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10 May 2019

AECOM
8/F, Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, N.T.

By Email & Post

Attention: Mr Owen NG

Dear Sirs

**Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Noise Mitigation Plan**

With reference to the amendment pages of Noise Mitigation Plan (NMP) provided to us on 9 May 2019, please be noted that we have no adverse comments on the captioned submission. We herewith verify the NMP of the captioned Project in accordance with Condition 3.5 of Environmental Permit No. EP-404/2011/D.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Mr Arthur CHIU on tel. 3995 8144 or by email to arthur.chiu@smec.com.

Yours faithfully

Antony WONG
Independent Environmental Checker

cc CEDD/BCP - Mr LU Pei Yu / Mr William CHEUNG
AECOM - Mr Pat LAM/ Mr Perry YAM
AUES - Mr TW TAM

by fax: 3547 1659
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Our Ref: TCS00694/13/300/L2059

AECOM
8/f Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin, Hong Kong

Attn: Mr. Owen Ng,

10 May 2019
By e-mail

Dear Sir,

Re: Agreement No. CE38/2010 (CE)
Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
(Site Formation and Infrastructure Works) Design and Construction
Amendment pages for Noise Mitigation Plan

I refer to the amendment pages for Noise Mitigation Plan submitted to us on 9 May 2019, please note that we have no adverse comment on this submission. We herewith certify the captioned submission accordance with *Condition 3.5* of Environmental Permit (EP) No. EP-404/2011/D.

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

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting



T. W. Tam
Environmental Team Leader
TW/nh

c.c. Mr. Vincent Chan (CCKJV -C6 Contractor)
Mr. Antony Wong (IEC, SMEC)

By email
By email

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Liantang/Heung Yuen Wai Boundary Control Point
and associated works
(Site Formation and Infrastructures) –
Design and Construction

Noise Mitigation Plan (Ref. C44-06)

April 2019

Reviewed:



Angela Tong

18 April 2019

Approved for Issue:



Francis Leong

18 April 2019

AECOM ASIA COMPANY LIMITED

This report is prepared for CEDD and is given for its sole benefit in relation to and pursuant to Agreement No. CE 38/2010(CE) and may not be disclosed to, quoted to or relied upon by any person other than CEDD without our prior written consent. No person (other than CEDD) into whose possession a copy of this report comes may rely on this report without our express written consent and CEDD may not rely on it for any purpose other than as described above.

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60212563/ER7/SK/706	Road Traffic Noise Mitigation Measures (3 of 4)
60212563/ER6/SK/701	Road Traffic Noise Mitigation Measures (4 of 4)

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Appendix C	Environmental Review Report for Modification of Noise Barriers between Nam Wa Po and Wo Hop Shek (Ref. C44-04-1)
Appendix D	Environmental Review Report for Modification of Noise Barriers between Nga Yiu Ha and Loi Tung (Ref. C44-05-1)

1 INTRODUCTION

1.1 Background

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works

- 1.1.1 The Project comprises a new Boundary Control Point (BCP) also known as Boundary Crossing Point in the EIA Study Brief, proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works.
- 1.1.2 An Environmental Impact Assessment (EIA) study for the LT/HYW Project was conducted in accordance with EIA Study Brief No. ESB-199/2008 and was approved on 24 March 2011 under the *Environmental Impact Assessment Ordinance* (EIAO). Following the approval of the EIA Report (Register No.: AEIAR-161/2011), an Environmental Permit (EP) was granted on 24 March 2011 (EP No: EP-404/2011) for the construction and operation of the LT/HYW Project.
- 1.1.3 Variations of Environmental Permit (VEP) were subsequently applied and the latest VEP (Application No.: VEP 519/2016) was applied with supporting documents including *Environmental Review Report (ERR) for Modification of Noise Barriers between Nam Wa Po and Wo Hop Shek* (Ref. C44-04a) (**Appendix A** refers) and *Environmental Review Report (ERR) for Modification of Noise Barriers between Nga Yiu Ha and Loi Tung* (Ref. C44-05) (**Appendix B** refers). Latest Environmental Permit (EP No: EP-404/2011/D) was issued by Director of Environmental Protection (DEP) on 20 Jan 2017.
- 1.1.4 AECOM Asia Co. Ltd. (AECOM) was commissioned by Civil Engineering and Development Department (CEDD) to provide design and construction services for the Liantang / Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) under Agreement No. CE 38/2010(CE).

1.2 Scope of this Noise Mitigation Plan

- 1.2.1 Condition 3.5 of EP-404/2011/D requires that *“To mitigate the traffic noise impact arising from the operation of the Project, the noise mitigation measures shall be implemented in accordance with Fig 4, 5, 6 and 7 attached to this Permit, or otherwise approved by the Director subject to the submission of a Noise Mitigation Plan by the Permit Holder to cater for the final layout and design of the Project. Noise mitigation measures as shown in Fig 4, 5, 6 and 7 or the approved Noise Mitigation Plan shall be fully implemented before commencement of operation of the Project and properly maintained throughout the operational phase of the Project.”*.
- 1.2.2 In accordance with the above EP Condition, the noise mitigation measures shall be implemented as shown in Fig 4, 5, 6 and 7 of the EP-404/2011/D or the approved Noise Mitigation Plan (NMP) to mitigate the traffic noise impact arising from the operation of the LT/HYW Project.
- 1.2.3 Pursuant to EP (EP-404/2011/D) Condition 3.5, there are proposed changes on the noise mitigation measures and this Noise Mitigation Plan (NMP) details the proposed changes to the road traffic noise mitigation measures requirements as shown in Fig 4, 5, 6 and 7 of EP-404/2011/D for LT/HYW Project.
- 1.2.4 This NMP also attaches the details of noise mitigation measures with supporting calculations as required in Section 2.5.4 of ERR for Modification of Noise Barriers between Nam Wa Po and Wo Hop Shek (Ref. C44-04a) and ERR for Modification of Noise Barriers between Nga Yiu Ha and Loi Tung (Ref. C44-05).

- 1.2.5 It should be noted that, as required in the EP Condition, noise mitigation measures as shown in the approved NMP shall be fully implemented before commencement of operation of the LT/HYW Project (i.e. Q2 2019 tentatively) and properly maintained throughout the operational phase of the LT/HYW Project.

2 LATEST PROPOSAL ON ROAD TRAFFIC NOISE MITIGATION MEASURES

2.1 Latest Proposal

2.1.1 The noise mitigation measures requirements in Fig 4, 5, 6 and 7 of EP-404/2011/D are proposed to update under this NMP to accommodate the final proposal of traffic noise mitigation measures. The proposed road traffic noise mitigation measures remain the same as those presented in the supporting documents of ERR (Ref. C44-04a) (**Appendix A** refers) and ERR (Ref. C44-05) (**Appendix B** refers), except NB9 and NB10 where the demarcation updated according to contract arrangement but the total length of NB9 and NM10 (i.e. 5m high VB in total 130m length) remains the same in the VEP application (Application No. VEP 519/2016).

2.1.2 The updated road traffic noise mitigation measures requirements and their reference to the EP Figures and VEP application supporting documents are listed in **Table 2.1** below. The latest road traffic noise mitigation measures for LT/HYW Project are shown in **Drawing Nos. 60212563/ER7/SK/704, 60212563/ER7/SK/705, 60212563/ER7/SK/706** and **60212563/ER6/SK/701**.

Table 2.1 Proposed Update to Road Traffic Noise Mitigation Measures According to This NMP

Noise Mitigation Measures of Concern	Proposed Update	Relevant Figures in EP-404/2011/D	Relevant Sections / Figures in VEP Application Supporting Document(s)
NB4-B	Update NB4-B from "2.5m HIGH VERTICAL NOISE BARRIER" to " <u>2.5m HIGH VERTICAL NOISE BARRIER ABOVE PARAPET</u> "	Figure 5	Drawing No. 60212563/ER7/702 of ERR (Ref. C44-05)
C2-NB5	Will not be erected ⁽¹⁾	Figure 6	Drawing No. 60212563/ER7/703 of ERR (Ref. C44-05)
NB9 and NB10	Update the demarcation of NB9 and NB10	Figure 6	Total length of NB9 and NM10 (i.e. 5m high VB in total 130m length) remains the same as shown in Drawing No. 60212563/ER7/703 of ERR (Ref. C44-05)
C2-NB2	Update C2-NB2 from "5m HIGH VERTICAL NOISE BARRIER" to " <u>3m HIGH VERTICAL NOISE BARRIER</u> "	Figure 7	Drawing No. 60212563/ER6/701 of ERR (Ref. C44-04a)

Noise Mitigation Measures of Concern	Proposed Update	Relevant Figures in EP-404/2011/D	Relevant Sections / Figures in VEP Application Supporting Document(s)
NB5	Update NB5 from “4m HIGH VERTICAL NOISE BARRIER” to “4m HIGH VERTICAL NOISE BARRIER ABOVE PARAPET”	Figure 7	Drawing No. 60212563/ER6/701 of ERR (Ref. C44-04a)

Note:

- (1) Noise assessment results without C2-NB5 was presented in ERR (Ref. C44-05-1) (Appendix D refers) and indicate the compliance of noise limit at the representative NSRs.

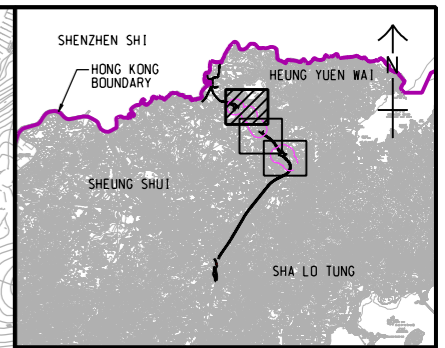
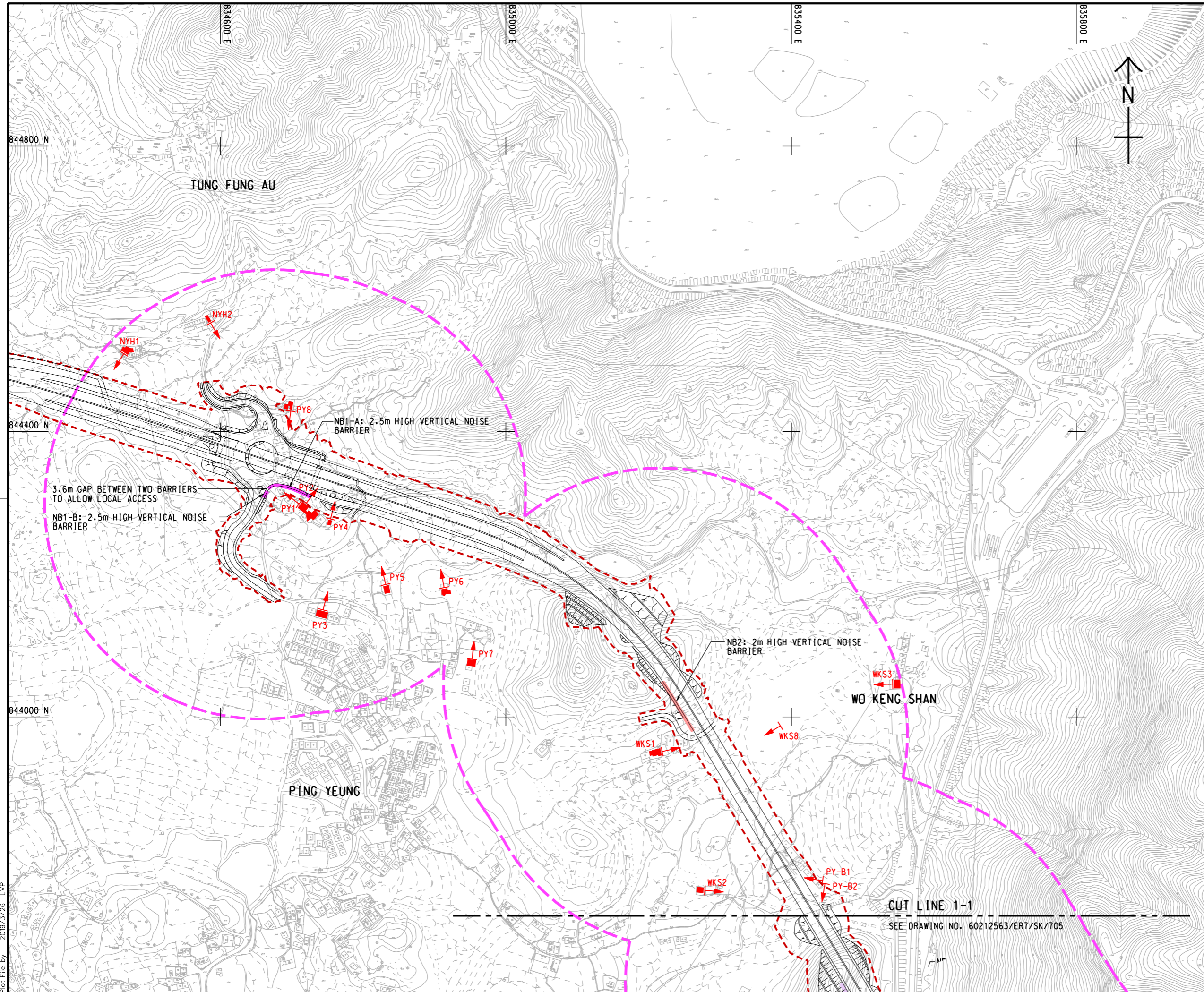
2.2 Submission of Supporting Calculations on Noise Mitigation Measures

- 2.2.1 According to Section 2.5.4 of ERR (Ref. C44-04a) and ERR (Ref. C44-05), a plan containing details of noise mitigation measures with supporting calculations will be submitted to EPD for obtaining their approval. Environmental Review Report (ERR) for Modification of Noise Barriers between Nam Wa Po and Wo Hop Shek (Ref. C44-04-1) in **Appendix C** and Environmental Review Report (ERR) for Modification of Noise Barriers between Nga Yiu Ha and Loi Tung (Ref. C44-05-1) in **Appendix D** were submitted to CEDD and copied to EPD on 30 December 2016 under the letter (ref: LYL:cfwl:60212563/4.3-2016015546W).
- 2.2.2 Section 3 of these ERRs (Ref. C44-04-1 and C44-05-1) presents the details of noise calculation in supporting the noise mitigation measures as presented in ERRs (Ref. C44-04a and ERR Ref. C44-05) which supported the VEP application (Application No. VEP 519/2016).

3 CONCLUSION

- 3.1.1 The noise mitigation measures requirements in EP-404/2011/D are proposed to change under this NMP. Nevertheless, the proposed road traffic noise mitigation measures remain the same as those presented in the ERRs supporting the VEP application (Application No. VEP 519/2016), except NB9 and NB10 where the demarcation updated according to contract arrangement only and the total length of NB9 and NM10 (i.e. 5m high VB in total 130m length) remains the same in the VEP application (Application No. VEP 519/2016). Details of noise mitigation measures with supporting calculations are presented.
- 3.1.2 It is concluded that the LT/HYW Project will remain in compliance with the Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO) requirements and the findings of the approved EIA report (AEIAR-161/2011), and no adverse road traffic noise impact is anticipated.

Drawings



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - 2m HIGH NOISE BARRIER
 - 2.5m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHKD.	DATE

土木工程拓展署
CEDD Civil Engineering and Development Department

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site formation and infrastructures) - Design and Construction

ROAD TRAFFIC NOISE MITIGATION MEASURES
SHEET 1 OF 4

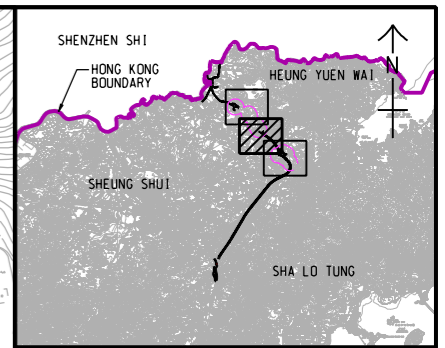
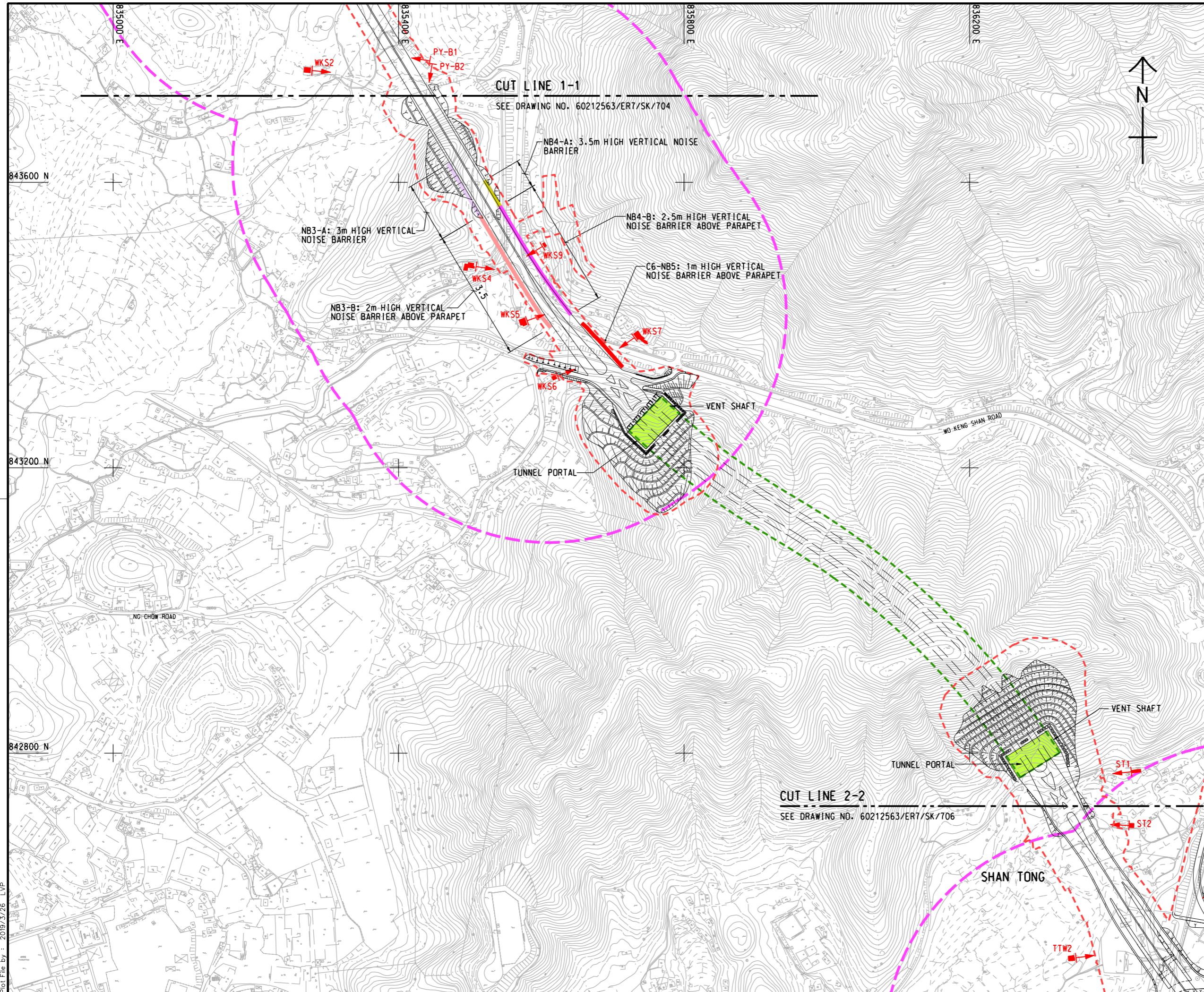


DRG. NO. 60212563/ER7/SK/704
圖紙編號

DESIGNED BY HC	CONTRACT NO. HT	P. Dir. APPROVED XX
DRAWN BY ZRH	STATUS	
SCALE A1 1 : 2500		

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Plot File by : 2019/3/26 LVP



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - TUNNEL SECTION
 - PROPOSED TUNNEL VENTILATION BUILDING
 - 1m HIGH NOISE BARRIER
 - 2m HIGH NOISE BARRIER
 - 2.5m HIGH NOISE BARRIER
 - 3m HIGH NOISE BARRIER
 - 3.5m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHKD.

土木工程拓展署
CEDD
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NOISE MITIGATION MEASURES
SHEET 2 OF 4

AECOM

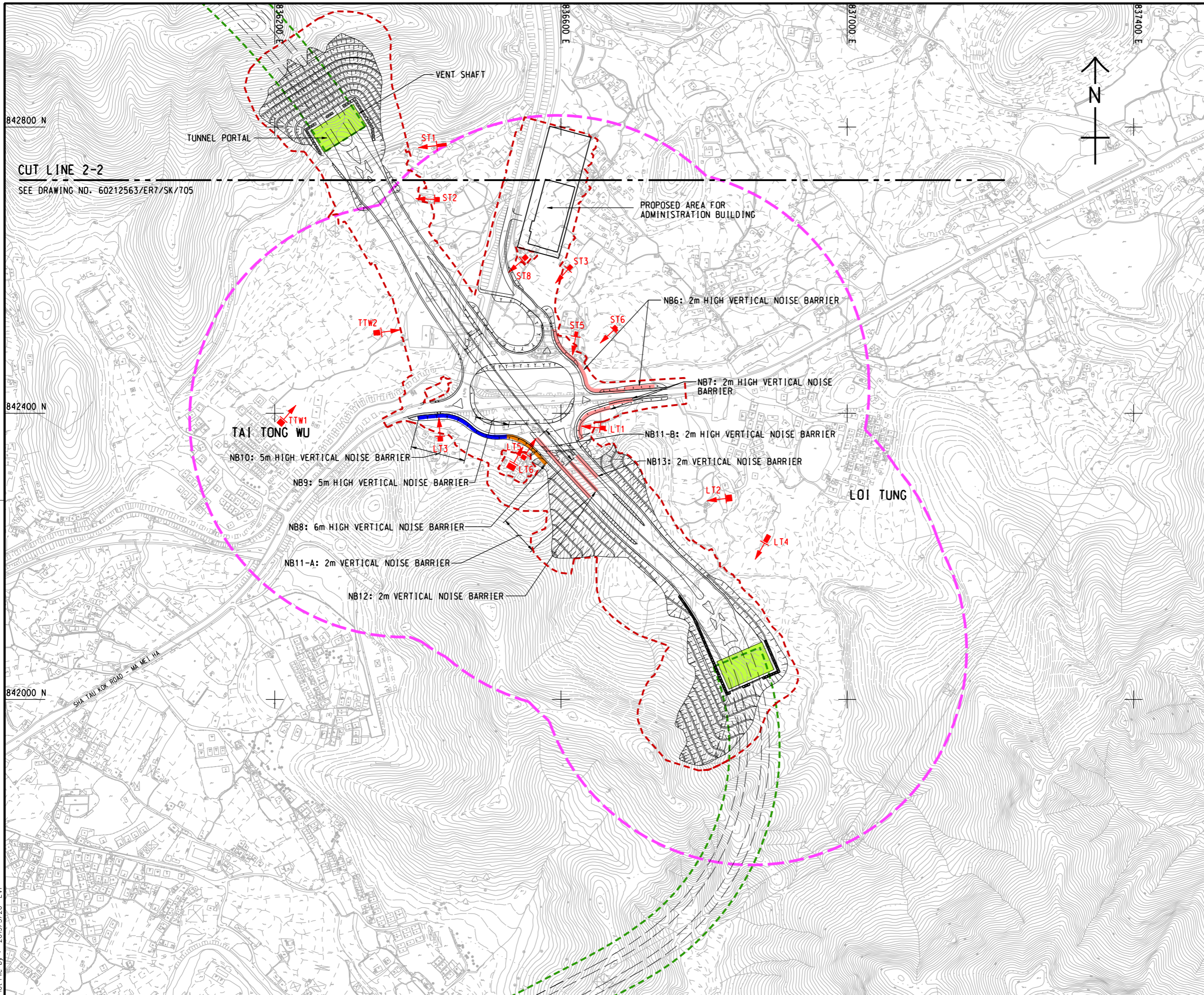
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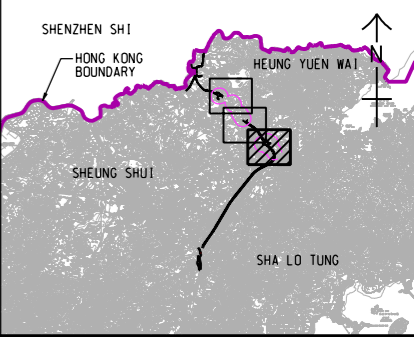
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CUT LINE 2-2
SEE DRAWING NO. 60212563/ER7/SK/705



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - TUNNEL SECTION
 - PROPOSED TUNNEL VENTILATION BUILDING
 - 1.5m HIGH NOISE BARRIER (TO BE DELETED)
 - 2m HIGH NOISE BARRIER
 - 5m HIGH NOISE BARRIER
 - 6m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

土木工程拓展署
CEDD
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NOISE MITIGATION MEASURES

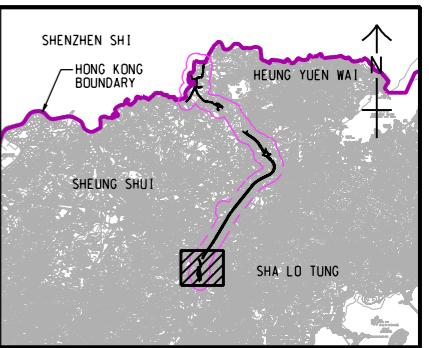
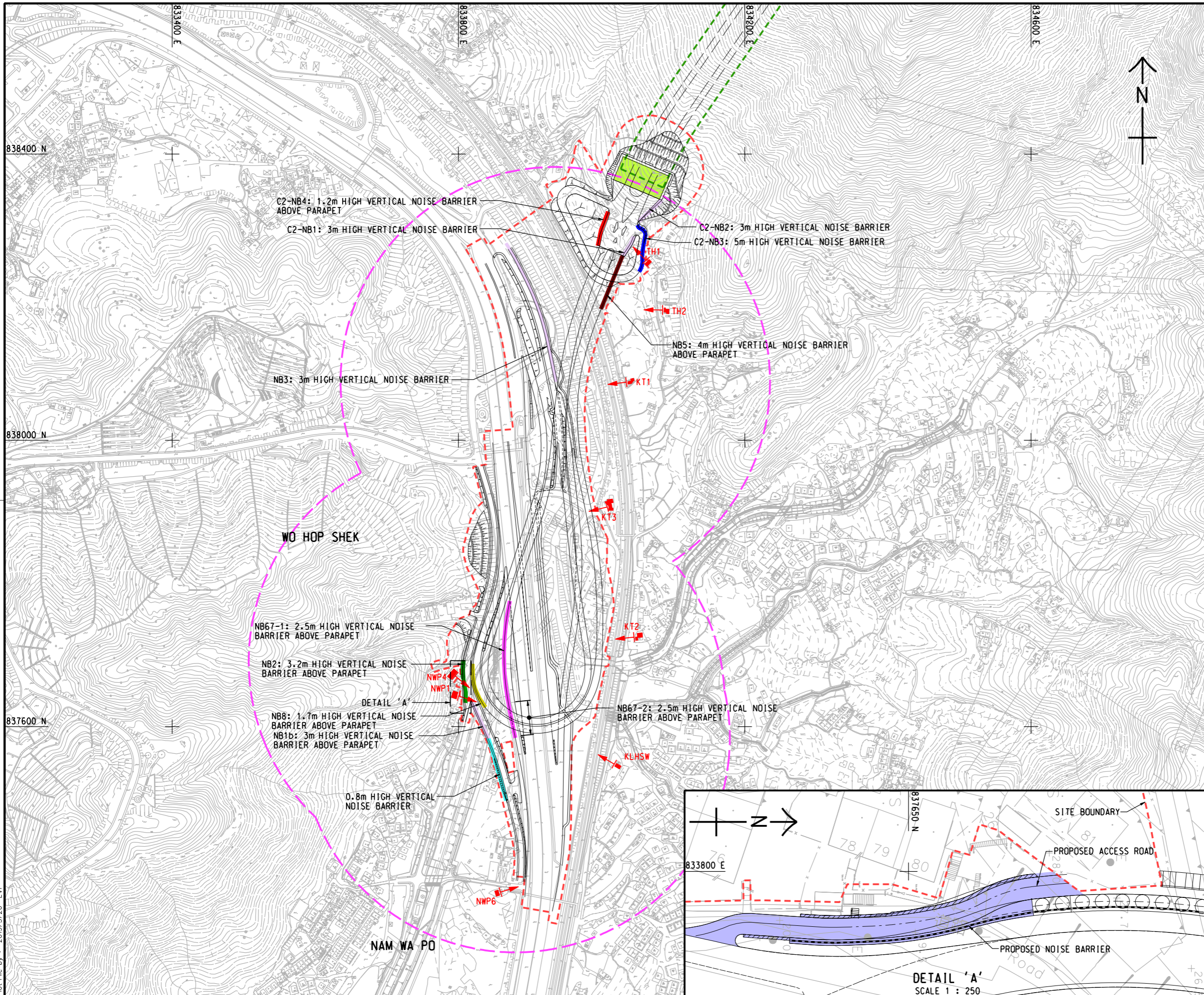
SHEET 3 OF 4



DRG. NO. 60212563/ER7/SK/706
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KEY PLAN
SCALE 1 : 150000

LEGEND:

	300m ASSESSMENT AREA
	TENTATIVE WORKS AREA
	TUNNEL SECTION
	0.8m HIGH NOISE BARRIER
	1.2m HIGH NOISE BARRIER
	1.7m HIGH NOISE BARRIER
	2.5m HIGH NOISE BARRIER
	3m HIGH NOISE BARRIER
	3.2m HIGH NOISE BARRIER
	4m HIGH NOISE BARRIER
	5m HIGH NOISE BARRIER
	PROPOSED TUNNEL VENTILATION BUILDING
	NOISE SENSITIVE RECEIVERS
	FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHKD.	DATE

土木工程拓展署
CEDD Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

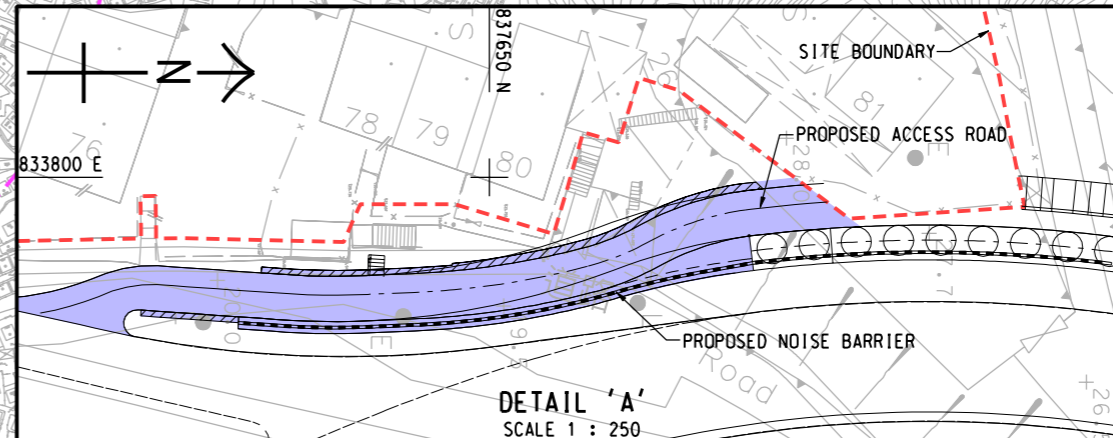
ROAD TRAFFIC NOISE MITIGATION MEASURES
SHEET 4 OF 4

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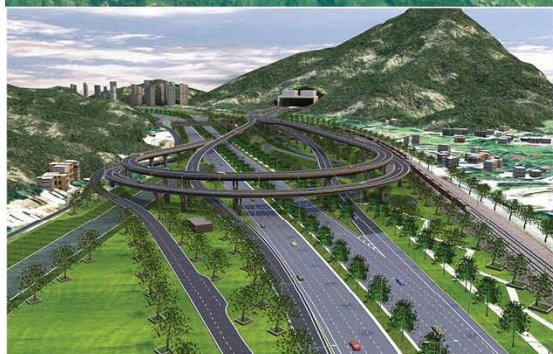
Appendices

Appendix A

*Environmental Review Report for Modification of Noise
Barriers between Nam Wa Po and Wo Hop Shek
(Ref. C44-04a)*

Agreement No. CE 38/2010 (CE)

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) – Design and Construction



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Liantang/Heung Yuen Wai Boundary Control Point and associated works
(Site Formation and Infrastructures) –
Design and Construction

**Environmental Review for Modification of Noise Barriers
between Nam Wa Po and Wo Hop Shek
(Ref. C44-04a)**

January 2017

Reviewed:



Angela Tong

18 January 2017

Approved for Issue:



Francis Leong

18 January 2017

AECOM ASIA COMPANY LIMITED

This report is prepared for CEDD and is given for its sole benefit in relation to and pursuant to Agreement No. CE 38/2010(CE) and may not be disclosed to, quoted to or relied upon by any person other than CEDD without our prior written consent. No person (other than CEDD) into whose possession a copy of this report comes may rely on this report without our express written consent and CEDD may not rely on it for any purpose other than as described above.

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Drawing No.
60212563/ER6/701

Title
Proposed Changes of Noise Barriers under Liantang / Heung Yuen Wai
Boundary Control Point

1 INTRODUCTION

1.1 Background

1.1.1 The Project comprises a new Boundary Control Point also known as Boundary Crossing Point in the EIA Study Brief, proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works.

1.1.2 An Environmental Impact Assessment (EIA) study for the LT/HYW Project was conducted in accordance with EIA Study Brief No. ESB-199/2008 and was approved on 24 March 2011 under the *Environmental Impact Assessment Ordinance* (EIAO). Following the approval of the EIA Report (Register No.: AEIAR-161/2011), an Environmental Permit (EP) was granted on 24 March 2011 (EP No: EP-404/2011) for the construction and operation of the LT/HYW Project. Variations of Environmental Permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-404/2011/C) was issued by Director of Environmental Protection (DEP) on 12 Mar 2015.

1.1.3 AECOM Asia Co. Ltd. (AECOM) was commissioned by Civil Engineering and Development Department (CEDD) to provide design and construction services for the Liantang / Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) under Agreement No. CE 38/2010(CE). The LT/HYW Project has commenced construction on 11 April 2013.

1.1.4 According to the site constraints and recent engineering design, the traffic noise mitigation proposal between Nam Wa Po and Wo Hop Shek is required to be slightly updated and some of barriers under Widening of Tolo Highway/Fanling Highway (EP324/2008/B) (hereinafter as "TH/FH Project") are required to modified due to LT/HYW Project.

1.2 Objective of this Environmental Review Report

1.2.1 AECOM is commissioned by CEDD to provide a supplementary review/assessment of potential environmental impacts at the sensitive receivers in the vicinity due to the proposed changes in traffic noise mitigation measures.

1.2.2 This Environmental Review Report (ERR) has been prepared to assess the likely environmental issues pertinent to the proposed changes in traffic noise mitigation measures and to confirm the compliance of relevant environmental standards.

1.2.3 This report will form part of the submission to the Environmental Protection Department (EPD) for the application of a Variation to Condition 3.5, Figures 4a-b, 5a-c, 6a-e and 7b-h and Table 2 of EP-404/2011/C.

1.3 Report Structure

1.3.1 The remainder of the report is organized as follows:

- Section 2 presents the details of the proposed changes, justification for such changes and potential environmental impact associated with the proposed changes.
- Section 3 presents the conclusion of this Environmental Review Report.

2 PROPOSED CHANGES

2.1 Proposed Changes

LT / HYW Project

2.1.1 The extent, type and height of noise barriers along the road works under the Project between Nam Wa Po and Wo Hop Shek have been slightly modified to satisfy the latest engineering design and site constraints, while road alignments of the Project remain unchanged. The proposed changes in noise barriers are summarized as below and shown in **Drawing No. 60212563/ER6/701**.

- Height of noise barrier (NB2) at chainage L01 Connecting Road – 412 (Tai Wo Service Road West) will be changed from 1.2m above parapet to 3.2m above parapet;
- Noise barrier at chainage L02 206 – 456 (Tai Wo Service Road East) (NB3) is shortened by about 48m due to the underground utilities including watermains and valve chambers; and
- Noise barrier at P02 285 – 333 (Link Road 1) (NB67-2) will be provided with additional 0.8m parapet.

2.1.2 The proposed changes in themselves do not constitute designated project (DP) elements under the EIAO, and thus no additional DP elements is associated as a result of proposed changes.

2.2 Reasons for Proposed Changes

2.2.1 During the construction stage of LT/HYW, it is found that modifications to the extent, type and height of the committed noise barriers under LT/HYW are required with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities and to avoid conflicting with structures of roads under LT/HYW. The required changes of noise barriers are described in **Section 2.1.1** above.

2.3 Construction Works and Programme

2.3.1 The proposed changes in the extent and form of noise barrier would not affect the construction method, works boundary and the construction programme of LT/HYW Project as presented in Appendix 2.1 of the LT/HYW EIA Report remains valid and is also same as that under previous ERR submitted for VEP-466/2015, and thus the operation year of LT/HYW remains as 2018.

2.4 Concurrent Projects

2.4.1 The concurrent projects identified in area between Nam Wa Po and Wo Hop Shek are identified as the Widening of Tolo Highway/ Fanling Highway (TH/FH) project. The cumulative impacts from these concurrent projects have also been reviewed and assessed in this report where appropriate.

2.5 Potential Environmental Impacts Associated with the Proposed Changes

2.5.1 In respect to the nature and scope of the proposed changes as discussed in **Section 2.1**, potential environmental impacts due to the proposed changes have been identified and discussed in the following sections.

Noise

2.5.2 As the proposed changes are related to the change of configuration of noise barriers only, the powered mechanical equipment (PME) to be used for the construction of noise barriers

remains unchanged. In addition, there is no change in the works boundary. As such, the construction noise impact assessment findings and proposed mitigation measures as presented in the LT/HYW ERR 2015 remains valid.

- 2.5.3 The proposed changes are required due to the interface between LT/HYW and TH/FH projects with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities and to avoid conflicting with structures of roads under LT/HYW. It is anticipated that there would be minor change in traffic noise levels as a result of the proposed changes. Nevertheless, the proposed changes would not result in material change to the traffic noise impact of the Project as the traffic noise impact will be mitigated to comply with the EIAO-TM requirements through implementation of proper mitigation measures such as provision of low noise road surfacing and noise barriers as appropriate.
- 2.5.4 Upon finalisation of the detailed design of the Project, the noise mitigation measures as shown in **Drawing No. 60212563/ER6/701** may need to be further refined but in any event will be properly and adequately designed to provide sufficient protection for the existing and planned noise sensitive receivers, such that the traffic noise impact will comply with TM-EIAO requirements. A plan containing details of noise mitigation measures with supporting calculations will be submitted to EPD their approval before the commencement of construction of the proposed changes to the noise mitigation measures of the Project.

Air Quality

- 2.5.5 Given that the construction activities and methodology remains unchanged, no adverse construction dust impact is expected from the proposed changes with the implementation of dust suppression measures as recommended in LT/HYW ERR 2015.
- 2.5.6 The proposed changes would not induce additional traffic forecast and the changes are expected to be localised and minor. In addition, vehicular emission assessment in the EIA Report adopted a worst case scenario without noise barrier effect such that the at-grade impacts represent the worst case due to vehicular emissions in the approved EIA Report. The representative air sensitive receivers as assessed in the EIA Report are located at more than 70m from the modified noise barriers, except NB2, and thus no additional vehicular emission impact is anticipated due to considerable separation distance from the modified barriers, except NB2. For NB2, the height of noise barrier is proposed to be 2m high than the original proposal (**Section 2.1.1** refers), it is expected that the source height would be 2m higher and the worst affected level would be shifted from 1.5mAG to 5mAG. It is therefore expected that the proposed changes would not cause significant change of vehicular emission pollutants at the sensitive receivers. The vehicular emission assessment findings in ERR submitted in support of the VEP application for LT/HYW project in 2015 is anticipated to be valid.

Landscape and Visual

- 2.5.7 No additional landscape resources would be affected due to the proposed changes of noise barriers where all are located within the works boundary. Therefore, the landscape impact assessment findings in LT/HYW ERR 2015 remain valid.
- 2.5.8 Considering that the changes of noise barriers are localised and minor, there would be no significant change in the visual impact assessment findings with the implementation of recommended measures. Therefore, the visual impact assessment findings in LT/HYW ERR 2015 remain valid.

Other Environmental Aspects

- 2.5.9 With no changes in works boundaries of LT/HYW, it is expected that no additional impacts on ecology, fisheries and cultural heritage resources, as well as no land contamination issues arising from the proposed changes of noise barriers. Assessment findings in LT/HYW ERR 2015 remain valid. Also, with construction methods and works boundary remains unchanged,

there would be no addition water quality and waste management issues arising from the proposed changes of noise barriers. In addition, the proposed changes of noise barriers would not affect the findings of sewerage and sewerage treatment impact, therefore the findings of sewerage and sewerage treatment impact remains valid.

Conclusion

- 2.5.10 Based on the above review findings, the potential impacts associated with the proposed changes are summarised in **Table 2.1**.

Table 2.1 Potential Impacts associated with the Proposed Changes

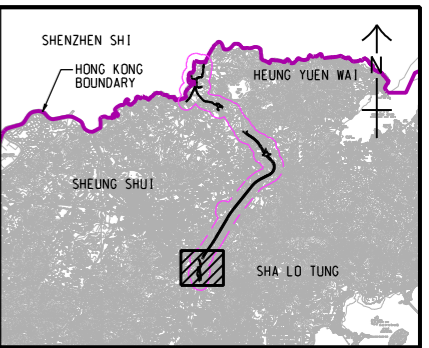
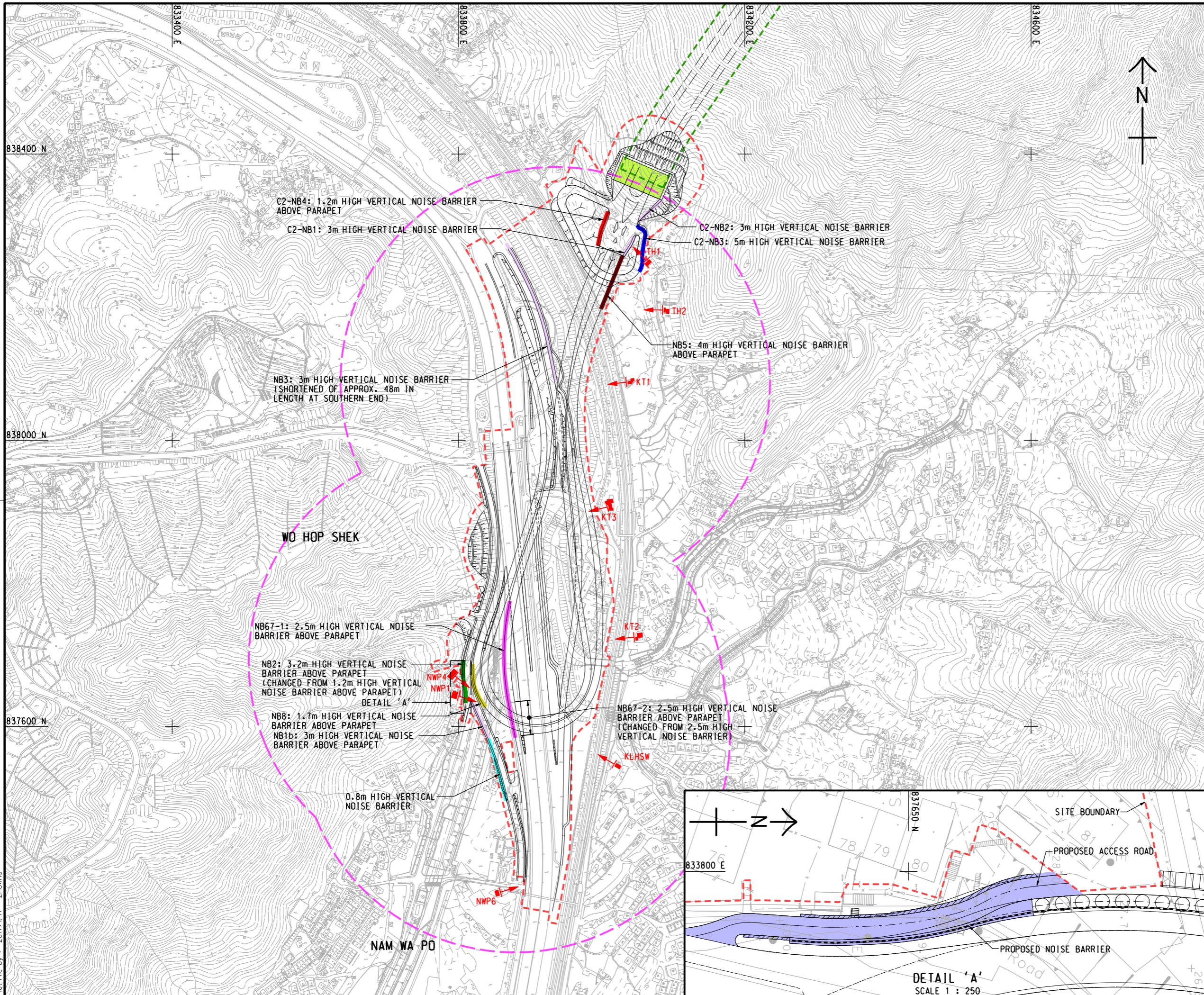
Potential Impact	Construction Phase	Operational Phase
Air Quality	x	x
Airborne Noise	x	x
Ground-borne Noise	x	x
Water Quality	x	x
Sewerage and Sewage Treatment Impact	x	x
Waste Management Implications	x	x
Land Contamination	x	x
Ecology	x	x
Fisheries	x	x
Landscape, Visual and Glare	x	x
Cultural Heritage	x	x

Note:

√ – Possible impact; X – Impact not expected.

3 CONCLUSION

- 3.1.1 An environmental review/assessment has been conducted for the proposed changes of operational noise mitigation measures for LT/HYW Project between Nam Wa Po and Wo Hop Shek. The likely environmental issues pertinent to the proposed changes have been assessed.
- 3.1.2 It is concluded that the proposed changes would not result in material change to environmental impacts with the implementation of the recommended mitigation measures, and the requirements of EIAO-TM will still be met. Therefore, no additional environmental monitoring and audit requirements are required.



KEY PLAN
SCALE 1 : 150000

LEGEND:

	300m ASSESSMENT AREA
	TENTATIVE WORKS AREA
	TUNNEL SECTION
	0.8m HIGH NOISE BARRIER
	1.2m HIGH NOISE BARRIER
	1.7m HIGH NOISE BARRIER
	2.5m HIGH NOISE BARRIER
	3m HIGH NOISE BARRIER
	3.2m HIGH NOISE BARRIER
	4m HIGH NOISE BARRIER
	5m HIGH NOISE BARRIER
	PROPOSED TUNNEL VENTILATION BUILDING
	NOISE SENSITIVE RECEIVERS
	FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHK.	DATE

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Civil Engineering and
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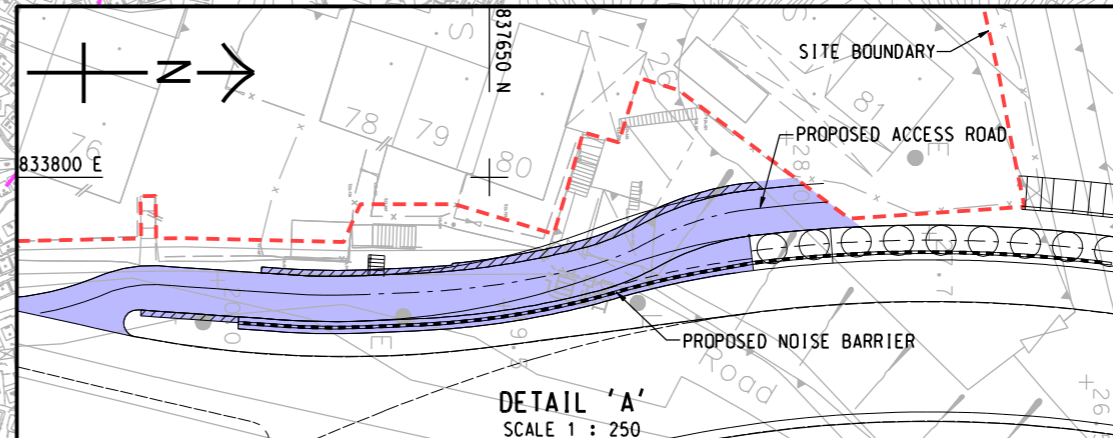
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS UNDER LIANTANG/ HEUNG YUEN WAI BOUNDARY CONTROL POINT

AECOM

DRG. NO. 60212563/ER6/701
圖紙編號

DESIGNED BY: HC	CONTRACT NO.:	P. Dir. APPROVED:
SCALE: A1 1 : 2500	STATUS:	HT
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Plot File by : 2017/1/17 ZHUXHU

Appendix B

***Environmental Review Report for Modification of Noise
Barriers between Nga Yiu Ha and Loi Tung
(Ref. C44-05)***

Agreement No. CE 38/2010 (CE)

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) – Design and Construction



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

**Liantang/Heung Yuen Wai Boundary Control Point and associated works
(Site Formation and Infrastructures) –
Design and Construction**

**Environmental Review for Modification of Noise Barriers
between Nga Yiu Ha and Loi Tung
(Ref. C44-05)**

January 2017

Reviewed:



Angela Tong

18 January 2017

Approved for Issue:



Francis Leong

18 January 2017

AECOM ASIA COMPANY LIMITED

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Drawing No.	Title
60212563/ER7/701 – 703	Proposed Changes of Noise Barriers

1 INTRODUCTION

1.1 Background

1.1.1 The Project comprises a new Boundary Control Point also known as Boundary Crossing Point in the EIA Study Brief, proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works.

1.1.2 An Environmental Impact Assessment (EIA) study for the LT/HYW Project was conducted in accordance with EIA Study Brief No. ESB-199/2008 and was approved on 24 March 2011 under the *Environmental Impact Assessment Ordinance* (EIAO). Following the approval of the EIA Report (Register No.: AEIAR-161/2011), an Environmental Permit (EP) was granted on 24 March 2011 (EP No: EP-404/2011) for the construction and operation of the LT/HYW Project. Variations of Environmental Permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-404/2011/C) was issued by Director of Environmental Protection (DEP) on 12 Mar 2015.

1.1.3 AECOM Asia Co. Ltd. (AECOM) was commissioned by Civil Engineering and Development Department (CEDD) to provide design and construction services for the Liantang / Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) under Agreement No. CE 38/2010(CE). The LT/HYW Project has commenced construction on 11 April 2013.

1.1.4 According to the site constraints and recent engineering design, the traffic noise mitigation proposal between Nga Yiu Ha and Loi Tung is required to be slightly updated.

1.2 Objective of this Environmental Review Report

1.2.1 AECOM is commissioned by CEDD to provide a supplementary review/assessment of potential environmental impacts at the sensitive receivers in the vicinity due to the proposed changes in traffic noise mitigation measures.

1.2.2 This Environmental Review Report (ERR) has been prepared to assess the likely environmental issues pertinent to the proposed changes in traffic noise mitigation measures and to confirm the compliance of relevant environmental standards.

1.2.3 This report will form part of the submission to the Environmental Protection Department (EPD) for the application of a Variation to Condition 3.5, Figures 4a-b, 5a-c, 6a-e and 7b-h and Table 2 of EP No.: EP-404/2011/C.

1.3 Report Structure

1.2.4 The remainder of the report is organized as follows:

- Section 2 presents the details of the proposed changes, justification for such changes and potential environmental impact associated with the proposed changes.
- Section 3 presents the conclusion of this Environmental Review Report.

2 PROPOSED CHANGES

2.1 Proposed Changes

- 2.1.1 The extent, type and height of noise barriers along the road works under the Project between Nga Yiu Ha and Loi Tung have been slightly modified to satisfy the latest engineering design and also the on-site conditions, while road alignments of the Project remain unchanged. The proposed changes in noise barriers are summarized as below and shown in **Drawing Nos. 60212563/ER7/701-703**.

Nga Yiu Ha

- Height of NB1-a at chainage P03 400 – N/A (Slip Road P03 – North Bound) will be changed from 2m vertical barrier to 2.5m vertical barrier, and its extent will be shortened by about 11m;
- Height of NB1-b at chainage N/A (Access Road to Ping Yeung) – P17 281 (Local Road – North Bound) will be changed from 2m vertical barrier to 2.5m vertical barrier, and its extent will be shortened by about 10m;

Ping Yeung

- Height of NB2 at chainage 9040 – 9085 (Main Road – North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier, and its extent will be shortened by about 4m.

Wo Keng Shan

- Height of NB3-a at chainage 8585 – 8500 (Main Road – North Bound) will be changed from 2m vertical barrier to 3m vertical barrier, and its extent will be slightly extended by about 3m;
- NB3-b at chainage 8500 – 8355 (Main Road – North Bound) will be extended by about 46m;
- NB4 at chainage CRP 8330 – 8550 (Connecting Road – South Bound) is split into 2 sections as NB4-a and NB4-b for suiting the site condition of at-grade and viaduct sections respectively. Noise barrier NB4-b will remain same as 2.5m vertical barrier above parapet, while noise barrier NB4-a will be changed to 3.5m vertical barrier;
- C6-NB5 at chainage 8180 – 8290 (Main Road – South Bound) will be shortened by about 27m;

Loi Tung

- C2-NB5 at chainage 6488 – 6855 (Main Road – South Bound) will be deleted;
- Height of NB6 at chainage 195 (Wo Keng Shan Rd) – 400 (Sha Tau Kok Rd – East Bound) will be changed from 1.5m vertical barrier to 2m vertical barrier; its alignment will be split into 2 sections to avoid clashing with underground utilities and also will be extended by about 13m in length;
- NB7 at chainage 360 (Sha Tau Kok Rd – West Bound) – 380 (Slip Rd – South Bound) will be split into 2 sections;
- NB8 at chainage P12 290 – N/A (Slip Road S1 – North Bound) will be shortened by about 10m in length;
- NB9 at chainage N/A (Sha Tau Kok Road Interchange – North Bound) will be extended by about 4m to connect with NB8 and NB10 at both ends to form a continuous alignment;
- NB10 at chainage 40 (Sha Tau Kok Rd) – 400 (Slip Road – North Bound) will be shortened by about 36m in length;

- Height of NB11-a at chainage CRP 6807 – 6854 (Connecting Road - North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be extended by about 2m;
 - NB11-b at chainage CRP6857 – 6917 (Connecting Road – North Bound) will be extended by about 2m;
 - NB12 at chainage CRP 6807 – 6859 (Connecting Road - North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be extended by about 2m; and
 - NB13 at chainage 6800 – 6855 (Main Road – South Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be shortened by about 17m.
- 2.1.2 The proposed changes in themselves do not constitute designated project (DP) elements under the EIAO, and thus no additional DP elements is associated as a result of proposed changes.

2.2 Reasons for Proposed Changes

- 2.2.1 During the construction stage of LT/HYW, it is found that modifications to the extent, type and height of the committed noise barriers under LT/HYW are required with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities, to fit in site condition, and to avoid conflicting with structures of project roads under LT/HYW. The required changes of noise barriers are described in **Section 2.1.1** above.

2.3 Construction Works and Programme

- 2.3.1 The proposed changes in the extent and form of noise barrier would not affect the construction method, works boundary and the construction programme of LT/HYW Project as presented in **Appendix 2.1** of the LT/HYW EIA Report remains valid and is also same as that under previous ERR submitted for VEP-466/2015, and thus the operation year of LT/HYW remains as 2018.

2.4 Concurrent Projects

- 2.4.1 There are no concurrent projects located in the vicinity of Nga Yiu Ha and Loi Tung. Therefore cumulative impact assessment from concurrent projects is not required. .

2.5 Potential Environmental Impacts Associated with the Proposed Changes

- 2.5.1 In respect to the nature and scope of the proposed changes as discussed in **Section 2.1**, potential environmental impacts due to the proposed changes have been identified and discussed in the following sections.

Noise

- 2.5.2 As the proposed changes are related to the change of configuration of noise barriers only, the powered mechanical equipment (PME) to be used for the construction of noise barriers remains unchanged. In addition, there is no change in the works boundary. As such, the construction noise impact assessment findings and proposed mitigation measures as presented in the LT/HYW ERR 2015 remains valid.
- 2.5.3 The proposed changes are required due to the interface between LT/HYW project with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities and to avoid conflicting with structures of roads under LT/HYW. It is anticipated that there would be minor change in traffic noise levels as a result of the proposed changes. Nevertheless, the proposed changes would not result in material change to the traffic noise impact of the Project as the traffic noise impact will be mitigated to comply with

the EIAO-TM requirements through implementation of proper mitigation measures such as provision of low noise road surfacing and noise barriers as appropriate.

- 2.5.4 Upon finalisation of the detailed design of the Project, the noise mitigation measures as shown in **Drawing Nos. 60212563/ER7/701 - 703** may need to be further refined but in any event will be properly and adequately designed to provide sufficient protection for the existing and planned noise sensitive receivers, such that the traffic noise impact will comply with EIAO-TM requirements. A plan containing details of noise mitigation measures with supporting calculations will be submitted to EPD their approval before the commencement of construction of the proposed changes to the noise mitigation measures of the Project.

Air Quality

- 2.5.5 The proposed changes would not induce additional traffic forecast and the changes are expected to be localised and minor. The representative air sensitive receivers as assessed in the EIA Report also remain valid without any new ASRs that were not covered in the approved EIA Report. In addition, vehicular emission assessment in the EIA Report adopted a worst case scenario without noise barrier effect such that the at-grade impacts represent the worst case due to vehicular emissions in the approved EIA Report. In view of the above, it is expected that the proposed changes would not cause significant change of vehicular emission pollutants at the sensitive receivers and the vehicular emission assessment findings in ERR submitted in support of the VEP application for LT/HYW project in 2015 remain valid.

Landscape and Visual

- 2.5.6 No additional landscape resources would be affected due to the proposed changes of noise barriers where all are located within the works boundary. Therefore, the landscape impact assessment findings in LT/HYW ERR 2015 remain valid.
- 2.5.7 Considering that the changes of noise barriers are localised and minor, there would be no significant change in the visual impact assessment findings with the implementation of recommended measures. Therefore, the visual impact assessment findings in LT/HYW ERR 2015 remain valid.

Other Environmental Aspects

- 2.5.8 With no changes in works boundaries of LT/HYW, it is expected that no additional impacts on ecology, fisheries and cultural heritage resources, as well as no land contamination issues arising from the proposed changes of noise barriers, and therefore these assessment findings in LT/HYW ERR 2015 remain valid. Also, with construction methods and works boundary remains unchanged, there would be no addition water quality and waste management issues arising from the proposed changes of noise barriers. In addition, the proposed changes of noise barriers would not affect the findings of sewerage and sewerage treatment impact, therefore the findings of sewerage and sewerage treatment impact remains valid.
- 2.5.9 Based on the above review findings, the potential impacts associated with the proposed changes are summarised in **Table 2.1**.

Table 2.1 Potential Impacts associated with the Proposed Changes

Potential Impact	Construction Phase	Operational Phase
Air Quality	x	x
Airborne Noise	x	x
Ground-borne Noise	x	x
Water Quality	x	x
Sewerage and Sewage Treatment Impact	x	x
Waste Management Implications	x	x

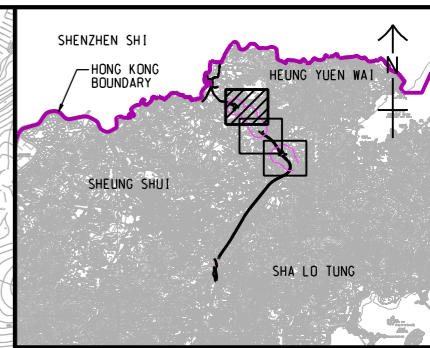
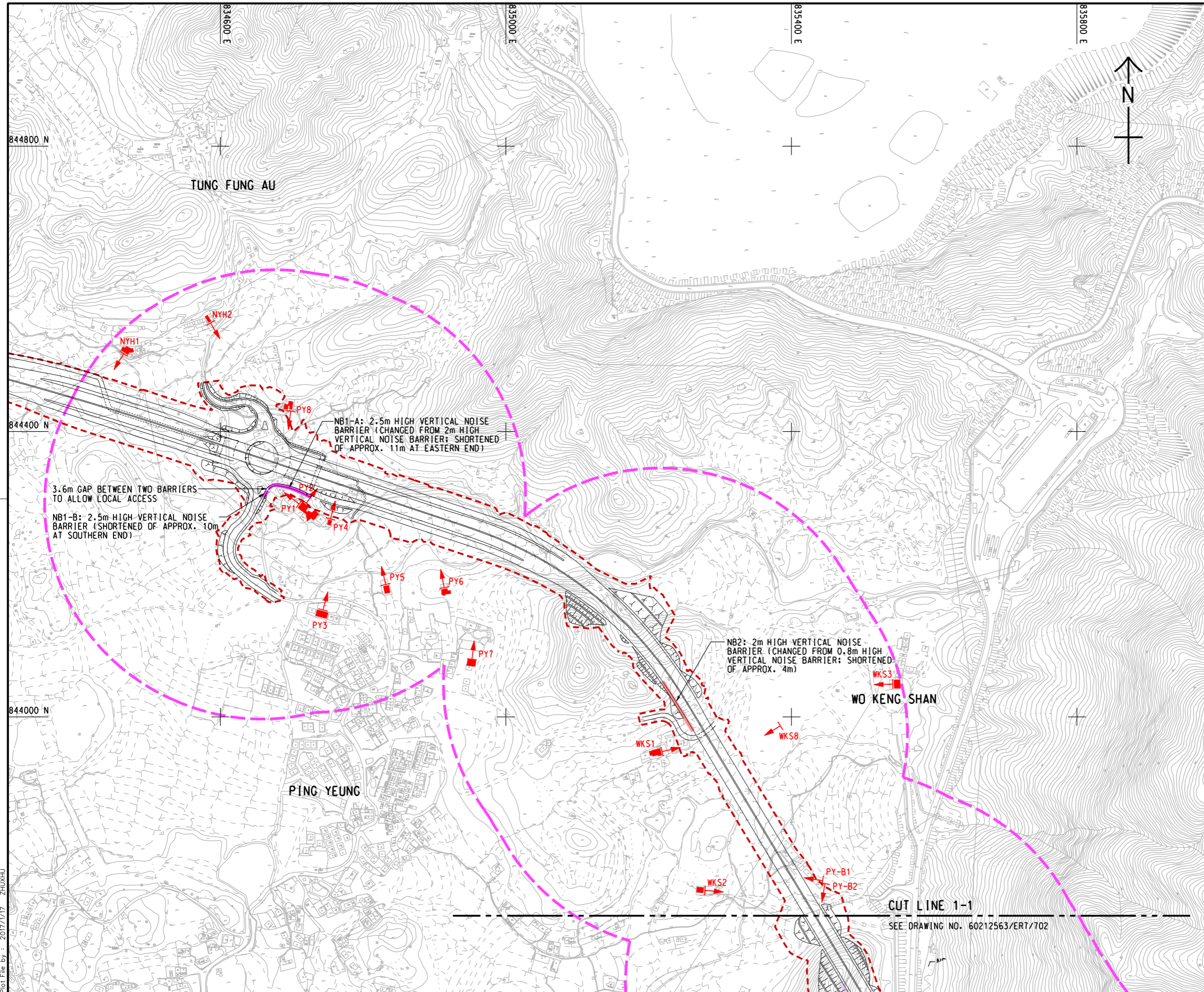
Potential Impact	Construction Phase	Operational Phase
Land Contamination	x	x
Ecology	x	x
Fisheries	x	x
Landscape, Visual and Glare	x	x
Cultural Heritage	x	x

Note:

√ – Possible impact; X – Impact not expected.

3 CONCLUSION

- 3.1.1 An environmental review/assessment has been conducted for the proposed changes of operational noise mitigation measures for LT/HYW Project between Nga Yiu Ha and Loi Tung. The likely environmental issues pertinent to the proposed changes have been assessed.
- 3.1.2 It is concluded that the proposed changes would not result in material change to environmental impacts with the implementation of the recommended mitigation measures, and the requirements of EIAO-TM will still be met. Therefore, no additional environmental monitoring and audit requirements are required.



KEY PLAN
SCALE 1 : 150000

LEGEND:

- 300m ASSESSMENT AREA
- TENTATIVE WORKS AREA
- 2m HIGH NOISE BARRIER
- 2.5m HIGH NOISE BARRIER
- NOISE SENSITIVE RECEIVERS
- ▲ FACADE FACING

REMARKS:

1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

土木工程拓展署
CEDD Civil Engineering and Development Department

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site formation and infrastructures) - Design and Construction

PROPOSED CHANGES OF NOISE BARRIERS
SHEET 1 OF 3

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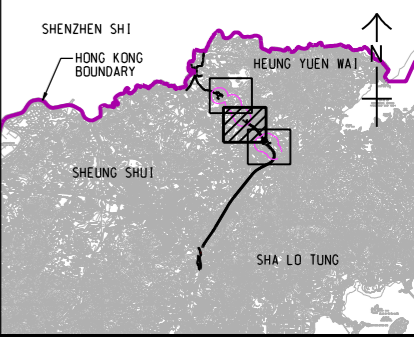
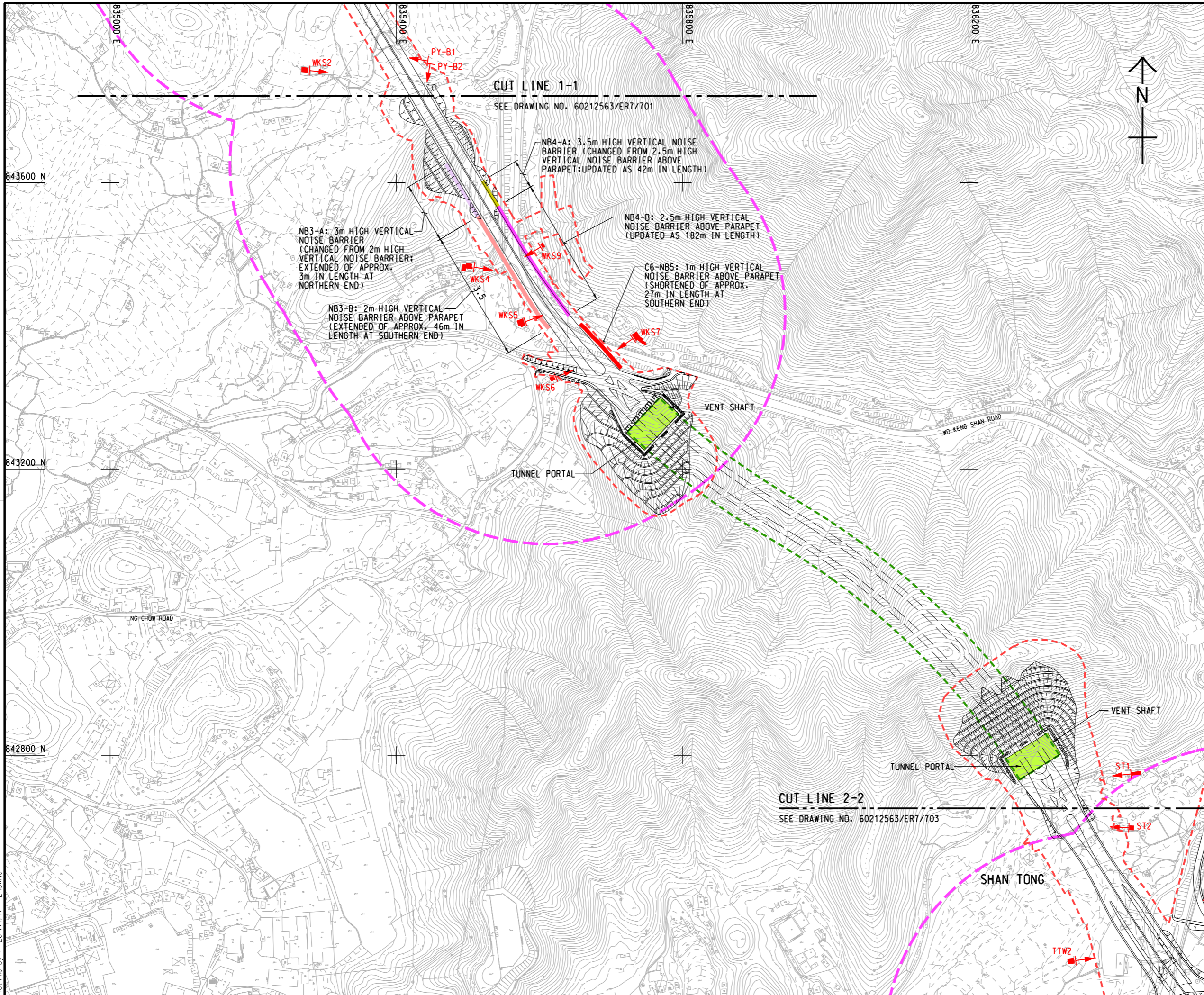
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圖紙編號

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DRAWN BY ZRH	STATUS	

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - TUNNEL SECTION
 - PROPOSED TUNNEL VENTILATION BUILDING
 - 1m HIGH NOISE BARRIER
 - 2m HIGH NOISE BARRIER
 - 2.5m HIGH NOISE BARRIER
 - 3m HIGH NOISE BARRIER
 - 3.5m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHKD.	DATE

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CEDD
Civil Engineering and Development Department

Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructures) - Design and Construction

PROPOSED CHANGES OF NOISE BARRIERS
SHEET 2 OF 3



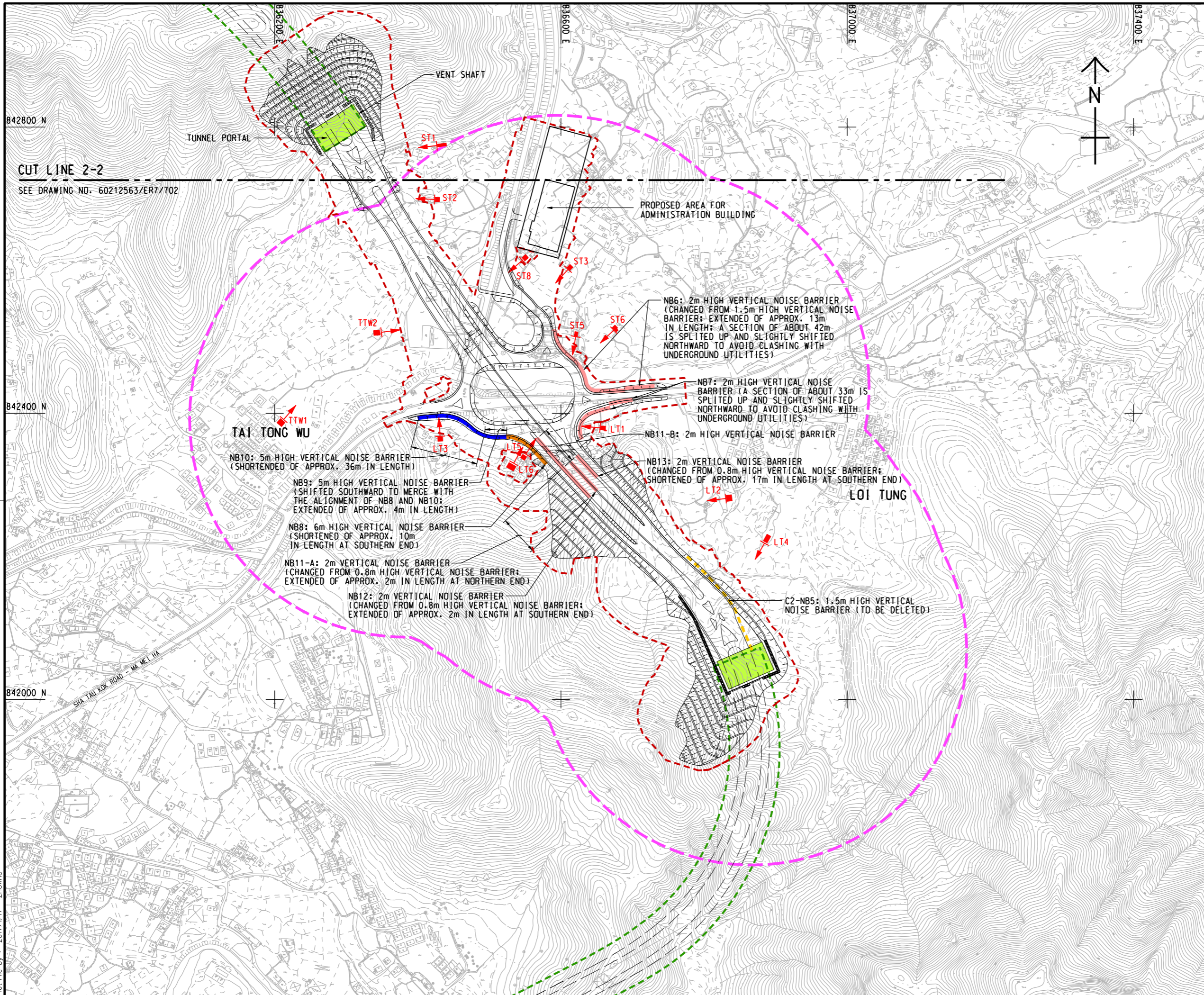
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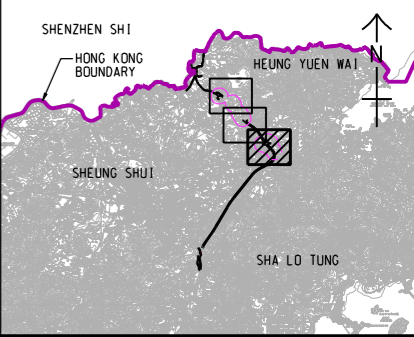
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CUT LINE 2-2
SEE DRAWING NO. 60212563/ER7/702



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - TUNNEL SECTION
 - PROPOSED TUNNEL VENTILATION BUILDING
 - 1.5m HIGH NOISE BARRIER (TO BE DELETED)
 - 2m HIGH NOISE BARRIER
 - 5m HIGH NOISE BARRIER
 - 6m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

- NB10: 5m HIGH VERTICAL NOISE BARRIER (SHORTENED OF APPROX. 36m IN LENGTH)
- NB9: 5m HIGH VERTICAL NOISE BARRIER (SHIFTED SOUTHWARD TO MERGE WITH THE ALIGNMENT OF NB8 AND NB10; EXTENDED OF APPROX. 4m IN LENGTH)
- NB8: 6m HIGH VERTICAL NOISE BARRIER (SHORTENED OF APPROX. 10m IN LENGTH AT SOUTHERN END)
- NB11-A: 2m VERTICAL NOISE BARRIER (CHANGED FROM 0.8m HIGH VERTICAL NOISE BARRIER; EXTENDED OF APPROX. 2m IN LENGTH AT NORTHERN END)
- NB12: 2m VERTICAL NOISE BARRIER (CHANGED FROM 0.8m HIGH VERTICAL NOISE BARRIER; EXTENDED OF APPROX. 2m IN LENGTH AT SOUTHERN END)
- NB6: 2m HIGH VERTICAL NOISE BARRIER (CHANGED FROM 1.5m HIGH VERTICAL NOISE BARRIER; EXTENDED OF APPROX. 13m IN LENGTH; A SECTION OF ABOUT 42m IS SPLITTED UP AND SLIGHTLY SHIFTED NORTHWARD TO AVOID CLASHING WITH UNDERGROUND UTILITIES)
- NB7: 2m HIGH VERTICAL NOISE BARRIER (A SECTION OF ABOUT 33m IS SPLITTED UP AND SLIGHTLY SHIFTED NORTHWARD TO AVOID CLASHING WITH UNDERGROUND UTILITIES)
- NB11-B: 2m HIGH VERTICAL NOISE BARRIER
- NB13: 2m VERTICAL NOISE BARRIER (CHANGED FROM 0.8m HIGH VERTICAL NOISE BARRIER; SHORTENED OF APPROX. 17m IN LENGTH AT SOUTHERN END)
- C2-NB5: 1.5m HIGH VERTICAL NOISE BARRIER (TO BE DELETED)

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS
SHEET 3 OF 3



DRG. NO. 60212563/ER7/703
圖紙編號

DESIGNED BY HC	CONTRACT NO. HT	P. Dir. APPROVED XX
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Appendix C

***Environmental Review Report for Modification of Noise
Barriers between Nam Wa Po and Wo Hop Shek
(Ref. C44-04-1)***

Agreement No. CE 38/2010 (CE)

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) – Design and Construction



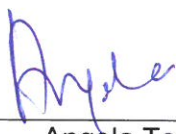
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Liantang/Heung Yuen Wai Boundary Control Point and associated works
(Site Formation and Infrastructures) –
Design and Construction

**Environmental Review for Modification of Noise Barriers
between Nam Wa Po and Wo Hop Shek
(Ref. C44-04-1)**

December 2016

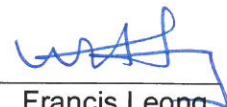
Reviewed:



Angela Tong

30 December 2016

Approved for Issue:



Francis Leong

30 December 2016

AECOM ASIA COMPANY LIMITED

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Drawing No.	Title
60212563/ER6/701	Proposed Changes of Noise Barriers under Liantang / Heung Yuen Wai Boundary Control Point
60212563/ER6/702 - 703	Proposed Changes of Noise Barriers under Widening of Tolo Highway and Fanling Highway

Appendices

Appendix 3.1	Photos of New/ Alternative/ Demolished Noise Sensitive Receivers
Appendix 3.2	Excerpt of ERR for VEP Application No. VEP-466/2015
Appendix 3.3	Details of Mitigated Road Traffic Noise Levels
Appendix 3.4	Sectional drawings of NB72

1 INTRODUCTION

1.1 Background

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works

- 1.1.1 The Project comprises a new Boundary Control Point (BCP) also known as Boundary Crossing Point in the EIA Study Brief, proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works.
- 1.1.2 An Environmental Impact Assessment (EIA) study for the LT/HYW Project was conducted in accordance with EIA Study Brief No. ESB-199/2008 and was approved on 24 March 2011 under the *Environmental Impact Assessment Ordinance* (EIAO). Following the approval of the EIA Report (Register No.: AEIAR-161/2011), an Environmental Permit (EP) was granted on 24 March 2011 (EP No: EP-404/2011) for the construction and operation of the LT/HYW Project. Variations of Environmental Permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-404/2011/C) was issued by Director of Environmental Protection (DEP) on 12 Mar 2015.
- 1.1.3 AECOM Asia Co. Ltd. (AECOM) was commissioned by Civil Engineering and Development Department (CEDD) to provide design and construction services for the Liantang / Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) under Agreement No. CE 38/2010(CE).
- 1.1.4 According to the site constraints and recent engineering design, the traffic noise mitigation proposal between Nam Wa Po and Wo Hop Shek is required to be slightly updated and some of barriers under Widening of Tolo Highway/Fanling Highway (EP324/2008/B) (hereinafter as "TH/FH Project") are required to modified due to LT/HYW Project.

Widening of Tolo Highway / Fanling Highway

- 1.1.5 The Project involves the widening a 4.7km section of Tolo Highway (TH) and a 4km section of Fanling Highway (FH) between Island House Interchange and Fanling. These sections will be widened to dual 4-lane carriageways to alleviate traffic congestion problems and to meet the forecasted increasing transport demands.
- 1.1.6 The TH/FH Project's EIA Report (Register No.: AEIAR-037/2000) was approved on 14 July 2000 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Report, an Environmental Permit (EP) was granted on 23 December 2008 (EP No: EP-324/2008) for the construction and operation of the TH/FH Project. Variations of environmental permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-324/2008/D) was issued by Director of Environmental Protection (DEP) on 27 August 2015.
- 1.1.7 The TH/FH Project's scope and the current preferred alignment (as shown in Drawings 551/R/9001 to 9016 of the EIA Report) remains unchanged but the operational noise mitigation proposal and road scheme between Nam Wa Po and Wo Hop Shek are required to be slightly updated to cope with the introduction of Liantang / Heung Yuen Wai Boundary Control Point link roads.

1.2 Objective of this Environmental Review Report

- 1.2.1 AECOM is commissioned by CEDD and Highways Department (HYD) to provide a supplementary review/assessment of potential environmental impacts at the sensitive receivers in the vicinity due to the proposed changes in traffic noise mitigation proposal.

1.2.2 This Environmental Review Report (ERR) has been prepared to assess the likely environmental issues pertinent to the proposed changes in traffic noise mitigation proposal and to confirm the compliance of relevant environmental standards.

1.3 Report Structure

1.3.1 The remainder of the report is organized as follows:

- Section 2 presents the details of the proposed changes, justification for such changes and potential environmental impact associated with the proposed changes.
- Section 3 presents the evaluation of the identified potential environmental impacts due to the proposed changes, and proposes additional mitigation measures and environmental monitoring and audit (EM&A) requirements (if required) for compliance with the requirements in the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM).
- Section 4 presents the conclusion of this Environmental Review Report.

2 PROPOSED CHANGES

2.1 Proposed Changes

LT / HYW Project

2.1.1 The extent, type and height of noise barriers along the project roads between Nam Wa Po and Wo Hop Shek have been slightly modified to satisfy the latest engineering design and site constraints. The proposed changes in noise barriers are summarized as below and shown in **Drawing No. 60212563/ER6/701**.

- Height of noise barrier (NB2) at chainage L01 Connecting Road – 412 (Tai Wo Service Road West) will be changed from 1.2m above parapet to 3.2m above parapet;
- Noise barrier at chainage L02 206 – 456 (Tai Wo Service Road East) (NB3) is shortened by about 48m due to the underground utilities including watermains and valve chambers; and
- Noise barrier at P02 285 – 333 (Link Road 1) (NB67-2) will be provided with additional 0.8m parapet.

2.1.2 The proposed changes do not constitute designated project (DP) elements under the EIAO, and thus no additional DP elements is associated as a result of proposed changes.

TH / FH Project

2.1.3 The location, extent and height of noise barriers along the southbound, northbound of Fanling Highway and Tai Wo Service Road West between Nam Wa Po and Wo Hop Shek have been slightly modified. The proposed changes are summarized in **Section 2.1.4** and **2.1.5** and shown in **Drawing Nos. 60212563/ER6/702 - 703**. A naming system starting with “NB” is assigned to the modified barriers for easy reference.

2.1.4 Proposed changes which have been assessed in Environmental Review Report (LT/HYW ERR 2015) for supporting the application of VEP (VEP No. 466/2015) included the following:

- (i) Noise barrier NB73 is shortened and is slightly shifted eastward;
- (ii) North tip of noise barrier NB72 is slightly shifted eastward;
- (iii) Noise Barrier NB71 is shortened;
- (iv) Noise barrier NB7 is shifted eastward and displaced by NB71;
- (v) Noise barriers NB6 is displaced from NB70 and is shifted eastward;
- (vi) North end of noise barrier NB70 is slightly shifted eastward;
- (vii) Extent of Noise barrier NB69 is shortened at the north and linked together as a continuous barrier;
- (viii) Noise barrier NB67 is divided into 2 sections (equivalent to NB67-3 and NB67-4 & NB67-5) and the southern portion is shifted westward; and
- (ix) Noise barrier NB4 is divided into 2 sections with road opening in between. Both sections are shifted westward, with the southern section has been lowered to 0.8m high and the northern section lowered to 4m high.

2.1.5 After the approval of VEP No. 466/2015, a minimum 3m set back of NB74 was proposed by the Highways Department due to the provision of Bus-Bus Interchange (BBI). A variation of EP (VEP No. 480/2015) was applied for TH/FH Project and the EP-324/2008/D was granted by EPD on 27 August 2015. The latest location of NB74 under EP-324/2008/D has been considered in this ERR.

2.1.6 Some latest changes on barriers under TH/FH Project are proposed due to interface issues with LT/HWY Project and are summarised below:

- (i) Noise Barrier NB72 is divided into 2 sections by LT/HWY Project Road Structure with leaving a 5m gap in between;
- (ii) A section of Noise Barrier NB69 in approximate 52m in length is lowered from 8m to 5m high; and
- (iii) NB67-4 is lowered from 8m high barrier with canopy to 4m high vertical barrier, and NB67-5 is lowered from 8m high barrier with canopy to 6m high vertical barrier.

2.1.7 The proposed changes do not constitute designated project (DP) elements under the EIAO, and thus no additional DP elements is associated as a result of proposed changes.

2.2 Reasons for Proposed Changes

LT / HYW Project

2.2.1 During EIA stage of LT/HYW, some sections of noise barriers under widening of Tolo Highway/Fanling Highway were proposed to be modified due to the interface between LT/HYW and widening of Tolo Highway/Fanling Highway (Figure 4.20.4 of LT/HYW EIA Report refers). Such modification was also presented in the LT/HYW ERR 2015.

2.2.2 During the construction stage of LT/HYW, it is found that modifications to the extent, type and height of the committed noise barriers under LT/HYW are required with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities and to avoid conflicting with structures of roads under LT/HYW. The required changes of noise barriers are described in **Section 2.1.1** above.

TH / FH Project

2.2.3 After the approval of the EIA Report of TH/FH Project, other committed project i.e. LT/HYW Project, was proposed within the area between Nam Wa Po and Wo Hop Shek. During the EIA study of LT/HYW, it was found that modifications to the extent, location and height of committed TH/FH Project's noise barriers were required with consideration of engineering and site constraints as well as noise compliance to the requirement of EIAO-TM. Further modifications of some committed noise barriers under TH/FH Project due to interface issue were proposed in the design stage of LT/HYW and such modifications were assessed in the Environmental Review Report (LT/HYW ERR 2015) for supporting the application of VEP (VEP No. 466/2015) and are also included in this ERR. However, further changes on 4 barriers (i.e. NB67-4, NB67-5, NB69 and NB72) under TH/FH Project are revealed during the construction stage of LT/HYW to minimize the impact to existing underground utilities and to avoid conflicting with structures of roads under LT/HYW.

2.2.4 The section of TWSR West outside Nam Wa Po and TWSR East below the roundabout were part of the TH/FH Project's scope as described in the EIA Report. However, these section of TWSR West and East were modified due to LT/HYW and is considered as project road in the LT/HYW EIA report (Register No.: AEIAR-161/2011).

2.3 Construction Works and Programme

LT / HYW Project

2.3.1 The proposed changes in the extent and form of noise barrier would not affect the construction method, works boundary and the construction programme of LT/HYW Project as presented in Appendix 2.1 of the LT/HYW EIA Report remains valid and is also same as that under previous ERR submitted for VEP-466/2015, and thus the operation year of LT/HYW remains as 2018.

TH / FH Project

2.3.2 The proposed changes in the extent and form of noise barrier would not affect the construction method, works boundary of TH/FH Project. It is considered that the construction

works as reviewed in VEP No. 480/2015 remain valid where the concerned construction programme is same as that under LT/HYW project.

2.4 Concurrent Projects

- 2.4.1 The concurrent projects identified in area between Nam Wa Po and Wo Hop Shek are identified as the LT/HYW and and TH/FH Project. The cumulative impacts from these concurrent projects have also been reviewed and assessed in this report where appropriate.

2.5 Potential Environmental Impacts Associated with the Proposed Changes

- 2.5.1 In respect to the nature and scope of the proposed changes as discussed in **Section 2.1**, potential environmental impacts due to the proposed changes have been identified and discussed in the following sections.

LT / HYW Project

Noise

- 2.5.2 As the proposed changes are related to the change of configuration of noise barriers only, the powered mechanical equipment (PME) to be used for the construction of noise barriers remains unchanged. In addition, there is no change in the works boundary. As such, the construction noise impact assessment findings and proposed mitigation measures as presented in the LT/HYW ERR 2015 remains valid.
- 2.5.3 It is anticipated that the proposed changes of noise barriers under LT/HYW Project would affect the traffic noise impact assessment findings and thus road traffic noise assessment has been conducted to review any adverse impact arising from the changes.

Air Quality

- 2.5.4 Given that the construction activities and methodology remains unchanged, no adverse construction dust impact is expected from the proposed changes with the implementation of dust suppression measures as recommended in LT/HYW ERR 2015.
- 2.5.5 The proposed changes would not induce additional traffic forecast and the changes are expected to be localised and minor. In addition, the representative air sensitive receivers as assessed in the EIA Report are located at more than 70m from the modified noise barriers, except NB2, and thus no additional vehicular emission impact is anticipated due to considerable separation distance from the modified barriers, except NB2. For NB2, the height of noise barrier is proposed to be 2m high than the original proposal (**Section 2.1.1** refers), it is expected that the source height would be 2m higher and the worst affected level would be shifted from 1.5mAG to 5mAG. It is therefore expected that the proposed changes would not cause significant change of vehicular emission pollutants at the sensitive receivers. The vehicular emission assessment findings in LT/HYW ERR 2015 is anticipated to be valid.

Landscape and Visual

- 2.5.6 No additional landscape resources would be affected due to the proposed changes of noise barriers where all are located within the works boundary. Therefore, the landscape impact assessment findings in LT/HYW ERR 2015 remain valid.
- 2.5.7 Considering that the changes of noise barriers are localised and minor, there would be no significant change in the visual impact assessment findings with the implementation of recommended measures. Therefore, the visual impact assessment findings in LT/HYW ERR 2015 remain valid.

Other Environmental Aspects

- 2.5.8 With no changes in works boundaries of LT/HYW, it is expected that no additional impacts on ecology, fisheries and cultural heritage resources, as well as no land contamination issues arising from the proposed changes of noise barriers. Assessment findings in LT/HYW ERR 2015 remain valid. Also, with construction methods and works boundary remains unchanged, there would be no addition water quality and waste management issues arising from the proposed changes of noise barriers. In addition, the proposed changes of noise barriers would not affect the findings of sewerage and sewerage treatment impact, therefore the findings of sewerage and sewerage treatment impact remains valid.

TH / FH Project

Noise

- 2.5.9 Environmental Review Report for the Tolo Widening Project (ref. EA 00798/R62/6) (TH/FH ERR 2008) was submitted to EPD for supporting EP application (Application No. AEP-324/2008). TH/FH ERR 2008 identifies and quantifies various potential changes in environmental impacts and required mitigation measures arising from the construction and operation of the project in the approved TH/FH EIA Report. In view of the proposed changes of noise barriers are localised and minor, in addition to without changes in works boundary and PME for the construction of noise barriers, it is therefore expected that the construction noise impact associated with the construction of noise barriers and required mitigation measures remain valid.
- 2.5.10 It is anticipated that the proposed changes of noise barriers under TH/FH Project would affect the traffic noise impact assessment findings only and thus road traffic noise assessment has been conducted to review any adverse impact arising from the changes.

Air Quality

- 2.5.11 Given that the construction activities and methodology remains unchanged, no adverse construction dust impact is expected from the proposed changes with the implementation of dust suppression measures as recommended in TH/FH ERR 2008.
- 2.5.12 The proposed changes would not induce additional traffic forecast and the changes are expected to be localised and minor. In addition, the representative air sensitive receivers as assessed in the EIA Report are located at more than 40m from the modified noise barriers, and thus no additional vehicular emission impact is anticipated due to considerable separation distance from the modified barriers. It is therefore expected that the proposed changes would not cause significant change of vehicular emission pollutants at the sensitive receivers. The vehicular emission assessment findings in TH/FH ERR 2008 is anticipated to be valid.

Landscape and Visual

- 2.5.13 No additional landscape resources would be affected due to the proposed changes of noise barriers where all are located within the works boundary. Therefore, the landscape impact assessment findings in TH/FH ERR 2008 remain valid.
- 2.5.14 Considering that the changes of noise barriers are localised and minor, there would be no significant change in the visual impact assessment findings with the implementation of recommended measures. Therefore, the visual impact assessment findings in TH/FH ERR 2008 remain valid.

Other Environmental Aspects

- 2.5.15 With no changes in works boundaries of TH/FH ERR, it is expected that no additional impacts on ecology, water quality and cultural heritage resources arising from the proposed changes of noise barriers. Assessment findings in TH/FH ERR 2008 remains valid.

Conclusion

- 2.5.16 Based on the above review findings, the potential impacts associated with the proposed changes are summarised in **Table 2.1**. The potential traffic noise impact during operation phase will be the major concern and has been reviewed and assessed in this ERR.

Table 2.1 Potential Impacts associated with the Proposed Changes

Potential Impact	Construction Phase	Operational Phase
Air Quality	x	x
Airborne Noise	x	√
Ground-borne Noise	x	x
Water Quality	x	x
Sewerage and Sewage Treatment Impact	x	x
Waste Management Implications	x	x
Land Contamination	x	x
Ecology	x	x
Fisheries	x	x
Landscape, Visual and Glare	x	x
Cultural Heritage	x	x

Note:
 √ – Possible impact; X – Impact not expected.

3 REVIEW ON TRAFFIC NOISE IMPACT ASSESSMENT

3.1 Introduction

3.1.1 As described in **Section 2.5.10**, the potential impact arising from the proposed changes of noise barriers would be the traffic noise from roads within 300m study area of the updated noise barriers. The potential traffic noise impact during the operation phase has been reviewed and evaluated in the following sections.

3.2 Representative Noise Sensitive Receivers

3.2.1 With reference to the LT/HYW ERR 2015, TH/FH ERR 2008, and other relevant Environmental Review Reports for Application No. VEP-351/2012, VEP-429/2014 and VEP-480/2015, the representative NSRs located within 300m study boundary of the proposed changes have been identified for assessment and presented in **Table 3.1** and **Drawing No. 60212563/ER6/701** under LT/HYW project and **Drawing Nos. 60212563/ER6/702 – 703** under TH/FH project.

Table 3.1 Details of Representative Noise Sensitive Receivers

NSR ID	EIA / ERR NSR ID	Descriptions	Land Use	Status	No. of Floor	Lowest Sensitive Floor
<i>Liantang/ Heung Yuen Wai Project</i>						
TH1	TH1	Village House, Tong Hang	Residential	Existing	1	G/F
TH2	TH2	Village House, Tong Hang	Residential	Existing	2	G/F
TH4 [^]	TH4	Village House, Tong Hang	Residential	Existing	2	G/F
TH5 [^]	TH5	House No. 88A1, Tong Hang	Residential	Existing	1	G/F
TH6 [^]	TH6	Village House, Tong Hang	Residential	Existing	1	G/F
WHS1 [^]	WHS1	House No. 307, Wo Hop Shek Village	Residential	Existing	1	G/F
KT1	KT1	Village House, Kiu Tau Village	Residential	Existing	1	G/F
KT2	KT2	House No. 300, Kiu Tau Village	Residential	Existing	2	G/F
KT3	KT3	Village House, Kiu Tau Village	Residential	Existing	1	G/F
NWP1	NWP1	House No. 78, Nam Wa Po	Residential	Existing	2	G/F
NWP4	-	House No.81, Nam Wa Po	Residential	Existing	2	G/F
NWP6	-	House No.131, Nam Wa Po	Residential	Existing	2	G/F
KLHSW	KLHSW	House No. 55C, Kau Lung Hang San Wai	Residential	Existing	2	G/F
<i>Tolo Highway/ Fanling Highway Project</i>						
N8B ⁽³⁾	N8	Village House near Nam Wa Po	Residential	Demolished	1	G/F
SR1012 [^]	SR1012	Tong Hang	Residential	Existing	1	G/F
SR1015	SR1015	Tong Hang	Residential	Existing	1	G/F
SR109	SR109	Village House near Nam Wa Po	Residential	Existing	1	G/F
SR110 ⁽⁴⁾	-	House No. 255,	Residential	Existing	3	G/F

NSR ID	EIA / ERR NSR ID	Descriptions	Land Use	Status	No. of Floor	Lowest Sensitive Floor
		Kiu Tau Village				
SR111 ⁽⁴⁾	-	House No. 76, Nam Wa Po	Residential	Existing	2	G/F
SR112 ⁽⁴⁾	-	House No. 63B, Nam Wa Po Village	Residential	Existing	3	G/F
SR11B	SR11B	Kiu Tau	Residential	Existing	1	G/F
SR12 ⁽⁵⁾	SR12	Nam Wa Po 1, House no. 80	Residential	Existing	2	G/F
SR76	SR76	Yuen Leng 1	Residential	Existing	2	G/F
SR77	SR77	Yuen Leng 2	Residential	Existing	2	G/F
SR83B ⁽¹⁾	SR83N	House No. 300, Kiu Tau Village	Residential	Existing	2	G/F
SR84	SR84	Nam Wa Po 2	Residential	Existing	1	G/F
SR85B ⁽²⁾	SR85	Nam Wa Po 3	Residential	Existing	2	G/F
SR86B ⁽¹⁾	SR86N	Village House, Kiu Tau Village	Residential	Existing	1	G/F
SR87	SR87	Tai Wo 2	Residential	Existing	2	G/F
SR9 [^]	SR9	Wo Hop Shek 2	Residential	Existing	2	G/F
TH2 ⁽¹⁾	-	Tong Hang	Residential	Existing	2	G/F
WHS1 [^]	-	Wo Hop Shek	Residential	Existing	1	G/F

Note:

[^] NSRs are located outside 300m study area of the proposed changes, and thus it is considered that the proposed changes would not affect these NSRS and traffic noise assessment will not be conducted at these NSRs.

- (1) New representative NSRs as identified in LT/YHW EIA Report (Register No.: AEIAR-161/2011) have been selected for traffic noise assessment.
- (2) The location of SR85 as set in the noise model for the application of VEP (Application No. VEP-429/2014) was inconsistent with the location as presented in the figure of ERR for the same VEP application. The location of SR85 in the noise model has been updated and has been renamed with new NSR ID SR85B for differentiation.
- (3) Based on recent site observation, N8B was demolished and thus the status of N8B has been updated accordingly. A photo is shown in **Appendix 3.1** for record. Therefore, traffic noise assessment will not be conducted at N8B.
- (4) New representative NSRs selected for traffic noise assessment. Photos of new representative NSRs are provided in **Appendix 3.1**.
- (5) Based on the supporting document for EP No. 466/2015, assessment level of SR12 has been updated to 24.5mPD to reflect the actual condition of the NSR.

3.3 Potential Sources of Impact

- 3.3.1 During the operational phase, operation of the LT/HYW and TH/FH Projects, may pose traffic noise impact on the nearby NSRs.

3.4 Traffic Noise Impact Assessment

- 3.4.1 Same assessment methodology for road traffic noise assessments as presented in **Section 4.5.1.2** of the LT/HYW EIA Report have been adopted in this traffic noise impact assessment. The traffic noise levels ($L_{10(1 \text{ hour})}$) at the representative NSRs have been predicted using the computer model "RoadNoise", which employs the calculation method as prescribed in the "Calculation of Road Traffic Noise" developed by Department of Transport, Welsh Office, in 1988.
- 3.4.2 As discussed in **Section 4.2.3** of LT/HYW ERR 2015, the year with maximum traffic flow within a 15-year period upon commencement of operation of the Project (i.e. 2018) is determined to be 2033 (same as that stated in the EIA Report). The traffic forecast as adopted

in ERR remains valid and has been adopted in this noise assessment. The traffic forecast for the Year 2033 is presented in **Appendix 3.2**.

- 3.4.3 The noise barriers with proposed changes as detailed in **Section 2.1** are shown in **Table 3.2** and **Drawing No. 60212563/ER6/701**.

Table 3.2 Proposed Changes of Noise Barriers under LT/HYW Project

Proposed ID No.	Chainage shown in EP-404/2011/C	Updated Chainage	Type of Noise Mitigation Measures	Height*, m	Length, m	Drawing No.
Wo Hop Shek						
NB3	L02 206 – 456 (Tai Wo Service Road East)	L02 254 – 456 (Tai Wo Service Road East)	Vertical Barrier	3m	205m (48m shortened)	60212563/ER6/701
Nam Wa Po						
NB2	L01 Connecting Road – 412 (Tai Wo Service Road West)	-	Vertical Barrier	3.2m above Parapet of access road (increased from 1.2m above parapet)	58m	60212563/ER6/701
NB67-2	P02 285 – 333 (Link Road 1)	-	Vertical Barrier	2.5m above parapet (with additional 0.8m parapet)	48m	60212563/ER6/701

Note:

* The parapet wall is 0.8m high above road surface.

- 3.4.4 During EIA stage of LT/HYW Project, some sections of noise barriers under TH/FH Project were modified due to the interface between these Projects (Figure 4.20.4 of LT/HYW EIA Report refers). Such modification was also considered in the LT/HYW ERR 2015. As discussed in **Section 2.1.5**, one of the noise barriers, i.e. NB74, was proposed to be setback with a minimum 3m set back after the approval of VEP No. 466/2015 which was supported by ERR for VEP-480/2015 under TH/FH Project and is currently stipulated under EP-324/2008/D for TH/FH Project. The latest location of NB74 under EP-324/2008/D has been considered in this traffic noise impact assessment.
- 3.4.5 Further modification of the committed noise barriers along the existing road, Fanling Highway, are required in order to minimize the impact to existing underground utilities and to avoid conflicting with structures of Project roads. Details of modification are shown in **Drawing No. 60212563/ER6/702 - 703** and discussed in **Table 3.3**.

Table 3.3 Proposed Modified Noise Barriers under TH/FH Project

Barrier ID	Location	Type of Noise Mitigation Measures	Height, m	Approx. Length, m	Drawing No.
Tong Hang					
NB73	Fanling Highway South Bound	Vertical Barrier	6m	140m	60212563/ER6/702
NB72	Fanling Highway South Bound	Vertical Barrier	6m	105m (With a gap)	60212563/ER6/702

Barrier ID	Location	Type of Noise Mitigation Measures	Height, m	Approx. Length, m	Drawing No.
				of 5m in length)	
Yuen Leng					
NB71	Fanling Highway South Bound	Vertical Barrier	4m	255m	60212563/ER6/703
NB7	Fanling Highway South Bound	Vertical Barrier	4m	60m	60212563/ER6/703
NB6	Fanling Highway South Bound	Vertical Barrier	7m	120m	60212563/ER6/703
NB70	Fanling Highway South Bound	Vertical Barrier	7m	55m	60212563/ER6/703
Nam Wa Po					
NB69	Fanling Highway North Bound	Vertical Barrier	8m	101m (A section of 52m in length is lowered from 8m to 5m)	60212563/ER6/703
NB67-3	Fanling Highway North Bound	Barrier with Canopy – Type I*	8m	85m	60212563/ER6/703
NB67-4	Fanling Highway North Bound	Vertical Barrier (Changed from Barrier with Canopy – Type I*)	4m (Changed from 8m)	95m	60212563/ER6/703
NB67-5	Fanling Highway North Bound	Vertical Barrier (Changed from Barrier with Canopy – Type I*)	6m (Changed from 8m)	35m	60212563/ER6/703
NB4	Tai Wo Service Road West	Vertical Barrier	4m	35m	60212563/ER6/703
	Tai Wo Service Road West	Vertical Barrier	0.8m	30m	60212563/ER6/703

Note:

* Type I canopy barrier consists of 6m high vertical barrier with 4.5m cantilever (i.e. 2m high from base of cantilever, total height of 8m).

3.4.6 The predicted mitigated traffic noise levels in Year 2033 are presented in **Table 3.4** with detailed breakdowns of road traffic noise shown in **Appendix 3.3**.

Table 3.4 Mitigated Road Traffic Noise Impact in Year 2033

NSR ID	Descriptions	Floor Level	Noise Criteria L ₁₀ (1hr) dB(A)	Overall Mitigated Noise Level L ₁₀ (1hr) dB(A)
TH1	Village House, Tong Hang	G/F	70	61
TH2	Village House, Tong Hang	G/F	70	69
		1/F		70
KT1/ SR86B	Village House, Kiu Tau Village	G/F	70	65
KT2/ SR83B	House No. 300, Kiu Tau Village	G/F	70	65
		1/F		67
KT3/ SR11B	Village House, Kiu Tau Village	G/F	70	70
NWP1	House No. 78, Nam Wa Po	G/F	70	65

NSR ID	Descriptions	Floor Level	Noise Criteria L ₁₀ (1hr) dB(A)	Overall Mitigated Noise Level L ₁₀ (1hr) dB(A)
		1/F		68
NWP4	House No. 81, Nam Wa Po	G/F	70	65
		1/F		68
NWP6/ SR85B	House No. 131, Nam Wa Po	G/F	70	66
		1/F		70
KLHSW/ SR76	House No. 55C, Kau Lung Hang San Wai	G/F	70	66
		1/F		67
SR1015	Tong Hang	G/F	70	70
SR109	Village House near Nam Wa Po	G/F	70	67
SR110	House No. 255, Kiu Tau Village	G/F	70	65
		1/F	70	65
		2/F	70	66
SR111	House No. 76, Nam Wa Po	G/F	70	69
		1/F	70	70
SR112	House No. 63B, Nam Wa Po Village	G/F	70	65
		1/F	70	65
		2/F	70	65
SR12	Nam Wa Po 1, House no. 80	G/F	70	64
		1/F	70	66
SR77	Yuen Leng 2	G/F	70	66
		1/F	70	68
SR84	Nam Wa Po 2	G/F	70	70
SR87	Tai Wo 2	G/F	70	66
		1/F	70	68

3.4.7 Based on the assessment results, the predicted road traffic noise levels at all NSRs comply with the stipulated noise limit of 70dB(A) during the operation of LT/HYW and TH/FH Projects. It is therefore concluded that there would be no adverse impact arising from LT/HYW and TH/FH Projects due to the proposed changes of noise barriers, and no material changes is expected due to the proposed changes.

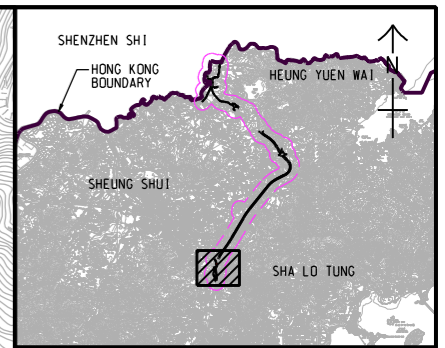
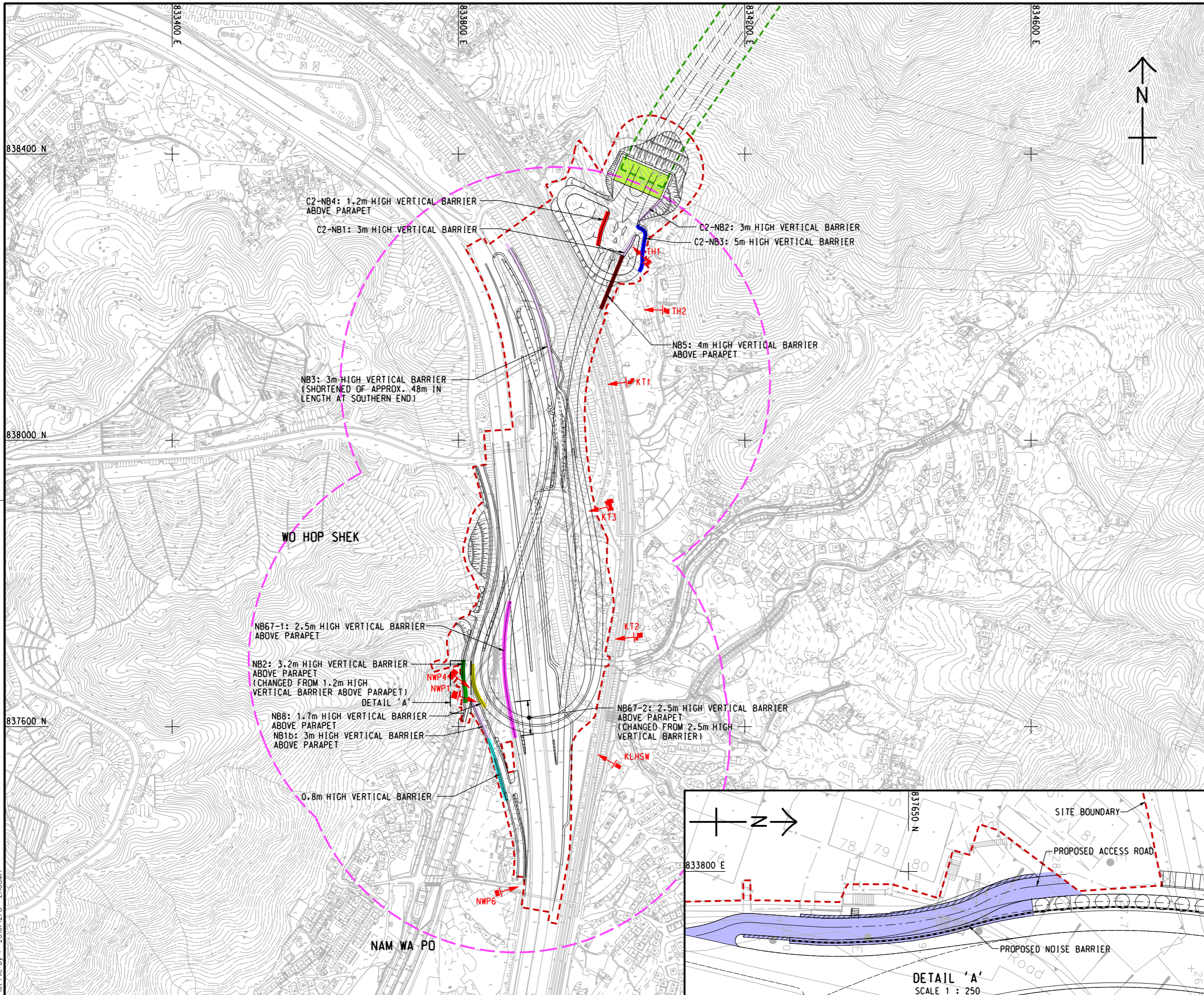
3.5 Environmental Monitoring and Audit Requirement

3.5.1 With the implementation of proposed noise barriers, no adverse operational noise impact is anticipated, and thus no additional EM&A requirements for the proposed change are required for LT/HYW and TH/FH Projects.

4 CONCLUSION

- 4.1.1 An environmental review/assessment has been conducted for the proposed changes of operational noise mitigation proposal for LT/HYW and TH/FH Projects between Nam Wa Po and Wo Hop Shek. The likely environmental issues pertinent to the proposed changes have been assessed.
- 4.1.2 It is concluded that the proposed changes would not result in material change leading to adverse residual environmental impacts with the implementation of the recommended mitigation measures, and thus no additional environmental monitoring and audit requirements are required.

Drawings

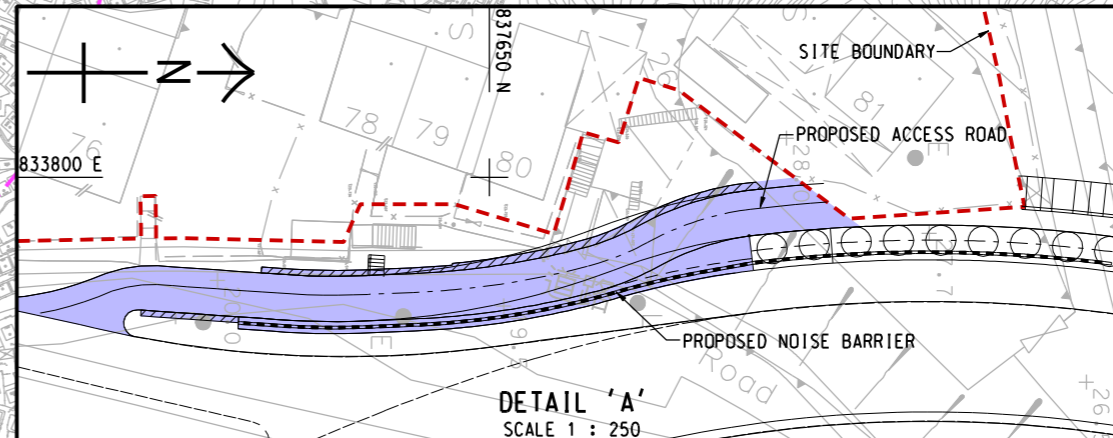


KEY PLAN
SCALE 1 : 150000

LEGEND:

- 300m ASSESSMENT AREA
- TENTATIVE WORKS AREA
- TUNNEL SECTION
- 0.8m HIGH NOISE BARRIER
- 1.2m HIGH NOISE BARRIER
- 1.7m HIGH NOISE BARRIER
- 2.5m HIGH NOISE BARRIER
- 3m HIGH NOISE BARRIER
- 3.2m HIGH NOISE BARRIER
- 4m HIGH NOISE BARRIER
- 5m HIGH NOISE BARRIER
- PROPOSED TUNNEL VENTILATION BUILDING
- ▬ NOISE SENSITIVE RECEIVERS
- ➔ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.



REV.	DESCRIPTION	DATE	BY	CHK.	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS UNDER LIANTANG/ HEUNG YUEN WAI BOUNDARY CONTROL POINT

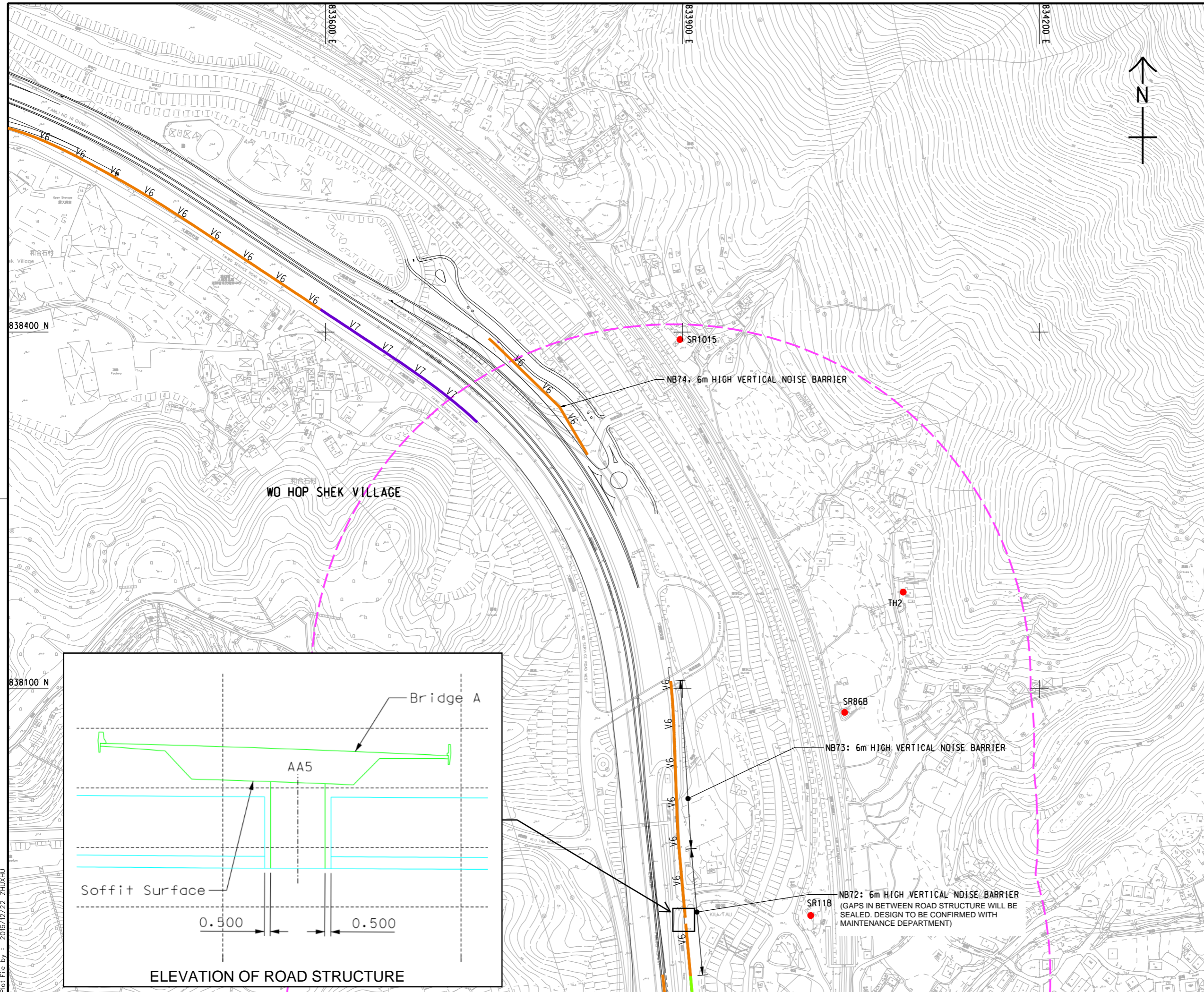
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DRG. NO. 60212563/ER6/701
圖紙編號

DESIGNED BY: HC	CONTRACT NO.:	P. Dir. APPROVED:
DRAWN BY: LVP	STATUS:	HT
SCALE: A1 1 : 2500		
DIMENSIONS ARE IN METRES		

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Plot File by : 2016/12/18_ZHOUHM



- LEGEND:**
- 300m ASSESSMENT AREA
 - SR1015 NOISE SENSITIVE RECEIVERS
 - V4 VERTICAL NOISE BARRIER 4m HIGH
 - V6 VERTICAL NOISE BARRIER 6m HIGH
 - V7 VERTICAL NOISE BARRIER 7m HIGH



WO HOP SHEK VILLAGE

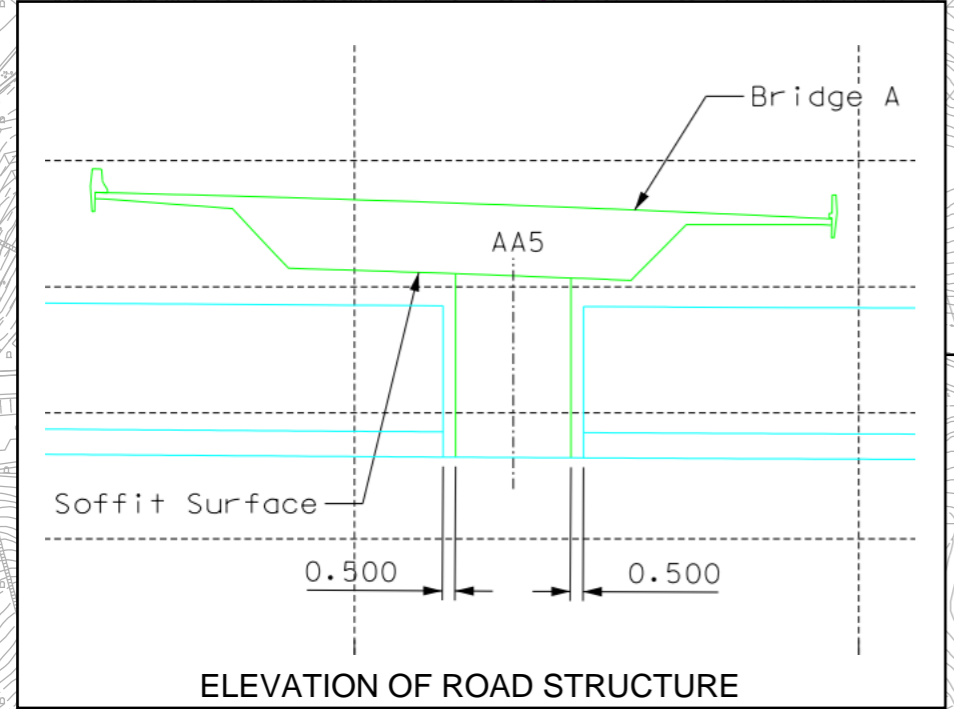
NB74: 6m HIGH VERTICAL NOISE BARRIER

TH2

SR86B

NB73: 6m HIGH VERTICAL NOISE BARRIER

SR11B NB72: 6m HIGH VERTICAL NOISE BARRIER
(GAPS IN BETWEEN ROAD STRUCTURE WILL BE SEALED. DESIGN TO BE CONFIRMED WITH MAINTENANCE DEPARTMENT)



REV.	DESCRIPTION	D.W.	P.C.	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS UNDER WIDENING OF TOLO HIGHWAY & FANLING HIGHWAY
(SHEET 1 OF 2)

AECOM

DRG. NO. 60212563/ER6/702
圖紙編號

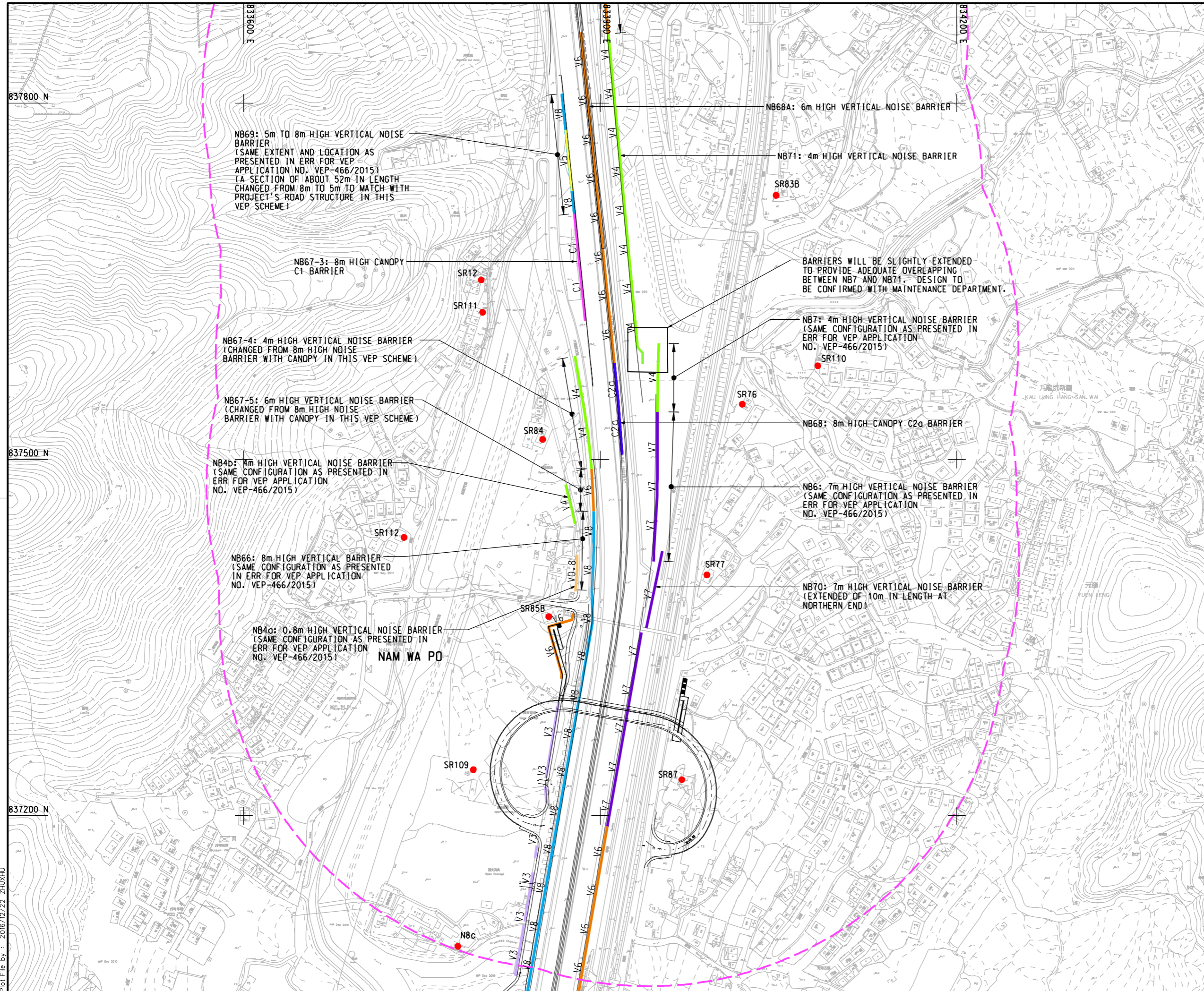
DESIGNED BY	CONTRACT NO.	P. Dir. APPROVED
YJP	CE 38/2010(CE)	HT

SCALE	STATUS
A1 1 : 1500	HT

DIMENSIONS ARE IN METERS

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Plot File by : 2016/12/22_ZHUXHU



NB69: 5m TO 8m HIGH VERTICAL NOISE BARRIER (SAME EXTENT AND LOCATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015) (A SECTION OF ABOUT 52m IN LENGTH CHANGED FROM 8m TO 5m TO MATCH WITH PROJECT'S ROAD STRUCTURE IN THIS VEP SCHEME.)

NB67-3: 8m HIGH CANOPY C1 BARRIER

NB67-4: 4m HIGH VERTICAL NOISE BARRIER (CHANGED FROM 8m HIGH NOISE BARRIER WITH CANOPY IN THIS VEP SCHEME)

NB67-5: 6m HIGH VERTICAL NOISE BARRIER (CHANGED FROM 8m HIGH NOISE BARRIER WITH CANOPY IN THIS VEP SCHEME)

NB4b: 4m HIGH VERTICAL NOISE BARRIER (SAME CONFIGURATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015)

NB66: 8m HIGH VERTICAL BARRIER (SAME CONFIGURATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015)

NB4a: 0.8m HIGH VERTICAL NOISE BARRIER (SAME CONFIGURATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015)

NAM WA PO

NB68A: 6m HIGH VERTICAL NOISE BARRIER

NB71: 4m HIGH VERTICAL NOISE BARRIER

BARRIERS WILL BE SLIGHTLY EXTENDED TO PROVIDE ADEQUATE OVERLAPPING BETWEEN NB7 AND NB71. DESIGN TO BE CONFIRMED WITH MAINTENANCE DEPARTMENT.

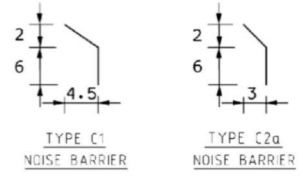
NB7: 4m HIGH VERTICAL NOISE BARRIER (SAME CONFIGURATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015)

NB68: 8m HIGH CANOPY C2a BARRIER

NB6: 7m HIGH VERTICAL NOISE BARRIER (SAME CONFIGURATION AS PRESENTED IN ERR FOR VEP APPLICATION NO. VEP-466/2015)

NB70: 7m HIGH VERTICAL NOISE BARRIER (EXTENDED OF 10m IN LENGTH AT NORTHERN END)

- LEGEND:**
- 300m ASSESSMENT AREA
 - SR105 NOISE SENSITIVE RECEIVERS
 - VO.8 VERTICAL NOISE BARRIER 0.8m HIGH
 - V3 VERTICAL NOISE BARRIER 3m HIGH
 - V4 VERTICAL NOISE BARRIER 4m HIGH
 - V5 VERTICAL NOISE BARRIER 5m HIGH
 - V6 VERTICAL NOISE BARRIER 6m HIGH
 - V7 VERTICAL NOISE BARRIER 7m HIGH
 - V8 VERTICAL NOISE BARRIER 8m HIGH
 - C2a C2a NOISE BARRIER FACING FANLING BOUND
 - C1 C1 NOISE BARRIER FACING FANLING BOUND



REV.	DESCRIPTION	CHK.	DATE

CEDD Civil Engineering and Development Department

LIANTANG/HUANG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS UNDER WIDENING OF TOLD HIGHWAY & FANLING HIGHWAY

(SHEET 2 OF 2)

AECOM

DRGNO. 60212563/ER6/703
圖紙編號

DESIGNED BY: YJP
SCALE: 1:1500
DIMENSIONS ARE IN METERS

CONTRACT NO. CE 38/2010(CE)
STATUS: HT
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Appendices

Appendix 3.1

Photos of New/ Demolished Noise Sensitive Receivers

Appendix 3.1 – Photos of New / Demolished Noise Sensitive Receivers

New NSRs



SR110

House No. 255, Kiu Tau Village

New NSRs



SR111

House No. 76, Nam Wa Po

New NSRs



SR112

House No. 63B, Nam Wa Po Village

Demolished NSRs



N8B

Village House near Nam Wa Po was found demolished

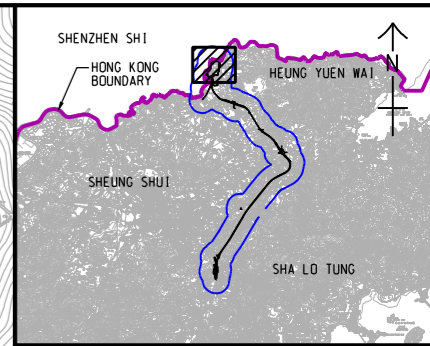
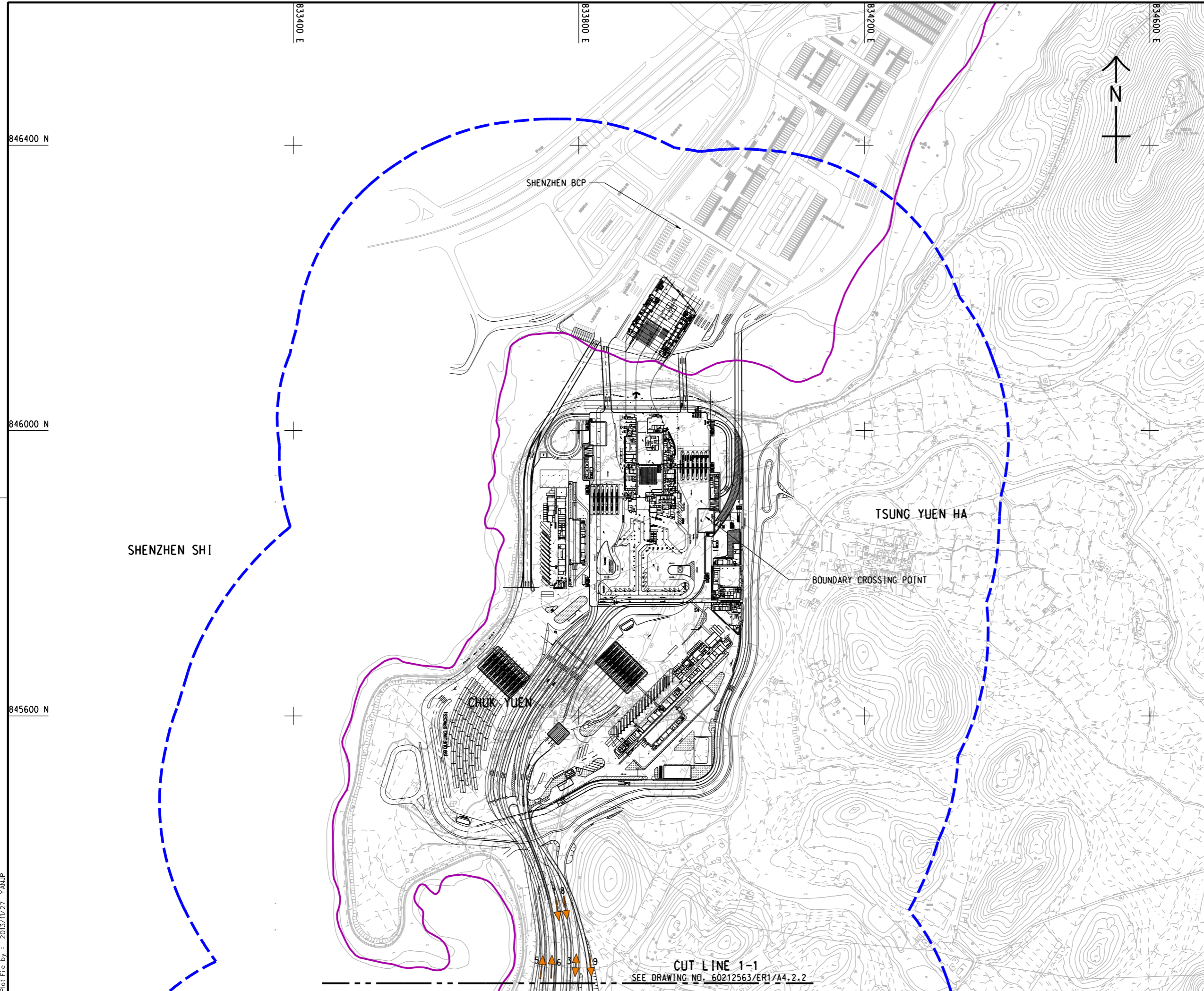
Appendix 3.2

Excerpt of ERR for VEP Application No. VEP-466/2015

2033 AM Peak Hour Traffic Flow (veh/hr) (With Project)

Road No.	Road Name	DIR	Total	HV%
1	Proposed Connecting Road (A)	NB	55	56.4
2	Proposed Connecting Road (B)	2-way	172	26.7
3	Proposed Connecting Road (C)	2-way	137	26.3
4	Proposed Connecting Road (D)	2-way	34	29.4
5	Proposed Connecting Road (E)	NB	150	26.7
6	Proposed Connecting Road (E)	NB	735	76.7
7	Proposed Connecting Road (F)	SB	756	87.0
8	Proposed Connecting Road (F)	SB	22	68.2
9	Proposed Connecting Road (G)	SB	53	54.7
10	Proposed Connecting Road – slip road (H)	SB	730	86.0
11	Proposed Connecting Road – slip road (H)	SB	48	93.8
12	Proposed Connecting Road – slip road (I)	NB	85	82.4
13	Proposed Connecting Road – slip road (I)	NB	800	66.8
14	Proposed Connecting Road – slip road (J)	NB	37	32.4
15	Proposed Connecting Road – slip road (J)	SB	32	46.9
16	Proposed Connecting Road – slip road (K)	NB	353	58.3
17	Proposed Connecting Road – slip road (K)	SB	414	55.9
18	Proposed Connecting Road – slip road (L)	NB	416	53.0
19	Proposed Connecting Road – slip road (L)	SB	313	53.9
20	Proposed Connecting Road (M)	NB	1216	62.0
21	Proposed Connecting Road (M)	SB	1043	76.4
22	Proposed Connecting Road – slip road (N)	NB	137	31.4
23	Proposed Connecting Road – slip road (N)	SB	120	43.3
26	Proposed Connecting Road (P)	NB	1081	65.7
27	Proposed Connecting Road (P)	SB	924	80.6
28	Sha Tau Kok Road – Wo Hang (A)	WB	531	50.5
29	Sha Tau Kok Road – Wo Hang (A)	EB	577	56.8
30	Sha Tau Kok Road – Wo Hang (B)	WB	639	42.6
31	Sha Tau Kok Road – Wo Hang (B)	EB	609	43.5
32	Proposed Connecting Road – slip road (Q)	NB	537	36.4
33	Proposed Connecting Road – slip road (Q)	SB	525	44.2
34	Fanling Highway (A)	NB	5541	28.5
35	Fanling Highway (A)	SB	5395	27.9
37	Widening Fanling Highways (A)	SB	200	47.0
38	Widening Fanling Highways (B)	NB	51	49.0
39	Widening Fanling Highways (B)	SB	51	49.0
40	Widening Fanling Highways (C)	NB	14	50.0
41	Widening Fanling Highways (C)	SB	191	48.2
42	Widening Fanling Highways - Slip Road (D)	SB	51	49.1
43	Proposed Connecting Road (R)	SB	845	67.9
44	Proposed Connecting Road (S)	NB	577	53.2
45	Proposed Connecting Road (T)	SB	604	66.7
47	Widening Fanling Highways - Slip Road (E)	2-way	767	32.9
48	Widening Fanling Highways - Slip Road (E)	NB	1042	57.6
51	Border Road	2-way	51	49.0
52	Lin Ma Hang Road (B)	2-way	181	29.3
52c	Lin Ma Hang Road (C)	2-way	230	35.0
52d	Ping Che Road (D)	2-way	85	50.0
53	Wo Keng Shan Road (A)	NB	61	55.7
54	Wo Keng Shan Road (A)	SB	84	53.6
55	Ng Chow Road (A)	SB	51	49.0
56	Ng Chow Road (A)	NB	51	49.0
57	Ng Chow Road (B)	SB	51	49.0
58	Ng Chow Road (B)	NB	51	49.0
59	Wo Keng Shan Road (B)	NB	61	55.7
60	Wo Keng Shan Road (B)	SB	68	32.4
61	Wo Keng Shan Road (C)	NB	61	55.7
62	Wo Keng Shan Road (C)	SB	68	32.4
63	Sha Tau Kok Road – Wo Hang (C)	WB	504	51.5
64	Sha Tau Kok Road – Wo Hang (C)	EB	549	56.9
67	Tai Wo Service Road West (B)	NB	443	20.8
68	Tai Wo Service Road West (B)	SB	189	45.0
69	Kiu Tau Road	WB	25	44.0
70	Kiu Tau Road	EB	117	64.1

71	Tai Wo Service Road East	NB	14	50.0
72	Tai Wo Service Road East	SB	191	48.2
73	Fanling Highways	NB	5980	29.7
74	Fanling Highways	SB	6291	33.5
75	Loi Tung Roundabout	1-way	844	45.1
76	Fanling Widening Roundabout 1	1-way	251	47.4
77	Fanling Widening Roundabout 2	1-way	200	47.0
78	Fanling Widening Roundabout 3	1-way	51	49.0
79	Fanling Widening Link Road	2-way	280	40.0



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- BOUNDARY OF HKSAR
 - - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REMARK:
LAYOUT OF HONG BCP IS TENTATIVE AND SUBJECT TO REVIEW

REV.	DESCRIPTION	DATE	BY	CHKD.

CEDD 土木工程拓展署
Civil Engineering and
Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS
(SITE FORMATION AND INFRASTRUCTURES)
- DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK

SHEET 1 OF 6



DRG. NO. 60212563/ER1/A4.2.1
圖紙編號

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 批核人
HC	-	HT

DRAWN BY 繪圖	STATUS 階段
YJP	-

SCALE 比例 A1 1 : 2500
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SHENZHEN BCP

TSUNG YUEN HA

BOUNDARY CROSSING POINT

CHUK YUEN

CUT LINE 1-1
SEE DRAWING NO. 60212563/ER1/A4.2.2

846400 N

846000 N

845600 N

833400 E

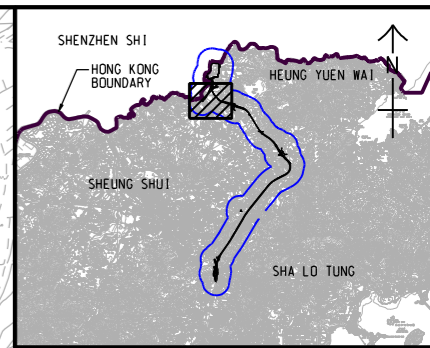
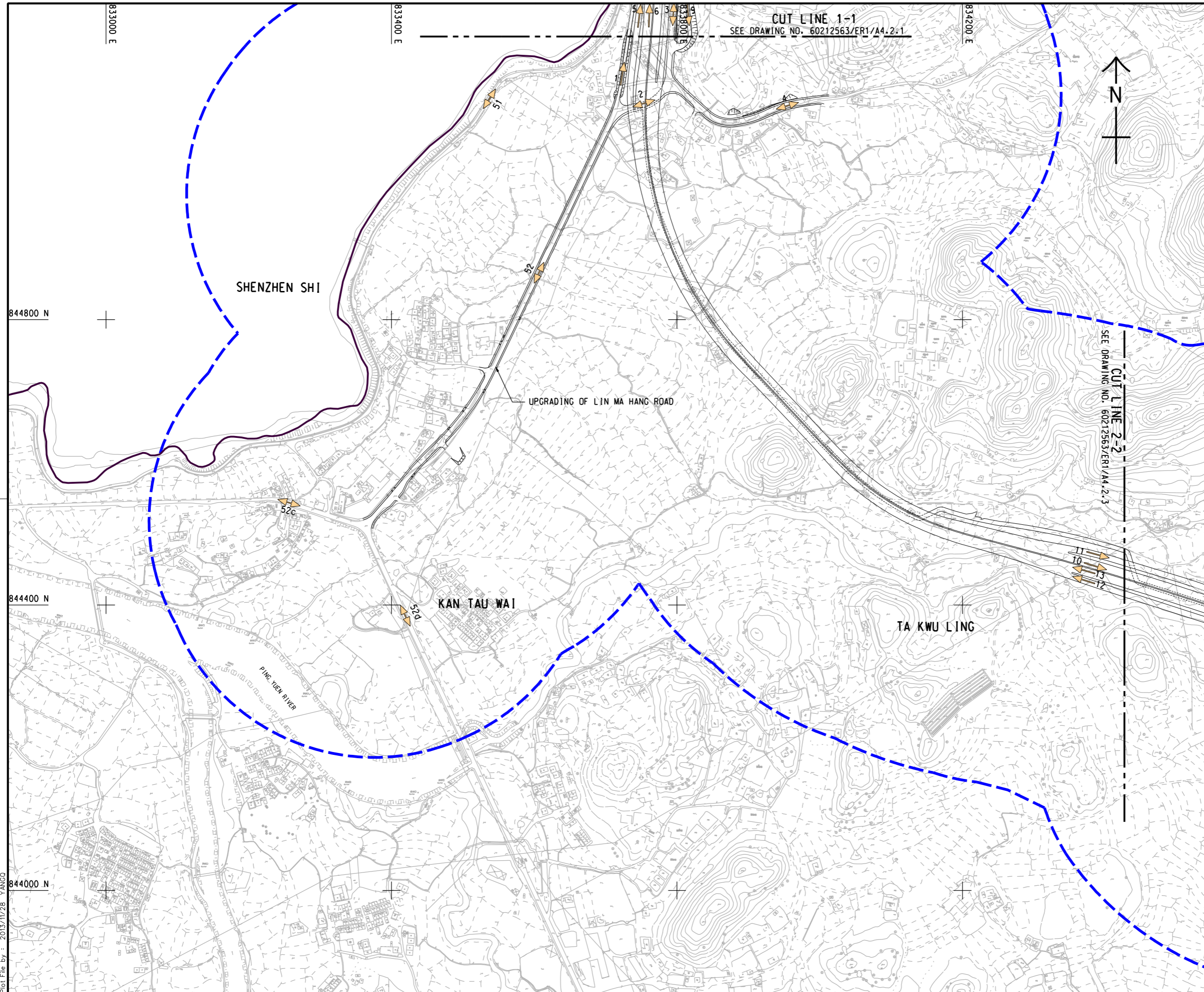
833800 E

834200 E

834600 E

SHENZHEN SHI

Plot File by : 2013/11/27 YANJP



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- BOUNDARY OF HKSAR
 - - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

833000 E
833400 E
834200 E
844800 N
844400 N
844000 N

REV.	DESCRIPTION	D.C.	P.C.	DATE

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Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

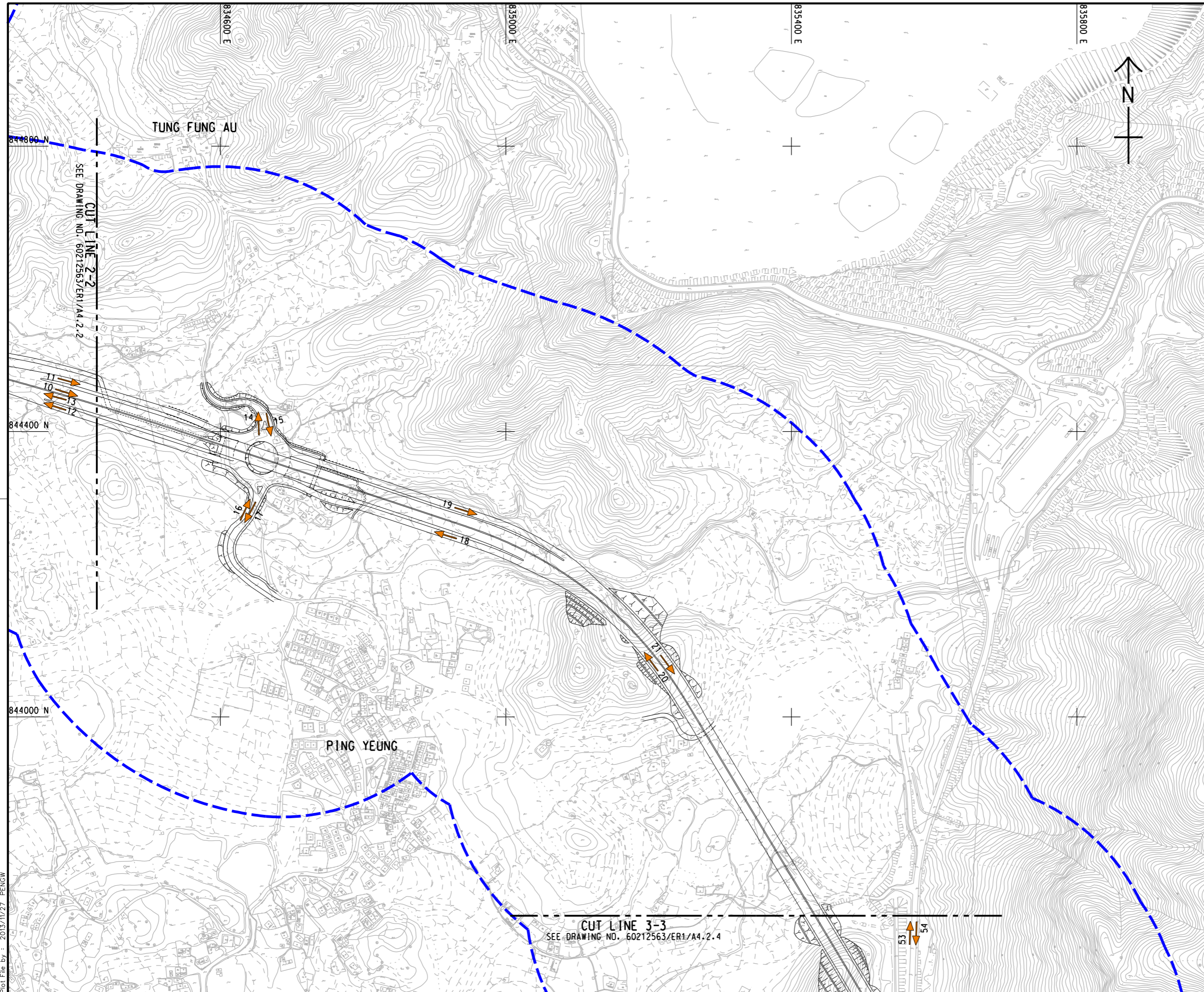
ROAD TRAFFIC NETWORK
SHEET 2 OF 6

AECOM

DRG. NO. 60212563/ER1/A4.2.2
圖紙編號

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.W.	P.C.	DATE

土木工程拓展署
CEDD Civil Engineering and
Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS
(SITE FORMATION AND INFRASTRUCTURES)
- DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK

SHEET 3 OF 6



DRG. NO. 60212563/ER1/A4.2.3
圖紙編號

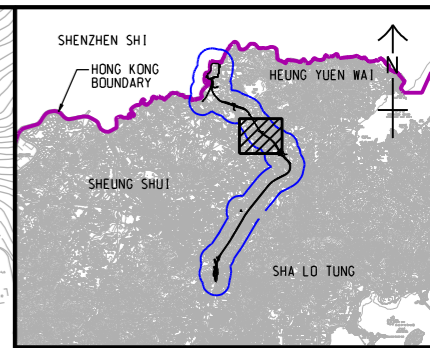
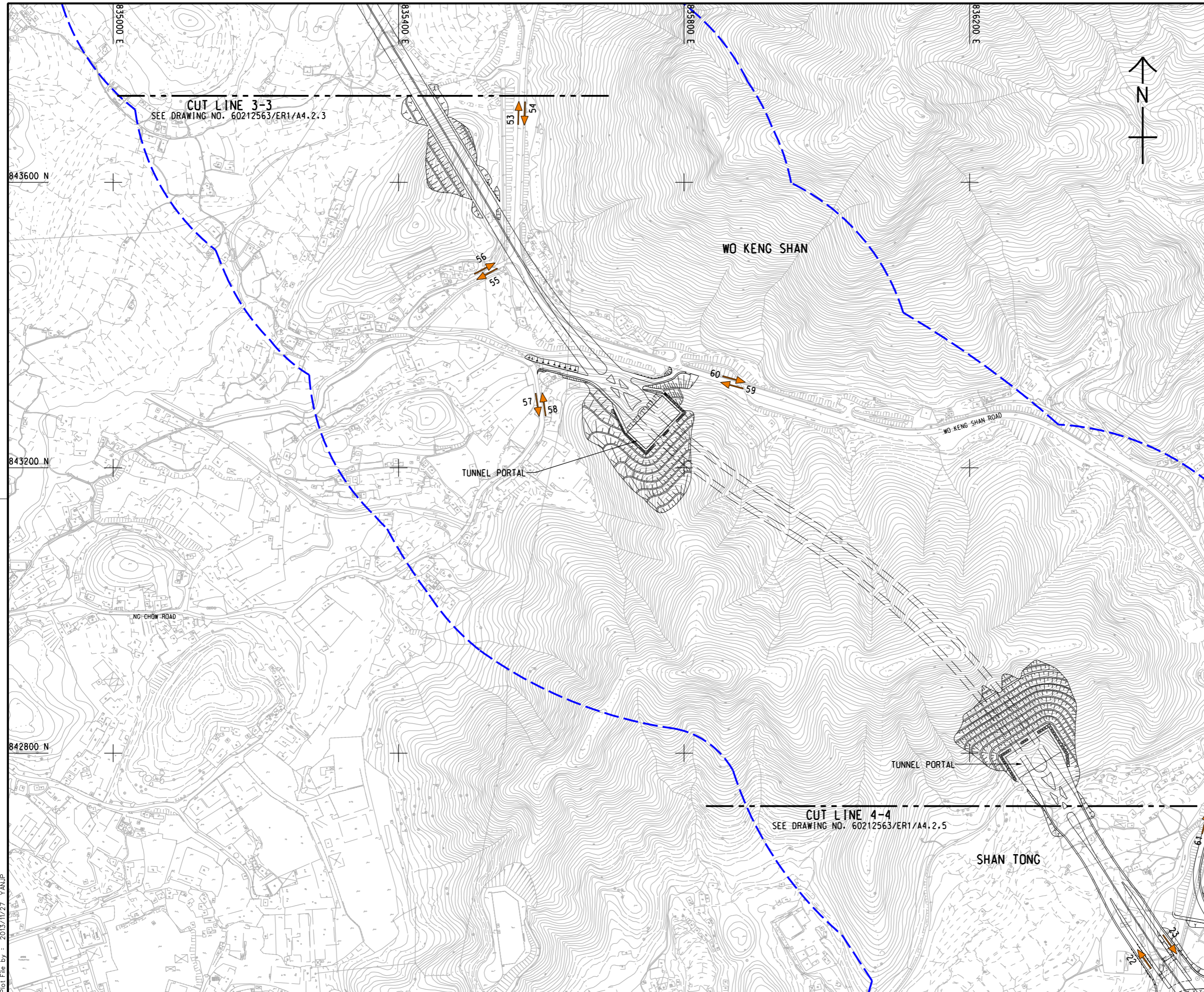
DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 承辦人
HC	-	HT

DRAWN BY 繪圖	STATUS 狀態
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KEY PLAN
SCALE 1 : 50000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

土木工程拓展署
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LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 4 OF 6

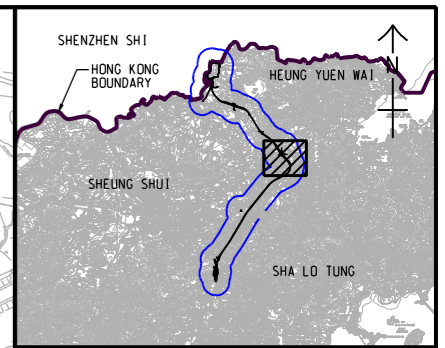
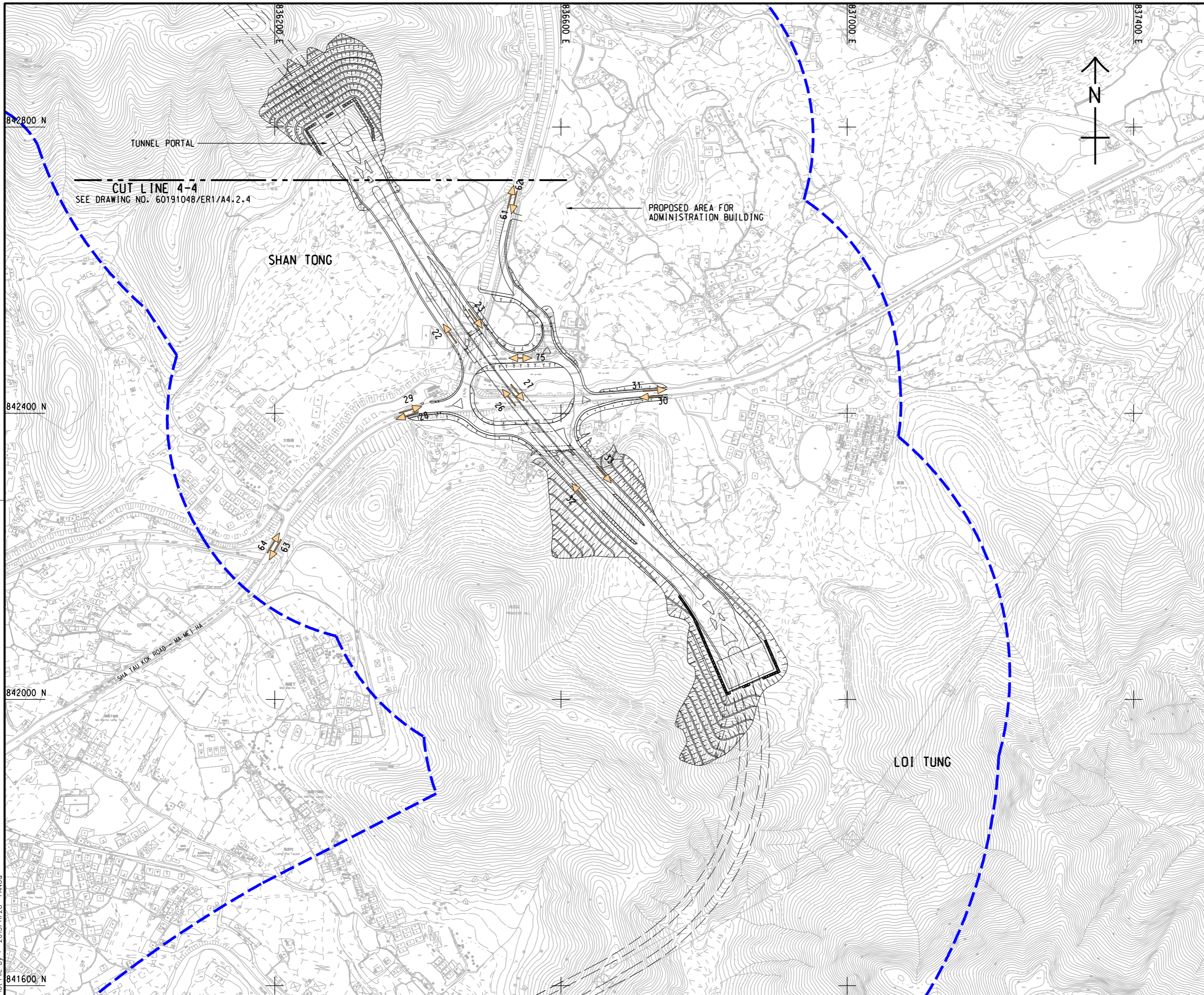
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圖紙編號

DESIGNED BY 設計人 HC	CONTRACT NO. 合約編號 -	P. Dir. APPROVED 承批人 HT
DRAWN BY 繪圖人 YJP	STATUS 狀態 REV.	
SCALE 比例尺 A1 1 : 2500		

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.C.	P.C.	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructures) - Design and Construction

ROAD TRAFFIC NETWORK

SHEET 5 OF 6



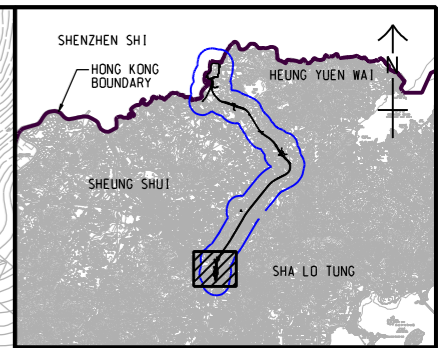
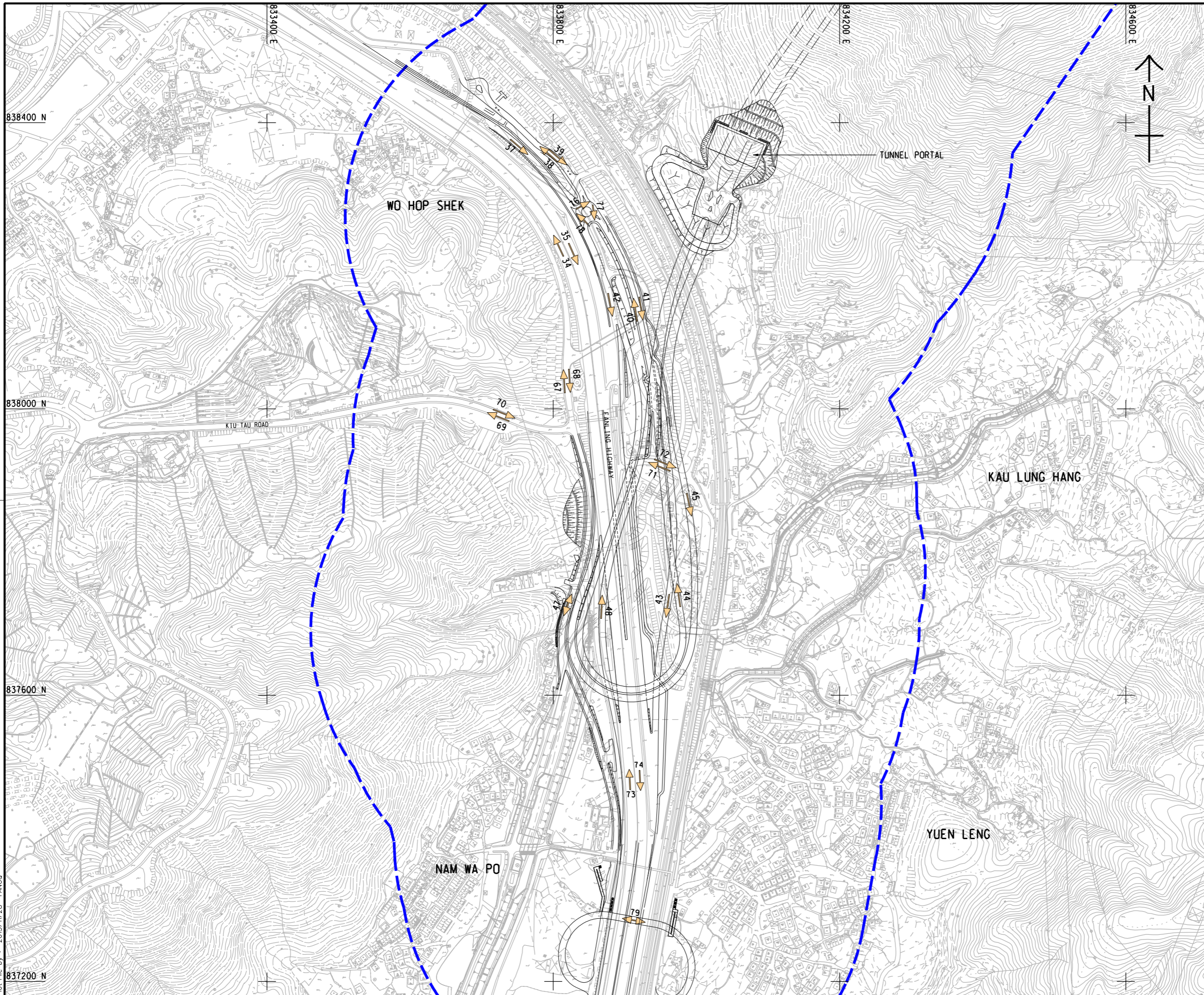
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圖紙編號

DESIGNED BY 設計人	HC	CONTRACT NO. 合約編號	-	P. Dir. APPROVED 承批人	HT
DRAWN BY 繪圖人	YJP	STATUS 階段			
SCALE 比例	A1 1 : 2500				

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.W.	P.C.	DATE

土木工程拓展署
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Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 6 OF 6

AECOM

DRG.NO. 60212563/ER1/A4.2.6
圖紙編號

DESIGNED BY 設計人	CONTRACT NO. 合約編號	P. Dir. APPROVED 批核人
HC	-	HT

DRAWN BY: YJP
 STATUS: REVISION
 SCALE: A1 1 : 2500
 DIMENSIONS ARE IN METRES
 尺寸單位: 公尺

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Appendix 3.3

Details of Mitigated Road Traffic Noise Levels

Appendix 3.3 Details of Mitigated Road Traffic Noise Levels

Mitigated Scenario at 2033

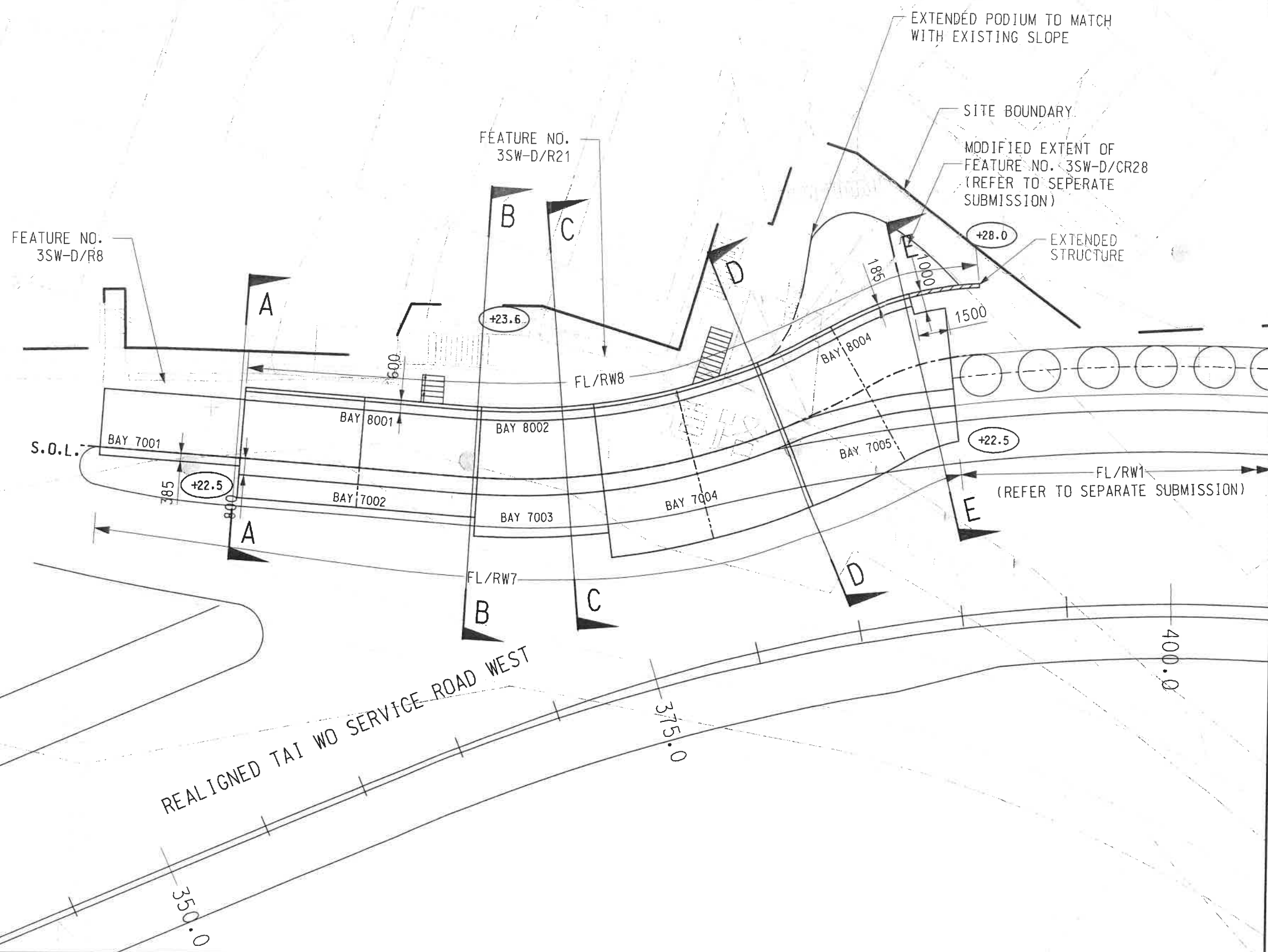
NSR ID.	Floor	Assessment Point Level (mPD)	Noise Criteria, dB(A)	Overall Predicted Noise Levels at 2033, dB(A)
TH1	G/F	27.4	70	61.0
TH2	G/F	28.6	70	69.3
	1/F	31.4	70	70.3
KT1/ SR86B	G/F	17.9	70	64.9
KT2/ SR83B	G/F	19.6	70	64.8
	1/F	22.4	70	66.8
KT3/ SR11B	G/F	21.5	70	70.2
NWP1	G/F	24.5	70	65.2
	1/F	27.3	70	67.6
KLHSW/ SR76	G/F	22.0	70	65.6
	1/F	24.8	70	67.4
NWP4	G/F	29.0	70	65.2
	1/F	31.8	70	68.4
NWP6/ SR85B	G/F	22.6	70	65.8
	1/F	25.4	70	70.2
SR1015	G/F	22.3	70	69.9
SR109	G/F	22.5	70	67.4
SR110	G/F	22.2	70	64.6
	1/F	24.9	70	65.3
	2/F	27.6	70	66.0
SR111	G/F	24.4	70	68.8
	1/F	27.1	70	70.4
SR112	G/F	20.4	70	64.5
	1/F	23.1	70	64.9
	2/F	25.8	70	65.3
SR12	G/F	24.5	70	63.7
	1/F	27.2	70	65.9
SR77	G/F	23.9	70	66.1
	1/F	26.6	70	68.5
SR84	G/F	19.7	70	70.1
SR87	G/F	26.1	70	66.1
	1/F	28.8	70	67.7

Appendix 3.4

Sectional drawings of NB72

NOTES:

1. FOR LAYOUT PLAN OF VILLAGE ACCESS ABOVE RETAINING WALLS FL/RW7 AND FL/RW8, REFER TO SKETCH NO. CV/2012/09/R10/120/0818.
2. FOR SECTIONS OF RETAINING WALLS FL/RW7 AND FL/RW8, REFER TO SKETCH NOS. CV/2012/09/R10/120/0819, 0820, 0821, 0822, & 0823.
3. FOR ELEVATION OF RETAINING WALLS FL/RW7 AND FL/RW8, REFER TO SKETCH NO. CV/2012/09/R10/120/0824.
4. FOR R.C. DETAILS OF RETAINING WALLS FL/RW7 AND FL/RW8, REFER TO SKETCH NO. CV/2012/09/R10/120/0825.
5. CONCRETE FOR RW7 & RW8 SHALL BE OF GRADE 40/20



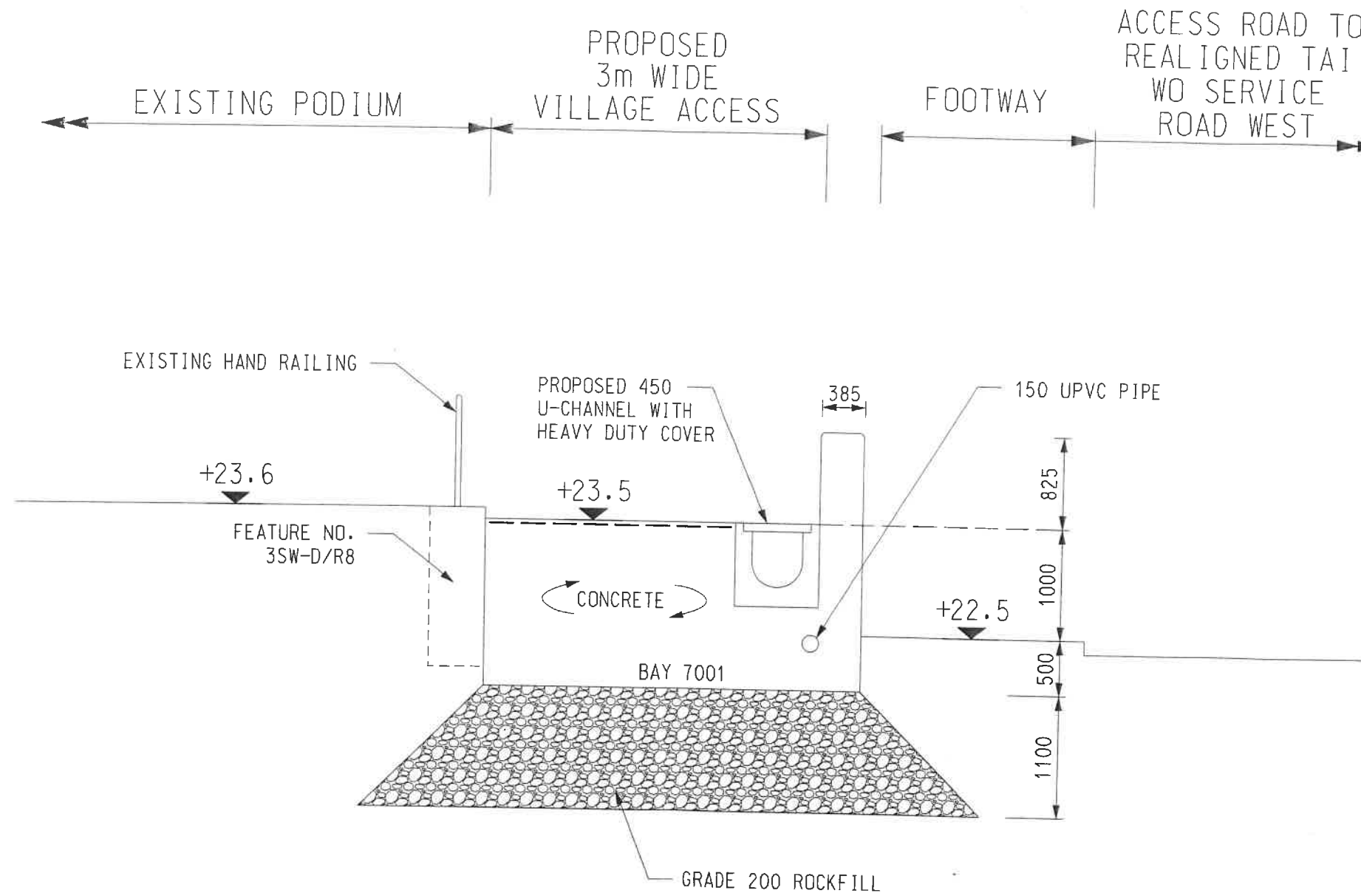
CONTRACT NO. CV/2012/09
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 3

LAYOUT PLAN OF
RETAINING WALLS FL/RW7 AND FL/RW8

SCALE	1:200 ON A3	DATE	14/10/2015
CHECKED	JW	DRAWN	JT
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0817
DOCUMENT REFERENCE NO.		REV	A

NOTES:

1. THIS SKETCH SHALL BE READ IN CONJUNCTION WITH SKETCH NOS. CV/2012/09/R10/120/0817 AND 0818.

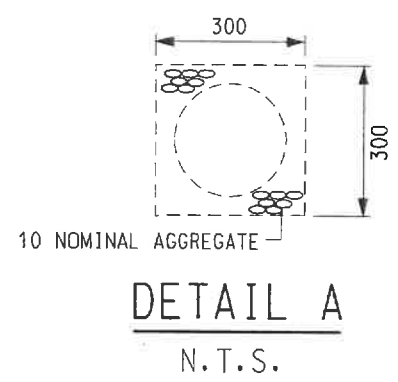
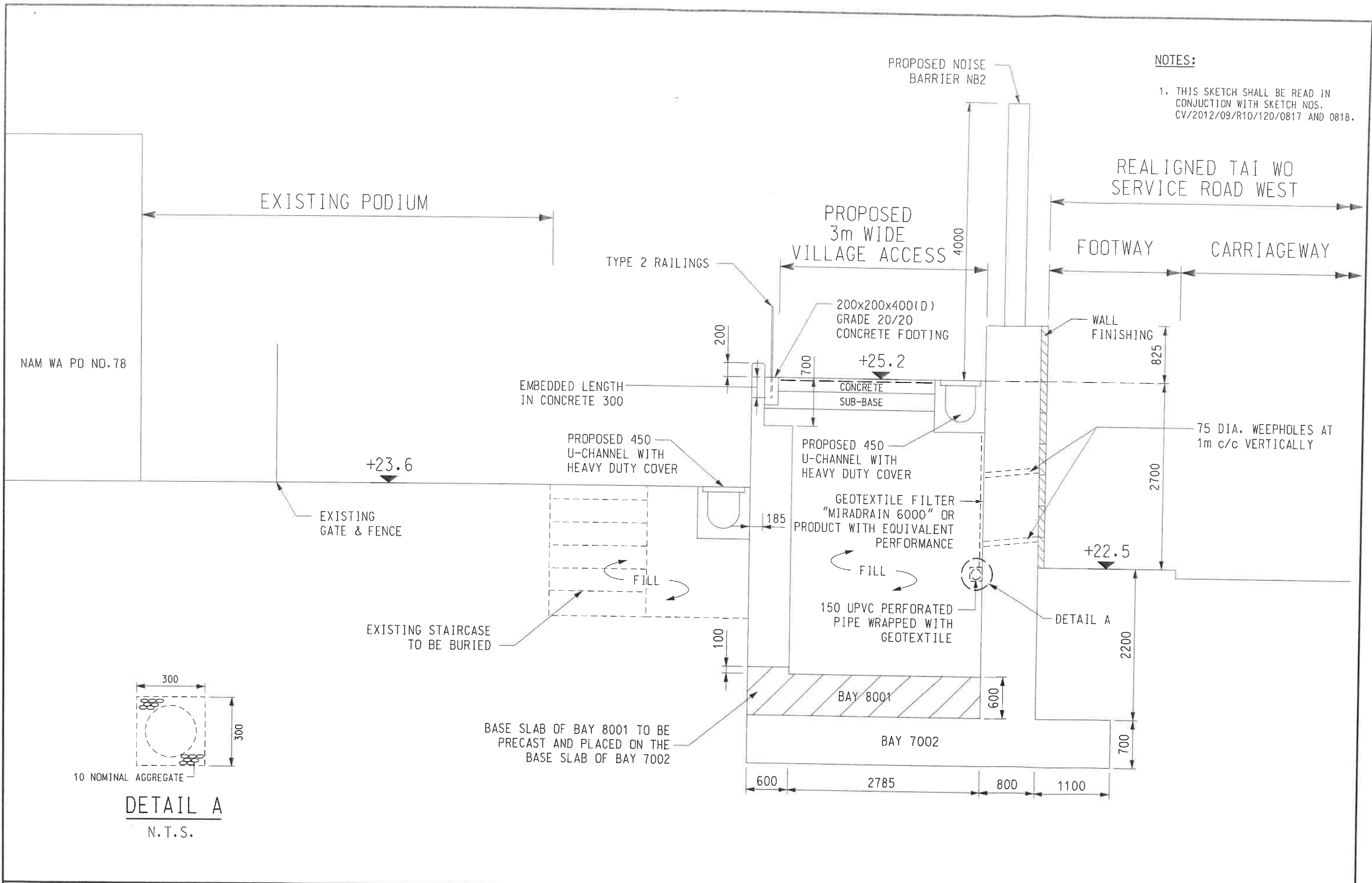


CONTRACT NO. CV/2012/09
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 3

RETAINING WALLS FL/RW7 & FL/RW8
SECTION A - A

SCALE	1:50 ON A3	DATE	24-JUL-15
CHECKED	JW	DRAWN	JT
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0819
DOCUMENT REFERENCE NO.		REV	-

NOTES:
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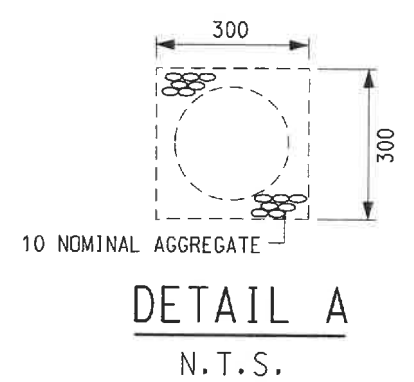
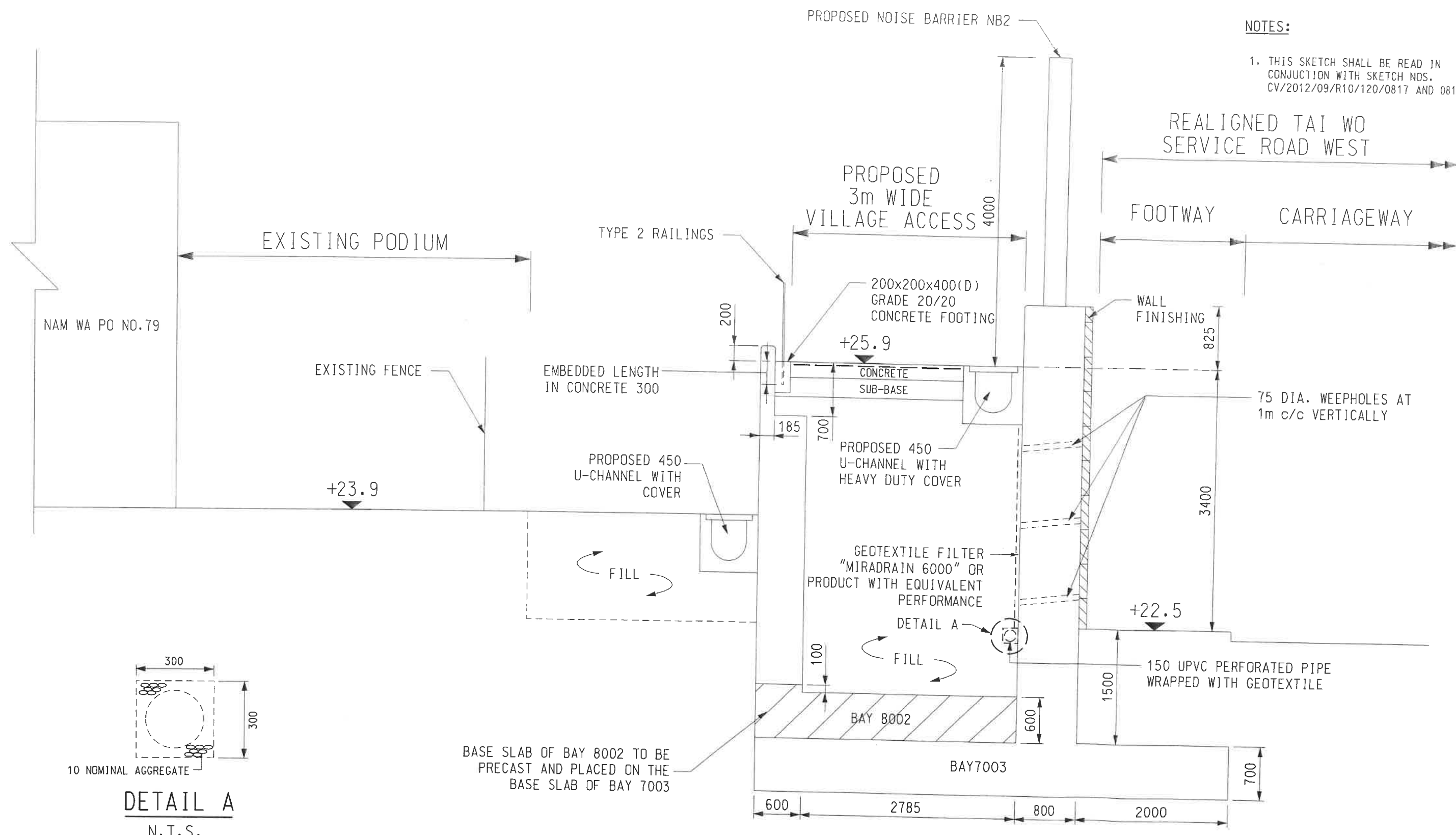


AECOM
 CONTRACT NO. CV/2012/09
 LIANTANG/HEUNG YUEN WAI
 BOUNDARY CONTROL POINT
 SITE FORMATION AND
 INFRASTRUCTURE WORKS
 - CONTRACT 3

RETAINING WALLS FL/RW7 & FL/RW8
 SECTION B - B

SCALE	1:50 ON A3	DATE	15-OCT-15
CHECKED	JW	DRAWN	CYK
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0820
DOCUMENT REFERENCE NO.		REV	A

NOTES:
 1. THIS SKETCH SHALL BE READ IN CONJUNCTION WITH SKETCH NOS. CV/2012/09/R10/120/0817 AND 0818.



BASE SLAB OF BAY 8002 TO BE PRECAST AND PLACED ON THE BASE SLAB OF BAY 7003



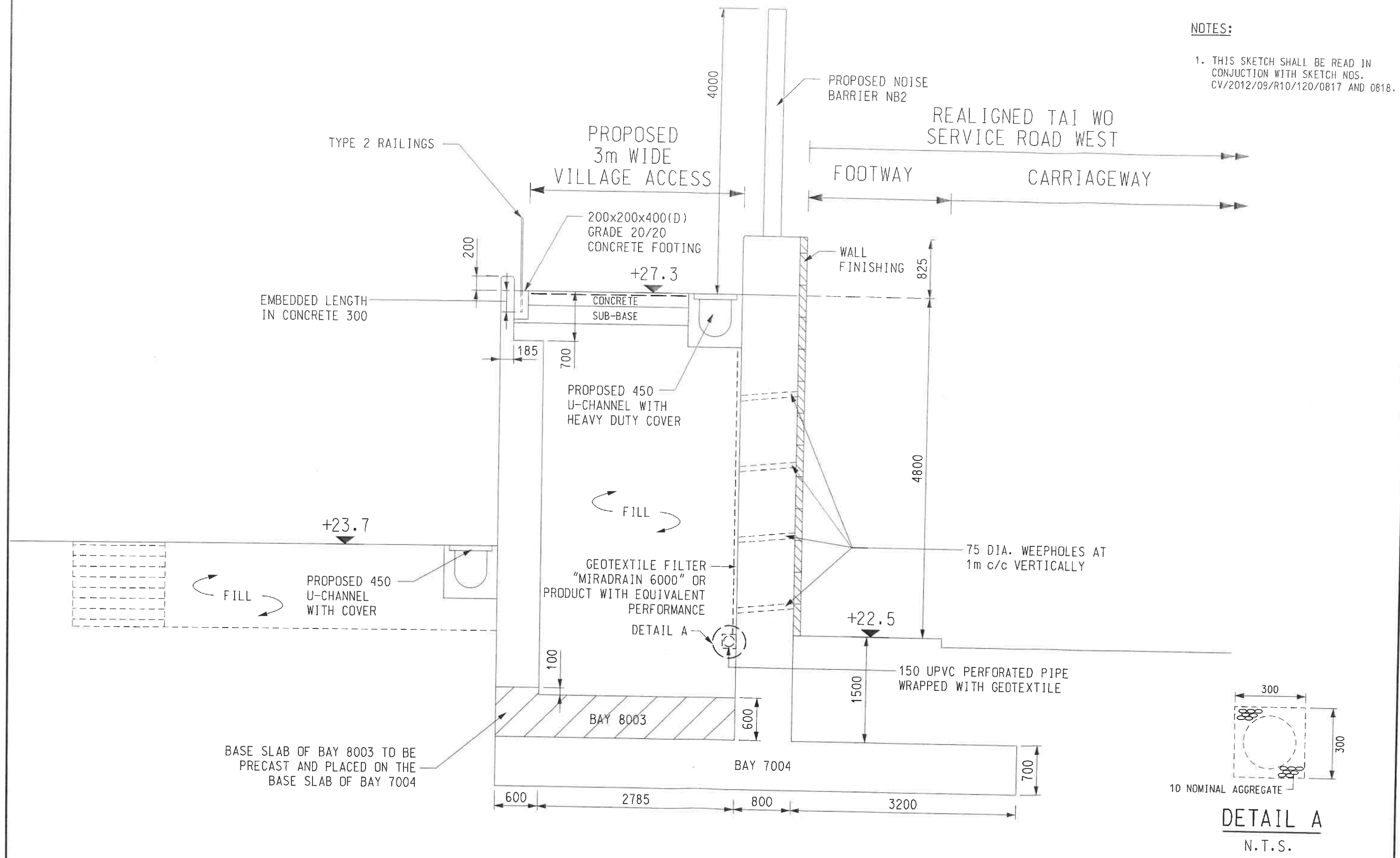
CONTRACT NO. CV/2012/09
 LIANTANG/HEUNG YUEN WAI
 BOUNDARY CONTROL POINT
 SITE FORMATION AND
 INFRASTRUCTURE WORKS
 - CONTRACT 3

RETAINING WALLS FL/RW7 & FL/RW8
 SECTION C - C

SCALE	1:50 ON A3	DATE	15-OCT-15
CHECKED	JW	DRAWN	CYK
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0821
DOCUMENT REFERENCE NO.		REV	A

NOTES:

1. THIS SKETCH SHALL BE READ IN CONJUNCTION WITH SKETCH NOS. CV/2012/09/R10/120/0817 AND 0818.



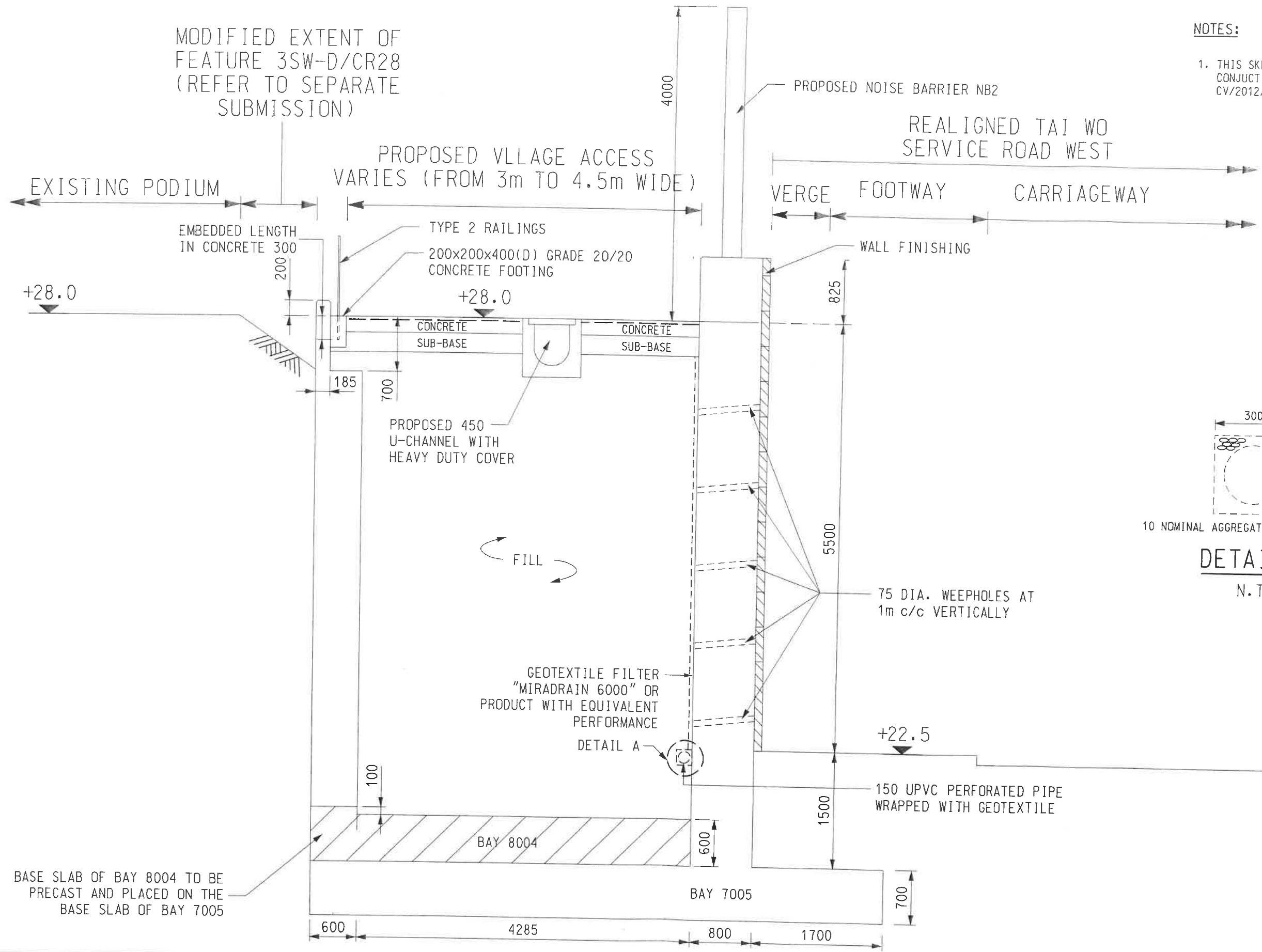
DETAIL A
N.T.S.



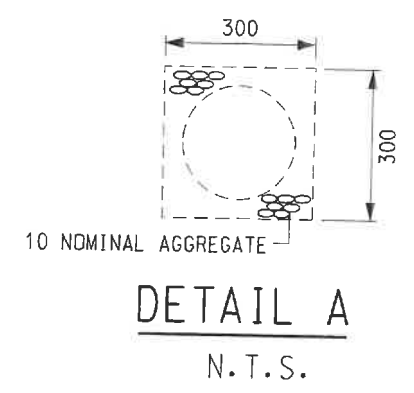
CONTRACT NO. CV/2012/09
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 3

**RETAINING WALLS FL/RW7 & FL/RW8
SECTION D - D**

SCALE	1:50 ON A3	DATE	15-OCT-15
CHECKED	JW	DRAWN	CYK
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0822
DOCUMENT REFERENCE NO.		REV	A



NOTES:
 1. THIS SKETCH SHALL BE READ IN CONJUNCTION WITH SKETCH NOS. CV/2012/09/R10/120/0817 AND 0818.



BASE SLAB OF BAY 8004 TO BE PRECAST AND PLACED ON THE BASE SLAB OF BAY 7005



CONTRACT NO. CV/2012/09
 LIANTANG/HEUNG YUEN WAI
 BOUNDARY CONTROL POINT
 SITE FORMATION AND
 INFRASTRUCTURE WORKS
 - CONTRACT 3

RETAINING WALLS FL/RW7 & FL/RW8
 SECTION E - E

SCALE	1:50 ON A3	DATE	15-OCT-15
CHECKED	JW	DRAWN	CYK
JOB NO.	60212563/C3	SKETCH NO.	CV/2012/09/R10/120/0823
DOCUMENT REFERENCE NO.		REV	A

Appendix D

***Environmental Review Report for Modification of Noise
Barriers between Nga Yiu Ha and Loi Tung
(Ref. C44-05-1)***

Agreement No. CE 38/2010 (CE)

Liantang/Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) – Design and Construction



CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Liantang/Heung Yuen Wai Boundary Control Point and associated works
(Site Formation and Infrastructures) –
Design and Construction

**Environmental Review for Modification of Noise Barriers
between Nga Yiu Ha and Loi Tung
(Ref. C44-05-1)**

December 2016

Reviewed:



Angela Tong

30 December 2016

Approved for Issue:



Francis Leong

30 December 2016

AECOM ASIA COMPANY LIMITED

This report is prepared for CEDD and is given for its sole benefit in relation to and pursuant to Agreement No. CE 38/2010(CE) and may not be disclosed to, quoted to or relied upon by any person other than CEDD without our prior written consent. No person (other than CEDD) into whose possession a copy of this report comes may rely on this report without our express written consent and CEDD may not rely on it for any purpose other than as described above.

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Drawing No.	Title
60212563/ER7/701 – 703	Proposed Changes of Noise Barriers

Appendices

Appendix 3.1	Excerpt of ERR for VEP Application No. VEP-466/2015
Appendix 3.2	Details of Mitigated Road Traffic Noise Levels

1 INTRODUCTION

1.1 Background

1.1.1 The Project comprises a new Boundary Control Point (BCP) also known as Boundary Crossing Point in the EIA Study Brief, proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works.

1.1.2 An Environmental Impact Assessment (EIA) study for the LT/HYW Project was conducted in accordance with EIA Study Brief No. ESB-199/2008 and was approved on 24 March 2011 under the *Environmental Impact Assessment Ordinance* (EIAO). Following the approval of the EIA Report (Register No.: AEIAR-161/2011), an Environmental Permit (EP) was granted on 24 March 2011 (EP No: EP-404/2011) for the construction and operation of the LT/HYW Project. Variations of Environmental Permit (VEP) were subsequently applied and the latest Environmental Permit (EP No: EP-404/2011/C) was issued by Director of Environmental Protection (DEP) on 12 Mar 2015.

1.1.3 AECOM Asia Co. Ltd. (AECOM) was commissioned by Civil Engineering and Development Department (CEDD) to provide design and construction services for the Liantang / Heung Yuen Wai Boundary Control Point and associated works (Site Formation and Infrastructures) under Agreement No. CE 38/2010(CE).

1.1.4 According to the site constraints and recent engineering design, the traffic noise mitigation proposal between Nga Yiu Ha and Loi Tung is required to be slightly updated.

1.2 Objective of this Environmental Review Report

1.2.1 AECOM is commissioned by CEDD to provide a supplementary review/assessment of potential environmental impacts at the sensitive receivers in the vicinity due to the proposed changes in traffic noise mitigation proposal.

1.2.2 This Environmental Review Report (ERR) has been prepared to assess the likely environmental issues pertinent to the proposed changes in traffic noise mitigation proposal and to confirm the compliance of relevant environmental standards.

1.2.3 This report will form part of the submission to the Environmental Protection Department (EPD) for the application of a Variation to Figures 4a – 4b, 5a – 5c and 6a – 6e, and Table 2 of the current EP (EP No.: EP-404/2011/C).

1.3 Report Structure

1.2.4 The remainder of the report is organized as follows:

- Section 2 presents the details of the proposed changes, justification for such changes and potential environmental impact associated with the proposed changes.
- Section 3 presents the evaluation of the identified potential environmental impacts due to the proposed changes, and proposes additional mitigation measures and environmental monitoring and audit (EM&A) requirements (if required) for compliance with the requirements in the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM).
- Section 4 presents the conclusion of this Environmental Review Report.

2 PROPOSED CHANGES

2.1 Proposed Changes

- 2.1.1 The extent, type and height of noise barriers along the project roads between Nga Yiu Ha and Loi Tung have been slightly modified to satisfy the latest engineering design and also the on-site conditions. The proposed changes in noise barriers are summarized as below and shown in **Drawing Nos. 60212563/ER7/701-703**.

Nga Yiu Ha

- Height of NB1-a at chainage P03 400 – N/A (Slip Road P03 – North Bound) will be changed from 2m vertical barrier to 2.5m vertical barrier, and its extent will be shortened by about 11m;
- Height of NB1-b at chainage N/A (Access Road to Ping Yeung) – P17 281 (Local Road – North Bound) will be changed from 2m vertical barrier to 2.5m vertical barrier, and its extent will be shortened by about 10m;

Ping Yeung

- Height of NB2 at chainage 9040 – 9085 (Main Road – North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier, and its extent will be shortened by about 4m.

Wo Keng Shan

- Height of NB3-a at chainage 8585 – 8500 (Main Road – North Bound) will be changed from 2m vertical barrier to 3m vertical barrier, and its extent will be slightly extended by about 3m;
- NB3-b at chainage 8500 – 8355 (Main Road – North Bound) will be extended by about 46m;
- NB4 at chainage CRP 8330 – 8550 (Connecting Road – South Bound) is split into 2 sections as NB4-a and NB4-b for suiting the site condition of at-grade and viaduct sections respectively. Noise barrier NB4-b will remain same as 2.5m vertical barrier above parapet, while noise barrier NB4-a will be changed to 3.5m vertical barrier;
- C6-NB5 at chainage 8180 – 8290 (Main Road – South Bound) will be shortened by about 27m;

Loi Tung

- C2-NB5 at chainage 6488 – 6855 (Main Road – South Bound) will be deleted;
- Height of NB6 at chainage 195 (Wo Keng Shan Rd) – 400 (Sha Tau Kok Rd – East Bound) will be changed from 1.5m vertical barrier to 2m vertical barrier; its alignment will be split into 2 sections to avoid clashing with underground utilities and also will be extended by about 13m in length;
- NB7 at chainage 360 (Sha Tau Kok Rd – West Bound) – 380 (Slip Rd – South Bound) will be split into 2 sections;
- NB8 at chainage P12 290 – N/A (Slip Road S1 – North Bound) will be extended by about 5m in length;
- NB9 at chainage N/A (Sha Tau Kok Road Interchange – North Bound) will be extended by about 4m to connect with NB8 and NB10 at both ends to form a continuous alignment;
- NB10 at chainage 40 (Sha Tau Kok Rd) – 400 (Slip Road – North Bound) will be shortened by about 36m in length;

- Height of NB11-a at chainage CRP 6807 – 6854 (Connecting Road - North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be extended by about 2m;
- NB11-b at chainage CRP6857 – 6917 (Connecting Road – North Bound) will be extended by about 2m;
- NB12 at chainage CRP 6807 – 6859 (Connecting Road - North Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be extended by about 2m; and
- NB13 at chainage 6800 – 6855 (Main Road – South Bound) will be changed from 0.8m vertical barrier to 2m vertical barrier; and its extent will be shortened by about 17m.

2.1.2 The proposed changes do not constitute designated project (DP) elements under the EIAO, and thus no additional DP elements is associated as a result of proposed changes.

2.2 Reasons for Proposed Changes

2.2.1 During the construction stage of LT/HYW, it is found that modifications to the extent, type and height of the committed noise barriers under LT/HYW are required with considerations of engineering and site constraints in order to minimize the impact to existing underground utilities, to fit in site condition, and to avoid conflicting with structures of project roads under LT/HYW. The required changes of noise barriers are described in **Section 2.1.1** above.

2.3 Construction Works and Programme

2.3.1 The proposed changes in the extent and form of noise barrier would not affect the construction method, works boundary and the construction programme of LT/HYW Project as presented in **Appendix 2.1** of the LT/HYW EIA Report remains valid and is also same as that under previous ERR submitted for VEP-466/2015, and thus the operation year of LT/HYW remains as 2018.

2.4 Concurrent Projects

2.4.1 There are no concurrent projects located in the vicinity of Nga Yiu Ha and Loi Tung. Therefore cumulative impact assessment from concurrent projects is not required. .

2.5 Potential Environmental Impacts Associated with the Proposed Changes

2.5.1 In respect to the nature and scope of the proposed changes as discussed in **Section 2.1**, potential environmental impacts due to the proposed changes have been identified and discussed in the following sections.

Noise

2.5.2 As the proposed changes are related to the change of configuration of noise barriers only, the powered mechanical equipment (PME) to be used for the construction of noise barriers remains unchanged. In addition, there is no change in the works boundary. As such, the construction noise impact assessment findings and proposed mitigation measures as presented in the LT/HYW ERR 2015 remains valid.

2.5.3 It is anticipated that the proposed changes of noise barriers under LT/HYW Project would affect the traffic noise impact assessment findings and thus road traffic noise assessment has been conducted to review any adverse impact arising from the changes.

Air Quality

2.5.4 Given that the construction activities and methodology remains unchanged, no adverse construction dust impact is expected from the proposed changes with the implementation of

dust suppression measures as recommended in LT/HYW ERR 2015.

- 2.5.5 As the proposed changes would not induce additional traffic forecast and the changes are localised and minor, it is expected that the proposed changes would not cause significant change of vehicular emission pollutants at the sensitive receivers. Therefore, the vehicular emission assessment findings in LT/HYW ERR 2015 remain valid.

Landscape and Visual

- 2.5.6 No additional landscape resources would be affected due to the proposed changes of noise barriers where all are located within the works boundary. Therefore, the landscape impact assessment findings in LT/HYW ERR 2015 remain valid.
- 2.5.7 Considering that the changes of noise barriers are localised and minor, there would be no significant change in the visual impact assessment findings with the implementation of recommended measures. Therefore, the visual impact assessment findings in LT/HYW ERR 2015 remain valid.

Other Environmental Aspects

- 2.5.8 With no changes in works boundaries of LT/HYW, it is expected that no additional impacts on ecology, fisheries and cultural heritage resources, as well as no land contamination issues arising from the proposed changes of noise barriers, and therefore these assessment findings in LT/HYW ERR 2015 remain valid. Also, with construction methods and works boundary remains unchanged, there would be no addition water quality and waste management issues arising from the proposed changes of noise barriers. In addition, the proposed changes of noise barriers would not affect the findings of sewerage and sewerage treatment impact, therefore the findings of sewerage and sewerage treatment impact remains valid.
- 2.5.9 Based on the above review findings, the potential impacts associated with the proposed changes are summarised in **Table 2.1**. The potential traffic noise impact during operation phase will be the major concern and has been reviewed and assessed in this ERR.

Table 2.1 Potential Impacts associated with the Proposed Changes

Potential Impact	Construction Phase	Operational Phase
Air Quality	x	x
Airborne Noise	x	√
Ground-borne Noise	x	x
Water Quality	x	x
Sewerage and Sewage Treatment Impact	x	x
Waste Management Implications	x	x
Land Contamination	x	x
Ecology	x	x
Fisheries	x	x
Landscape, Visual and Glare	x	x
Cultural Heritage	x	x

Note:
 √ – Possible impact; X – Impact not expected.

3 TRAFFIC NOISE IMPACT ASSESSMENT

3.1 Introduction

3.1.1 As described in **Section 2.5.9**, the potential impact arising from the proposed changes of noise barriers would be the traffic noise from roads within 300m study area of the updated noise barriers. The potential traffic noise impact during the operation phase has been evaluated in the following sections.

3.2 Representative Noise Sensitive Receivers

3.2.1 With reference to the LT/HYW ERR 2015, the representative NSRs located within 300m study boundary of the proposed changes have been identified for assessment and presented in **Table 3.1** and **Drawing Nos. 60212563/ER7/701-703**.

Table 3.1 Details of Representative Noise Sensitive Receivers

NSR ID	EIA NSR ID	Descriptions	Land Use	Status	No. of Floor	Lowest Sensitive Floor
<i>Nga Yiu Ha to North Tunnel</i>						
NYH1	NYH1	Village House, Nga Yiu Ha	Residential	Existing	2	G/F
NYH2	NYH2	House No. 4, Nga Yiu Ha	Residential	Existing	2	G/F
PY1	PY1	Village House, Ping Yeung (facade facing northwest)	Residential	Existing	2	G/F
PY2	PY2	Village House, Ping Yeung (facade facing northeast)	Residential	Existing	2	G/F
PY3	PY3	House No. 303, Ping Yeung	Residential	Existing	3	G/F
PY4	PY4	Village House, Ping Yeung	Residential	Existing	1	G/F
PY5	PY5	Village House, Ping Yeung	Residential	Existing	1	G/F
PY6	PY6	Village House, Ping Yeung	Residential	Existing	1	G/F
PY7	PY7	Village House, Ping Yeung	Residential	Existing	3	G/F
PY8	-	Village House, Ping Yeung	Residential	Existing	2	G/F
WKS1	WKS1	Village House, Wo Keng Shan	Residential	Existing	1	G/F
WKS2	WKS2	Village House, Wo Keng Shan	Residential	Existing	3	G/F
WKS3	WKS3	Village House No.1, Wo Keng Shan Village	Residential	Existing	3	G/F
WKS4	WKS4	Village House, Wo Keng Shan	Residential	Existing	1	G/F
WKS5	WKS5	Village House, Wo Keng Shan	Residential	Existing	1	G/F
WKS6	WKS6	Village House, Wo Keng Shan	Residential	Existing	1	G/F
WKS7	WKS7	Village House, Wo Keng Shan	Residential	Existing	1	G/F
WKS8	WKS8	Planned Village	Residential	Planned	3	G/F

NSR ID	EIA NSR ID	Descriptions	Land Use	Status	No. of Floor	Lowest Sensitive Floor
		House, Wo Keng Shan				
WKS9	-	Village House, Wo Keng Shan	Residential	Existing	2	G/F
PY-B1	-	Proposed Resite Development	Residential	Planned	3	G/F
PY-B2	-	Proposed Resite Development	Residential	Planned	3	G/F
Sha Tau Kok Road Section						
ST1	ST1	Village House, Shan Tong	Residential	Existing	2	G/F
ST2	ST2	Village House, Shan Tong	Residential	Existing	2	G/F
ST3	ST3	Village House, Shan Tong	Residential	Existing	2	G/F
ST5	ST5	Village House, Shan Tong	Residential	Existing	2	G/F
ST6	ST6	Village House, Shan Tong	Residential	Existing	2	G/F
ST8	-	Village House, Shan Tong	Residential	Existing	2	G/F
TTW1	TTW1	House No. 115, Tai Tong Wu Village	Residential	Existing	3	G/F
TTW2	TTW2	Tai Tong Wu Village House 2	Residential	Existing	1	G/F
LT1	LT1	Village House, Loi Tung	Residential	Existing	2	G/F
LT2	LT2	Village House, Loi Tung	Residential	Existing	3	G/F
LT3	LT3	Village House, Loi Tung	Residential	Existing	2	G/F
LT4	LT4	Village House, Loi Tung	Residential	Existing	3	G/F
LT5	-	Village House, Loi Tung	Residential	Existing	2	G/F
LT6	-	Village House, Loi Tung	Residential	Existing	2	G/F

3.3 Potential Sources of Impact

3.3.1 During the operational phase, operation of the LT/HYW Project may pose traffic noise impact on the nearby NSRs.

3.4 Traffic Noise Impact Assessment

3.4.1 Same assessment methodology for road traffic noise assessments as presented in **Section 4.5.1.2** of the LT/HYW EIA Report have been adopted in this traffic noise impact assessment. The traffic noise levels ($L_{10(1 \text{ hour})}$) at the representative NSRs have been predicted using the computer model "RoadNoise", which employs the calculation method as prescribed in the "Calculation of Road Traffic Noise" developed by Department of Transport, Welsh Office, in 1988.

3.4.2 As discussed in **Section 4.2.3** of LT/HYW ERR 2015, the year with maximum traffic flow within a 15-year period upon commencement of operation of the Project (i.e. 2018) is determined to be 2033 (same as that stated in the EIA Report). The traffic forecast as adopted

in ERR remains valid and has been adopted in the this noise assessment. The traffic forecast for the Year 2033 is presented in **Appendix 3.1**.

3.4.3 The noise barriers with proposed changes as detailed in **Section 2.1** are shown in **Table 3.2** and **Drawing Nos. 60212563/ER7/701-703**.

Table 3.2 Proposed Modified Noise Barriers

Barrier ID	Chainage shown in EP-404/2011/C	Updated chainage	Type of Noise Mitigation Measures	Height, m	Approx. Length, m	Drawing No.
Nga Yiu Ha						
NB1-a	P03 400 - N/A (Slip Road P03 – North Bound)	P03 410 (Slip Road P03 – North Bound) - P19 219	Vertical Barrier	2.5m (Changed from 2m)	62m (shortened of approx. 11m)	60212563/ER7/701
NB1-b	N/A (Access Road to Ping Yeung) – P17 281 (Local Road – North Bound)	P17 290 - 299 (Local Road – North Bound)	Vertical Barrier	2.5m (Changed from 2m)	10m (shortened of approx. 10m)	60212563/ER7/701
Ping Yeung						
NB2	9040 – 9085 (Main Road – North Bound)	CRP 9008 – 9090 (Main Road – North Bound)	Vertical Barrier	2m (Changed from 0.8m)	81m (shortened of approx. 4m)	60212563/ER7/701
Wo Keng Shan						
NB3-a	8585 – 8500 (Main Road – North Bound)	CRP 8507 – 8595 (Main Road – North Bound)	Vertical Barrier	3m (Changed from 2m)	88m (extended of approx. 3m)	60212563/ER7/702
NB3-b	8500 – 8355 (Main Road – North Bound)	CRP 8316 – 8507 (Main Road – North Bound)	Vertical Barrier	2m above parapet	191m (extended of approx. 46m)	60212563/ER7/702
NB4-a	CRP 8330 – 8550 (Connecting Road – South Bound)	CRP 8506 – 8548 (Main Road – South Bound)	Vertical Barrier	3.5m (Changed from 2.5m above parapet)	224m (NB4-a: 42m; NB4-b: 182m)	60212563/ER7/702
NB4-b		CRP 8322 – 8506 (Main Road – South Bound)	Vertical Barrier	2.5m above parapet	(total extended of approx. 10m)	60212563/ER7/702
C6-NB5	8180 – 8290 (Main Road – South Bound)	CRP 8218 – 8302 (Main Road – South Bound)	Vertical Barrier	1m above parapet	83m (shortened of approx. 27m)	60212563/ER7/702
Loi Tung						
C2-NB5	6488 – 6855 (Main Road – South Bound)	- (To be deleted)	- (To be deleted)	- (To be deleted)	- (To be deleted)	60212563/ER7/703
NB6	195 (Wo Keng Shan Rd) – 400 (Sha Tau Kok Rd – East Bound)	P16 327 (Sha Tau Kok Interchange East Bound) – L16 200 (Sha Tau Kok Rd –	Vertical Barrier	2m (Changed from 1.5m)	195m (splited into 2 sections and extended	60212563/ER7/703

Barrier ID	Chainage shown in EP-404/2011/C	Updated chainage	Type of Noise Mitigation Measures	Height, m	Approx. Length, m	Drawing No.
		East Bound)			of approx. 13m)	
NB7	360 (Sha Tau Kok Rd – West Bound) – 380 (Slip Road – South Bound)	P13 250 (Slip Road S2) –L16 169 (Sha Tau Kok Rd – West Bound)	Vertical Barrier	2m	108m (splited into 2 sections)	60212563/ER7/703
NB8	P12 290 – N/A (Slip Road S1 – North Bound)	P16 138 – 183 (Sha Tau Kok Interchange WestBound)	Vertical Barrier	6m	70m (extended of approx. 5m)	60212563/ER7/703
NB9	N/A (Sha Tau Kok Road Interchange – North Bound)	P16 505-512 & 100-138 (Sha Tau Kok Interchange West Bound)	Vertical Barrier	5m	48m (extended of approx. 4m)	60212563/ER7/703
NB10	40 (Sha Tau Kok Rd) – 400 (Slip Road – North Bound)	L17 120 (Sha Tau Kok Rd – West Bound) - P16 505 (Sha Tau Kok Interchange West Bound)	Vertical Barrier	5m	84m (shortened of approx. 36m)	60212563/ER7/703
NB11-a	CRP 6807 – 6854 (Connecting Road – North Bound)	CRP 6794 - 6846 (Main Road – North Bound)	Vertical Barrier	2m (Changed from 0.8m)	52m (extended of approx. 2m)	60212563/ER7/703
NB11-b	CRP 6857– 6917 (Connecting Road – North Bound)	CRP 6848 – 6905 (Main Road – North Bound)	Vertical Barrier	2m	57m (extended of approx. 2m)	60212563/ER7/703
NB12	CRP 6807 – 6859 (Connecting Road - North Bound)	CRP 6792 – 6846 (Main Road, central divider)	Vertical Barrier	2m (Changed from 0.8m)	54m (extended of approx. 2m)	60212563/ER7/703
NB13	6800 – 6855 (Main Road – South Bound)	CRP 6846 - 6808 (Main Road – South Bound)	Vertical Barrier	2m (Changed from 0.8m)	38m (shortened of approx. 17m)	60212563/ER7/703

Note:

* The parapet wall is 0.8m high above road surface.

3.4.4 The predicted mitigated traffic noise levels in Year 2033 are presented in **Table 3.3** with detailed breakdowns of road traffic noise shown in **Appendix 3.2**.

Table 3.3 Mitigated Road Traffic Noise Impact in Year 2033

NSR ID	Descriptions	Floor Level	Noise Criteria L ₁₀ (1hr) dB(A)	Overall Mitigated Noise Level L ₁₀ (1hr) dB(A)
NYH1	Village House, Nga Yiu Ha	G/F	70	66.6
		1/F		67.5
NYH2	House No. 4, Nga Yiu Ha	G/F	70	65.7

NSR ID	Descriptions	Floor Level	Noise Criteria L ₁₀ (1hr) dB(A)	Overall Mitigated Noise Level L ₁₀ (1hr) dB(A)
		1/F		66.1
PY1	Village House, Ping Yeung (facade facing northwest)	G/F	70	69.2
		1/F		70.4
PY2	Village House, Ping Yeung (facade facing northeast)	G/F	70	67.3
		1/F		70.3
PY3	House No. 303, Ping Yeung	G/F	70	67.8
		1/F		68.1
		2/F		68.4
PY4	Village House, Ping Yeung	G/F	70	68.6
PY5	Village House, Ping Yeung	G/F	70	68.4
PY6	Village House, Ping Yeung	G/F	70	69.3
PY7	Village House, Ping Yeung	G/F	70	66.5
		1/F		66.8
		2/F		67.2
PY8	Village House, Ping Yeung	G/F	70	68.8
		1/F		69.6
WKS1	Village House, Wo Keng Shan	G/F	70	68.0
WKS2	Village House, Wo Keng Shan	G/F	70	64.5
		1/F	70	65.0
		2/F	70	65.7
WKS3	Village House No.1, Wo Keng Shan Village	G/F	70	63.9
		1/F	70	64.1
		2/F	70	64.4
WKS4	Village House, Wo Keng Shan	G/F	70	69.0
WKS5	Village House, Wo Keng Shan	G/F	70	66.9
WKS6	Village House, Wo Keng Shan	G/F	70	68.8
WKS7	Village House, Wo Keng Shan	G/F	70	70.2
WKS8	Planned Village House, Wo Keng Shan	G/F	70	66.6
		1/F		67.1
		2/F		67.7
WKS9	Village House, Wo Keng Shan	G/F	70	66.4
		1/F		69.0
PY-B1	Proposed Resite Development	G/F	70	64.8
		1/F		67.2
		2/F		70.4
PY-B2	Proposed Resite Development	G/F	70	64.5
		1/F		66.9
		2/F		70.3
ST1	Village House, Shan Tong	G/F	70	64.7
		1/F		67.7
ST2	Village House, Shan Tong	G/F	70	68.6
		1/F		70.2
ST3	Village House, Shan Tong	G/F	70	68.4
		1/F		68.8
ST5	Village House, Shan Tong	G/F	70	67.0
		1/F		68.8
ST6	Village House, Shan Tong	G/F	70	66.8
		1/F		67.4
ST8	Village House, Shan Tong	G/F	70	70.1
		1/F		70.4
TTW1	House No. 115,	G/F	70	67.9

NSR ID	Descriptions	Floor Level	Noise Criteria L ₁₀ (1hr) dB(A)	Overall Mitigated Noise Level L ₁₀ (1hr) dB(A)
	Tai Tong Wu Village	1/F		68.0
		2/F		68.1
TTW2	Tai Tong Wu Village House 2	G/F	70	69.7
LT1	Village House, Loi Tung	G/F	70	67.8
		1/F		69.0
LT2	Village House, Loi Tung	G/F	70	68.8
		1/F		68.9
		2/F		69.1
LT3^	Village House, Loi Tung	G/F	70	69.3
		1/F		70.1
LT4	Village House, Loi Tung	G/F	70	66.1
		1/F		66.4
		2/F		66.9
LT5	Village House, Loi Tung	G/F	70	67.1
		1/F		70.4
LT6	Village House, Loi Tung	G/F	70	67.6
		1/F		69.4

Note:

^ The assessment level of G/F is updated from +25.6mPD to +23.1mPD according to recent site visit.

- 3.4.5 Based on the assessment results, the predicted road traffic noise levels at all NSRs comply with the stipulated noise limit of 70dB(A) during the operation of LT/HYW Project. It is therefore concluded that there would be no adverse impact arising from LT/HYW Project due to the proposed changes of noise barriers, and no material changes is expected due to the proposed changes.

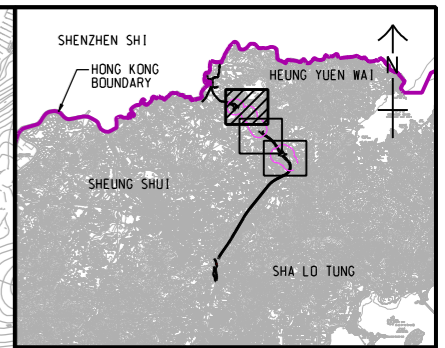
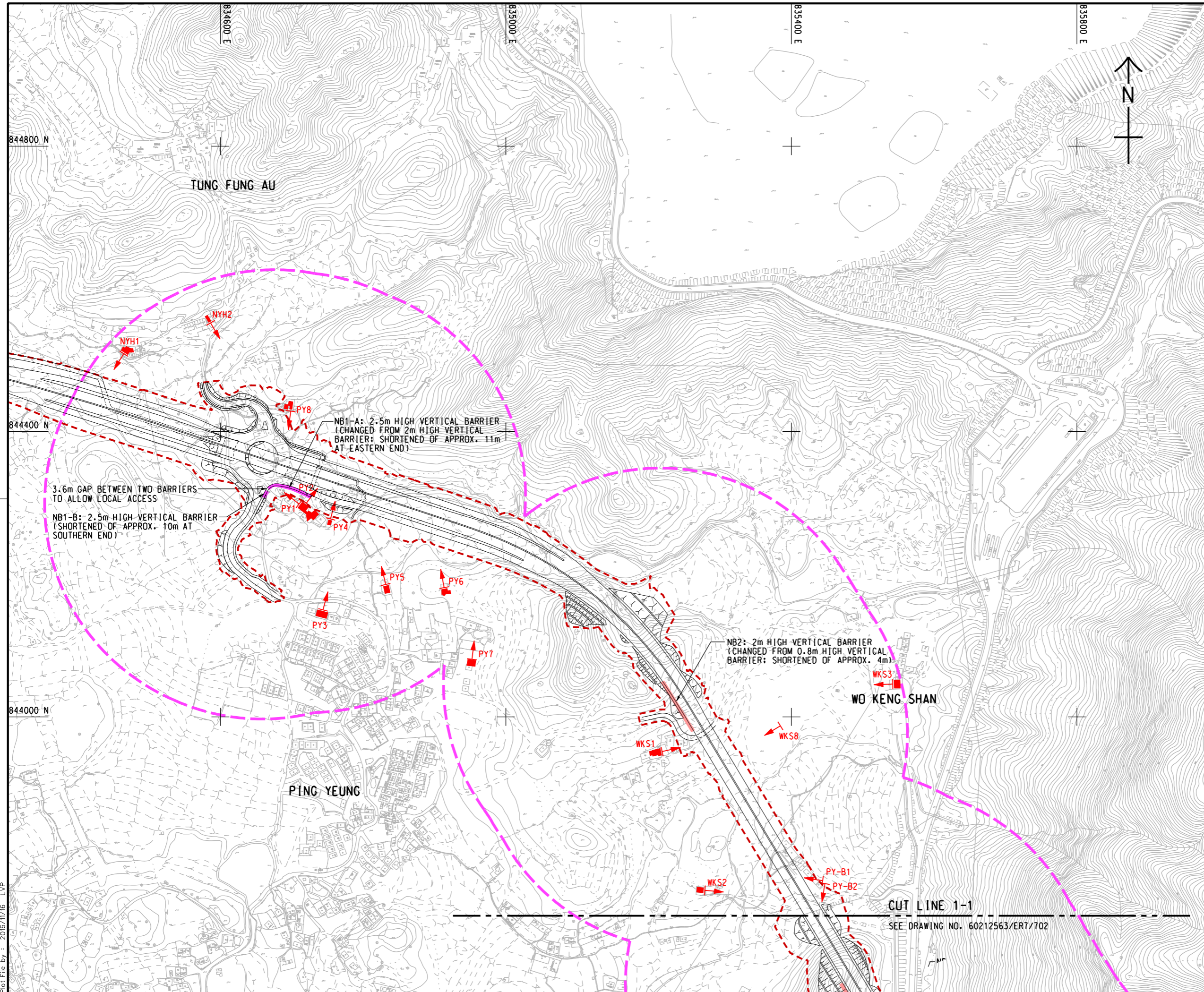
3.5 Environmental Monitoring and Audit Requirement

- 3.5.1 With the implementation of proposed noise barriers, no adverse operational noise impact is anticipated, and thus no additional EM&A requirements for the proposed change are required for LT/HYW Project.

4 CONCLUSION

- 4.1.1 An environmental review/assessment has been conducted for the proposed changes of operational noise mitigation proposal for LT/HYW Project between Nga Yiu Ha and Loi Tung. The likely environmental issues pertinent to the proposed changes have been assessed.
- 4.1.2 It is concluded that the proposed changes would not result in material change leading to adverse residual environmental impacts with the implementation of the recommended mitigation measures, and thus no additional environmental monitoring and audit requirements are required.

Drawings



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - 2m HIGH NOISE BARRIER
 - 2.5m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHK.	DATE

土木工程拓展署
CEDD Civil Engineering and Development Department

LIAOTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS
SHEET 1 OF 3

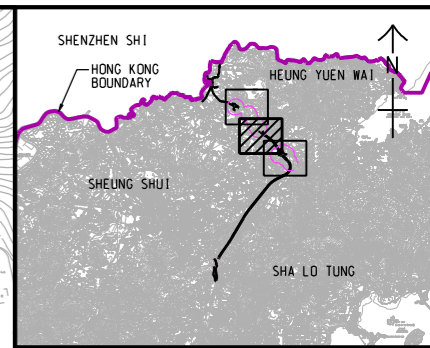
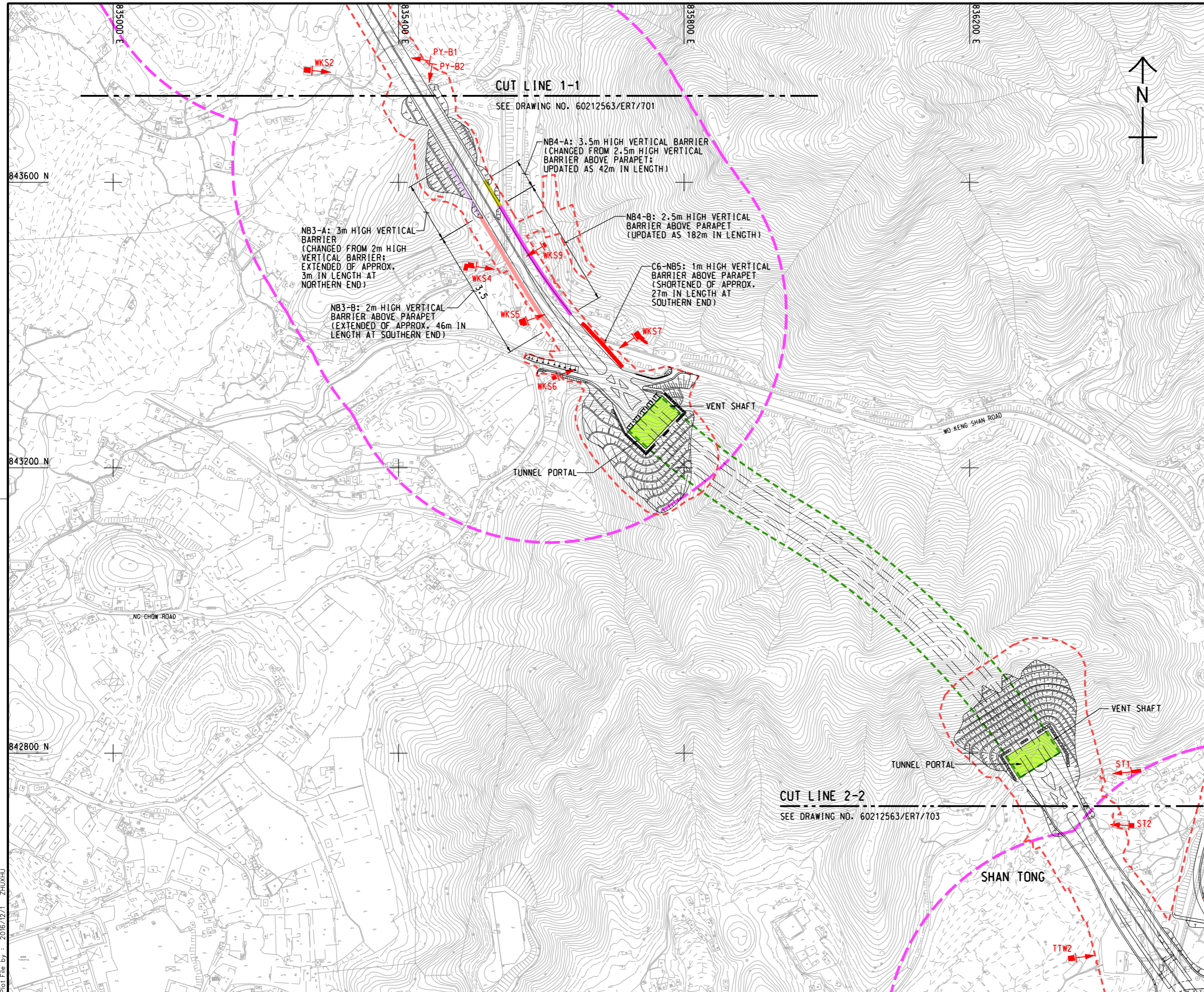


DRG. NO. 60212563/ER7/701
圖紙編號

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TENTATIVE WORKS AREA
 - TUNNEL SECTION
 - PROPOSED TUNNEL VENTILATION BUILDING
 - 1m HIGH NOISE BARRIER
 - 2m HIGH NOISE BARRIER
 - 2.5m HIGH NOISE BARRIER
 - 3m HIGH NOISE BARRIER
 - 3.5m HIGH NOISE BARRIER
 - NOISE SENSITIVE RECEIVERS
 - ▶ FACADE FACING

- REMARKS:**
1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
 2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DATE	BY	CHKD.	DATE

土木工程拓展署
CEDD
Civil Engineering and Development Department

Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructures) - Design and Construction

PROPOSED CHANGES OF NOISE BARRIERS
SHEET 2 OF 3

AECOM

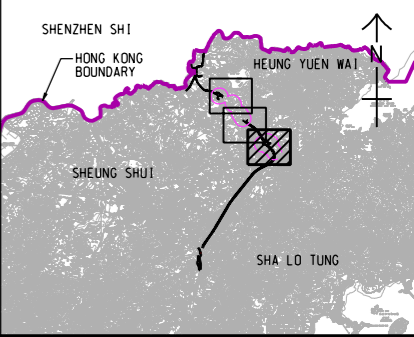
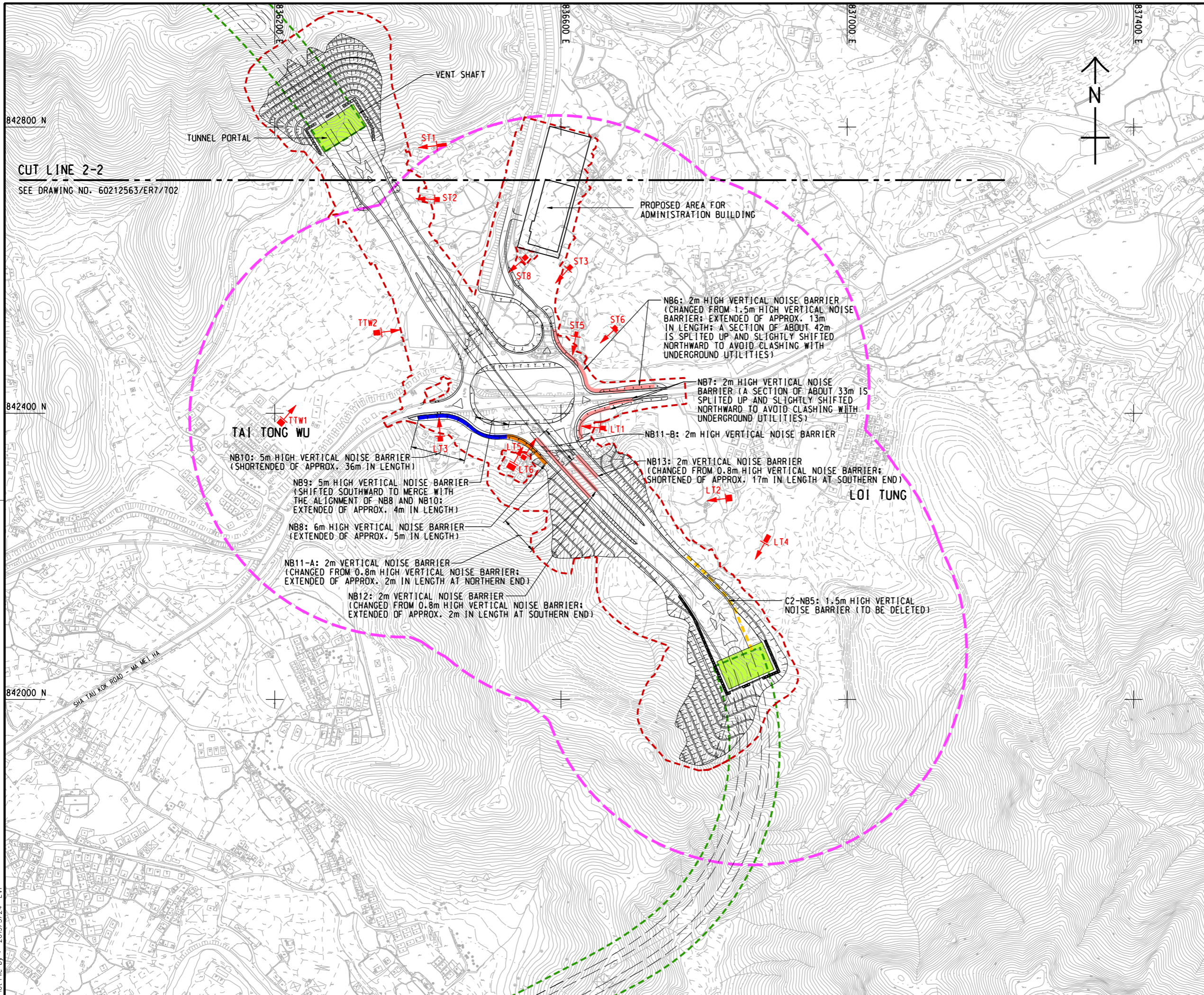
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KEY PLAN
SCALE 1 : 150000

LEGEND:

- 300m ASSESSMENT AREA
- TENTATIVE WORKS AREA
- TUNNEL SECTION
- PROPOSED TUNNEL VENTILATION BUILDING
- 1.5m HIGH NOISE BARRIER (TO BE DELETED)
- 2m HIGH NOISE BARRIER
- 5m HIGH NOISE BARRIER
- 6m HIGH NOISE BARRIER
- NOISE SENSITIVE RECEIVERS
- ▶ FACADE FACING

REMARKS:

1. THE SPECIFIED BARRIER HEIGHT IS FROM FINISHED ROAD SURFACE LEVEL UNLESS SPECIFIED OTHERWISE.
2. THE HEIGHT OF THE PARAPET IS 0.8m FROM FINISHED ROAD SURFACE.

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

土木工程拓展署
CEDD Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROPOSED CHANGES OF NOISE BARRIERS

SHEET 3 OF 3

AECOM

DRG. NO. 60212563/ER7/703
圖紙編號

DESIGNED BY HC	CONTRACT NO. HT	P. Dir. APPROVED XX
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Appendices

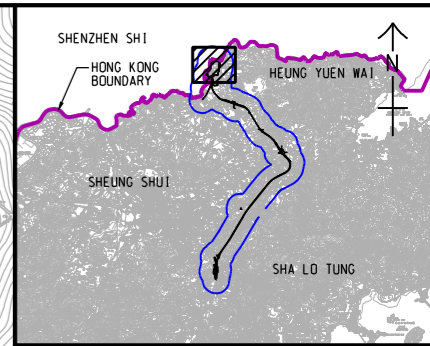
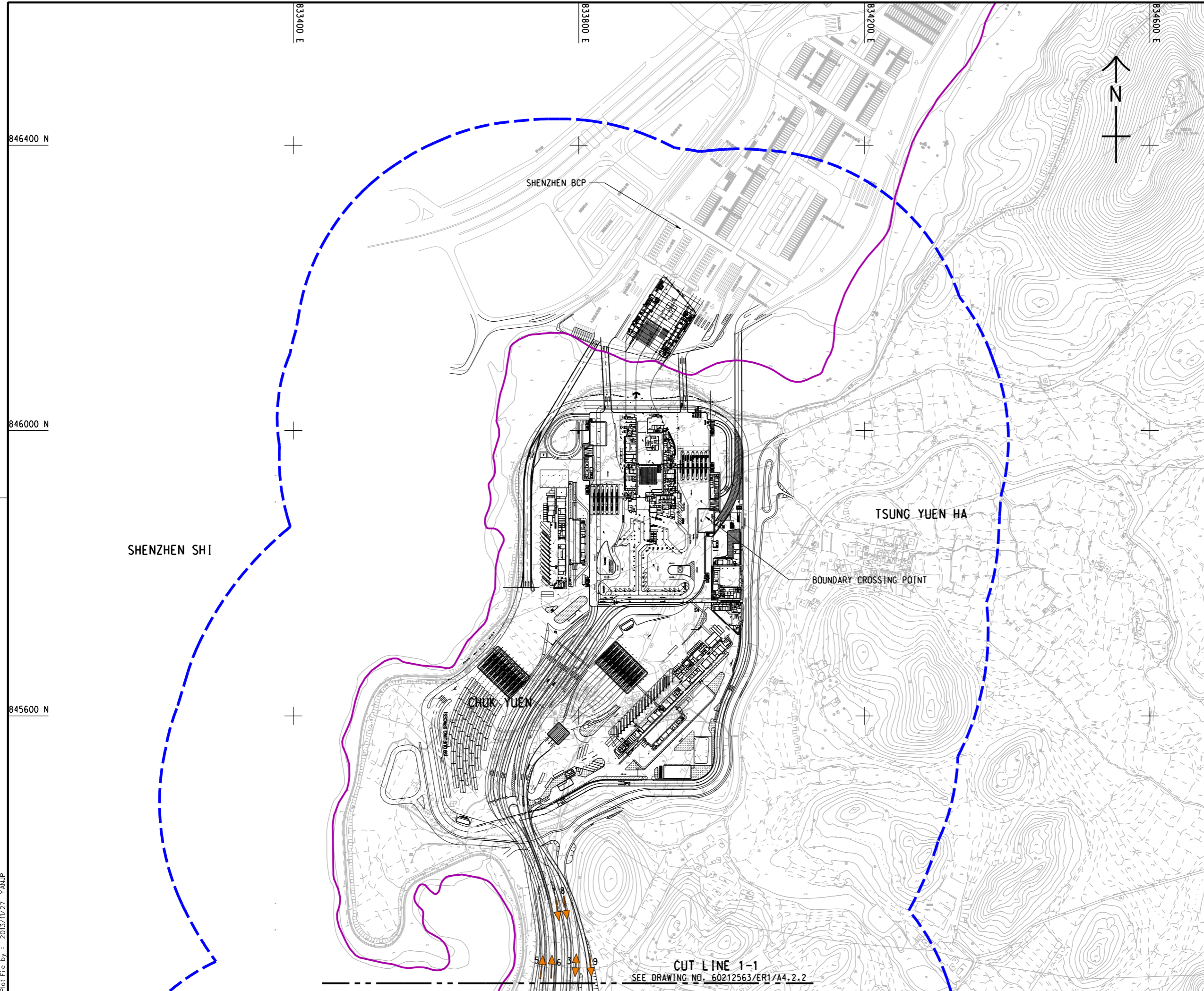
Appendix 3.1

Excerpt of ERR for VEP Application No. VEP-466/2015

2033 AM Peak Hour Traffic Flow (veh/hr) (With Project)

Road No.	Road Name	DIR	Total	HV%
1	Proposed Connecting Road (A)	NB	55	56.4
2	Proposed Connecting Road (B)	2-way	172	26.7
3	Proposed Connecting Road (C)	2-way	137	26.3
4	Proposed Connecting Road (D)	2-way	34	29.4
5	Proposed Connecting Road (E)	NB	150	26.7
6	Proposed Connecting Road (E)	NB	735	76.7
7	Proposed Connecting Road (F)	SB	756	87.0
8	Proposed Connecting Road (F)	SB	22	68.2
9	Proposed Connecting Road (G)	SB	53	54.7
10	Proposed Connecting Road – slip road (H)	SB	730	86.0
11	Proposed Connecting Road – slip road (H)	SB	48	93.8
12	Proposed Connecting Road – slip road (I)	NB	85	82.4
13	Proposed Connecting Road – slip road (I)	NB	800	66.8
14	Proposed Connecting Road – slip road (J)	NB	37	32.4
15	Proposed Connecting Road – slip road (J)	SB	32	46.9
16	Proposed Connecting Road – slip road (K)	NB	353	58.3
17	Proposed Connecting Road – slip road (K)	SB	414	55.9
18	Proposed Connecting Road – slip road (L)	NB	416	53.0
19	Proposed Connecting Road – slip road (L)	SB	313	53.9
20	Proposed Connecting Road (M)	NB	1216	62.0
21	Proposed Connecting Road (M)	SB	1043	76.4
22	Proposed Connecting Road – slip road (N)	NB	137	31.4
23	Proposed Connecting Road – slip road (N)	SB	120	43.3
26	Proposed Connecting Road (P)	NB	1081	65.7
27	Proposed Connecting Road (P)	SB	924	80.6
28	Sha Tau Kok Road – Wo Hang (A)	WB	531	50.5
29	Sha Tau Kok Road – Wo Hang (A)	EB	577	56.8
30	Sha Tau Kok Road – Wo Hang (B)	WB	639	42.6
31	Sha Tau Kok Road – Wo Hang (B)	EB	609	43.5
32	Proposed Connecting Road – slip road (Q)	NB	537	36.4
33	Proposed Connecting Road – slip road (Q)	SB	525	44.2
34	Fanling Highway (A)	NB	5541	28.5
35	Fanling Highway (A)	SB	5395	27.9
37	Widening Fanling Highways (A)	SB	200	47.0
38	Widening Fanling Highways (B)	NB	51	49.0
39	Widening Fanling Highways (B)	SB	51	49.0
40	Widening Fanling Highways (C)	NB	14	50.0
41	Widening Fanling Highways (C)	SB	191	48.2
42	Widening Fanling Highways - Slip Road (D)	SB	51	49.1
43	Proposed Connecting Road (R)	SB	845	67.9
44	Proposed Connecting Road (S)	NB	577	53.2
45	Proposed Connecting Road (T)	SB	604	66.7
47	Widening Fanling Highways - Slip Road (E)	2-way	767	32.9
48	Widening Fanling Highways - Slip Road (E)	NB	1042	57.6
51	Border Road	2-way	51	49.0
52	Lin Ma Hang Road (B)	2-way	181	29.3
52c	Lin Ma Hang Road (C)	2-way	230	35.0
52d	Ping Che Road (D)	2-way	85	50.0
53	Wo Keng Shan Road (A)	NB	61	55.7
54	Wo Keng Shan Road (A)	SB	84	53.6
55	Ng Chow Road (A)	SB	51	49.0
56	Ng Chow Road (A)	NB	51	49.0
57	Ng Chow Road (B)	SB	51	49.0
58	Ng Chow Road (B)	NB	51	49.0
59	Wo Keng Shan Road (B)	NB	61	55.7
60	Wo Keng Shan Road (B)	SB	68	32.4
61	Wo Keng Shan Road (C)	NB	61	55.7
62	Wo Keng Shan Road (C)	SB	68	32.4
63	Sha Tau Kok Road – Wo Hang (C)	WB	504	51.5
64	Sha Tau Kok Road – Wo Hang (C)	EB	549	56.9
67	Tai Wo Service Road West (B)	NB	443	20.8
68	Tai Wo Service Road West (B)	SB	189	45.0
69	Kiu Tau Road	WB	25	44.0
70	Kiu Tau Road	EB	117	64.1

71	Tai Wo Service Road East	NB	14	50.0
72	Tai Wo Service Road East	SB	191	48.2
73	Fanling Highways	NB	5980	29.7
74	Fanling Highways	SB	6291	33.5
75	Loi Tung Roundabout	1-way	844	45.1
76	Fanling Widening Roundabout 1	1-way	251	47.4
77	Fanling Widening Roundabout 2	1-way	200	47.0
78	Fanling Widening Roundabout 3	1-way	51	49.0
79	Fanling Widening Link Road	2-way	280	40.0



KEY PLAN
SCALE 1 : 150000

LEGEND:

- BOUNDARY OF HKSAR
- - - 300m ASSESSMENT AREA
- TRAFFIC FLOW DIRECTION

REMARK:
LAYOUT OF HONG BCP IS TENTATIVE AND SUBJECT TO REVIEW

REV.	DESCRIPTION	DATE	BY	CHKD.

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 1 OF 6

AECOM

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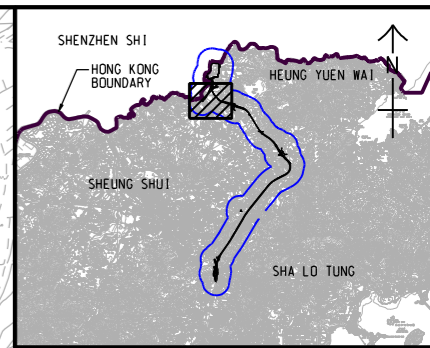
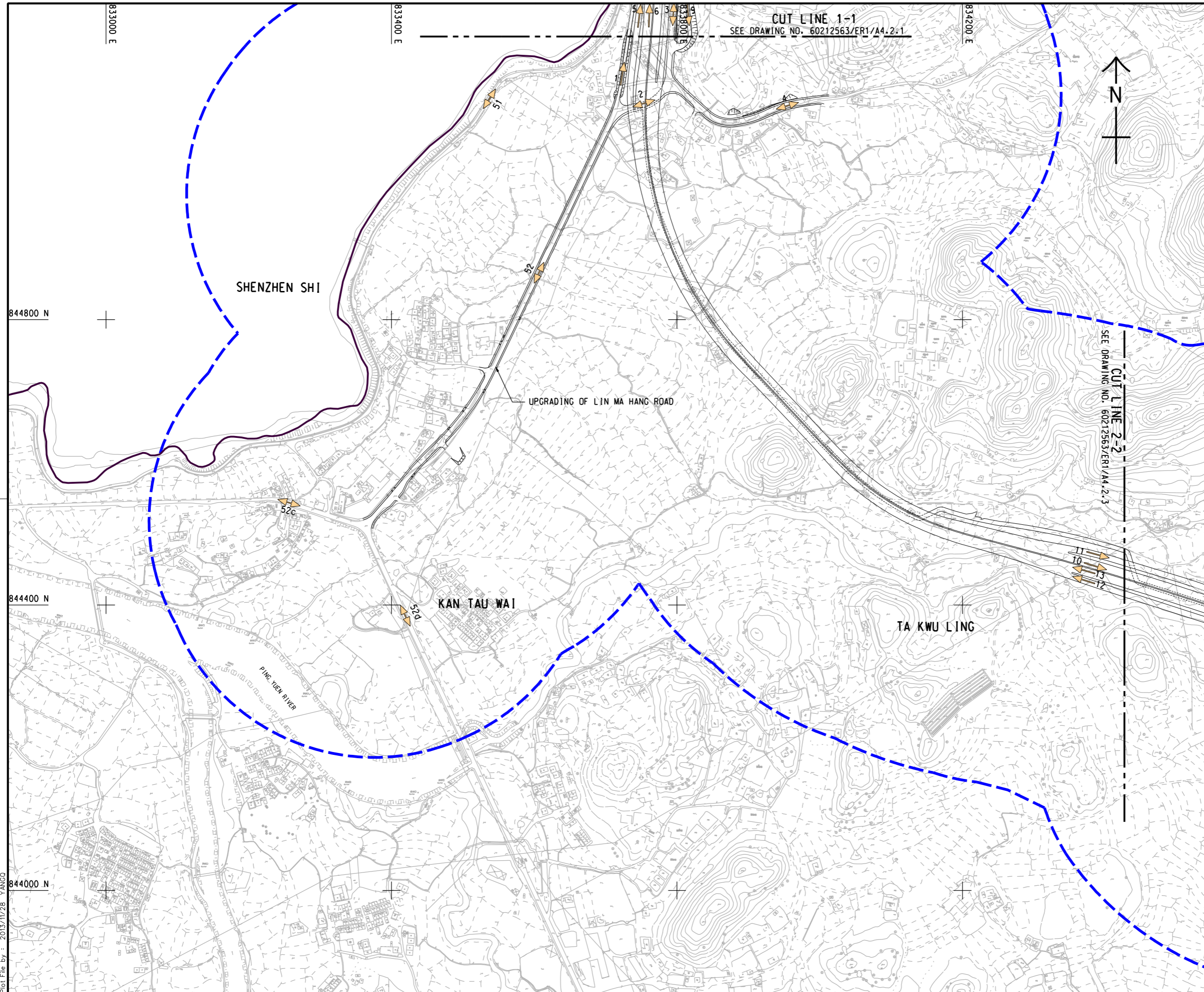
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HC	-	HT

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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- BOUNDARY OF HKSAR
 - - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

833000 E
833400 E
834200 E
844800 N
844400 N
844000 N

REV.	DESCRIPTION	DRAWN	CHECKED	DATE

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Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 2 OF 6

AECOM

DRG. NO. 60212563/ER1/A4.2.2
圖紙編號

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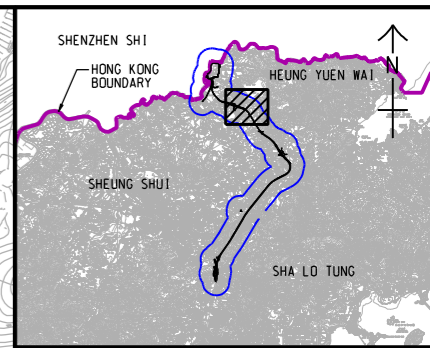
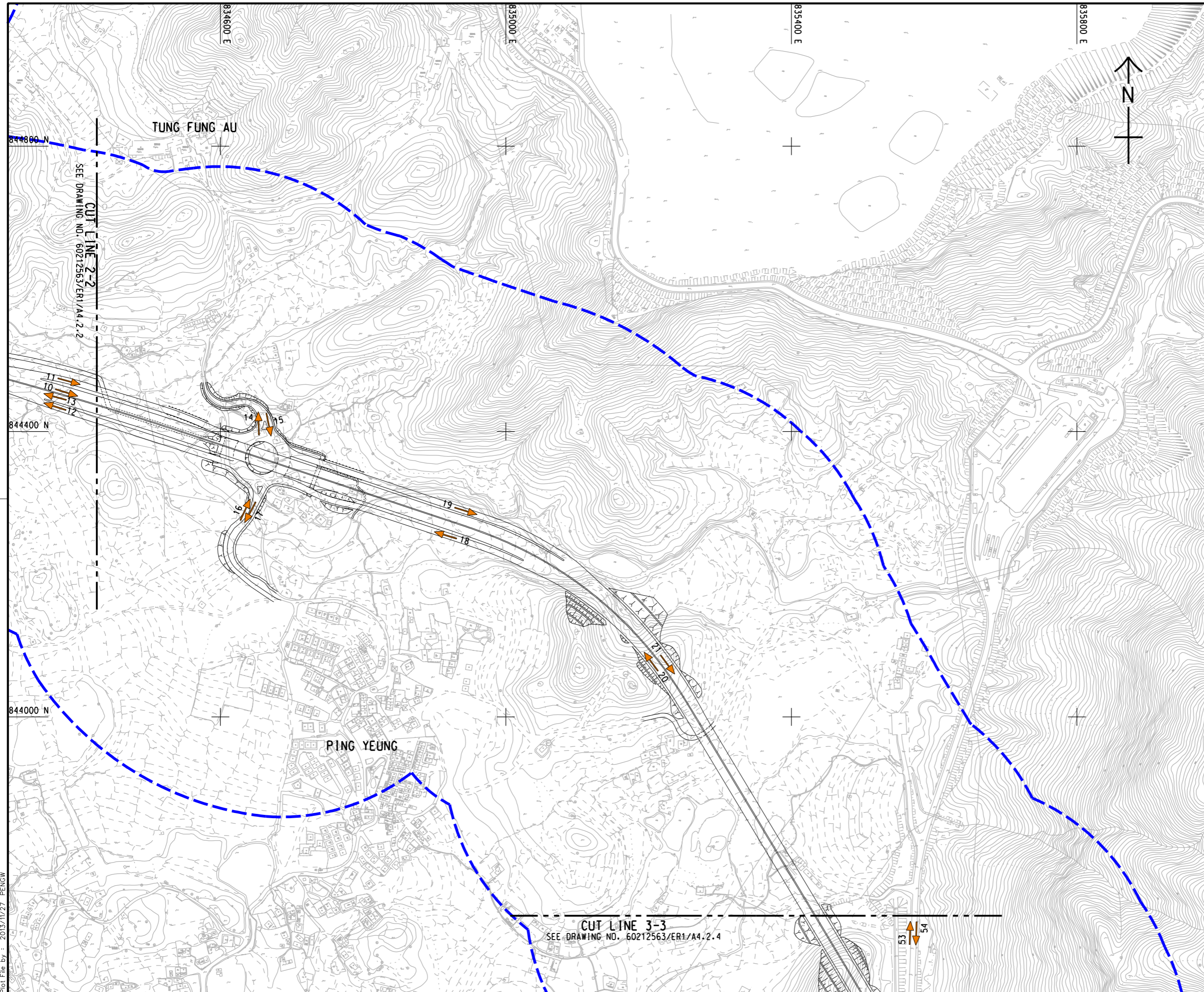
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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.W.	P.C.	DATE

土木工程拓展署
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LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK

SHEET 3 OF 6

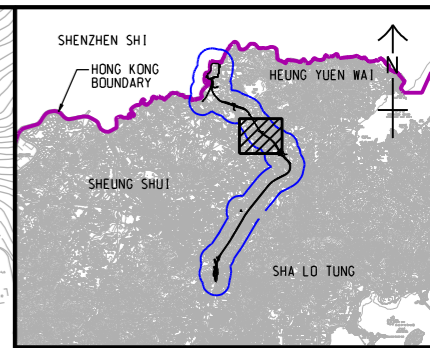
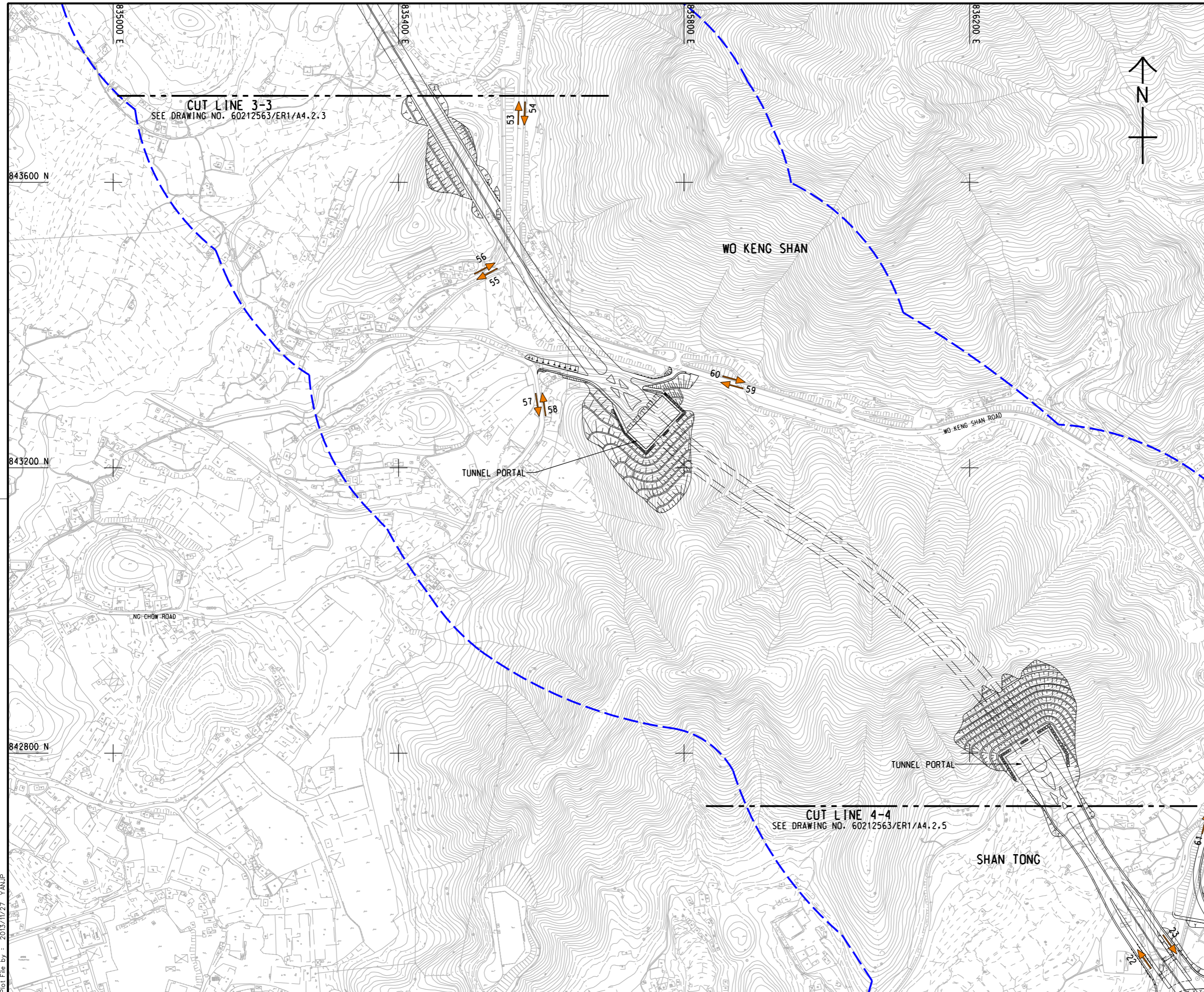


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KEY PLAN
SCALE 1 : 50000

- LEGEND:**
- 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	DATE	BY	CHKD.

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Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 4 OF 6

AECOM

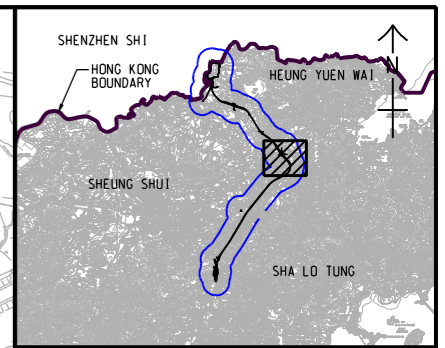
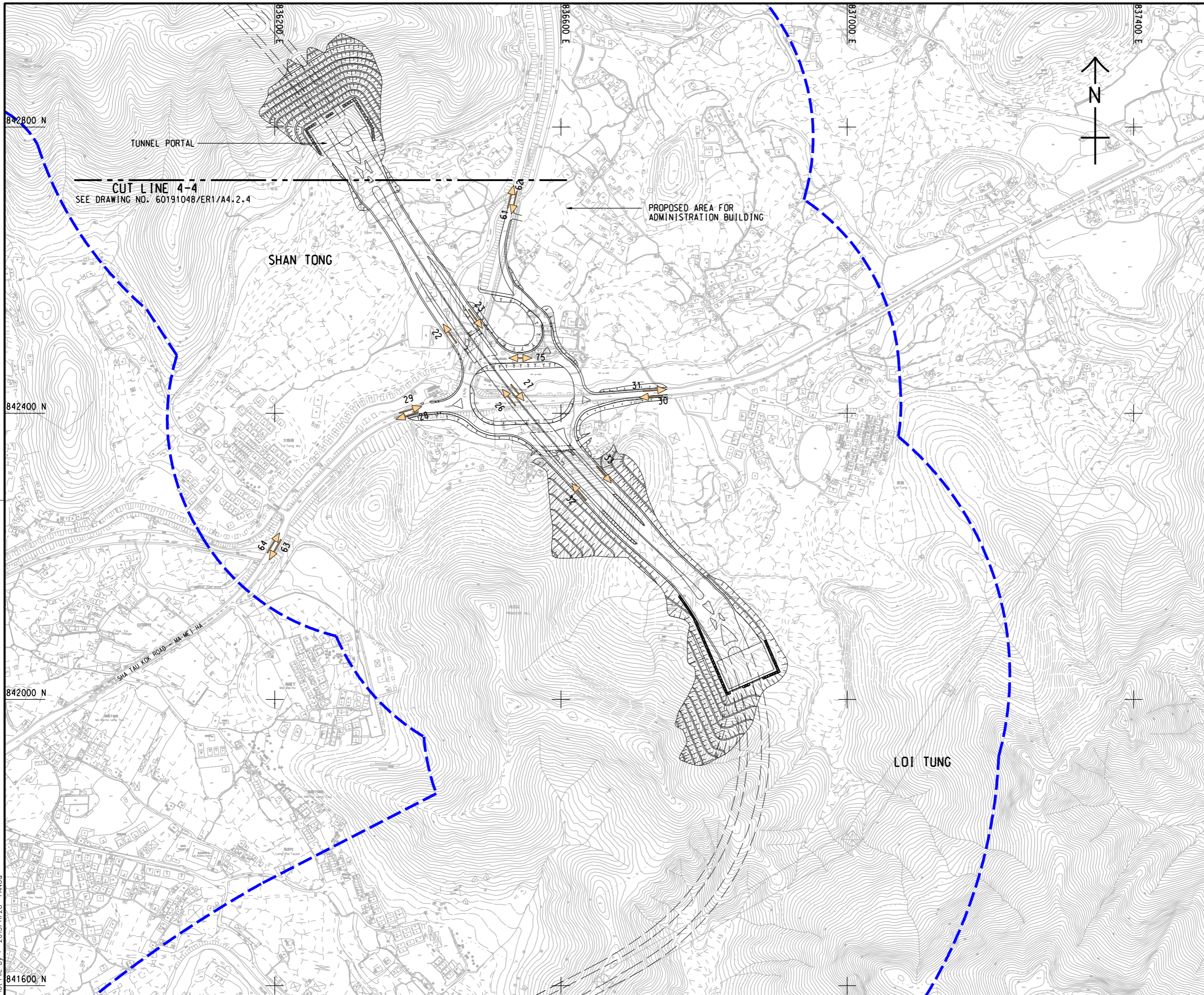
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KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.C.	P.C.	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK

SHEET 5 OF 6



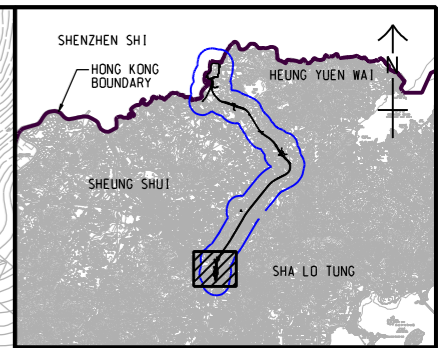
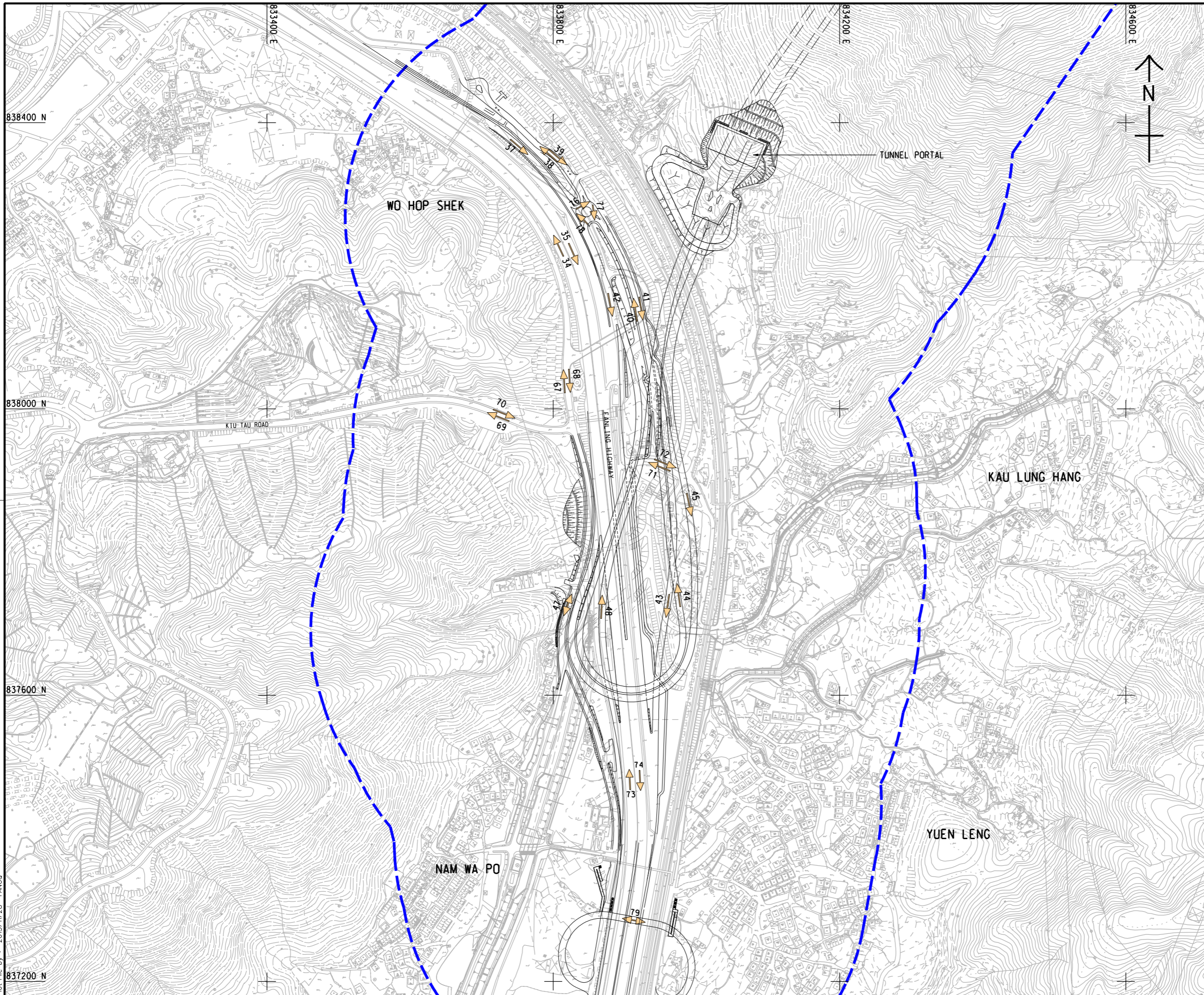
DRGNO. 60212563/ER1/A4.2.5
圖紙編號

DESIGNED BY 設計人	CONTRACT NO. 合約編號	P. Dir. APPROVED 承辦人
HC	-	HT
DRAWN BY 繪圖人	STATUS 階段	
YJP		
SCALE 比例	A1 1 : 2500	

DIMENSIONS ARE IN METRES
尺寸單位：公尺

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Plot File by : 2013/11/28 YANGO



KEY PLAN
SCALE 1 : 150000

- LEGEND:**
- - - 300m ASSESSMENT AREA
 - TRAFFIC FLOW DIRECTION

REV.	DESCRIPTION	D.W.	P.C.	DATE

土木工程拓展署
CEDD
Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

ROAD TRAFFIC NETWORK
SHEET 6 OF 6

AECOM

DRG.NO. 60212563/ER1/A4.2.6
圖紙編號

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 批核人
HC	-	HT

DRAWN BY: YJP
 STATUS: 擬定
 SCALE: A1 1 : 2500
 DIMENSIONS ARE IN METRES
 尺寸單位: 公尺

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Appendix 3.2

Details of Mitigated Road Traffic Noise Levels

Appendix 3.2 Details of Mitigated Road Traffic Noise Levels

Mitigated Scenario at 2033

NSR ID.	Floor	Assessment Point Level (mPD)	Noise Criteria, dB(A)	Predicted Noise Levels at 2033, dB(A)			
				With Project			Contributions from New Roads (2) - (1)
				Existing Roads (1)	New Roads	Overall (2)	
NYH1	G/F	16.5	70	44.7	66.5	66.6	21.9
	1/F	19.3	70	44.7	67.5	67.5	22.8
NYH2	G/F	18.9	70	37.5	65.7	65.7	28.2
	1/F	21.7	70	37.6	66.1	66.1	28.5
PY1	G/F	18.5	70	0.0	69.2	69.2	69.2
	1/F	21.3	70	0.0	70.4	70.4	70.4
PY2	G/F	18.5	70	35.8	67.3	67.3	31.5
	1/F	21.3	70	35.9	70.3	70.3	34.4
PY3	G/F	19.6	70	34.1	67.8	67.8	33.7
	1/F	22.4	70	34.3	68.1	68.1	33.8
	2/F	25.2	70	34.5	68.4	68.4	33.9
PY4	G/F	19.5	70	36.1	68.6	68.6	32.5
PY5	G/F	19.7	70	0.0	68.4	68.4	68.4
PY6	G/F	21.2	70	32.6	69.3	69.3	36.7
PY7	G/F	24.4	70	15.0	66.5	66.5	51.5
	1/F	27.2	70	15.7	66.8	66.8	51.1
	2/F	30.0	70	16.5	67.2	67.2	50.7
PY8	G/F	18.0	70	30.9	68.8	68.8	37.9
	1/F	20.8	70	32.3	69.6	69.6	37.3
WKS1	G/F	28.3	70	48.9	68.0	68.0	19.1
WKS2	G/F	23.0	70	49.9	64.3	64.5	14.6
	1/F	25.8	70	50.2	64.9	65.0	14.8
	2/F	28.6	70	50.4	65.6	65.7	15.3
WKS3	G/F	29.2	70	47.1	63.8	63.9	16.8
	1/F	32.0	70	47.7	64.0	64.1	16.4
	2/F	34.8	70	48.7	64.3	64.4	15.7
WKS4	G/F	24.6	70	68.3	60.4	69.0	0.7
WKS5	G/F	20.9	70	66.1	59.0	66.9	0.8
WKS6	G/F	29.8	70	62.6	67.6	68.8	6.2
WKS7	G/F	31.1	70	67.3	67.2	70.2	2.9
WKS8	G/F	24.7	70	42.1	66.6	66.6	24.5
	1/F	27.5	70	42.9	67.0	67.1	24.2
	2/F	30.3	70	43.7	67.7	67.7	24.0
WKS9	G/F	32.0	70	61.1	64.9	66.4	5.3
	1/F	34.8	70	64.8	66.9	69.0	4.2
PY-B1	G/F	25.0	70	19.2	64.8	64.8	45.6
	1/F	27.8	70	19.6	67.2	67.2	47.6
	2/F	30.6	70	20.0	70.4	70.4	50.4

Appendix 3.2 Details of Mitigated Road Traffic Noise Levels

Mitigated Scenario at 2033

NSR ID.	Floor	Assessment Point Level (mPD)	Noise Criteria, dB(A)	Predicted Noise Levels at 2033, dB(A)			
				With Project			Contributions from New Roads (2) - (1)
				Existing Roads (1)	New Roads	Overall (2)	
PY-B2	G/F	25.0	70	51.9	64.3	64.5	12.6
	1/F	27.8	70	52.6	66.8	66.9	14.3
	2/F	30.6	70	53.2	70.3	70.3	17.1
ST1	G/F	25.8	70	47.1	64.7	64.7	17.6
	1/F	28.6	70	52.9	67.6	67.7	14.8
ST2	G/F	23.1	70	57.0	68.3	68.6	11.6
	1/F	25.9	70	57.1	70.0	70.2	13.1
ST3	G/F	24.7	70	59.4	67.8	68.4	9.0
	1/F	27.5	70	59.7	68.2	68.8	9.1
ST5	G/F	22.8	70	62.5	65.2	67.0	4.5
	1/F	25.6	70	62.7	67.6	68.8	6.1
ST6	G/F	22.8	70	61.0	65.4	66.8	5.8
	1/F	25.6	70	61.1	66.3	67.4	6.3
ST8	G/F	23.4	70	49.1	70.1	70.1	21.0
	1/F	26.2	70	51.6	70.4	70.4	18.8
TTW1	G/F	21.0	70	66.6	62.0	67.9	1.3
	1/F	23.8	70	66.6	62.5	68.0	1.4
	2/F	26.6	70	66.6	62.9	68.1	1.5
TTW2	G/F	21.3	70	64.0	68.4	69.7	5.7
LT1	G/F	19.7	70	44.0	67.8	67.8	23.8
	1/F	22.5	70	46.8	69.0	69.0	22.2
LT2	G/F	23.8	70	61.5	67.9	68.8	7.3
	1/F	26.6	70	61.5	68.1	68.9	7.4
	2/F	29.4	70	61.5	68.3	69.1	7.6
LT3^	G/F	23.1	70	67.3	64.9	69.3	2.0
	1/F	25.9	70	67.3	66.8	70.1	2.8
LT4	G/F	24.7	70	50.3	65.9	66.1	15.8
	1/F	27.5	70	50.4	66.2	66.4	16.0
	2/F	30.3	70	50.4	66.8	66.9	16.5
LT5	G/F	25.4	70	42.7	67.1	67.1	24.4
	1/F	28.2	70	53.8	70.3	70.4	16.6
LT6	G/F	26.8	70	43.5	67.6	67.6	24.1
	1/F	29.6	70	49.4	69.4	69.4	20.0