

Project Title:

**Site Formation and Associated Infrastructural Works for
Development of Columbarium, Crematorium and Related
Facilities at Sandy Ridge Cemetery**

Contract No.

CEDD Contract CV/2017/02

**Development of Columbarium at Sandy Ridge
Cemetery – Infrastructural Works at Man Kam To Road
and Lin Ma Hang Road**


Traffic Noise Mitigation Plan

Document No: CV/2017/02/R0021r10

Revision: 10

Date: 21 November 2023

Certified By:

Position	Signature	Name	Date
Environmental Team Leader		Mr. T.W. Tam	21 Nov 2023

Our Ref: TCS00944/18/300/L0496

**Civil Engineering and Development Department
Civil Engineering Office
Land Works Division**

Section 8

2/F, Civil Engineering and Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Attn: Mr. CHAU Wai Tong

23 November 2023

By email

Dear Sirs,

**Re: Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road
Environmental Permit no. EP-534/2017/A Condition 2.23 and Condition 2.24
Traffic Noise Mitigation Plan (Revision 10)**

With reference to the Traffic Noise Mitigation Plan (Revision 10) prepared for the respective geographic location of Contract CV/2017/02 under Environmental Permit no. EP-534/2017/A Condition 2.23, which included the measures to mitigate ecological impacts from noise barriers for Condition 2.24. We have no adverse comment and hereby certify the aforementioned submission in accordance with General Condition 1.9 of EP-534/2017/A.

Should you have any queries, please feel free to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or Email: twtam@fordbusiness.com.

Yours sincerely,

For and on Behalf of

Action-United Environmental Services & Consulting (AUES)



T. W. Tam
Environmental Team Leader
TW/nh

cc	Arup (RE)	Mr. Anthony Lau	By-email
	Acuity (IEC)	Mr. Jacky Leung	By-email
	Sang Hing (Contractor)	Mr. Elvin Lam	By-email

Our Ref.: PL-202311057

LAND WORKS DIVISION
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
2/F, CIVIL ENGINEERING AND DEVELOPMENT BUILDING
101, PRINCESS MARGARET ROAD
HOMANTIN, KOWLOON
HONG KONG

Attention: Mr. Steven Shum

23 November 2023

Dear Steven,

**Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road
Traffic Noise Mitigation Plan**

I referred to the email from ET concerning the captioned. We have no adverse comment on the revised Traffic Noise Mitigation Plan (Revision 10) with document No. CV/2017/02/R0021r10. In accordance with Condition 2.23 of the Environmental Permit with permit no. EP-534/2017/A, I hereby verify the Traffic Noise Mitigation Plan has conformed to the information and recommendations contained in the approved EIA Report (Register No. AEIAR 198/2016) and included the measures to mitigate ecological impacts from noise barriers for Condition 2.24 of the Environmental Permit.

Yours faithfully,



Leung CH Jacky
Independent Environmental Checker

cc. ARUP – Mr. LEE Davis
ET Leader – Mr. TAM

Traffic Noise Mitigation Plan

Document No: CV/2017/02/R0021r10

Revision: 10

Date: 21 November 2023

Revision Summary

Revision	Description	Revised By	Date
0	First Submission	N/A	3 Oct 2018
1	Amended according to EPD's comment 25 Oct 2018	Ben Tam	18 Jan 2019
2	Amended according to EPD's comment 3 Apr 2019	Ben Tam	23 July 2019
3	Amended according to EPD's comment 31 Dec 2019 and the updated 2016-based TPEDM	Nicola Hon	27 May 2021
4	Amended according to EPD's comment 29 Jul 2021	Nicola Hon	31 Aug 2021
5	Amended according to EPD's comment 4 Nov 2022	Nicola Hon	25 Oct 2022
6	Amended according to EPD's comment 30 Dec 2022	Nicola Hon	15 Feb 2023
7	Amended according to EPD's comment 16 May 2023	Nicola Hon	31 May 2023
8	Amended according to EPD's comment 16 May 2023	Nicola Hon	27 July 2022
9	Amended according to EPD's comment	Nicola Hon	2 Nov 2023
10	Amended according to EPD's comment	Nicola Hon	21 Nov 2023

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1. INTRODUCTION

1.1 THE CONTRACT DESCRIPTION

1.1.1 Civil Engineering and Development Department (hereafter referred as “CEDD”) is the Project Proponent for the Project “Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery” (hereafter referred as “the Project”). The Project is a Designated Project to be implemented under Environmental Permit (EP) No. EP-534/2017/A. To facilitate the Project management, the Project works were separated into three different Contracts and they are listed below.

- CEDD Contract No. CV/2016/10 - Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery (hereafter referred as “Contract 1”) - to be implemented under FEP-01/534/2017/A
- CEDD Contract No. CV/2017/02 - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road for Development of Columbarium at Sandy Ridge Cemetery (hereafter referred as “Contract 2”) - to be implemented under EP-534/2017/A; and
- Other CEDD’s Contract as related Development of Columbarium at Sandy Ridge Cemetery (hereafter referred as “Contract 3”) - to be implemented under EP-534/2017/A

1.1.2 Sang Hing Civil Contractors Co., Ltd (hereinafter called the “Sang Hing”) was awarded the CEDD Contract No. CV/2017/02 “Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road” on 23 May 2018. The Contract layout plan is shown in *Annex A*.

1.1.3 Construction works under Contract 2 were commenced in early November 2018. Major works to be executed under the Contract shall include the following:

- (i) Site formation works and associated drainage, sewerage and landscape works for development of Columbarium at Sandy Ridge Cemetery;
- (ii) Widening of about 1.4km of the existing Lin Ma Hang Road; and
- (iii) Associated drainage, sewerage, waterworks and utility works along Man Kam To Road and Lin Ma Hang Road.

1.2 SUBMISSION REQUIREMENT

1.2.1 According to Environmental Impact Assessment (EIA) Report Section 5, road traffic noise impact during the operational phase arising from the Project could be mitigated by implementing the recommended noise barriers and low noise surfacing materials at the suggested locations.

1.2.2 Pursuant to Environmental Permit *EP-534/2017/A Condition 2.23*, the Permit Holder shall, no later than one month before the commencement of construction of the Project, submit the copy of Traffic Noise Mitigation Plan to EPD for approval. The Plan or any Updated Plan shall demonstrate that the traffic noise performance requirements set out in the EIA (Register No.:” AEIAR-198/2016) will not be exceeded with the mitigation measures in place.

1.2.3 This Traffic Noise Mitigation Plan is prepared and submitted to fulfill the respective geographic location of Contract 2 under *EP-534/2017/A Condition 2.23*. All mitigation measures recommended in the approved Traffic Noise Mitigation Plan or approved Updated Plan shall be fully implemented and properly maintained. Traffic noise mitigation measures would also be addressed for Contract 1 under submission of *FEP-01/534/2017/A Condition 2.22* and for Contract 3 to be awarded in due course.

1.2.4 According to the EIA, poor designed noise barrier do pose a risk on flying birds especially those with transparent material being utilized and potential risk of collision mortality may be minimised by the use of opaque, non-reflective panels where appropriate. In light of that, all requirements under *EP-534/2017/A Condition 2.24*, i.e., noise barriers shall be opaque, non-

transparent and non-reflective to minimize mortality impacts on birds, unless with the written approval of the Director, will be implemented and properly maintained as well.

2. TRAFFIC NOISE MITIGATION PLAN

2.1 INTRODUCTION

- 2.1.1 Exceedance of noise criteria as set out in *Table 1A of Annex 5 of TM-EIAO* are found in various existing and planned NSRs and direct noise mitigation measures should therefore be recommended. The consideration of noise mitigation measures has followed *Annex 13 of TM-EIAO and EIAO Guidance Note “Road Traffic Noise Impact Assessment under the Environmental Impact Assessment Ordinance”* [GN 12/2010].
- 2.1.2 According to Section 5 of the EIA report, a numbers of existing noise sensitive receivers (NSRs) (N5-2, N5-5, N5-6, N9-1, N18-1 to N18-6, N19-1) and planned NSRs (N23-P1 to N23-P5) would require mitigation measures according to the justifications mentioned. In order to alleviate the noise impacts as far as practicable, absorptive noise barriers (ANB) as defined in the *Guidelines on Design of Noise Barriers* and low noise surfacing materials have been considered and investigated as direct at-source mitigation measures.
- 2.1.3 In view of practicability, the use of permanent noise mitigation measures in form of noise barriers along Sha Ling Road and Lin Ma Hang Road, as well as low noise surfacing materials on sections of Lin Ma Hang Road are considered as effective mitigation measures. Issues and concerns such as user accessibility, road gradient, line of sight at road junctions, construction practicability and engineering matters have been considered during the configuration of the recommended traffic noise mitigation measures.
- 2.1.4 According to the EIA, the recommended noise barriers and low noise surfacing materials for affected existing NSRs and planned NSRs are summarised in Tables *I-1* and *I-2*.

Table I-1 Summary of Mitigation Measures for road traffic impact recommended in EIA (Existing NSRs)

Mitigation Measures ID	Location	Type of Noise Barrier ^[1]	Key NSRs Protected	Related Contract
MM1	Along Sha Ling Road	Approx. 12m long, 2.5m high ANB	N5-2	Contract 1
MM2	Along Sha Ling Road	Approx. 92m long, 2.5m high ANB	N5-5 and N5-6	Contract 1
MM3	Along Project Road near Sha Ling Road	Approx. 28m long, 3m high ANB	N9-1	Contract 3
MM4	Along Project Road near Sha Ling Road	Approx. 51m long, 3m high ANB	N9-1	Contract 3
MM5	Along Lin Ma Hang Road near San Uk Ling	Approx. 25m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6	Contract 2
MM6	Along Lin Ma Hang Road near San Uk Ling	Approx. 21m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6	Contract 2
MM7	Along Lin Ma Hang Road near San Uk Ling	Approx. 14m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6	Contract 2
MM8	Along Lin Ma Hang Road near San Uk Ling	Approx. 18m long, 3m high ANB	N18-5, N18-6	Contract 2
MM9	Along temporary pullover space opposite San Uk Ling	Approx. 42m long, 3m high ANB	N19-1	Contract 2
MM10	Along Lin Ma Hang Road opposite San Uk Ling	Approx. 93m long, 3m high ANB	N19-1	Contract 2
MM11	Along Lin Ma Hang Road near San Uk Ling	Approx. 185m long, Low Noise Surfacing Materials	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6	Contract 2

Note:

[1] ANB – Absorptive noise barrier (About 1m of lower portion will be absorptive).

Table 1-2 Summary of Mitigation Measures for road traffic impact recommended in EIA (Planned NSRs)

Mitigation Measures ID	Location	Type of Noise Barrier [1]	Key NSRs Protected	Related Contract
MM12	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 36m long, 5m high ANB	N23-P1, N23-P2	Contract 2
MM13	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 47m long, 5m high ANB	N23-P1, N23-P2, N23-P3	Contract 2
MM14	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 31m long, 5m high ANB	N23-P1, N23-P2, N23-P3	Contract 2
MM15	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 31m long, 5m high ANB	N23-P4	Contract 2
MM16	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 41m long, 5m high ANB	N23-P5	Contract 2
MM17	Along Lin Ma Hang Road near Muk Wu Nga Yiu[2]	Approx. 340m long, Low Noise Surfacing Materials	N23-P1, N23-P2, N23-P3, N23-P4, N23-P5	Contract 2

Note:

[1] ANB – Absorptive noise barrier (About 1m of lower portion will be absorptive).

[2] Planned NSRs are assigned within the “V” zone in N23.

2.2 IMPLEMENTATION OF NOISE BARRIERS FOR CONTRACT 2

Assumption in EIA

- 2.2.1 The relevant NSRs (existing and planned) under respective geographical location of Contract 2 of EP-534/2017/A included village houses near San Uk Ling - N18 (N18-1 to N18-9); village houses opposite to San Uk Ling – N19 (N19-1 to N19-3); village houses to the northeast of San Uk Ling – N20 (N20-1 to N20-3); village house of Muk Wu – N21 (N21-1 to N21-4) and village houses (planned NSRs) of Muk Wu Ngai Yiu – N23 (N23-1 to N23-7 & N23-P1 to N23-P5). They are all residential premise located along Lin Ma Hang Road and their locations are illustrated in *Annex B*.
- 2.2.2 According to the EIA, with Project implemented, NSRs N18-1 to N18-6, N19-1 and N23-P1-N23-P5 would exceed the traffic noise criterion (below 70dB(A) or equal) during the normal days and festive days, whereby noise mitigation measures were proposed. The noise mitigation measures by mean of traffic noise barriers recommended in the EIA are shown *Annex C*.
- 2.2.3 Although exceedance is still found in a few NSRs after exhaustion of direct mitigation measures, the concerned NSRs do not fulfil the testing criteria for indirect mitigation measure. In summary, with the implementation of the direct mitigation measures recommended in Section 5.6.6 in EIA, the project would help to alleviate the traffic noise at the concerned NSRs N18-1, N18-2, N18-3 and N18-4 in long run. Therefore, the residual impacts are not significant as assessed against the criteria indicated in EIA.

Change of Noise Barrier Panel Design

- 2.2.4 Upon the project commencement, the Project Designer advised that the ACABAS had requested the extent of the tinted transparent part had to be increased so that adults with average height can maintain the eye level on the tinted transparent part. Therefore, the noise barriers panels along Lin Ma Hang would be changed from absorptive noise barrier to tinted transparent noise barrier panels in order to fulfill the request from ACABAS committee. The Project Designer also clarified that the tinted transparent reflective noise barrier panel is noise reflective, but optically non-reflective. The design of noise barrier panel was accepted by Highways Department (HyD) and ACABAS during the 392nd ACABAS Meeting on 20th September 2016

and confirmed via memo ref. (54W9) in HyD LU/14-1/2 dated 3rd October 2016.

- 2.2.5 Furthermore, with reference to the CEDD's consultant's letter dated 25th September 2017, the design of noise barrier panel along Lin Ma Hang with drawings of tinted transparent reflective noise barrier were enclosed for agreement by AFCD. In AFCD's letter of 19th October 2017, AFCD expressed no adverse comment on the design of the noise barrier panel from nature conservation point of view. Justifications of the requirements on Condition 2.25 of EP-534/2017 (subsequent Condition 2.24 of EP-534/2017/A) were given in CEDD's consultant letter dated 31st October 2017 which revealed that the latest noise barrier design complies with EP Condition, i.e., noise barriers shall be opaque, non-transparent and non-reflective to minimize mortality impacts on birds, unless with the written approval of the Director. The design of noise barrier panels is shown in *Annex D*.

Review of Traffic Noise according to the 2016-based TPEDM

- 2.2.6 In view of the subsequent adjustment of site location of the proposed crematorium and funeral parlor, CEDD had applied for Variation of EP (VEP). The supporting document for the Application No. VEP-554/2018 was approved in December 2018 and the amended EP was issued on 24 December 2018 (EP No. EP-534/2017/A).
- 2.2.7 The original traffic forecast for the environmental assessment was developed based on 2011-based Territorial Population and Employment Data Matrix (TPEDM). The source of traffic along Lin Ma Hang Road would be mainly from the existing villages and the planned Frontier Closed Area Development. Yet, in the latest 2016-based TPEDM published by Planning Department in December 2019, the planned Frontier Closed Area Development is not included in the planned horizon of the TPEDM. In response to the change in planning assumptions in this area, the original traffic forecast on Lin Ma Hang Road will be superseded by event. Taking this occasion of traffic review on Lin Ma Hang Road, the latest 2016-based TPEDM has been adopted and it is anticipated that the traffic projection on Lin Ma Hang Road will be mainly based on the natural growth of the existing villages.
- 2.2.8 A technical note on revision of noise mitigation measures at Lin Ma Hang Road using 2016-based TPEDM (TN) was prepared that incorporated the methodology, change of traffic flow data and noise mitigation measures. The TN was submitted to PlanD, TD and EPD, and their consents have been obtained subsequently. Moreover, the surveys of NSRs identified in the EIA study have been conducted quarterly since June 2018. The survey schedule is attached in *Annex E*.
- 2.2.9 The computer programme, RoadNoise 2000, has been used to model traffic noise from road networks. It complies with the CRTN developed by the UK Department of Transport. The road traffic noise will be presented in terms of noise levels exceeded for 10% of the one-hour period during peak traffic flow [i.e. L10 (1hr) dB(A)]. Representative NSRs have been identified in the approved EIA report. The location, layout and orientation of NSRs adopted in the assessment for the technical note remain unchanged.
- 2.2.10 The future road traffic noise, under both unmitigated and mitigated scenarios, have been calculated based on peak hourly traffic for the maximum traffic projected within the next 15 years upon commencement of operation of the Project. According to the supporting document for the Application No. VEP-554/2018, the commissioning year of the Project will be in Year 2024, the traffic forecast for the assessment year of the Project has been revised to Year 2039, for scenarios of (i) with Project during normal days (Year 2039); and (ii) with Project during festive days (Year 2039). The revised traffic flow predicted in Year 2039 for the two scenarios have been considered for the road traffic noise assessment and details of the traffic forecast under these scenarios are presented in *Annex F*.

Assessment Results according to the 2016-based TPEDM

- 2.2.11 According to TN (REP-184-00), the predicted road noise levels for the unmitigated case during

normal days (Year 2039) and festive days (Year 2039) are summarized in *Table 2-1* and *Table 2-2* respectively. Detailed unmitigated assessment results are shown in *Annex G*.

Table 2-1 Unmitigated road traffic noise levels of concerned NSRs during normal days in Year 2039

NSR	Description	NAP ^[1]	L ₁₀ (1 hr) dB(A) ^[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
N18	Village houses near San Uk Ling	N18-1	70	76	63	0.5
		N18-2		74	58	0.2
		N18-3		74	67	1.1
		N18-4		71	67	2.0
		N18-5		70	69	7.6
		N18-6		67	67	7.4
		N18-7		62	56	1.1
		N18-8		59	54	1.7
		N18-9		65	61	1.9
N19	Village houses opposite to San Uk Ling	N19-1	70	70	67	2.6
		N19-2		66	64.2	4.4
		N19-3		65	63	5.2
N20	Village houses to the northeast of San Uk Ling	N20-1	70	61	58	2.4
		N20-2		65	63	5.5
		N20-3		64	64	10.0
N21	Village houses of Muk Wu	N21-1	70	63	61	4.3
		N21-2		60	60	60.1
		N21-3		58	58	19.3
		N21-4		59	59	11.5
N23	Village houses of Muk Wu Nga Yiu	N23-1	70	59	59	59.1
		N23-2		57	57	57.1
		N23-3		57	57	56.8
		N23-4		63	63	63.1
		N23-5		62	62	61.6
		N23-6		59	59	58.6
		N23-7		59	59	59.0
		N23-P1		68	68	67.6
		N23-P2		68	68	67.6
		N23-P3		68	68	67.5
		N23-P4		67	67	66.7
		N23-P5		66	66	66.3

Note:

[1] NAP – Noise assessment point

Table 2-2 Unmitigated road traffic noise levels of concerned NSRs during festive days in Year 2039

NSR	Description	NAP[1]	L10 (1 HR) DB(A)[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
N18	Village houses near San Uk Ling	N18-1	70	75	64	1.9
		N18-2		72	62	0.5
		N18-3		74	72	3.7
		N18-4		72	71	6.4
		N18-5		74	74	17.1
		N18-6		71	71	15.9
		N18-7		62	60	3.8
		N18-8		59	58	6.1
		N18-9		68	68	67.6
N19	Village houses opposite to San Uk Ling	N19-1	70	72	72	15.9
		N19-2		69	69	11.1
		N19-3		68	68	11.8
N20	Village houses to the northeast of San Uk Ling	N20-1	70	63	62	8.0
		N20-2		68	68	13.7
		N20-3		69	69	18.6
N21	Village houses of Muk Wu	N21-1	70	66	66	12.3
		N21-2		66	66	65.5
		N21-3		63	63	25.7
		N21-4		64	64	18.0
N23	Village houses of Muk Wu Nga Yiu	N23-1	70	65	65	64.7
		N23-2		63	63	62.9
		N23-3		63	63	63.3
		N23-4		70	70	70.0
		N23-5		69	69	68.7
		N23-6		66	66	66.3
		N23-7		67	67	66.7
		N23-P1		75	75	74.9
		N23-P2		75	75	75.0
		N23-P3		75	75	75.0
		N23-P4		74	74	74.6
N23-P5	74	74	74.4			

Note:

[1] NAP – Noise assessment point

2.2.12 According to the assessment result for unmitigated case with project implemented, the existing NSRs (N18-1 to N18-4) would exceed the criterion of 70dB(A), in the range of 71-76 dB(A) during normal days. Also, the existing NSRs (N18-1 to N18-6 and N19-1) would exceed criterion of 70dB(A), in the range of 71-75 dB(A) during festive days. For planned NSRs, all planned NSRs (N23-P1 to N23-P5) would comply with criterion of 70dB(A) during normal days, whereas all planned NSRs (N23-P1 to N23-P5) would exceed the criterion of 70dB(A), in the range of 74-75 dB(A) during festive days.

2.2.13 In view of practicability, the use of permanent noise mitigation measures in form of noise barriers and planters along Lin Ma Hang Road, as well as low noise road surfacing (LNRS) materials on sections of Lin Ma Hang Road are considered as effective mitigation measures. Issues and concerns such as user accessibility, road gradient, line of sight at road junctions, construction practicability and engineering constraints have been considered during the configuration of the recommended noise mitigation measures. These have all been confirmed by Engineers.

Mitigation Measures

Direct Mitigation Measures

2.2.14 According to the updated assessment result, the proposed mitigation measures are summarised in the table below and shown in *Annex H*.

Table 2-3 Summary of Updated Mitigation Measures for Road Traffic Impact (existing NSRs)

Mitigation Measures ID in EIA Report	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM5	Along Lin Ma Hang Road Near San Uk Ling	Approx. 25m long, 4m high VB	N18-1, N18-2, N18-3, N18-4,
MM6	Along Lin Ma Hang Road	Approx. 21m long, 2m high VB	N18-1, N18-2, N18-3, N18-4,
MM8	Along Lin Ma Hang Road	Approx. 18m long, 1.1m high Planter [2]	N18-5, N18-6
MM11	Along Lin Ma Hang Road	Approx. 185m long LNRS	N18-1 to N18-6, N19-1

Note:

[1] VB – Vertical barrier

[2] The minimum thickness of planter is 250mm. The general layout of planter (in form of) concrete barrier is attached in *Annex I*.

LNRS – Low noise road surfacing

Table 2-4 Summary of Updated Mitigation Measures for Road Traffic Impact (Planned NSRs)

Mitigation Measures ID in EIA Report	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM13	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 47m long, 5m high VB	N23-P1, N23-P2, N23-P3
MM14	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 31m long, 5m high VB	N23-P1, N23-P2, N23-P3
MM15	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 31m long, 5m high VB	N23-P4
MM16	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 25m long, 5m high VB	N23-P5

Note:

[1] VB – Vertical barrier

2.2.15 The predicted noise levels for mitigated case with project implemented are shown *Table 2-5* and *Table 2-6* respectively. Detailed mitigated assessment results are shown in *Annex J*.

Table 2-5 Mitigated road traffic noise levels of concerned NSRs during normal days in Year 2039

NSR	Description	NAP ^[1]	L ₁₀ (1 hr) dB(A) ^[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
N18	Village houses near San Uk Ling	N18-1	70	76	57	0.1
		N18-2		73	53	0.1
		N18-3		72	59	0.2
		N18-4		70	59	0.3
		N18-5		68	64	2.5
		N18-6		63	60	3.2
		N18-7		59	49	0.5
		N18-8		57	47	0.4
		N18-9		64	57	1.0
N19	Village houses opposite to San Uk Ling	N19-1	70	69	64	1.7
		N19-2		66	63	4.2
		N19-3		64	62	5.0
N20	Village houses to the northeast of San Uk Ling	N20-1	70	60	55	1.5
		N20-2		64	63	5.3
		N20-3		64	64	10.1
N21	Village houses of Muk Wu	N21-1	70	62	60	4.3
		N21-2		60	60	60.1
		N21-3		58	58	19.5
		N21-4		59	59	13.7
N23	Village houses of Muk Wu Nga Yiu	N23-1	70	59	59	59.0
		N23-2		57	57	57.0
		N23-3		56	56	55.7
		N23-4		60	60	59.5
		N23-5		57	57	57.0
		N23-6		54	54	54.1
		N23-7		58	58	57.5
		N23-P1		63	63	63.2
		N23-P2		63	63	62.9

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
 CEDD Contract CV/2017/02 - Development of Columbarium at Sandy Ridge Cemetery –
 Infrastructural Works at Man Kam To Road and Lin Ma Hang Road
Traffic Noise Mitigation Plan



NSR	Description	NAP ^[1]	L ₁₀ (1 hr) dB(A) ^[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
		N23-P3		62	62	62.3
		N23-P4		60	60	60.1
		N23-P5		62	62	62.2

Note:

[1] NAP – Noise assessment point

Table 2-6 Mitigated road traffic noise levels of concerned NSRs during festive days in Year 2039

NSR	Description	NAP ^[1]	L ₁₀ (1 hr) dB(A) ^[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
N18	Village houses near San Uk Ling	N18-1	70	75	61	0.2
		N18-2		72	57	0.1
		N18-3		71	63	0.8
		N18-4		69	66	3.5
		N18-5		69	68	7.6
		N18-6		65	65	10.3
		N18-7		57	53	2.3
		N18-8		55	51	2.3
		N18-9		66	66	65.9
N19	Village houses opposite to San Uk Ling	N19-1	70	70	70	22.2
		N19-2		69	68	11.1
		N19-3		68	67	12.0
N20	Village houses to the northeast of San Uk Ling	N20-1	70	61	59	6.0
		N20-2		68	68	13.3
		N20-3		69	69	18.9
N21	Village houses of Muk Wu	N21-1	70	66	65	12.1
		N21-2		65	65	65.5
		N21-3		63	63	26.0
		N21-4		64	64	20.5
N23	Village houses of Muk Wu Nga Yiu	N23-1	70	65	65	64.7
		N23-2		63	63	62.7
		N23-3		62	62	61.9
		N23-4		66	66	66.3

NSR	Description	NAP ^[1]	L ₁₀ (1 hr) dB(A) ^[2]			
			Criterion	Predicted Road Traffic Noise Level	Project Road Noise Level	Project Road Contribution
		N23-5		64	64	63.9
		N23-6		62	62	61.8
		N23-7		65	65	65.2
		N23-P1		70	70	70.4
		N23-P2		70	70	70.2
		N23-P3		70	70	70.1
		N23-P4		68	68	67.9
		N23-P5		70	70	70.0

Note:

[1] NAP – Noise assessment point

2.2.16 With the implementation of recommended noise mitigation measures, the assessment result revealed that all existing NSRs and planned NSRs would comply with the criterion of 70dB(A), except for NSRs N18-1 to N18-3. The overall noise levels of N18-1 to N18-3 would exceed the criterion of 70dB(A) and will have residual impact.

Indirect Mitigation Measures

2.2.17 All possible direct noise mitigation measures, including the use of VB, planters and LNRS, have been exhausted. It has considered the engineering feasibility, operational practicability and site constraints during the formulation of direct noise mitigation measures. The detailed assessment for indirect mitigation measures are shown in *Annex K*. In summary, indirect mitigation measures at the concerned NSRs are not required.

Residual Impacts

2.2.18 The road traffic noise impact arising from the Project are recommended to be mitigated by implementing the noise barriers, planters and LNRS at the suggested locations. After exhausting all practicable mitigation measures, all existing and planned NSRs except N18-1 to N18-3 would comply with the noise criterion of 70dB(A). For the NSRs with residual traffic noise impacts, the contribution of traffic noise from the project roads are insignificant (i.e. smaller than 1.0dB(A)) as shown in the *Annex K*. Exceedances at these concerned NSRs are due to traffic noise from the existing Man Kam To Road. Besides, the mitigated noise impacts with Project in place would be less than that in prevailing scenario at Year 2016. Hence, it is anticipated that traffic noise impacts of the Project (with mitigation measures in place) would be less than that of without the Project. Therefore, the residual impacts are not significant.

Arrangement of Traffic Noise Mitigation Measure for Planned NSRs

2.2.19 The noise barriers (MM5 to MM8) along Lin Ma Hang Road near Muk Wu Nga Yiu are mitigation measures for the future planned development (planned NSR). To ascertain the status of the planned NSRs near Muk Wu Nga Yiu, CEDD had liaised with LandsD in November 2018 and March 2020 as to the status of small house application at NSRs N23-P1 to N23-P5. LandsD replied that no small house redevelopment/ application were received within the Lots where five planned NSRs in the approved EIA are located.

2.2.20 Having reviewed the traffic noise level at the existing NSRs at Muk Wu Nga Yiu (NSRs N23-1 to N23-7) without mitigation measures, the assessment result revealed that the overall noise at NSRs N23-1 to N23-7 would comply with the noise criterion of 70dB(A). Hence, noise barriers

as traffic noise mitigation measures at Muk Wu Nga Yiu are not necessary at this stage. Nevertheless, CEDD will closely liaise with LandsD and PlanD to monitor the development of any planned NSRs at Muk Wu Nga Yiu and update the traffic noise mitigation plan where necessary.

- 2.2.21 The summary of traffic noise mitigation measures for Contract 2 at this stage is shown in **Table 2-7**. The road traffic noise mitigation measures for EP-534/2017/A under the respective geographic location of Contract 2 at this stage are provided in **Annex L**.

Table 2-7 Summary of Mitigation Measures for Road Traffic Impact for Contract 2 at this Stage

Mitigation Measures ID in EIA Report	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM5	Along Lin Ma Hang Road Near San Uk Ling	Approx. 25m long, 4m high VB	N18-1, N18-2, N18-3, N18-4,
MM6	Along Lin Ma Hang Road	Approx. 21m long, 2m high VB	N18-1, N18-2, N18-3, N18-4,
MM8	Along Lin Ma Hang Road	Approx. 18m long, 1.1m high Planter	N18-5, N18-6
MM11	Along Lin Ma Hang Road	Approx. 185m long LNRS	N18-1 to N18-6, N19-1

Note:

[1] VB – Vertical barrier

LNRS – Low noise road surfacing

2.3 IMPLEMENTATION OF NOISE BARRIERS FOR REMAINING MM3 AND MM4

- 2.3.1 As planned at early stage of the Project, the implementation of noise mitigation measures for MM3 and MM4 would be carried out by Contract 3. However, as there is currently no programme of work for Contract 3, the implementation of noise mitigation measures MM3 and MM4 will be the responsibility of the Contract at later stage. The CEDD shall keep reviewing the status of the noise mitigation measures as proposed in the EIA report.

3. CONCLUSION

- 3.1.1 Road traffic noise impact of the Project along Lin Ma Hang has been assessed. The impact arising from the Project could be mitigated by implementing the proposed noise barriers, planters and LNRS at the suggested locations. Although exceedance is still found in a few NSRs after the exhaustion of direct mitigation measures, the concerned NSRs do not fulfil the testing criteria and are not eligible for indirect mitigation measure.
- 3.1.2 For the NSRs with residual traffic noise impacts, the contribution of traffic noise from the project roads are insignificant (i.e. smaller than 1.0dB(A)). Exceedances at these concerned NSRs are due to traffic noise from the existing Man Kam To Road. Besides, the mitigated noise impacts with Project in place would be less than that in prevailing scenario at Year 2016. Hence, it is anticipated that traffic noise impacts of the Project (with mitigation measures in place) would be less than that of without the Project. Therefore, the residual impacts are not significant.
- 3.1.3 In addition, EIA mentioned that poor designed noise barrier do pose a risk on flying birds especially those with transparent material being utilized and potential risk of collision mortality may be minimised by the use of opaque, non-reflective panels where appropriate. By the consideration of sightline and safety issues due to the present of village access at Sun Uk Ling, the noise barrier panel adopted for Contract 2 would be tinted transparent panels with bird pattern with aluminum absorptive noise barrier panel at the lower part. Justifications of the requirements on EP-534/2017/A Condition 2.24 were given by CEDD to EPD and AFCD as discussed in Section 2.2.4 and 2.2.5.
- 3.1.4 The summary of traffic noise mitigation measures against the EIA and current status are summarised in **Tables 3-1 and 3-2**. With the updated assessment results according to the 2016-based TPEDM, noise mitigation measures under the Project have been reviewed. For existing NSRs, it is noted that the mitigation measures, including MM5, MM6, MM8 and MM11 with proposed changes of design (details as shown in Table 3-1), could mitigate the traffic noise impact to meet the relevant noise requirement under the EIAO-TM, while the MM7, MM9 and MM10 are no longer required. For planned NSRs, it is noted that the mitigation measures, including MM13, MM14, MM15 and MM16 with proposed changes of design (details as shown in Table 3-2), could also mitigate the traffic noise impact to meet the relevant noise requirement under the EIAO-TM, while the MM12 and MM17 are no longer required.
- 3.1.5 Implementation Schedule for Noise Mitigation Measures proposed for Contract 2 is shown in **Annex M**. The coordinates for the noise mitigation measures and a figure highlighting the proposed deletion of the abovementioned noise mitigation measures are provided in **Annex M1** and **Annex M2** respectively.

Table 3-1 Summary of Changes of Mitigation Measures for Road Traffic Impact against the EIA (Existing NSRs)

MITIGATION MEASURES UNDER EIA				MITIGATION MEASURES UNDER TNMP	
Mitigation Measures ID in EIA	Location	Type of Noise Barrier ^[1]	Key NSRs Protected	Proposed changes ^{[2][3]}	Key NSRs Protected
MM5	Along Lin Ma Hang Road near San Uk Ling	Approx. 25m long, 4m high ANB	N18-1 to N18-6	Change to Approx. 25m long, 4m high VB	N18-1 to N18-4
MM6	Along Lin Ma Hang Road near San Uk Ling	Approx. 21m long, 4m high ANB	N18-1 to N18-6	Change to Approx. 21m long, 2m high VB	N18-1 to N18-4
MM7	Along Lin Ma Hang Road near San Uk Ling	Approx. 14m long, 4m high ANB	N18-1 to N18-6	Assessment results were updated according to the 2016-based TPEDM and the noise mitigation measure is considered no long required and proposed to delete.	

MITIGATION MEASURES UNDER EIA				MITIGATION MEASURES UNDER TNMP	
Mitigation Measures ID in EIA	Location	Type of Noise Barrier ^[1]	Key NSRs Protected	Proposed changes ^{[2][3]}	Key NSRs Protected
MM8	Along Lin Ma Hang Road near San Uk Ling	Approx. 18m long, 3m high ANB	N18-5, N18-6	Change to Approx. 18m long, 1.1m high Planter	N18-5, N18-6
MM9	Along temporary pullover space opposite San Uk Ling	Approx. 42m long, 3m high ANB	N19-1	Assessment results were updated according to the 2016-based TPEDM and the noise mitigation measure is considered no longer required and proposed to delete.	
MM10	Along Lin Ma Hang Road opposite San Uk Ling	Approx. 93m long, 3m high ANB	N19-1	Assessment results were updated according to the 2016-based TPEDM and the noise mitigation measure is considered no longer required and proposed to delete.	
MM11	Along Lin Ma Hang Road near San Uk Ling	Approx. 185m long, Low Noise Surfacing Materials	N18-1 to N18-6	Approx. 185m long LNRS (no change)	N18-1 to N18-6, N19-1

Note:

[1] ANB – Absorptive noise barrier (About 1m of lower portion will be absorptive).

[2] LNRS – Low noise road surfacing

[3] VB – Vertical barrier

Table 3-2 Summary of Changes of Mitigation Measures for Road Traffic Impact against the (Planned NSRs)

Mitigation Measures under EIA				Mitigation Measures under TN		
Mitigation Measures ID in EIA	Location	Type of Noise Barrier ^[1]	Key NSRs Protected	Proposed changes ^[1]	Key NSRs Protected	Status
MM12	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 36m long, 5m high ANB	N23-P1, N23-P2	Assessment results were updated according to the 2016-based TPEDM and the noise mitigation measure is considered no long required and proposed to delete.		
MM13	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 47m long, 5m high ANB	N23-P1, N23-P2, N23-P3	Change to Approx. 47m long, 5m high VB	N23-P1 to N23-P3	Having liaised with LandsD in November 2018 and March 2020, there is no planned development.
MM14	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 31m long, 5m high ANB	N23-P1, N23-P2, N23-P3	Change to Approx. 31m long, 5m high VB	N23-P1 to N23-P3	These traffic noise mitigation measures at Muk Wu Nga Yiu do not cover under Contract 2 at this stage
MM15	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 31m long, 5m high ANB	N23-P4	Change to Approx. 31m long, 5m high VB	N23-P4	
MM16	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 41m long, 5m high ANB	N23-P5	Change to Approx. 25m long , 5m high VB	N23-P5	

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Traffic Noise Mitigation Plan**



MM17	Along Lin Ma Hang Road near Muk Wu Nga Yiu [2]	Approx. 340m long, Low Noise Surfacing Materials	N23-P1, N23-P2, N23-P3, N23-P4, N23-P5	Assessment results were updated according to the 2016-based TPEDM and the noise mitigation measure is considered no long required and proposed to delete.
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Note:

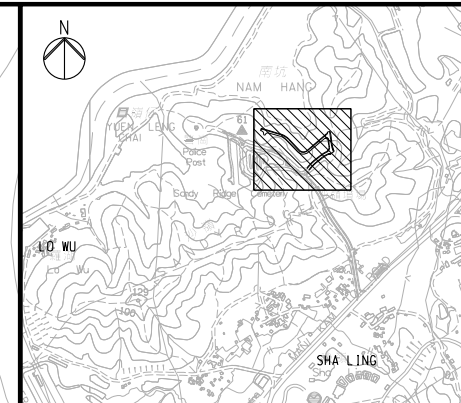
[1] VB – Vertical Barrier

[2] Planned NSRs are assigned within the “V” zone in N23.

Annex A

Layout Plan for Contract CV/2017/02

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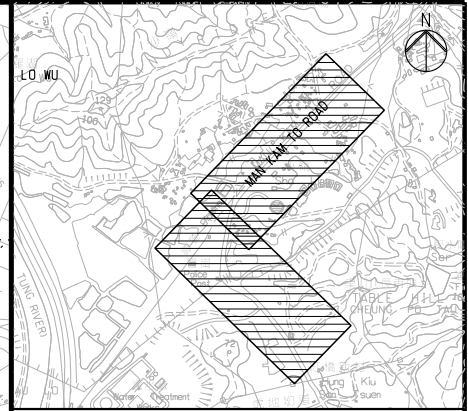
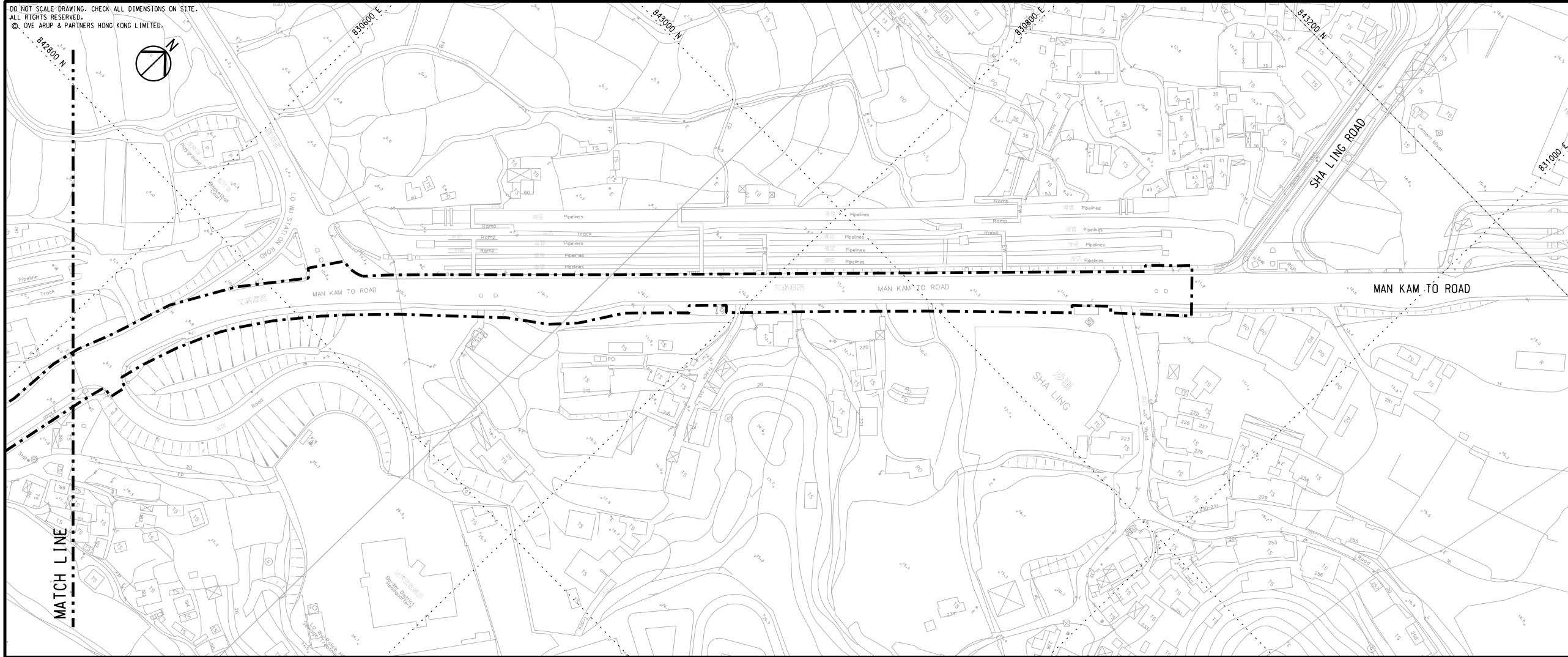
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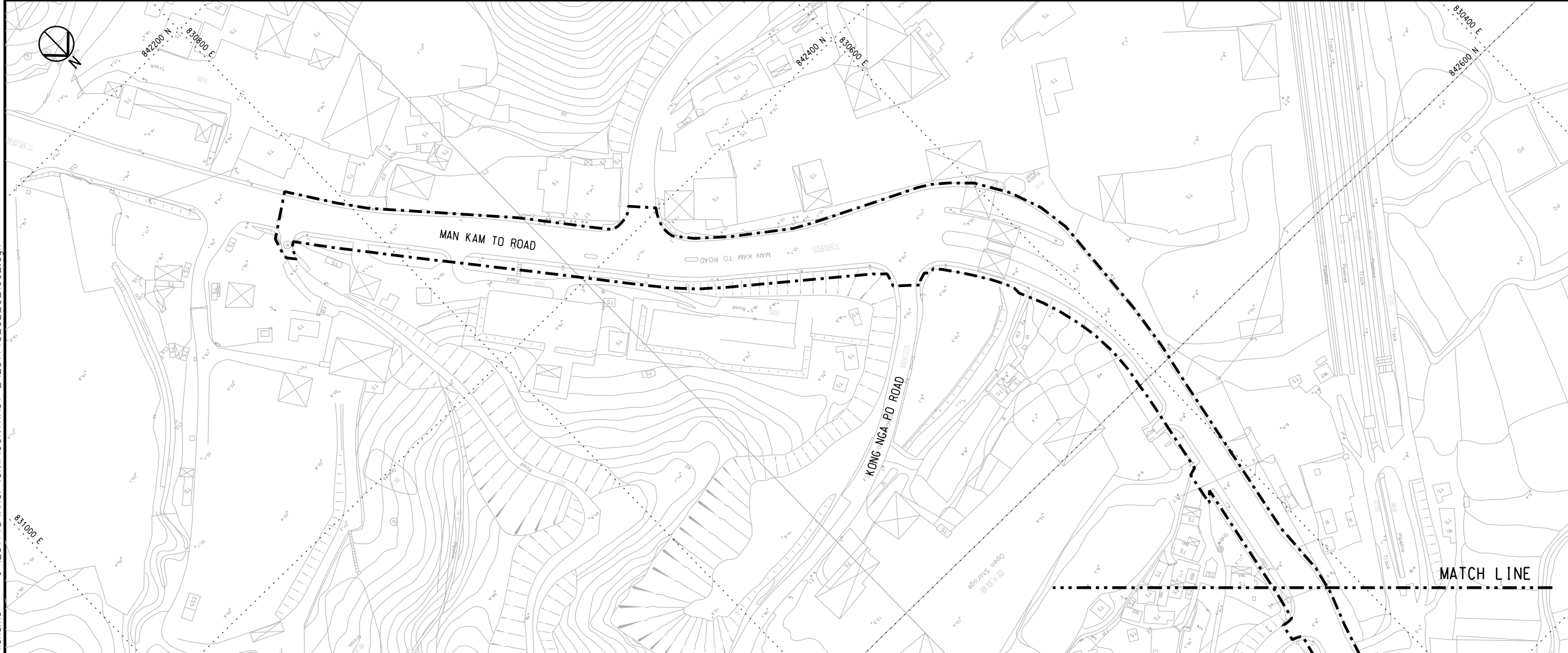
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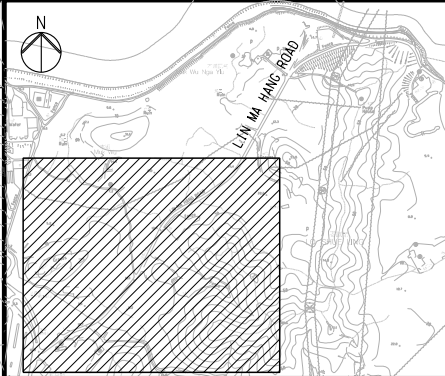
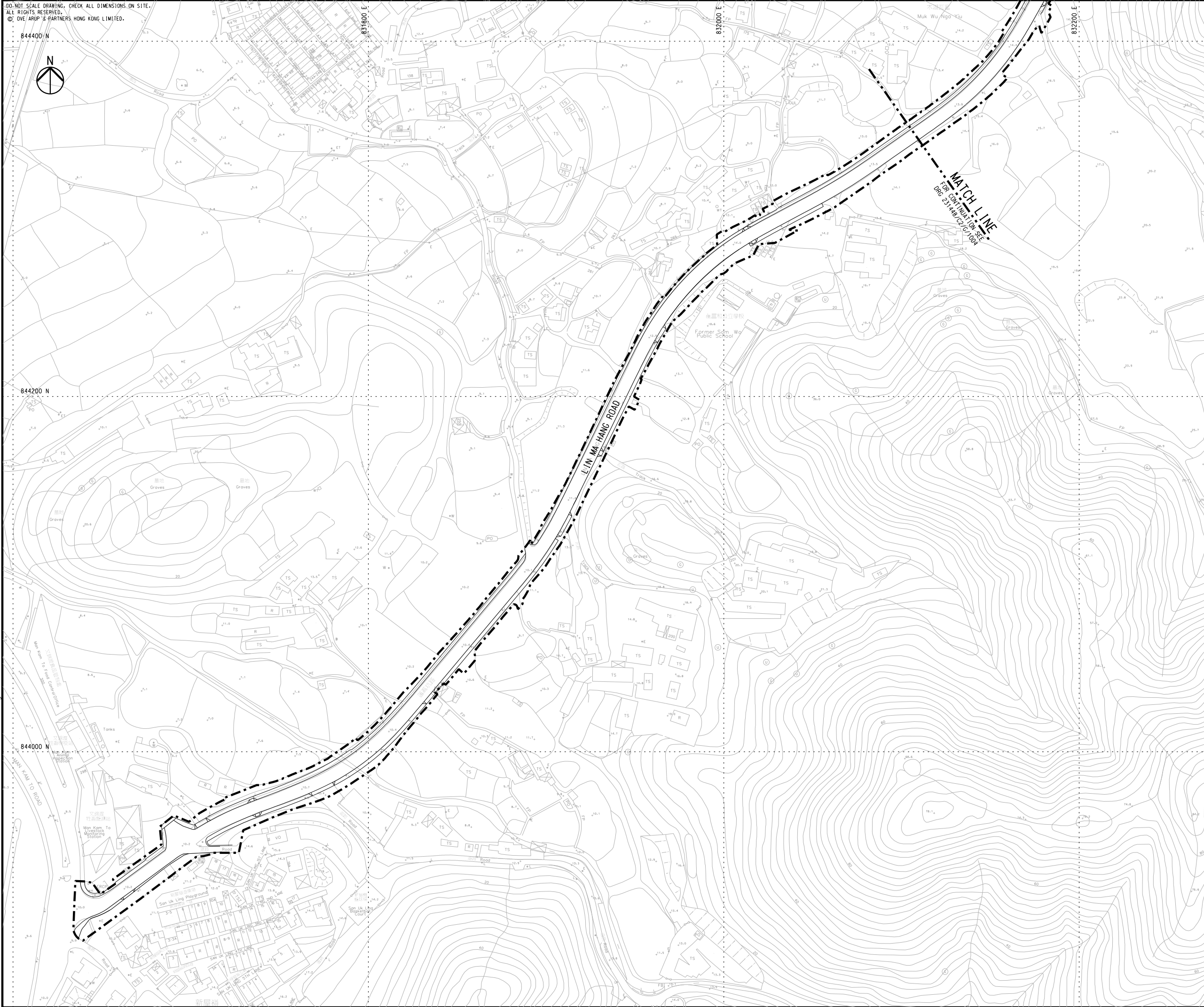
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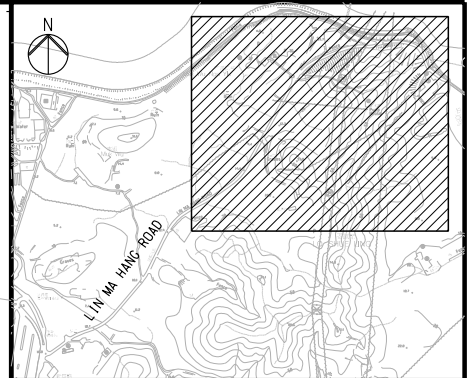
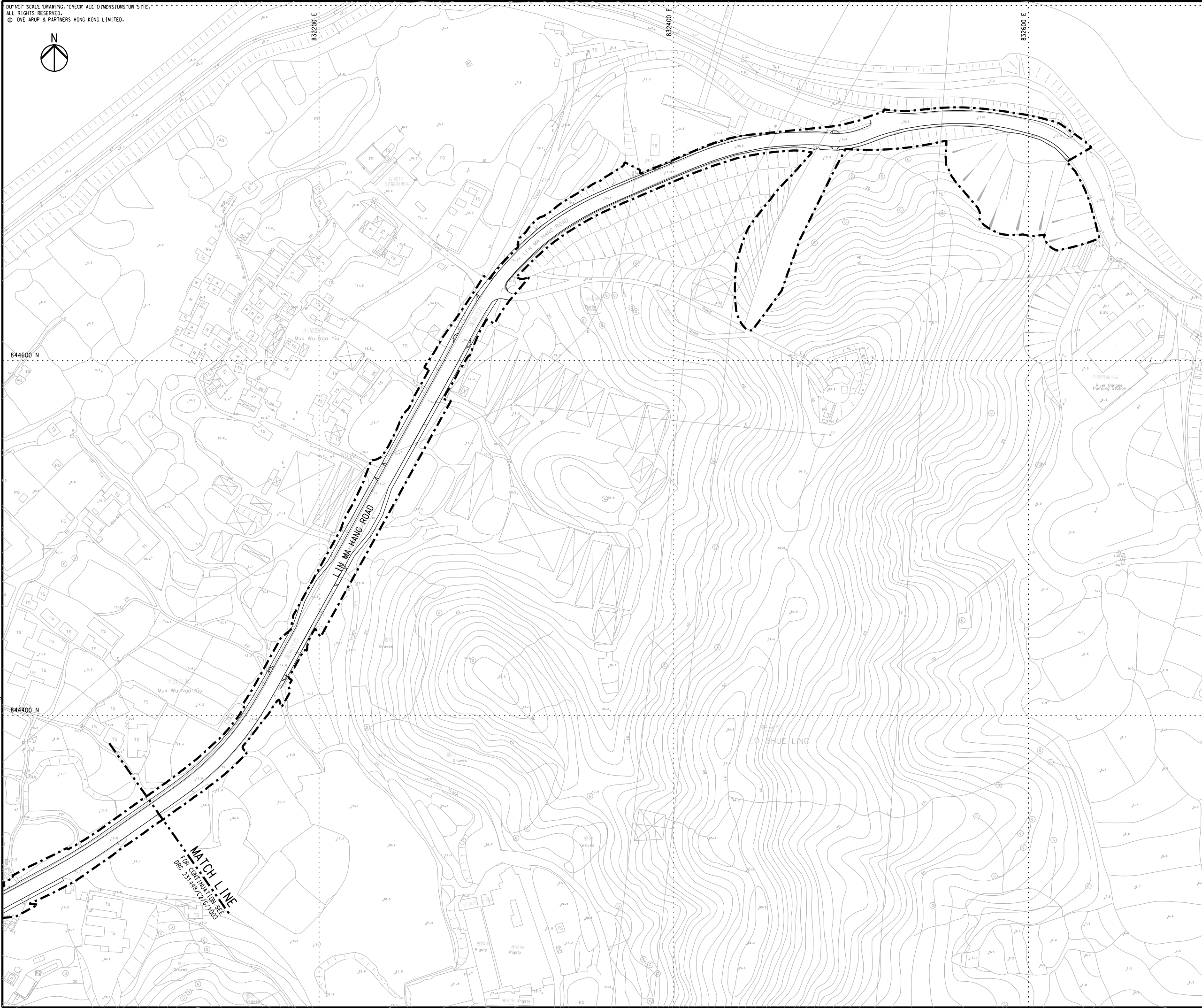
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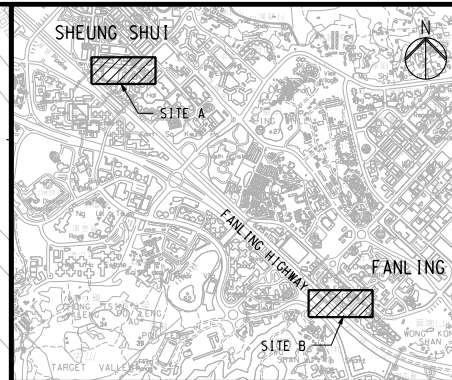
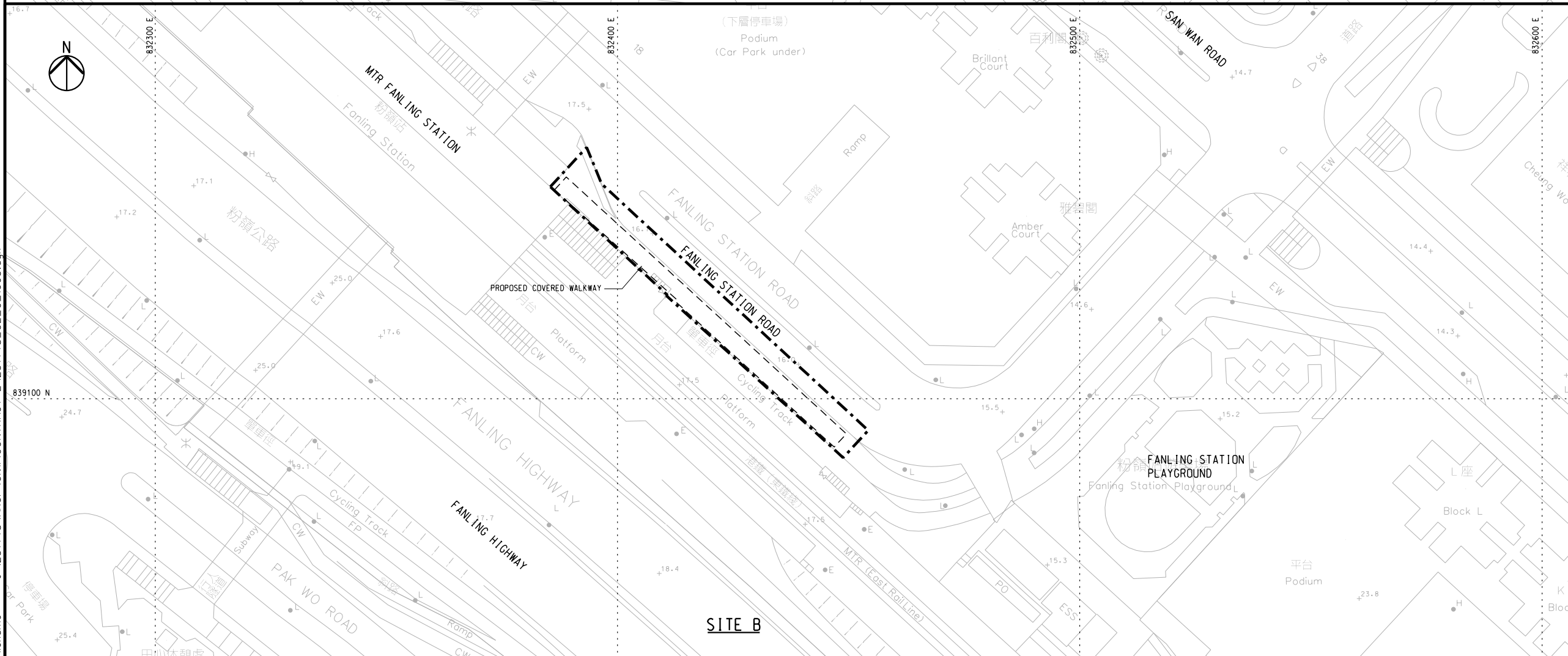
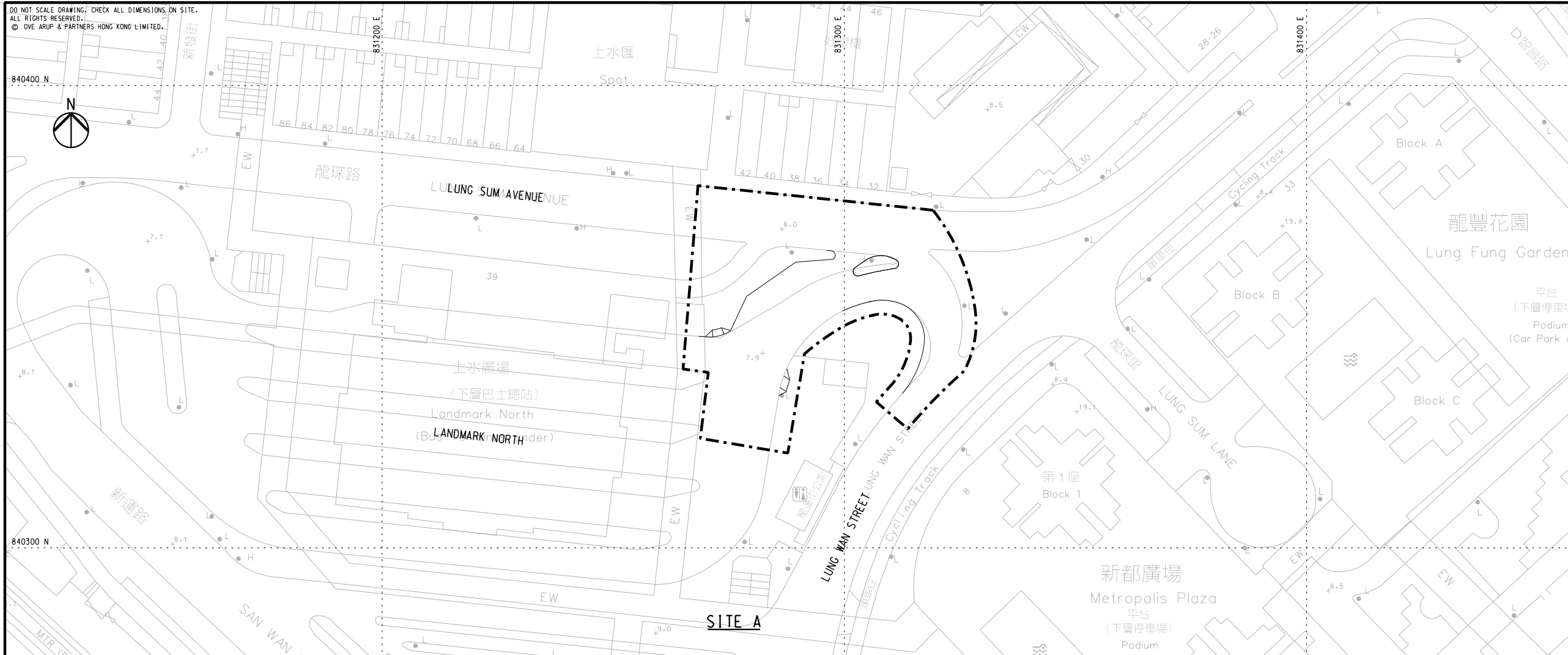
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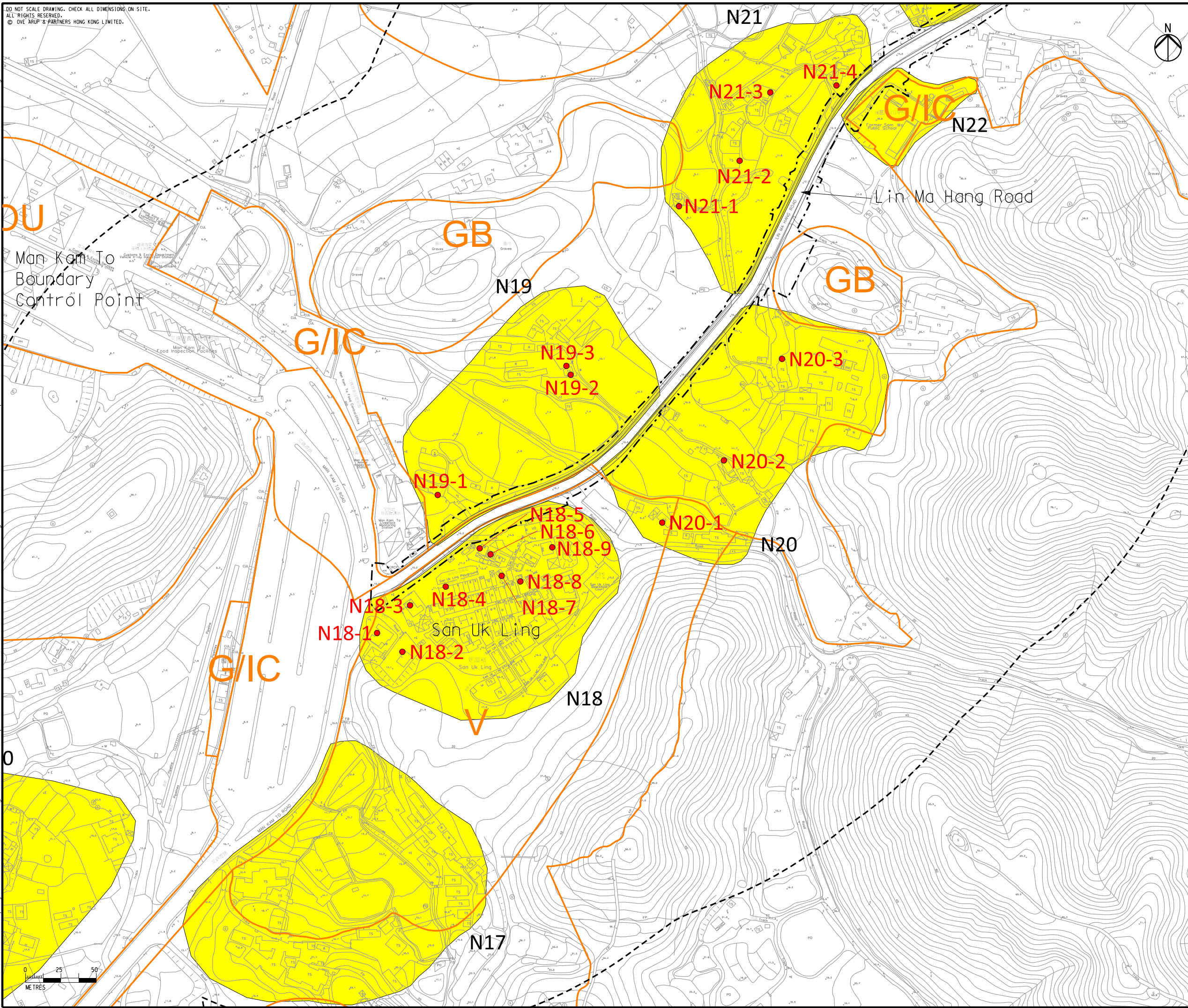
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Annex B

Noise Sensitive Receiver identified in EIA

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 Filename : G:\env\project\2314448\13 Drawing Deliverables\Reports\015 EIA\20151203 Final EIA\Ch 5 Noise\Figure 5.6.7 - Locations of Representative Noise Sensitive Receivers (Road Traffic Noise) (Sheet 7 of 8).dgn



Legend

- Project Boundary
- 300m Assessment Area
- Area with Representative Noise Sensitive Use
- Representative Noise Sensitive Receivers (Existing)

Outline Zoning Plan

(Ref: Fu Tei Au & Sha Ling OZP (S/NE-FTA/14) and Man Kam To OZP (S/NE-MKT/1) & (S/NE-MKT/2))

- AGR Agriculture
- CA Conservation Area
- G/IC Government/ Institution/ Community
- GB Green Belt
- OU Other Specified Used
- OS Open Storage
- U Undetermined
- V Village Type Development
- MRDJ Road

E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15
C	THIRD ISSUE	GL	02/15
B	SECOND ISSUE	GL	11/14
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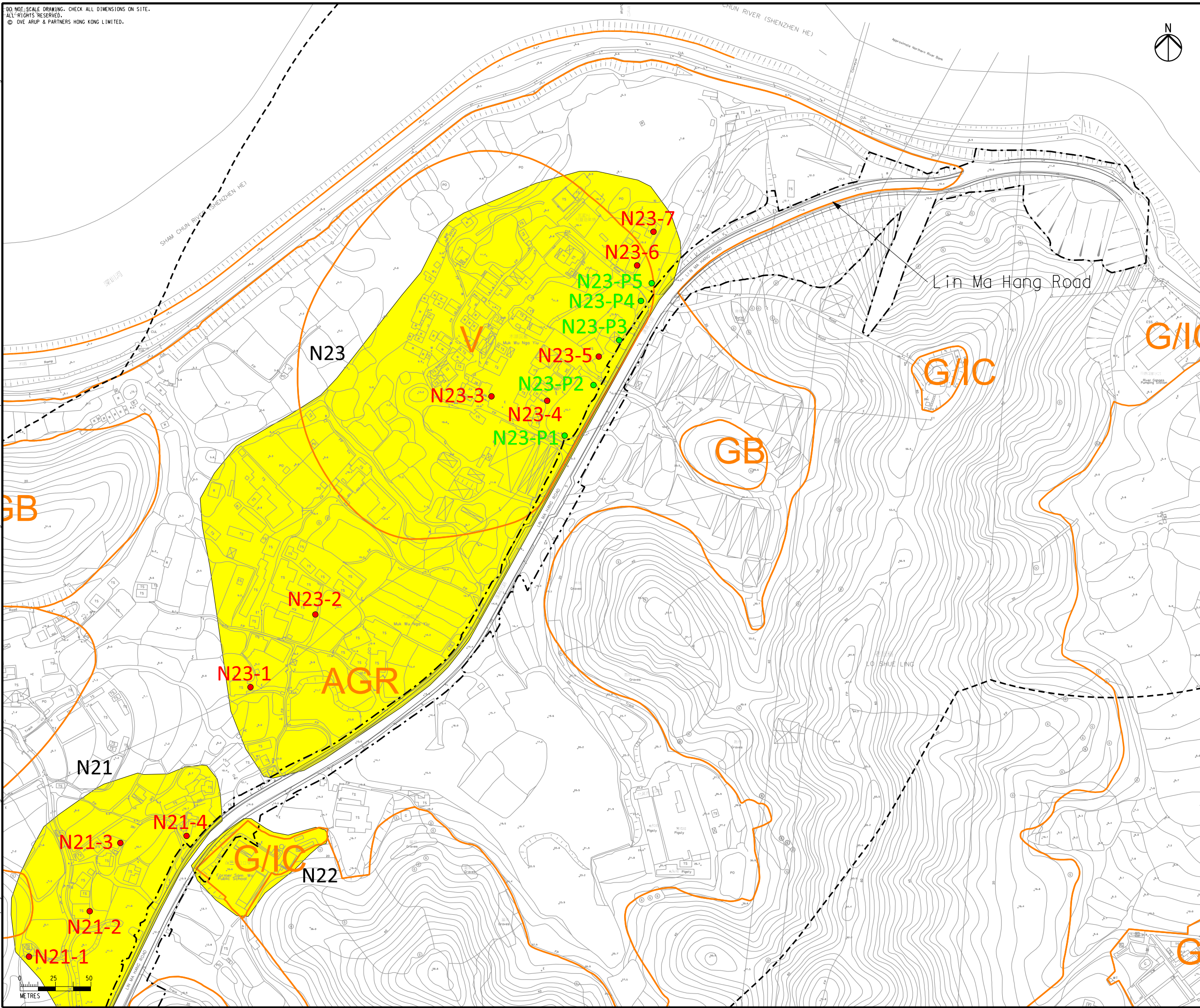
Drawing title
 Locations of Representative Noise Sensitive Receivers (Road Traffic Noise) (Sheet 7 of 8)

Drawing no. Figure 5.6.7		Rev. E	
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- Legend**
- Project Boundary
 - 300m Assessment Area
 - Area with Representative Noise Sensitive Use
 - Representative Noise Sensitive Receivers (Existing)
 - Representative Noise Sensitive Receivers (Planned)

Outline Zoning Plan
 (Ref: Fu Tei Au & Sha Ling OZP (S/NE-FTA/14) and Man Kam To OZP (S/NE-MKT/1) & (S/NE-MKT/2))

- Agriculture
- Conservation Area
- Government/ Institution/ Community
- Green Belt
- Other Specified Used
- Open Storage
- Undetermined
- Village Type Development
- Road

Rev	Description	By	Date
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C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	11/14
A	FIRST ISSUE	KY	08/14

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Locations of Representative Noise Sensitive Receivers (Road Traffic Noise) (Sheet 8 of 8)

Drawing no. Figure 5.6.8		Rev. D	
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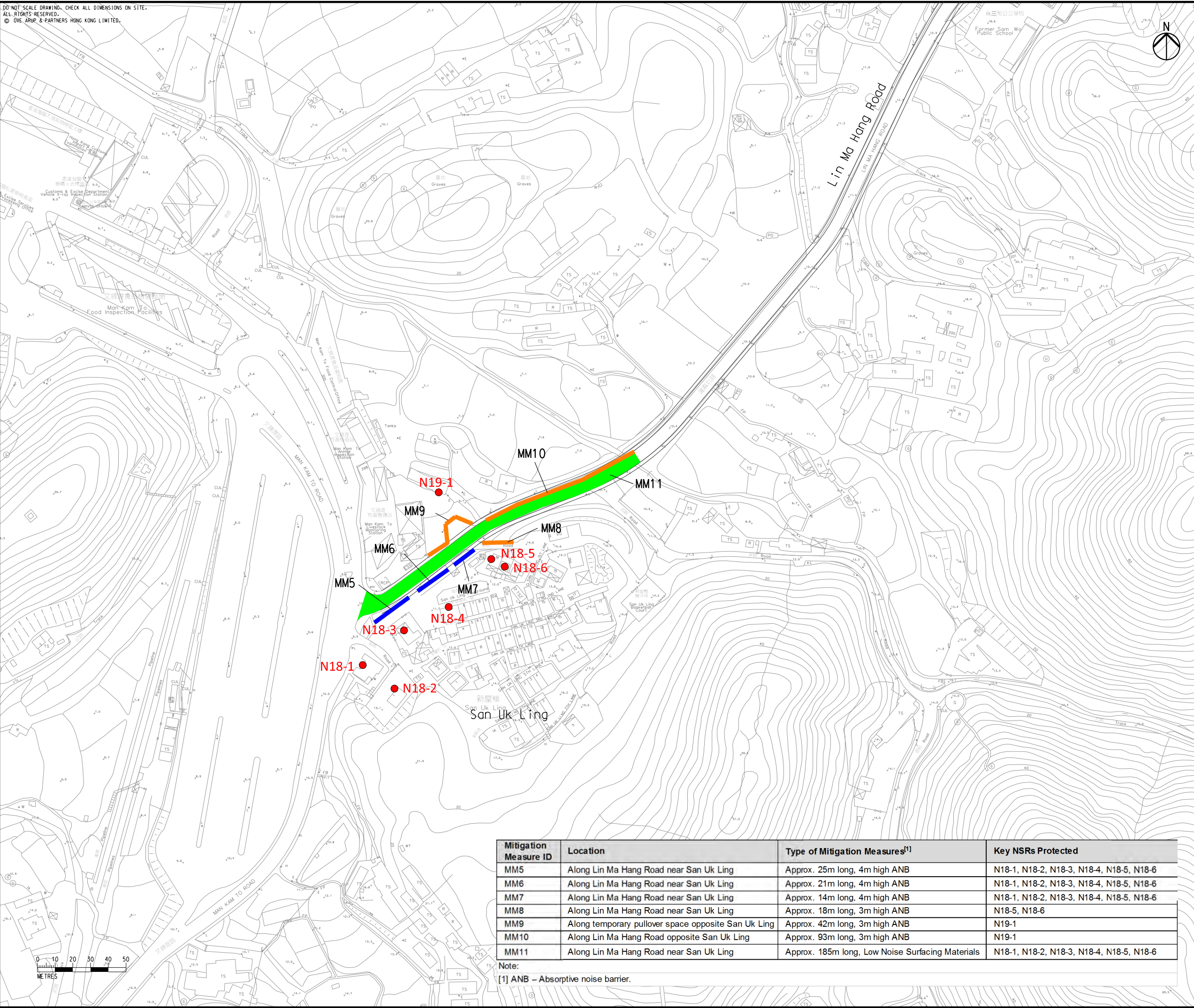
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Annex C

Extents and Locations of Road Traffic Noise Barriers extracted from EIA

Printed by : 12/21/2015
 Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\015 EIA\20151203 Final EIA\Ch 5 Noise\Figure 5.6.11 - Extents and Locations of Road Traffic Noise Barriers (for Existing Representative NSRs) (Sheet 3 of 3).dgn

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Legend

- Proposed Road Network
- 3m Absorptive Noise Barrier
- 4m Absorptive Noise Barrier
- Low Noise Surfacing Materials
- Representative Noise Sensitive Receivers (Road Traffic Noise)

E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15
C	THIRD ISSUE	GL	02/15
B	SECOND ISSUE	GL	11/14
Rev	Description	By	Date

Consultant
ARUP

Contract No. and Title:
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title
Extents and Locations of Road Traffic Noise Barriers (for Existing Representative NSRs) (Sheet 3 of 3)

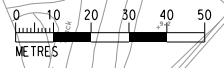
Drawing no. Figure 5.6.11		Rev. E	
Drawn GL	Date 12/15	Checked EL	Approved ST
Scale 1:2000 @A3		Status PRELIMINARY	

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 Civil Engineering and Development Department

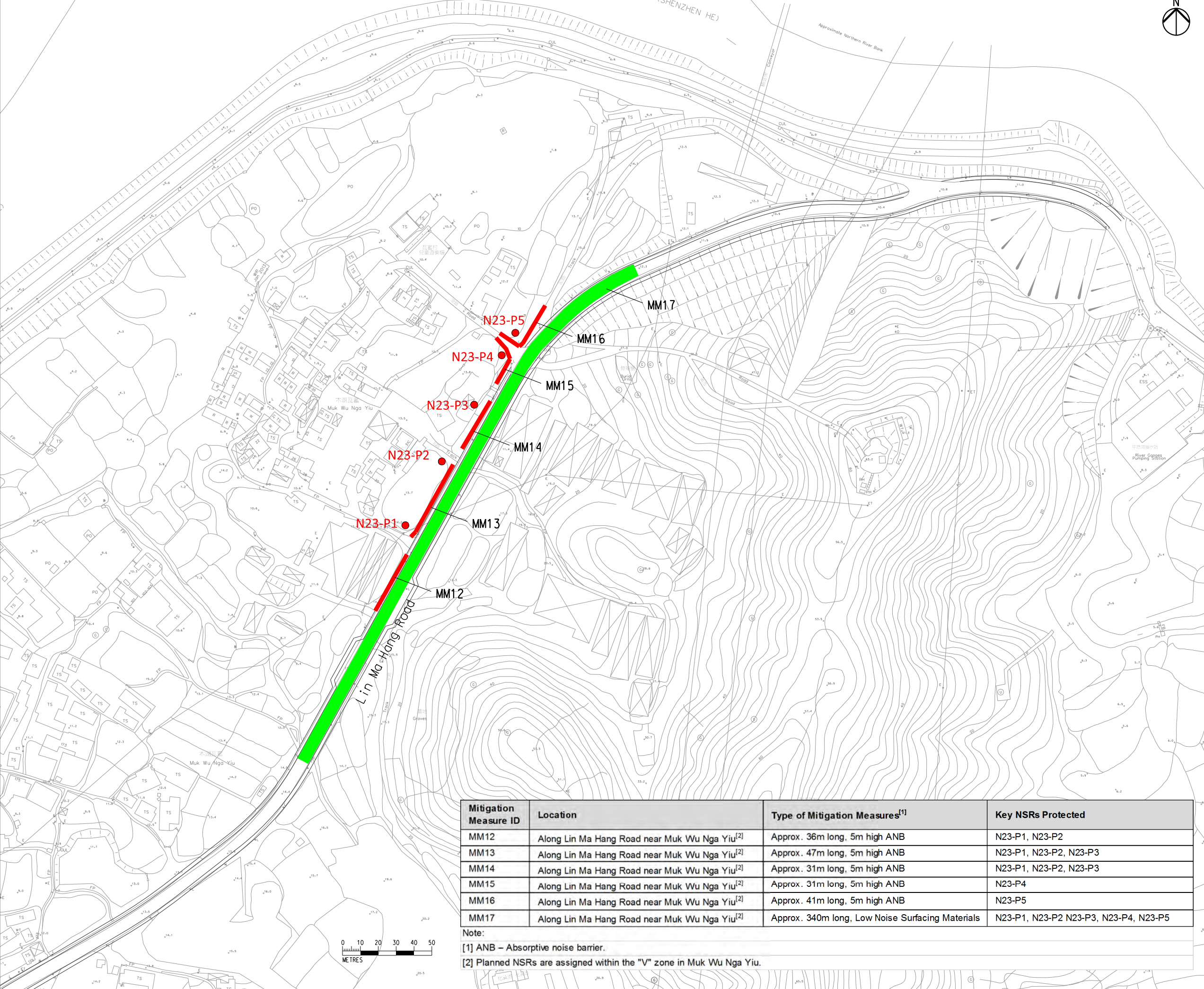
Mitigation Measure ID	Location	Type of Mitigation Measures ^[1]	Key NSRs Protected
MM5	Along Lin Ma Hang Road near San Uk Ling	Approx. 25m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6
MM6	Along Lin Ma Hang Road near San Uk Ling	Approx. 21m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6
MM7	Along Lin Ma Hang Road near San Uk Ling	Approx. 14m long, 4m high ANB	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6
MM8	Along Lin Ma Hang Road near San Uk Ling	Approx. 18m long, 3m high ANB	N18-5, N18-6
MM9	Along temporary pullover space opposite San Uk Ling	Approx. 42m long, 3m high ANB	N19-1
MM10	Along Lin Ma Hang Road opposite San Uk Ling	Approx. 93m long, 3m high ANB	N19-1
MM11	Along Lin Ma Hang Road near San Uk Ling	Approx. 185m long, Low Noise Surfacing Materials	N18-1, N18-2, N18-3, N18-4, N18-5, N18-6

Note:
 [1] ANB – Absorptive noise barrier.



Printed by : 12/21/2015
 Filename : G:\env\project\2314448\13 Drawing Deliverables\Reports\015 EIA\20151203 Final EIA\Ch 5 Noise\Figure 5.6.13 - Extents and Locations of Road Traffic Noise Barriers (for Planned Representative NSRs) (Sheet 2 of 2).dgn

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Legend

- Proposed Road Network
- 5m Absorptive Noise Barrier
- Low Noise Surfacing Materials
- Representative Noise Sensitive Receivers (Road Traffic Noise)

E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15
C	THIRD ISSUE	GL	02/15
B	SECOND ISSUE	GL	11/14
Rev	Description	By	Date

Consultant

ARUP

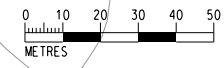
 Contract No. and Title:
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title
Extents and Locations of Road Traffic Noise Barriers (for Planned Representative NSRs) (Sheet 2 of 2)

Drawing no. Figure 5.6.13		Rev. E	
Drawn GL	Date 12/15	Checked EL	Approved ST
Scale 1:2000 @A3		Status PRELIMINARY	

Mitigation Measure ID	Location	Type of Mitigation Measures ^[1]	Key NSRs Protected
MM12	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 36m long, 5m high ANB	N23-P1, N23-P2
MM13	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 47m long, 5m high ANB	N23-P1, N23-P2, N23-P3
MM14	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 31m long, 5m high ANB	N23-P1, N23-P2, N23-P3
MM15	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 31m long, 5m high ANB	N23-P4
MM16	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 41m long, 5m high ANB	N23-P5
MM17	Along Lin Ma Hang Road near Muk Wu Nga Yiu ^[2]	Approx. 340m long, Low Noise Surfacing Materials	N23-P1, N23-P2, N23-P3, N23-P4, N23-P5

Note:
 [1] ANB – Absorptive noise barrier.
 [2] Planned NSRs are assigned within the "V" zone in Muk Wu Nga Yiu.



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 Civil Engineering and Development Department

Annex D

The Design of Noise Barrier Panels

BY HAND

Agriculture, Fisheries and Conservation Department
Headquarters
Conservation Branch
Nature Conservation (North) Division
Nature Conservation Section (North)
7/F Cheung Sha Wan Government Offices
303 Cheung Sha Wan Road
Kowloon

Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon
Hong Kong
t +852 2528 3031
d +852 2268 3627
f +852 2268 3955
davis.lee@arup.com
www.arup.com

Attn: Mr. Cheung Kwok Wai / Ms. CHAN Sin Wai, Aidia

25 September 2017

Dear Sir,

Agreement No. CE 1/2013 (CE)

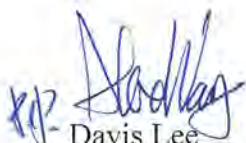
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Design of Noise Barrier Panel along Sha Ling Road and Lin Ma Hang Road

We refer to paragraph 2.25 of Environmental Permit Conditions (Environment Permit No. EP-534/2017) regarding the measures to mitigate ecological impacts from noise barrier and are pleased to enclose herewith the design of the noise barrier panel along Sha Ling Road and Lin Ma Hang Road for your comments. In view of the tight programme of the Assignment, your valuable comments including nil return by 29 September 2017 would be highly appreciated.

Should you have any queries, please feel free to contact the undersigned or our Mr. Paul Cheng at 3447 6233.

Yours faithfully



Davis Lee
Project Manager

Encl. (w/e)

c.c. CEDD, CE/LW - Attn: Mr. Lau Chun Tat (w/e)
EPD - Attn: Mr. PANG Koon Yin, Charles (w/e)



PROPOSED 3M NOISE BARRIER

PROPOSED 4M NOISE BARRIER

PROPOSED FOOTPATH WIDENING

Artistic Impression of proposed noise barrier along Lin Ma Hang Road



PROPOSED 2.5M NOISE BARRIER

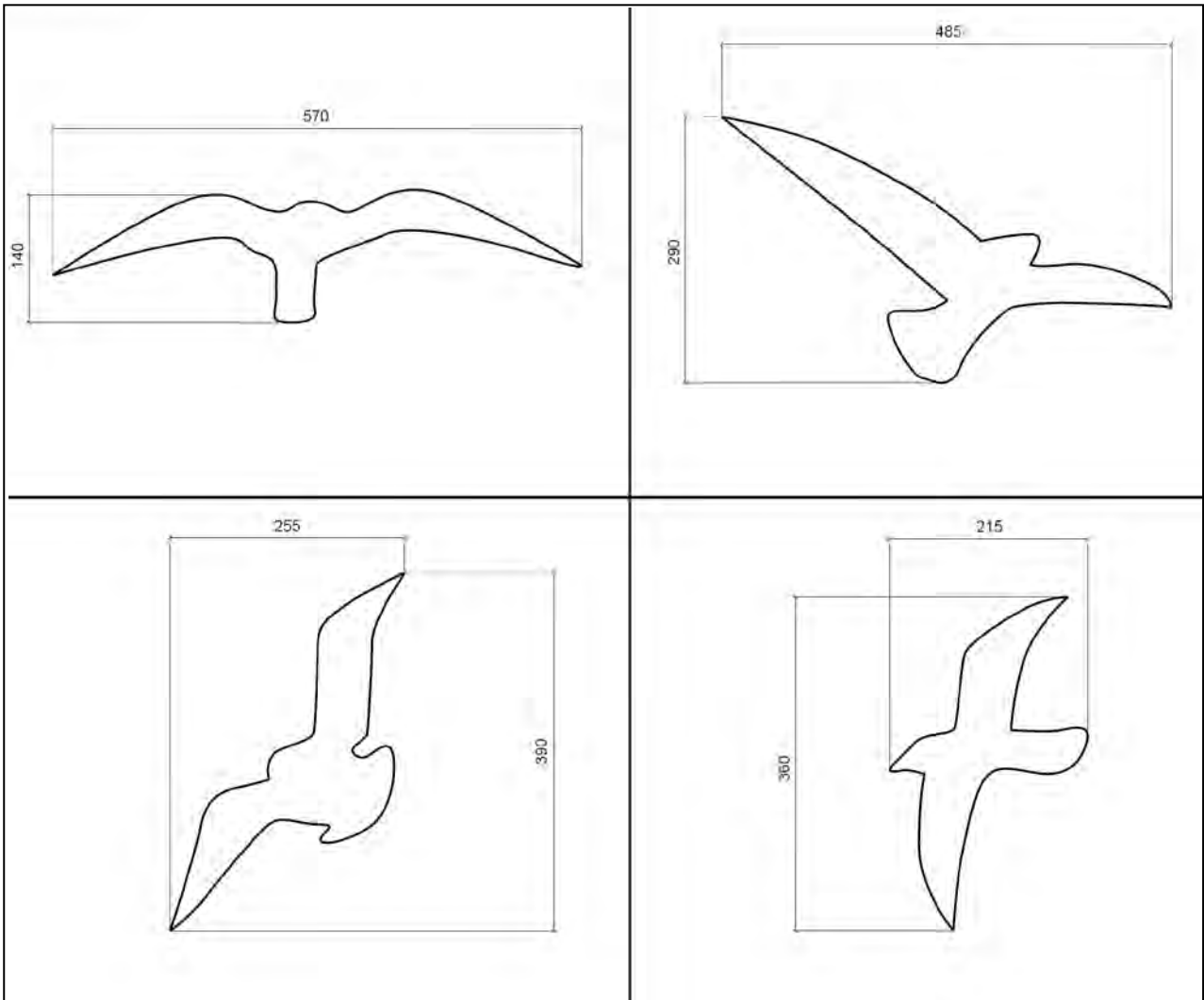
PROPOSED FOOTPATH

PROPOSED ROAD WIDENING

PROPOSED FOOTPATH

Artistic Impression of proposed noise barrier along Sha Lin Road

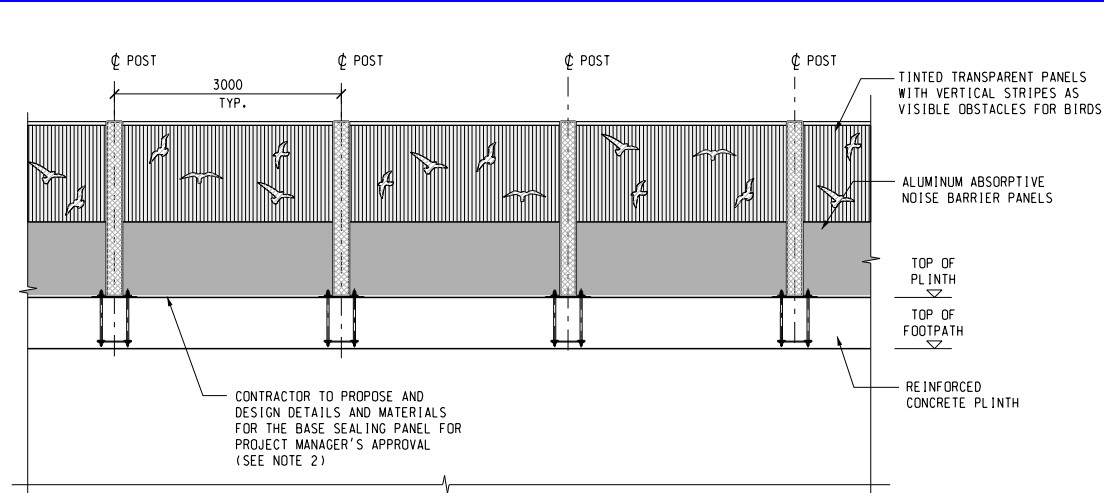
SAMPLE PATTERN OF FALCON STICKER



Design of Noise Barrier Panel along Lin Ma Hang Road

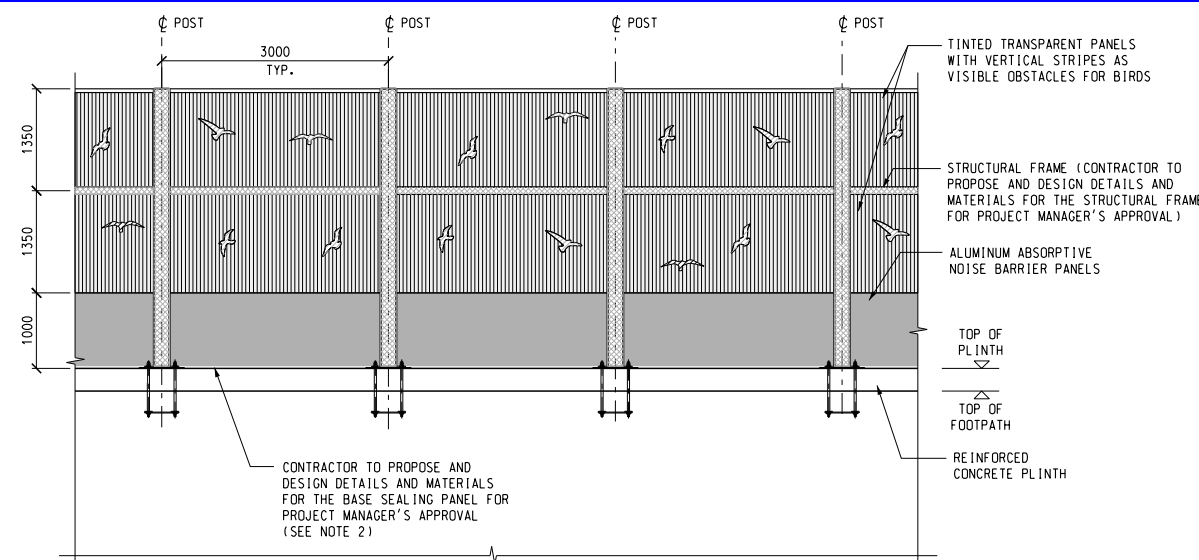
NOTES:

- NOTE AND LEGEND, REFER TO DRAWING NO. 231448/C2/NB/1021.
- THE BASE SEALING PANEL SHALL HAVE THE SAME FUNCTION AND PERFORMANCE AS THE NOISE BARRIERS.



TYPICAL COLOR SCHEME FOR 3m HIGH NOISE BARRIER (TYPE A & B)

SCALE 1:50



TYPICAL COLOR SCHEME FOR 4m HIGH NOISE BARRIER (TYPE B)

SCALE 1:50

COLOR CODE

COLOR DESIGNATION	ITEMS	COLOR
	1. ALL METAL WORKS INCLUDING POST, SEALING PANELS, STRUCTURAL FRAME	BS381 276 DEEP CHROME GREEN / TRAFFIC GREEN
	1. TINTED TRANSPARENT PANELS	BS5252F 14 E 51 BRIGHT GREEN / GOBLIN / GARLAND TRANSPARENT PANEL
	1. BIRD PATTERN	BS381 226 MID BRUNWICK GREEN
	1. ALUMINUM ABSORPTIVE NOISE BARRIER PANELS	BS381 276 DEEP CHROME GREEN / TRAFFIC GREEN

NOTE: THE COLOR OF PANELS SHALL MATCH THE SPECIFIED COLOUR CODE ACCORDING TO BS5252F OR BS381 OR SIMILAR AS CLOSE AS POSSIBLE. THE CONTRACTOR SHALL SUBMIT COLOUR SAMPLES TO THE PROJECT MANAGER FOR APPROVAL.

Rev	Description	By	Date

Consultant		ARUP	
Contract No. and Title:			
Contract No. CV/2017/02			
Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road			
Drawing title			
NOISE BARRIER STEELWORKS AND PANELS ARRANGEMENT (SHEET 2 OF 2)			
Drawing no.		Rev.	
231448/C2/NB/1022		-	
Drawn	Date	Checked	Approved
WM	05/17	AW	DL
Scale	Status		
1:50 @A1	TENDER		

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Annex E

Survey schedule of NSR

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Quarterly verification on Noise Sensitive Receivers along Lin Ma Hang Road

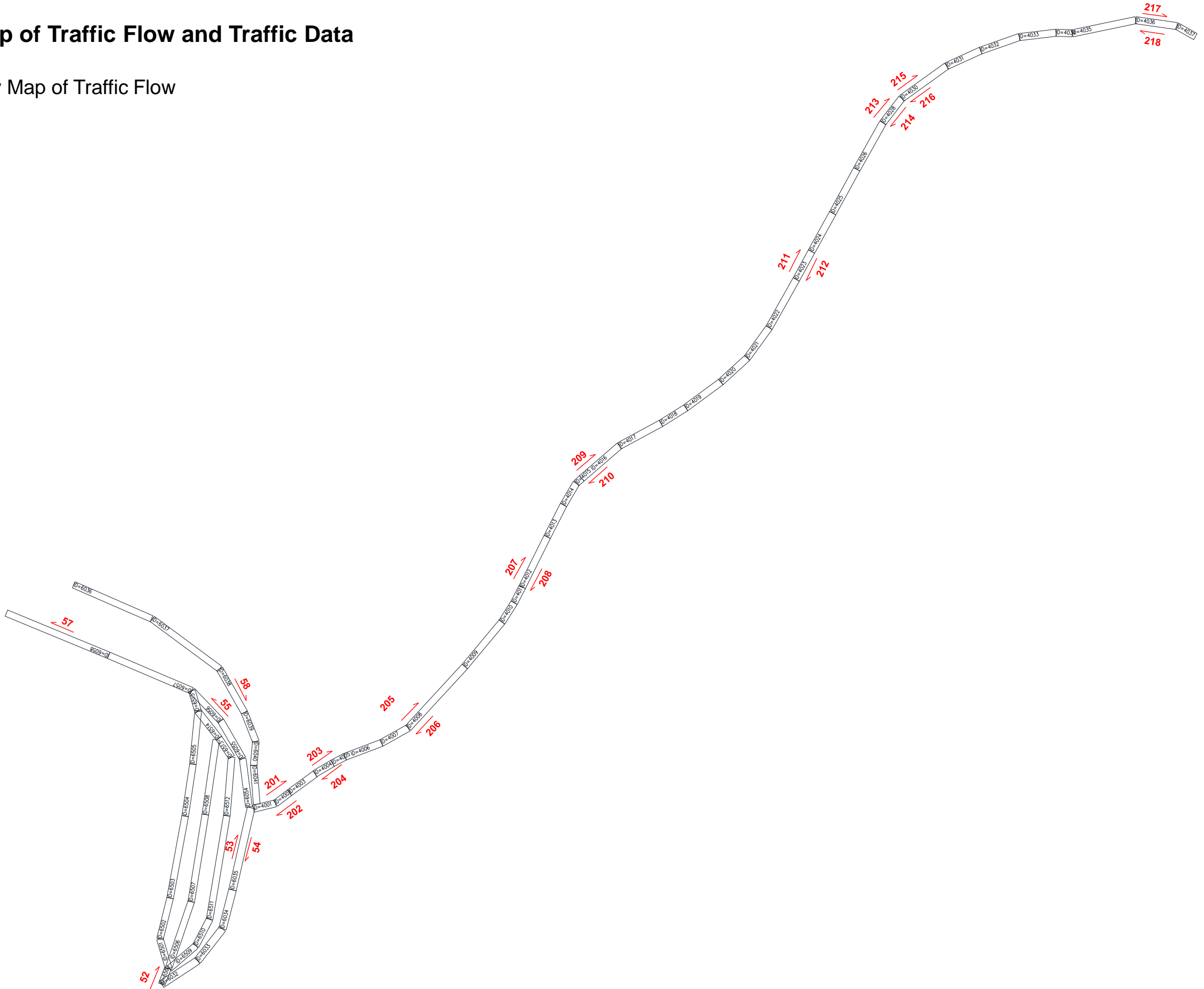
Verification Month	Any changes in NSRs?				
	Village houses near San Uk Ling- N18	Village houses opposite to San Uk Ling – N19	Village houses to the northeast of San Uk Ling – N20	Village house of Muk Wu – N21	Village houses of Muk Wu Ngai Yiu – N23
June 2018	No	No	No	No	No
September 2018	No	No	No	No	No
December 2018	No	No	No	No	No
March 2019	No	No	No	No	No
June 2019	No	No	No	No	No
September 2019	No	No	No	No	No
December 2019	No	No	No	No	No
March 2020	No	No	No	No	No
June 2020	No	No	No	No	No
September 2020	No	No	No	No	No
December 2020	No	No	No	No	No
March 2021	No	No	No	No	No
June 2021	No	No	No	No	No
September 2021	No	No	No	No	No
December 2021	No	No	No	No	No
March 2022	No	No	No	No	No
June 2022	No	No	No	No	No
September 2022	No	No	No	No	No
December 2022	No	No	No	No	No

Annex F

Key Map of Traffic Flow and Traffic Data

Key Map of Traffic Flow and Traffic Data

Title: Key Map of Traffic Flow



Project: Agreement No. CE 1/2013 (CE) Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction - Technical Note on Revised Traffic Forecast for Road Traffic Noise

Key Map of Traffic Flow and Traffic Data

Title: Traffic Data (With Project Year 2039 Normal Day)

Road ID	Road Description	Total Vehicles	HV	PHV	Speed
52	Man Kam To Road (NB)	222	222	100.0	50
53	Man Kam To Road (NB)	232	57	24.5	50
54	Man Kam To Road (SB)	489	353	72.1	50
55	Man Kam To Road (WB)	46	9	20.5	50
57	Man Kam To Road (WB)	268	232	86.5	50
58	Man Kam To Road (EB)	359	308	85.8	50
201	Lin Ma Hang Road (EB)	166	43	26.0	50
202	Lin Ma Hang Road (WB)	117	41	35.0	50
203	Lin Ma Hang Road (EB)	153	43	28.2	50
204	Lin Ma Hang Road (WB)	107	40	37.7	50
205	Lin Ma Hang Road (EB)	121	35	29.0	50
206	Lin Ma Hang Road (WB)	79	32	40.5	50
207	Lin Ma Hang Road (NB)	95	31	32.4	50
208	Lin Ma Hang Road (SB)	57	28	49.6	50
209	Lin Ma Hang Road (NB)	95	31	32.4	50
210	Lin Ma Hang Road (SB)	57	28	49.6	50
211	Lin Ma Hang Road (NB)	71	22	31.2	50
212	Lin Ma Hang Road (SB)	35	19	54.8	50
213	Lin Ma Hang Road (NB)	54	18	33.2	50
214	Lin Ma Hang Road (SB)	40	17	42.2	50
215	Lin Ma Hang Road (EB)	54	18	33.2	50
216	Lin Ma Hang Road (WB)	40	17	42.2	50
217	Lin Ma Hang Road (EB)	57	18	31.6	50
218	Lin Ma Hang Road (WB)	42	17	40.0	50

Title: Traffic Data (With Project Year 2039 Festive Day)

Road ID	Road Description	Total Vehicles	HV	PHV	Speed
52	Man Kam To Road (NB)	90	90	100.0	50
53	Man Kam To Road (NB)	248	131	52.8	50
54	Man Kam To Road (SB)	328	212	64.6	50
55	Man Kam To Road (WB)	59	6	10.8	50
57	Man Kam To Road (WB)	148	96	64.8	50
58	Man Kam To Road (EB)	163	87	53.4	50
201	Lin Ma Hang Road (EB)	190	125	65.8	50
202	Lin Ma Hang Road (WB)	164	125	75.7	50
203	Lin Ma Hang Road (EB)	181	125	69.1	50
204	Lin Ma Hang Road (WB)	159	124	78.0	50
205	Lin Ma Hang Road (EB)	163	121	74.3	50
206	Lin Ma Hang Road (WB)	147	121	82.2	50
207	Lin Ma Hang Road (NB)	146	120	81.9	50
208	Lin Ma Hang Road (SB)	136	119	87.8	50
209	Lin Ma Hang Road (NB)	146	120	81.9	50
210	Lin Ma Hang Road (SB)	136	119	87.8	50
211	Lin Ma Hang Road (NB)	142	116	82.0	50
212	Lin Ma Hang Road (SB)	131	116	88.2	50
213	Lin Ma Hang Road (NB)	143	115	80.1	50
214	Lin Ma Hang Road (SB)	128	116	90.0	50
215	Lin Ma Hang Road (EB)	143	115	80.1	50
216	Lin Ma Hang Road (WB)	128	116	90.0	50
217	Lin Ma Hang Road (EB)	145	115	78.9	50
218	Lin Ma Hang Road (WB)	130	116	89.2	50

Annex G

Predicted Road Traffic Noise Results (Unmitigated)

Project: Agreement No. CE 1/2013 (CE) Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction - Technical Note on Revised Traffic Forecast for Road Traffic Noise

Title: Unmitigated Road Traffic Noise Results

Scenario: Unmitigated (Normal Day)

Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N18-1a	1	78.3	76.3	60.0	76.4	Y	0.1	N	N
N18-1b	1	74.4	71.6	62.5	72.1	Y	0.5	N	N
N18-1c	1	77.6	76.0	< 40.0	76.0	Y	0.0	N	N
N18-2a	1	74.0	72.2	56.9	72.3	Y	0.1	N	N
N18-2a	2	74.9	73.1	57.6	73.2	Y	0.1	N	N
N18-2a	3	75.2	73.3	58.3	73.5	Y	0.2	N	N
N18-2b	1	73.2	71.8	< 40.0	71.8	Y	0.0	N	N
N18-2b	2	73.4	71.9	< 40.0	71.9	Y	0.0	N	N
N18-2b	3	73.5	72.0	< 40.0	72.0	Y	0.0	N	N
N18-3a	1	71.2	68.7	59.9	69.2	N	0.5	N	N
N18-3a	2	76.2	72.6	67.4	73.7	Y	1.1	Y	Y
N18-3b	1	72.6	70.8	53.9	70.9	Y	0.1	N	N
N18-3b	2	74.7	72.6	60.1	72.9	Y	0.3	N	N
N18-4a	1	70.6	66.4	63.4	68.2	N	1.8	Y	N
N18-4a	2	73.2	68.9	65.5	70.5	Y	1.6	Y	Y
N18-4a	3	74.0	69.2	66.9	71.2	Y	2.0	Y	Y
N18-4b	1	72.0	68.3	63.4	69.5	N	1.2	Y	N
N18-4b	2	72.9	69.4	64.1	70.5	Y	1.1	Y	Y
N18-4b	3	73.6	70.0	65.1	71.2	Y	1.2	Y	Y
N18-5a	1	69.9	62.4	63.4	66.0	N	3.6	Y	N
N18-5a	2	74.2	65.3	68.4	70.2	N	4.9	Y	N
N18-5b	1	72.8	59.8	67.7	68.3	N	8.5	Y	N
N18-5b	2	74.5	62.6	69.3	70.2	N	7.6	Y	N
N18-6	1	70.9	55.5	65.9	66.3	N	10.8	Y	N
N18-6	2	71.8	60.0	66.5	67.4	N	7.4	Y	N
N18-7	1	65.0	61.0	55.6	62.1	N	1.1	Y	N
N18-8	1	59.0	52.2	52.4	55.3	N	3.1	Y	N
N18-8	2	61.5	56.8	53.7	58.5	N	1.7	Y	N
N18-9a	1	67.0	61.0	60.3	63.6	N	2.6	Y	N
N18-9a	2	67.3	61.7	60.3	64.1	N	2.4	Y	N
N18-9a	3	68.0	63.0	60.5	64.9	N	1.9	Y	N
N18-9b	1	68.1	< 40.0	63.2	63.2	N	63.2	Y	N
N18-9b	2	68.0	< 40.0	63.1	63.1	N	63.1	Y	N
N18-9b	3	67.9	< 40.0	63.0	63.0	N	63.0	Y	N
N19-1a	1	73.0	57.0	67.7	68.0	N	11.0	Y	N
N19-1b	1	73.4	67.5	66.5	70.1	N	2.6	Y	N
N19-2	1	69.8	61.7	64.2	66.1	N	4.4	Y	N
N19-3a	1	62.2	56.2	55.9	59.1	N	2.9	Y	N
N19-3a	2	68.6	59.6	63.2	64.8	N	5.2	Y	N
N19-3b	1	65.0	< 40.0	60.8	60.8	N	60.8	Y	N
N19-3b	2	65.1	< 40.0	60.8	60.8	N	60.8	Y	N
Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N20-1	1	64.3	58.9	57.6	61.3	N	2.4	Y	N
N20-2	1	68.4	59.1	63.2	64.6	N	5.5	Y	N
N20-2	2	68.4	59.1	63.2	64.6	N	5.5	Y	N
N20-3a	1	67.7	56.1	62.9	63.7	N	7.6	Y	N
N20-3a	2	67.9	56.3	63.1	63.9	N	7.6	Y	N
N20-3b	1	68.3	53.1	63.7	64.1	N	11.0	Y	N
N20-3b	2	68.5	54.4	64.0	64.4	N	10.0	Y	N
N21-1	1	65.9	58.2	60.5	62.5	N	4.3	Y	N
N21-2	1	64.4	< 40.0	60.1	60.1	N	60.1	Y	N
N21-3	1	62.1	38.3	57.5	57.6	N	19.3	Y	N

N21-4a	1	63.6	47.5	58.7	59.0	N	11.5	Y	N
N21-4b	1	60.0	< 40.0	54.8	54.8	N	54.8	Y	N
N23-1a	1	62.7	37.3	58.5	58.6	N	21.3	Y	N
N23-1b	1	63.2	< 40.0	59.1	59.1	N	59.1	Y	N
N23-2	1	60.8	< 40.0	57.1	57.1	N	57.1	Y	N
N23-3a	1	59.3	< 40.0	56.2	56.2	N	56.2	Y	N
N23-3a	2	59.9	< 40.0	56.8	56.8	N	56.8	Y	N
N23-3b	1	58.5	< 40.0	55.3	55.3	N	55.3	Y	N
N23-3b	2	59.0	< 40.0	55.7	55.7	N	55.7	Y	N
N23-4a	1	63.3	< 40.0	60.7	60.7	N	60.7	Y	N
N23-4a	2	64.5	< 40.0	62.1	62.1	N	62.1	Y	N
N23-4a	3	65.2	< 40.0	63.1	63.1	N	63.1	Y	N
N23-4b	1	61.4	< 40.0	58.5	58.5	N	58.5	Y	N
N23-4b	2	62.2	< 40.0	59.6	59.6	N	59.6	Y	N
N23-4b	3	62.7	< 40.0	60.3	60.3	N	60.3	Y	N
N23-5a	1	63.9	< 40.0	61.6	61.6	N	61.6	Y	N
N23-5b	1	60.6	< 40.0	58.6	58.6	N	58.6	Y	N
N23-6a	1	59.2	< 40.0	56.7	56.7	N	56.7	Y	N
N23-6b	1	62.1	< 40.0	58.6	58.6	N	58.6	Y	N
N23-7	1	62.9	< 40.0	59.0	59.0	N	59.0	Y	N
N23-P1	1	66.9	< 40.0	64.1	64.1	N	64.1	Y	N
N23-P1	2	69.5	< 40.0	67.2	67.2	N	67.2	Y	N
N23-P1	3	69.8	< 40.0	67.6	67.6	N	67.6	Y	N
N23-P2	1	65.8	< 40.0	63.3	63.3	N	63.3	Y	N
N23-P2	2	69.4	< 40.0	67.1	67.1	N	67.1	Y	N
N23-P2	3	69.9	< 40.0	67.6	67.6	N	67.6	Y	N
N23-P3	1	63.6	< 40.0	61.4	61.4	N	61.4	Y	N
N23-P3	2	68.8	< 40.0	66.5	66.5	N	66.5	Y	N
N23-P3	3	69.8	< 40.0	67.5	67.5	N	67.5	Y	N
N23-P4	1	65.2	< 40.0	61.9	61.9	N	61.9	Y	N
N23-P4	2	69.2	< 40.0	66.1	66.1	N	66.1	Y	N
N23-P4	3	69.7	< 40.0	66.7	66.7	N	66.7	Y	N
N23-P5	1	66.2	< 40.0	62.8	62.8	N	62.8	Y	N
N23-P5	2	69.0	< 40.0	65.9	65.9	N	65.9	Y	N
N23-P5	3	69.4	< 40.0	66.3	66.3	N	66.3	Y	N

Note:

[1] The predicted road traffic noise levels at the identified NSRs under prevailing scenario extracted from the approved EIA report (AEIAR-198/2016).

Scenario: Unmitigated (Festive Day)

Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N18-1a	1	78.3	75.1	64.1	75.4	Y	0.3	N	
N18-1b	1	74.4	69.2	66.6	71.1	Y	1.9	Y	
N18-1c	1	77.6	74.9	<40.0	74.9	Y	0.0	N	
N18-2a	1	74.0	70.4	61.0	70.9	Y	0.5	N	
N18-2a	2	74.9	71.3	61.7	71.8	Y	0.5	N	
N18-2a	3	75.2	71.7	62.4	72.2	Y	0.5	N	
N18-2b	1	73.2	70.5	<40.0	70.5	Y	0.0	N	
N18-2b	2	73.4	70.6	<40.0	70.6	Y	0.0	N	
N18-2b	3	73.5	70.8	<40.0	70.8	Y	0.0	N	
N18-3a	1	71.2	66.7	64.0	68.6	N	1.9	Y	
N18-3a	2	76.2	70.2	71.5	73.9	Y	3.7	Y	
N18-3b	1	72.6	69.4	58.0	69.7	N	0.3	N	
N18-3b	2	74.7	70.7	64.2	71.6	Y	0.9	N	
N18-4a	1	70.6	63.1	67.5	68.8	N	5.7	Y	
N18-4a	2	73.2	65.1	69.6	70.9	Y	5.8	Y	
N18-4a	3	74.0	65.7	71.0	72.1	Y	6.4	Y	
N18-4b	1	72.0	64.8	67.5	69.4	N	4.6	Y	
N18-4b	2	72.9	66.1	68.2	70.3	N	4.2	Y	
N18-4b	3	73.6	67.0	69.2	71.2	Y	4.2	Y	
N18-5a	1	69.9	58.9	67.6	68.2	N	9.3	Y	

N18-5a	2	74.2	61.6	72.6	73.0	Y	11.4	Y	Y
N18-5b	1	72.8	54.9	71.9	72.0	Y	17.1	Y	Y
N18-5b	2	74.5	57.7	73.6	73.7	Y	16.0	Y	Y
N18-6	1	70.9	50.3	70.1	70.2	N	19.9	Y	N
N18-6	2	71.8	54.9	70.7	70.8	Y	15.9	Y	Y
N18-7	1	65.0	58.2	59.8	62.0	N	3.8	Y	N
N18-8	1	59.0	48.6	56.6	57.2	N	8.6	Y	N
N18-8	2	61.5	53.0	57.9	59.1	N	6.1	Y	N
N18-9a	1	67.0	56.6	64.4	65.1	N	8.5	Y	N
N18-9a	2	67.3	57.6	64.5	65.3	N	7.7	Y	N
N18-9a	3	68.0	59.2	64.7	65.8	N	6.6	Y	N
N18-9b	1	68.1	< 40.0	67.6	67.6	N	67.6	Y	N
N18-9b	2	68.0	< 40.0	67.5	67.5	N	67.5	Y	N
N18-9b	3	67.9	< 40.0	67.4	67.4	N	67.4	Y	N
N19-1a	1	73.0	56.1	71.9	72.0	Y	15.9	Y	Y
N19-1b	1	73.4	63.0	70.7	71.3	Y	8.3	Y	Y
N19-2	1	69.8	58.1	68.9	69.2	N	11.1	Y	N
N19-3a	1	62.2	51.9	60.9	61.4	N	9.5	Y	N
N19-3a	2	68.6	56.4	67.9	68.2	N	11.8	Y	N
N19-3b	1	65.0	< 40.0	65.7	65.7	N	65.7	Y	N
N19-3b	2	65.1	< 40.0	65.8	65.8	N	65.8	Y	N
Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd [A] dB(A)	Proj Rd [B] dB(A)	All Rds [C] = [A]+[B] dB(A)		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
N20-1	1	64.3	54.5	61.8	62.5	N	8.0	Y	N
N20-2	1	68.4	54.5	68.0	68.2	N	13.7	Y	N
N20-2	2	68.4	54.6	68.0	68.2	N	13.6	Y	N
N20-3a	1	67.7	51.8	67.9	68.0	N	16.2	Y	N
N20-3a	2	67.9	52.0	68.1	68.2	N	16.2	Y	N
N20-3b	1	68.3	49.3	68.8	68.8	N	19.5	Y	N
N20-3b	2	68.5	50.5	69.0	69.1	N	18.6	Y	N
N21-1	1	65.9	53.5	65.5	65.8	N	12.3	Y	N
N21-2	1	64.4	< 40.0	65.5	65.5	N	65.5	Y	N
N21-3	1	62.1	37.2	62.9	62.9	N	25.7	Y	N
N21-4a	1	63.6	46.2	64.1	64.2	N	18.0	Y	N
N21-4b	1	60.0	< 40.0	60.5	60.5	N	60.5	Y	N
N23-1a	1	62.7	36.4	64.1	64.1	N	27.7	Y	N
N23-1b	1	63.2	< 40.0	64.7	64.7	N	64.7	Y	N
N23-2	1	60.8	< 40.0	62.9	62.9	N	62.9	Y	N
N23-3a	1	59.3	< 40.0	62.6	62.6	N	62.6	Y	N
N23-3a	2	59.9	< 40.0	63.3	63.3	N	63.3	Y	N
N23-3b	1	58.5	< 40.0	61.5	61.5	N	61.5	Y	N
N23-3b	2	59.0	< 40.0	61.9	61.9	N	61.9	Y	N
N23-4a	1	63.3	< 40.0	67.5	67.5	N	67.5	Y	N
N23-4a	2	64.5	< 40.0	69.0	69.0	N	69.0	Y	N
N23-4a	3	65.2	< 40.0	70.0	70.0	N	70.0	Y	N
N23-4b	1	61.4	< 40.0	65.1	65.1	N	65.1	Y	N
N23-4b	2	62.2	< 40.0	66.3	66.3	N	66.3	Y	N
N23-4b	3	62.7	< 40.0	67.0	67.0	N	67.0	Y	N
N23-5a	1	63.9	< 40.0	68.7	68.7	N	68.7	Y	N
N23-5b	1	60.6	< 40.0	65.8	65.8	N	65.8	Y	N
N23-6a	1	59.2	< 40.0	64.1	64.1	N	64.1	Y	N
N23-6b	1	62.1	< 40.0	66.3	66.3	N	66.3	Y	N
N23-7	1	62.9	< 40.0	66.7	66.7	N	66.7	Y	N
N23-P1	1	66.9	< 40.0	71.3	71.3	Y	71.3	Y	Y
N23-P1	2	69.5	< 40.0	74.5	74.5	Y	74.5	Y	Y
N23-P1	3	69.8	< 40.0	74.9	74.9	Y	74.9	Y	Y
N23-P2	1	65.8	< 40.0	70.6	70.6	Y	70.6	Y	Y
N23-P2	2	69.4	< 40.0	74.5	74.5	Y	74.5	Y	Y
N23-P2	3	69.9	< 40.0	75.0	75.0	Y	75.0	Y	Y
N23-P3	1	63.6	< 40.0	68.8	68.8	N	68.8	Y	N

N23-P3	2	68.8	< 40.0	74.1	74.1	Y	74.1	Y	Y
N23-P3	3	69.8	< 40.0	75.0	75.0	Y	75.0	Y	Y
N23-P4	1	65.2	< 40.0	69.9	69.9	N	69.9	Y	N
N23-P4	2	69.2	< 40.0	74.0	74.0	Y	74.0	Y	Y
N23-P4	3	69.7	< 40.0	74.6	74.6	Y	74.6	Y	Y
N23-P5	1	66.2	< 40.0	70.9	70.9	Y	70.9	Y	Y
N23-P5	2	69.0	< 40.0	74.0	74.0	Y	74.0	Y	Y
N23-P5	3	69.4	< 40.0	74.4	74.4	Y	74.4	Y	Y

Note:

[1] The predicted road traffic noise levels at the identified NSRs under prevailing scenario extracted from the approved EIA report (AEIAR-198/2016).

Annex H

Updated Road Traffic Noise Mitigation Measures

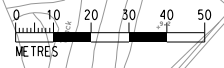
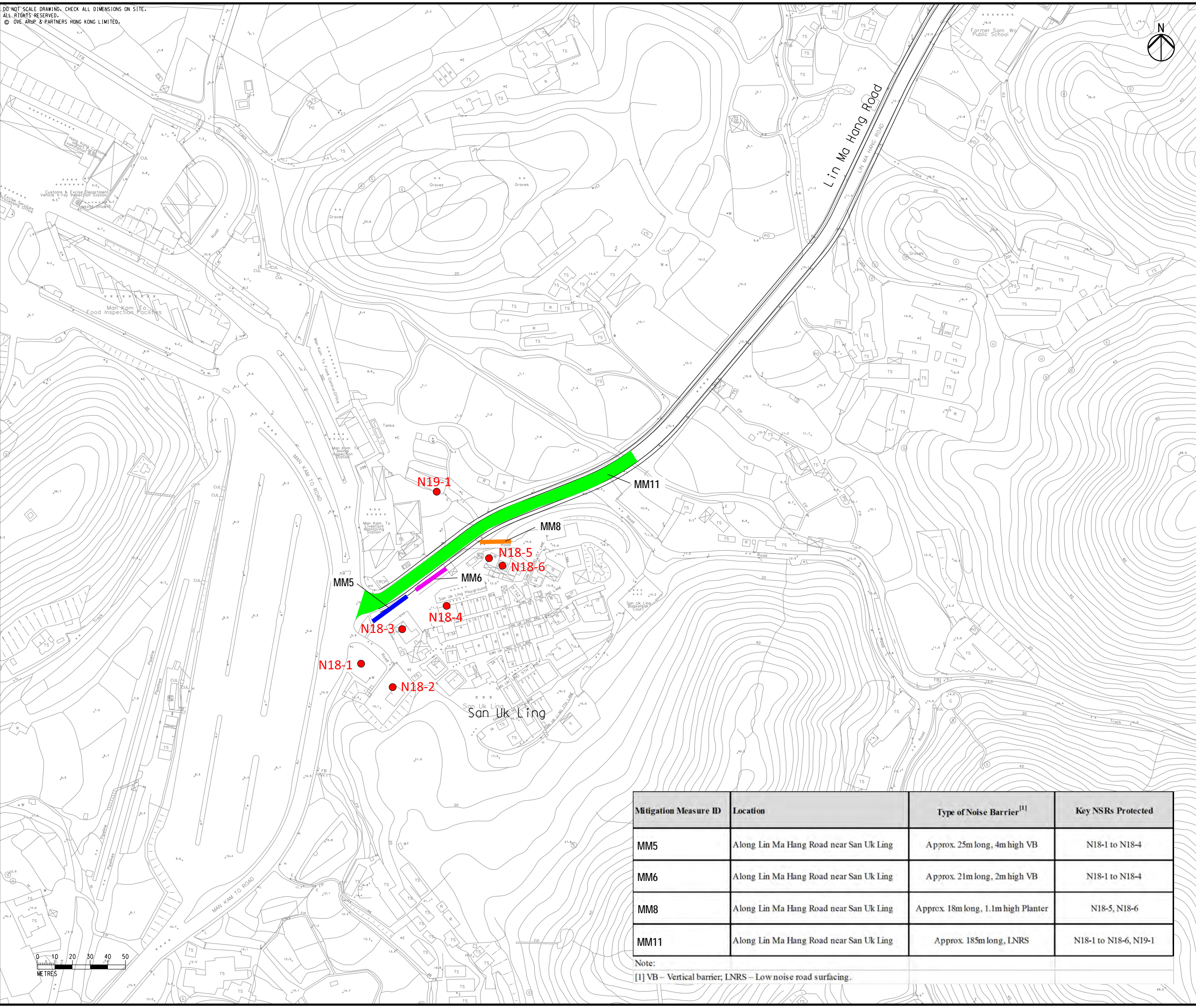
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Legend

- Proposed Road Network
- 1.1m Planter
- 2m Vertical Barrier
- 4m Vertical Barrier
- Low Noise Surfacing Materials
- Representative Noise Sensitive Receivers (Road Traffic Noise)

Printed by : 12/29/2020
Filename : \\hkgrts27\c:\env\project\231448\13 Drawing Deliverables\Reports\20201020 Technical Note\Figure 2.2a Extents and Locations of Road Traffic Noise Mitigation Measures (Sheet 2 of 3).dgn



Mitigation Measure ID	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM5	Along Lin Ma Hang Road near San Uk Ling	Approx. 25m long, 4m high VB	N18-1 to N18-4
MM6	Along Lin Ma Hang Road near San Uk Ling	Approx. 21m long, 2m high VB	N18-1 to N18-4
MM8	Along Lin Ma Hang Road near San Uk Ling	Approx. 18m long, 1.1m high Planter	N18-5, N18-6
MM11	Along Lin Ma Hang Road near San Uk Ling	Approx. 185m long, LNRS	N18-1 to N18-6, N19-1

Note:
[1] VB – Vertical barrier; LNRS – Low noise road surfacing.

Rev	Description	By	Date
B	SECOND ISSUE	BS	12/20
A	FIRST ISSUE	BS	11/20

Consultant
ARUP

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title
Extents and Locations of Road Traffic Noise Mitigation Measures (Sheet 2 of 3)

Drawing no. Figure 2.2a		Rev. B	
Drawn BS	Date 12/20	Checked EL	Approved FC
Scale 1:2000 @A3		Status PRELIMINARY	

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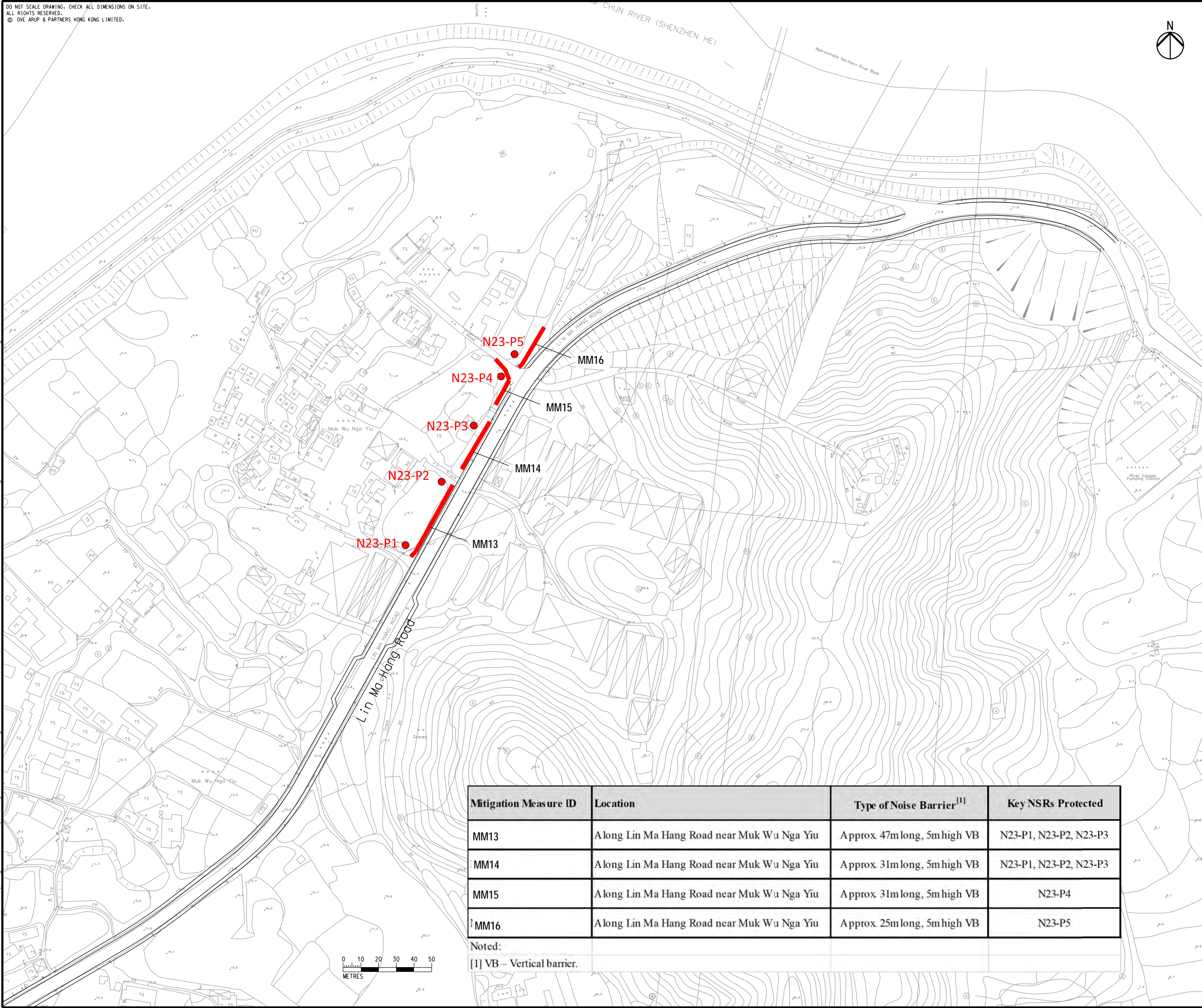
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Legend

- Proposed Road Network
- 5m Vertical Barrier
- Representative Noise Sensitive Receivers (Road Traffic Noise)

Printed by : 11/25/2020
Filename : C:\Users\chi-pano.siu\Desktop\Project\231448\Figure 2.2b Extents and Locations of Road Traffic Noise Mitigation Measures (Sheet 3 of 3).dgn



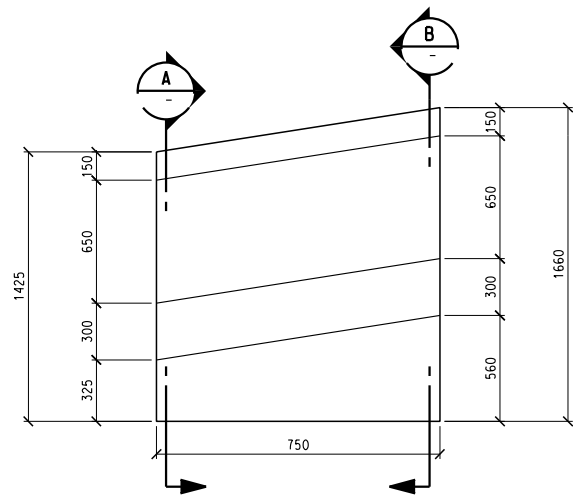
Mitigation Measure ID	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM13	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 47m long, 5m high VB	N23-P1, N23-P2, N23-P3
MM14	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 31m long, 5m high VB	N23-P1, N23-P2, N23-P3
MM15	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 31m long, 5m high VB	N23-P4
MM16	Along Lin Ma Hang Road near Muk Wu Nga Yiu	Approx. 25m long, 5m high VB	N23-P5

Noted:
[1] VB – Vertical barrier.

A FIRST ISSUE	BS 11/20
Rev Description	By Date
ARUP	
Contract No. and Title: Agreement No. CE 1/2013(CE) Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction	
Drawing title: Extents and Locations of Road Traffic Noise Mitigation Measures (Sheet 3 of 3)	
Drawing no. Figure 2.2b	Rev. A
Drawn BS	Date 11/20
Scale 1:2000 @A3	Checked EL
	Approved FC
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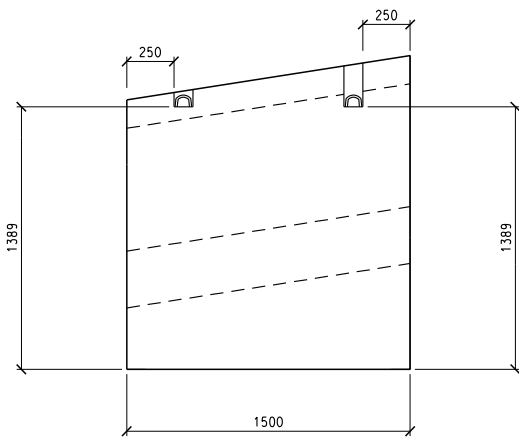
Annex I

General Layout of Concrete Barrier



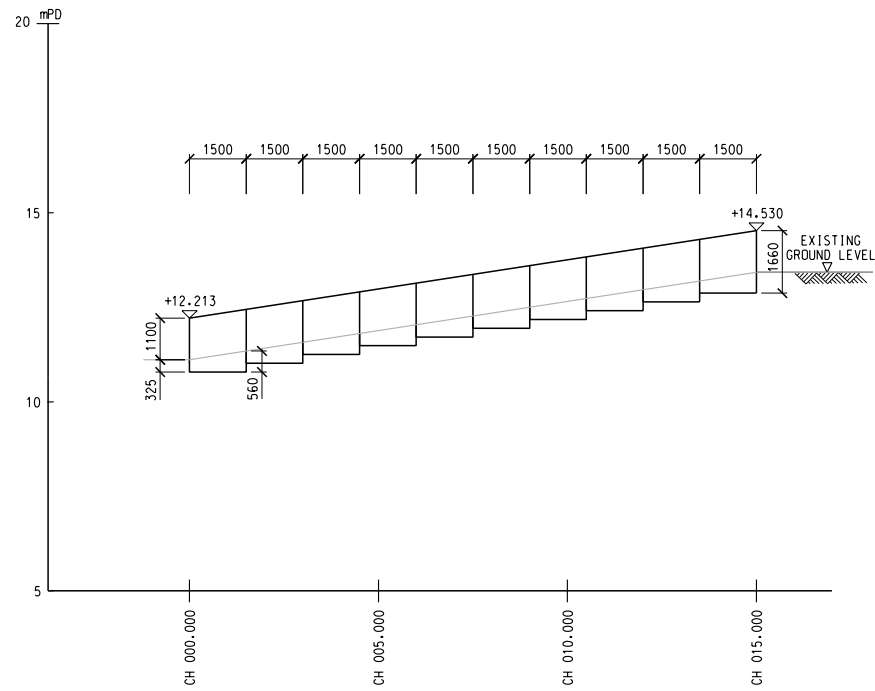
FRONT VIEW OF PRECAST UNIT

SCALE 1:20



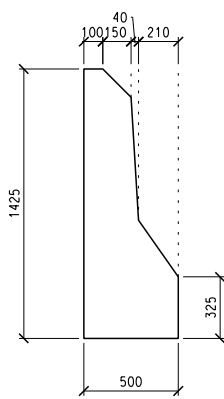
REAR VIEW OF PRECAST UNIT

SCALE 1:20



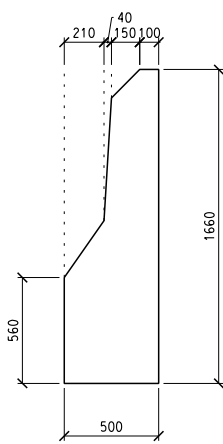
ELEVATION OF NOISE BARRIER MM8

SCALE 1:100



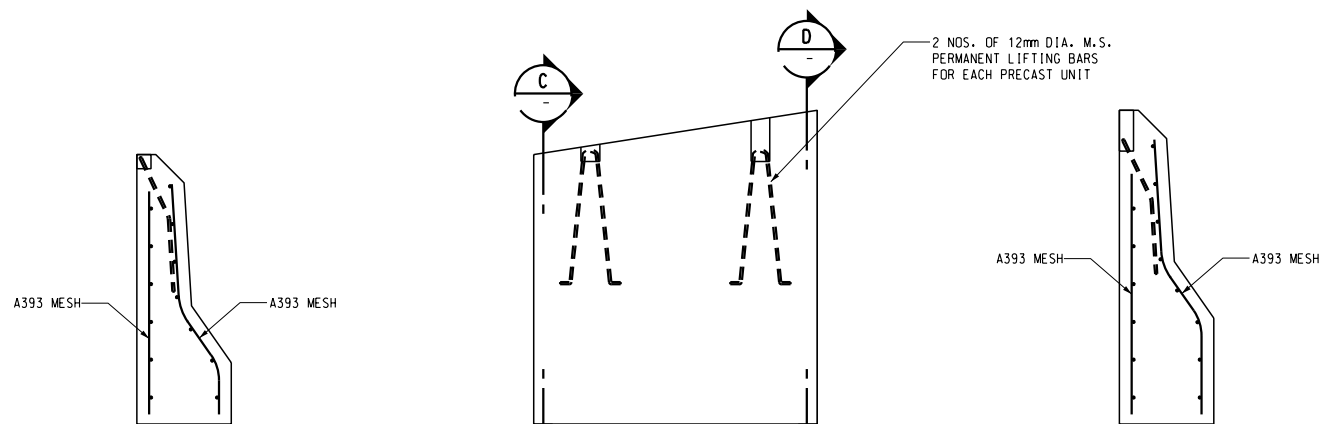
SECTION A

SCALE 1:20



SECTION B

SCALE 1:20



TYPICAL R.C. DETAILS FOR NOISE BARRIER MM8

SCALE 1:20

SECTION D

SCALE 1:20

NOTE:

1. NOTES OF Hyd STANDARD DRAWING NO. H2104/1B SHALL APPLY.

ARUP

Ove Arup & Partners Hong Kong Ltd

Job Title : Development of Columbarium at Sandy Ridge Cemetery -
Infrastructural Works at Man Kam To Road and
Lin Ma Hang Road

Project No. : 231448

Contract No. : CV/2017/02

Sketch No. : CV/2017/02/SK/0288

Rev : 0

Sketch Title : NOISE BARRIER MM8 - GENERAL ARRANGEMENT

Scale : AS SHOWN @A1

Date : 25/01/2021

Drawn : CKH

Other Related Ref. :

Checked : AL

Working Dwg. No. : 231448/C2/NB/1014
(NOT YET ISSUED)

DAN No. : N/A
RFI No. : N/A

Approved : HW

PMI No. : N/A
Others : N/A

Annex J

Predicted Road Traffic Noise Results (Mitigated)

Project: Agreement No. CE 1/2013 (CE) Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction - Technical Note on Revised Traffic Forecast for Road Traffic Noise

Mitigated Road Traffic Noise Results

Scenario: Mitigated (Normal Day)

Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N18-1a	1	78.3	76.3	56.7	76.4	Y	0.1	N	N
N18-1b	1	74.4	71.6	56.8	71.7	Y	0.1	N	N
N18-1c	1	77.6	76.0	< 40.0	76.0	Y	0.0	N	N
N18-2a	1	74.0	71.9	51.3	71.9	Y	0.0	N	N
N18-2a	2	74.9	72.9	52.3	73.0	Y	0.1	N	N
N18-2a	3	75.2	73.3	52.8	73.4	Y	0.1	N	N
N18-2b	1	73.2	71.8	< 40.0	71.8	Y	0.0	N	N
N18-2b	2	73.4	71.9	< 40.0	71.9	Y	0.0	N	N
N18-2b	3	73.5	72.0	< 40.0	72.0	Y	0.0	N	N
N18-3a	1	71.2	67.7	53.6	67.9	N	0.2	N	N
N18-3a	2	76.2	71.7	58.7	71.9	Y	0.2	N	N
N18-3b	1	72.6	70.6	48.4	70.6	Y	0.0	N	N
N18-3b	2	74.7	71.9	51.9	71.9	Y	0.0	N	N
N18-4a	1	70.6	64.1	57.9	65.1	N	1.0	Y	N
N18-4a	2	73.2	67.9	59.8	68.6	N	0.7	N	N
N18-4a	3	74.0	68.8	61.9	69.6	N	0.8	N	N
N18-4b	1	72.0	66.7	56.5	67.1	N	0.4	N	N
N18-4b	2	72.9	68.3	57.2	68.6	N	0.3	N	N
N18-4b	3	73.6	69.5	58.6	69.8	N	0.3	N	N
N18-5a	1	69.9	62.4	58.9	64.0	N	1.6	Y	N
N18-5a	2	74.2	65.2	64.1	67.7	N	2.5	Y	N
N18-5b	1	72.8	58.7	59.9	62.3	N	3.6	Y	N
N18-5b	2	74.5	62.6	64.2	66.5	N	3.9	Y	N
N18-6	1	70.9	53.8	59.3	60.4	N	6.6	Y	N
N18-6	2	71.8	60.0	60.4	63.2	N	3.2	Y	N
N18-7	1	65.0	58.1	49.1	58.6	N	0.5	N	N
N18-8	1	59.0	52.1	44.3	52.8	N	0.7	N	N
N18-8	2	61.5	56.6	47.1	57.0	N	0.4	N	N
N18-9a	1	67.0	60.9	57.0	62.4	N	1.5	Y	N
N18-9a	2	67.3	61.7	57.1	63.0	N	1.3	Y	N
N18-9a	3	68.0	62.9	57.3	63.9	N	1.0	Y	N
N18-9b	1	68.1	< 40.0	61.4	61.4	N	61.4	Y	N
N18-9b	2	68.0	< 40.0	61.3	61.3	N	61.3	Y	N
N18-9b	3	67.9	< 40.0	61.1	61.1	N	61.1	Y	N
N19-1a	1	73.0	48.6	65.5	65.6	N	17.0	Y	N
N19-1b	1	73.4	67.5	64.2	69.2	N	1.7	Y	N
N19-2	1	69.8	61.3	63.4	65.5	N	4.2	Y	N
N19-3a	1	62.2	56.2	55.7	59.0	N	2.8	Y	N
N19-3a	2	68.6	59.0	62.4	64.0	N	5.0	Y	N
N19-3b	1	65.0	< 40.0	60.8	60.8	N	60.8	Y	N
N19-3b	2	65.1	< 40.0	60.8	60.8	N	60.8	Y	N
Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N20-1	1	64.3	58.9	55.1	60.4	N	1.5	Y	N
N20-2	1	68.4	59.0	62.8	64.3	N	5.3	Y	N
N20-2	2	68.4	59.1	62.8	64.3	N	5.2	Y	N
N20-3a	1	67.7	56.0	62.8	63.6	N	7.6	Y	N
N20-3a	2	67.9	56.2	63.0	63.8	N	7.6	Y	N
N20-3b	1	68.3	52.8	63.7	64.0	N	11.2	Y	N
N20-3b	2	68.5	54.2	63.9	64.3	N	10.1	Y	N
N21-1	1	65.9	58.1	60.3	62.4	N	4.3	Y	N
N21-2	1	64.4	< 40.0	60.1	60.1	N	60.1	Y	N
N21-3	1	62.1	38.0	57.5	57.5	N	19.5	Y	N

N21-4a	1	63.6	45.0	58.5	58.7	N	13.7	Y	N
N21-4b	1	60.0	< 40.0	54.8	54.8	N	54.8	Y	N
N23-1a	1	62.7	37.0	58.5	58.6	N	21.6	Y	N
N23-1b	1	63.2	< 40.0	59.0	59.0	N	59.0	Y	N
N23-2	1	60.8	< 40.0	57.0	57.0	N	57.0	Y	N
N23-3a	1	59.3	< 40.0	55.3	55.3	N	55.3	Y	N
N23-3a	2	59.9	< 40.0	55.7	55.7	N	55.7	Y	N
N23-3b	1	58.5	< 40.0	55.2	55.2	N	55.2	Y	N
N23-3b	2	59.0	< 40.0	55.5	55.5	N	55.5	Y	N
N23-4a	1	63.3	< 40.0	57.1	57.1	N	57.1	Y	N
N23-4a	2	64.5	< 40.0	58.5	58.5	N	58.5	Y	N
N23-4a	3	65.2	< 40.0	59.5	59.5	N	59.5	Y	N
N23-4b	1	61.4	< 40.0	56.5	56.5	N	56.5	Y	N
N23-4b	2	62.2	< 40.0	57.6	57.6	N	57.6	Y	N
N23-4b	3	62.7	< 40.0	58.2	58.2	N	58.2	Y	N
N23-5a	1	63.9	< 40.0	57.0	57.0	N	57.0	Y	N
N23-5b	1	60.6	< 40.0	50.8	50.8	N	50.8	Y	N
N23-6a	1	59.2	< 40.0	52.3	52.3	N	52.3	Y	N
N23-6b	1	62.1	< 40.0	54.1	54.1	N	54.1	Y	N
N23-7	1	62.9	< 40.0	57.5	57.5	N	57.5	Y	N
N23-P1	1	66.9	< 40.0	59.3	59.3	N	59.3	Y	N
N23-P1	2	69.5	< 40.0	62.4	62.4	N	62.4	Y	N
N23-P1	3	69.8	< 40.0	63.2	63.2	N	63.2	Y	N
N23-P2	1	65.8	< 40.0	58.5	58.5	N	58.5	Y	N
N23-P2	2	69.4	< 40.0	62.1	62.1	N	62.1	Y	N
N23-P2	3	69.9	< 40.0	62.9	62.9	N	62.9	Y	N
N23-P3	1	63.6	< 40.0	55.8	55.8	N	55.8	Y	N
N23-P3	2	68.8	< 40.0	61.3	61.3	N	61.3	Y	N
N23-P3	3	69.8	< 40.0	62.3	62.3	N	62.3	Y	N
N23-P4	1	65.2	< 40.0	50.2	50.2	N	50.2	Y	N
N23-P4	2	69.2	< 40.0	53.9	53.9	N	53.9	Y	N
N23-P4	3	69.7	< 40.0	60.1	60.1	N	60.1	Y	N
N23-P5	1	66.2	< 40.0	57.6	57.6	N	57.6	Y	N
N23-P5	2	69.0	< 40.0	60.8	60.8	N	60.8	Y	N
N23-P5	3	69.4	< 40.0	62.2	62.2	N	62.2	Y	N

Note:

[1] The predicted road traffic noise levels at the identified NSRs under prevailing scenario extracted from the approved EIA report (AEIAR-198/2016).

Scenario: Mitigated (Festive Day)

Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N18-1a	1	78.3	75.1	60.8	75.3	Y	0.2	N	N
N18-1b	1	74.4	69.2	60.9	69.8	N	0.6	N	N
N18-1c	1	77.6	74.9	<40.0	74.9	Y	0.0	N	N
N18-2a	1	74.0	70.2	55.4	70.4	N	0.2	N	N
N18-2a	2	74.9	71.3	56.4	71.4	Y	0.1	N	N
N18-2a	3	75.2	71.7	57.0	71.8	Y	0.1	N	N
N18-2b	1	73.2	70.5	<40.0	70.5	Y	0.0	N	N
N18-2b	2	73.4	70.6	<40.0	70.6	Y	0.0	N	N
N18-2b	3	73.5	70.8	<40.0	70.8	Y	0.0	N	N
N18-3a	1	71.2	66.2	57.8	66.8	N	0.6	N	N
N18-3a	2	76.2	69.7	62.9	70.5	Y	0.8	N	N
N18-3b	1	72.6	69.3	52.5	69.4	N	0.1	N	N
N18-3b	2	74.7	70.4	56.0	70.5	Y	0.1	N	N
N18-4a	1	70.6	60.3	62.0	64.2	N	3.9	Y	N
N18-4a	2	73.2	63.8	64.0	66.9	N	3.1	Y	N
N18-4a	3	74.0	65.0	66.0	68.5	N	3.5	Y	N
N18-4b	1	72.0	63.7	60.6	65.4	N	1.7	Y	N
N18-4b	2	72.9	65.2	61.3	66.7	N	1.5	Y	N
N18-4b	3	73.6	66.5	62.7	68.0	N	1.5	Y	N
N18-5a	1	69.9	58.9	63.0	64.5	N	5.6	Y	N

N18-5a	2	74.2	61.5	68.3	69.1	N	7.6	Y	N
N18-5b	1	72.8	53.8	64.2	64.6	N	10.8	Y	N
N18-5b	2	74.5	57.7	68.5	68.9	N	11.2	Y	N
N18-6	1	70.9	48.7	63.6	63.7	N	15.0	Y	N
N18-6	2	71.8	54.8	64.7	65.1	N	10.3	Y	N
N18-7	1	65.0	54.8	53.3	57.1	N	2.3	Y	N
N18-8	1	59.0	48.6	48.5	51.6	N	3.0	Y	N
N18-8	2	61.5	52.8	51.3	55.1	N	2.3	Y	N
N18-9a	1	67.0	56.6	61.2	62.5	N	5.9	Y	N
N18-9a	2	67.3	57.5	61.3	62.8	N	5.3	Y	N
N18-9a	3	68.0	59.0	61.5	63.5	N	4.5	Y	N
N18-9b	1	68.1	< 40.0	65.9	65.9	N	65.9	Y	N
N18-9b	2	68.0	< 40.0	65.8	65.8	N	65.8	Y	N
N18-9b	3	67.9	< 40.0	65.6	65.6	N	65.6	Y	N
N19-1a	1	73.0	47.6	69.8	69.8	N	22.2	Y	N
N19-1b	1	73.4	63.0	68.4	69.5	N	6.5	Y	N
N19-2	1	69.8	57.4	68.1	68.5	N	11.1	Y	N
N19-3a	1	62.2	51.9	60.8	61.3	N	9.4	Y	N
N19-3a	2	68.6	55.5	67.2	67.5	N	12.0	Y	N
N19-3b	1	65.0	< 40.0	65.7	65.7	N	65.7	Y	N
N19-3b	2	65.1	< 40.0	65.8	65.8	N	65.8	Y	N
Assessment Point		Prevailing	With Project Normal			Exceedance Overall [C] > Criteria (Y/N)	Project Road Contribution [D]		Concerned NSRs for further consideration (Y/N)
NSR	Floor	All Rds dB(A)	Existing Rd	Proj Rd	All Rds		Project Road Contribution [D] = [C] - [A] dB(A)	Project Road Contribution [D] ≥ 1 dB(A) (Y/N)	
			[A] dB(A)	[B] dB(A)	[C] = [A]+[B] dB(A)				
N20-1		64.3	54.5	59.3	60.5	N	6.0	Y	N
N20-2	1	68.4	54.5	67.6	67.8	N	13.3	Y	N
N20-2	2	68.4	54.5	67.6	67.8	N	13.3	Y	N
N20-3a	1	67.7	51.5	67.8	67.9	N	16.4	Y	N
N20-3a	2	67.9	51.7	68.0	68.1	N	16.4	Y	N
N20-3b	1	68.3	48.8	68.7	68.8	N	20.0	Y	N
N20-3b	2	68.5	50.1	69.0	69.0	N	18.9	Y	N
N21-1	1	65.9	53.5	65.4	65.6	N	12.1	Y	N
N21-2	1	64.4	< 40.0	65.5	65.5	N	65.5	Y	N
N21-3	1	62.1	36.9	62.9	62.9	N	26.0	Y	N
N21-4a	1	63.6	43.6	64.0	64.1	N	20.5	Y	N
N21-4b	1	60.0	< 40.0	60.5	60.5	N	60.5	Y	N
N23-1a	1	62.7	36.1	64.1	64.1	N	28.0	Y	N
N23-1b	1	63.2	< 40.0	64.7	64.7	N	64.7	Y	N
N23-2	1	60.8	< 40.0	62.7	62.7	N	62.7	Y	N
N23-3a	1	59.3	< 40.0	61.5	61.5	N	61.5	Y	N
N23-3a	2	59.9	< 40.0	61.9	61.9	N	61.9	Y	N
N23-3b	1	58.5	< 40.0	61.3	61.3	N	61.3	Y	N
N23-3b	2	59.0	< 40.0	61.7	61.7	N	61.7	Y	N
N23-4a	1	63.3	< 40.0	63.6	63.6	N	63.6	Y	N
N23-4a	2	64.5	< 40.0	65.1	65.1	N	65.1	Y	N
N23-4a	3	65.2	< 40.0	66.3	66.3	N	66.3	Y	N
N23-4b	1	61.4	< 40.0	62.9	62.9	N	62.9	Y	N
N23-4b	2	62.2	< 40.0	64.0	64.0	N	64.0	Y	N
N23-4b	3	62.7	< 40.0	64.7	64.7	N	64.7	Y	N
N23-5a	1	63.9	< 40.0	63.9	63.9	N	63.9	Y	N
N23-5b	1	60.6	< 40.0	58.1	58.1	N	58.1	Y	N
N23-6a	1	59.2	< 40.0	59.7	59.7	N	59.7	Y	N
N23-6b	1	62.1	< 40.0	61.8	61.8	N	61.8	Y	N
N23-7	1	62.9	< 40.0	65.2	65.2	N	65.2	Y	N
N23-P1	1	66.9	< 40.0	66.3	66.3	N	66.3	Y	N
N23-P1	2	69.5	< 40.0	69.6	69.6	N	69.6	Y	N
N23-P1	3	69.8	< 40.0	70.4	70.4	N	70.4	Y	N
N23-P2	1	65.8	< 40.0	65.7	65.7	N	65.7	Y	N
N23-P2	2	69.4	< 40.0	69.4	69.4	N	69.4	Y	N
N23-P2	3	69.9	< 40.0	70.2	70.2	N	70.2	Y	N
N23-P3	1	63.6	< 40.0	63.4	63.4	N	63.4	Y	N

N23-P3	2	68.8	< 40.0	69.2	69.2	N	69.2	Y	N
N23-P3	3	69.8	< 40.0	70.1	70.1	N	70.1	Y	N
N23-P4	1	65.2	< 40.0	57.4	57.4	N	57.4	Y	N
N23-P4	2	69.2	< 40.0	61.3	61.3	N	61.3	Y	N
N23-P4	3	69.7	< 40.0	67.9	67.9	N	67.9	Y	N
N23-P5	1	66.2	< 40.0	65.6	65.6	N	65.6	Y	N
N23-P5	2	69.0	< 40.0	68.7	68.7	N	68.7	Y	N
N23-P5	3	69.4	< 40.0	70.0	70.0	N	70.0	Y	N

Note:

[1] The predicted road traffic noise levels at the identified NSRs under prevailing scenario extracted from the approved EIA report (AEIAR-198/2016).

Annex K

Detailed Assessment for Indirect Mitigation Measures

Title: Indirect Mitigation Measures

All the existing and planned NSRs, except N18-1 to N18-3, would comply with the noise criterion of 70dB(A). N18-1 to N18-3 would still exceed the noise criterion of 70dB(A) after exhausting all possible direct noise mitigation measures.

According to Section 4.8 of EIAO Guidance Note No. 12/2010, the testing criteria for consideration of Indirect Mitigation Measures are set out as below:

- (i) the predicted overall noise level from the road project together with other traffic noise in the vicinity must be above a specified noise level (e.g. 70 dB(A) for domestic premises and 65 dB(A) for education institutions, all in $L_{10(1hr)}$);
- (ii) the predicted overall noise level is at least 1.0 dB(A) more than the prevailing traffic noise level, i.e. the total traffic noise level existing before the works to construct the road were commenced; and
- (iii) the contribution to the increase in the predicted overall noise level from the road project must be at least 1.0dB(A).

Table 1 summarises the mitigated results against the above testing criteria. The maximum overall noise level of NSRs between normal days and festive days are presented in **Table 1**.

Table 1 Mitigated results against testing criteria of indirect mitigation measures

NSR	Location ^[1,2]	NSR ID	Uses ^[3]	Criterion L ₁₀ (1 hr), dB(A)	Predicted L ₁₀ (1 hr), dB(A) ^[4]		Project Road Contribution, dB(A)	Testing Criteria (Y / N)			Indirect Mitigation Measures Required (Y / N)
					Prevailing Noise Level	With Project		(i) ^[5]	(ii) ^[6]	(iii) ^[7]	
N18	Village houses near San Uk Ling	N18-1	R	70	78	76	0.2	Y	N	N	N
N18	Village houses near San Uk Ling	N18-2	R	70	75	73	0.1	Y	N	N	N
N18	Village houses near San Uk Ling	N18-3	R	70	76	72	0.8	Y	N	N	N

Note:

- [1] The assessment will only include NSRs which rely on opened windows for ventilation.
- [2] NSRs that require mitigation measures are included.
- [3] R – Residential Premises.
- [4] Noise levels presented are rounded to the nearest dB(A). Bold value denotes non-compliance TM-EIAO's criteria.
- [5] The predicted overall noise level from the road project together with other traffic noise in the vicinity must be above a specified noise level. (e.g. 70 dB(A) for domestic premises in L₁₀(1hr)).
- [6] The predicted overall noise level is at least 1.0 dB(A) more than the prevailing traffic noise level, i.e. the total traffic noise level existing before the works to construct the road were commenced.
- [7] The contribution to the increase in the predicted overall noise level from the road project must be at least 1.0 dB(A).

As seen from **Table 1**, as the NSRs exceeding the noise criterion of 70dB(A) do not fulfill the above 3 testing criteria as set out above, they are not eligible for indirect mitigation measures.

Annex L

Road Traffic Noise Mitigation Measures for EP-534/2017/A under the respective geographic location of Contract 2

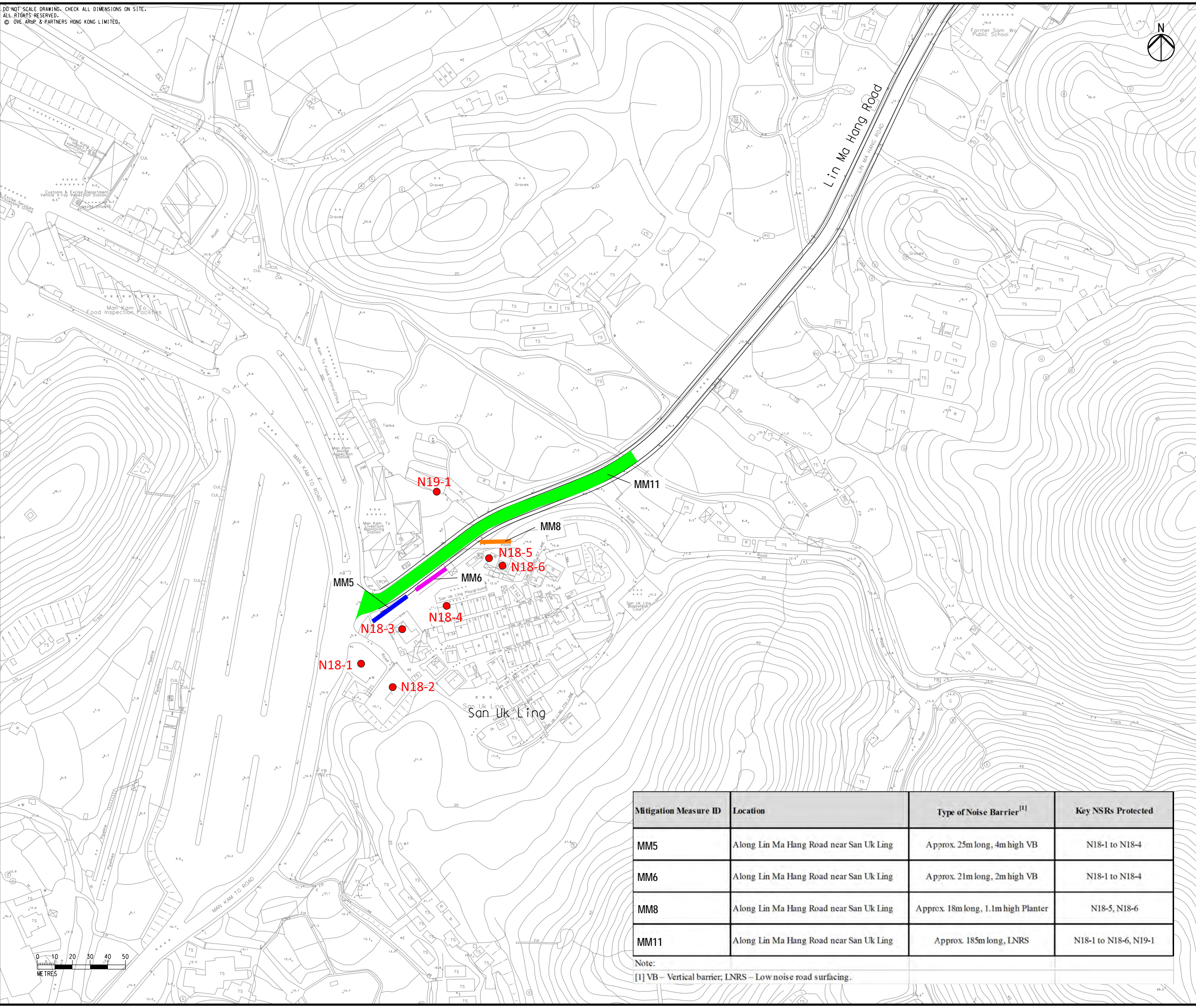
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Legend

- Proposed Road Network
- 1.1m Planter
- 2m Vertical Barrier
- 4m Vertical Barrier
- Low Noise Surfacing Materials
- Representative Noise Sensitive Receivers (Road Traffic Noise)

Printed by : 12/29/2020
Filename : \\hkgrts27\c:\env\project\231448\13 Drawing Deliverables\Reports\20201020 Technical Note\Figure 2.2a Extents and Locations of Road Traffic Noise Mitigation Measures (Sheet 2 of 3).dgn



Rev	Description	By	Date
B	SECOND ISSUE	BS	12/20
A	FIRST ISSUE	BS	11/20

Consultant
ARUP

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title
**Extents and Locations of
Road Traffic Noise
Mitigation Measures
(Sheet 2 of 3)**

Drawing no. Figure 2.2a		Rev. B	
Drawn BS	Date 12/20	Checked EL	Approved FC
Scale 1:2000 @A3		Status PRELIMINARY	

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Mitigation Measure ID	Location	Type of Noise Barrier ^[1]	Key NSRs Protected
MM5	Along Lin Ma Hang Road near San Uk Ling	Approx. 25m long, 4m high VB	N18-1 to N18-4
MM6	Along Lin Ma Hang Road near San Uk Ling	Approx. 21m long, 2m high VB	N18-1 to N18-4
MM8	Along Lin Ma Hang Road near San Uk Ling	Approx. 18m long, 1.1m high Planter	N18-5, N18-6
MM11	Along Lin Ma Hang Road near San Uk Ling	Approx. 185m long, LNRS	N18-1 to N18-6, N19-1

Note:
[1] VB – Vertical barrier; LNRS – Low noise road surfacing.



Annex M

Implementation Schedule for

Noise Mitigation Measures under Contract 2

Implementation Schedule for Noise Mitigation Measures

Noise Mitigation Measure	MM5	MM6	MM8	MM11	MM13	MM14	MM15	MM16
Relevant paragraph(s) in TNMP where the recommendation was made and the main concerns were required to address	Section 1.2.3, Section 1.2.4 and Section 2.2.11 of TNMP refers							
Specifications requirements of the recommended mitigation measures (e.g. height, colour, materials etc.);	<u>Opaque/ non-transparent</u> a. Tinted transparent panels with bird pattern with aluminum absorptive noise barrier panel at the lower part → complied with EP b. Concrete plinth → complied with EP <u>Non-reflective (i.e. Reflection of light)</u> a. Tinted transparent panel with bird pattern → tinted transparent acrylic cannot reflect light/ image as the way of mirror or pond of water → complied with EP b. Concrete plinth → material cannot reflect light/ image as the way of mirror or pond of water → complied with EP			<u>Low noise road surface</u> 25mm Polymer Modified Stone Mastic Asphalt of 6mm Nominal Maximum Aggregate size as refers from Guidance Notes RD/GN/011C published by Highways Department.		<u>Opaque/ non-transparent</u> a. Tinted transparent panels with bird pattern with aluminum absorptive noise barrier panel at the lower part → complied with EP b. Concrete plinth → complied with EP <u>Non-reflective (i.e. Reflection of light)</u> a. Tinted transparent panel with bird pattern → tinted transparent acrylic cannot reflect light/ image as the way of mirror or pond of water → complied with EP b. Concrete plinth → material cannot reflect light/ image as the way of mirror or pond of water → complied with EP		
Specific location of mitigation measures	Along Lin Ma Hang Road near San Uk Ling Coordinates are shown in Annex N1			Along Lin Ma Hang Road near San Uk Ling		Along Lin Ma Hang Road near Muk Wu Nga Yiu		
Dimension of the noise mitigation measures	Approx. 25m long, 4m high vertical barrier	Approx. 21m long, 2m high vertical barrier	Approx. 18m long, 1.1m high planter	Approx. 185m low noise road surfacing	Approx. 47m long, 5m high vertical barrier	Change to Approx. 31m long, 5m high vertical barrier	Change to Approx. 31m long, 5m high vertical barrier	Change to Approx. 25m long , 5m high V vertical barrier
Required surface mass density	10kg/m2 with reference to Guidelines On Design of Noise Barriers							

Implementation Schedule for Noise Mitigation Measures

Noise Mitigation Measure	MM5	MM6	MM8	MM11	MM13	MM14	MM15	MM16
Implementation timing of mitigation measures;	Construction period (Dec 2021 to May 2022) which implemented before operation of the project and throughout the operation phase of the project.		Construction period (Oct 2021 to Dec 2021) which implemented before operation of the project and throughout the operation phase of the project.	Construction period (Dec 2021 to May 2022) which implemented before operation of the project and throughout the operation phase of the project.	Having liaised with LandsD in November 2018 and March 2020, there is no planned development. These traffic noise mitigation measures at Muk Wu Nga Yiu do not cover under Contract 2 at this stage and will be implemented in later stage. The project proponent would maintain regular review (i.e. in yearly interval) with LandsD and PlanD, or other relevant Authorities, at the later stages to update the development status of any planned NSRs and to implement the proposed noise mitigation measures in accordance with the EP conditions and updated TNMP.			
Responsible parties for implementation	Contractor: Sang Hing Civil Contractors Co., Ltd Consultant: Ove Arup & Partners HK Ltd				CEDD			
Responsible parties for maintenance	Highways Department							
Methodology of construction	<ol style="list-style-type: none"> 1. UU investigation and detection 2. Excavation for the substructure 3. Reinforced concrete works for the substructure 4. Installation of steel posts 5. Installation of absorptive panels and transparent panels 		<ol style="list-style-type: none"> 1. UU investigation and detection 2. Excavation for foundation 3. Lifting and rigging for the precast units 	<ol style="list-style-type: none"> 1. Road widening works of the concerned section of Lin Ma Hang Road 2. Placing of asphalt materials 3. Laying and compacting of asphalt materials 	These traffic noise mitigation measures at Muk Wu Nga Yiu do not cover under Contract 2 at this stage and will be implemented in later stage.			
Methodology of monitoring	<p>Carrying monitoring at the relevant monitoring station ON3 and ON4 under Contract 2 as recommended in EM&A during the operation phase.</p> <ul style="list-style-type: none"> • two sets of measurements at the morning traffic peak hour on normal days; • one set of measurement at the morning traffic peak hour on festival days; • a concurrent census of traffic flow and percentage heavy vehicles shall be conducted for the Project Road and the existing road network in the vicinity of each measurement points; • average vehicle speed estimated for Project Road and the existing road network in the vicinity of each measuring points; and • the three sets of monitoring data shall be obtained within the first year of operation. 							

Implementation Schedule for Noise Mitigation Measures

Noise Mitigation Measure	MM5	MM6	MM8	MM11	MM13	MM14	MM15	MM16
Methodology of maintenance	<p>In accordance with the Guidelines on Design of Noise Barriers Chapter 4 published by EPD and HyD, noise barrier should be designed so that they require minimal maintenance other than cleaning.</p> <p>Apart from cleaning, tightening joints and fixings after initial construction should be conducted at the end of the construction maintenance period. Painting of metal surface should also be conducted.</p>			<p>In accordance with the Guidance Notes No. RD/GN/039 published by HyD, repairing of localised distressed on low noise road surfacing using ordinary wearing course material is acceptable.</p>	<p>These traffic noise mitigation measures at Muk Wu Nga Yiu do not cover under Contract 2 at this stage and will be implemented in later stage.</p>			
Noise mitigation measures to be monitored, reviewed and reported	<p>According to the EM&A Manual S.6.7.2, impact monitoring for road traffic noise during operational phase will be implemented.</p> <p>Monitoring details and results including the comparison between the measured noise levels and the predicted levels should be recorded in a report to be deposited with EPD within one month of the completion of the monitoring. The report should be certified by the ET Leader before deposit with EPD.</p>							
Event / Action Plan	<p>For the traffic noise, the measured / monitored noise levels shall be compared with the predicted results and the predicted traffic flow conditions (calculated noise levels based on concurrent traffic census obtained). In case discrepancies are observed, explanation shall be given to justify the discrepancies.</p>							

NOTE: As planned at early stage of the Project, the implementation of noise mitigation measures for MM3 and MM4 would be carried out by Contract 3. However, as there is currently no programme of work for Contract 3, the implementation of noise mitigation measures MM3 and MM4 will be the responsibility of the Contract at later stage. The CEDD shall keep reviewing the status of the noise mitigation measures as proposed in the EIA report.