (EP No. EP-129/2002/H) held by KCRC includes the construction and operation of a railway and its associated stations while that of the FEP held by MTRCL (EP No. FEP-06/129/2002/H) includes the operation of a railway and its associated stations.

The proposed railway station at Kwu Tung will be constructed and operated by MTRCL under the ownership approach. As such, unlike in the case of the existing LMC Spur Line which MTRCL operates through a service concession granted by KCRC, there is no service concession involved and MTRCL will be solely responsible for construction and operation of this proposed railway station at Kwu Tung and ultimately own it.

Since MTRCL is the sole project owner of the proposed railway station at Kwu Tung, the EP conditions in KCRC's EP would not be affected, and no variation of this EP is required. On the other hand, in order to expand the scope of the FEP (No. FEP-06/129/2002/H) held by MTRCL to cover the construction and operation of the proposed railway station at Kwu Tung, variation of this FEP would be required.

The proposed amendments shown in **Table 2.1** would constitute a variation of EP conditions. The proposed variations to the conditions in current FEP due to the proposed amendments are summarised in the **Table 16.1**, which is made reference to Part D of Form 5 for the application of VEP under the EIAO.

Table 16.1 Proposed Variations to the Conditions in the Current Environmental Permit (FEP-06/129/2002/H)

Proposed Amendments	Condition(s)/Figure(s) in the Current EP	Reasons for Variations	Describe the environmental changes arising from the proposed variation(s)	Describe how the environment and the community might be affected by the proposed variation(s)	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	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 EIAO-TM
<p>➤ Construction of railway station at Kwu Tung</p> <p>The key modifications required are given below:</p> <ul style="list-style-type: none"> • Excavation of the fill material above the existing tunnel box; • Modification of existing tunnel box structures; • Construction of concourse and platform areas; • Construction of back-of-house areas; • Construction of entrances, VB and FRS; • Modification of existing EAP/EEP; 	<p>Vary scale and Scope of Designated Project in Part B of FEP-06/129/2002/H</p> <p>Vary Figure 1A of FEP-06/129/2002/H</p> <p>Add Figure 1C to FEP-06/129/2002/H</p>	<p>In order to facilitate the implementation of the new town at Kwu Tung, the existing tunnel box structure at Kwu Tung in the LMC Spur Line will be modified to a functional railway station so as to cater for the population intake of the new town.</p>	<p>Refer to Section 4 to Section 13.</p>	<p>Refer to Section 4 to Section 13.</p> <p>The proposed variation would not affect the extent of environmental impacts as predicated in the approved EIA Report. The proposed variation would comply with the requirements in the Technical Memorandum on EIA Process (EIAO – TM) with mitigation</p>	<p>The environmental performance requirements set out in the approved EIA Report will be maintained. The proposed variation would not change the extent of environmental impacts predicted in the approved EIA Report.</p>	<p>No additional mitigation measures required.</p>

Proposed Amendments	Condition(s)/Figure(s) in the Current EP	Reasons for Variations	Describe the environmental changes arising from the proposed variation(s)	Describe how the environment and the community might be affected by the proposed variation(s)	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	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 EIAO-TM
<ul style="list-style-type: none"> • Relocation of existing EVA and associated facilities; and • Construction of other station associated facilities and underground adit. <p>➤ Operation of railway station at Kwu Tung</p>				measures in place.		



Figures

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 FILENAME:

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REMARKS: RODP IS PRESENTED TO ILLUSTRATE THE LOCATION OF THE PROJECT

LEGEND	
	EXISTING EAP/EEP
	PROPOSED ABOVE-GROUND STRUCTURE OF THE PROJECT

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

B	SECOND ISSUE	BS	11/21	FC
A	FIRST ISSUE	BS	09/21	FC

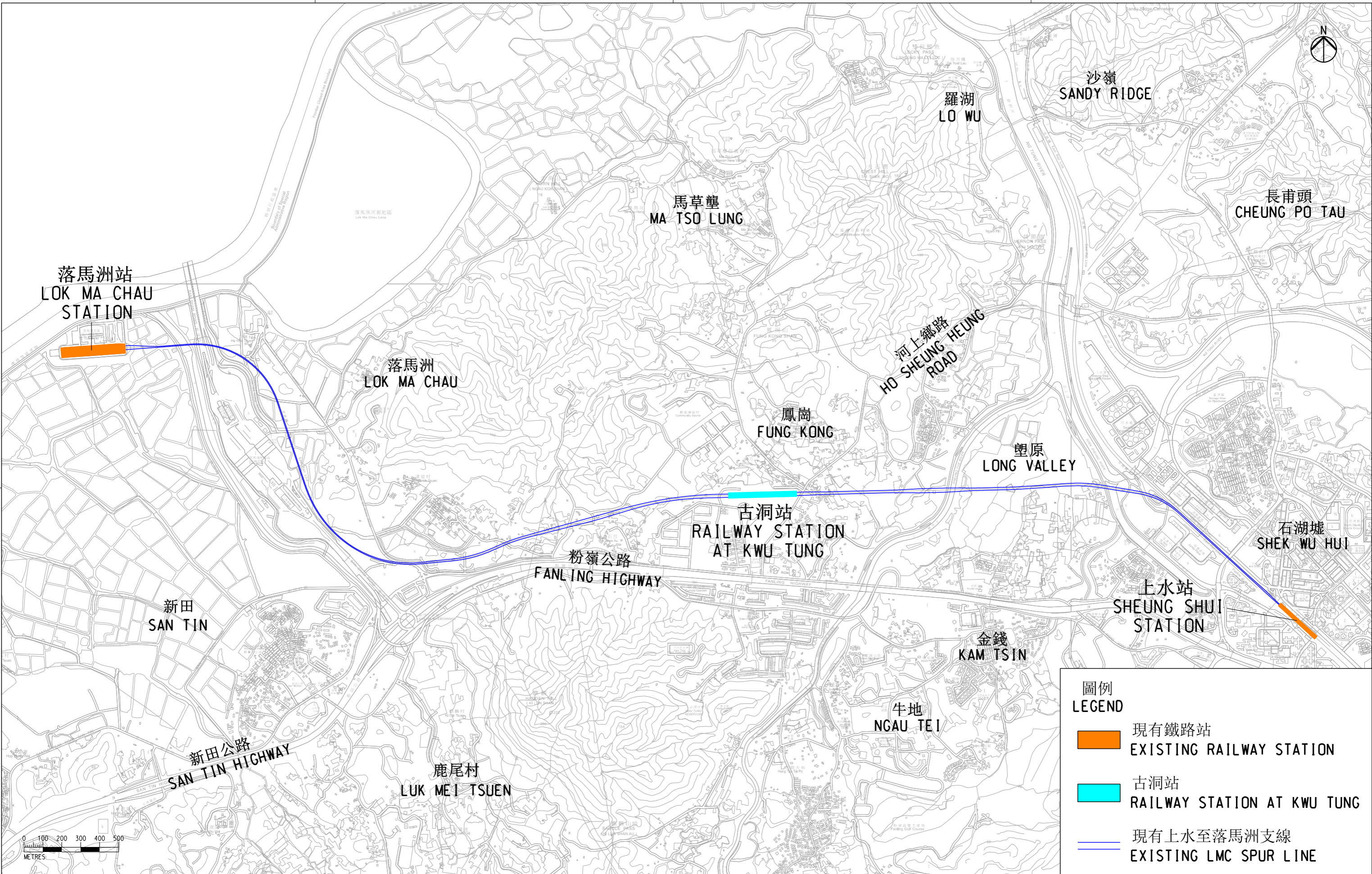
DRAWN	BS
DESIGNED	BS
CHECKED	JC
APPROVED	FC
DATE	02/11/21



ARUP Supported by Arcadis Hong Kong Ltd.

CADD REF. Figure 1.2 - Existing and Proposed Above-ground structures at Kwu Tung of LMC Spur Line

TITLE		SCALE	DRAWING NO.	REV.
VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE EXISTING AND PROPOSED ABOVE-GROUND STRUCTURES AT KWU TUNG OF LMC SPUR LINE		1 : 2000 (A3)	FIGURE 1.2	A



圖例
LEGEND

-  現有鐵路站
 EXISTING RAILWAY STATION
-  古洞站
 RAILWAY STATION AT KWU TUNG
-  現有上水至落馬洲支線
 EXISTING LMC SPUR LINE

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
B	SECOND ISSUE				BS		11/21	FC	
A	FIRST ISSUE				BS		09/21	FC	

DRAWN	BS
DESIGNED	BS
CHECKED	JC
APPROVED	FC
DATE	16/11/21

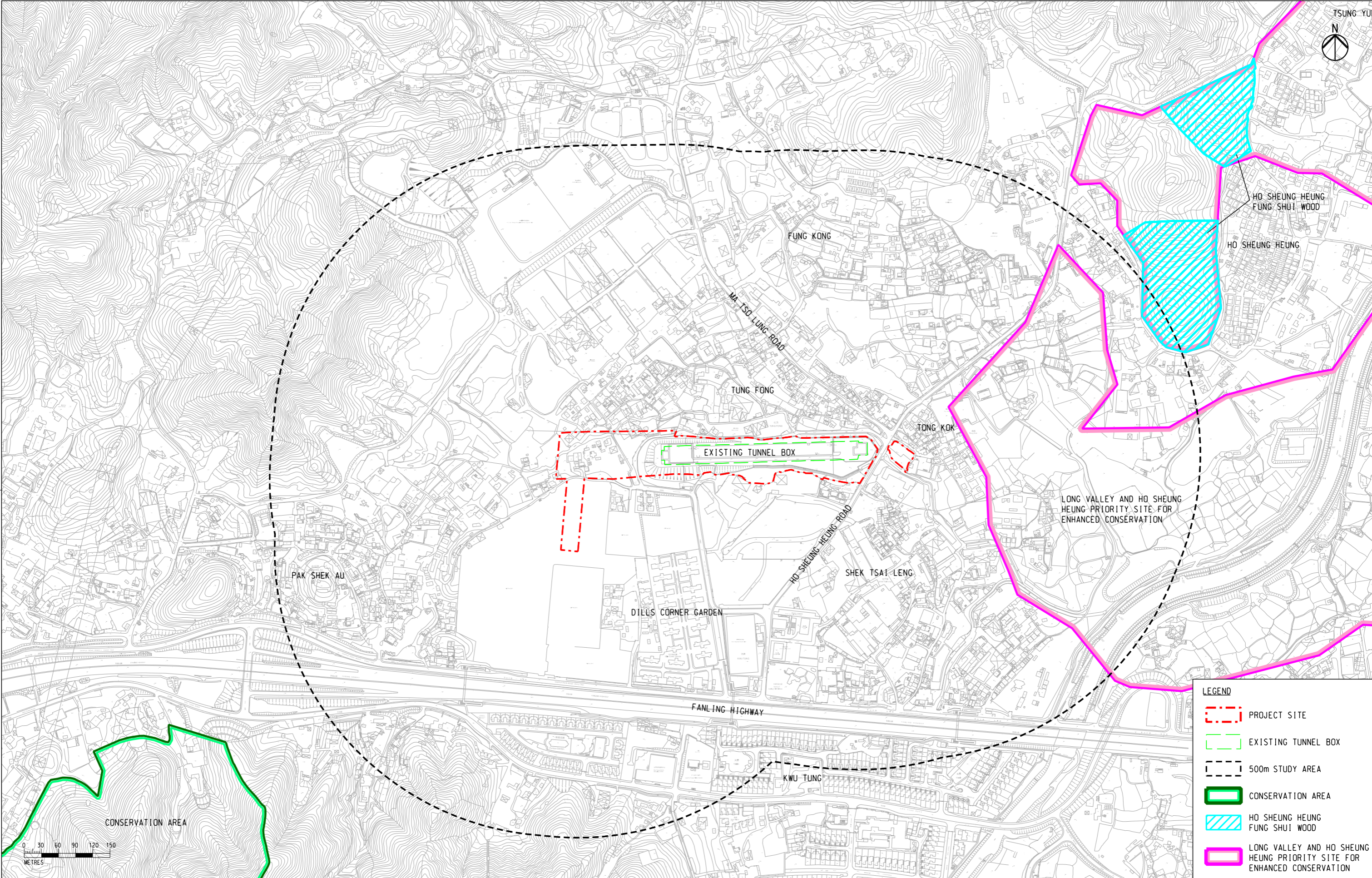
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ORIGINATOR: **ARUP** Supported by: Arcadis Hong Kong Ltd.

CADD REF.: Figure 2.1 - Location of the Project

TITLE	
VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE LOCATION OF THE PROJECT	
SCALE	DRAWING NO.
AS SHOWN	FIGURE 2.1
REV.	B



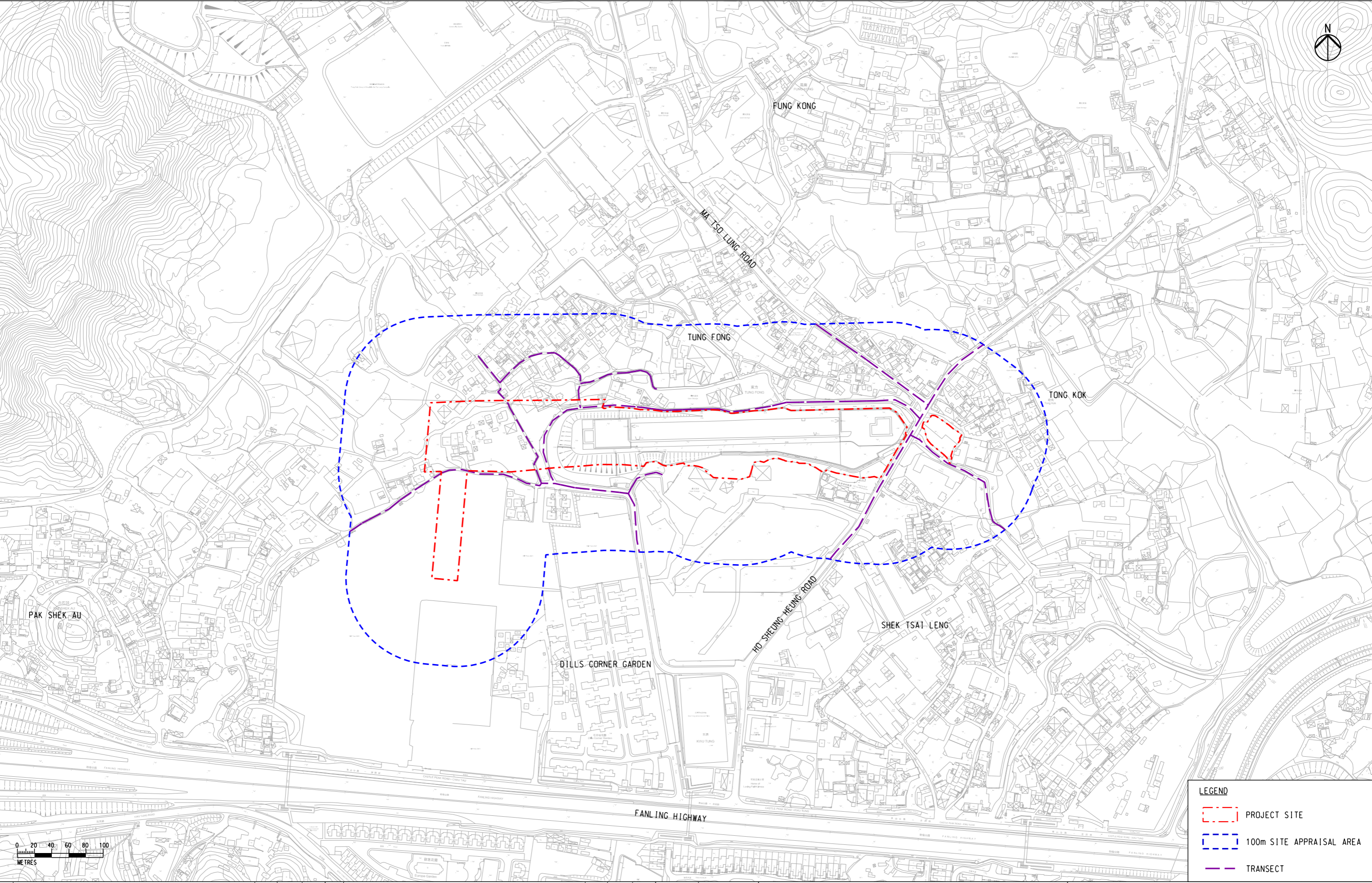
LEGEND

- PROJECT SITE
- EXISTING TUNNEL BOX
- 500m STUDY AREA
- CONSERVATION AREA
- HO SHEUNG HEUNG FUNG SHUI WOOD
- LONG VALLEY AND HO SHEUNG HEUNG PRIORITY SITE FOR ENHANCED CONSERVATION

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DRAWN BS		DESIGNED BS		CHECKED JC		APPROVED FC		DATE 14/09/21	
REV		DESCRIPTION		BY		DATE		APPROVED	
A		FIRST ISSUE		BS		09/21		FC	
SCALE 1 : 4000 (A3)		DRAWING NO. FIGURE 5.1		CADD REF. Figure 5.1 - Tentative Works Area of Railway Station 500m Study Area and Recognised Site of Conservation Importance		REV. A			

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 \$MODELS\$
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 MODELNAME: C:\PROJ\DATA\08_Env\3\Drawing\Deliverables\report\1\05_EnvironmentalReview_Report1_EIR\draft_2\Figure 5.2 - Ecological Site Appraisal Area and Transect.dgn
 FILENAME:

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LEGEND

- - - PROJECT SITE
- - - 100m SITE APPRAISAL AREA
- TRANSECT

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
A	FIRST ISSUE	BS	09/21	FC					

DRAWN	BS
DESIGNED	BS
CHECKED	JC
APPROVED	FC
DATE	23/09/21

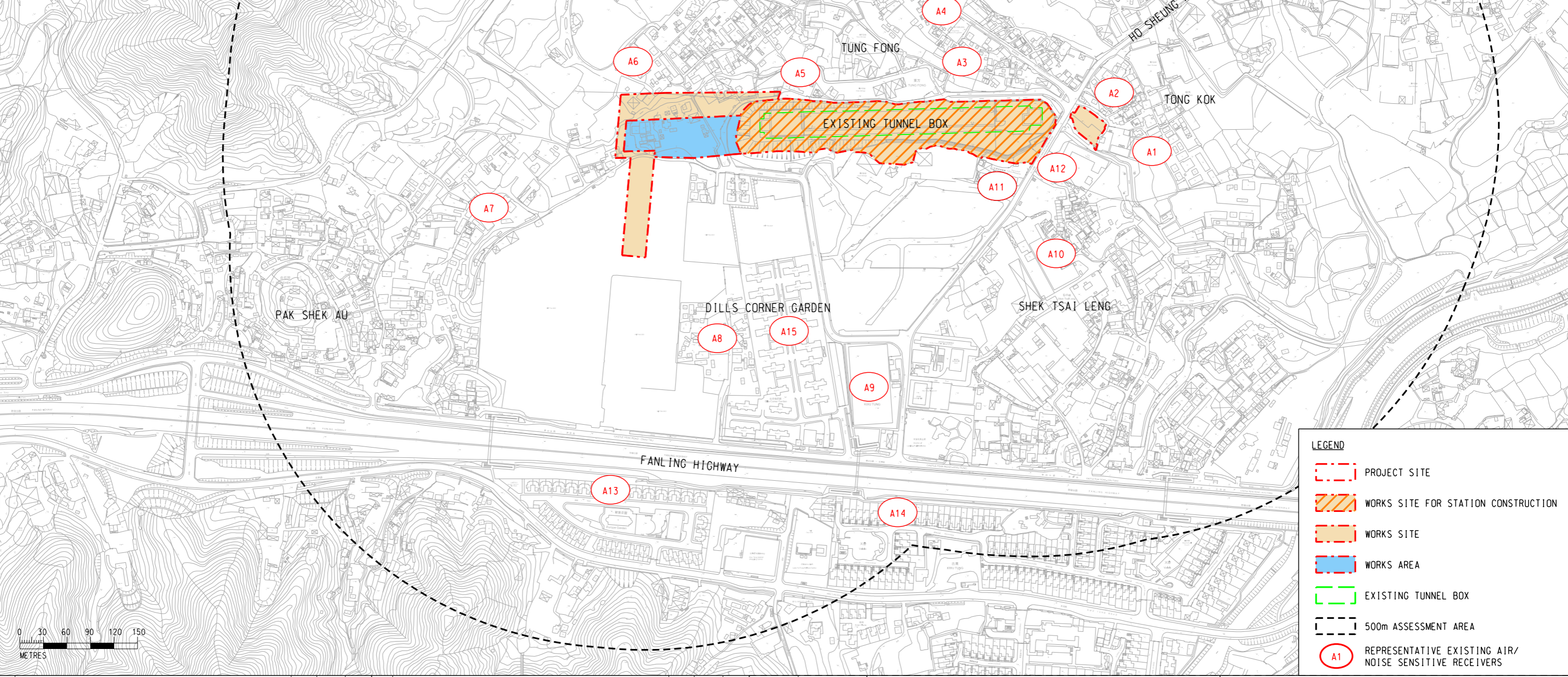
ARUP

ORIGINATOR: Supported by Arcadis Hong Kong Ltd.
 CADD REF.: Figure 5.2 - Ecological Site Appraisal Area and Transect

TITLE		VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE	
ECOLOGICAL SITE APPRAISAL AREA AND TRANSECT			
SCALE	DRAWING NO.	REV.	
1 : 4000 (A3)	FIGURE 5.2	A	

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 MODELNAME: J:\2020\2852-00_CDD\TUN_V3_Env_V3_Drawing\Deliverables\report\105_EnvironmentalReview_Report1_ERM\Draft_3\Figure 7.1 - Location of Representative Existing Air and Noise Sensitive Receivers.dwg
 FILENAME:

ID	Description	ASR	NSR
A1	Village Houses along Ho Sheung Heung Road	✓	✓
A2	Village Houses along Ho Sheung Heung Road	✓	✓
A3	Village Houses along Ma Tso Lung Road	✓	✓
A4	Temporary Structures with residential use along Ma Tso Lung Road	✓	✓
A5	Village Houses near Tung Fong	✓	✓
A6	Temporary Structures with residential use near Tung Fong	✓	✓
A7	Temporary Structures with residential use near Pak Shek Au	✓	✓
A8	Temporary Structures with residential use near Dills Corner Garden	✓	✓
A9	Kwu Tung Grass Soccer Pitch	✓	
A10	Village House near Shek Tsai Leng	✓	✓
A11	Sheung Shui Pui Yau Kindergarten	✓	✓
A12	Village Houses along Ho Sheung Heung Road	✓	✓
A13	Europa Garden Phase 1	✓	✓
A14	Valais Phase 1	✓	
A15	Dills Comer Garden	✓	✓

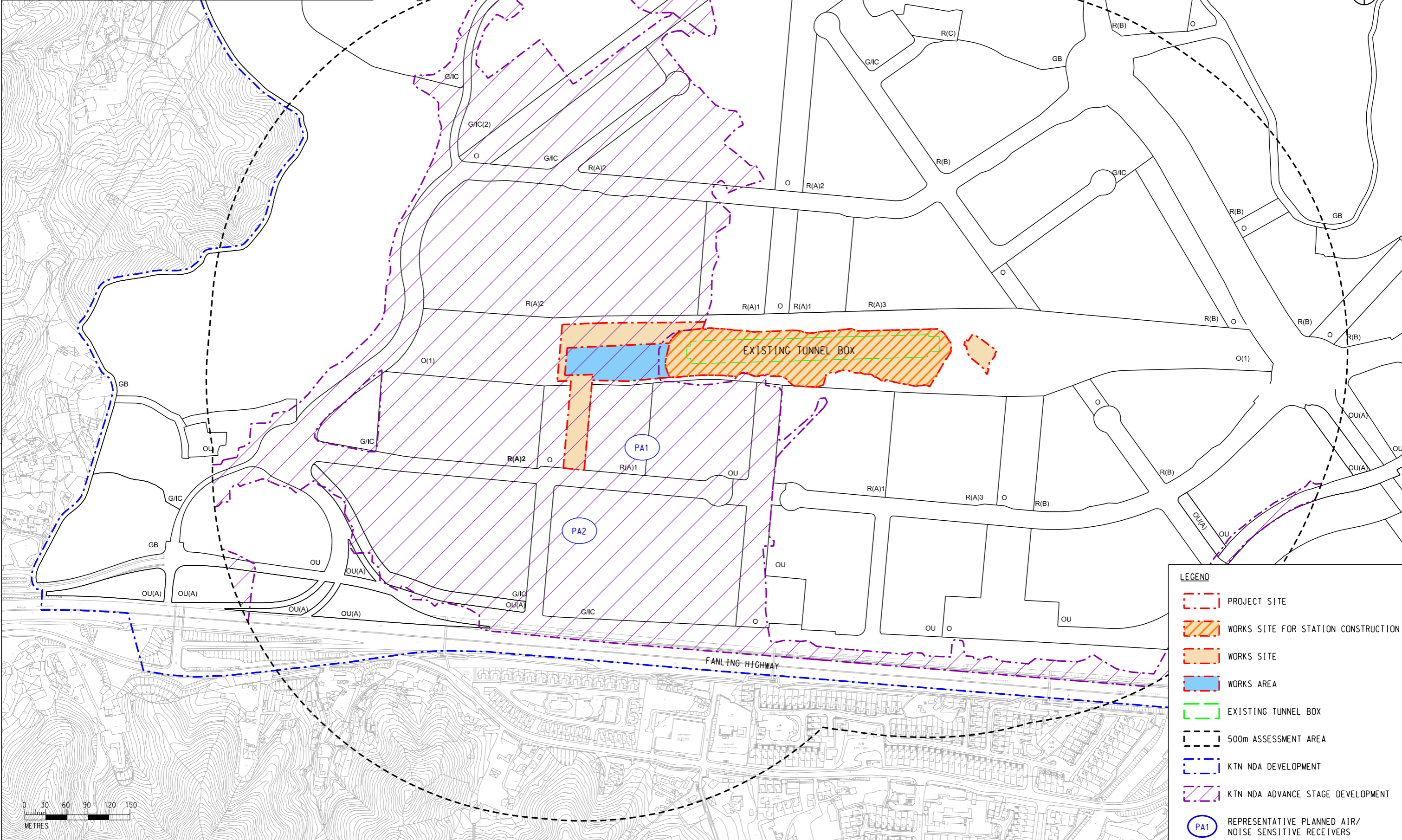


LEGEND	
	PROJECT SITE
	WORKS SITE FOR STATION CONSTRUCTION
	WORKS SITE
	WORKS AREA
	EXISTING TUNNEL BOX
	500m ASSESSMENT AREA
	REPRESENTATIVE EXISTING AIR/ NOISE SENSITIVE RECEIVERS

DRAWN		BS		MTR		ORIGINATOR		Supported by : Arcadis Hong Kong Ltd.		TITLE	
DESIGNED		BS		ARUP		DATE		27/10/21		VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE	
CHECKED		JC		CADD REF.		DATE		09/21		LOCATION OF REPRESENTATIVE EXISTING AIR AND NOISE SENSITIVE RECEIVERS	
APPROVED		FC		Figure 7.1 - Locations of Representative Existing Air and Noise Sensitive Receivers		DATE		10/21		SCALE	
DATE		27/10/21		BY		DATE		10/21		DRAWING NO.	
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REV		DESCRIPTION		BY		DATE		APPROVED		REV.	
B		SECOND ISSUE		BS		10/21		FC		1 : 5000 (A3)	
A		FIRST ISSUE		BS		09/21		FC		FIGURE 7.1	

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 FILENAME: Drawing Deliverables\report\05 Environmental\Review Report\ERR\Draft\Figure 7.2 - Location of Representative Planned Air and Noise Sensitive Receivers

ID	Description	ASR	NSR
PA1	Planned Private Housing	✓	✓
PA2	Planned Multi Welfare Service Complex	✓	✓

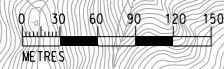
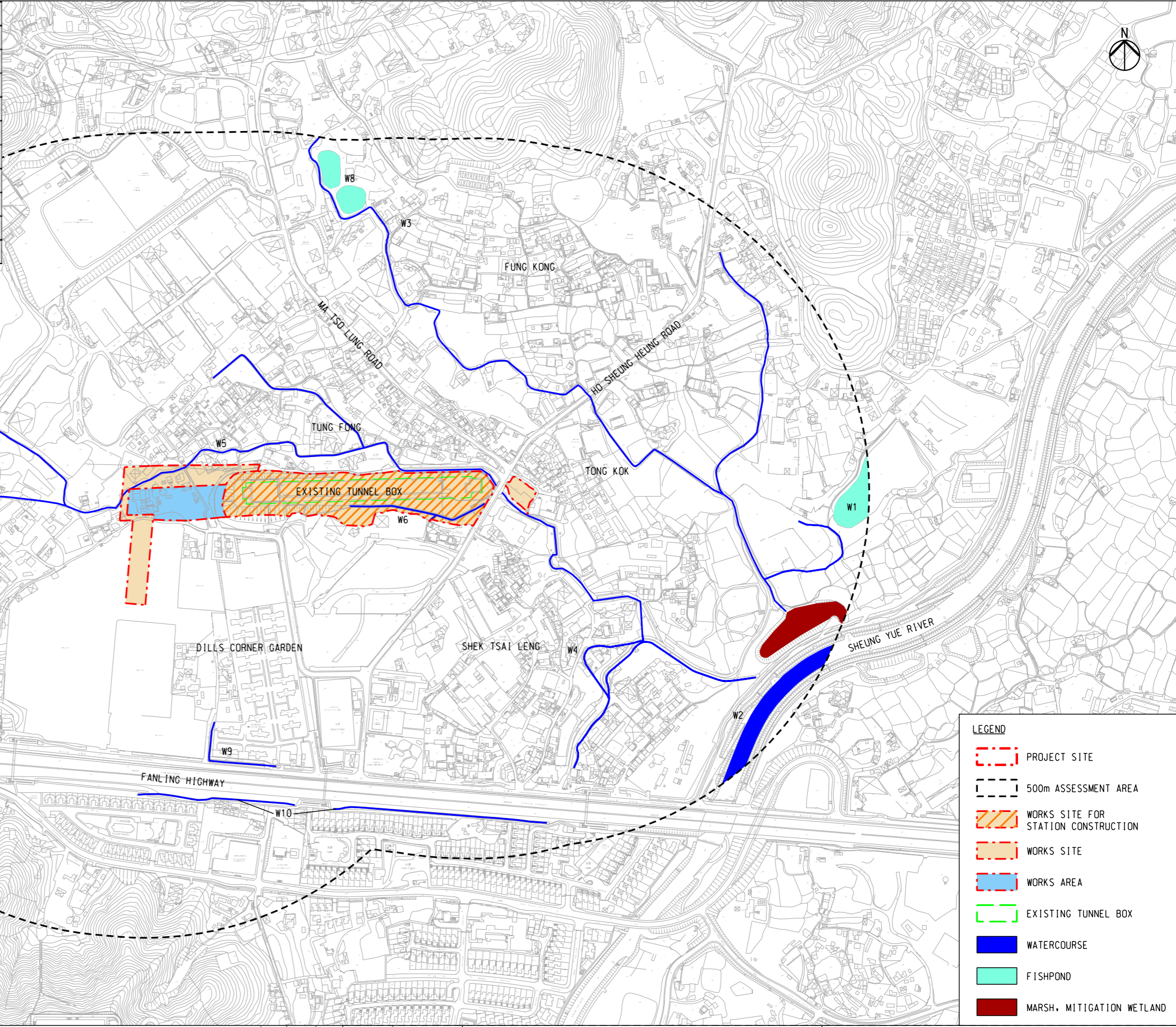


LEGEND	
	PROJECT SITE
	WORKS SITE FOR STATION CONSTRUCTION
	WORKS SITE
	WORKS AREA
	EXISTING TUNNEL BOX
	500m ASSESSMENT AREA
	KTN NDA DEVELOPMENT
	KTN NDA ADVANCE STAGE DEVELOPMENT
	REPRESENTATIVE PLANNED AIR/ NOISE SENSITIVE RECEIVERS

DRAWN BS DESIGNED BS CHECKED JC APPROVED FC DATE 27/10/21								TITLE VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE LOCATION OF REPRESENTATIVE PLANNED AIR AND NOISE SENSITIVE RECEIVERS			
B SECOND ISSUE BY BS DATE 10/21 APPROVED FC				ORIGINATOR Supported by Arcadis Hong Kong Ltd.				SCALE 1 : 5000 (A3) DRAWING NO. FIGURE 7.2			
A FIRST ISSUE BY BS DATE 09/21 APPROVED FC				CADD REF. Figure 7.2 - Location of Representative Planned Air and Noise Sensitive Receivers				REV. B			

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 PLOT DRI: 1/17/2021 12:33 PM
 MODELNAME: C:\PROJ\05_Env\13_Drawing\Deliverables\report\105_Environmental\Review_Report1_ERM\Draft_4\Figure 9.1_Location of Existing Water Sensitive Receiver.sgn
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WSR	Description
W1	Pond at Ho Sheung Heung
W2	River Beas (also known as "Sheung Yue River")
W3	Fung Kong watercourse
W4	Kwu Tung watercourse
W5	Tung Fong/Shek Tsai Ling watercourse
W6	Watercourse at the south of LMC Spur Line
W7	Pak Shek Au watercourse
W8	Ponds near Fung Kong
W9	Watercourse at the north of Fanling Highway
W10	Watercourse at the south of Fanling Highway



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B	SECOND ISSUE				BS	10/21	FC		
A	FIRST ISSUE				BS	09/21	FC		

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DATE	04/11/21

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TITLE		SCALE	DRAWING NO.	REV.
VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE LOCATION OF EXISTING WATER SENSITIVE RECEIVERS		AS SHOWN	FIGURE 9.1	C





REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
B	SECOND ISSUE				BS	11/21	FC		
A	FIRST ISSUE				BS	10/21	FC		

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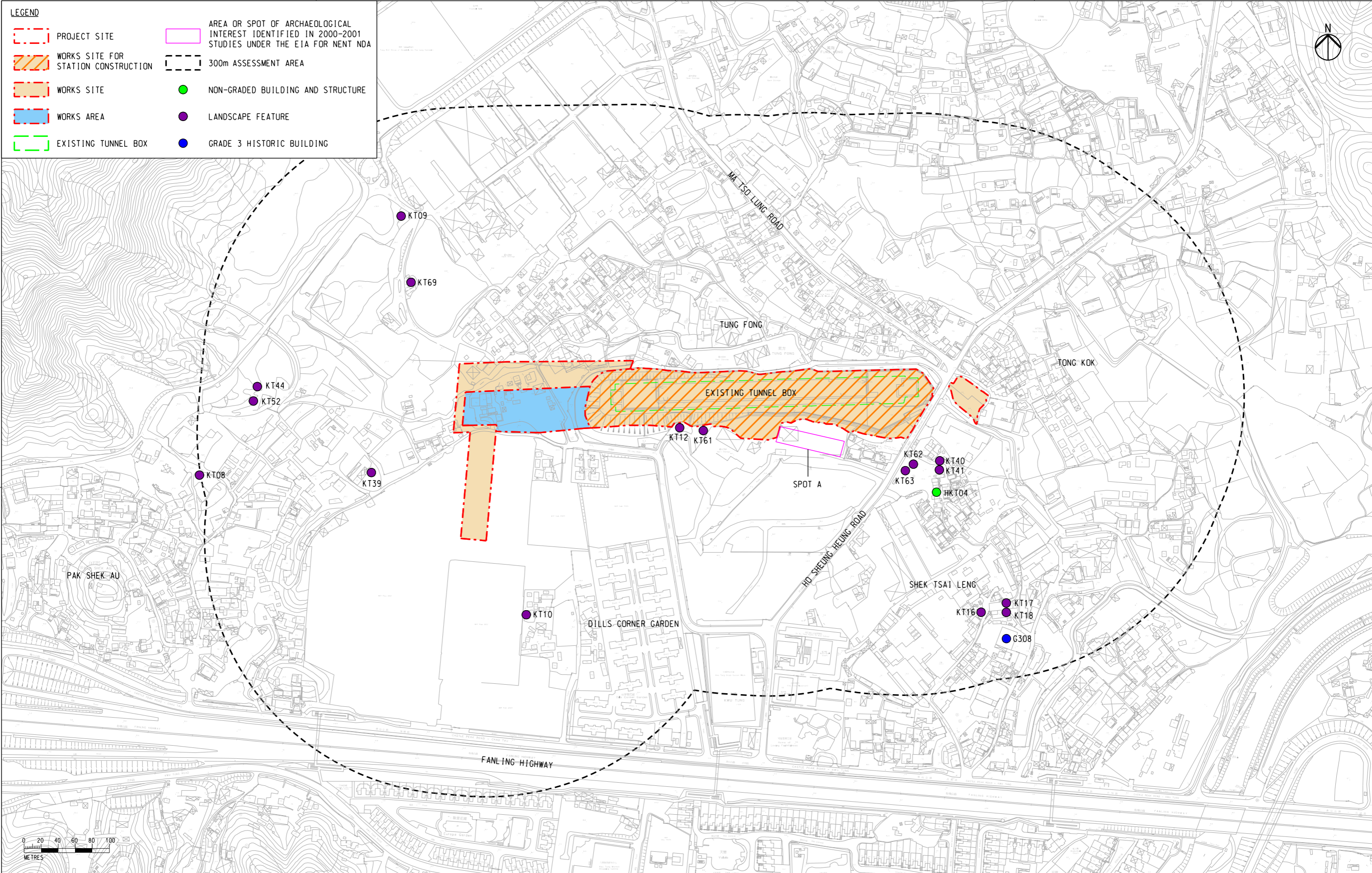
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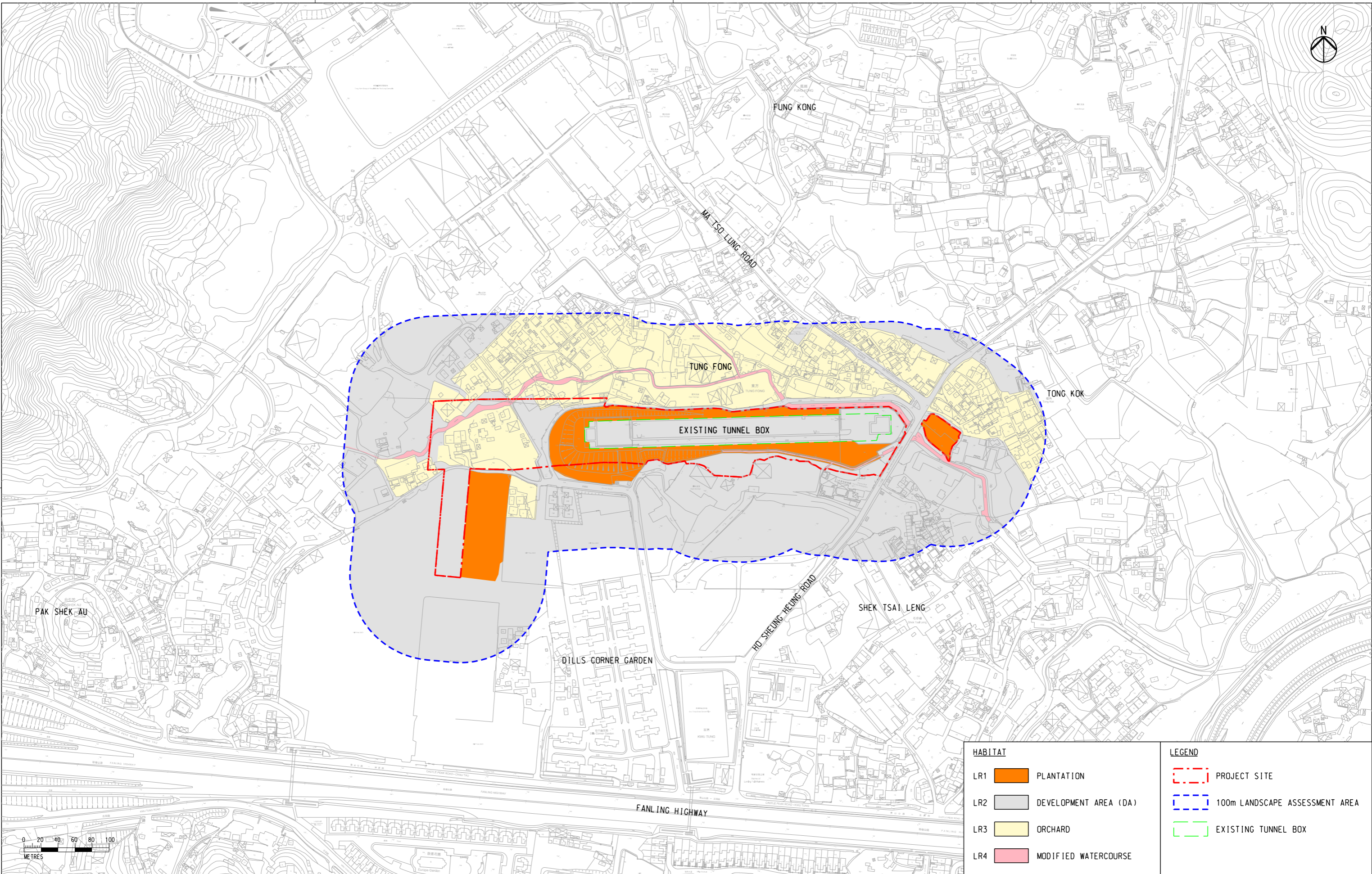
CADD REF. Figure 11.1 - Site Survey Photos

TITLE VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE SITE SURVEY PHOTOS	
SCALE 1 : 4000 (A3)	DRAWING NO. FIGURE 11.1
REV. B	

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 Drawing Deliverables\report\05 Environmental\Review Report\ERR\Draft\Figures\12- Locations of Built Heritages and Spot of Archaeological Interest
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DESIGNED		BS				ORIGINATOR		LOCATIONS OF BUILT HERITAGES AND SPOT OF ARCHAEOLOGICAL INTEREST			
CHECKED		JC				Supported by: Arcadis Hong Kong Ltd.		SCALE		1 : 4000 (A3)	
APPROVED		FC						DATE		DRAWING NO.	
DATE		11/2021		CADD REF.		Figure 12.1 - Locations of Built Heritages and Spot of Archaeological Interest		REV.		A	
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A	FIRST ISSUE	BS	11/21	FC							



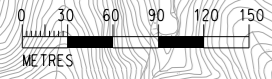
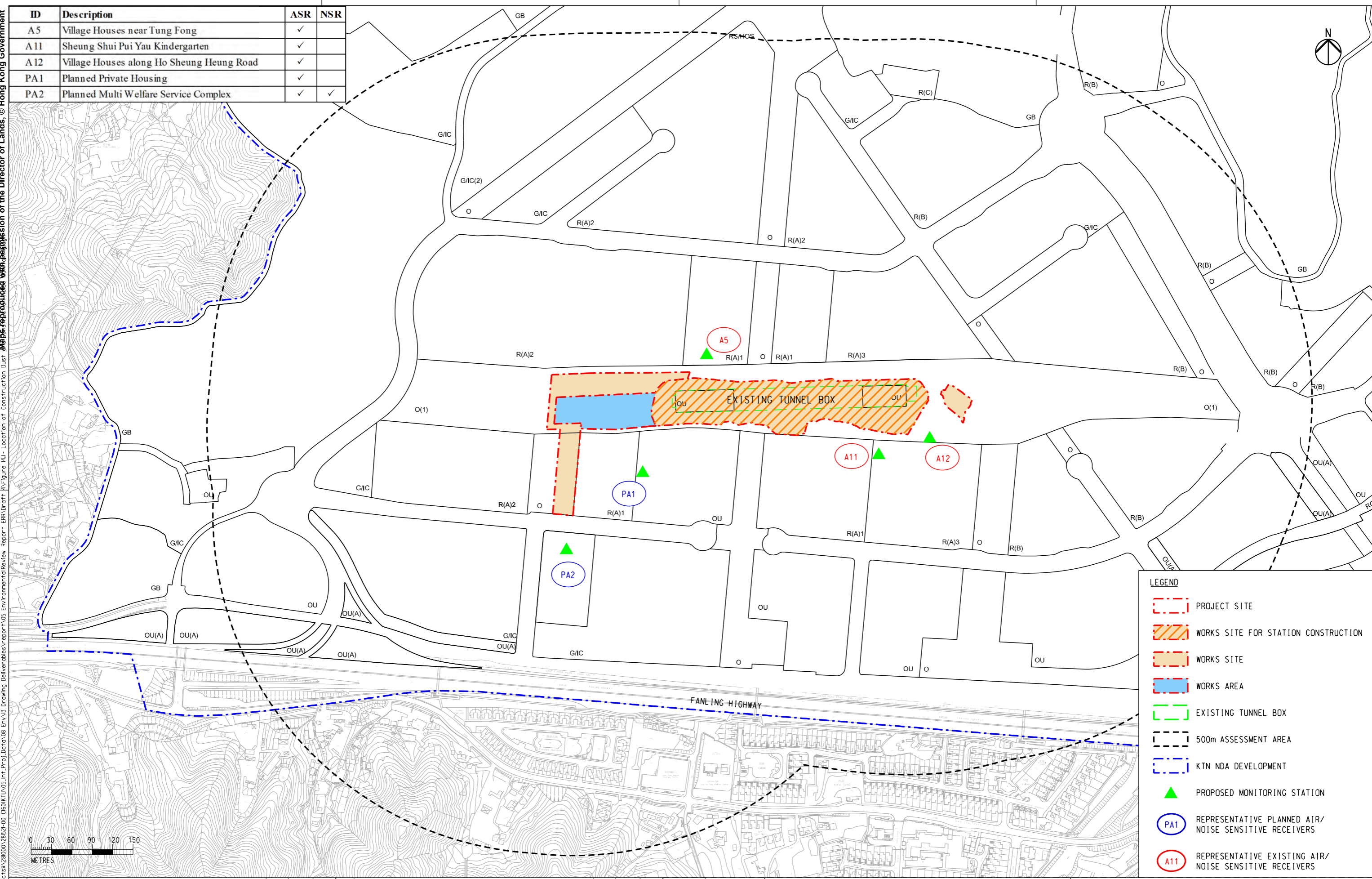
HABITAT		LEGEND	
LR1	PLANTATION	PROJECT SITE	
LR2	DEVELOPMENT AREA (DA)	100m LANDSCAPE ASSESSMENT AREA	
LR3	ORCHARD	EXISTING TUNNEL BOX	
LR4	MODIFIED WATERCOURSE		

DRAWN		BS		MTR		ORIGINATOR		Supported by :		TITLE	
DESIGNED		BS		ARUP		Arcadis Hong Kong Ltd.				VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE LANDSCAPE RESOURCES PLAN	
CHECKED		JC		DATE		04/11/21				SCALE	
APPROVED		FC		BY						DRAWING NO.	
DATE		04/11/21		REV		A		DESCRIPTION		FIGURE 13.1	
REV		B		BY		BS		DATE		REV	
DESCRIPTION		SECOND ISSUE		BY		BS		DATE		B	
DESCRIPTION		FIRST ISSUE		BY		BS		DATE		B	
DESCRIPTION		FIRST ISSUE		BY		BS		DATE		B	

Figure 13.1 - Landscape Resources Plan

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 PLOT DATE: 17/10/2021 4:34:07 PM
 MODEL\$: \MGP530\Project\1828000\2852-00_06\K1\U05.dwg
 FILENAME: Drawing Deliverables\report\05_Environmental\Review_Report\ERR\Draft\Figure 14.1 - Location of Construction Dust and Construction Noise Monitoring

ID	Description	ASR	NSR
A5	Village Houses near Tung Fong	✓	
A11	Sheung Shui Pui Yau Kindergarten	✓	
A12	Village Houses along Ho Sheung Heung Road	✓	
PA1	Planned Private Housing	✓	
PA2	Planned Multi Welfare Service Complex	✓	✓



LEGEND	
	PROJECT SITE
	WORKS SITE FOR STATION CONSTRUCTION
	WORKS SITE
	WORKS AREA
	EXISTING TUNNEL BOX
	500m ASSESSMENT AREA
	KTN NDA DEVELOPMENT
	PROPOSED MONITORING STATION
	REPRESENTATIVE PLANNED AIR/NOISE SENSITIVE RECEIVERS
	REPRESENTATIVE EXISTING AIR/NOISE SENSITIVE RECEIVERS

DRAWN BS				DESIGNED BS				CHECKED JC				APPROVED FC				DATE 27/10/21				ORIGINATOR				TITLE											
B SECOND ISSUE				BS 10/21				FC				A FIRST ISSUE				BS 09/21				FC				VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE LOCATION OF CONSTRUCTION DUST AND CONSTRUCTION NOISE MONITORING											
BY				DATE				APPROVED				BY				DATE				APPROVED				SCALE 1 : 5000 (A3)				DRAWING NO. FIGURE 14.1				REV. A			
REV				DESCRIPTION				BY				DATE				APPROVED				CADD REF. Figure 14.1 - Location of Construction Dust and Construction Noise Monitoring				SCALE 1 : 5000 (A3)				DRAWING NO. FIGURE 14.1				REV. A			



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Appendix 1.1

**Demarcation of Kwu Tung
Station in Approved EIA for
LMC Spur Line**

Appendix 5.1

Representative Photos of Habitats



Plantation within Project Site



Developed Area within Project Site



Developed Area (flood retention area) within Project Site



Village / Orchard within Project Site



Modified Watercourse within Project Site



Developed Area (construction site) within 100m Site Appraisal Area

Appendix 5.1

Title: Representative Photos of Habitats

Drawn by: Ivan Wan

Checked by: Franki Chiu

Project: Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line

Rev.: 0

Date: 13th August 2021



Village / Orchard within 100m Site Appraisal Area



Modified Watercourse within 100m Site Appraisal Area

Appendix 5.1

Title: Representative Photos of Habitats

Drawn by: Ivan Wan

Checked by: Franki Chiu

Project: Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line

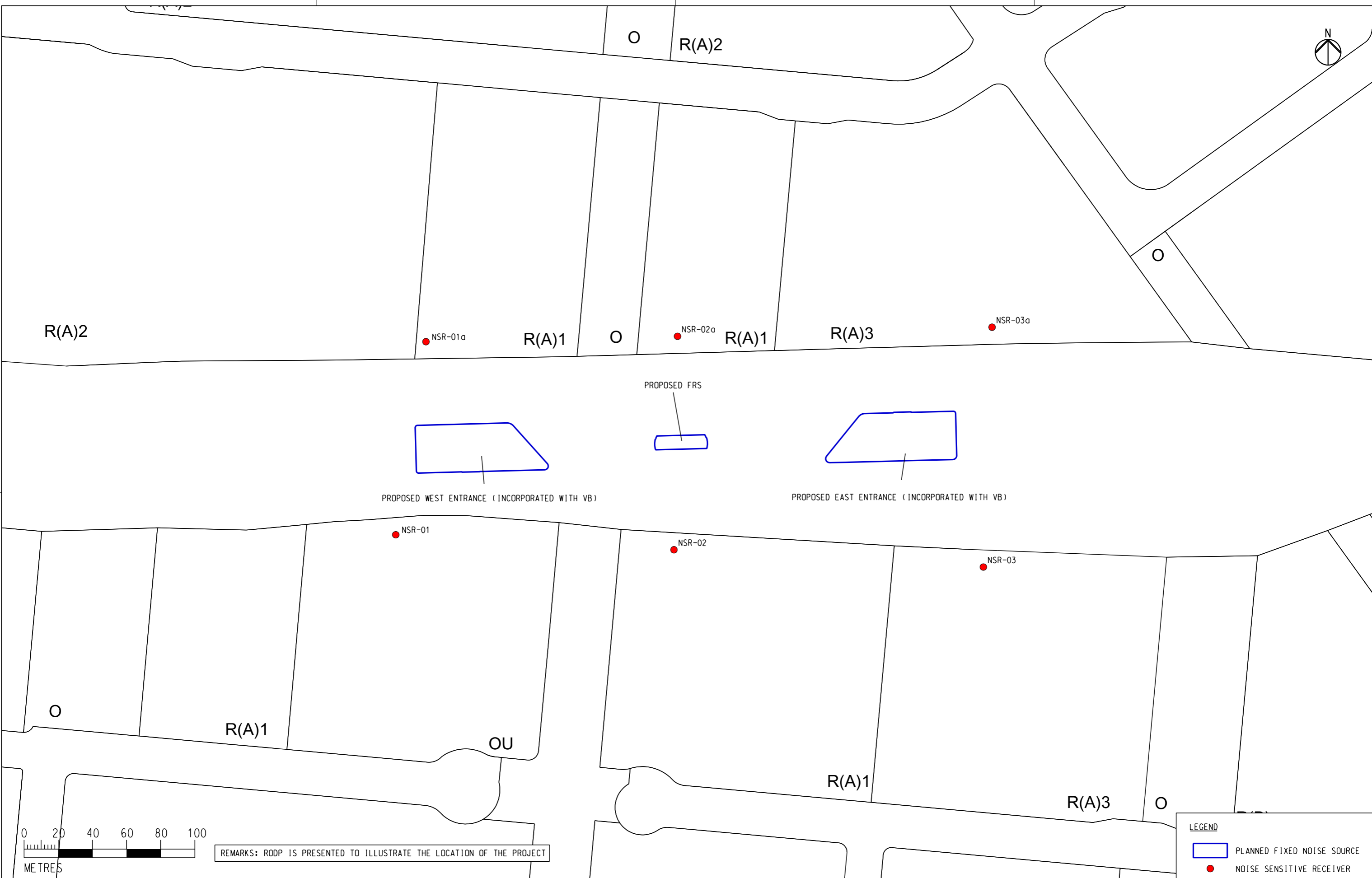
Rev.: 0

Date: 30th August 2021

Appendix 8.1

Calculation of Maximum Allowable SWLs for Planned Fixed Noise Sources

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REMARKS: RODP IS PRESENTED TO ILLUSTRATE THE LOCATION OF THE PROJECT

LEGEND

- PLANNED FIXED NOISE SOURCE
- NOISE SENSITIVE RECEIVER

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
A	FIRST ISSUE	BS	10/21	FC					

DRAWN	BS
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CHECKED	JC
APPROVED	FC
DATE	27/10/21

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CADD REF. Appendix 8.1 - Location of Planned Fixed Noise Source

TITLE
 VARIATION OF ENVIRONMENTAL PERMIT (VEP)
 OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE
 LOCATION OF PLANNED FIXED NOISE SOURCES

SCALE: 1 : 2000 (A3) DRAWING NO. APPENDIX 8.1 REV. A

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Maximum Allowable Sound Power Level for Planned Fixed Noise Sources and Noise Criteria

Source Location	Source Description	Max. SWL , dB(A)
Proposed West Entrance (Incorporated with VB)	North façade	82
	East façade	82
	South façade	80
	West façade	82
	Roof	82
Proposed FRS	North façade	88
	South façade	88
Proposed East Entrance (Incorporated with VB)	North façade	82
	East façade	82
	South façade	84
	West façade	82
	Roof	82

NSR ID	Land Use	ASR	Day and Evening Time Criteria (ANL - 5), dB(A)	Nighttime Criteria (ANL - 5), dB(A)	Noise Criteria for Planned Noise Source, dB(A)
NSR-01	Education	B	60	N/A	60
NSR-01a	Residential premises	B	60	50	50
NSR-02	Residential premises	B	60	50	50
NSR-02a	Residential premises	B	60	50	50
NSR-03	Residential premises	B	60	50	50
NSR-03a	Residential premises	B	60	50	50

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-01 (School)

Predicted Fixed Noise Level at NSR-01 (School)

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	65	-44	3	-10	31
	East façade		82	95	-48	3	-10	27
	South façade		80	35	-39	3	0	44
	West façade		82	35	-39	3	0	46
	Roof		82	35	-39	3	0	46
FRS	North façade	B	88	160	-52	3	-10	29
	South façade		88	155	-52	3	0	39
Proposed East Entrance (Incorporated with VB)	North façade	B	82	280	-57	3	-10	18
	East façade		82	325	-58	3	-10	17
	South façade		84	255	-56	3	0	31
	West façade		82	255	-56	3	0	29
	Roof		82	255	-56	3	0	29
Overall Noise level, dB(A)								51
Noise Criteria for Planned Noise Source, dB(A)								60
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

[2] -10dB(A) is adopted for the louve that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-01a

Predicted Fixed Noise Level at NSR-01a

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	45	-41	3	0	44
	East façade		82	65	-44	3	-10	31
	South façade		80	75	-46	3	-10	27
	West façade		82	45	-41	3	0	44
	Roof		82	45	-41	3	0	44
FRS	North façade	B	88	145	-51	3	0	40
	South façade		88	145	-51	3	-10	30
Proposed East Entrance (Incorporated with VB)	North façade	B	82	255	-56	3	0	29
	East façade		82	310	-58	3	-10	17
	South façade		84	245	-56	3	-10	22
	West façade		82	255	-56	3	0	29
	Roof		82	245	-56	3	0	29
Overall Noise level, dB(A)								49
Noise Criteria for Planned Noise Source, dB(A)								50
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

[2] -10dB(A) is adopted for the louve that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-02

Predicted Fixed Noise Level at NSR-02

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	120	-50	3	-10	25
	East façade		82	85	-47	3	0	38
	South façade		80	85	-47	3	0	36
	West façade		82	155	-52	3	-10	23
	Roof		82	85	-47	3	0	38
FRS	North façade	B	88	65	-44	3	-10	37
	South façade		88	60	-44	3	0	48
Proposed East Entrance (Incorporated with VB)	North façade	B	82	135	-51	3	-10	24
	East façade		82	170	-53	3	-10	22
	South façade		84	100	-48	3	0	39
	West façade		82	100	-48	3	0	37
	Roof		82	100	-48	3	0	37
Overall Noise level, dB(A)								50
Noise Criteria for Planned Noise Source, dB(A)								50
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

[2] -10dB(A) is adopted for the louve that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-02a

Predicted Fixed Noise Level at NSR-02a

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	110	-49	3	0	36
	East façade		82	110	-49	3	0	36
	South façade		80	110	-49	3	-10	24
	West façade		82	160	-52	3	-10	23
	Roof		82	110	-49	3	0	36
FRS	North façade	B	88	60	-44	3	0	48
	South façade		88	65	-44	3	-10	37
Proposed East Entrance (Incorporated with VB)	North façade	B	82	115	-49	3	0	35
	East façade		82	165	-52	3	-10	22
	South façade		84	110	-49	3	-10	28
	West façade		82	110	-49	3	0	36
	Roof		82	110	-49	3	0	36
Overall Noise level, dB(A)								49
Noise Criteria for Planned Noise Source, dB(A)								50
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

[2] -10dB(A) is adopted for the louve that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-03

Predicted Fixed Noise Level at NSR-03

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	290	-57	3	-10	18
	East façade		82	260	-56	3	0	29
	South façade		80	260	-56	3	0	26
	West façade		82	335	-59	3	-10	16
	Roof		82	260	-56	3	0	29
FRS	North façade	B	88	175	-53	3	-10	28
	South façade		88	175	-53	3	0	38
Proposed East Entrance (Incorporated with VB)	North façade	B	82	90	-47	3	-10	28
	East façade		82	65	-44	3	0	41
	South façade		84	65	-44	3	0	43
	West façade		82	110	-49	3	-10	26
	Roof		82	65	-44	3	0	41
Overall Noise level, dB(A)								47
Noise Criteria for Planned Noise Source, dB(A)								50
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

[2] -10dB(A) is adopted for the louvre that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Project : Variation of Environmental Permit (VEP) of Sheung Shui to Lok Ma Chau Spur Line
 Project no. : 281521
 Title: Predicted Fixed Noise Level at NSR-03a

Predicted Fixed Noise Level at NSR-03a

Source Location	Source Description	ASR	Max. SWL, dB(A)	Shortest Horizontal Distance to NAP, m	Correction, dB(A) ^[1]			Predicted Noise Level, dB(A)
					Distance	Facade	Line of sight ^[2]	
Proposed West Entrance (Incorporated with VB)	North façade	B	82	290	-57	3	0	28
	East façade		82	260	-56	3	0	29
	South façade		80	260	-56	3	-10	16
	West façade		82	340	-59	3	-10	16
	Roof		82	270	-57	3	0	28
FRS	North façade	B	88	175	-53	3	0	38
	South façade		88	180	-53	3	-10	28
Proposed East Entrance (Incorporated with VB)	North façade	B	82	45	-41	3	0	44
	East façade		82	45	-41	3	0	44
	South façade		84	75	-46	3	-10	32
	West façade		82	90	-47	3	-10	28
	Roof		82	45	-41	3	0	44
Overall Noise level, dB(A)								49
Noise Criteria for Planned Noise Source, dB(A)								50
Comply								Y

Note:

[1] If tonality is confirmed during noise commissioning test at receiver, tonality correction should be considered according to Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites.

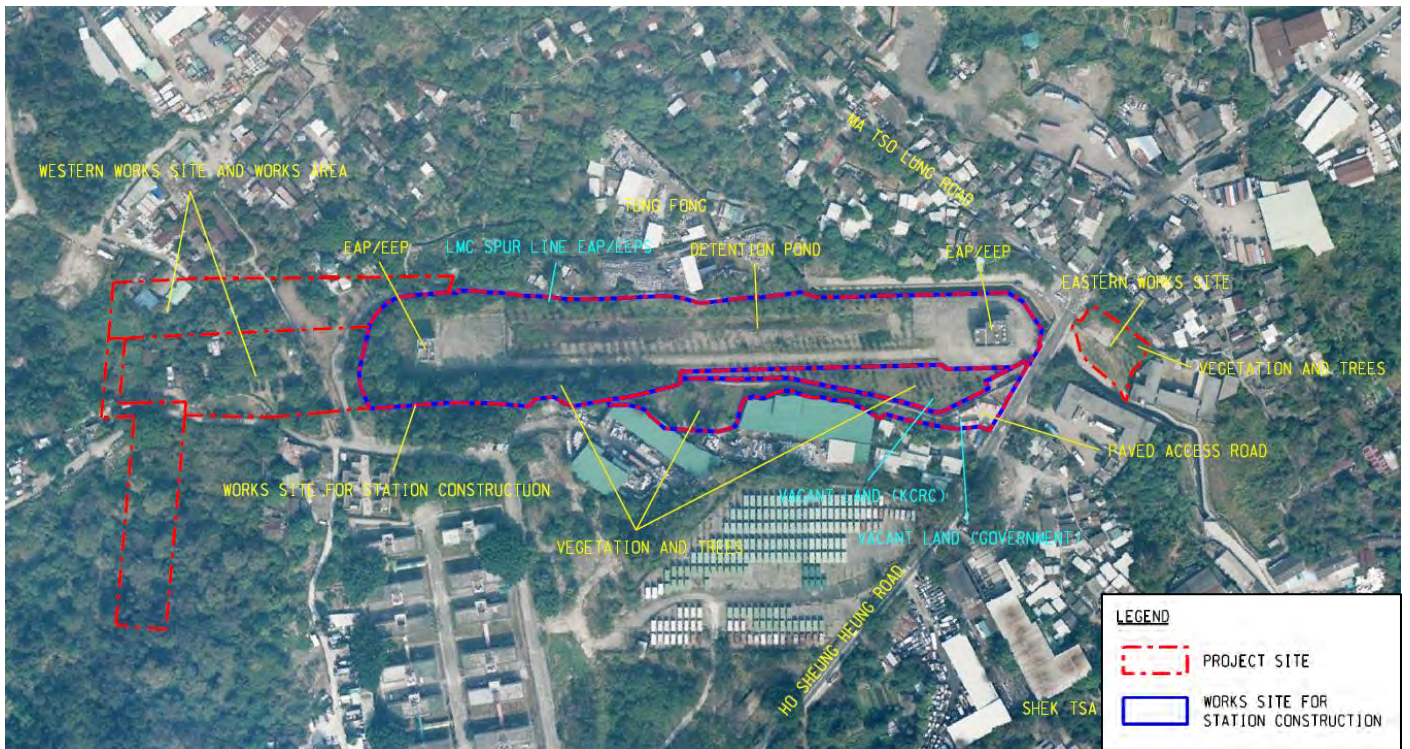
[2] -10dB(A) is adopted for the louvre that cannot be viewed from the NSR due to its opening orientation is not towards the NSR or screened by other buildings.

Appendix 11.1

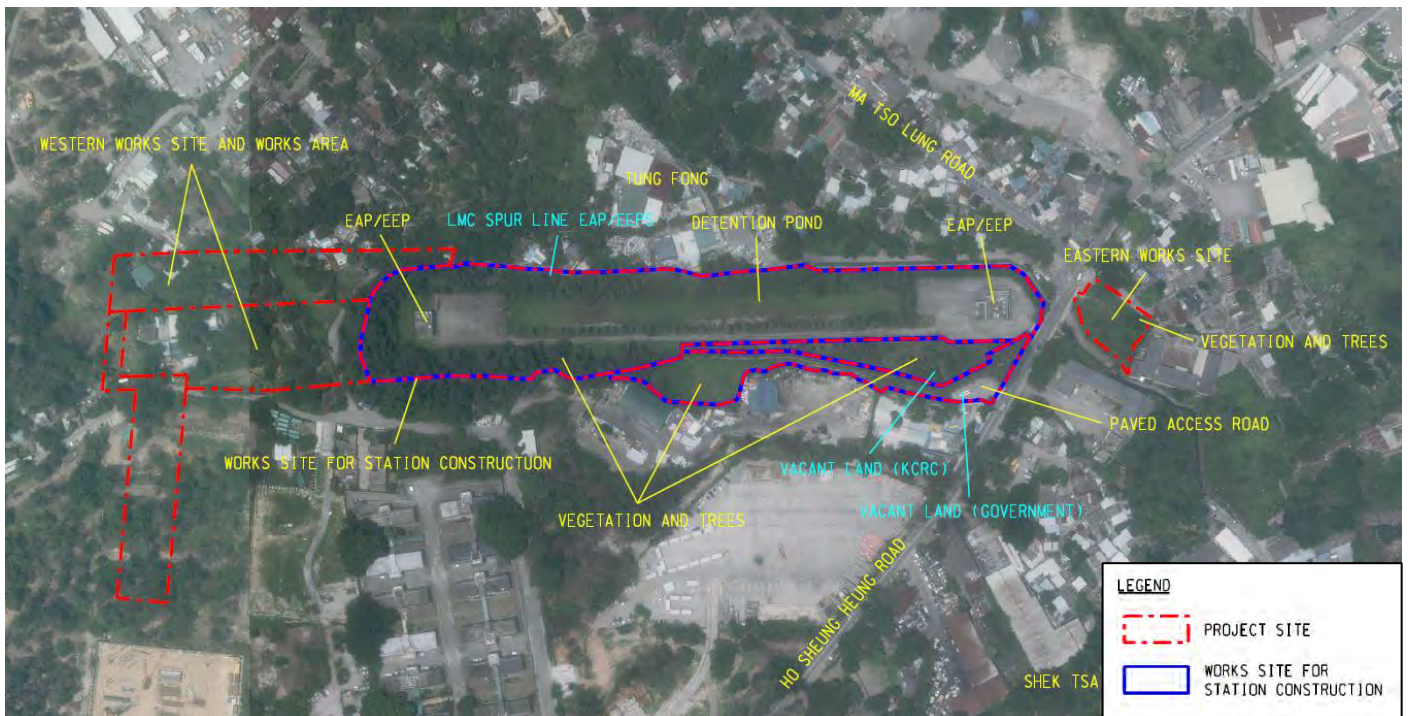
Historical Aerial Photos

Historical Aerial Photos

2014

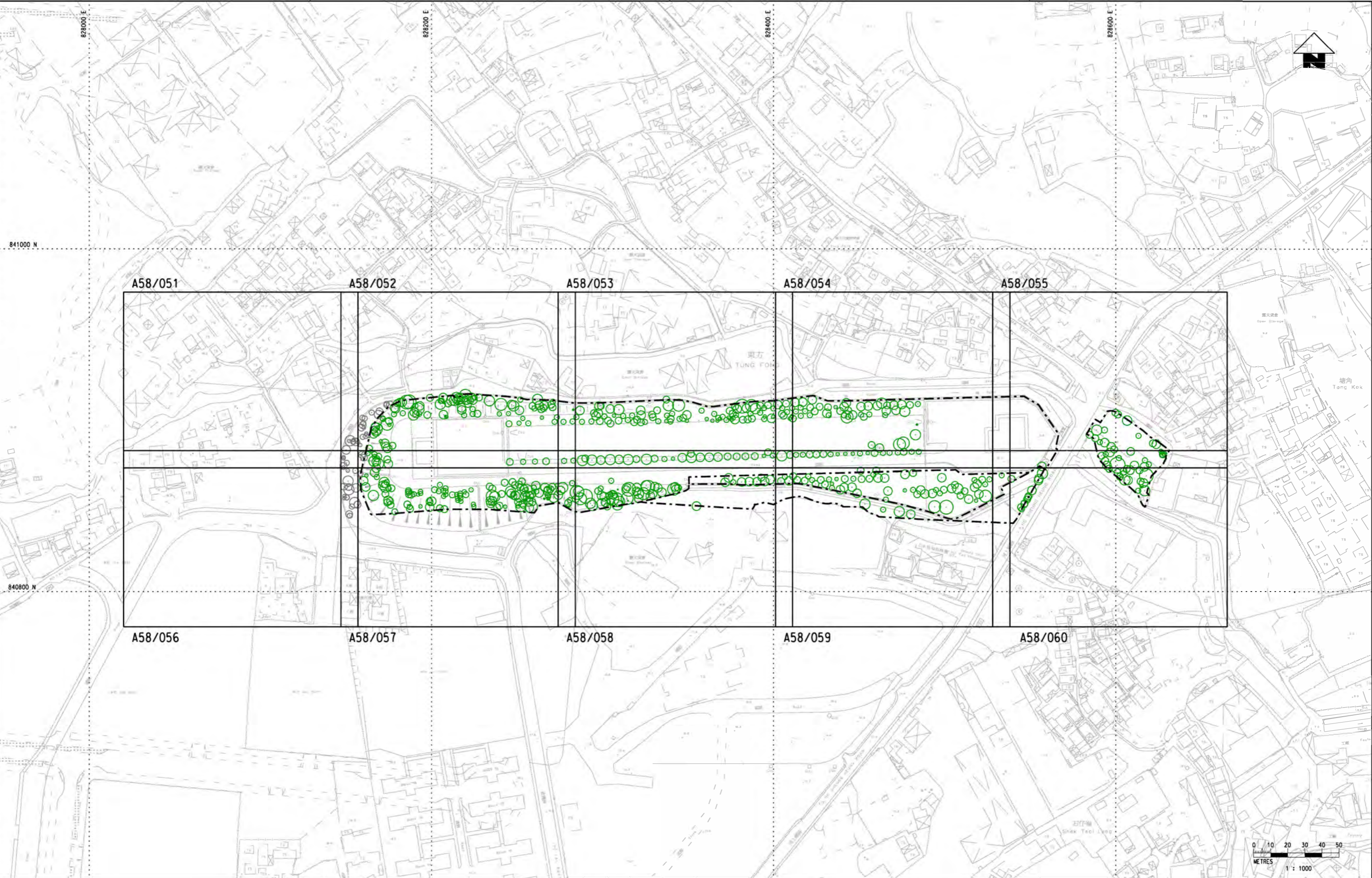


2020



Appendix 13.1

Tree Survey Plan



PLOT DRY: V:\128521-660\CAD_ADMIN\PLT_DRIVER\MTRC_A3-PDF.plt
 DATE: 17/09/2021 4:44:47 PM
 USER: wilsongmak
 FILENAME: V:\128521-660\ARUP_Landscape\REPORT\Appendix 13\Appendix13.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	---
DESIGNED	---
CHECKED	---
APPROVED	NP
DATE	---

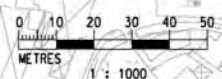
MTR

ORIGINATOR

ARUP Supported by **ARCADIS**

CADD REF. Appendix13.1.dgn

TITLE		VARIATION OF ENVIRONMENTAL PERMIT (VEP) OF SHEUNG SHUI TO LOK MA CHAU SPUR LINE	
TREE SURVEY PLAN			
SCALE	DRAWING NO.		
1 : 1000 (A1)	APPENDIX 13.1		
			REV. C



Appendix 14.1

Sample Data Sheet for TSP Monitoring

Data Sheet for TSP Monitoring

Monitoring Location		
Details of Location		
Sampler Identification		
Date & Time of Sampling		
Elapsed-time Meter Reading	Start (min.)	
	Stop (min.)	
Total Sampling Time (min.)		
Weather Conditions		
Site Conditions		
Initial Flow Rate, Qsi	Pi (mmHg)	
	Ti (C)	
	Hi (in.)	
	Qsi (Std. m ³)	
Final Flow Rate, Qsf	Pf (mmHg)	
	Tf (C)	
	Hf (in.)	
	Qsf (Std. m ³)	
Average Flow Rate (Std. m ³)		
Total Volume (Std. m ³)		
Filter Identification No.		
Initial Wt. of Filter (g)		
Final Wt. of Filter (g)		
Measured TSP Level (µg/m ³)		

Name & Designation

Signature

Date

Field Operator :

Laboratory Staff :

Checked by :

Appendix 14.2

Sample Data Sheet for Construction Noise Monitoring

Noise Monitoring Field Record Sheet

Monitoring Location		
Description of Location		
Date of Monitoring		
Measurement Start Time (hh:mm)		
Measurement Time Length(min.)		
Noise Meter Model/Identification		
Calibrator Model/Identification		
Measurement Results	L ₉₀ (dB(A))	
	L ₁₀ (dB(A))	
	Leq (dB(A))	
Major Construction Noise Source(s) During Monitoring		
Other Noise Source(s) During Monitoring		
Remarks		

Name & Designation

Signature

Date

Recorded By :

Checked By :

Appendix 14.3

Sample Template for Interim Notification

Sample Template for Interim Notifications of Environmental Quality Limits Exceedances

Incident Report on Action Level or Limit Level Non-compliance

Project	
Date	
Time	
Monitoring Location	
Parameter	
Action & Limit Levels	
Measured Level	
Possible reason for Action or Limit Level Non-compliance	
Actions taken / to be taken	
Remarks	

Location Plan

Prepared by :

Designation :

Signature :

Date :