RAMBOLL ENVIRON

Ref.: AACWBIECEM00_0_9988L.17

6 December 2017

Chun Wo – CRGL – MBEC Joint Venture
C2, 5/F, Hong Kong Spinners Industrial Building
601-603 Tai Nan West Street
Cheung Sha Wan
Kowloon, Hong Kong

By Post and Fax (2570 8013)

Attention: Mr. David Lau

Dear Sir,

Re: Contract No. HY/2009/19
Central – Wan Chai Bypass – Tunnel (North Point Section) & Island Eastern Corridor Link
Construction Noise Management Plan (Revision 4)

Reference is made to your submission of the Construction Noise Management Plan (Revision 4 dated 20 November 2017) to us through e-mail on 22 November 2017 for our review and comment.

Please be informed that we have no adverse comments on the captioned submission. We write to verify it in accordance with Condition 2.9 of FEP-07/364/2009/D.

Thank you for your kind attention.

Yours sincerely,

David Yeung
Independent Environmental Checker

c.c.	HyD	Mr. Tong Cheung	by fax: 2714 5289
	CEDD	Mr. Jason Cheung	by fax: 2577 5040
	AECOM	Mr. Frankie Fan	by fax: 2691 2649
	LAM	Mr. Raymond Dai (ETL)	by fax: 2882 3331

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Ramboll Environ Hong Kong Limited 英環香港有限公司
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www.Ramboll-Environ.com

Lam Geotechnics Limited
Ground Investigation & Instrumentation Professionals

華益土力有限公司

Ref : G1525/CS/L584/FEP-07/364/2009/D
Date : 06 December 2017

Chun Wo - CRGL - MBEC Joint Venture
C2, 5/F,
Hong Kong Spinners Industrial Building,
601-603 Tai Nan West Street,
Cheung Sha Wan,
Kowloon, Hong Kong

By Post and Fax (2570 8013)

Attn: Mr. David Lau, Project Manager

Dear Sir,

Contract No. HY/2009/19
Central – WanChai Bypass Tunnel
(North Point Section) and Island Eastern Corridor Link
Construction Noise Management Plan (Rev. 4)

Referring to the captioned information dated 20 November 2017 received through email on 22 November 2017, we have reviewed your submitted details and hereby certify the submission in accordance with Condition 2.9 of FEP-07/364/2009/D.

Should you have any enquiry, please feel free to contact the undersigned at 2839 5666.

Yours faithfully,

Raymond Dai
Environmental Team Leader

c.c.

HyD	- Mr. Tony Cheung	(By Fax: 2714 5289)
AECOM	- Mr. Peter Poon	(By Fax: 3912 3210)
AECOM	- Mr. Frankie Fan	(By Fax: 2587 1877)
Ramboll ENVIRON	- Mr. David Yeung	(By Fax: 3548 6988)

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONTRACT HY/2009/19

CENTRAL – WAN CHAI BYPASS – TUNNEL (NORTH POINT SECTION)
AND
ISLAND EASTERN CORRIDOR LINK

Construction Noise Management Plan

(Pursuant to the Further Environmental Permit - No. FEP-07/364/2009/D)

Rev	4	Prepared and Reviewed By	Approved By:
Date	20 Nov 2017		
Name		M.H. Isa	David Lau
Designation		Environmental Officer	Site Agent

REGISTRY OF NOISE MANAGEMENT PLAN AMENDED

Rev. No.	Amendment Date	Amendment Section	Content	Amended by
0	18 Mar 2011	All	Initial Revision incorporated ET and ICE comment	Simon Wong
1	12 Sep 2011	Appendix E	Construction Works Programme	M.H. Isa
		Sections 8.0,10.0,11.0	Responses to comments (1) received from EPD	
2	25 Oct 2011	Section 8.2	Movable / Temporary Noise Barrier	M.H. Isa
3	13 Mar 2013	Section 8.2	Movable / Temporary Noise Barrier	M.H. Isa
		Section 11	Conclusion	
		Appendix G	Schedule for the Installation of Noise Barrier	
		Appendix H	Specification of Noise Absorptive Material	
		Appendix I	Minutes of Meeting – Harbour Grand HK Hotel	
		Appendix J	Contract HY/2009/17 – FEHD Basement & Ground Floor Layout Plan	
4	13 Feb 2016	Section 1.0	Purpose of this Plan	M.H. Isa
		Section 8.1	Restriction on the use of Pneumatic Breaker	
		Section 8.2	Temporary Noise Barrier	
		Appendix C	Plan and Sectional View of Typical Noise Barrier during Construction Phase	
		Appendix D	Mitigation measures for the items of PME in each construction tasks	
		Appendix E	Specification of Noise Absorptive Material	
		Appendix F	Site Layout Plan	
4	05 Aug 2017	Section 8.2.1	Temporary Noise Barrier – Harbour Grand HK Hotel	M.H. Isa
		Appendix B	Figure 2: Location Plan of Temporary Noise Barrier during Construction Phase in North Point Waterfront	
		Appendix G	Harbour Grand HK Hotel Correspondence	
		Appendix H	Environmental Review Report	
4	20 Nov 2017	All	Revised the whole document and renamed to Construction Noise Management Plan	M.H. Isa

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List of Appendixes

1.0 Purpose of this Plan

Pursuant to the Further Environmental Permit (No. FEP-07/364/2009/D), Part C, Special Condition, Clause 2.9, a Construction Noise Management Plan (NMP) is developed by Permit Holder (Chun Wo – CRGL - MBEC Joint Venture) to demonstrate clearly the management of construction noise generated in the execution of works for the Project. The mitigation measures specified in this NMP shall be implemented on site to reduce and/or minimise the construction noise impact on the publics and nearest noise sensitive receivers.

The purpose of this Plan is to update the latest noise barrier arrangement with respect to the reviewed construction sequence and alternative arrangement on the demolition and construction of substructure for the Island Eastern Corridor (IEC).

2.0 Project Description

This Project "Contract No. HY/2009/19 Central - Wan Chai Bypass – Tunnel (North Point Section) and Island Eastern Corridor Link" (HY/2009/19) is part of the Central-Wan Chai Bypass (CWB) project, which shall provide relief to the existing congestion along the East-West corridor and cater for the anticipated growth of traffic on Hong Kong Island.

Scope of Works

The scope of the Project mainly includes:

- Construction of a 300-metre-long tunnel at North Point;
- Construction of an approach road to the tunnel;
- Modification of the section of Island Eastern Corridor between Hing Fat Street and Po Leung Kuk Yu Lee Mo Fan Memorial School;
- Modification of the junction of Victoria Park Road and Hing Fat Street;
- Demolition of Rumsey Street Flyover eastbound in Central;
- Sub-structure works of the East Ventilation Building and the foundation works of the Administration Building; and
- Associated works including landscaped deck, noise barriers, noise semi-enclosures, road drainage and landscaping works.

The site layout plan for the project is shown in Figure 6 in **Appendix E**.

3.0 Environmental Legislation, Policies, Plans, Standards and Criteria

Construction noise impacts have been assessed in accordance with methodology and the criteria given in the Technical Memoranda (TM) on Noise from Construction Works other than Percussive Piling (GW-TM) issued under the Noise Control Ordinance (NCO) and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) respectively.

The NCO provides the statutory framework for noise control of construction work other than percussive piling using Powered Mechanical Equipment (PME) between the hours of 1900 to 0700 or at any time on Sundays and a general holiday (i.e. restricted hours). Noise from construction activities in non-restricted hours is subject to the Criteria for evaluating Noise Impact stated in Table 1B of Annex 5 in the EIAO-TM. The noise criteria are 75dB(A) $L_{eq(30\ minutes)}$ at the facades of dwellings and 70 dB(A) $L_{eq(30\ minutes)}$ at the facades of schools (65dB(A) during examination). The construction noise criteria are summarized in Table 3-1.

Table 3-1: Daytime Construction Noise Criteria

Uses	Noise Level in Leq (30-minutes), dB(A)
Domestic Premises	75
Educational Institution	70
Educational Institution (during examination)	65

4.0 Noise Sensitive Receivers (NSRs)

In order to evaluate the construction noise impacts from the Project, representative existing NSRs of the Project have been identified in the EIA (AEIAR-125/2008), and are summarized in Table 4-1. The locations of the NSRs are shown in Figure 1 in **Appendix A.**

Table 4-1: Representative Existing Noise Sensitive Receivers

NSR	Section	Location	Use
N9	Tin Hau	Viking Garden	Residential
N10		Victoria Court	
N11		Mayson Garden	
N12		Gordon House	
N13		Belle House	
N14		Hoi Tao Building	
N15		Staff Quarters of FEHD	
N16		Victoria Centre	
N17		Harbour Heights	
N18	North Point	City Garden, Block 10	
N19		City Garden, Block 7	
N20		HK Baptist Church Henrietta Sec. School	Educational Institution
N21		Provident Centre, Blk 1	Residential
N22		Provident Centre, Blk 6	

N23		Provident Centre, Blk 17	
N24*		PLK Yu Lee Mo Fan Memorial School	Educational Institution

Note: * Not being identified as representative NSR in the EIA.

5.0 Identification of Noise Impacts

Potential noise impacts of the Project are likely arise from the following activities:

- Diaphragm wall and tunnel construction;
- Substructure and superstructure for landscape deck and connection of Island Eastern Corridor (IEC) Link;
- Demolition of superstructure, including the IEC structure; and
- Road formation, earth works and drainage culvert construction

6.0 Assessment Methodology

In accordance with the EIAO, the methodology outlined in the GW-TM has been used for the assessment of construction noise (excluding percussive piling). Sound Power Levels (SWLs) of the equipment were taken from Table 3 of this TM.

A negative correction of 10dB(A) was added to the calculated result if there is noise screening eliminating the line of sight from a NSR to the construction areas.

A positive correction of 3dB(A) was added to the calculated result in order to allow for façade reflection effect.

7.0 Prediction and Evaluation of Noise Impacts

In accordance with the approved EIA report (AEIAR-125/2008), exceedences of the construction noise-criteria as stated in Table 3-1 are predicted at representative NSRs in the absence of mitigation measures. A summary of the unmitigated construction noise levels of the representative NSRs during normal daytime working hours within the construction period of the Project is summarized in Table 7-1.

Table 7-1: Summary of Unmitigated Construction Noise Levels at Representative NSRs during Normal Daytime Working Hours

Representative NSRs	Predicted Unmitigated Construction Noise Levels during Normal Daytime Working Hour ($L_{eq\ (30\text{-minutes})}$ dB(A))
N11	57 – 101
N13	60 – 84
N15	66 – 88
N17	63 – 96
N18	62 – 98

N20#	65 – 90
N22	64 - 79

Note: # For normal daytime working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal teaching periods and examination periods, respectively.

Noise mitigation measures should therefore be required to reduce construction noise impacts.

8.0 Mitigation of Adverse Environmental Impacts

In order to reduce the construction noise impacts on NSRs during normal daytime working hours, it is recommended that the following noise reduction measures shall be strictly implemented during the construction phase.

8.1 Restriction on the use of Pneumatic Breaker

At the planning stage it was anticipated that pneumatic breakers may be used for the demolition of the existing IEC and its restriction was laid down as below.

The use of pneumatic breakers, if required to demolish the existing IEC, shall be confined to the period from 0900 to 1700 hours on weekdays (Monday to Friday), and the pneumatic breakers shall not be used any time on Saturdays, Sundays and general holidays, and during examination hours of the schools affected by the works site, including:

(1) HK Baptist Church Henrietta Secondary School;
(2) PLK Yu Lee Mo Fan Memorial School

To ensure no pneumatic breakers shall be used during the examination period, CW-CRGL-MBEC JV shall:

- closely liaise with the schools to address their environmental concerns during the course of construction works;
- check the examination schedule and re-schedule the works during the examination period, where practicable, to avoid construction noise affecting the schools; and
- join the briefing sessions / visits held by the Highway Department or the Engineer to the schools to provide them more updating information about the upcoming construction activities of the Project.

8.2 Temporary Noise Barrier

Due to the latest construction sequence and alternative arrangement on the demolition and construction of substructure for the Island Eastern Corridor (IEC), different types of noise barriers will

be installed for particular items of powered mechanical equipment (including saw cutting / wire cutting machines) and construction works at the locations as shown in Figure 2 in **Appendix B**. These noise barriers shall be installed along the existing Island Eastern Corridor (IEC) during the demolition and construction of substructure for the IEC and construction of adjacent tunnel approach ramp structure, as shown in Figure 2 in **Appendix B**. Besides, temporary noise barriers shall be provided on temporary working platforms on piers or pile caps for the demolition works of existing piers and crossheads for the marine section of the existing IEC as shown in Figure 3 in **Appendix B**. The barrier material shall have a surface mass of not less than 14 kg/m^2 on skid footing with 25mm thick internal sound absorptive lining.

Movable noise barriers will be used for static plant, such as generator, air compressor and concrete pump and / or truck as well as Powered Mechanical Equipment (PME) such as crawler crane where appropriate. The barrier material shall have a surface mass of not less than 14 kg/m^2 with sound absorptive lining. We would **exhaust all practicable mitigation measures** as required in TM-EIAO in order to minimize the construction noise impact on nearby NSRs including the use of movable noise barriers. Plan and sectional view of movable noise barrier for static plants/PME to be adopted during the construction phase are shown in **Appendix C**.

Materials used for the construction of the noise barriers are given in **Appendix D**.

Detailed noise barrier arrangements are given in the Environmental Review Report (ERR) in **Appendix G**.

8.2.1 Movable Noise Barrier – for Harbour Grand Hong Kong Hotel (HGH)

In accordance with **Figure 2** of **FEP-07/364/2009/D**, during the demolition and construction of substructure for the Island Eastern Corridor (IEC) and in particular the location facing the HGH, movable noise barriers were installed. As of 26 April 2017, the above works had been completed and a portion of site area directly opposite to the HGH was subsequently handed back to the Hotel.

Subsequently, for the construction of the Approach Ramp we, Chun Wo – CRGL - MBEC Joint Venture, liaised with the HGH regarding the requirements of placing the movable noise barriers. HGH expressed objection to the installation of the movable noise barriers right in front of HGH as highlighted in Figure 2 of **Appendix B**. The relevant correspondence is attached in **Appendix F**.

HGH is the only NSR who might be potentially affected without the corresponding section of the movable noise barrier. However, as HGH is centrally air-conditioned fitted with double glazed well-gasketed windows and does not rely on open windows for ventilation. No adverse construction noise impact on HGH is anticipated even if the corresponding section of movable noise barrier is not

installed. In view of the objection of HGH, we propose not to install the above said section of the movable noise barriers. Nevertheless to minimize construction noise, scheduling of works will be discussed with the HGH during the construction of the Approach Ramp.

8.3 Quality Powered Mechanical Equipment (QPME)

The following types of QPME are proposed to be used during the construction phase of the Project:

- Bulldozer, wheeled
- Excavator, wheeled / tracked
- Loader, wheeled
- Road roller
- Power rammer (petrol)
- Crane, mobile
- Bulldozer, tracked
- Loader, tracked
- Asphalt paver
- Roller, vibratory
- Compactor, vibratory
- Generator

8.4 Good Site Practices

The following good site practices should be adopted to further ameliorate the construction noise impacts:

- Only well-maintained plant shall be operated on-site and plant shall be serviced regularly during the construction period;
- Silencers or mufflers on construction equipment shall be utilized and shall be properly maintained during the construction period;
- Mobile plant, if any, shall be sited as far away from NSRs as possible;
- Machines and plant (such as trucks) that may be in intermittent use must be shut down between works periods or shall be throttled down to a minimum;
- Plant known to emit noise strongly in one direction shall, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- Material stockpiles and other structures shall be effectively utilized, wherever practicable, in screening noise from on-site construction activities.
- The use of QPME as far as practicable
- Exhaust all practicable mitigation measures to minimize noise impact to the NSRs.

8.5 Multi-Phase Construction

Proactive planning of working sequences for multi-phase construction could minimize the construction noise impact during normal daytime working hours.

PME grouping as noise mitigation measures shall be implemented at NSRs N11, N13, N17, N18 and N20. In order to minimize the construction noise impact on the surrounding NSRs, only one group of PME shall be operated at any one time during construction.

Detailed list of PME and specific noise impact of individual construction work shall be reviewed in relevant method statement via submission to the Engineer.

9.0 Evaluation of Mitigated Noise Impacts

With the use of QPME, temporary / movable noise barriers and PME grouping, the overall construction noise levels at NSRs shall be reduced by 7 to 31dB(A), depending on the type of construction activities. With the exception of NSRs N11, N17, N18 and N20, the predicted construction noise levels arising from the Project at all other NSRs selected for assessment shall comply with the EIAO-TM construction noise criteria. A summary for mitigated construction noise levels during normal daytime working hours at representative NSRs extracted from the approved EIA report (AEIAR-125/2008) is shown in Table 9-1.

Table 9-1: Summary of Mitigated Construction Noise Levels at Representative NSRs during Normal Daytime Working Hours

Representative NSRs	Predicted Mitigated Construction Noise Levels ($L_{eq(30\text{-minutes})}$ dB(A))
N11	44 – 70 (Group 1 PME)
N11	51 – 85 (Group 2 PME)
N13	55 – 71 (Group 1 PME)
N13	55 – 71 (Group 2 PME)
N15	62 – 75
N17	58 – 80 (Group 1 PME)
N17	58 – 80 (Group 2 PME)
N18	54 – 84 (Group 1 PME)
N18	54 – 84 (Group 2 PME)
N20#	60 – 77 (Group 1 PME)
N20#	60 - 77 (Group 2 PME)
N22	62 - 72

Note: # For normal daytime working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal teaching periods and examination periods respectively.

In accordance with the approved EIA report, the on-site survey has revealed that NSR N20 (HK Baptist Church Henrietta Secondary School) has already been noise insulated with air-conditioners. With the provision of noise insulation and air-conditioners, it is considered that the noise impact shall be minimized by keeping the windows closed during the construction activities. Notwithstanding this, due to a limited buffer distance and a more stringent noise criterion of 65 dB(A), it is proposed that particularly noisy construction activities, especially those associated with the demolition of the IEC structures, shall be scheduled to avoid examination periods as far as practicable.

10.0 Impact Monitoring during Construction

External Monitoring

Environmental Monitoring and Audit (EM&A) Manual serves as a guideline to set up of an EM&A programme to ensure compliance with the EIA study recommendations, to assess the effectiveness of the recommended mitigation measures and to identify any further need for additional mitigation measures or remedial action.

The Environmental Team Leader and his team member shall be responsible for the set-up, implementation and maintaining of the EM&A system. The real-time on-site monitoring of noise level around the work sites areas shall be carried out by Environmental Team during the construction phase.

The monitoring station(s) may be subject to change with respect to the availability of the measurement location and/or other related factors. The relevant location(s) should be referred to the latest EM&A Manual via the Project website at the below link:

http://www.wd2-cwb.com/web/index.php/project-ema-manual

Action shall be immediately taken if the construction noise level exceeded the limit and action levels stipulated in the EM&A Manual.

11.0 Conclusion

(1) The predicted unmitigated noise level shall range from 57 to 101 dB(A) at the respective NSRs. With the use of QPME, temporary / movable noise barriers and PME grouping for construction tasks under the Project, the predicted construction noise levels at the representative NSRs except NSRs N11, N17, N18 and N20 shall comply with the construction noise criteria.

Having exhausted practicable noise mitigation measures, the predicted noise level at NSR N11 (i.e Mayson Garden) shall exceed the noise criterion of 75dB(A) by 10 dB(A) with Group 2 PME. For NSR N17 (i.e Harbour Heights), the predicted noise level shall exceed the noise criterion of 75 dB(A) by up to 5 dB(A) with Group 1 or Group 2 PME. For NSR N18 (i.e City Garden), the predicted noise level shall exceed the noise standard of 75 dB(A) by up to 9 dB(A) with Group 1 or Group 2 PME. For NSR N20 (i.e HK Baptist Church Henrietta Secondary School), the predicted noise level with Group 1 or Group 2 PME shall exceed the noise standard of 65 dB(A) by up to 12 dB(A) for Group 1 or Group 2 PME during examination periods. For the normal teaching period, the noise level shall exceed the noise standard of 70 dB(A) by 7 dB(A) with Group 1 or Group 2 PME. However, the school has been noised insulated with air

conditioners and, by keeping the windows closed during construction activities, noise impacts at the indoor environment can be avoided. Notwithstanding this, the particularly noisy construction activities shall be scheduled to avoid examination period as far as practicable.

Whilst the prediction does indicate some noise exceedance for limited periods of time, during the actual construction period all practicable mitigation measures possible shall be done to reduce construction noise further and there shall be on-going liaison with all concerned parties and site monitoring to deal with and minimize any exceedances. Community Liaison Group (CLG) will facilitate communication, enquires and complaint handling on all environmental issues. Regular meetings will be set up for the CLG to update the latest cumulative environmental impact due to the project.

Nonetheless, as mentioned above, the erection of movable noise barrier where allowable, at localized location as a possible noise mitigation measures will minimizes any construction noise impact on the NSRs in the construction stage.

This Construction Noise Management Plan will be revised regularly to reflect changes if any.

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

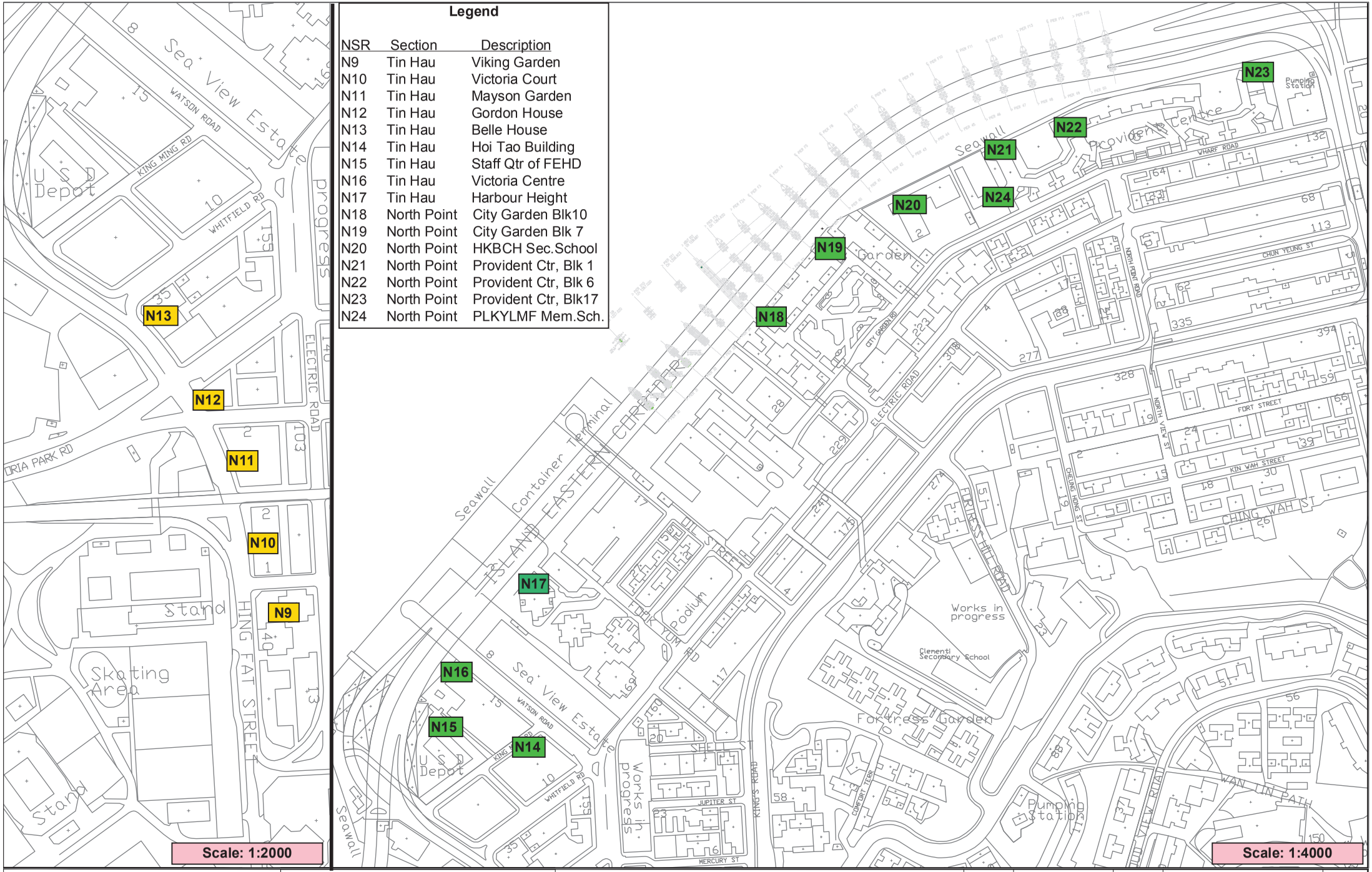
FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix A

Location Plan for Representative Noise Sensitive Receivers



CLIENT	CONTRACTOR: 俊和-中國中鐵-中鐵大橋局聯營 CHUN WO - CRGL - MBEC JOINT VENTURE	JOB TITLE: **Location Plan of Noise Sensitive Receivers (NSRs)**	SCALE: As shown at A4
ENGINEER'S REPRESENTATIVE	PROJECT: CONTRACT NO. HY/2009/19 CENTRAL - WAN CHAI BYPASS TUNNEL (NORTH POINT SECTION) AND ISLAND EASTERN CORRIDOR LINK		DATE / DRAWN / DESIGNED / CHECKED / APPROVED
			Sheet of
			Figure 1
			REV 0

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix B

Location Plan of Temporary Noise Barrier during Construction Phase in North Point Waterfront and during the Demolition of Existing Piers and Crossheads in Marine Section of IEC

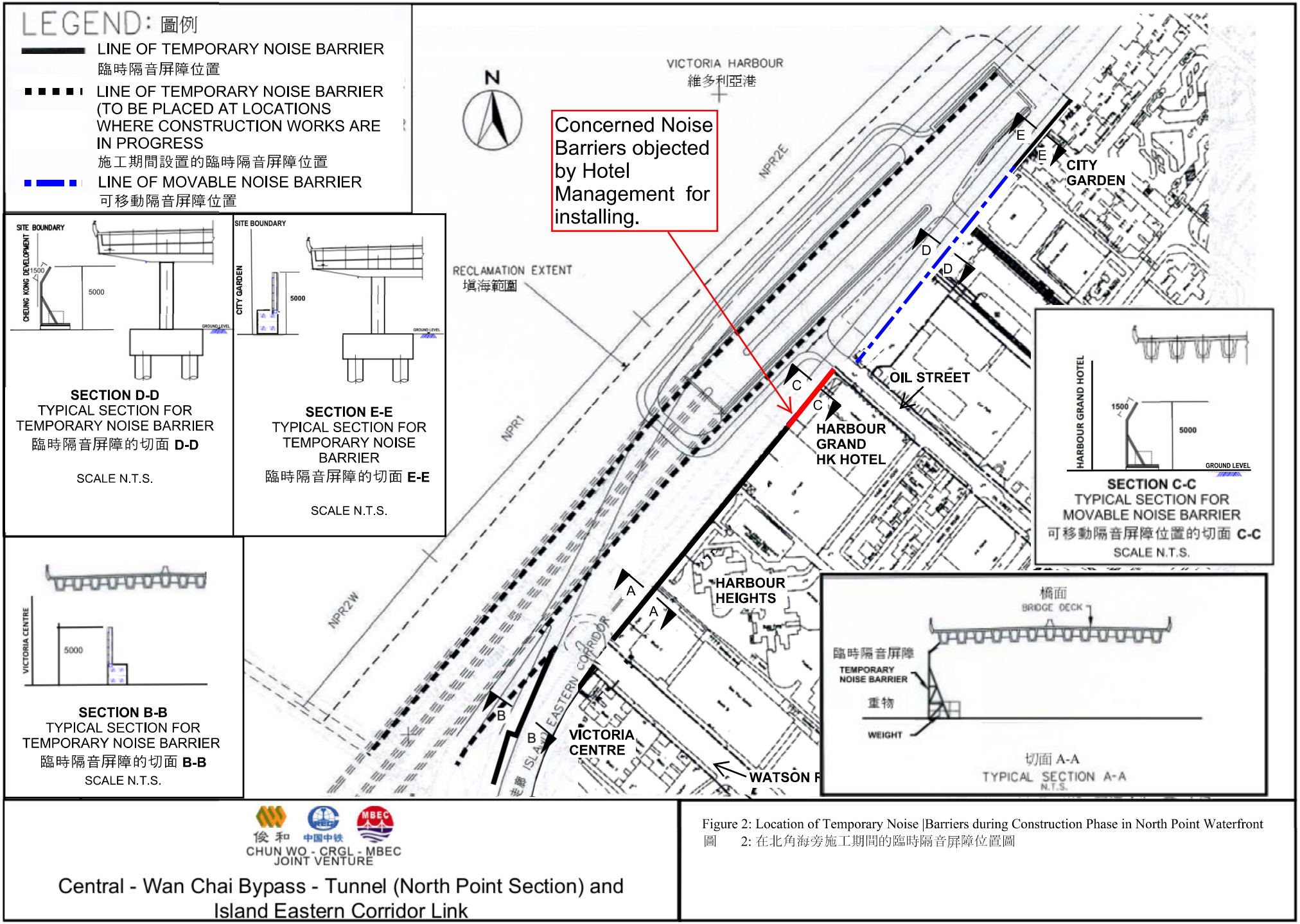
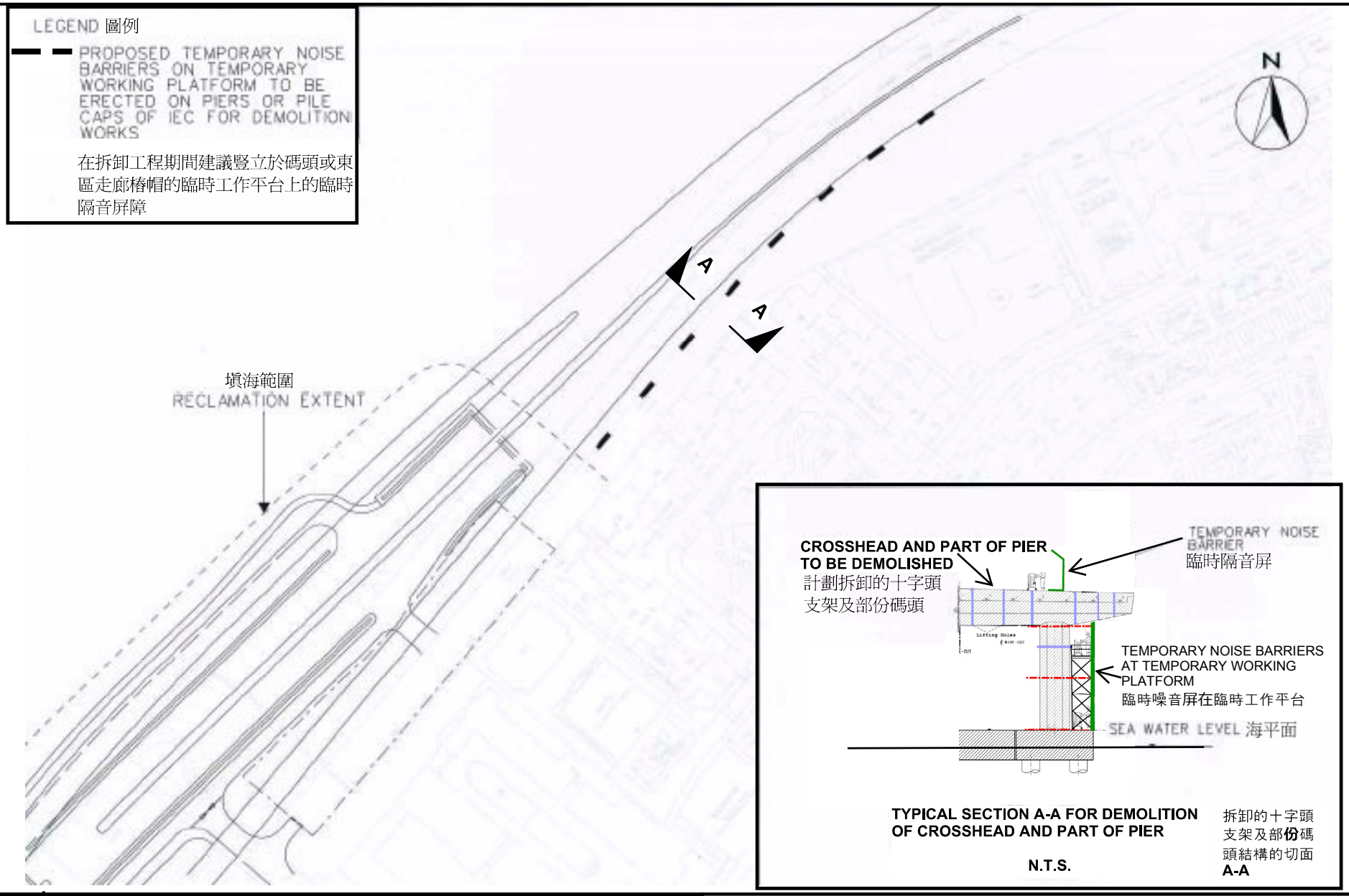


Figure 2: Location of Temporary Noise |Barriers during Construction Phase in North Point Waterfront
圖 2: 在北角海旁施工期間的臨時隔音屏障位置圖



CHUN WO - CRGL - MBEC JOINT VENTURE

Central - Wan Chai Bypass - Tunnel (North Point Section) and Island Eastern Corridor Link

Figure 3: Location of Temporary Noise Barriers during Demolition of Existing Piers and Crossheads in Marine Section of IEC

圖 3: 拆卸現有碼頭及東區走廊海面十字頭支架期間的臨時隔音屏障位置圖

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

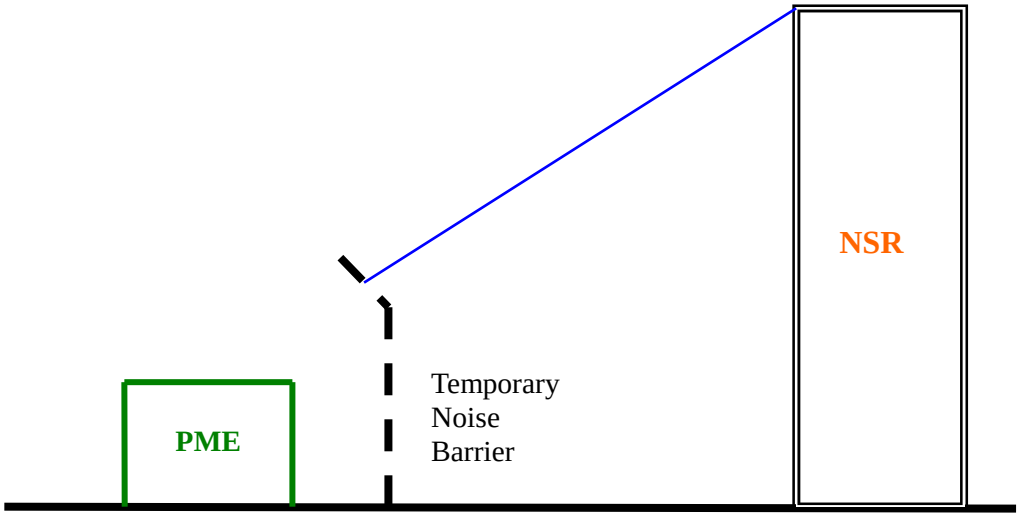
Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix C

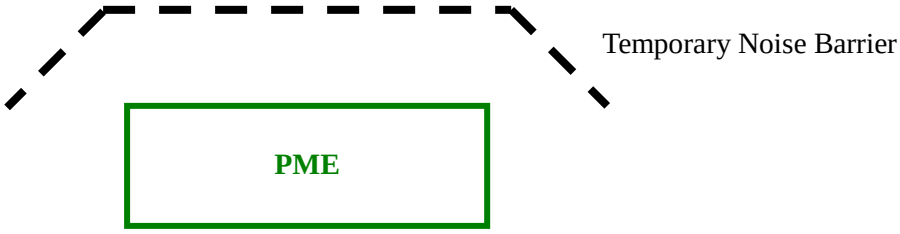
Plan and Sectional View of Typical Noise Barrier during Construction Phase

Section View of Temporary Noise Barrier



Temporary Noise Barrier comprised of a surface mass of not less than 14 kg/m^2 on skid footing with 25mm thick internal sound absorptive lining backing with a cantilevered upper portion located within 5m from any static plant. The PME shall be totally screened when viewed from the NSR.

Plan View of Temporary Noise Barrier



Static plant that shall be totally screened when viewed from the NSR

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix D

Specification of Noise Absorptive Material

AECOM

17B000514

15 JUL 2010

RESPONSE TO CONTRACTOR'S SUBMISSION

Our Ref. : CWB/(HY/2009/17)/M25/110/17B000514

To : Lam Woo & Co., Ltd. Attn. : Mr. Daniel Chan

Location : Aesthetic Panel (Type 1)	CSF No. : CMS/C&S/014/2	
Title of Submission : **Noise Absorptive Material – Rockwool for Aesthetic Panel (Type 1)** *(Originated from Contractor)*	Rev.: N/A	Date: 12 July 2010

The Engineer's Representative's Comment(s) :

Your submission ref: CMS/C&S/014/2, dated 13 July 2010 and received on 13 July 2010 refers.

I have no objection to the use of "IAC" Acoustic Panel (Standard Panel Size: 1900 x 500 x 50mm) for the Aesthetic Panel Type 1.

Please note that the colour of aluminium perforated sheet should be similar to the colour of steel posts.

Please submit the schedule of material delivery to site.

Status :

- ☐ Approved;
- ☐ Not approved and resubmission required;
- ☑ Approved subject to condition(s) as stated / further required information as stated.
- ☐ Approval not required.
- ☐ Others _____ *(Please specify)*

The Engineer's Representative : _____ Date of Response : 14 July 2010

Terry Siu

c.c. AECOM – Mr. Kelvin Cheng

TS/TL/SN/cw

Transportation Noise Barriers

Highways • Railroads • Buses • Airports • Light Rail Vehicles • Subways • Elevated Systems

- **Galvanized Steel or Aluminium**
- **Free-Draining**
- ***Light Weight***
- **Easily Installed**
- **Sound Absorptive**
- **Weather-Tested Finishes**
- **Freestanding or Add-on Cladding**
- **Horizontal or Vertical Installation**
- **Architectural Aesthetics**

Freestanding Barriers

Noise Barriers Types : FS, HB and HBS Barriers – sound absorptive on one and two sides respectively – optimize sound transmission losses and sound absorbing properties in a durable and attractive wall system in harmony with the community. Excellent low frequency absorption for heavy vehicles.

- Laboratory-rated sound absorption on one or both sides.
- Low weight, rugged construction – ideal for wall or roof mounting.
- 125mm thick modular system in steel or aluminium.
- Abuse resistant powder coated galvanized steel or aluminium construction.
- Readily relocated in the event of expansion or the re-use in other projects.
- Withstand wind load up to 4.23 KPa (max. 3m) - designs for specific wind loads are available.

Noise Barrier system Finishes

Noise Barriers are finished with a tough, thermosetting, polyester powder coating. A wide variety of standard colors allows complementary decorative schemes and attractive designs to reduce apparent wall height as perceived by the community and motorists.

- Salt spray tested for checking, blistering, loss or adhesion, or evidence of corrosion per ASTM B 117 for 3000 hours without coating failure.
- Tested for accelerated weathering per AAMA 2604-98 for 5 years Florida with colour change $\Delta E < 5$ and gloss retention > 30%.
- Optional facings include *stucco and others*.

iac

Industrial Acoustics Company...Making the World a Quieter Place .....

Suite 1601, 148 Electric Road, North Point, Hong Kong. *Tel : 852-25281138* *Fax : 852-25291961* *email : info@iachk.com*

Contract No. HY/2009/17 Noise Absorptive Material

Configuration		TYPE FS/A	TYPE FS/A/1	TYPE HB/A	TYPE HBS/A
		 Thickness 125mm	 Thickness 125mm	 Thickness 125mm	 Thickness 125mm
Weight (kg/m²)	Aluminium	10.70	24.50	12.20	25.40
Application		Freestanding alongside noisy equipment			Freestanding between multiple noise source

ACOUSTIC PERFORMANCE CHARACTERISTICS

1/1 Octave Band Center Frequency, Hz	125	250	500	1K	2K	4K	STC / Rw
SOUND TRANSMISSION LOSS DATA, dB (.)							
FS/A	14	19	27	33	38	39	31
FS/A/1	23	30	39	35	41	45	38
HB/A	14	17	24	32	36	43	29
HBS/A	14	15	22	40	48	53	27
SOUND ABSORPTION COEFFICIENT (..)							NRC
FS/A	0.79	1.14	1.18	1.12	1.06	1.01	1.10
FS/A/1	0.66	1.07	1.12	1.06	1.04	0.97	1.05
HB/A	0.62	1.07	1.22	1.14	1.17	1.10	1.15
HBS/A	0.43	0.60	0.92	1.06	1.04	1.13	0.90

. All data in accordance with ISO Standard 140 or ASTM E90.
.. All data in accordance with ASTM C423 or ISO Standard 354.

Specifications

Transportation Noise Barriers FS/A , FS/A/1, HB/A and HBS/A Module

1.0 GENERAL

1.1 Noise Barrier Modules shall be manufactured and installed with an acoustically absorptive surface, having guaranteed sound absorptive properties facing the predominant noise source. The barrier shall be constructed of vertical posts and polyester powder coated absorptive modules stacked to achieve the required wall heights. The pre-approved barrier system shall be Transportation NOISHIELD Type : FS, HB and HBS as manufactured by Industrial Acoustics Company (H.K.) Ltd.,Suite 1601, 148 Electric Road, North Point, Hong Kong.

1.2 Pre-bid submittals and approval shall include sample, structural calculations and wall design drawings: current test data illustrating compliance with the requirements of the acoustical and durability specifications for modules made on production line; proof of adequate manufacturing and financial capability consistent with project requirements; and a sample module made on production tooling.

2.0 DESIGN

2.1 Ground Mounted Barriers

2.1.1 Posts shall be spaced at 3000mm on center for steel posts, (plus concrete web thickness for concrete posts) consistent with the module spanning capability at the design wind pressure.

2.2 Color, Module Patterns

2.2.1 Modules shall have a consistent color from module to module. A sample of each color to be supplied shall be submitted for approval prior to the start of manufacturing.

2.2.2 Panels shall be stacked with joints aligned horizontally or joints may be uniformly stepped where the top or bottom of the wall change elevations. Barrier module color patterns shall be shown on shop drawings (using a legend keyed to color numbers).

2.3 Acoustical Characteristics

2.3.1 The barrier shall incorporate absorptive sound materials to prevent reverberation of noise between parallel walls, between vehicles and nearby sound barriers, and noise reflections to unshielded noise sensitive areas of the community.

3.0 MATERIALS

3.1 Modules shall be constructed of aluminium sheets manufactured in accordance with the requirements of AA1100 Specification, minimum 1.2mm solid side and 1.2mm perforated side. Modules shall be non-welded, free draining. Modules shall be coated in the factory with polyester powder coating applied through the use of an electrostatic charged and thermally bonded to the aluminium sheets.

3.2 Acoustic fill material shall be fiberglass, non-corrosive, resistant to be attacked by fungus, fire-resistant, vermin proof, and non-hygroscopic. Fill material shall be free draining, self supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements.

3.3 Posts shall be galvanized steel meeting the requirements of BS729 and BS4360 Grade 43A or approved equal. Color coating of posts shall be as required by the owner/architect.

3.4 Anchor bolts shall be stainless steel or approved equal.

3.5 Bearing blocks shall be EPDM, neoprene, or rubber, 60 durometer.

3.6 *Material Testing and* Certification.

3.6.1 Acoustical testing

3.6.1.1 Certified test reports shall be submitted to demonstrate compliance with the Sound Transmission Loss and Sound Absorption Coefficients specified. Tests have been conducted in a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or HOKLAS.

3.6.1.2 Sound Absorption Coefficient Tests shall be performed in accordance with ASTM C423 or ISO 354.

3.6.1.3 Transmission Loss Tests shall be performed in accordance with ASTM E90 or ISO 140.

3.6.2 Module Testing

3.6.2.1 Fire properties of the panel shall be tested in accordance with ASTM E84-01 with the following results :

a) Flame Spread Index = 0
b) Smoke Developed Index ≈ 5

3.6.2.2 Salt spray tested for checking, blistering, loss or adhesion, or evidence of corrosion per ASTM B117 for 3000 hours without coating failure.

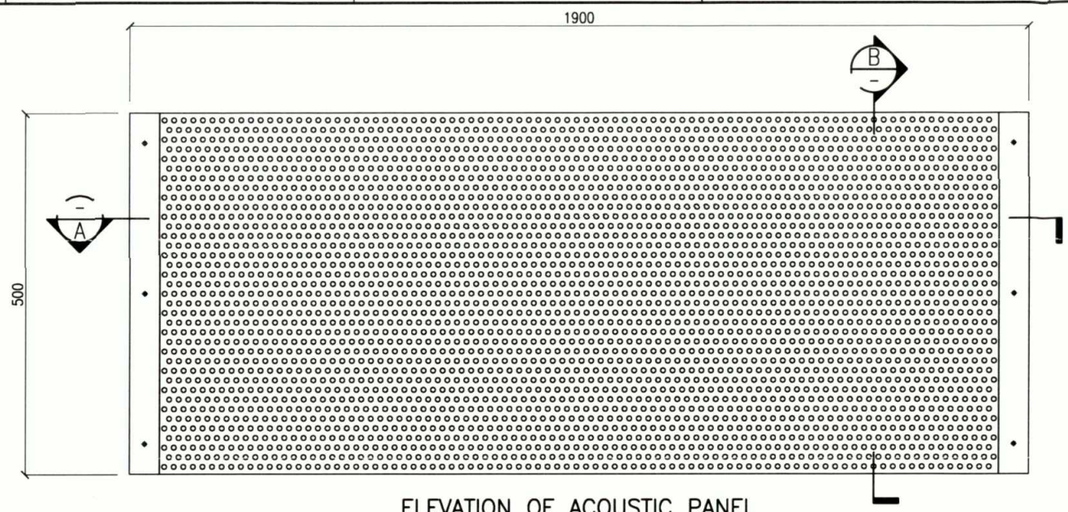
3.6.2.3 Tested for accelerated weathering per AAMA 2604-98 for 5 year Florida with colour change $\Delta E < 5$ and gloss retention > 30%.

INDUSTRIAL ACOUSTICS COMPANY (H.K.) LTD.
雅士消聲器材(香港)有限公司
Suite 1601, 148 Electric Road, North Point, Hong Kong
Tel: (852) 2528 1138 Fax: (852) 2529 1961
E-mail address: info@iachk.com Web Site: www.iachk.com

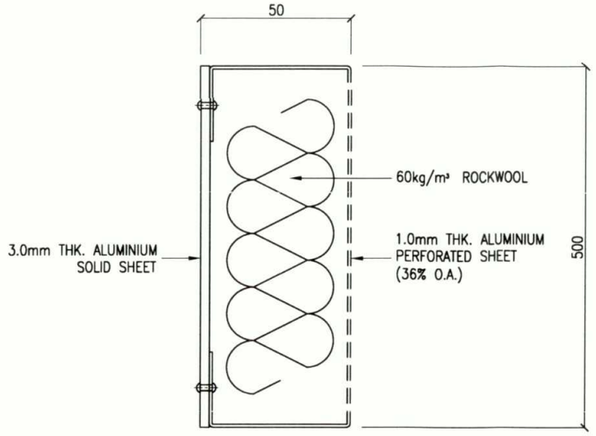
Calculation the weight of 50mm thick panel

panel size 1900x500 = 0.95 m2

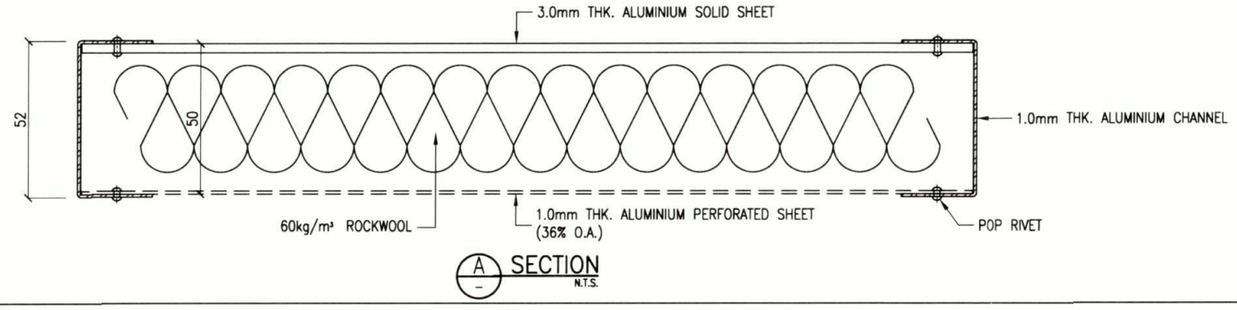
Material		Area		Weight	
1)	3mm thick aluminium sheet 1900x500	0.95	m2	7.84	kg
2)	1.0mm thick Aluminium perforated sheet 1900x700 (36% Opening)	1.33	m2	2.3408	kg
3)	1.0mm thick Aluminium End U	0.1	m2	0.275	kg
4)	50mm Thk. 60kg/m3 Rockwool	0.95	m2	2.85	kg
5)	Others (Pop revit and screws)			0.15	kg
		Total		13.4533	kg
		Unit Weight		14.16	kg/m2



ELEVATION OF ACOUSTIC PANEL
N.T.S.



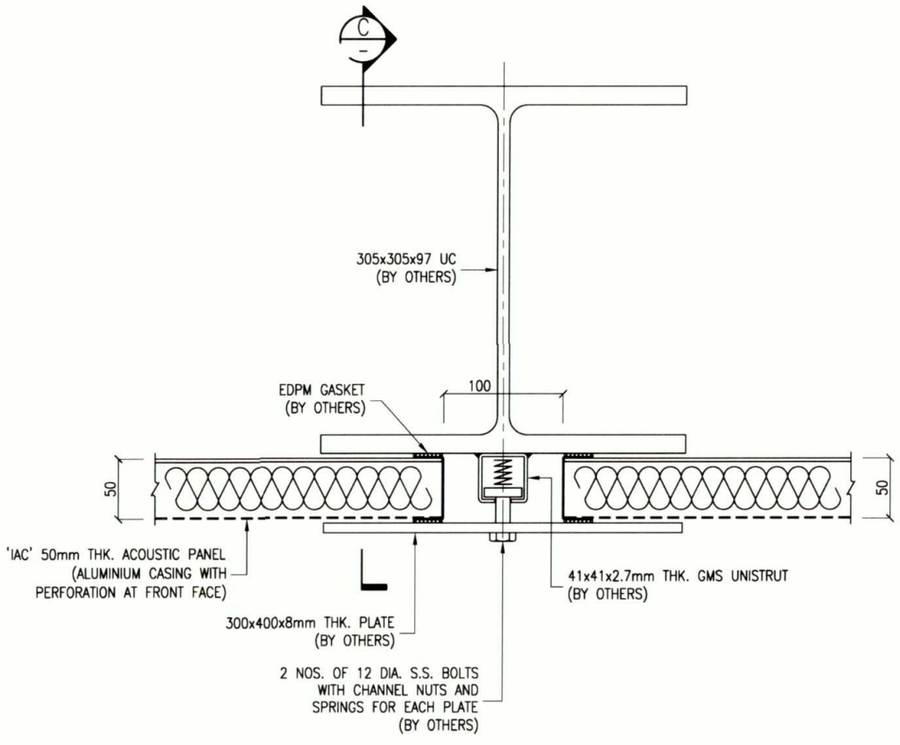
B SECTION
N.T.S.



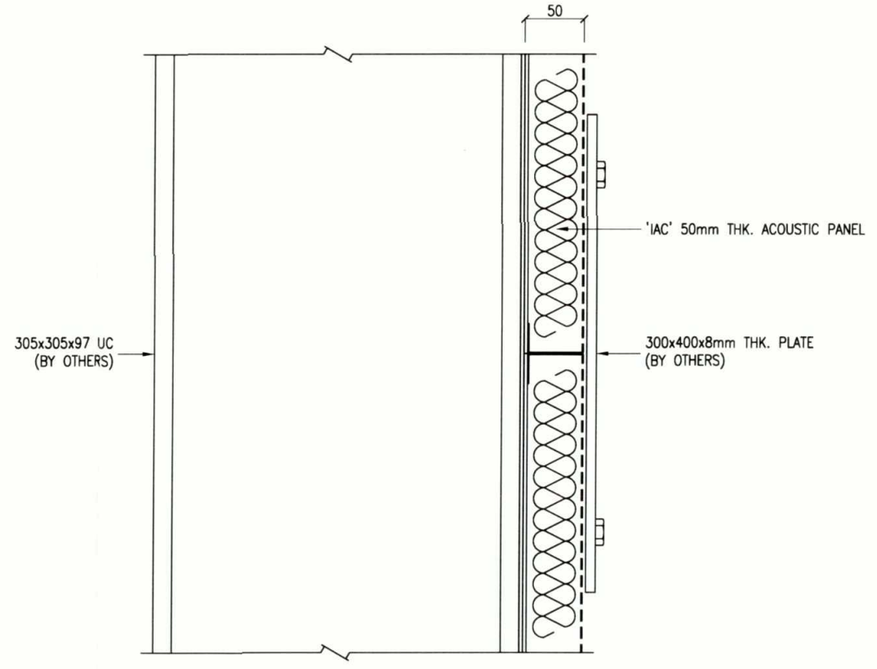
A SECTION
N.T.S.

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH AECOM'S DWG. NO. 60095653/FEHD/1107A, 1108A.



FIXING DETAIL FOR ACOUSTIC PANEL
SCALE 1:5



C SECTION
SCALE 1:5

INDUSTRIAL ACOUSTICS COMPANY HONG KONG LIMITED
雅士消聲器材(香港)有限公司

PROJECT:
CONTRACTOR NO. HY/2009/17
CENTRAL – WAN CHAI BYPASS
FEHD WHITFIELD DEPOT
RE-PROVISIONING WORKS

TITLE:
LAYOUT AND FIXING DETAIL OF ACOUSTIC PANEL

DRAWN BY: SHL	DESIGNED BY: FML
SCALE: AS SHOWN@A3	CHECKED BY: FML
JOB NO: –	DATE: 9-JUL-2010
DRAWING NO: EW-2009/17-AP-D001	REV: 0

AECOM
8/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號
新城市中央廣場第 2 座 8 樓
www.aecom.com

Your Ref. : CHEC-CRBCJV/C-257/01.01/000243, CGS/000016/A
Our Ref. : CWB/(HY/2009/11)/M25/110/B000207

10 March 2010

Mr. Daniel Cheung
China Harbour Engineering Company Limited -
China Road and Bridge Corporation Joint Venture
19th Floor, China Harbour Building
370-374 King's Road
North Point
Hong Kong

Dear Sirs,

Contract No. HY/2009/11
Central-Wan Chai Bypass – North Point Reclamation

Submission CGS/000016/A for Noise Absorptive Material

I refer to your above referenced submission dated 12 February 2010 and your subsequent letter dated 5 March 2010 enclosing the manufacturer's testing report on the proposed Forster F2 absorptive panel.

Since the report shows that the absorptive panel can absorb 12 dB noise intensity which meets the EIA noise reduction requirement of 10dB, I have no further comment on their use for the special hoarding of this project.

Yours faithfully,
For and on behalf of
AECOM Asia Co. Ltd.

Terry Siu
Engineer's Representative
Transportation

c.c. AECOM - Attn : Mr. Kelvin Cheng

TS/ TL/SN/mt

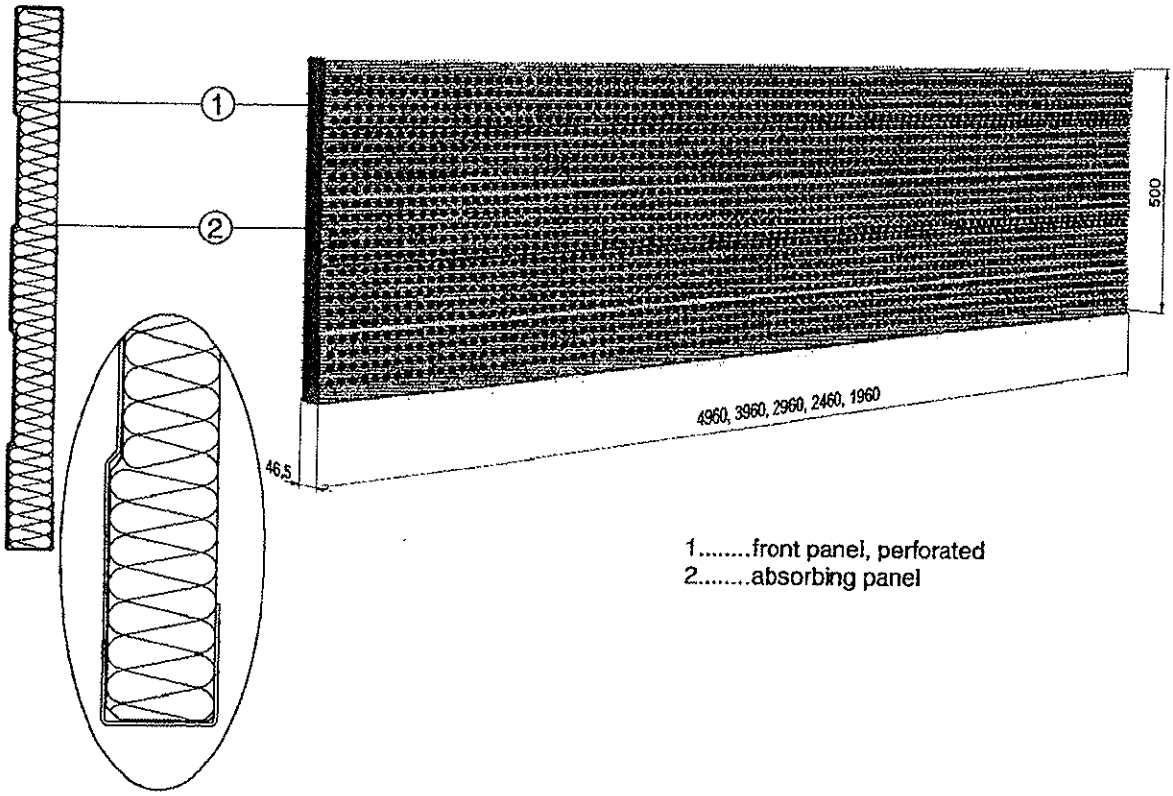
Forster Metallbau Gesellschaft m. b. H.
P.O. Box 176, Weyrer Strasse 135
A-3340 Waidhofen/Ybbs, Austria

Tel. (0) 74 42 / 501 - 0
Fax (0) 74 42 / 501 - 100
e-mail: forster@forster.at
http://www.forster.at

FORSTER

Traffic Engineering · Shelving Systems

highly absorbing aluminium cladding panel type F2



1.....front panel, perforated
2.....absorbing panel

Types:

F2/1,25 ..... sheet thickness 1,25 mm

Material:

Aluminium, polyester-powder-coated

Standard size : 1960mm x 500mm x 45mm

Description:

Aluminium cladding panel, highly absorbing, for cladding of reflecting walls, according to EN 1793-1, ZTV-LSW 06 and CE-label acc. to EN 14388.
Absorbing panel: 40 mm thick rockwool with 100 kg/m³, front side covered with black glass fleece (hydrophobic).
Front panel crimped for stiffening and profiled.

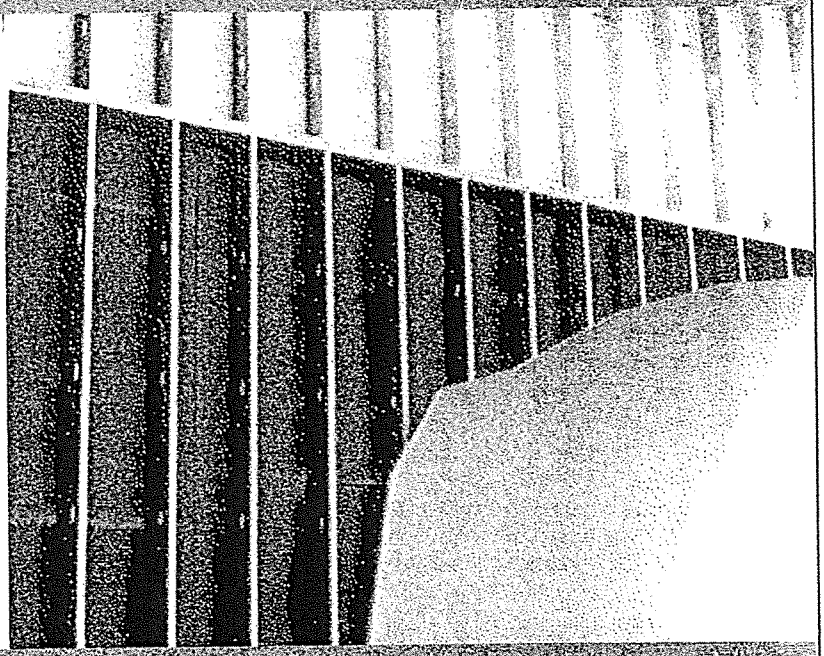
Characteristic values:

	sound absorption acc. EN 1793-1
	DL_{α}, dB
	min. 9 (A3)

專業隔音 給您真正寧靜空間

讓噪音成為絕響

SOUND PROOF



Contract No. HY/2009/19 Noise Absorptive Material

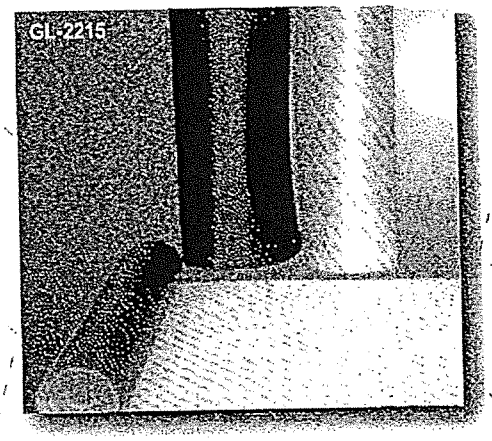
隔音材料

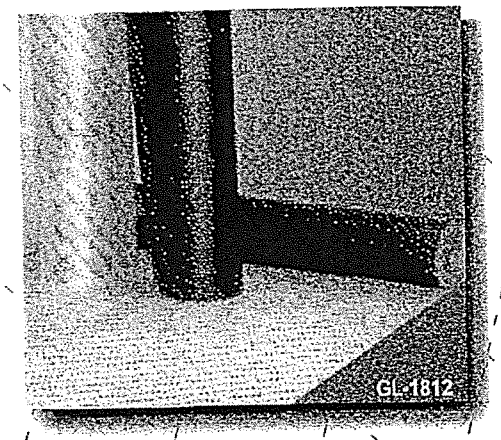
GOODLY隔音毯

1. 面積密度: **2.1Kg／m²**
   厚度: **1.5m／m**
   寬度: **0.9m.**
2. 標準長度: **10m** 耐燃度: **200℃.**
3. 特性: 音響透過 **STC-21.**
   抗拉強度為 **9.56MPa,** 延伸率為 **143.1%,** 可承受抗壓力為 **88.8N.** 不阻礙電波傳達, 具柔軟性, 可任意剪裁, 可配合各種施工方法, (如膠合, 壓合)等.
4. 組合成份: 聚乙稀加無機礦物粉, 加不銹鋼金屬纖維.
5. 可適用於工業廠房、空調機房、汽車、音響室、KTV、音樂教室等.

美國 ASTM 聲學量測結果表

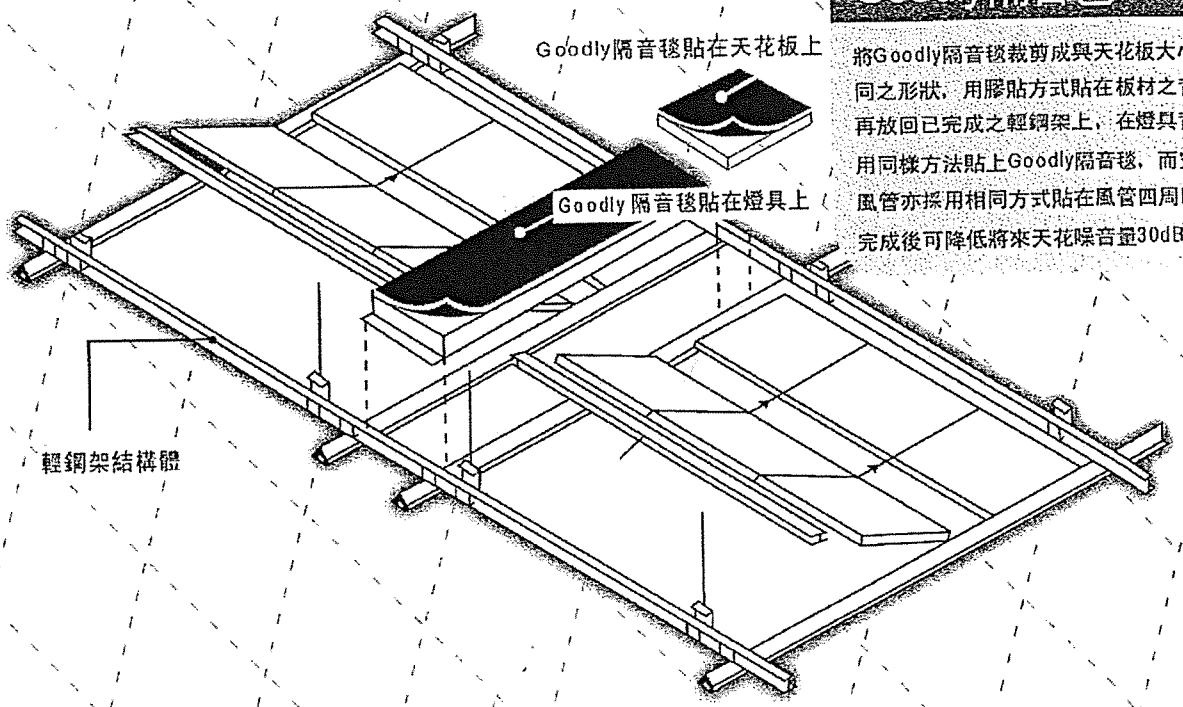
	125	250	500	1000	2000	4000	STC
GL-2215	12	12	16	22	27	32	21



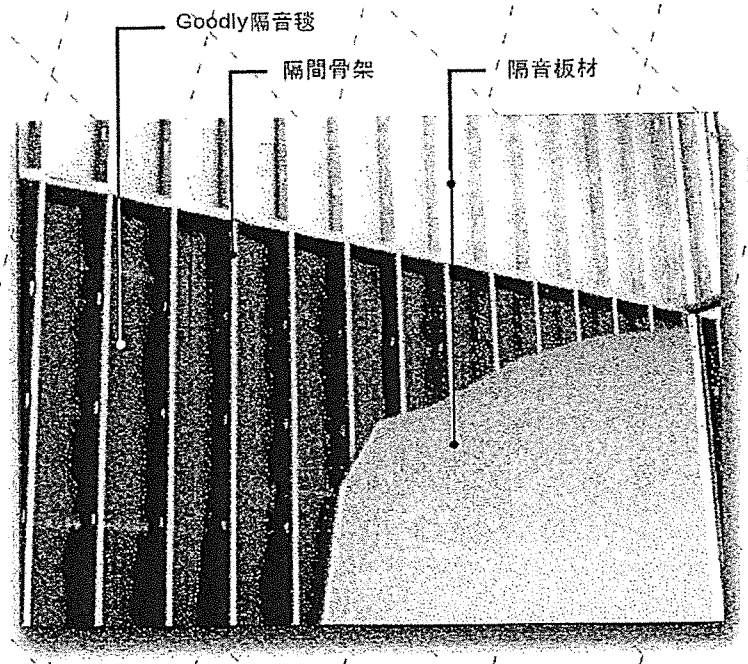


輕鋼架天花系統貼上Goodly隔音毯

將Goodly隔音毯裁剪成與天花板大小相同之形狀, 用膠貼方式貼在板材之背面, 再放回已完成之輕鋼架上, 在燈具背面亦用同樣方法貼上Goodly隔音毯, 而空調風管亦採用相同方式貼在風管四周即可。完成後可降低將來天花噪音量30dB.



GOODLY® 隔音毯施工法

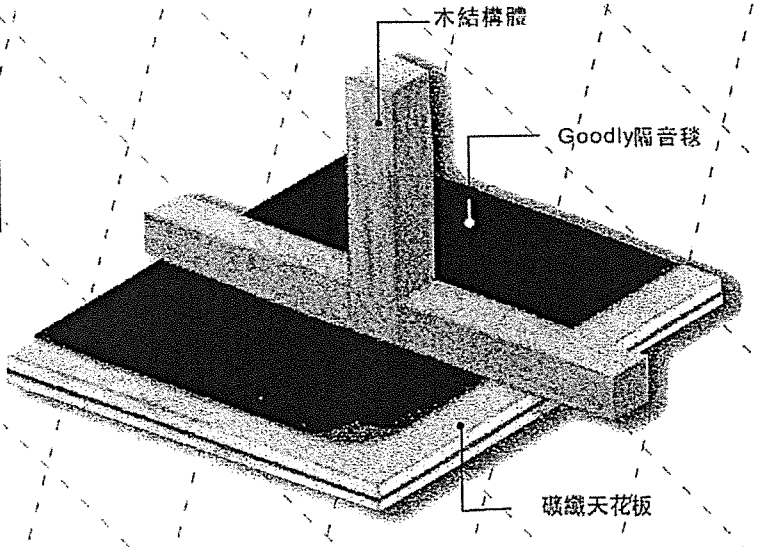


內貼Goodly隔音毯

先在已完成之單面板材上用膠貼或風壓釘方式，把Goodly隔音毯固定在板材上（黑色為面），面需貼向噪音來源點，再封釘另一片板材即可，再用粉刷漆上顏色或貼上壁紙修飾，完成后隔音量可達30dB

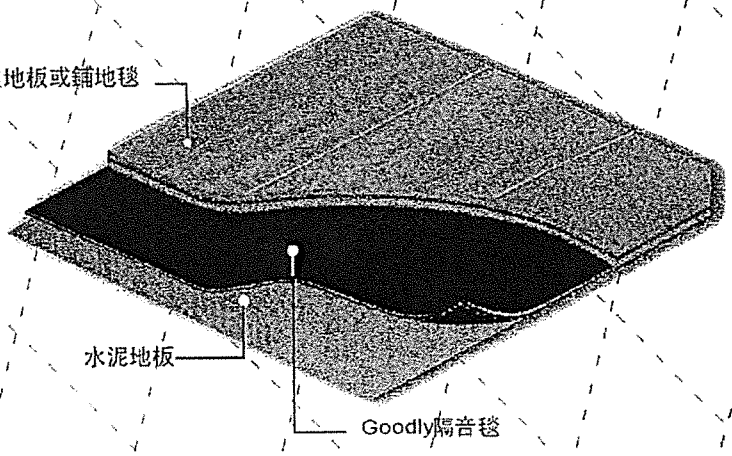
木作天花板貼上Goodly隔音毯

在木天花板第一層板材完成後，用膠貼或風壓釘把Goodly隔音毯固定在板面上（黑色為面），需面向噪音來源點，後再封釘另一面板材即可，再用粉刷或漆上顏色或貼上壁紙修飾。完成後可隔絕由上層所產生之噪音量為40dB



水泥、磚塊或木地板貼上Goodly隔音毯

先將原地面打掃乾淨，吸掉地面一切灰塵並吹乾地面，使表面乾燥後，再用白膠或強力膠塗滿地面，另在Goodly隔音毯底部（黑色為面）面需貼向噪音來源點，同樣塗滿膠貼物，待膠貼物1/3乾後，鋪貼在地面上即可，最後再鋪上地毯或木地板便完成。完工後隔音量可達40dB。



現代人
一直追求一個高品質的生活環境，
除在物質上的滿足外，我們更需要一個寧靜的居家休息環境。
但是在現實生活與工作中，我們常受到不同程度的噪音污染，如：
工廠的機械噪音、辦公室的空調馬達聲音、
電腦主機、打字的聲音或在户外活動時的機動車輛、攤販叫賣聲、
甚至連回家休息時，從鄰居家發出的音響聲、
電視、小朋友練琴聲...等等。
這些噪音對我們的情緒、心情、聽覺和心臟都會帶來
身心健康的影響。
GOODLY隔音毯能幫助您有效解決噪音的問題，
讓您有一個舒適、寧靜的休息空間。

KINETICS
Noise Control
Problem Solvers in vibration isolation, noise and shock control

KINETICS NOISE CONTROL (ASIA) LTD.
香港官塘巧明街 95 號世達中心 9 樓 E 室
Unit E, 9/F., World Tech Centre, 95 How Ming Street,
Kwun Tong, Hong Kong
Tel : (852) 2191 2488 Fax : (852) 2191 2477
E-mail : fchan@kineticsnoise.com www.kineticsnoise.com

中國内地經銷商：
東莞聯華五金制品有限公司
地址：東莞市虎門鎮龍眼管理區
Tel：86-769-85551248 85554024
Fax：86-769-85551848
E-mail:luenwah@hkstar.com

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix E

Site layout Plan

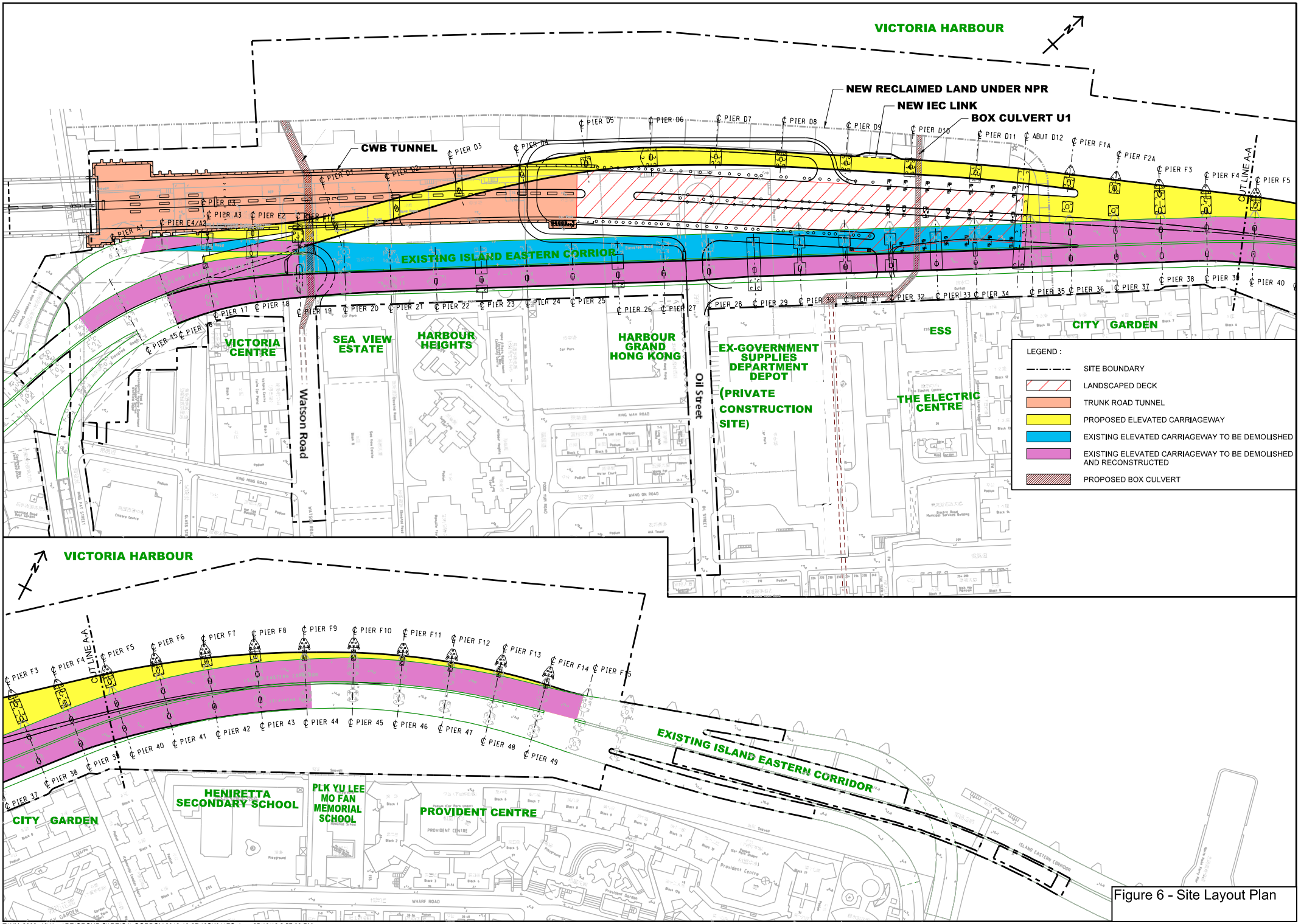


Figure 6 - Site Layout Plan

T:\HY_2009_19\User\RE(GROUP C)\RE(C4)-GORDON\2012-10-25\19SK0117G.dgn 25/10/12 2:57:03 PM

俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix F

Harbour Grand Hong Kong Hotel Correspondence

Mohamed Hasan Isa

From: Simon Tang (Harbour Grand Hong Kong - Director of Guest Safety & Services) <simont@harbourgrand.com>
Sent: Thursday, July 06, 2017 4:33 PM
To: George Lee (CW)
Cc: Ivan Wong (CW); Andy Chan (CW); Mohamed Hasan Isa
Subject: RE: HGHK: Placing Temp Noise Barrier at HGHK Carpark

Dear George:
Hotel fully understood the barrier would block the view and natural wind.
We would prefer not to build the barrier.
BR,
Simon

From: GEORGE LEE CHUNG [mailto:george.lee@chunwo.com]
Sent: Wednesday, 05 July, 2017 9:59 AM
To: Simon Tang (Harbour Grand Hong Kong - Director of Guest Safety & Services)
Cc: IVAN WONG CHI CHEUNG; ANDY CHAN CHI CHUNG; mh.isa@hy200919.chunwo.com
Subject: RE: HGHK: Placing Temp Noise Barrier at HGHK Carpark

Dear Simon,

Further to my previous email, I would like to further elaborate the reason of placing noise barrier.

The provision of temporary noise barrier as noise mitigation measures as recommended under the relevant EIA report and EP.

We understand that the view to Victoria Harbour from hotel will be blocked and natural wind will be reduced once the barriers are in place.

Should you understand the requirement and accept the removal of the temporary noise barrier, kindly reply our email once again to express your opinion on such arrangement.

Regards,

Lee Chung
Chun Wo Construction & Engineering Co. Ltd.
Mobile: (852) 9641 9401
Website: www.chunwo.com

寄件者: Simon Tang (Harbour Grand Hong Kong - Director of Guest Safety & Services) <simont@harbourgrand.com>
寄件日期: 2017 年 7 月 3 日 16:26
收件者: GEORGE LEE CHUNG
副本: IVAN WONG CHI CHEUNG
主旨: RE: HGHK: Placing Temp Noise Barrier at HGHK Carpark

Dear George:

A 5m height barriers would definitely blocking our view from the alfresco as well as the function room on 1/F. Therefore, we would not agree on this proposal.

Thanks & regards,

Simon Tang
Director of Guest Safety & Services
Harbour Grand Hong Kong Limited

23 Oil Street, North Point, Hong Kong
(MTR Fortress Hill Station, Exit A)
Dir: +852 2121 2635
Fax: +852 3908 6159
Email: simont@harbourgrand.com
Website: www.harbourgrand.com

From: GEORGE LEE CHUNG [mailto:george.lee@chunwo.com]
Sent: Monday, 03 July, 2017 1:59 PM
To: Simon Tang (Harbour Grand Hong Kong - Director of Guest Safety & Services)
Cc: IVAN WONG CHI CHEUNG
Subject: HGHK: Placing Temp Noise Barrier at HGHK Carpark

Dear Simon,

Currently our project is carrying out foundation works outside HGHK Carpark.
Such works target to finish in July 2017.

Our client's Environmental Team (ET) comments that, in order to mitigate the impact to adjacent stakeholders, JV propose to place some temporary noise barriers along the fence wall of HGHK Carpark. The barrier will have approx. 5m in height and continuous from east to west.

We understand that the view to Victoria Harbour from hotel will be blocked and natural wind will be reduced once the barriers are in place.

We therefore write to seek your approval on such arrangement.

Should you have any queries please feel free to contact me.

Regards,

Lee Chung

Chun Wo Construction & Engineering Co. Ltd.
Mobile: (852) 9641 9401
Website: www.chunwo.com

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俊和-中國中鐵-中鐵大橋局聯營
CHUN WO - CRGL - MBEC JOINT VENTURE

CONSTRUCTION NOISE MANAGEMENT PLAN

FOR

Contract No.: HY/2009/19

Central – Wan Chai Bypass
Tunnel (North Point Section)
and
Island Eastern Corridor Link

Appendix G

Environmental Review Report

Central-Wan Chai Bypass –Tunnel (North Point Section) and Island Eastern Corridor Link

Environmental Review Report for Alternative Arrangement for Demolition and Construction of Substructures for the Island Eastern Corridor and Construction of Adjacent Tunnel Approach Ramp Structure

1. Introduction

1.1 As stipulated in Condition 2.9(b) of Environmental Permit EP-364/2009/C (EP), temporary noise barriers with height up to the soffit of the bridge deck area shall be installed along the existing IEC structure during the demolition and construction of substructure for the IEC and construction of adjacent tunnel approach ramp structure to mitigate the construction noise impact.

1.2 This Environmental Review Report aims to identify potential environmental impact due to the alternative arrangement on the demolition and construction of substructures for the Island Eastern Corridor (IEC) with associated noise mitigation measures.

2. Site Description

2.1 As mentioned in the EP, the scope of the Central - Wan Chai Bypass Project includes:

(i) a dual three-lane trunk road, approximately 4.5 km in length, and tunnel approximately 3.7 km in length defined from the connection with the existing Rumsey Street Flyover in Central, through to a connection with the existing Island Eastern Corridor to the east of the Causeway Bay Typhoon Shelter (CBTS);
(ii) the Central Interchange near the Rumsey Street Flyover to provide road connections to the Central area;
(iii) tunnel control buildings and ventilation buildings;
(iv) slip roads to connect the CWB to the local road system in the Wan Chai North and Causeway Bay area;
(v) associated road lighting, road signing, traffic control and surveillance system; and
(vi) other associated works.

2.2 As part of the works of the Project, the modification of the section of Island Eastern Corridor (IEC) between Hing Fat Street and Po Leung Kuk Yu Lee Mo Fan Memorial School is required in which demolition and construction of the IEC will be carried out in stages. The general site layout showing the extent of the IEC reconstruction work is indicated in Figure 1a.

3. Alternative Arrangement during Demolition and Construction of Substructures for the IEC

3.1 Pursuant to Condition 2.9(b) of the EP, temporary noise barriers with height up to the soffit of the bridge deck area shall be installed along the existing IEC structure during the demolition and construction of substructure for the IEC and construction of adjacent tunnel approach ramp structure to mitigate the construction noise impact.

3.2 As stated in Section 4.5.6 of the approved EIA report (Report No. AEIAR-125/2008), the original demolition method for existing IEC is that the IEC is to be demolished by the breaking of the two ends at the piers to separate the U-beams and the U-beams will be removed by lifting cranes. Mechanical breakers such as excavator mounted breakers will be adopted in the breaking works as a conventional method which has already been considered in the construction noise assessment of the EIA report. Alternative construction method such as saw cutting may be used in localized areas for cutting the slabs to separate the U-beams for removal by lifting one by one. Excavator mounted breakers with sound-proof hammer bracket or hydraulic breaker will be used in any case to break the pier head for the connection with the reconstructed IEC.

3.3 As an alternative arrangement on the demolition method for IEC, saw cutting method will be fully adopted in the U-beam separation, whilst wire cutting method will be adopted to replace conventional concrete breaking method to separate the U-beams from the existing piers. Besides, the pier heads and columns will be removed by wire cutting and lifting by cranes instead of conventional breaking work by excavator mounted breakers.

3.4 Apart from the above alternative arrangement, the alignment / height of the temporary noise barriers at some locations will be varied from the EP due to different site constraints.

3.5 The original alignment of the temporary noise barriers along the IEC as per EP requirement is indicated in Figure 1b (i.e. black dotted line). The proposed realignment of such type of temporary noise barriers is also indicated in Figure 1b (i.e. red dotted line). The photos showing the general views of the subject site and its surrounding environment with the nearest sensitive receivers are indicated in Figure 1b and Appendix 3.

3.6 The original location of the temporary noise barriers is shown in Figure 2 of the EP. Figure 1c shows the proposed layout of temporary noise barriers requiring realignment or modification. There are totally 3 nos. of locations requiring realignment or modification of temporary noise barriers, which are situated:

(1) at the end of Watson Road opposite Victoria Centre (namely area A1 as indicated in Figure 1b);
(2) opposite Harbour Grand HK Hotel (namely area A2); and
(3) between Oil Street and City Garden Block 10 (namely area A3).

3.7 The original location of the temporary noise barriers required for demolition of crossheads and piers of existing marine section of IEC is shown in Figure 3 of the EP. Figure 1f shows the proposed layout of temporary noise barriers requiring modification (namely area A4 as indicated in Figure 1b).

3.8 The details of temporary noise barriers requiring realignment / modification at the above concerned areas are mentioned as follows:

Area A1 – Temporary Noise Barriers at End of Watson Road opposite Victoria Centre

3.8.1 The alignment of the temporary noise barriers has to be revised since:

i) the basement car park of Food and Environmental Hygiene Department (FEHD) was located underneath this work area and some part of the site area has already been returned to the FEHD for daily operation; and

ii) placing the up-to-soffit noise barriers would cause structural damage to the ground floor slab of the FEHD basement car park and therefore the height of the temporary noise barriers has to be reduced.

The detail of the proposed realignment / modification of temporary noise barriers at this area is shown in Figure 1d.

Area A2 – Temporary Noise Barriers Opposite Harbour Grand HK Hotel (HGHK)

3.8.2 As requested by the HGHK, the installation of temporary noise barriers with height up to the soffit of the bridge deck area along the existing IEC structure opposite HGHK will hinder their business (Please refer to Appendix 4 for the minutes of meeting with HGHK). Therefore, movable noise barriers are proposed to be placed during the demolition and construction of substructure for the IEC. The detail of the proposed modification of temporary noise barriers at this area is shown in Detail A of Figure 1e.

Area A3 – Temporary Noise Barriers between Oil Street and City Garden Block 10

3.8.3 As mentioned in Section 3.3, the pier heads and the columns of the IEC will be removed by wire cutting and lifting by cranes. The installation of temporary noise barriers with height up to the soffit of the bridge deck area along the existing IEC structure will obstruct such operation. For the safety consideration, the alignment and height of the temporary noise barriers have to been revised and reduced for lifting operation by cranes for the demolition and construction of IEC superstructure and substructure and to allow working

space for temporary storage of demolished beams from the IEC. The detail of the proposed realignment / modification of temporary noise barriers at this area is shown in Figure 1e.

Area A4 – Temporary Noise Barriers at Marine Section of IEC in front of City Garden

3.8.4 With the change of the demolition method from conventional breaking method to wire cutting and lifting for the IEC substructure at marine section, the layout of temporary noise barriers has been modified which are installed at noise sources (i.e. the noise generated from the saw cutting / wire cutting machines) such that the construction noise impact to NSRs will be minimized. The detail of the proposed modification of temporary noise barriers at this area is shown in Figure 1f.

4. Potential environmental impacts and proposed environmental mitigation measures

4.1 The following paragraphs summarise the nature and extent of the key environmental impacts arising from the alternative arrangement mentioned in Section 3 above. Additional impact on waste generation due to the alternative arrangement is considered insignificant as no additional waste was generated.

5. Air Quality

End of Watson Road opposite Victoria Centre / Opposite Harbour Grand HK Hotel (HGHK)

5.1 As observed, the nearest domestic premise at Watson Road is Victoria Centre, which is identified as the Air Sensitive Receivers (ASR) for this assessment.

5.2 With curtain walls installed at HGHK, the air quality impact in not significant and therefore HGHK is not identified as the ASR for this assessment.

5.3 At the end of Watson Road opposite Victoria Centre, the air quality impact from the subject site would mainly be related to dust from demolition of substructures and material handling. Considering that the site is a hard paving ground, there would be no other emission sources from dust generation that would cause adverse impact to the nearby ASRs.

5.4 The possible sources of air emissions from materials handling would be from the ingress and egress of vehicles for transportation of materials and the vehicle movement within the subject site under the IECL. However, since FEHD is located in between the site and the ASRs, site traffic will not pose any significant impacts to the ASRs. Nevertheless, the following mitigation measures would be implemented:

- The haul road of the subject site is paved and the road will be water sprayed to minimize any fugitive dust emission due to vehicle movements.
- Water spray during excavation and demolition works;
- Stockpiles of dusty materials would be covered or sprayed with water during dry or windy conditions to prevent airborne dust impact if necessary;
- Ultra Low Sulfur Diesel will be used in for all construction plants as far as possible;
- Fugitive dust generation from loading/unloading activities would be limited by depositing the excavated materials from a minimum practical height;
- Exposed soil would be covered as far as practicable.

5.5 With the implementation of the above mitigation measures, the air quality impact is considered not significant.

Works area beneath IEC bridge between Oil Street and City Garden Block 10 and Marine Section of IEC in front of City Garden

5.6 As observed, from Oil Street to marine side (towards North Point), there are some domestic premises such as Wan Wah Mansion (which is behind Harbour Grand HK Hotel) and from City Garden to Provident Centre, which are identified as the ASRs for this assessment.

5.7 The air quality impact from the proposed subject site would mainly be related to dust from construction activities such as excavation, demolition, and material handling activities which would have impact to the nearby sensitive receivers.

5.8 To reduce the air quality impact, the following mitigation measures would be implemented:

- Haul road will be water sprayed regularly to minimize any fugitive dust emission due to vehicle movements;
- Water spray during excavation, the demolition of pile caps and columns;
- Stockpiles of dusty materials would be covered or sprayed with water during dry or windy conditions to prevent airborne dust impact if necessary;
- Ultra Low Sulfur Diesel will be used in for all construction plants as far as possible;
- Fugitive dust generation from loading/unloading would be limited by dropping the excavated materials from only a minimum practical height;
- To minimise dust emissions, the amount of soil exposed would be kept as low as possible.

5.9 With the implementation of the above mitigation measures, the air quality is considered not significant.

6. Noise

6.1 As mentioned in Section 3.3, saw cutting method will be fully adopted in the U-beam separation, whilst wire cutting method will be adopted to replace conventional concrete breaking method to separate the U-beams from the existing piers. Besides, the pier heads and columns will be removed by wire cutting and lifting by cranes instead of conventional breaking work by excavator mounted breakers. The construction noise impact on the demolition of IEC substructure has been significantly reduced compared with conventional method as stated in EIA report.

6.2 Besides, due to various site constraints, the installation of such temporary noise barriers cannot be carried out at some locations or the alignment has to be amended as compared with those as stated in the EP. Such constraint will continue to exist during the remaining construction period of the demolition and construction of substructure for the Island Eastern Corridor (IEC) and construction of adjacent tunnel approach ramp structure. Hence, different types of temporary noise barriers have been proposed for Area A1 to A3 as shown in Figures 1d and 1e**.**

Area A1 – End of Watson Road opposite Victoria Centre

6.3 This area has been occupied since April 2013. As the basement car park of Food and Environmental Hygiene Department (FEHD) was located underneath this work area and some part of site area has already been handed back to the FEHD for daily operation, the alignment of the temporary noise barrier has to be revised. Furthermore, the height of the temporary noise barrier has to be reduced because engineering calculation revealed that placing the up-to-soffit noise barriers on location according to figure 2 of the Environmental Permit would cause structural damage to the ground floor slab to the basement car park of the FEHD depot. This proposal has been addressed in the Noise Management Plan (Rev. 3) which was submitted to EPD on 15 March 2013.

6.4 As observed, the nearest domestic premise at Watson Road is Victoria Centre, which is identified as the Noise Sensitive Receivers (NSR) for this assessment.

6.5 At the end of Watson Road opposite Victoria Centre, the construction noise impact from the subject site would mainly be related to the demolition and construction of substructures. We have exhausted all practicable mitigation measures as required in TM-EIAO at this area in order to minimize the construction noise impact to nearby residents. Temporary noise barriers have been placed as indicated in Figure 1d and alternative demolition method as stated in Section 6.1 has been adopted to minimize environmental nuisance to the nearby NSRs.

Area A2 – Opposite Harbour Grand HK Hotel (HGHK)

6.6 This area is located in front of the Hotel Harbour Grand Hong Kong (HGHK) and has been occupied since February 2014. As requested by the HGHK, the installation of temporary noise barriers with height up to the soffit of the bridge deck area along the existing IEC structure within this area will hinder their business (refer to Appendix 4). As such localized movable noise barrier is proposed to be placed during the demolition and construction of substructure for the IEC (refer to Figure 1e). This proposal has been addressed in the Noise Management Plan (Rev. 3) which was submitted to EPD on 15 March 2013.

6.7 As observed, HGHK is identified as the Noise Sensitive Receivers (NSR) for this assessment.

6.8 We have exhausted all practicable mitigation measures as required in TM-EIAO at this area in order to minimize the construction noise impact to nearby residents. Curtain walls were installed at HGHK and temporary noise barriers have been placed as indicated in Figure 1e and alternative demolition method as stated in Section 6.1 has been adopted to minimize environmental nuisance to the nearby NSRs.

Area A3 – Between Oil Street and City Garden Block 10

6.9 This area has been occupied. Demolition of the bridge deck for the IEC has commenced in May 2015. As the alignment of temporary noise barriers will obstruct the construction of substructure for the IEC and it's height at some locations will obstruct the movement of the mobile plant during its operation when demolishing the superstructure, both the alignment and the height of the temporary noise barriers have to be revised. Further elaboration on the impact of proposed change will be addressed in following session.

6.10 The construction of substructure for the tunnel approach ramp is expected to commence in late 2015. With the site constraints as mentioned above, continuous temporary noise barriers placed with details as shown in Figure 1e will be installed from Eastern side of Oil Street to City Garden Block 10.

6.11 Practical difficulties in installing the temporary noise barrier are shown in S6.12 to S6.14.

6.12 Within Area A3, the following works will be carried out:

(i) Substructure construction for Administration Building (ground beam);
(ii) Extension of existing IEC pile caps;
(iii) Demolition & construction of IEC; and
(iv) Construction of Approach Ramp.

6.13 The substructures to be constructed under the IEC includes:

(a) Pile caps reconstruction and pile cap tie-in works for the IEC – Some piles requiring tie-in for the IEC are either too close to the original alignment of the temporary noise barriers or pile cap is required to be extended from underneath of the IEC and extended beyond the alignment.

(b) Substructure works for the construction of Administration Building which sits directly under the IEC – The piling works and the pile caps for the Administration Building sits on the alignment of the temporary noise barriers, therefore the temporary noise barriers have to be shifted outward towards the site boundary.

(c) pile cap extension works can only start after the demolition of the IEC with the demolition sequence starting from the bridge deck, then the columns and finally down to the pile cap. The demolition works will be carried out using wire saw cutting (which is more quiet) instead of pneumatic breaker. The pile cap will then be extended by inserting re-bars at it's side and concreting it. After the extension of the pile caps, the construction of columns on it followed by the deck can commence. Therefore, the above revised alignment of temporary noise barriers will be maintained during the demolition and reconstruction of the IEC.

(d) Between Oil Street and City Garden Block 10, as observed, Wan Wah Mansion (which is behind Harbour Grand HK Hotel) and City Garden Block 10 &11 (Block 11 nearer to the site) are the nearest Noise Sensitive Receiver (NSR). For this works area, the pier heads and the columns of the IEC will be removed by wire cutting and lifting by cranes. The installation of temporary noise barriers with height up to the soffit of the bridge deck area along the existing IEC structure will obstruct such operation. For the safety consideration, the alignment and height of the temporary noise barriers have to been revised and reduced for lifting operation by cranes for the demolition and construction of IEC superstructure and substructure. However, as pile cap is not required to be removed for works area facing opposite City Garden Block 10/11, temporary noise barrier with height up to soffit will be kept. But again due to the operation of plants as mentioned above, the alignment of the temporary noise barrier will be along the boundary to City Garden. The detail of the proposed realignment / modification of temporary noise barriers at this area are shown in Figure 1e.

6.14 Besides, as the working space for pile cap reconstruction is restricted and the work requires heavy lifting operation of mobile plants, for the sake of safety, the height of temporary noise barriers has to be reduced to avoid possible collision with the lifting jibs of mobile plants during the work which results in overturning of the temporary noise barriers (refer to Section A-A in Figure 1e). Therefore, temporary noise barriers with an overall height of 5 m have been erected at in front of City Garden instead of under the IEC soffit.

6.15 Apart from the above, the construction of the approach ramp will also be carried out. The approach ramp can be divided into 3 stages, mainly excavation, re-bar fixing and concreting. It is anticipated that with the temporary noise barriers installed as shown in Figure 1e, additional movable noise barriers at the source of construction will further minimize noise nuisance.

6.16 Regarding the potential impact on the above proposed changes, we have exhausted all practicable mitigation measures as required in TM-EIAO in order to minimize the construction noise impact to nearby residents (e.g. City Garden), including the installation of temporary noise barriers and the use of movable noise barriers. Apart from City Garden, another areas adjacent to this works area are a private development (i.e. Cheung Kong) construction site and Hong Kong Electric Substation (HKE), the establishment of temporary noise barriers with 5m in height will block the line of sight between the nearest noise sensitive receivers namely, Man Wah Mansion (behind Harbour Grand HK Hotel) and approach ramp construction area. Movable noise barriers at sources have also been provided to further reduce the construction noise level.

6.17 In order to be able to demolish the substructure, the deck of the existing IEC needs to be demolished. The demolition work started from the westbound bridge deck of existing IEC which has commenced in May 2015 and the combined screening effect of the temporary noise barriers (with height up to soffit) and bridge deck would not exist in the remaining construction period of the demolition and construction of substructure for the IEC and construction of adjacent tunnel approach ramp structure after the removal of the soffit of the bridge deck. Even though there are practical difficulties in providing the up-to-soffit noise barriers strictly according to Figure 2 of the EP and there will be exceedance of construction noise limit, we have **exhausted all practicable mitigation measures** as required in TM-EIAO in order to minimize the construction noise impact to nearby residents including the use of movable noise barriers.

6.18 Furthermore, an updated noise assessment of cumulative impacts due to construction work with reference to (i) Appendix 4.13 - Powered Mechanical Equipment (PME) for the Different Construction Tasks during Normal Daytime Working Hours (with Mitigation Measures), and (ii) Appendix 4.14 - Calculations and Results of Construction Noise Impacts During Normal Daytime Working Hour (with Mitigation Measures) of

approved EIA report has been carried out (refer to Appendix 5). It is noted that the construction noise impact due to the proposed changes on the temporary noise barriers is negligible when comparing with the estimated noise level during EIA stage.

6.19 However, as a further measure for noise mitigation, the following suggested measures will be implemented during construction stage:
(a) Only one construction task will be carried out at any time through thorough planning of works;
(b) Installation of movable noise barriers at noise source (including the construction of Approach Ramp) to achieve noise reduction.

6.20 We have exhausted all practicable mitigation measures as required in TM-EIAO in order to minimize the construction noise impact to nearby residents. Temporary noise barriers have been placed as indicated in Figure 1e and additional movable noise barrier has been placed at source to minimize environmental nuisance to the nearby NSRs.

Area A4 – Marine Section of IEC in front of City Garden

6.21 To further reduce noise nuisance, the demolition of the existing piers and crossheads for the marine section of the existing IEC will be carried out using wire cutting method instead of pneumatic breakers as mentioned above. The section will then be transported away from the works area. With demolition of the existing piers and crossheads not employing pneumatic breakers, temporary noise barrier as shown in Figure 3 of the Environmental Permit will not serve it's original purpose. Temporary / Movable noise barriers will be installed at source as shown in Figure 1f.

6.22 With the change of the demolition method from conventional breaking method to wire cutting and lifting for the IEC substructure at marine section, the layout of temporary noise barriers has been modified which are installed at noise sources (i.e. the noise generated from the saw cutting / wire cutting machines) such that the construction noise impact to NSRs will be minimized.

6.23 We have exhausted all practicable mitigation measures as required in TM-EIAO in order to minimize the construction noise impact to nearby residents. Temporary noise barriers have been placed locally at source (i.e. movable noise barriers).

6.24 A review on construction noise impact has been conducted for the alternative arrangement on the demolition and construction of substructures. (please refer to Appendix 5).

6.25 With the alternative arrangement as stated in Section 6.1 above, associated noise mitigation measures have been implemented to minimize noise nuisance to the NSRs:

(i) Ensure that all plant and equipment to be used are properly maintained and in good operating condition;
(ii) The use of Quality Powered Mechanical Equipment (QPME) plant as far as practicable;
(iii) Powered Mechanical Equipment would be switched off when idling; and
(iv) The use of additional movable noise barrier at construction noise sources as additional noise mitigation measures to cut off the line of sight between the PME and the NSR.

6.26 To minimize environmental nuisance to the nearby NSRs, we have exhausted all practicable mitigation measures as required in TM-EIAO in order to minimize the construction noise impact to nearby residents.

7. Visual

End of Watson Road opposite Victoria Centre

7.1 With temporary noise barrier constructed below the IEC there will be no line of sight between the sensitive receivers (Victoria Centre) and the construction of substructure works. Therefore, the visual impact is considered insignificant.

Opposite Harbour Grand HK Hotel (HGHK)

7.2 As requested by the HGHK, the installation of temporary noise barriers with height up to the soffit of the bridge deck area along the existing IEC structure opposite HGHK will hinder their business. Therefore, the localized movable noise barrier is proposed to cover the line of sight of the construction activities and the visual impact is considered insignificant.

Works area beneath IEC bridge between Oil Street and City Garden Block 10

7.3 Between Oil Street and City Garden there is a private construction site and a Hong Kong Electric Substation (HKE) next to it. This is not identified as a VSR and no impact is anticipated.

7.4 To reduce visual impact to the VSRs, the following mitigation measures would be implemented:

- Erection of movable noise barriers or temporary noise barriers (Figure 1e); and
- Control of night- time lighting by
  (i) Position and aim the lighting properly to avoid overspill of light to outside the area being lit up.
  (ii) Ensure the external lighting is appropriately positioned, aimed or shielded so that illumination of nearby roads will not be adversely affected.
  (iii) Position of lighting away from VSRs and facing down towards the site.

Marine Section of IEC in front of City Garden

7.5 Both City Garden and Provident Centre are identified as VSRs for this assessment.

7.6 With the installation of temporary noise barriers (identified in the Environmental Impact Assessment (EIA)) placed locally at source, the visual impact is considered insignificant.

7.7 To reduce the visual impact, the following mitigation measures would be implemented:

- Erection of movable noise barriers and temporary noise barriers (Figure 1f); and
- Control of night- time lighting by placing light source away from VSRs and facing down.

8. Water

8.1 With the alternative arrangement as stated in Section 3 above, water will be used as a cooling agent to reduce the heat generated from saw cutting and wire cutting operations to avoid overheating of the machinery.

8.2 The following control measures would be implemented during the usage of water for saw cutting and wire cutting operations:

- bunds will be formed to confine the used water for the saw cutting or wire cutting operation.
- The quantity of water to be used for cooling during saw cutting / wire cutting operation is approximately 420 litres per hour (or 117 ml/s). The used water (which might be possibly mixed with the concrete debris generated from saw cutting / wire cutting operation) will be collected and transferred to the local wastewater treatment plant (e.g. Wetsep) with treatment capacity of 80 cu.m (i.e. 80,000 litres) per hour, which is sufficient to treat those used water.
- Instead of discharging the used water after treatment to approved discharge point in accordance with the water discharge licence under the Water Pollution Control Ordinance (WPCO), the water will be reused for watering on haul road for dust suppression as a sustainable measure to the environment.

8.3 With the implementation of the above control measures, the impact on water quality is considered insignificant.

9. Conclusion

9.1 With the alternative arrangement on the demolition and construction of substructures for the IEC and implementation of corresponding control measures and mitigation measures, the environmental nuisance (including noise, air, water and visual impacts) to these sensitive receivers is considered insignificant.

9.2 Saw cutting and wire cutting methods have been adopted for the demolition and construction of substructures for the IEC. Associated noise mitigation measures will be implemented to minimize noise nuisance to the NSRs:

- Ensure that all plant and equipment to be used are properly maintained and in good operating condition;
- Prohibition of any noisy operations during restricted hours (i.e. any day not being a general holiday 1900 – 0700 next day; and general holiday including Sundays 0000 - 2400) unless a Construction Noise Permit has been granted;
- The use of Quality Powered Mechanical Equipment (QPME) plant if possible;
- Noise Emission Labels would be applied for air compressors with an air pressure not less than 500 kPa and handheld percussive breakers with weight not less than 10kg. No such PME would be used without a valid Noise Emission Label;
- Powered Mechanical Equipment would be switched off when idling; and
- The use of movable noise barrier if necessary.

To minimize environmental nuisance to the nearby NSRs, we have exhausted all practicable mitigation measures as required in TM-EIAO in order to minimize the construction noise impact to nearby residents.

9.3 With the proposed mitigation measures mentioned below, the visual impact to sensitive receivers is considered insignificant:

- Erection of movable noise barriers and temporary noise barriers and
- Control of night- time lighting by placing light source away from VSRs and facing down.

Reference:

Technical Memorandum on Environmental Impact Assessment Process, published by EPD, HKSAR

A Guide to the EIA Ordinance, published by EPD, HKSAR

Technical Memorandum on Noise from Construction Work other than Percussive Piling

Guidelines on Industry Best Practices for External Lighting Installation, issued by Environmental Bureau dated January 2012

END

Appendix 1

1. **Figure 1a - Site layout plan for IEC reconstruction**

2. **Figure 1b - Original layout and proposed realignment of temporary noise barriers for IEC reconstruction**

3. **Figure 1c - Proposed layout of temporary noise barriers requiring modification / realignment (with reference to Figure 2 of EP-364/2009/C)**

4. **Figure 1d – Detail of proposed realignment / modification of temporary noise barriers at Watson Road**

5. **Figure 1e – Detail of proposed realignment / modification of temporary noise barriers at Oil Street**

6. **Figure 1f – Proposed layout of temporary noise barriers requiring modification (with reference to Figure 3 of EP-364/2009/C)**

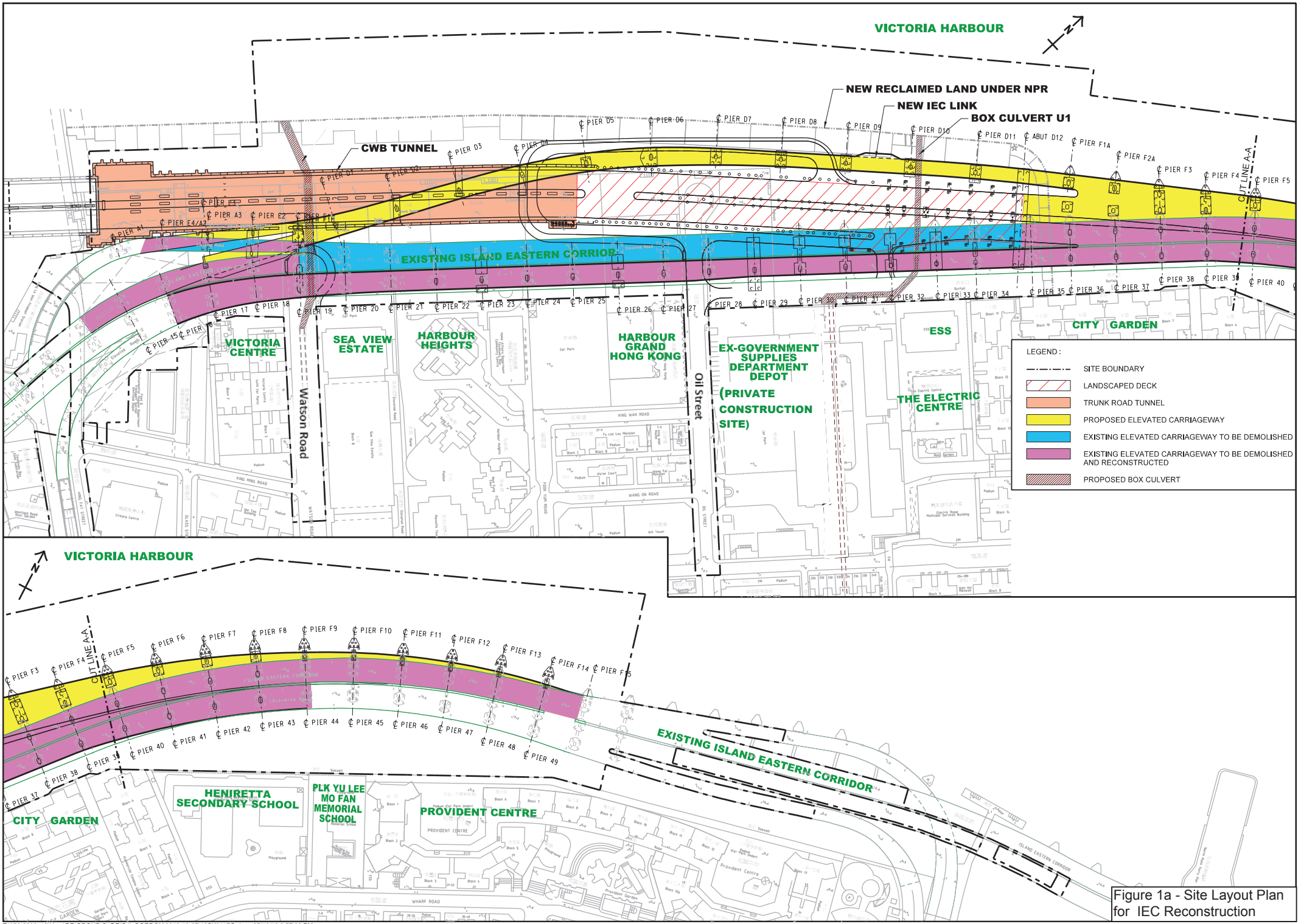

Figure 1a - Site Layout Plan for IEC Reconstruction

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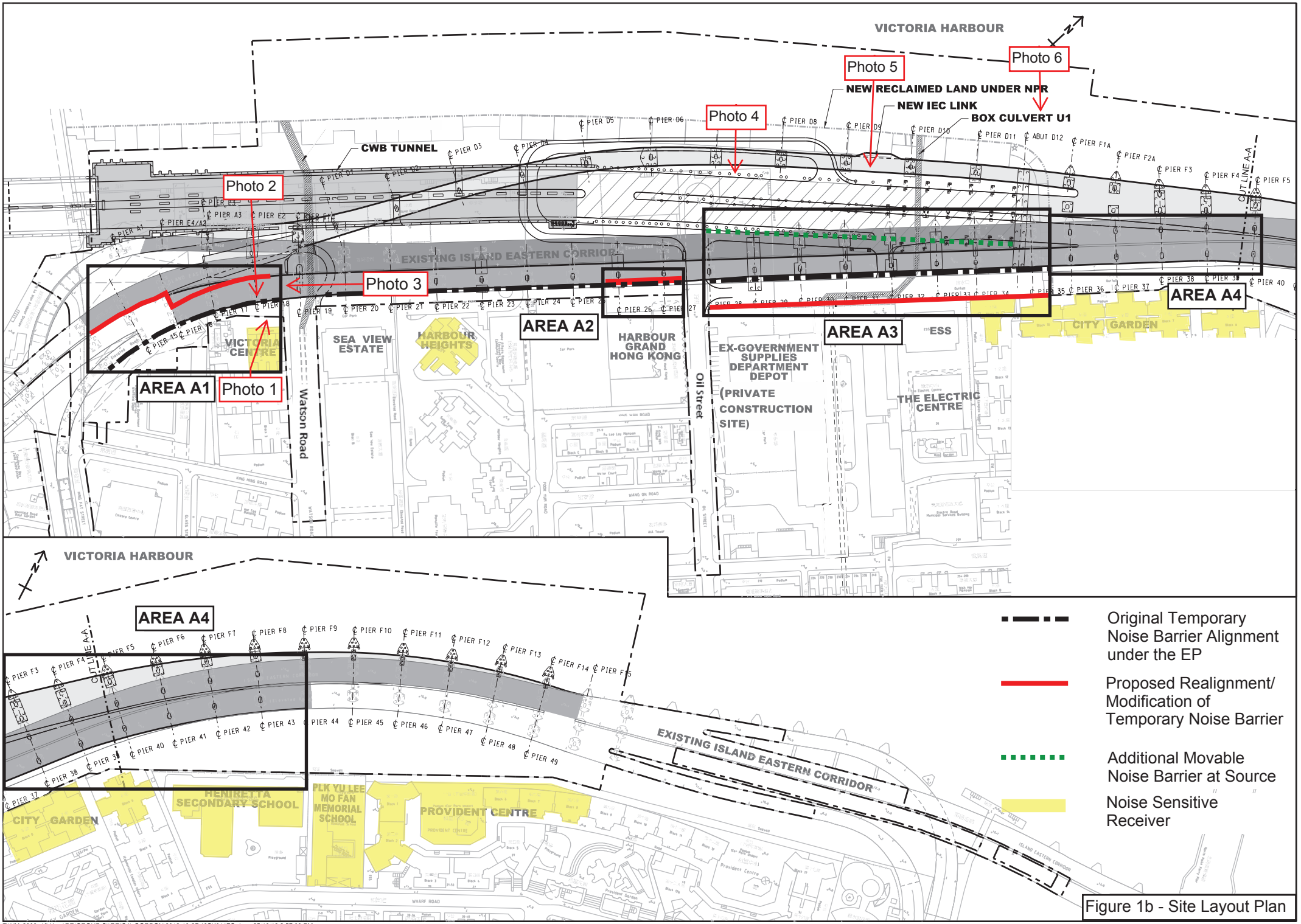

Figure 1b - Site Layout Plan

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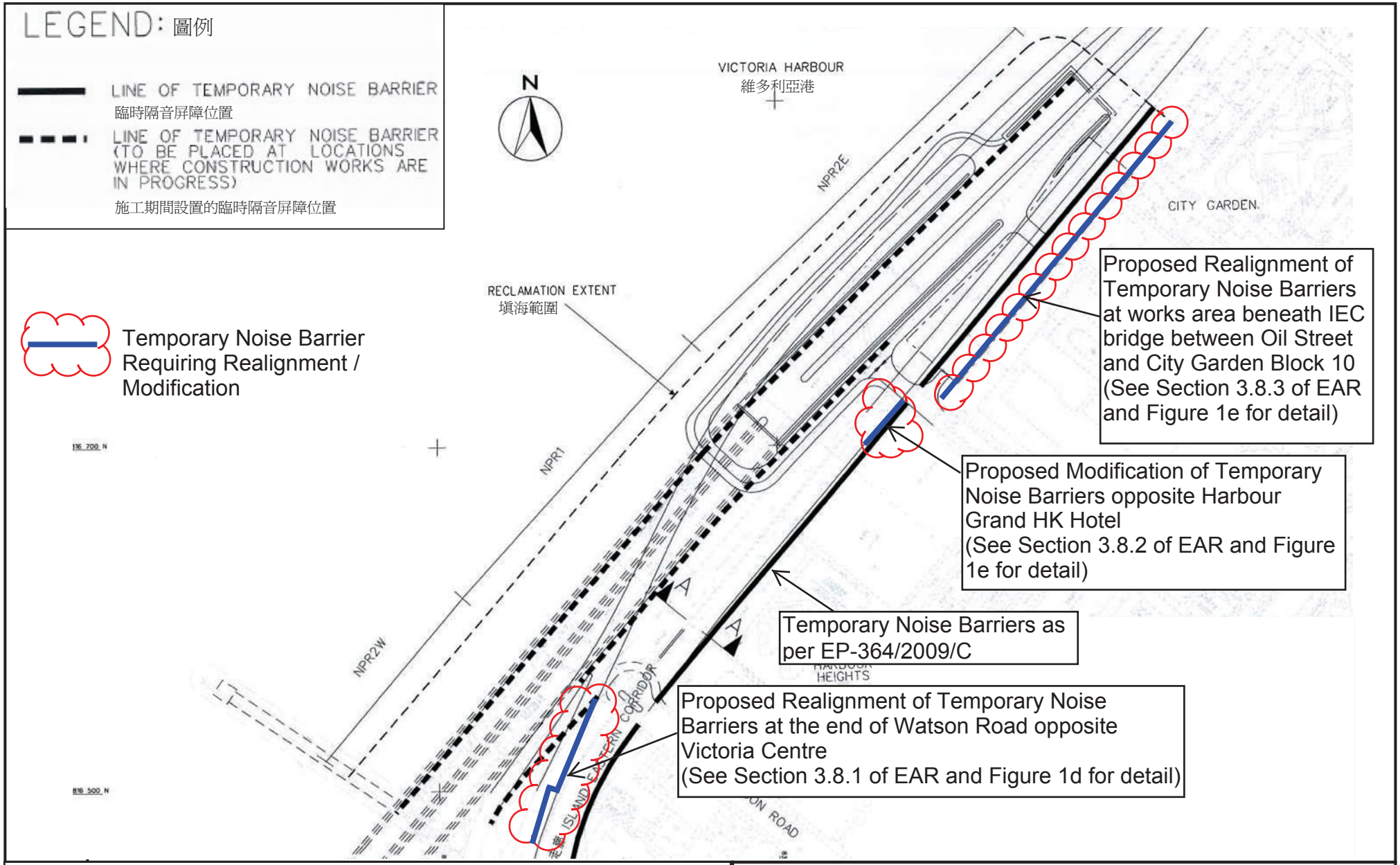


CHUN WO - CRGL - MBEC JOINT VENTURE

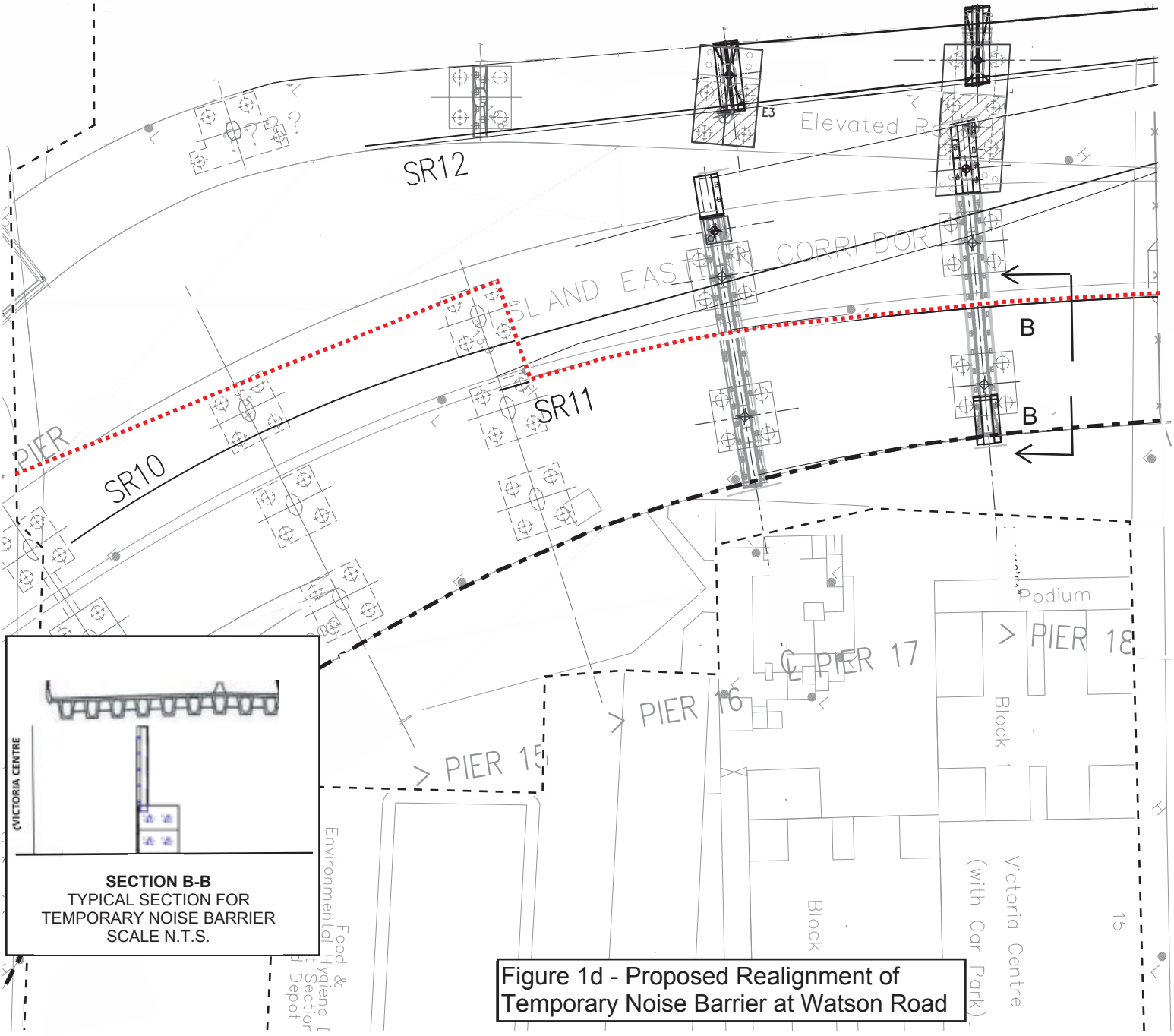
Central - Wan Chai Bypass - Tunnel (North Point Section) and Island Eastern Corridor Link

Figure 1c - Proposed Layout of Temporary Noise Barriers Requiring Modification / Realignment (with Reference to Figure 2.9 of EP-364/2009/C)

Project Site Boundary

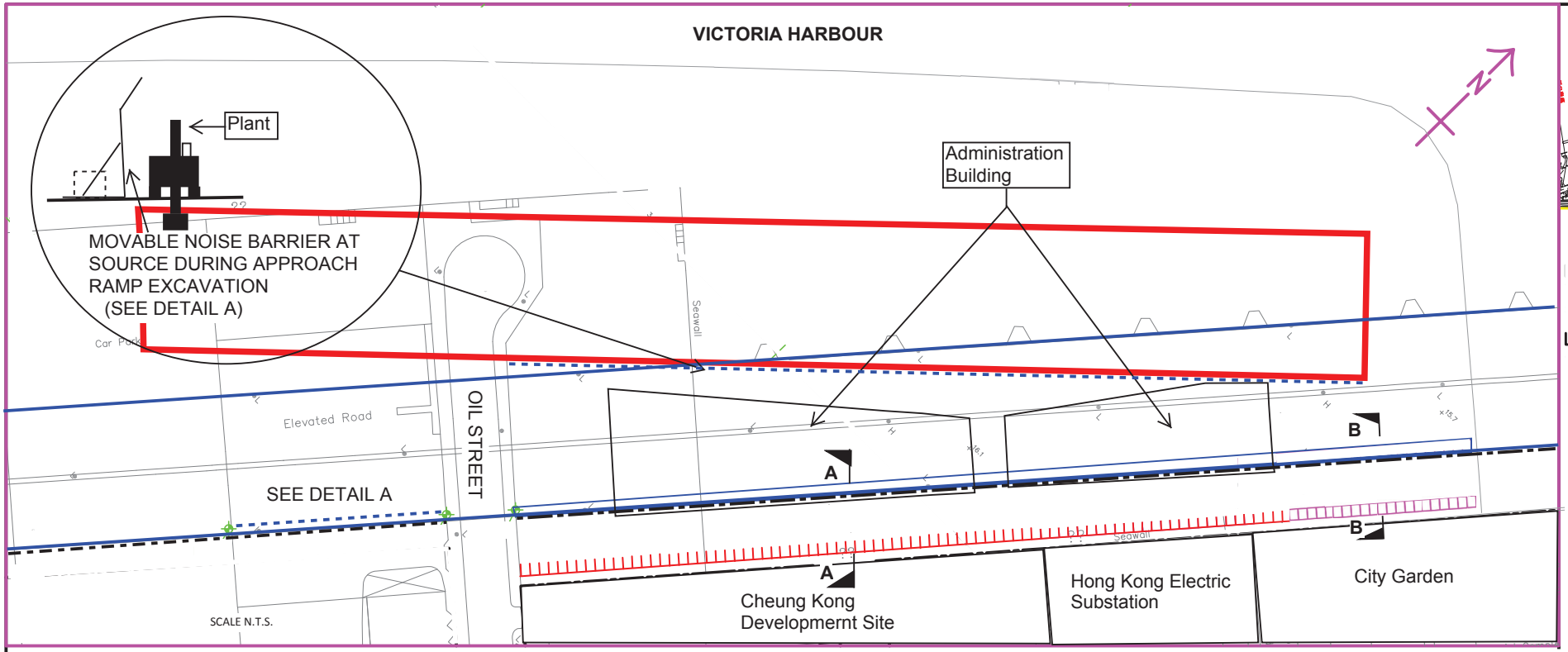
Original Temporary Noise Barrier as per EP-364/2009/C

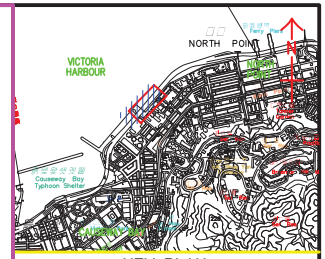
Proposed Alignment of Temporary Noise Barrier



SECTION B-B
TYPICAL SECTION FOR
TEMPORARY NOISE BARRIER
SCALE N.T.S.

Figure 1d - Proposed Realignment of Temporary Noise Barrier at Watson Road

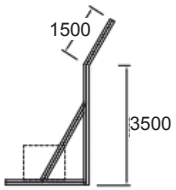




KEY PLAN

LEGEND:

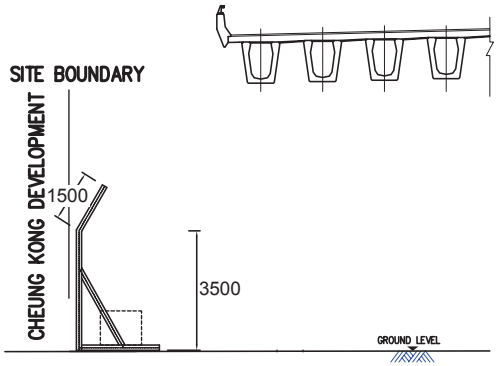
- Details refer to Section B-B
- Details refer to Section A-A
- Approach Ramp
- Existing Island Eastern Corridor (IEC)
- Original Temporary Noise Barrier
- Movable Noise Barrier



DETAIL A

TYPICAL SECTION FOR MOVABLE NOISE BARRIER AT SOURCE (THE BARRIER MATERIAL SHALL HAVE A SURFACE MASS OF NOT LESS THAN 14 Kg/m2 ON SKID FOOTING WITH 25 mm THICK INTERNAL SOUND ABSORPTIVE LINING)

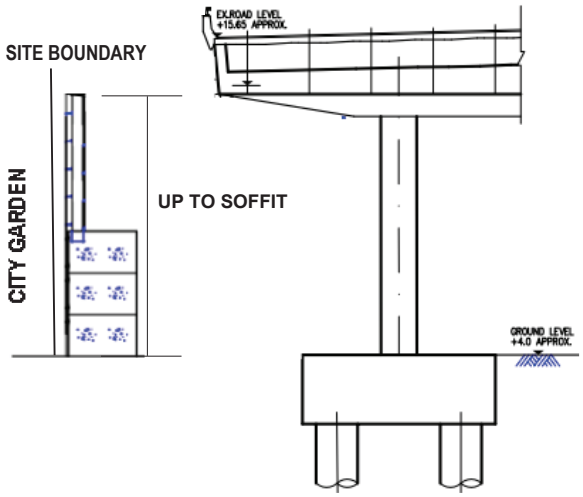
SCALE N.T.S.



SECTION A-A

TYPICAL SECTION FOR TEMPORARY NOISE BARRIER (THE BARRIER MATERIAL SHALL HAVE A SURFACE MASS OF NOT LESS THAN 14 Kg/m2 ON SKID FOOTING WITH 25 mm THICK INTERNAL SOUND ABSORPTIVE LINING)

SCALE N.T.S.



SECTION B-B

TYPICAL SECTION FOR TEMPORARY NOISE BARRIER

SCALE N.T.S.

Figure 1e - Details of Temporary Noise Barriers (From Oil Street to City Garden Block 10)

LEGEND 圖例

PROPOSED TEMPORARY NOISE BARRIERS ON TEMPORARY WORKING PLATFORM TO BE ERECTED ON PIERS OR PILE CAPS OF IEC FOR DEMOLITION WORKS

在拆卸工程期間建議豎立於碼頭或東區走廊椿帽的臨時工作平台上的臨時隔音屏障

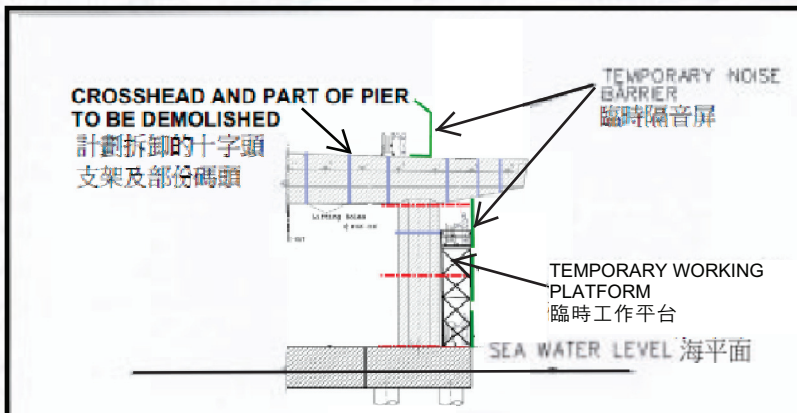
Proposed Modification of Temporary Noise Barriers

N

A

A

填海範圍
RECLAMATION EXTENT



TYPICAL SECTION A-A FOR DEMOLITION OF CROSSHEAD AND PART OF PIER

N.T.S.

拆卸的十字頭支架及部份碼頭結構的切面 A-A

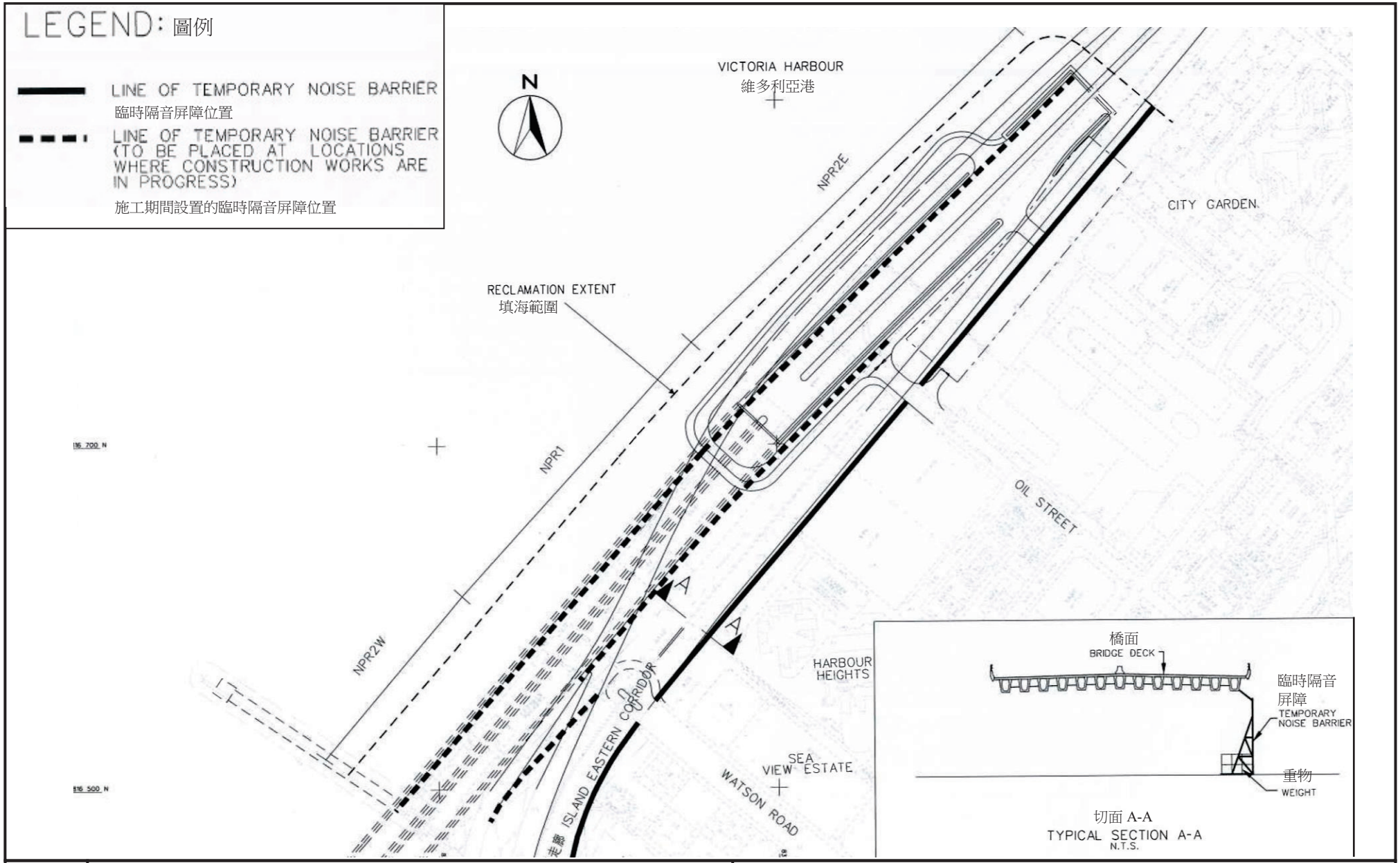
俊和 中国中铁 MBEC
CHUN WO - CRGL - MBEC JOINT VENTURE

Central - Wan Chai Bypass - Tunnel (North Point Section) and Island Eastern Corridor Link

Figure 1f - Location and Typical Details of Temporary Noise Barrier during Demolition of Existing Piers and Crossheads in Marine Section of IEC

Appendix 2

1. Figure 2 of EP-364/2009C (for comparison)
2. Revised Figure 2 for Variation of EP
3. Figure 3 of EP-364/2009C (for comparison)
4. Revised Figure 3 for Variation of EP

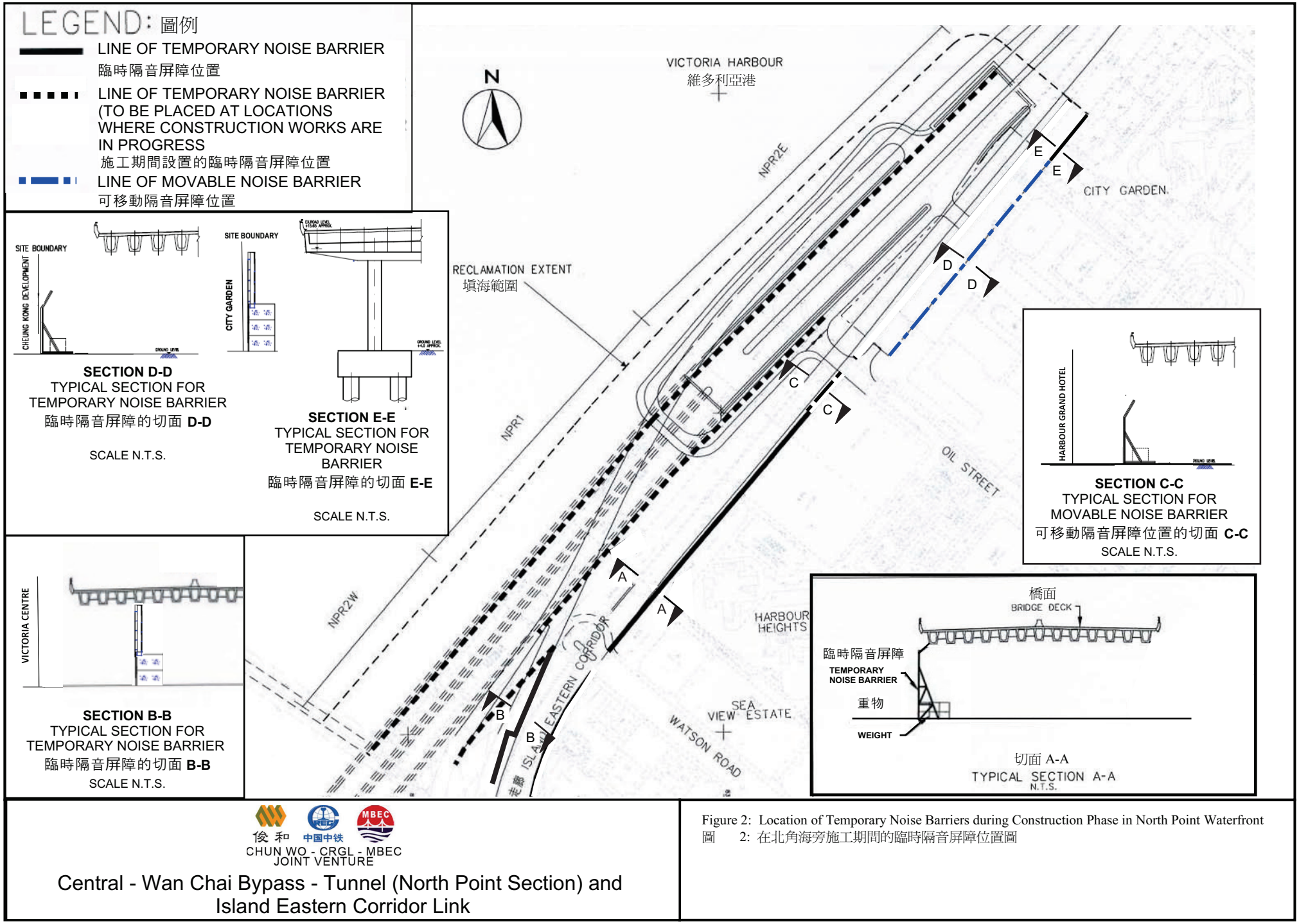


Project Title: Central-Wanchai Bypass (CWB) Including Its Road Tunnel and Slip Roads
工程項目名稱： 中環灣仔繞道包括其行車隧道及連接路

Environmental Permit No. : EP-364/2009/C
環境許可證編號 : EP-364/2009/C

Figure 2: Location of Temporary Noise Barriers during Construction Phase in North Point Waterfront
圖 2: 在北角海旁施工期間的臨時隔音屏障位置圖

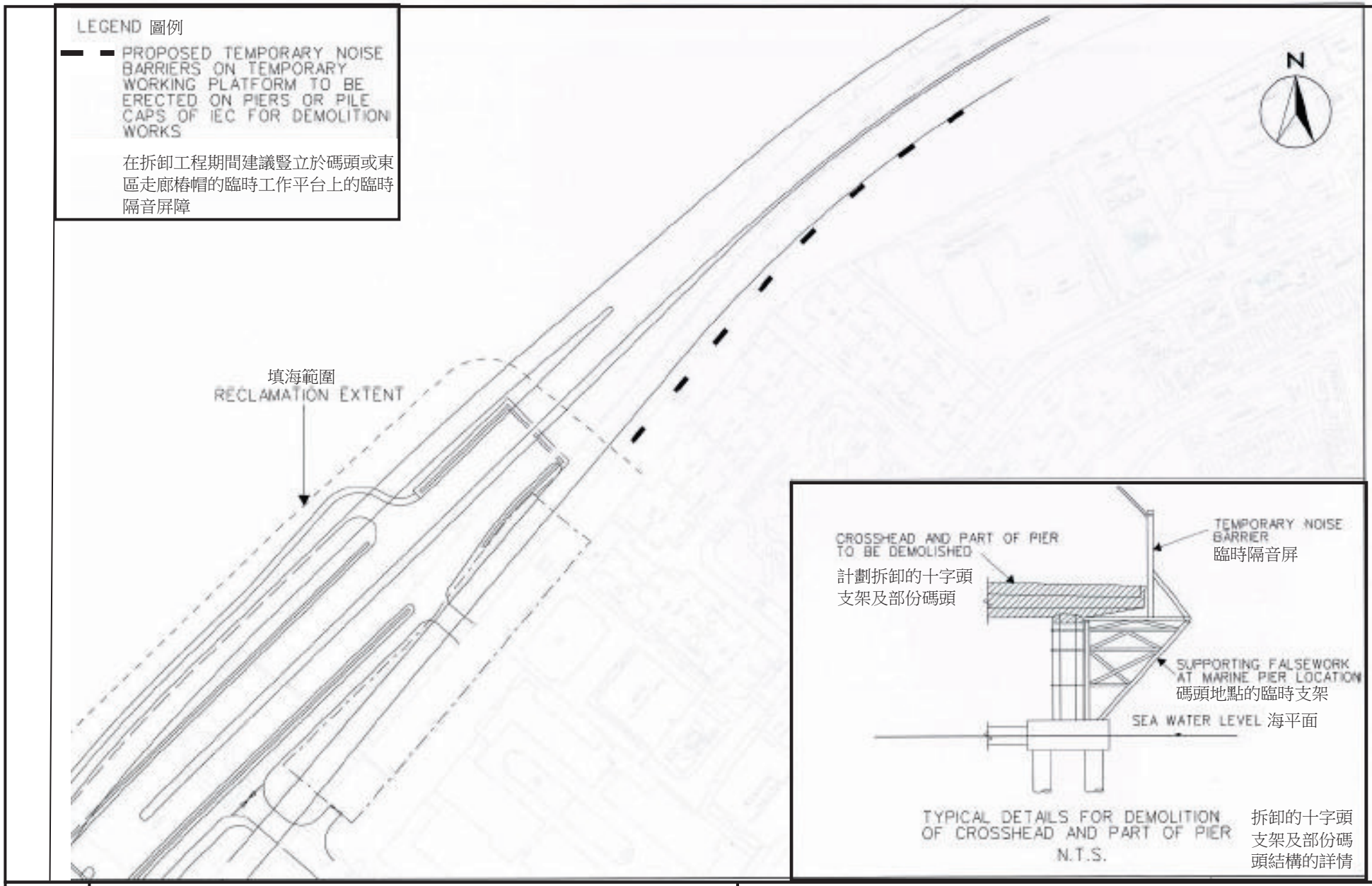
(This figure was prepared based on Figure 4.9 of the WDII&CWB EIA report (Register No.: AEIAR-125/2008))
(本圖是根據 WDII&CWB 環評報告（登記冊編號 AEIAR-125/2008）圖 4.9 編製)



俊和 中国中铁 MBEC
CHUN WO - CRGL - MBEC JOINT VENTURE

Central - Wan Chai Bypass - Tunnel (North Point Section) and Island Eastern Corridor Link

Figure 2: Location of Temporary Noise Barriers during Construction Phase in North Point Waterfront
圖 2: 在北角海旁施工期間的臨時隔音屏障位置圖

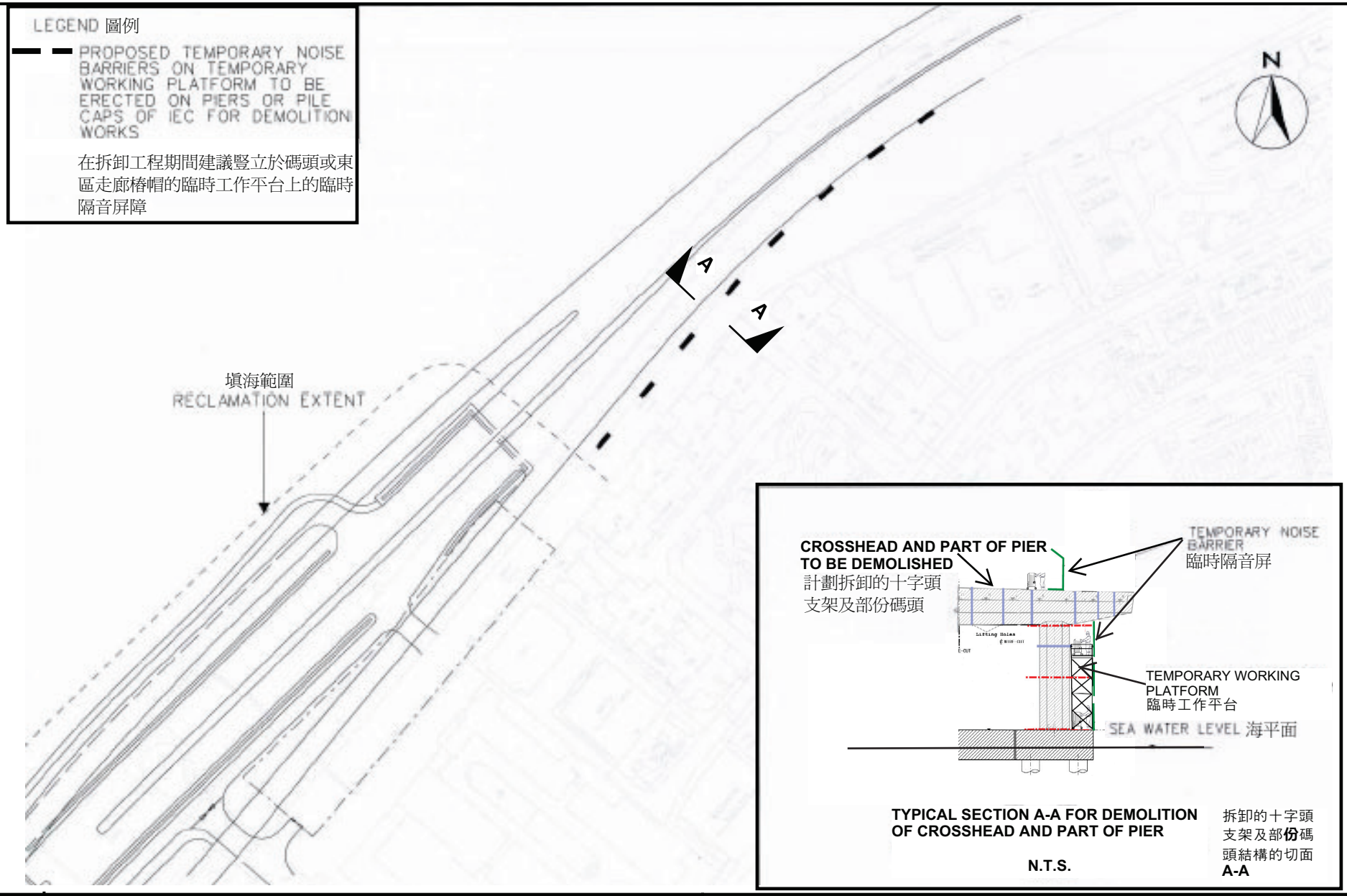


Project Title: Central-Wanchai Bypass (CWB) Including Its Road Tunnel and Slip Roads
工程項目名稱： 中環灣仔繞道包括其行車隧道及連接路

Environmental Permit No. : EP-364/2009/C
環境許可證編號 : EP-364/2009/C

Figure 3: Location of Temporary Noise Barriers during Demolition of Existing Piers and Crossheads in Marine Section of IEC
圖 3: 拆卸現有碼頭及東區走廊海面十字頭支架期間的臨時隔音屏障位置圖

(This figure was prepared based on Figure 4.9a of the WDII&CWB EIA report (Register No.: AEIAR-125/2008))
(本圖是根據 WDII&CWB 環評報告（登記冊編號 AEIAR-125/2008）圖 4.9a 編製)



CHUN WO - CRGL - MBEC JOINT VENTURE

Central - Wan Chai Bypass - Tunnel (North Point Section) and Island Eastern Corridor Link

Figure 3: Location of Temporary Noise Barriers during Demolition of Existing Piers and Crossheads in Marine Section of IEC

圖 3: 拆卸現有碼頭及東區走廊海面十字頭支架期間的臨時隔音屏障位置圖

Appendix 3

Photos of Works Area with Surrounding Environment and nearest Sensitive Receiver

Central-Wan Chai Bypass –Tunnel (North Point Section) and Island Eastern Corridor Link

Photo 1 - Victoria Centre (Facing FEHD)

Photo 2 - FEHD (Facing Victoria Centre)

Photo 3 - FEHD (Between Victoria Centre and the project site)

Photo 4 - Private Project Site to Harbour Grand HK Hotel (Wan Wah Mansion behind the Hotel)

Photo 5 - City Garden to HKE and Private Project Site

Photo 6 - Marine portion facing City Garden

Appendix 4

Minutes of Meeting with HGHK

Interface Meeting with Harbour Grand Hong Kong

Venue : 12/F., Cheung Kong Center
Date : 30 January 2013
Time : 10:00am

Attendance:

Name	Company	Contract
Ms. Vanessa POON	Cheung Kong	Harbour Grand Hotel
Mr. H H WU	Cheung Kong	Harbour Grand Hotel
Mr. Ivan LI	Cheung Kong	Harbour Grand Hotel
Mr. Ringo LAM	Cheung Kong	Harbour Grand Hotel
Mr. Johan WONG	AECOM	HY/2009/19
Mr. Paul YIM	AECOM	HY/2009/19
Mr. K. C. CHEUNG	Chun Wo	HY/2009/19
Mr. Eric FONG	Chun Wo	HY/2009/19

ITEM	CONTENT	ACTION BY
1.0	**Carpark Requirements**	
1.1	Chun Wo tabled a layout plan to show the proposed land area for temporary relocation of Harbour Grand Hotel's (HGH) carpark to facilitate the bored piles construction (see Appendix A).	Note
1.2	In order to relocate the existing HGH carpark, Chun Wo agreed to provide the following Portion IVA, IVB and part of IIA/IIB: i) Carpark space – 1800m^2 and formation of run in-out ii) Fencing for temporary carpark iii) Sufficient lighting inside carpark iv) Security booth v) 24 hrs. security guard for monitoring vi) Temporary CCTV (record with stand along computer) for carpark area vii) Car park marking	Note
1.3	AECOM advised that FEHD would start to move out from their existing carpark area at Oil Street by April 2013 and the area would be handed over to Chun Wo immediately. Chun Wo confirmed that the said area as hatched in the layout plan would be ready for HGH's use as temporary carpark by early June 2013.	Note

ITEM	CONTENT	ACTION BY
1.4	HGH requested AECOM to confirm whether they could use the proposed land area as temporary carpark legally and free of charge.	AECOM
1.5	Refer to the discussion in previous meeting, Chun Wo requested to early possess the existing HGH carpark area for piling works in 3 stages. In order to start the piling works, Chun Wo asked whether the Stage 1 area could be possessed now (see Appendix B). HGH advised that the area could only be available for construction if the insurance arrangement of both HGH and Chun Wo in regards with the use of concerned land area had been cleared.	HGH / Chun Wo
1.6	HGH complaint that there were lots of construction works being carried out at Oil Street which caused negative impacts to HGH. AECOM / HyD were requested to review the associated works arrangement.	AECOM
1.7	Programme for temporary and permanent relocation of HGH's car park would be provided for reference.	Chun Wo
1.8	In regards with the site boundary line, HGH requested AECOM to provide the coordinates of the setting out points for their reference.	AECOM
1.9	HGH would like to know whether Chun Wo could relocate the hoarding line away from the hotel and not possess the area of café shop.	Note
1.10	Chun Wo confirmed that in order to fulfill the condition of Environmental Permit (EP-364/2009/B), special hoarding (approx. 12m high) had to be erected. And in order to provide sufficient working space for the demolition and reconstruction of the bridge, the special hoarding had to be erected along the site boundary line which is within the HGH's café shop open area. To minimize the adverse impact to the café shop's operation, it was suggested that, instead of 12m high special hoarding, 5m high movable noise barrier would be erected outside the café shop's area along the boundary line as marked by Highways Department (HyD). And during the demolition of the existing bridge, Chun Wo suggested the café shop's	Note

ITEM	CONTENT	ACTION BY
	open area should be closed. The tentative closing date would be around Jun. 2015 to Sept. 2015. HGH preferred to have the works carried out at (winter time) and requested Chun Wo to confirm if the arrangement is feasible HGH had no objection to the arrangement of having the 5m high hoarding.	
1.11	HGH asked Chun Wo to send them a formal letter together with insurance information about the request for works area with a clear demarcation of responsibility held by each party. HGH requested the presence of representative from HyD in meetings	Note

- End –

Appendix 5

Review on Construction Noise Impact (To be incorporated into the Noise Management Plan for submission)

Reference No. 1 - Comparing EIA Appendix 4.13:

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

Section 6.0 Construction of IECL

6.2 IEC Connection Work

6.2A Substructures (Group 1 and 2 PME)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5
Crane, mobile (diesel)	Table C7/114	101	2	70%	5	97.5
Air Compressor	Table C7/16	96	1	100%	5	91.0
Excavator, wheeled/tracked	Table C3/97	105	1	70%	5	98.5
Water pump (electric)	CNP 281	88	2	100%	5	86.0
Concrete Pump	Table C6/35	100	0	100%	5	0.0
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0
						111.4

6.2A Substructures (Group 1 PME)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	1	70%	0	98.5
Poker, vibratory, hand-held	Table C6/32	100	1	70%	5	93.5
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Air Compressor	Table C7/16	96	1	100%	5	91.0
Concrete Pump	Table C6/35	100	0	100%	5	0.0
						101.3

6.2A Substructures (Group 2 PME)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Excavator, wheeled/tracked	Table C3/97	105	1	50%	5	97.0
Water pump (electric)	CNP 281	88	1	100%	5	83.0
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0
						110.3

6.2B Superstructures

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Air Compressor	Table C7/16	96	0	100%	5	0.0
Excavator, wheeled/tracked	Table C3/97	105	0	70%	5	0.0
Water pump (electric)	CNP 281	88	0	100%	5	0.0
Concrete Pump	Table C6/35	100	0	100%	5	0.0
Bar Bender	CNP 021	90	0	100%	5	0.0
						104.4

Reference No. 1 - Comparing EIA Appendix 4.13:

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

6.2B Superstructures (For Marine Works)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Air Compressor	Table C7/16	96	0	100%	5	0.0
Excavator, wheeled/tracked	Table C3/97	105	0	70%	5	0.0
Water pump (electric)	CNP 281	88	0	100%	5	0.0
Concrete Pump	Table C6/35	100	0	100%	5	0.0
Bar Bender	CNP 021	90	0	100%	5	0.0
Tug boat	CNP 221	110	1	50%	0	107.0
Barge	-	0	1	100%	0	0.0
						104.4

6.2C Demolition of Structure (For IEC E/B)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0
Electric Motor On Launching Girder	--	95	5	100%	5	97.0
Concrete corer	CNP 042	117	1	100%	10	107.0
Saw, wire	CNP 205	101	1	100%	5	96.0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0
Crane, mobile (diesel)	Table C7/114	101	2	100%	5	99.0
						110.7

6.2C Demolition of Structure (For IEC W/B)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0
Electric Motor On Launching Girder	--	95	5	100%	5	97.0
Concrete corer	CNP 042	117	1	100%	10	107.0
Saw, wire	CNP 205	101	1	100%	5	96.0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0
Crane, mobile (diesel)	Table C7/114	101	2	100%	5	99.0
						110.7

6.2C Demolition of Structure (For IEC E/B) (For Marine Works)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0
Electric Motor On Launching Girder	--	95	5	100%	5	97.0
Concrete corer	CNP 042	117	1	100%	10	107.0
Saw, wire	CNP 205	101	1	100%	5	96.0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0
Tug boat	CNP 221	110	1	50%	0	107.0
Barge	-	0	1	100%	0	0.0
						112.1

Reference No. 1 - Comparing EIA Appendix 4.13:

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

6.2C Demolition of Structure (For IEC W/B) (For Marine Works)

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Generator, silenced, 75dB(A) at 7m	CNP 102	100	1	100%	10	90.0
Electric Motor On Launching Girder	--	95	5	100%	5	97.0
Concrete corer	CNP 042	117	1	100%	10	107.0
Saw, wire	CNP 205	101	1	100%	5	96.0
Cutter, circular, steel (electric)	CNP 056	112	1	100%	5	107.0
Tug boat	CNP 221	110	1	50%	0	107.0
Barge	-	0	1	100%	0	0.0
						112.1

6.3 East Portal and IEC Connection Work

6.3.1 Substructures

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Air Compressor	Table C7/16	96	0	100%	5	0.0
Excavator, wheeled/tracked	Table C3/97	105	2	70%	5	101.5
Water pump (electric)	CNP 281	88	6	100%	10	85.8
Concrete Pump	Table C6/35	100	2	100%	5	98.0
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0
						106.8

6.3.2 Retaining Structures

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5
Air Compressor	Table C7/16	96	0	100%	5	0.0
Excavator, wheeled/tracked	Table C3/97	105	2	70%	5	101.5
Water pump (electric)	CNP 281	88	6	100%	10	85.8
Concrete Pump	Table C6/35	100	2	100%	5	98.0
Piling, large diameter bored, oscillator	CNP 165	115	1	100%	5	110.0
						111.7

6.3.3 Demolition of Structure

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))
Breaker, excavator mounted	Table C8/13	110	1	70%	5	103.5
Excavator, wheeled/tracked	Table C3/97	105	0	80%	5	0.0
Breaker, hand-held, mass > 20kg and < 35kg	Table C2/10	110	0	100%	5	0.0
Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne	Table C9/27	105	1	70%	0	103.5
Crane, mobile (diesel)	Table C7/114	101	1	100%	5	96.0
						106.9

Reference No. 1 - Comparing EIA Appendix 4.13:

Powered Mechanical Equipment (PME) for Different Construction Tasks during Normal Daytime Working Hours (With Mitigation Measures)

NSR: N18 City Garden, Block 10

9.0 Tunnel Building and Installation

9.0 Tunnel Building and Installation at East Ventilation Building, Administration Building & Central Ventilation Building, West Ventilation

9.0A Substructures

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))	
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E+09
Drill rig, rotary type (diesel)	CNP 072	110	2	100%	5	108.0	6.31E+10
Water pump (electric)	CNP 281	88	2	100%	10	81.0	125892541
Grout mixer	CNP 105	90	1	100%	5	85.0	316227766
Concrete Pump	Table C6/35	100	0	100%	5	0.0	0
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0	0
						109.6	9.203E+10

9.0B Superstructures

Powered Mechanical Equipment (PME)	TM Ref. Identification Code	SWL (dB(A))	Quantity	On-time %	Reduction	Total SWL (dB(A))	
Concrete lorry mixer	Table C6/35	100	2	100%	0	103.0	1.995E+10
Poker, vibratory, hand-held	Table C6/32	100	2	70%	5	96.5	4.467E+09
Crane, mobile (diesel)	Table C7/114	101	1	70%	5	94.5	2.818E+09
Air Compressor	Table C7/16	96	1	100%	5	91.0	1.259E+09
Drill rig, rotary type (diesel)	CNP 072	110	2	100%	5	108.0	6.31E+10
Water pump (electric)	CNP 281	88	2	100%	10	81.0	125892541
Grout mixer	CNP 105	90	1	100%	5	85.0	316227766
Concrete Pump	Table C6/35	100	0	100%	5	0.0	0
Piling, large diameter bored, oscillator	CNP 165	115	0	100%	5	0.0	0
						109.6	9.203E+10

Reference No. 2 - Comparison of Predicted Construction Noise Level with EIA Appendix 4.14 at N18 City Garden, Block 10 with Group 1 PME

Predicted Construction Noise Levels, dB(A)		SWL	Distance																																								
N18 City Garden, Block 10 with Group 1 PME		dB(A)	(m)	2014			2015												2016												2017												
				10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
6.0 Construction of IECL																																											
6.2 IEC Connection Work																																											
6.2A Substructures	NPR1	111	255	Completed																																							
6.2B Superstructures	NPR1	104	255	Completed																																							
6.2A Substructures	NPR2E(EB)	111	68	Completed																																							
6.2B Superstructures	NPR2E(EB)	104	68	Completed																																							
Reconstruction IEC West Bound																																											
6.2C Demolition of Structure	WB(section 2,(45m in length land section))	111	16					82																																			81.9358
6.2C Demolition of Structure	WB(other than section 2)	111	37		75	75	75																																				74.65417
6.2C Demolition of Structure	WB(section 2,(70m in length marine section))	112	16						83																																		82.9358
6.2C Demolition of Structure	WB(other than section 2)	112	70							70																																	70.11624
6.2A Substructures	WB(Group 1 PME) land section	110	34						74																																		74.38862
6.2A Substructures	WB(Group 1 PME) marine section	112	50	Completed																																							
6.2B Superstructures	WB(other than section B land section)	104	23															72	72	72	72	72	72	72	72	72	72	72															71.78364
6.2B Superstructures	WB(section B,(20m in length land section))	104	20														73																										72.9976
6.2B Superstructures	WB(other than section B marine section)	110	30								75	75	75	75	75																												75.47578
6.2B Superstructures	WB(section B,(20m in length marine section))	110	20													79																											78.9976
6.2C Demolition of Structure	EB(section 5,(150m in length land section))	111	30																											76													76.47578
6.2C Demolition of Structure	EB(other than section 5 land section)	111	150																										62														62.49638
6.2C Demolition of Structure	EB(section 5,(150m in length marine section))	112	30																												77												77.47578
6.2C Demolition of Structure	EB(other than section 5 marine section)	112	160																													63	63										62.9358
6.2A Substructures	EB(Group 1 PME) marine section	112	50	Completed																																							
6.2B Superstructures	EB marine section	110	50	Completed																																							
6.3 East Portal and IEC Connection Work																																											
6.3.1 Substructures		107	34																													71	71										71.38862
6.3.2 Retaining Structures	48m away from NSR18	112	48																															73	73	73	73						73.39338
6.3.2 Retaining Structures	34m closest distance	112	34																																			76					76.38862
6.3.3 Demolition of Structure	34m closest distance	107	34																																			76					76.38862
9.0 Tunnel Building & Installation																																											
9.0 Tunnel Building & Installation at East Ventilation Building, Administration Bulding, &																																											
Central Ventilation Building, West Ventilation Building																																											
9.0A Substructures	Admin B.	110	40																										73														72.977
9.0B Superstructures	Admin B.	110	40																											73	73												72.977
Predicted Construction Noise Level, dB(A)(with Façade Effect)					75	75	75	82	84	70	75	75	75	75	75	79	73	72	72	72	72	72	72	72	72	72	72	72	73	78	79	72	72	73	73	73	73	76					
Predicted Construction Noise Level in EIA report for same construction work, dB(A)(with Façade Effect)					75	75	75	82	84	74	75	75	75	75	75	79	76	75	75	75	75	75	75	75	75	75	75	75	75	80	82	74	74	75	75	75	75	77	71	71	71	71	

Reference No. 3 - Comparison of Predicted Construction Noise Level with EIA Appendix 4.14 at N18 City Garden, Block 10 with Group 2 PME

Predicted Construction Noise Levels, dB(A)		SWL	Distance																																							
N18 City Garden, Block 10 with Group 2 PME		dB(A)	(m)	2014			2015												2016												2017												
				10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
6.0 Construction of IECL																																											
6.2 IEC Connection Work																																											
6.2A Substructures	NPR1	111	255	Completed																																							
6.2B Superstructures	NPR1	104	255	Completed																																							
6.2A Substructures	NPR2E(EB)	111	68	Completed																																							
6.2B Superstructures	NPR2E(EB)	104	68	Completed																																							
Reconstruction IEC West Bound																																											
6.2C Demolition of Structure	WB(section 2,(45m in length land section))	111	16					82																																			81.9358
6.2C Demolition of Structure	WB(other than section 2)	111	37		75	75	75																																				74.65417
6.2C Demolition of Structure	WB(section 2,(70m in length marine section))	112	16						83																																		82.9358
6.2C Demolition of Structure	WB(other than section 2)	112	70							70																																	70.11624
6.2A Substructures	WB(Group 2 PME) land section	110	34						74																																		74.38862
6.2A Substructures	WB(Group 2 PME) marine section	112	50	Completed																																							
6.2B Superstructures	WB(other than section B land section)	104	23															72	72	72	72	72	72	72	72	72	72	72															71.78364
6.2B Superstructures	WB(section B,(20m in length land section))	104	20														73																										72.9976
6.2B Superstructures	WB(other than section B marine section)	110	30								75	75	75	75	75																												75.47578
6.2B Superstructures	WB(section B,(20m in length marine section))	110	20													79																											78.9976
6.2C Demolition of Structure	EB(section 5,(150m in length land section))	111	30																											76													76.47578
6.2C Demolition of Structure	EB(other than section 5 land section)	111	150																										62														62.49638
6.2C Demolition of Structure	EB(section 5,(150m in length marine section))	112	30																												77												77.47578
6.2C Demolition of Structure	EB(other than section 5 marine section)	112	160																													63	63										62.9358
6.2A Substructures	EB(Group 2 PME) marine section	112	50	Completed																																							
6.2B Superstructures	EB marine section	110	50	Completed																																							
6.3 East Portal and IEC Connection Work																																											
6.3.1 Substructures		107	34																													71	71										71.38862
6.3.2 Retaining Structures	48m away from NSR18	112	48																															73	73	73	73						73.39338
6.3.2 Retaining Structures	34m closest distance	112	34																																			76					76.38862
6.3.3 Demolition of Structure	34m closest distance	107	34							71																												76					76.38862
9.0 Tunnel Building & Installation																																											
9.0 Tunnel Building & Installation at East Ventilation Building, Administration Bulding, &																																											
Central Ventilation Building, West Ventilation Building																																											
9.0A Substructures	Admin B.	110	40																										73														72.977
9.0B Superstructures	Admin B.	110	40																											73	73												72.977
Predicted Construction Noise Level, dB(A)(with Façade Effect)					75	75	75	82	84	74	75	75	75	75	75	79	73	72	72	72	72	72	72	72	72	72	72	72	73	78	79	72	72	73	73	73	73	76					
Predicted Construction Noise Level in EIA report for same construction work, dB(A)(with Façade Effect)					75	75	75	82	84	74	75	75	75	75	75	79	76	75	75	75	75	75	75	75	75	75	75	75	75	80	82	74	74	75	75	75	75	77	71	71	71	71	