



俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at Hong Kong Convention and
Exhibition Centre

Noise Management Plan

Revision	Date of Issue	Remarks	Author	Approved
0	13 May 11	Initial issue	AM	PY
1	27 May 11	Incorporated comments from ET & IEC	AM	PY

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1. GENERAL

1.1 *Introduction*

The CEDD Project, namely Wan Chai Development Phase II, Central – Wan Chai Bypass at Hong Kong Convention and Exhibition Centre is one of the major sub-projects of the Wan Chai Development Phase II Project.

According to the requirement in the Environmental Permit No.EP-364/2009 and Further Environmental Permit No.FEP-02/364/2009 section 2.9, the Permit Holder shall submit a noise management plan (NMP) showing the noise mitigation measures to be adopted.

1.2 *Purpose of the Noise Management Plan*

This NMP identify major construction activities that might generate adverse noise impacts to the nearby public and lists mitigation measures that will ensure that the impacts that could result from construction works of the project will be as benign as possible. Chun Wo Leader JV (CWLJV) has the overall responsibility of ensuring that the environmental impacts are mitigated as specified.

It must be verified that the noise mitigation measures are accomplished in accordance with the NMP. This effort will encompass all monitoring activities needed to determine the success of the noise mitigation measures (e.g., to determine if they are implemented according to schedule, if they are producing the desired result, or if additional mitigation measures are needed). According to the Contract requirement, the Environmental Team (ET) shall be responsible for the implementation of the EM&A Manual of the Project and conduct noise monitoring throughout the course of construction at locations proposed in the EM&A Manual. All aspects of the noise mitigation measure must be audited to ascertain compliance with requirements.

CWLJV also has the responsibility of reviewing the project to ensure that the impacts and mitigations presented in the NMP are appropriate to the

planned activities. In addition to conducting the specific mitigation activities addressed in this NMP, all parties involved with or overseeing the project will comply with all applicable environmental laws, regulations and ordinances.

1.3 Summary of the Plan

This NMP addresses the pertinent mitigation measures as recommended in the EIA report of the project. This NMP does not repeat or present in-depth technical information. The presentation of noise mitigation actions in this NMP is organized by the resource categories. Noise mitigation measures will be planned specifically in accordance with the construction activities.

1.4 Noise Sensitive Receivers

The project is located primarily in areas of mixed commercial and residential areas. Activities that generate noise levels above natural background include traffic on major road systems and local roadways across the site, marine traffic from Victoria Harbour, residential areas, other recreational locations and commercial operations. Table 1.1 shows the representative NSRs for this noise impact assessment as identified in the EIA report of the project. Insignificant construction noise impacts are expected on the indoor environment of NSRs such as HKCEC extension, Grand Hyatt Hotel, Hong Kong Space Museum and Museum of Arts, which are close to the construction sites, as they have facades / fixed windows and are provided with central air conditioning, therefore they do not rely on openable windows for ventilation. Aim of noise mitigation measures in this plan is to lower the noise level at the nearest noise sensitive receivers.

Table 1.1 Representative Existing Noise Sensitive Receivers

NSR	Section	Location	Use	Ground Elevation (mPD)	No. of Floors
N1	Wanchai	HKAPA (Open Arena)	Performing Arts Centre	5.0	G/F
N2	Wanchai	Causeway Centre	Residential	4.0	42

2. Noise Legislation and License Application

The main legislative instrument to control construction noise and the subsidiary regulations include:

- Noise Control (Construction Work) Regulation
- Noise Control (Construction Work Designated Areas) Notice
- Noise Control (Hand Held Percussive Breakers) Regulations
- Noise Control (Air Compressors) Regulations
- The Factories and Industrial Undertakings (Noise at Work) Regulations are also applicable

Under the Noise Control Ordinance (NCO), construction activities are grouped into two categories: general construction work and percussive piling (for example, piling by means of a hydraulic hammer or drop hammer). Each of these categories of works is controlled by means of a system of Construction Permits.

In relation to the construction noise permit system, three Technical Memoranda relevant to the construction noise provisions have been issued, namely the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM), the Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM) and the Technical Memorandum on Noise from Percussive Piling (PP-TM).

Under the GW-TM, the contractor carrying out of general construction work using powered mechanical equipment during the restricted hours, that is between 7 p.m. and 7 a.m. or at any time on a general holiday (including Sunday), should require a valid Construction Noise Permit (CNP).

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Under the PP-TM, the carrying out of percussive piling is prohibited between 7 p.m. and 7 a.m. and on holidays. Percussive piling during the daytime should require a valid CNP.

The Noise Control (Hand Held Percussive Breakers) and (Air Compressors) Regulations limit the noise emission from hand held breakers having a mass of above 10 kg and air compressor capable of supplying compressed air at 500kPa or above for carrying out construction work. The above equipment must be fitted with noise emission labels when in operation.

Followings are the license / permits to be applied / renewed:

- A CNP for the use of powered mechanical equipment for the carrying out construction work other than percussive piling
- A CNP for the carrying out of prescribed construction work
- A CNP for the carrying out of percussive piling
- Noise Emission Labels for each hand held breakers
- Noise Emission Labels for each air compressors

3. Identification of Major Construction Activities

Major construction activities in this project consist of:

- Construction of new drainage culverts in the hinterland urban area
- Diversion of existing cooling water mains through the hinterland area
- Construction of upgraded sewerage pipelines along existing roads
- Construction of new water mains along existing roads
- Demolition of West Bridge
- Construction of a dual three-lane trunk road tunnel

The major powered mechanical equipments (PME) to be used on site are listed in Appendix 4.13 of EIA Report (Register No.: AEIAR-125/2008). Detailed list of PME will be proposed in corresponding method statement submitted to the Engineer.

4. Noise Mitigation Measures

- 4.1 Use of QPME and other noise mitigation measures will be made according to the PME schedules listed in Appendix 4.13 of EIA Report

and be proposed in corresponding method statement submitted to the Engineer.

- 4.2 CWLJV will take all reasonable precautions to avoid any nuisance arising from the construction works. All works will be carried out in a matter as to cause as little inconvenience as possible and to minimize adverse impacts on the indoor and outdoor environment during construction works.
- 4.3 A combination of noise mitigation measures will be utilized during the construction stage for the construction phase listed in the EM&A Manual. No single noise mitigation measure would be most effective at reducing noise levels. The following mitigation measures together are considered to offer the most potential for application to this project and incorporated into this plan as described below. Regular monitoring, inspection and audit will be conducted to ensure the effectiveness of the mitigation measures.
- 4.4 In according to the Section of 4.9.3 in EIA Report, stationary noise sources will be located as far as possible from NSRs. If stationary sources have to be located near NSRs, they will be adequately muffled and enclosed within temporary sheds, or movable noise barriers will be used (S4.9.3 of EIA Report).
- 4.5 In order to reduce the excessive noise impacts at the affected areas, movable noise barriers are proposed to be provided for particular items of plants and construction works. Movable noise barriers with cantilevered upper portion for the following items of plants:
- i) Excavator with breaker
 - ii) Diaphragm wall rigs
 - iii) Poker vibrator
 - iv) Hand held pneumatic breaker
 - v) Generator
 - vi) Air compressor
 - vii) Concrete pump
 - viii) Vibration hammer

Movable noise barrier with a cantilevered upper portion located within 5m from any static or mobile plant can provide 5 to 10 dB(A) noise reduction.

If required, temporary noise barriers (4m in height) including cantilevered upper portion are proposed in work sites to further reduce the noise level during construction phase.

The noise barrier (See **Appendix D**) shall have a surface mass of not less than 14kg/m² on skid footing with 25mm thick internal sound absorptive lining (See **Appendix C**) to achieve maximum screening effect.

- 4.6 Quiet Power Mechanical Equipment (QPME) deployed on site will be effectively sound reduced (refer to S4.8.3 of EIA Report), as required, to meet the appropriate standards. Sound reduction methods that may be considered are manufacturer recommended silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means, as required avoiding disturbance to any nearby NSRs.
- 4.7 Construction equipment will be turned off when not in operation. Close all hoods, cover panels and inspection hatches of powered mechanical plant such as generators, air compressors, etc, during operation.
- 4.8 Construction equipment will be maintained in good condition in order to minimize noise emission during the Works. Daily inspection and repairs, when appropriate, will be made to ensure that equipment remains within compliance limits.
- 4.9 Construction equipment such as excavator that is known to emit noise strongly in one direction will be orientated to face away from the NSRs.
- 4.10 Quiet plant will be used whenever possible throughout the works. Giken silent piler will be used whenever possible to drive sheet piles by jacking mechanism, hence the noise and vibration generated will be significantly reduced. Concrete crusher will be used to replace breaker whenever possible for the demolition works in order to minimize noise pollution in the demolition area.
- 4.11 Equipment used for project construction will be hydraulically or electrically powered whenever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However,

where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust will be used.

- 4.12 External jackets on the tools will be used where feasible. Breakers mounted on excavators will be surrounded by acoustic blanket to reduce the noise level (see **Appendix C**).
- 4.13 For the demolition of Wan Chai West Pier and Expo Drive East Bridge, it is proposed to surround air compressor and pneumatic breakers on three sides by movable noise barriers during the course of demolition works to reduce the noise level. Breakers of excavators will also be wrapped with acoustical material to further suppress the noise generated during breaking. Super quiet air compressor will also be used. It is anticipated that when properly placed the movable noise curtain will provide noise control of 5 dB(A) to each PME. Layout plans showing the proposed noise mitigation measures for those major construction activities is attached in **Appendix B**.

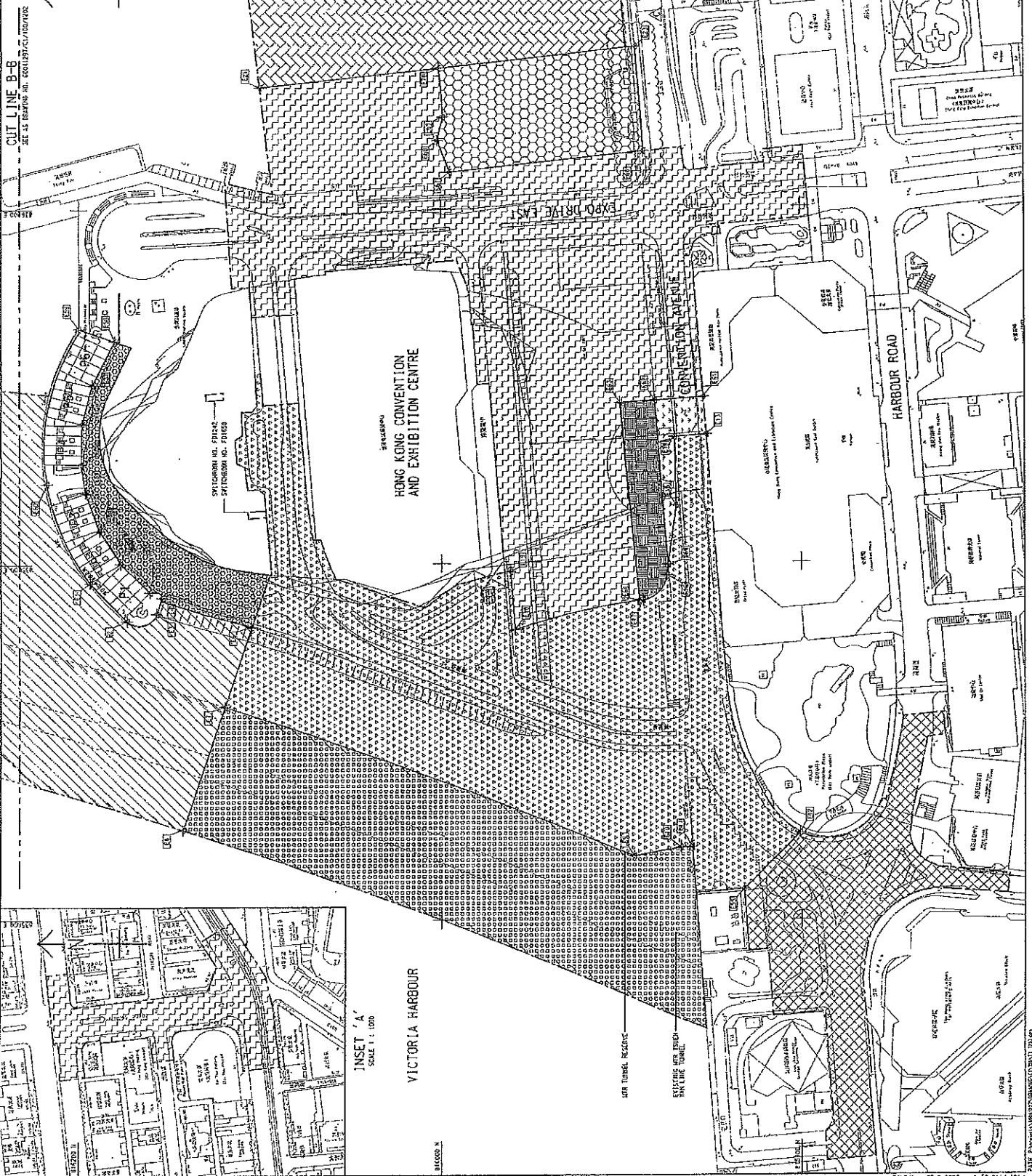
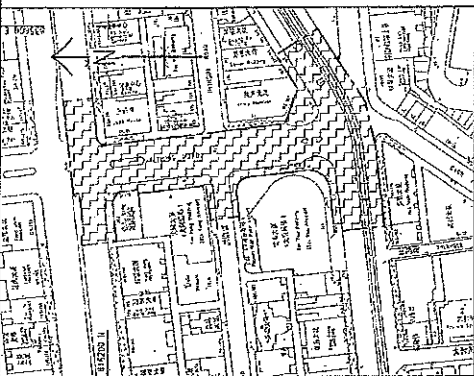
5. Impact Monitoring for Construction Noise

- 5.1 During the construction period, monitoring of noise levels shall be carried out at the agreed monitoring locations by ET in accordance with the EM&A report.
- 5.2 The Action and Limit levels for construction noise are defined in the EM&A report. Should non-compliance of the criteria occur, action in accordance with the Action Plan shall be carried out.



Appendix A

Site Plan



NOTE:

1. FOR NOTES AND LEGEND, REFER TO DRAWING NO. 60041297/C1/100/1203C.

T.M.	COORDINATES	
	EASTING	NORTHING
E1	537791.618	816131.652
E2	537796.221	816131.652
E3	537800.824	816131.652
E4	537805.427	816131.652
E5	537810.030	816131.652
E6	537814.633	816131.652
E7	537819.236	816131.652
E8	537823.839	816131.652
E9	537828.442	816131.652
E10	537833.045	816131.652
E11	537837.648	816131.652
E12	537842.251	816131.652
E13	537846.854	816131.652
E14	537851.457	816131.652
E15	537856.060	816131.652
E16	537860.663	816131.652
E17	537865.266	816131.652
E18	537869.869	816131.652
E19	537874.472	816131.652
E20	537879.075	816131.652
E21	537883.678	816131.652
E22	537888.281	816131.652
E23	537892.884	816131.652
E24	537897.487	816131.652
E25	537902.090	816131.652
E26	537906.693	816131.652
E27	537911.296	816131.652
E28	537915.899	816131.652
E29	537920.502	816131.652
E30	537925.105	816131.652
E31	537929.708	816131.652
E32	537934.311	816131.652
E33	537938.914	816131.652
E34	537943.517	816131.652
E35	537948.120	816131.652
E36	537952.723	816131.652
E37	537957.326	816131.652
E38	537961.929	816131.652
E39	537966.532	816131.652
E40	537971.135	816131.652
E41	537975.738	816131.652
E42	537980.341	816131.652
E43	537984.944	816131.652
E44	537989.547	816131.652
E45	537994.150	816131.652
E46	537998.753	816131.652
E47	538003.356	816131.652
E48	538007.959	816131.652
E49	538012.562	816131.652
E50	538017.165	816131.652
E51	538021.768	816131.652
E52	538026.371	816131.652
E53	538030.974	816131.652
E54	538035.577	816131.652
E55	538040.180	816131.652
E56	538044.783	816131.652
E57	538049.386	816131.652
E58	538053.989	816131.652
E59	538058.592	816131.652
E60	538063.195	816131.652
E61	538067.798	816131.652
E62	538072.401	816131.652
E63	538077.004	816131.652
E64	538081.607	816131.652
E65	538086.210	816131.652
E66	538090.813	816131.652
E67	538095.416	816131.652
E68	538100.019	816131.652
E69	538104.622	816131.652
E70	538109.225	816131.652
E71	538113.828	816131.652
E72	538118.431	816131.652
E73	538123.034	816131.652
E74	538127.637	816131.652
E75	538132.240	816131.652
E76	538136.843	816131.652
E77	538141.446	816131.652
E78	538146.049	816131.652
E79	538150.652	816131.652
E80	538155.255	816131.652
E81	538159.858	816131.652
E82	538164.461	816131.652
E83	538169.064	816131.652
E84	538173.667	816131.652
E85	538178.270	816131.652
E86	538182.873	816131.652
E87	538187.476	816131.652
E88	538192.079	816131.652
E89	538196.682	816131.652
E90	538201.285	816131.652
E91	538205.888	816131.652
E92	538210.491	816131.652
E93	538215.094	816131.652
E94	538219.697	816131.652
E95	538224.300	816131.652
E96	538228.903	816131.652
E97	538233.506	816131.652
E98	538238.109	816131.652
E99	538242.712	816131.652
E100	538247.315	816131.652

C. TENDER ADDRESS NO. 4
D. TENDER ADDRESS NO. 5
E. TENDER ADDRESS NO. 6
F. TENDER ADDRESS NO. 7

SEE IS DRAWING NO. 60041297/C1/100/1203C

WAN CHAI DEVELOPMENT PHASE II
MAX GROUND DEVELOPMENT PHASE II
HONG KONG CONVENTION AND EXHIBITION CENTRE
AREAS OF THE SITE

AECOM

DRIVING DISTANCE 60041297/C1/100/1203C

DATE 11/2003

SCALE 1:10000

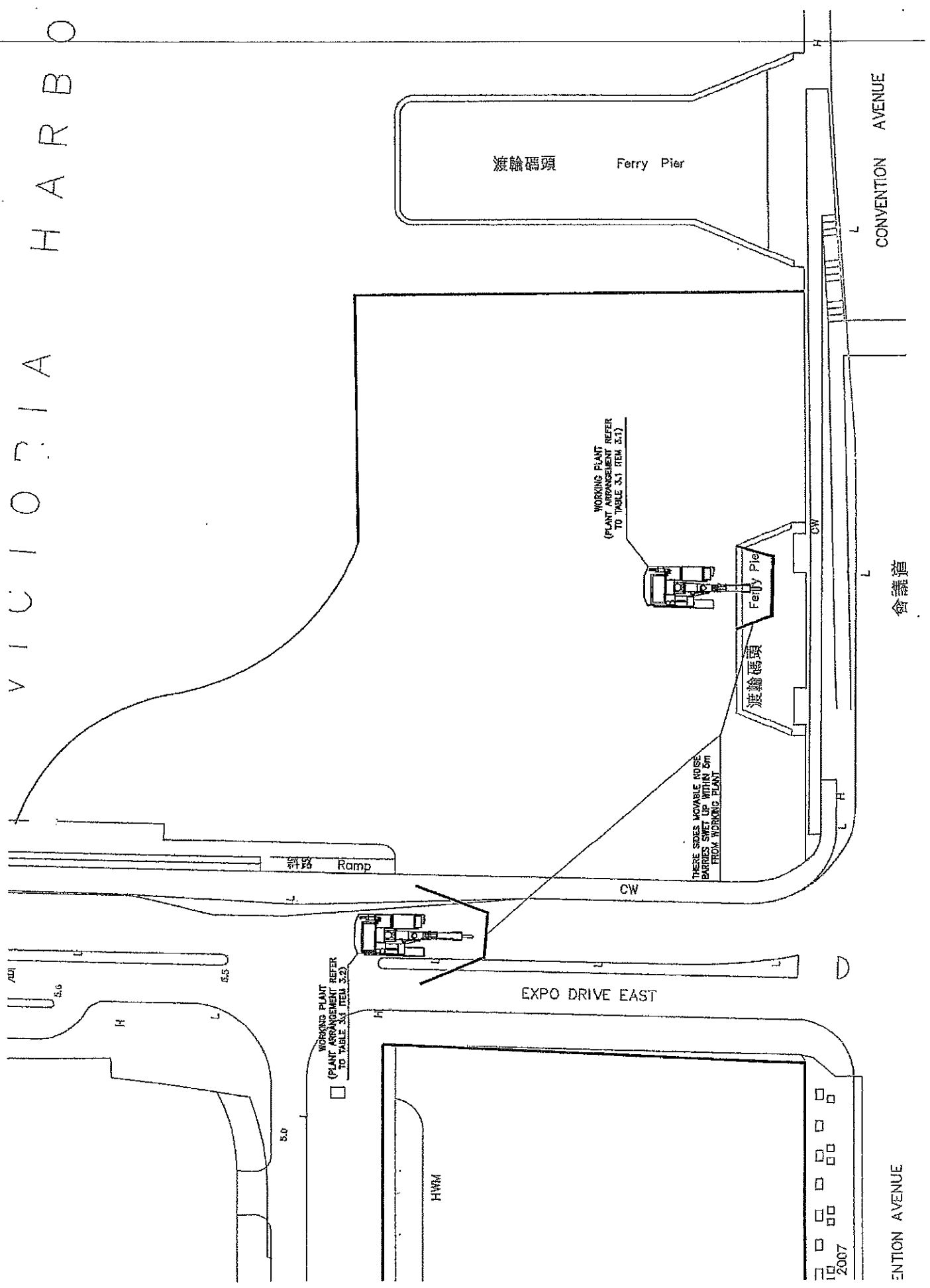
METRES

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Appendix B

**Layout plans showing the proposed noise mitigation
measures for those major construction activities likely
to exceed statutory limit**

VICTORIA HARBOUR

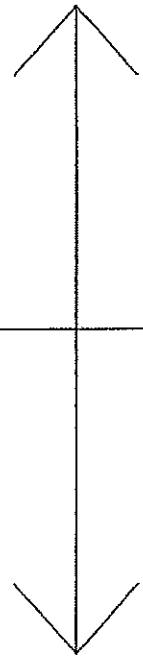


2007

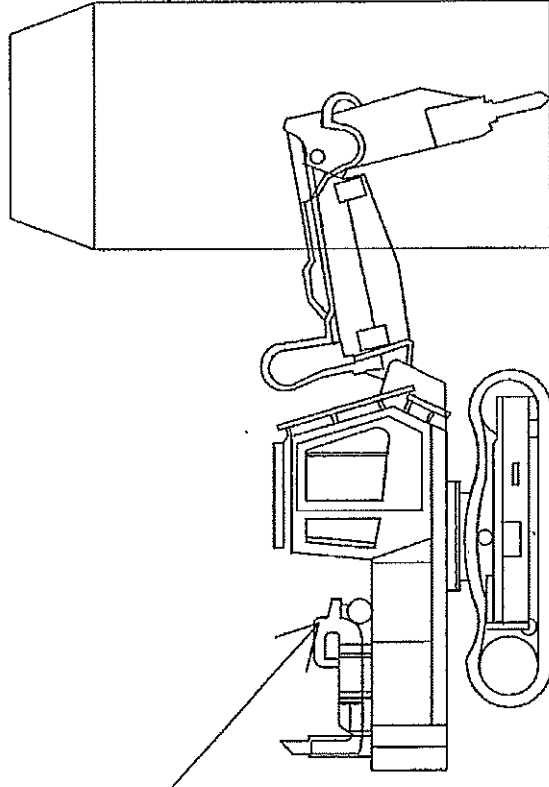
ENTION AVENUE

**Victoria
Harbour**

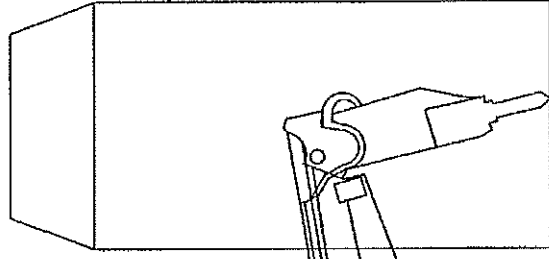
Wan Chai



**Excavator
&
Breaker**



**Three Side
Movable Noise Barrier**



**Expo Drive East Bridge /
Wan Chai West Pier**

Appendix C

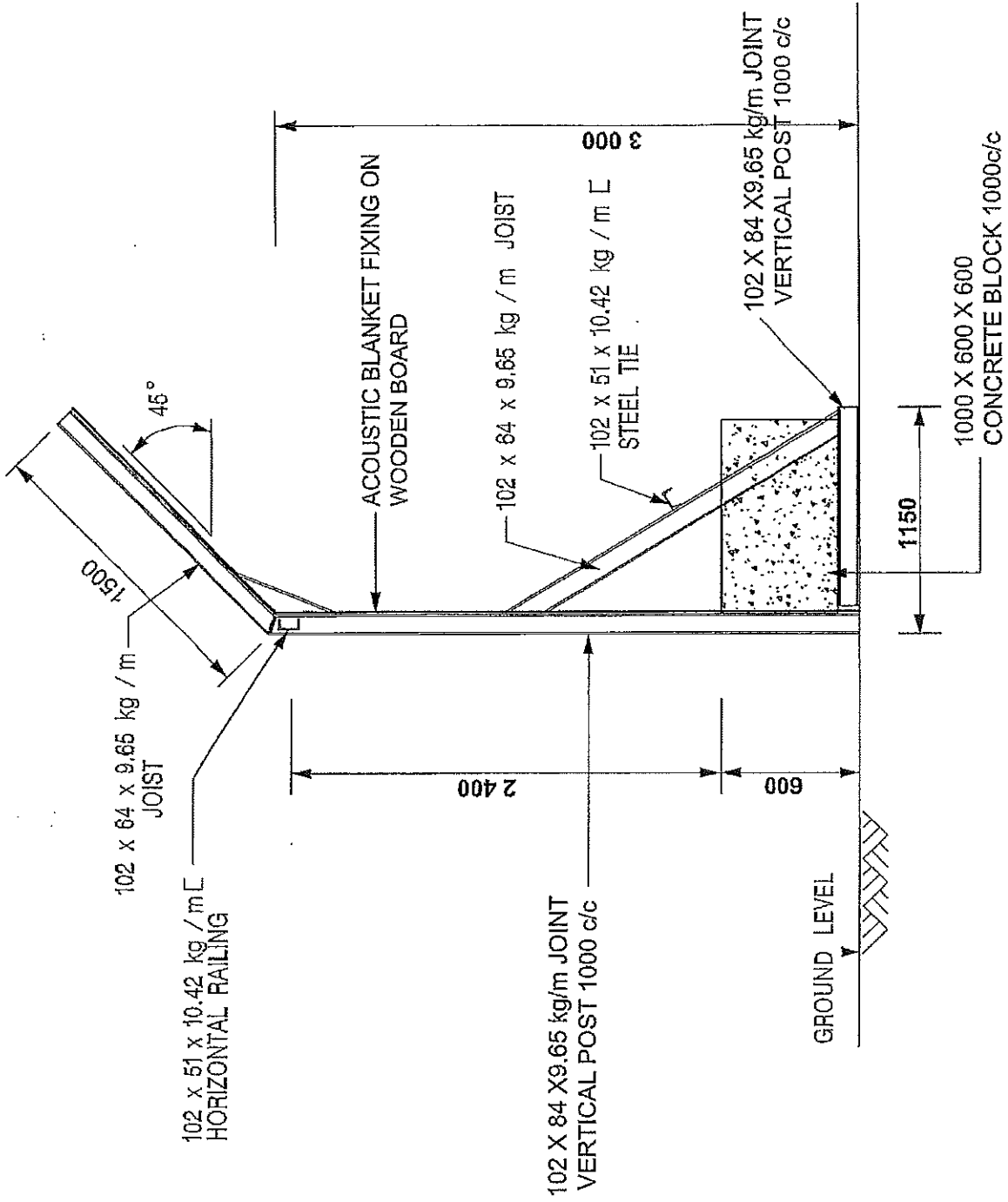
Sound Insulating Material for Noise Barrier and Plant

External Acoustic Jacket



Appendix D

Details of Noise Barrier



DETAIL FOR NOISE BARRIER



利達



LEADER

俊和 - 利達聯營

CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
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- 4.13 For the demolition of Wan Chai West Pier and Expo Drive East Bridge, it is proposed to surround air compressor and pneumatic breakers on three sides by movable noise barriers during the course of demolition works to reduce the noise level. Breakers of excavators will also be wrapped with acoustical material to further suppress the noise generated during breaking. Super quiet air compressor will also be used. It is anticipated that when properly placed the movable noise curtain will provide noise control of 5 dB(A) to each PME. Layout plans showing the proposed noise mitigation measures for those major construction activities is attached in **Appendix B**.

5. Impact Monitoring for Construction Noise

- 5.1 During the construction period, monitoring of noise levels shall be carried out at the agreed monitoring locations by ET in accordance with the EM&A report.
- 5.2 The Action and Limit levels for construction noise are defined in the EM&A report. Should non-compliance of the criteria occur, action in accordance with the Action Plan shall be carried out.



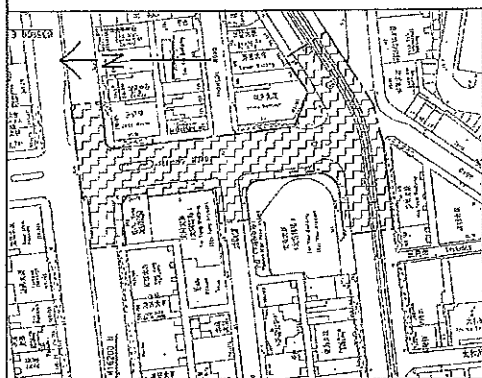
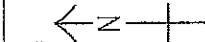
俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central - Wan Chai Bypass at HKCEC

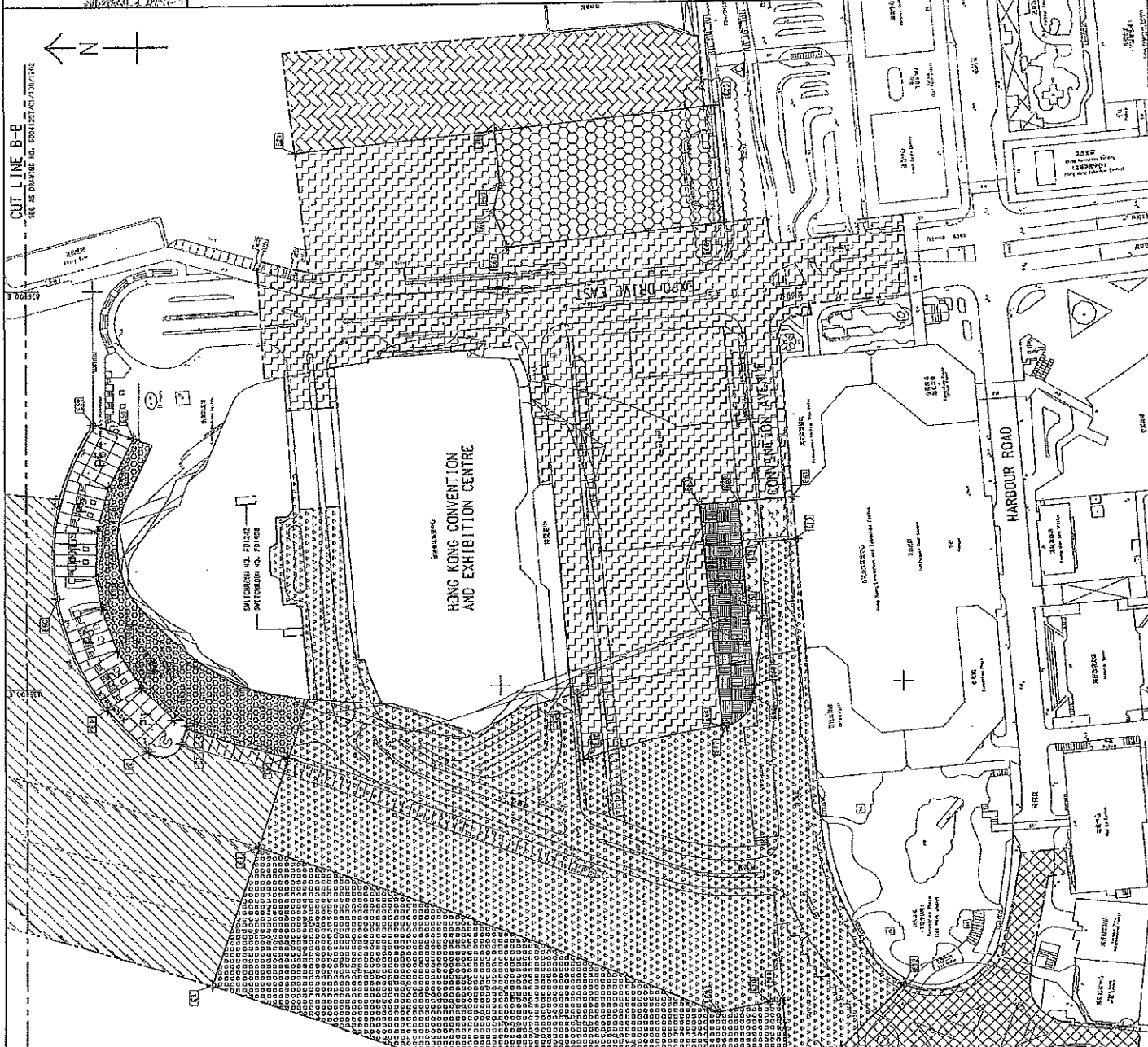
Appendix A

Site Plan

CUT LINE B-B
SEE AS DRAWING NO. 60041297/C1/100/1203C



INSET 'A'
SCALE 1:1000
VICTORIA HARBOUR



KEY PLAN
SCALE 1:5000

NOTE:
1. FOR NOTES AND LEGEND, REFER TO CHAIRING NO. 60041297/C1/100/1203C.

ITEM	DESCRIPTION	COORDINATES	AREA (SQ. METERS)
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
E16
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E37
E38
E39
E40
E41
E42
E43
E44
E45
E46
E47
E48
E49
E50

C	TENDER ADDENDUM NO. 4	REVISED
B	TENDER ADDENDUM NO. 3	REVISED
A	TENDER ADDENDUM NO. 1	REVISED
	TENDER DRAWING	REVISED

WAN CHAI DEVELOPMENT PHASE II
HONG KONG CONVENTION AND EXHIBITION CENTRE

DRGNO. 60041297/C1/100/1203C
AECOM
SHEET 3 OF 3



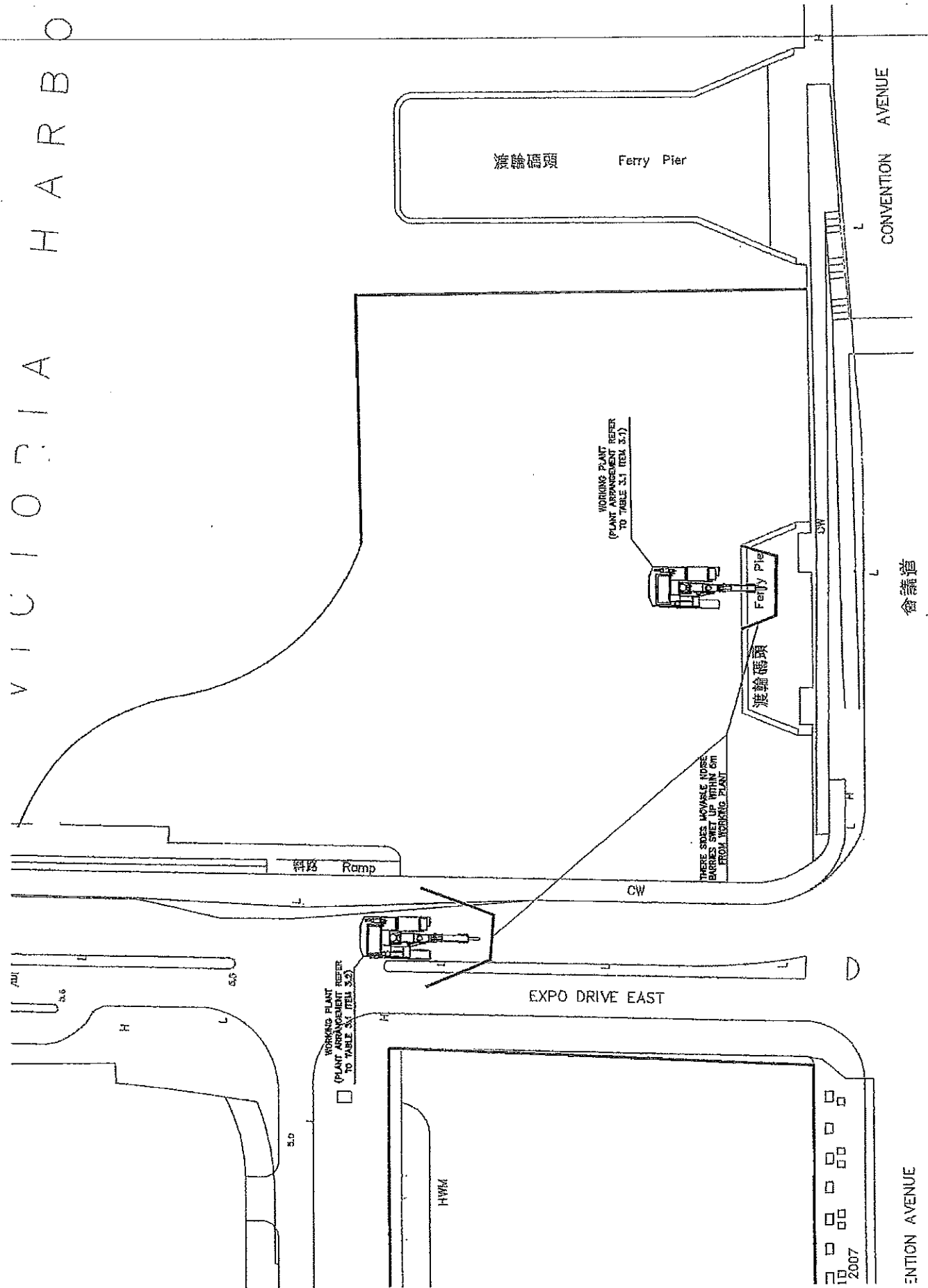
俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at HKCEC

Appendix B

**Layout plans showing the proposed noise mitigation
measures for those major construction activities likely
to exceed statutory limit**

VICTORIA HARBOUR



2007

ENTON AVENUE

會議道

CONVENTION AVENUE

Ferry Pier

渡輪碼頭

WORKING PLANT
(PLANT ARRANGEMENT REFER
TO TABLE 3.1 ITEM 3.1)

Ferry Pier

渡輪碼頭

THERE SIDES MOVABLE NOISE
BARRIERS SWAY UP WITHIN 6M
FROM WORKING PLANT

WORKING PLANT
(PLANT ARRANGEMENT REFER
TO TABLE 3.1 ITEM 3.2)

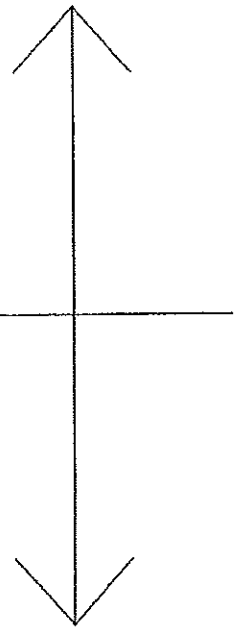
EXPO DRIVE EAST

HWM

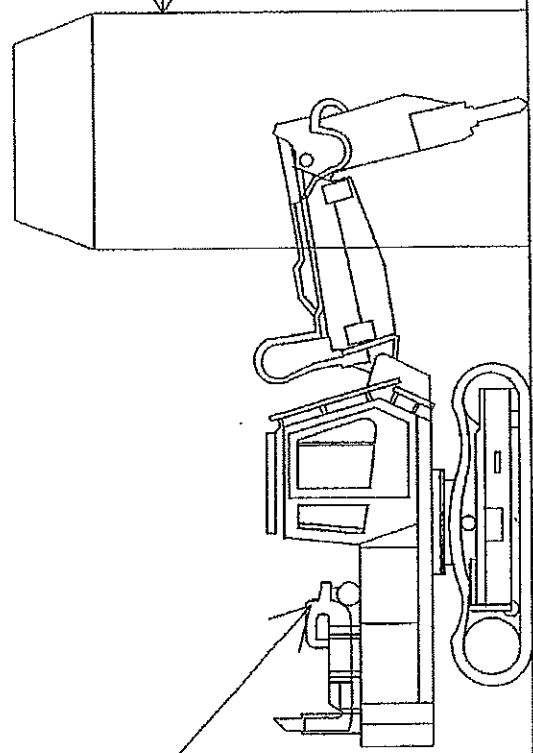
Ramp

**Victoria
Harbour**

Wan Chai



**Excavator
&
Breaker**



**Three Side
Movable Noise Barrier**



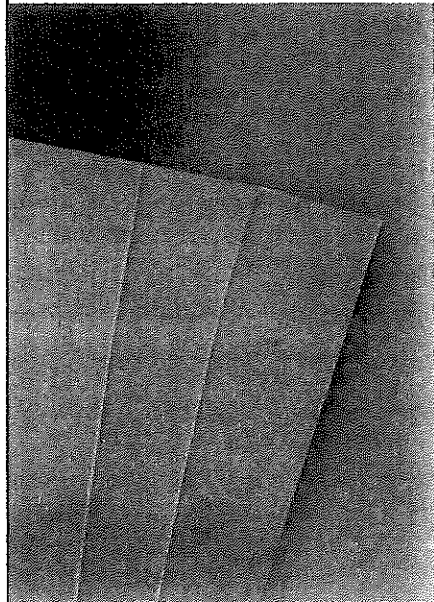
**Expo Drive East Bridge /
Wan Chai West Pier**

Appendix C

Sound Insulating Material for Noise Barrier and Plant

External Acoustic Jacket

NoiseStop Barrier Mat-Bm4



連雲聲聲學(集團)有限公司 NoiseStop Bm4 產品說明書

概述

NoiseStop Barrier Mat-Bm4 可謂建築最佳選擇，設備或裝置配件除噪聲處理工作外，亦可作爲交通隔聲屏障。被廣泛應用於建築工程、火警、火車等交通隔聲屏障。Bm4 以卷裝出售，標準尺寸爲 1mx10m/卷。安裝極簡便和其他細節請參閱圖紙。

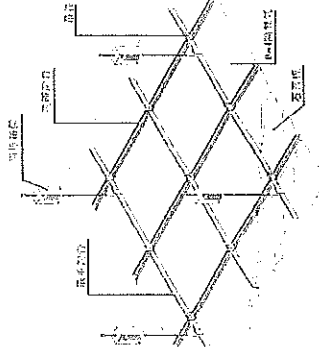
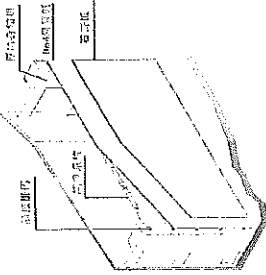
系統描述

材料堅固耐用，有效控制聲能。NoiseStop Barrier Mat-Bm4 可謂建築最佳選擇，設備或裝置配件除噪聲處理工作外，亦可作爲交通隔聲屏障。被廣泛應用於建築工程、火警、火車等交通隔聲屏障。Bm4 以卷裝出售，標準尺寸爲 1mx10m/卷。安裝極簡便和其他細節請參閱圖紙。

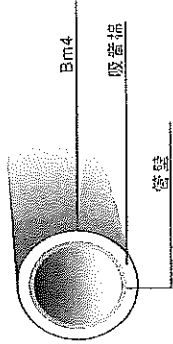
系統描述

Bm4 由耐用材料製成，具有優良的吸音性能。其獨特的結構，能吸收和阻擋聲音，有效降低噪音。安裝簡便，可與各種建築材料配合使用，適用於各種場合。其獨特的結構，能吸收和阻擋聲音，有效降低噪音。安裝簡便，可與各種建築材料配合使用，適用於各種場合。

施工示意圖

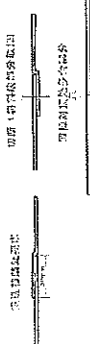


管道特殊處理，管道包第一層由三層材料製成，內層爲吸音棉，中間層爲防水作，最外層爲吸音棉。包管層與吸音棉作用，最後保證裝飾性的包管層包管層。

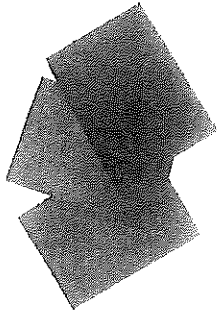


施工示意圖

1. 承接以鋼管、鐵管與地城交接處，每隔 100mm 以上，用釘子固定。2. 承接以鋼管、鐵管與地城交接處，每隔 200mm 用螺絲釘固定。



NoiseStop Barrier Mat-Bm4



材料

型號: Bm4
顏色: 灰色, 青銅色
厚度: 10x10mm/卷
長度: 2.0m
密度: 5kg/m³

防火性能

符合 BS476: Part 7, 測試。
符合 3 級建築標準。

聲學性能

中心頻率 (Hz)	125	250	500	750	1k	2k	4k
隔聲量 (dB)	13	19	22	27	32	32	37

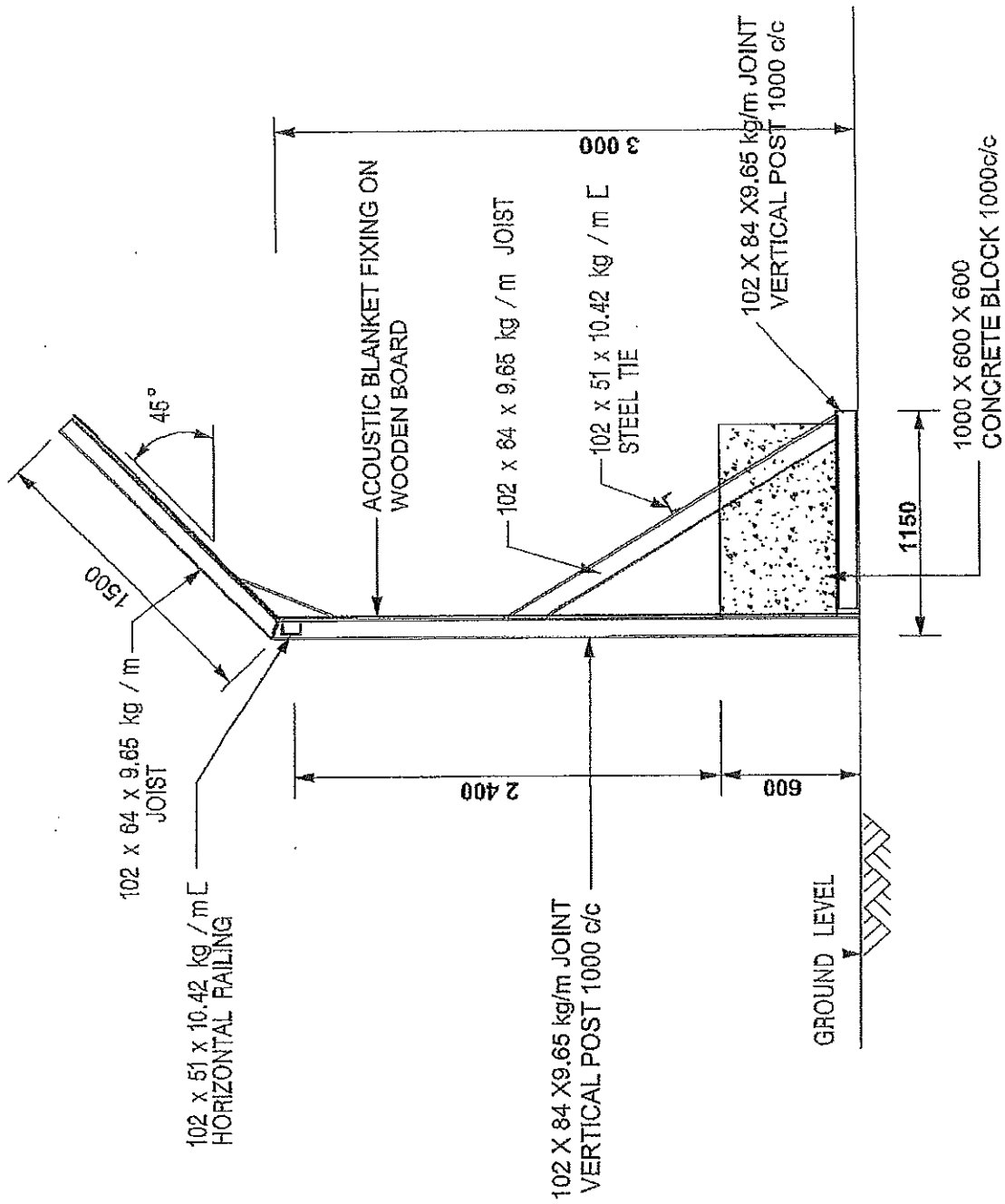
本地供應商

連雲聲聲學(集團)有限公司
香港沙咀順興街 25 號
電話: (852) 23673232
傳真: (852) 27248001

聲學

Appendix D

Details of Noise Barrier



DETAIL FOR NOISE BARRIER



俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at Hong Kong Convention and
Exhibition Centre

Noise Management Plan

Revision	Date of Issue	Remarks	Author	Approved
0	13 May 11	Initial issue	AM	PY
1	27 May 11	Incorporated comments from ET & IEC	AM	PY

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C	Sound Insulating Material for Noise Barrier and Plant External Acoustic Jacket	12
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1. GENERAL

1.1 Introduction

The CEDD Project, namely Wan Chai Development Phase II, Central – Wan Chai Bypass at Hong Kong Convention and Exhibition Centre is one of the major sub-projects of the Wan Chai Development Phase II Project.

According to the requirement in the Environmental Permit No.EP-364/2009 and Further Environmental Permit No.FEP-02/364/2009 section 2.9, the Permit Holder shall submit a noise management plan (NMP) showing the noise mitigation measures to be adopted.

1.2 Purpose of the Noise Management Plan

This NMP identify major construction activities that might generate adverse noise impacts to the nearby public and lists mitigation measures that will ensure that the impacts that could result from construction works of the project will be as benign as possible. Chun Wo Leader JV (CWLJV) has the overall responsibility of ensuring that the environmental impacts are mitigated as specified.

It must be verified that the noise mitigation measures are accomplished in accordance with the NMP. This effort will encompass all monitoring activities needed to determine the success of the noise mitigation measures (e.g., to determine if they are implemented according to schedule, if they are producing the desired result, or if additional mitigation measures are needed). According to the Contract requirement, the Environmental Team (ET) shall be responsible for the implementation of the EM&A Manual of the Project and conduct noise monitoring throughout the course of construction at locations proposed in the EM&A Manual. All aspects of the noise mitigation measure must be audited to ascertain compliance with requirements.

CWLJV also has the responsibility of reviewing the project to ensure that the impacts and mitigations presented in the NMP are appropriate to the

planned activities. In addition to conducting the specific mitigation activities addressed in this NMP, all parties involved with or overseeing the project will comply with all applicable environmental laws, regulations and ordinances.

1.3 Summary of the Plan

This NMP addresses the pertinent mitigation measures as recommended in the EIA report of the project. This NMP does not repeat or present in-depth technical information. The presentation of noise mitigation actions in this NMP is organized by the resource categories. Noise mitigation measures will be planned specifically in accordance with the construction activities.

1.4 Noise Sensitive Receivers

The project is located primarily in areas of mixed commercial and residential areas. Activities that generate noise levels above natural background include traffic on major road systems and local roadways across the site, marine traffic from Victoria Harbour, residential areas, other recreational locations and commercial operations. Table 1.1 shows the representative NSRs for this noise impact assessment as identified in the EIA report of the project. Insignificant construction noise impacts are expected on the indoor environment of NSRs such as HKCEC extension, Grand Hyatt Hotel, Hong Kong Space Museum and Museum of Arts, which are close to the construction sites, as they have facades / fixed windows and are provided with central air conditioning, therefore they do not rely on openable windows for ventilation. Aim of noise mitigation measures in this plan is to lower the noise level at the nearest noise sensitive receivers.

Table 1.1 Representative Existing Noise Sensitive Receivers

NSR	Section	Location	Use	Ground Elevation (mPD)	No. of Floors
N1	Wanchai	HKAPA (Open Arena)	Performing Arts Centre	5.0	G/F
N2	Wanchai	Causeway Centre	Residential	4.0	42

2. Noise Legislation and License Application

The main legislative instrument to control construction noise and the subsidiary regulations include:

- Noise Control (Construction Work) Regulation
- Noise Control (Construction Work Designated Areas) Notice
- Noise Control (Hand Held Percussive Breakers) Regulations
- Noise Control (Air Compressors) Regulations
- The Factories and Industrial Undertakings (Noise at Work) Regulations are also applicable

Under the Noise Control Ordinance (NCO), construction activities are grouped into two categories: general construction work and percussive piling (for example, piling by means of a hydraulic hammer or drop hammer). Each of these categories of works is controlled by means of a system of Construction Permits.

In relation to the construction noise permit system, three Technical Memoranda relevant to the construction noise provisions have been issued, namely the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM), the Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM) and the Technical Memorandum on Noise from Percussive Piling (PP-TM).

Under the GW-TM, the contractor carrying out of general construction work using powered mechanical equipment during the restricted hours, that is between 7 p.m. and 7 a.m. or at any time on a general holiday (including Sunday), should require a valid Construction Noise Permit (CNP).

Under the DA-TM, the use of any specified powered mechanical equipment and the carrying out of any prescribed construction work within a designated area during the restricted hours should require a valid CNP.

Under the PP-TM, the carrying out of percussive piling is prohibited between 7 p.m. and 7 a.m. and on holidays. Percussive piling during the daytime should require a valid CNP.

The Noise Control (Hand Held Percussive Breakers) and (Air Compressors) Regulations limit the noise emission from hand held breakers having a mass of above 10 kg and air compressor capable of supplying compressed air at 500kPa or above for carrying out construction work. The above equipment must be fitted with noise emission labels when in operation.

Followings are the license / permits to be applied / renewed:

- A CNP for the use of powered mechanical equipment for the carrying out construction work other than percussive piling
- A CNP for the carrying out of prescribed construction work
- A CNP for the carrying out of percussive piling
- Noise Emission Labels for each hand held breakers
- Noise Emission Labels for each air compressors

3. Identification of Major Construction Activities

Major construction activities in this project consist of:

- Construction of new drainage culverts in the hinterland urban area
- Diversion of existing cooling water mains through the hinterland area
- Construction of upgraded sewerage pipelines along existing roads
- Construction of new water mains along existing roads
- Demolition of West Bridge
- Construction of a dual three-lane trunk road tunnel

The major powered mechanical equipments (PME) to be used on site are listed in Appendix 4.13 of EIA Report (Register No.: AEIAR-125/2008). Detailed list of PME will be proposed in corresponding method statement submitted to the Engineer.

4. Noise Mitigation Measures

- 4.1 Use of QPME and other noise mitigation measures will be made according to the PME schedules listed in Appendix 4.13 of EIA Report

and be proposed in corresponding method statement submitted to the Engineer.

- 4.2 CWLJV will take all reasonable precautions to avoid any nuisance arising from the construction works. All works will be carried out in a matter as to cause as little inconvenience as possible and to minimize adverse impacts on the indoor and outdoor environment during construction works.
- 4.3 A combination of noise mitigation measures will be utilized during the construction stage for the construction phase listed in the EM&A Manual. No single noise mitigation measure would be most effective at reducing noise levels. The following mitigation measures together are considered to offer the most potential for application to this project and incorporated into this plan as described below. Regular monitoring, inspection and audit will be conducted to ensure the effectiveness of the mitigation measures.
- 4.4 In according to the Section of 4.9.3 in EIA Report, stationary noise sources will be located as far as possible from NSRs. If stationary sources have to be located near NSRs, they will be adequately muffled and enclosed within temporary sheds, or movable noise barriers will be used (S4.9.3 of EIA Report).
- 4.5 In order to reduce the excessive noise impacts at the affected areas, movable noise barriers are proposed to be provided for particular items of plants and construction works. Movable noise barriers with cantilevered upper portion for the following items of plants:
 - i) Excavator with breaker
 - ii) Diaphragm wall rigs
 - iii) Poker vibrator
 - iv) Hand held pneumatic breaker
 - v) Generator
 - vi) Air compressor
 - vii) Concrete pump
 - viii) Vibration hammer

Movable noise barrier with a cantilevered upper portion located within 5m from any static or mobile plant can provide 5 to 10 dB(A) noise reduction.



If required, temporary noise barriers (4m in height) including cantilevered upper portion are proposed in work sites to further reduce the noise level during construction phase.

The noise barrier (See **Appendix D**) shall have a surface mass of not less than 14kg/m² on skid footing with 25mm thick internal sound absorptive lining (See **Appendix C**) to achieve maximum screening effect.

- 4.6 Quiet Power Mechanical Equipment (QPME) deployed on site will be effectively sound reduced (refer to S4.8.3 of EIA Report), as required, to meet the appropriate standards. Sound reduction methods that may be considered are manufacturer recommended silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means, as required avoiding disturbance to any nearby NSRs.
- 4.7 Construction equipment will be turned off when not in operation. Close all hoods, cover panels and inspection hatches of powered mechanical plant such as generators, air compressors, etc, during operation.
- 4.8 Construction equipment will be maintained in good condition in order to minimize noise emission during the Works. Daily inspection and repairs, when appropriate, will be made to ensure that equipment remains within compliance limits.
- 4.9 Construction equipment such as excavator that is known to emit noise strongly in one direction will be orientated to face away from the NSRs.
- 4.10 Quiet plant will be used whenever possible throughout the works. Giken silent piler will be used whenever possible to drive sheet piles by jacking mechanism, hence the noise and vibration generated will be significantly reduced. Concrete crusher will be used to replace breaker whenever possible for the demolition works in order to minimize noise pollution in the demolition area.
- 4.11 Equipment used for project construction will be hydraulically or electrically powered whenever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However,



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Contract No. HK/2009/01
Wan Chai Development Phase II
Central - Wan Chai Bypass at HKCEC

where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust will be used.

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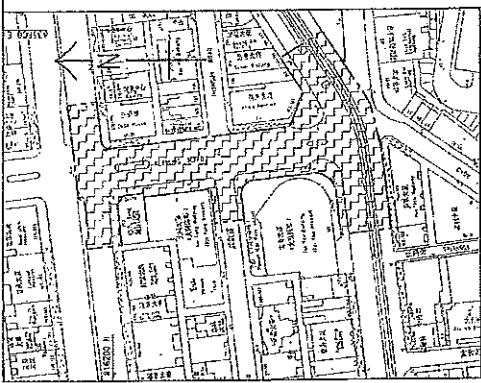
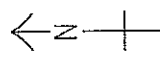
LEADER 俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at HKCEC

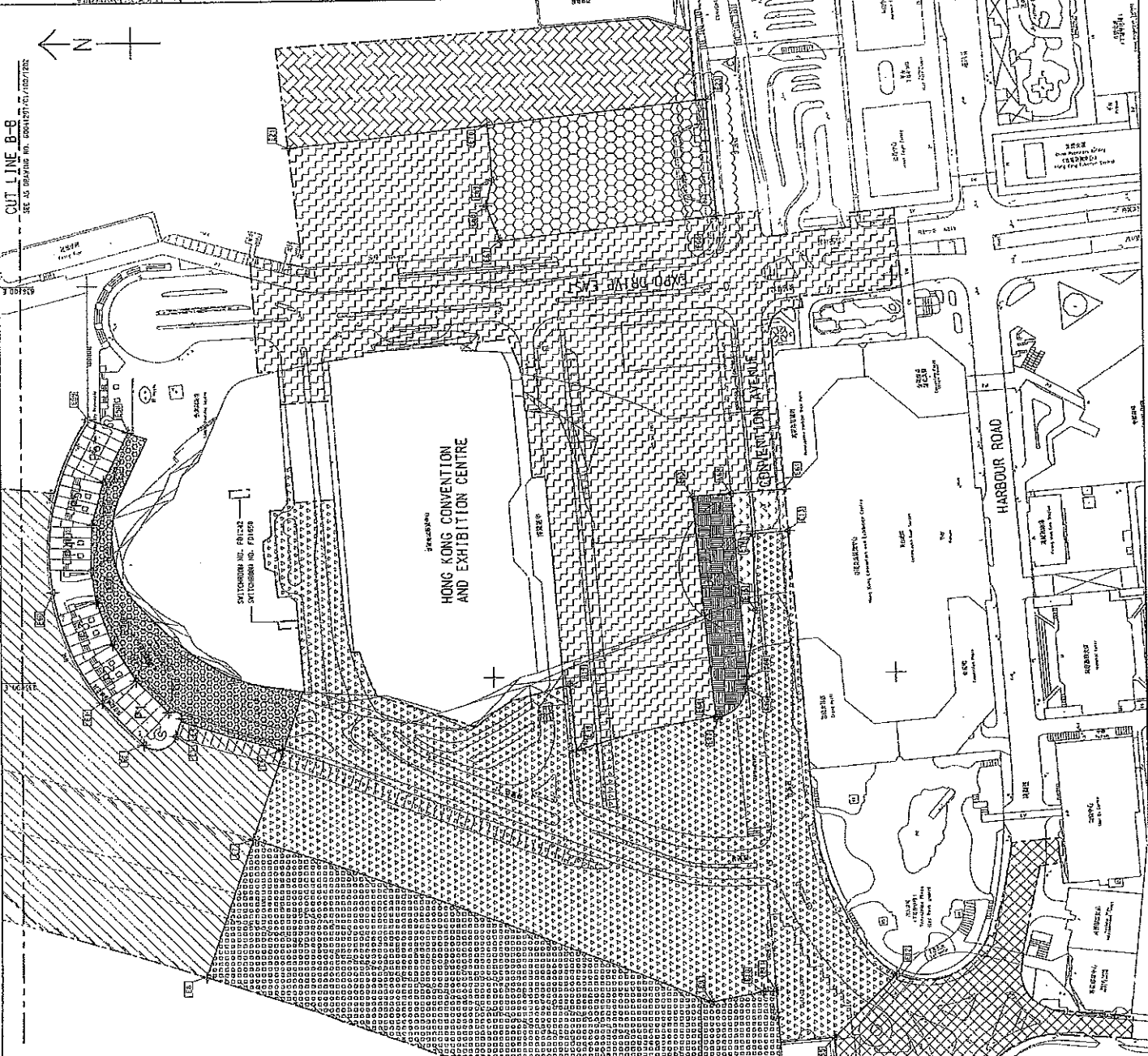
Appendix A

Site Plan

CUT LINE B-B
SEE EX DRAWING NO. C000701/CI/102/02



INSET 'A'
SCALE 1:1000
VICTORIA HARBOUR



KEY PLAN
SCALE 1:10000

NOTE:
1. FOR NOTES AND LEGEND, REFER TO DRAWING NO. C000701/CI/100/1203C.

STATION	EASTING	NORTHING
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E6	455747.445	451331.827
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C TENDER ADDENDUM NO. 4
DATE: 17 SEP 08

D TENDER ADDENDUM NO. 5
DATE: 17 SEP 08

A TENDER ADDENDUM NO. 1
DATE: 17 SEP 08

F TENDER DRAWING
DATE: 17 SEP 08

WAN CHAI DEVELOPMENT PHASE II
Civil Engineering and
Development Department

WAN CHAI DEVELOPMENT PHASE II
HONG KONG CONVENTION AND EXHIBITION CENTRE
AREAS OF THE SITE

DRGNO. 60041297/CI/100/1203C
DRAWN BY: [Name]
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DATE: 17/09/08

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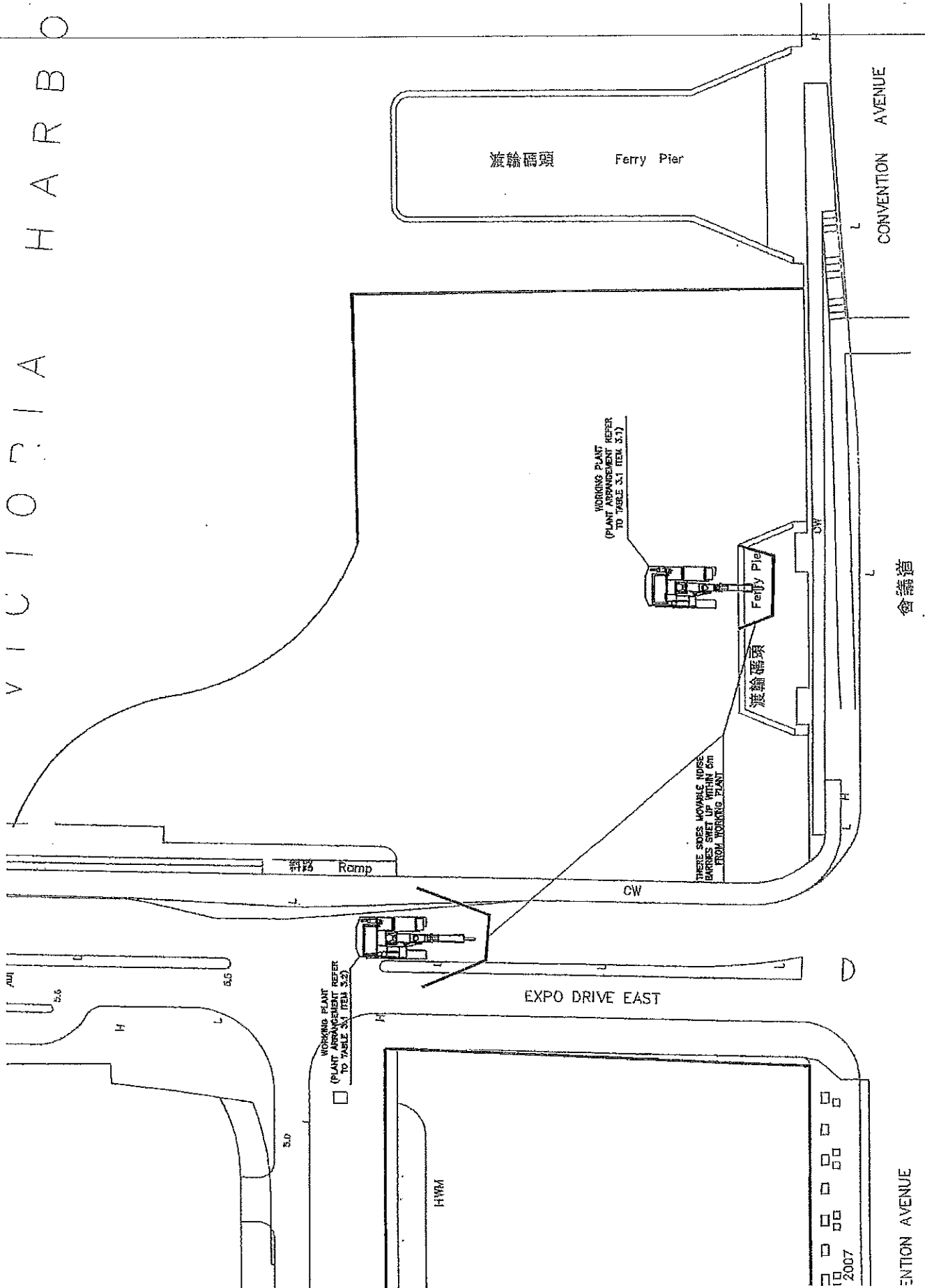
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Appendix B

**Layout plans showing the proposed noise mitigation
measures for those major construction activities likely
to exceed statutory limit**

V I C T O R I A H A R B O R



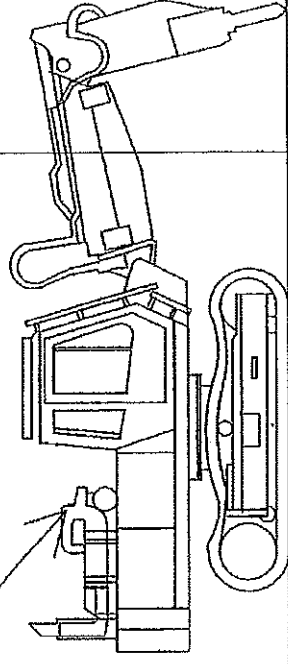
2007

**Victoria
Harbour**

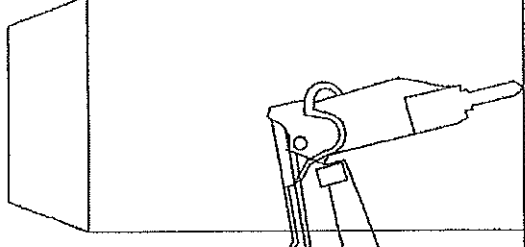
Wan Chai



**Excavator
&
Breaker**



**Three Side
Movable Noise Barrier**



**Expo Drive East Bridge /
Wan Chai West Pier**

Appendix C

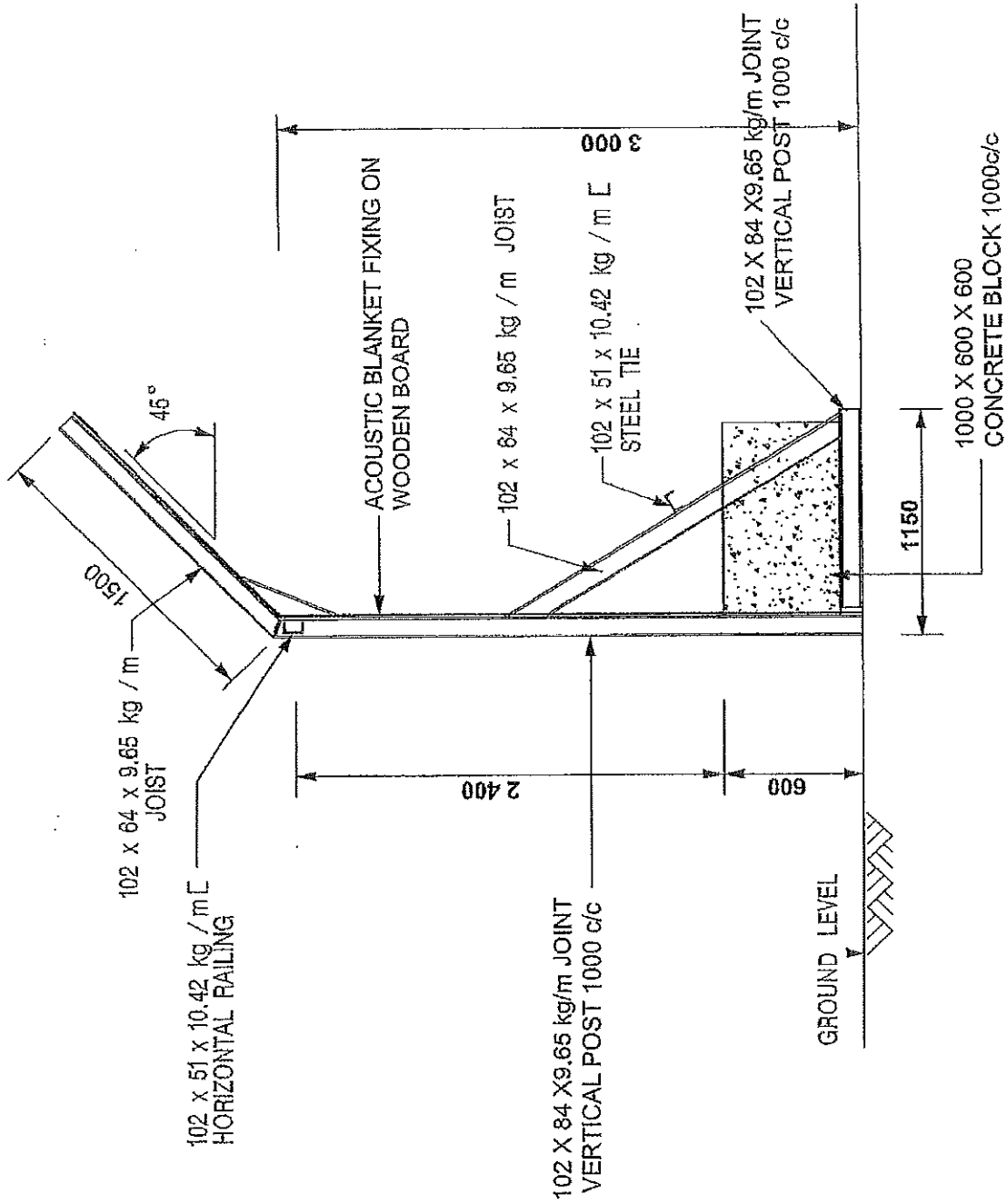
Sound Insulating Material for Noise Barrier and Plant

External Acoustic Jacket



Appendix D

Details of Noise Barrier



DETAIL FOR NOISE BARRIER



俊和 - 利達聯營

CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at Hong Kong Convention and
Exhibition Centre

Noise Management Plan

Revision	Date of Issue	Remarks	Author	Approved
0	13 May 11	Initial issue	AM	PY
1	27 May 11	Incorporated comments from ET & IEC	AM	PY



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1. GENERAL

1.1 Introduction

The CEDD Project, namely Wan Chai Development Phase II, Central – Wan Chai Bypass at Hong Kong Convention and Exhibition Centre is one of the major sub-projects of the Wan Chai Development Phase II Project.

According to the requirement in the Environmental Permit No.EP-364/2009 and Further Environmental Permit No.FEP-02/364/2009 section 2.9, the Permit Holder shall submit a noise management plan (NMP) showing the noise mitigation measures to be adopted.

1.2 Purpose of the Noise Management Plan

This NMP identify major construction activities that might generate adverse noise impacts to the nearby public and lists mitigation measures that will ensure that the impacts that could result from construction works of the project will be as benign as possible. Chun Wo Leader JV (CWLJV) has the overall responsibility of ensuring that the environmental impacts are mitigated as specified.

It must be verified that the noise mitigation measures are accomplished in accordance with the NMP. This effort will encompass all monitoring activities needed to determine the success of the noise mitigation measures (e.g., to determine if they are implemented according to schedule, if they are producing the desired result, or if additional mitigation measures are needed). According to the Contract requirement, the Environmental Team (ET) shall be responsible for the implementation of the EM&A Manual of the Project and conduct noise monitoring throughout the course of construction at locations proposed in the EM&A Manual. All aspects of the noise mitigation measure must be audited to ascertain compliance with requirements.

CWLJV also has the responsibility of reviewing the project to ensure that the impacts and mitigations presented in the NMP are appropriate to the

planned activities. In addition to conducting the specific mitigation activities addressed in this NMP, all parties involved with or overseeing the project will comply with all applicable environmental laws, regulations and ordinances.

1.3 Summary of the Plan

This NMP addresses the pertinent mitigation measures as recommended in the EIA report of the project. This NMP does not repeat or present in-depth technical information. The presentation of noise mitigation actions in this NMP is organized by the resource categories. Noise mitigation measures will be planned specifically in accordance with the construction activities.

1.4 Noise Sensitive Receivers

The project is located primarily in areas of mixed commercial and residential areas. Activities that generate noise levels above natural background include traffic on major road systems and local roadways across the site, marine traffic from Victoria Harbour, residential areas, other recreational locations and commercial operations. Table 1.1 shows the representative NSRs for this noise impact assessment as identified in the EIA report of the project. Insignificant construction noise impacts are expected on the indoor environment of NSRs such as HKCEC extension, Grand Hyatt Hotel, Hong Kong Space Museum and Museum of Arts, which are close to the construction sites, as they have facades / fixed windows and are provided with central air conditioning, therefore they do not rely on openable windows for ventilation. Aim of noise mitigation measures in this plan is to lower the noise level at the nearest noise sensitive receivers.

Table 1.1 Representative Existing Noise Sensitive Receivers

NSR	Section	Location	Use	Ground Elevation (mPD)	No. of Floors
N1	Wanchai	HKAPA (Open Arena)	Performing Arts Centre	5.0	G/F
N2	Wanchai	Causeway Centre	Residential	4.0	42

2. Noise Legislation and License Application

The main legislative instrument to control construction noise and the subsidiary regulations include:

- Noise Control (Construction Work) Regulation
- Noise Control (Construction Work Designated Areas) Notice
- Noise Control (Hand Held Percussive Breakers) Regulations
- Noise Control (Air Compressors) Regulations
- The Factories and Industrial Undertakings (Noise at Work) Regulations are also applicable

Under the Noise Control Ordinance (NCO), construction activities are grouped into two categories: general construction work and percussive piling (for example, piling by means of a hydraulic hammer or drop hammer). Each of these categories of works is controlled by means of a system of Construction Permits.

In relation to the construction noise permit system, three Technical Memoranda relevant to the construction noise provisions have been issued, namely the Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW-TM), the Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM) and the Technical Memorandum on Noise from Percussive Piling (PP-TM).

Under the GW-TM, the contractor carrying out of general construction work using powered mechanical equipment during the restricted hours, that is between 7 p.m. and 7 a.m. or at any time on a general holiday (including Sunday), should require a valid Construction Noise Permit (CNP).

Under the DA-TM, the use of any specified powered mechanical equipment and the carrying out of any prescribed construction work within a designated area during the restricted hours should require a valid CNP.

Under the PP-TM, the carrying out of percussive piling is prohibited between 7 p.m. and 7 a.m. and on holidays. Percussive piling during the daytime should require a valid CNP.

The Noise Control (Hand Held Percussive Breakers) and (Air Compressors) Regulations limit the noise emission from hand held breakers having a mass of above 10 kg and air compressor capable of supplying compressed air at 500kPa or above for carrying out construction work. The above equipment must be fitted with noise emission labels when in operation.

Followings are the license / permits to be applied / renewed:

- A CNP for the use of powered mechanical equipment for the carrying out construction work other than percussive piling
- A CNP for the carrying out of prescribed construction work
- A CNP for the carrying out of percussive piling
- Noise Emission Labels for each hand held breakers
- Noise Emission Labels for each air compressors

3. Identification of Major Construction Activities

Major construction activities in this project consist of:

- Construction of new drainage culverts in the hinterland urban area
- Diversion of existing cooling water mains through the hinterland area
- Construction of upgraded sewerage pipelines along existing roads
- Construction of new water mains along existing roads
- Demolition of West Bridge
- Construction of a dual three-lane trunk road tunnel

The major powered mechanical equipments (PME) to be used on site are listed in Appendix 4.13 of EIA Report (Register No.: AEIAR-125/2008). Detailed list of PME will be proposed in corresponding method statement submitted to the Engineer.

4. Noise Mitigation Measures

- 4.1 Use of QPME and other noise mitigation measures will be made according to the PME schedules listed in Appendix 4.13 of EIA Report



利達



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CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central - Wan Chai Bypass at HKCEC

and be proposed in corresponding method statement submitted to the Engineer.

- 4.2 CWLJV will take all reasonable precautions to avoid any nuisance arising from the construction works. All works will be carried out in a manner as to cause as little inconvenience as possible and to minimize adverse impacts on the indoor and outdoor environment during construction works.
- 4.3 A combination of noise mitigation measures will be utilized during the construction stage for the construction phase listed in the EM&A Manual. No single noise mitigation measure would be most effective at reducing noise levels. The following mitigation measures together are considered to offer the most potential for application to this project and incorporated into this plan as described below. Regular monitoring, inspection and audit will be conducted to ensure the effectiveness of the mitigation measures.
- 4.4 In accordance with the Section of 4.9.3 in EIA Report, stationary noise sources will be located as far as possible from NSRs. If stationary sources have to be located near NSRs, they will be adequately muffled and enclosed within temporary sheds, or movable noise barriers will be used (S4.9.3 of EIA Report).
- 4.5 In order to reduce the excessive noise impacts at the affected areas, movable noise barriers are proposed to be provided for particular items of plants and construction works. Movable noise barriers with cantilevered upper portion for the following items of plants:
- i) Excavator with breaker
 - ii) Diaphragm wall rigs
 - iii) Poker vibrator
 - iv) Hand held pneumatic breaker
 - v) Generator
 - vi) Air compressor
 - vii) Concrete pump
 - viii) Vibration hammer

Movable noise barrier with a cantilevered upper portion located within 5m from any static or mobile plant can provide 5 to 10 dB(A) noise reduction.

If required, temporary noise barriers (4m in height) including cantilevered upper portion are proposed in work sites to further reduce the noise level during construction phase.

The noise barrier (See **Appendix D**) shall have a surface mass of not less than 14kg/m² on skid footing with 25mm thick internal sound absorptive lining (See **Appendix C**) to achieve maximum screening effect.

- 4.6 Quiet Power Mechanical Equipment (QPME) deployed on site will be effectively sound reduced (refer to S4.8.3 of EIA Report), as required, to meet the appropriate standards. Sound reduction methods that may be considered are manufacturer recommended silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means, as required avoiding disturbance to any nearby NSRs.
- 4.7 Construction equipment will be turned off when not in operation. Close all hoods, cover panels and inspection hatches of powered mechanical plant such as generators, air compressors, etc, during operation.
- 4.8 Construction equipment will be maintained in good condition in order to minimize noise emission during the Works. Daily inspection and repairs, when appropriate, will be made to ensure that equipment remains within compliance limits.
- 4.9 Construction equipment such as excavator that is known to emit noise strongly in one direction will be orientated to face away from the NSRs.
- 4.10 Quiet plant will be used whenever possible throughout the works. Giken silent piler will be used whenever possible to drive sheet piles by jacking mechanism, hence the noise and vibration generated will be significantly reduced. Concrete crusher will be used to replace breaker whenever possible for the demolition works in order to minimize noise pollution in the demolition area.
- 4.11 Equipment used for project construction will be hydraulically or electrically powered whenever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However,

where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust will be used.

- 4.12 External jackets on the tools will be used where feasible. Breakers mounted on excavators will be surrounded by acoustic blanket to reduce the noise level (see **Appendix C**).
- 4.13 For the demolition of Wan Chai West Pier and Expo Drive East Bridge, it is proposed to surround air compressor and pneumatic breakers on three sides by movable noise barriers during the course of demolition works to reduce the noise level. Breakers of excavators will also be wrapped with acoustical material to further suppress the noise generated during breaking. Super quiet air compressor will also be used. It is anticipated that when properly placed the movable noise curtain will provide noise control of 5 dB(A) to each PME. Layout plans showing the proposed noise mitigation measures for those major construction activities is attached in **Appendix B**.

5. Impact Monitoring for Construction Noise

- 5.1 During the construction period, monitoring of noise levels shall be carried out at the agreed monitoring locations by ET in accordance with the EM&A report.
- 5.2 The Action and Limit levels for construction noise are defined in the EM&A report. Should non-compliance of the criteria occur, action in accordance with the Action Plan shall be carried out.



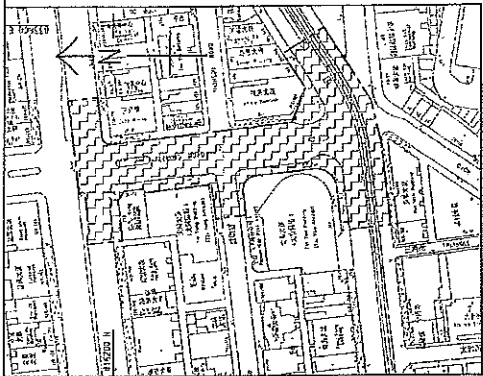
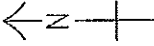
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Wan Chai Development Phase II
Central – Wan Chai Bypass at HKCEC

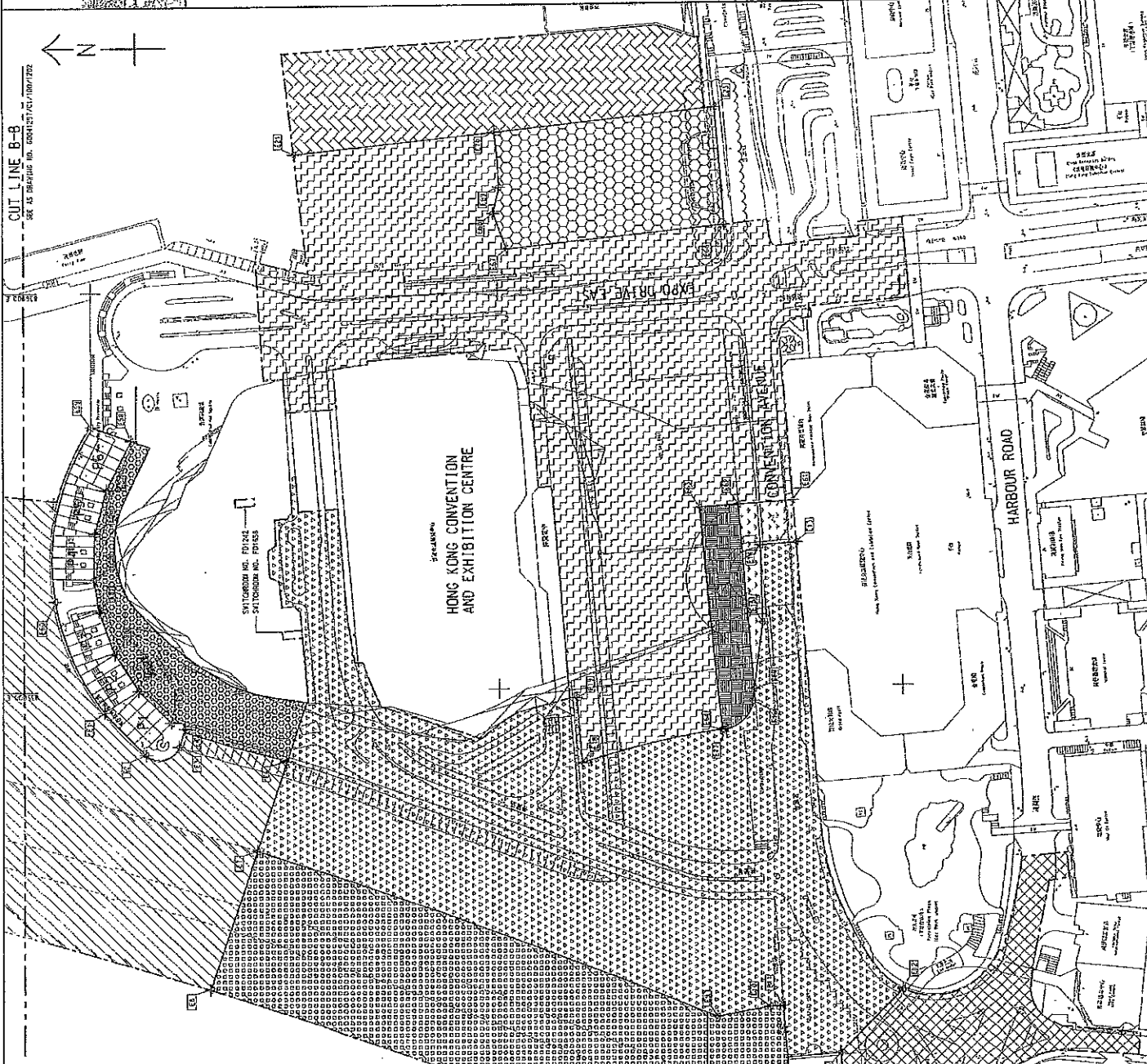
Appendix A

Site Plan

CUT LINE B-B
SEE AS SHOWN ON DRAWING NO. 6004129T/C1/100/1203C



INSET 'A'
SCALE: 1:1000
VICTORIA HARBOUR



KEY PLAN
SCALE: 1:5000

NOTE:
1. FOR NOTES AND LEGEND, REFER TO DRAWING NO. 6004129T/C1/100/1203C.

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E1	837348.616	816413.629
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E3	837349.886	816413.277
E4	837350.521	816413.101
E5	837351.156	816412.925
E6	837351.791	816412.749
E7	837352.426	816412.573
E8	837353.061	816412.397
E9	837353.696	816412.221
E10	837354.331	816412.045
E11	837354.966	816411.869
E12	837355.601	816411.693
E13	837356.236	816411.517
E14	837356.871	816411.341
E15	837357.506	816411.165
E16	837358.141	816410.989
E17	837358.776	816410.813
E18	837359.411	816410.637
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E24	837363.221	816409.581
E25	837363.856	816409.405
E26	837364.491	816409.229
E27	837365.126	816409.053
E28	837365.761	816408.877
E29	837366.396	816408.701
E30	837367.031	816408.525
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E41	837374.016	816406.589
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E47	837377.826	816405.533
E48	837378.461	816405.357
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E63	837387.986	816402.717
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E67	837390.526	816402.013
E68	837391.161	816401.837
E69	837391.796	816401.661
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- C TENDER AGREEMENT NO. 4
- D TENDER AGREEMENT NO. 5
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- CU TENDER AGREEMENT NO. 100

WAN CHAI DEVELOPMENT PHASE II
 HONG KONG CONVENTION AND EXHIBITION CENTRE
 AREAS OF THE SITE

SCALE: 3 OF 3

AECOM

6004129T/C1/100/1203C

DATE: 10/11/2009

BY: [Signature]

FOR: [Signature]

PROJECT NO. 6004129T/C1/100/1203C

DATE: 10/11/2009

SCALE: 3 OF 3

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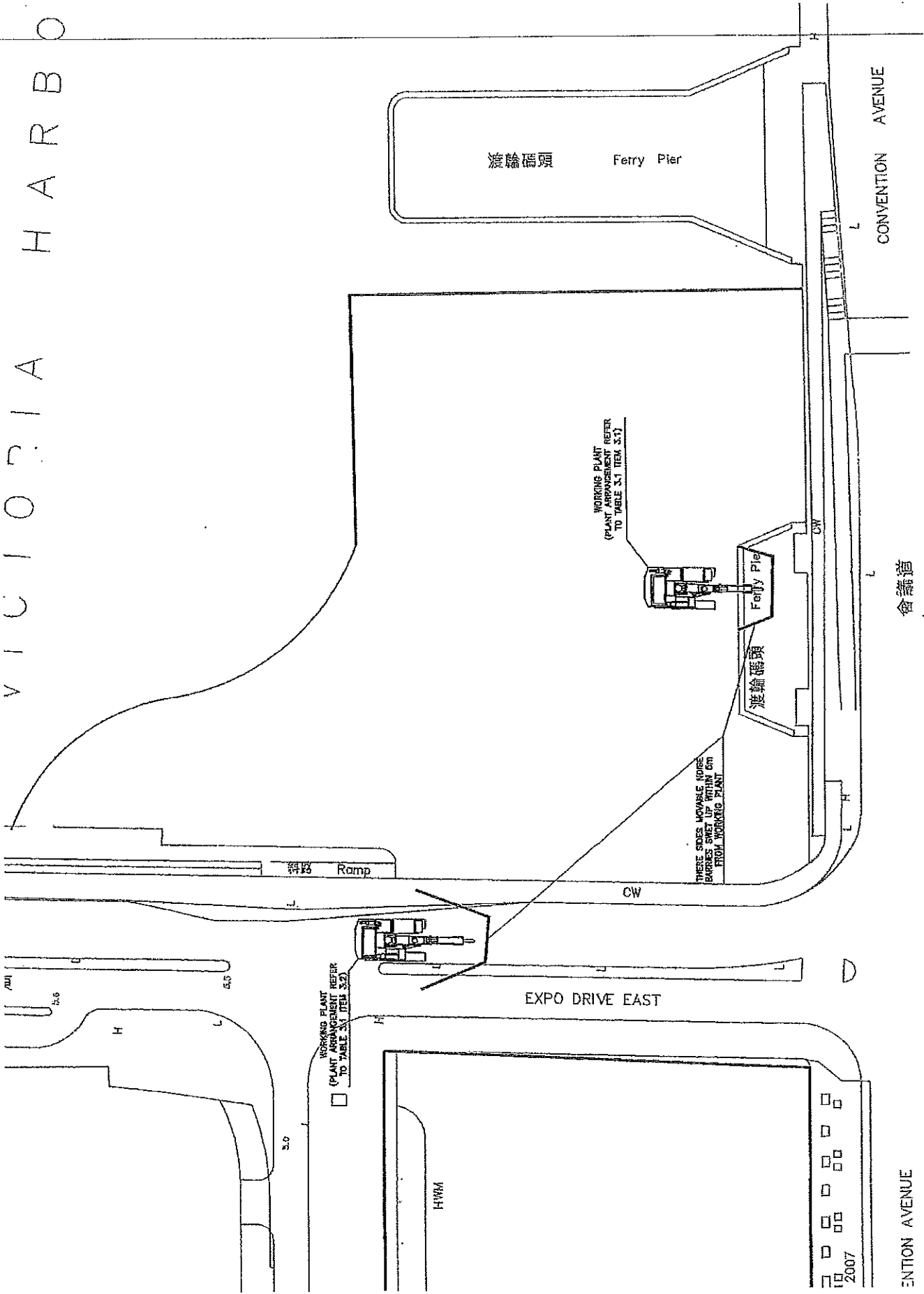
LEADER 俊和 - 利達聯營
CHUN WO - LEADER JOINT VENTURE

Contract No. HK/2009/01
Wan Chai Development Phase II
Central – Wan Chai Bypass at HKCEC

Appendix B

**Layout plans showing the proposed noise mitigation
measures for those major construction activities likely
to exceed statutory limit**

V I C T O R I A H A R B O R



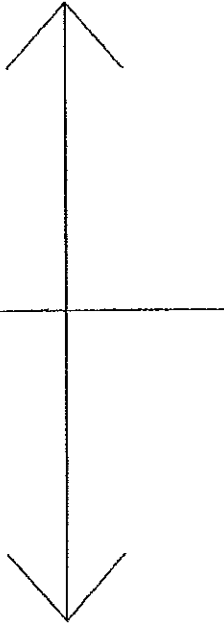
會議道

ENTON AVENUE

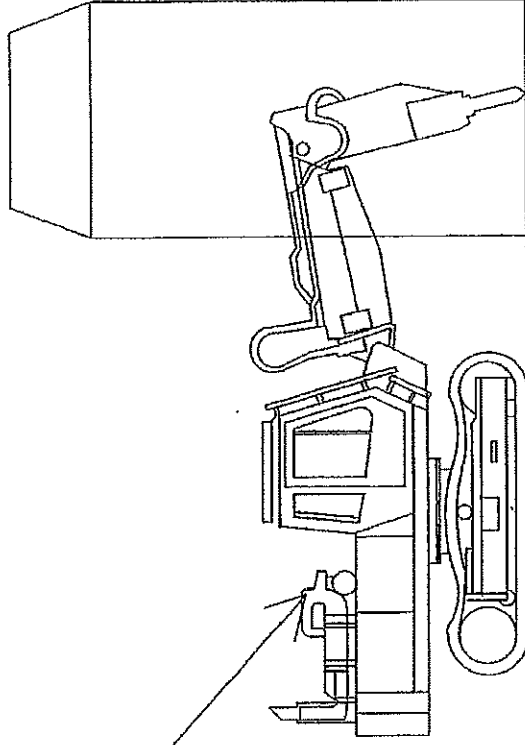
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**Victoria
Harbour**

Wan Chai



**Excavator
&
Breaker**



**Three Side
Movable Noise Barrier**

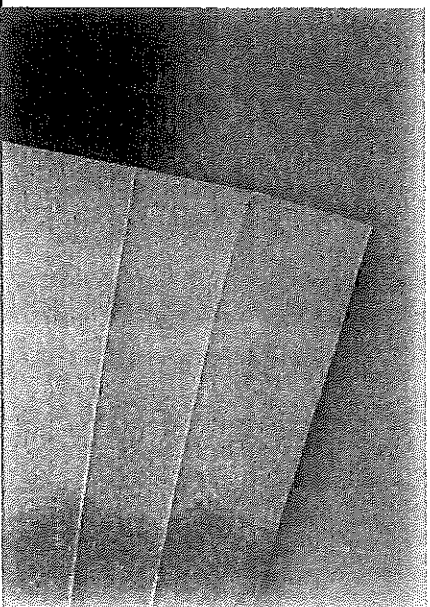


**Expo Drive East Bridge /
Wan Chai West Pier**

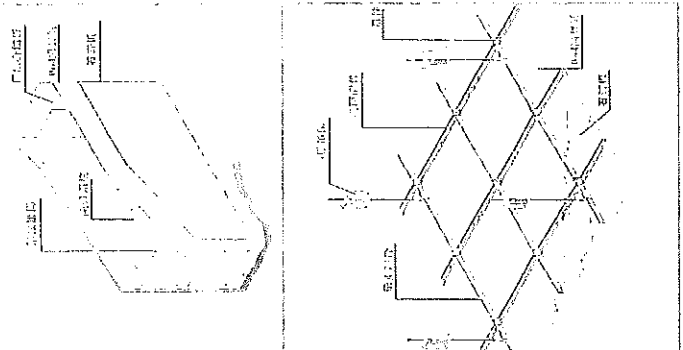
Appendix C

Sound Insulating Material for Noise Barrier and Plant

External Acoustic Jacket



施工示意图

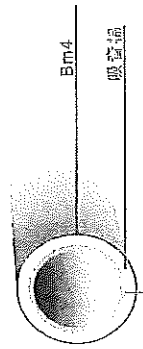


概述
NoiseStop Barrier Mat - Bm4 可與各種配件、構件或吊環配合使用，提供最佳降噪效果。其獨特的設計可防止噪音在牆面或天花板上反射，並防止噪音在室內傳播。其獨特的設計可防止噪音在牆面或天花板上反射，並防止噪音在室內傳播。

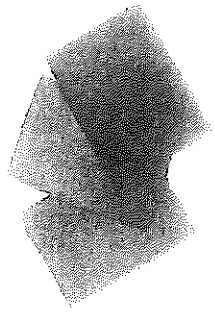
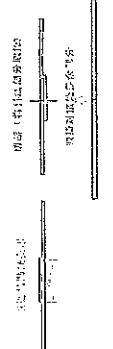
系統描述
1. 材料堅固耐用，可與各種配件、構件或吊環配合使用。
2. 安裝簡便，只需將材料鋪設在牆面或天花板上即可。
3. 具有優良的吸音性能，可顯著降低噪音水平。
4. 具有優良的防火性能，可防止火災蔓延。
5. 具有優良的防盜性能，可防止盜賊破牆而入。
6. 具有優良的防蟲性能，可防止昆蟲進入。

系統描述
NoiseStop Barrier Mat - Bm4 可與各種配件、構件或吊環配合使用，提供最佳降噪效果。其獨特的設計可防止噪音在牆面或天花板上反射，並防止噪音在室內傳播。其獨特的設計可防止噪音在牆面或天花板上反射，並防止噪音在室內傳播。

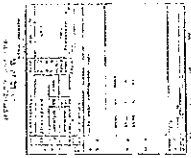
這道特殊處理的每片材料均具備曲型內層材料，能吸收噪音，並防止噪音在牆面或天花板上反射。其獨特的設計可防止噪音在牆面或天花板上反射，並防止噪音在室內傳播。



1. 承接板與牆面、柱或地樑交接處需留100mm以上空隙，以便安裝。
2. 安裝時應注意材料的對齊，確保每片材料之間無縫隙。
3. 安裝時應注意材料的固定，確保材料不會鬆動。



材料
規格: Bm4
顏色: 黑色
厚度: 10mm
密度: 2.0g/cm³
重量: 3kg/m²



防火性能
經BS476: Part 7 測試，符合3級標準。

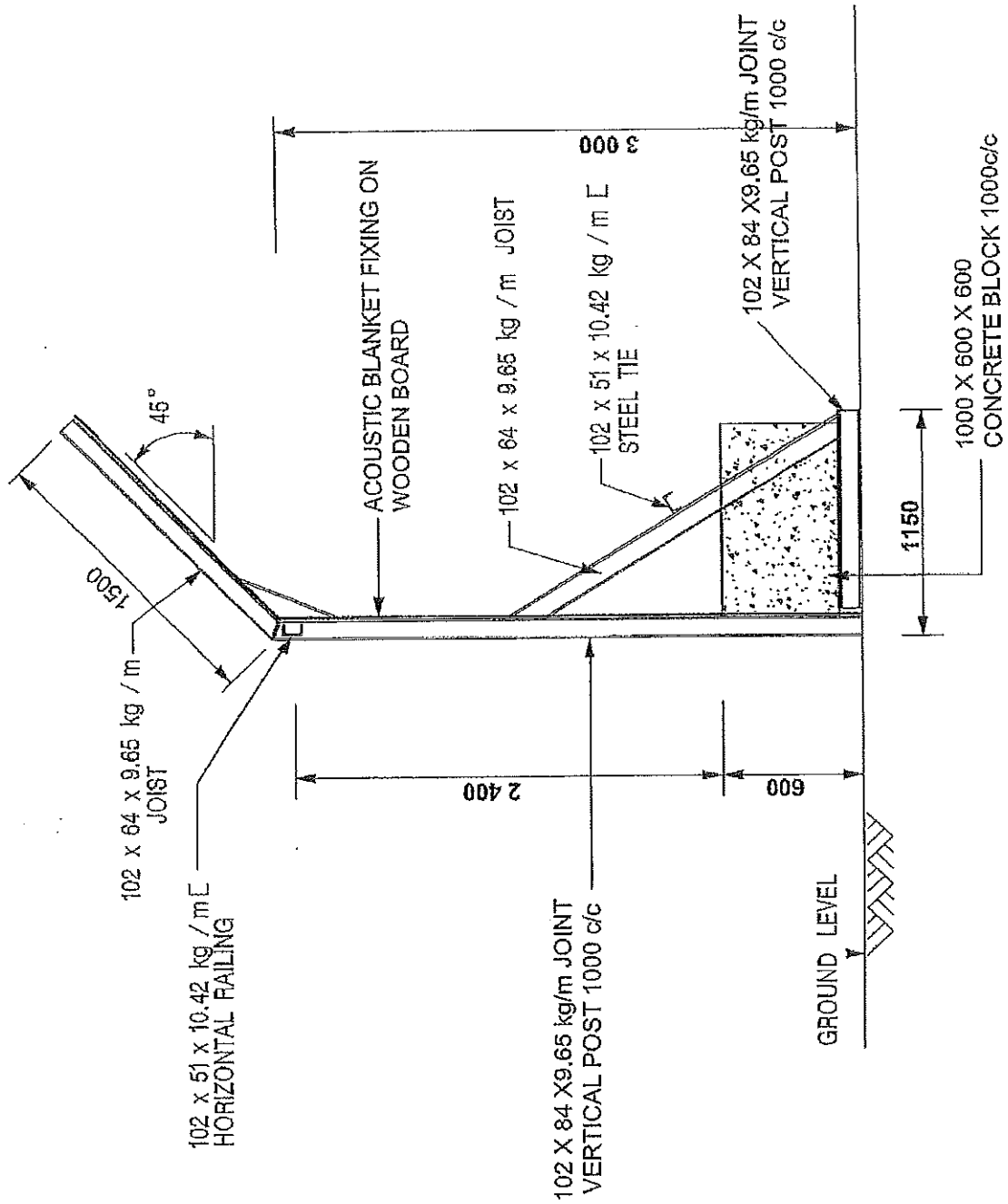
聲學性能

中心頻率 (Hz)	125	250	500	1k	2k	4k
隔聲量 (dB)	13	19	22	27	32	37

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Appendix D

Details of Noise Barrier



DETAIL FOR NOISE BARRIER