





Lam Woo & Co. Ltd

**Noise Management Plan
for
Contract No. : HY/2009/17**

**Central-Wan Chai Bypass-
FEHD Whitfield Depot Re-provisioning Works
Advance Piling Works**

**Revision No.: 0
27th August 2010**

| | |
|---|--|
| Prepared by: | Approved by: |
|  |  |
| Andy Mak Environmental Officer | Daniel Chan Site Agent |



Lam Geotechnics Limited

Ground Investigation & Instrumentation Professionals

華益土力有限公司

Ref : G1001/CS/L179/FEP-03/364/2009
Date : 31 August 2010

Lam Woo & CO., LTD
11/F, Chevalier Engineering Service Centre,
21 Sheung Yuet Road,
Kowloon Bay, Hong Kong

Attn: Site Agent, Mr. Daniel Chan

Dear Sir,

Contract No. HY/2009/17
Central- Wan Chai Bypass – FEHD Whitfield Depot Re-provisioning Works Advance Piling Works
Noise Management Plan (Revision 0)

Referring to the captioned submission dated 27 August 2010, we have reviewed your submitted details and hereby certified this submission in accordance with Conditions 2.9 of FEP-03/364/2009.

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. Jones Lai | (By Fax: 2714 5289) |
| CEDD | - Mr. Patrick Keung | (By Fax: 2577 5040) |
| AECOM (CWB) | - David Kwan | (By Fax: 3529 2829) |
| AECOM (WDII) | - Mr. Frankie Fan | (By Fax: 2587 1877) |
| ENVIRON | - Mr. David Yeung | (By Fax: 3548 6988) |



Ref.: AACWBIECEM00_0_0438L.10

31 August 2010

Lam Woo & Co. Ltd
11/F, Chevalier Engineering Service Centre
21 Sheung Yuet Road
Kowloon Bay
Kowloon

By Post and E-mail

Attention: Mr. Daniel Chan

Dear Sir,

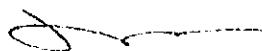
Re: FEP-03/364/2009
Contract No. HY/2009/17
Central-Wan Chai Bypass – FEHD Whitefield Depot Re-provisioning
Works Advance Piling Works
Noise Management Plan (Revision 0)

Reference is made to the captioned submission of Noise Management Plan (Revision 0) dated 27 August 2010 for our review and comment.

Please be informed that we have no adverse comments on the captioned submission. We write to verify the captioned submission in accordance with Condition 2.9 of FEP-03/364/2009.

Thank you for your kind attention.

Yours sincerely,



David Yeung
Independent Environmental Checker

| | | | |
|------|--------------|-----------------------|-------------------|
| c.c. | HyD | Mr. Jones Lai | by fax: 2714 5289 |
| | CEDD | Mr. Patrick Keung | by fax: 2577 5040 |
| | AECOM (CWB) | Mr. David Kwan | by fax: 3529 2829 |
| | AECOM (WDII) | Mr. Frankie Fan | by fax: 2587 1877 |
| | LAM | Mr. Raymond Dai (ETL) | by fax: 2882 3331 |

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Noise Management Plan

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1. Introduction

1.1 The Works to be executed under this Project are mainly located at No.11 King Ming Road, Food & Environmental Hygiene Department, Transport Section (Hong Kong) Whitefield, North Point.

The major works under this contract include the construction of bored piles or pre-bored H-piles for the future contract of Tunnel (North Point section) and Island Eastern Corridor Link.

1.2 Objective of the Noise Management Plan (NMP)

This NMP provide an evaluation of the potential noise impacts arising during construction and operation phases. The construction noise levels have been predicted based on the estimate of the construction plants used and assessed against the EIAO-TM noise criteria. Appropriate mitigation measures have been recommended where adverse impacts are predicted.

2. Environmental legislation, Policies, Plans, Standards and Criteria

2.1 Noise impacts have been assessed in accordance with the criteria and methodology given in the Technical memoranda (TM) made under the Noise Control Ordinance (NCO) and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

2.2 The Noise Control Ordinance (NCO) provides the statutory framework for noise control. Assessment procedures and standards are set out in the following Technical Memoranda:

- EIAO-TM;
- TM on Noise from Construction Work other than Percussive Piling (GW-TM);
- TM on Noise from Construction Work in Designated Areas (DA-TM);
- TM on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM);

Noise Management Plan

3. Construction Noise

3.1 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 and 0700 or at any time on Sundays and a general holiday (that is, restricted hours). Noise control on construction activities taking place at other times is subject to the Criteria for Evaluating Noise Impact stated in Table 1B of Annex 5 in the EIAO-TM. The noise limit is 75 dB(A) $L_{eq(30\text{ minutes})}$ at the facades of dwellings and 70 dB(A) $L_{eq(30\text{ minutes})}$ at the facades of schools (65 dB(A) during examinations). The construction noise criteria are summarised in Table 1.

Table 1 Daytime Construction Noise Criteria

| Uses | Noise Level in $L_{eq(30\text{-minutes})}$, dB(A) |
|--|---|
| Domestic premises | 75 |
| Educational Institution | 70 |
| Educational Institution (during examination) | 65 |

3.2 Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of powered mechanical equipment (PME) for the purpose of carrying out construction work is prohibited unless a Construction Noise Permit (CNP) has been obtained. A CNP may be granted provided that the Acceptable Noise Level (ANL) for the noise sensitive receivers (NSRs) can be complied with. ANLs are assigned depending upon the Area Sensitivity Ratings (ASRs). The corresponding basic noise levels (BNLs) for evening and night time periods are given in Table 2.

Table 2 Construction Noise Criteria for Activity other than Percussive Piling

| Time Period | Basic Noise Level (BNLs) | | |
|---|---------------------------------|--------------|--------------|
| | ASR A | ASR B | ASR C |
| Evening (1900 to 2300 hours) ⁽¹⁾ | 60 | 65 | 70 |
| Night (2300 to 0700 hours) | 45 | 50 | 55 |

Noise Management Plan

4. Noise Sensitive Receivers

4.1 In order to evaluate the construction and operation noise impacts from the project, representative existing noise sensitive receivers (NSRs) within the Study Area are identified for assessment. In accordance with Section 3 of Annex 13 of EIAO-TM, the NSRs within 300m of the Study Area have been identified and are summarized in Table 3.

Table 3 Summary of Identified Existing Noise Sensitive Receivers

| | | |
|---------|--|--------------------------------|
| Tin Hau | Viking Garden | Residential |
| | Victoria Court | Residential |
| | Mayson Garden | Residential |
| | Gorden House | Residential |
| | Belle House | Residential |
| | Hoi Tao Building | Residential |
| | Deport of Food and Environment Hygiene Department (FEHD) | Government quarters and office |
| | Victoria Centre | Residential |
| | Harbour Heights Tower | Residential |

Based on the above summary, Victoria Centre have been selected as a representative NSR to evaluate the construction noise impacts as it located the closest to our construction site. A detail of the representative is given below:

| NSR | Section | Location | Use | Slant Distance from Closest Piling Works(m) | No. of Floors |
|-----|---------|---------------------------|-------------|---|---------------|
| N1 | Tin Hau | Victoria Centre (Block 1) | Residential | 48 | 35 |

Noise Management Plan

5. Assessment Methodology

- 5.1 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.
- 5.2 A negative correction of 10dB(A) was made to the calculated result as all items of PME to be used on the construction site will be totally screened by Island Eastern Corridor such that none will be visible when viewed from any opening in façade of the NSR. (Refer to Appendix B)
- 5.3 A positive correction of 3dB(A) was made to the calculated result in order to allow for façade effect.

6. Prediction and Evaluation of Environmental Impacts

- 6.1 For normal daytime working hours, the construction noise are predicted to be lower than the Leq,(30 minutes) 75dB(A) noise limit for residential uses in the absence of mitigation measures.
- 6.2 Details of construction noise calculations and results are presented in Appendix D. Results showed that the predicted noise levels for pre-bored H-piles or bored piles at the representative NSR during the piling works were between 65dB(A) – 69dB(A).
- 6.3 In Appendix E, it was assumed that some portions of Area B may be partially visible from windows at 25th floor or up in Victoria Centre. Therefore, we calculate the predicted noise level at 25th floor to demonstrate that it would comply with the daytime construction noise criteria of 75dB(A) even without screened by Island Eastern Corridor. The predicted noise levels for pre-bored H-piles or bored piles were 71.3dB(A) & 72.8dB(A) respectively.

7 Mitigation of Environmental Impacts

- 7.1 In order to further reduce the noise impacts to NSRs during normal daytime working hours, it is still recommended that the following noise reduction measures shall be considered as far as practicable during construction :

| | | |
|--|--------|---------------------------------|
| | Page 5 | Issue : 0 Date : August / 10 |
|--|--------|---------------------------------|

Noise Management Plan

- All plant and equipment to be used on site shall be properly maintained;
- Mobile plant shall be sited as far as away from sensitive receivers as possible; and
- Install direct noise mitigation measures including silencers, acoustic louvers and movable acoustic enclosure where necessary
- Machines and plant that maybe in intermittent use should be shut down between work periods.
- Plant known to emit noise strongly in one direction should, where possible, be orientated so that the noise is directed away from the nearby NSRs.

8 Conclusion

8.1 This assessment has predicted the construction noise impacts associated with the construction works of our piling works. The noise level for pre-bored H-piles or bored piles were predicted to be lower than the Leq(30 minutes) 75dB(A) noise limit for residential uses as stipulated under the Environmental Impact Assessment Ordinance. If we assumed the site area can be visible from the 25th floor or up in Victoria Building, the predicted cumulative sound level were still compliances with the EIAO. Therefore, either method can be used for the piling works.

APPENDIX A
Site Layout Plan



1 Co-ordinates are relative to Hong Kong Metric Grid (1980)

Legend:

| REV. | DATE | DESCRIPTION | CHK.BY | AUTH.BY |
|------|------|-------------|--------|---------|
| | | | | |

Highways Department 路政署
Major Works Project Management Office

CENTRAL - WAN CHAI BYPASS AND IEG LIN

PWP ITEM NO. 579 TH
T 務計劃項目編號

Project:
CENTRAL - WAN CHAI BYPASS - FEED WHITFIELD DEPOT RE-PROVISIONING WORKS



Drawing Title
PILING PLAN FOR MODIFIED ICE BRIDGE

Contractor
LAM WOO & COMPANY LIMITED

DRAWING NO. 0020

SURVEY DATE 12-06-2010

DRAWN BY KENG

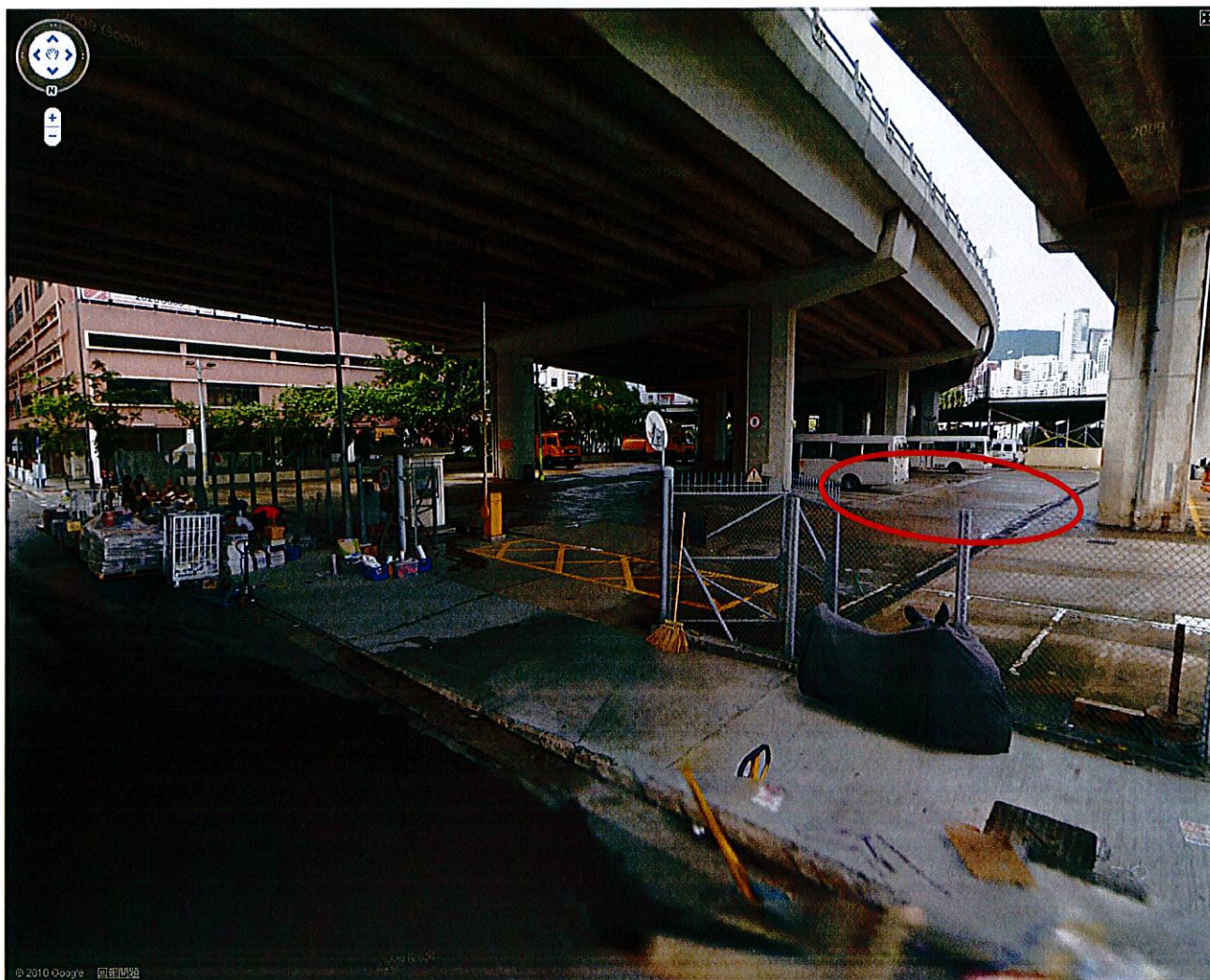
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Noise Management Plan

APPENDIX B
Location of Piling Works

Noise Management Plan



 = Location of Piling Works

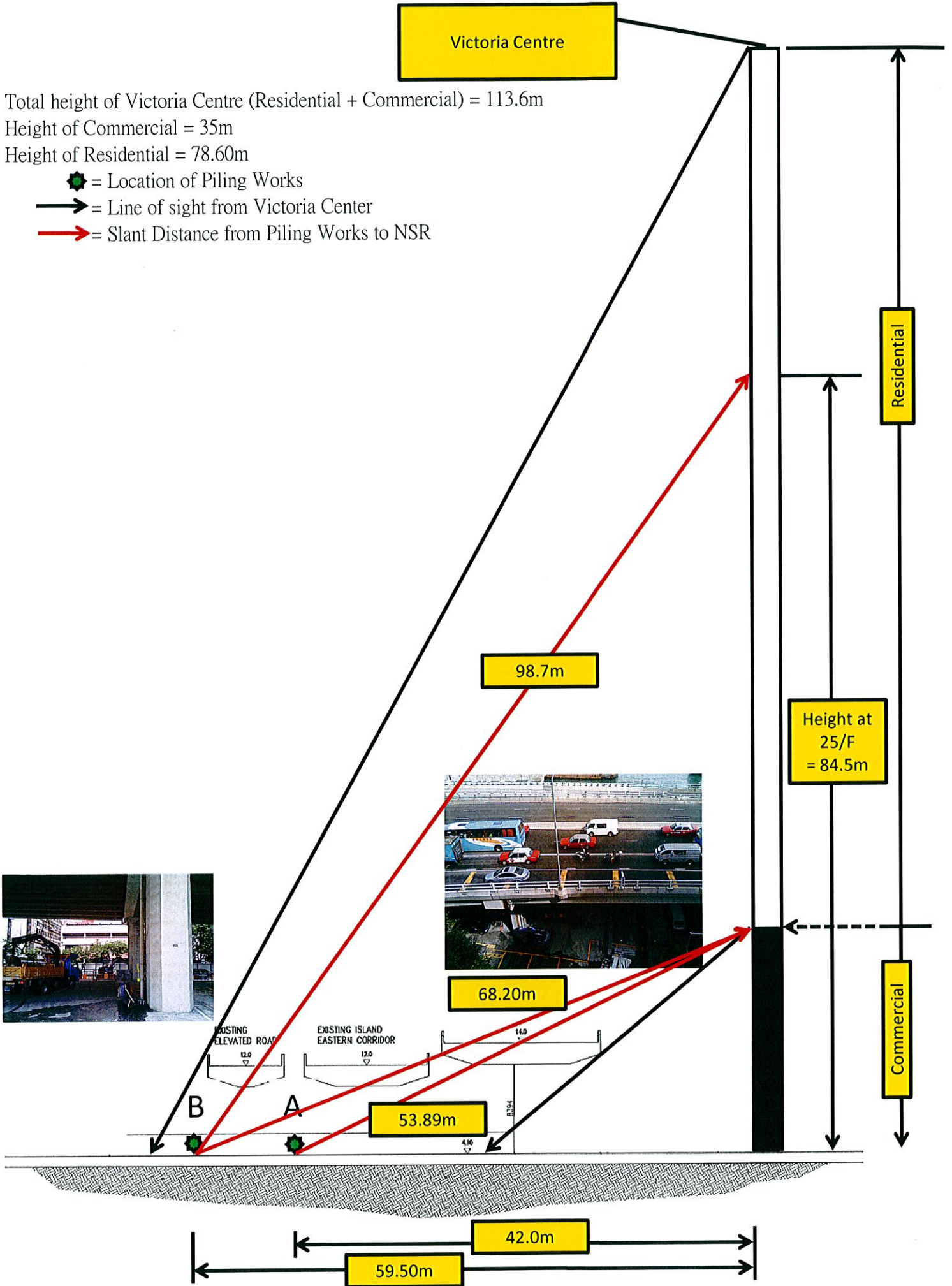
Noise Management Plan

APPENDIX C
Line of Sight from
Victoria Centre

Victoria Centre

Total height of Victoria Centre (Residential + Commercial) = 113.6m
Height of Commercial = 35m
Height of Residential = 78.60m

- ★ = Location of Piling Works
- = Line of sight from Victoria Center
- = Slant Distance from Piling Works to NSR



Calculation for the slant distance from NSR to piling works areas

NSR to Area A : $\tan \theta = \text{Height of Commercial} / \text{horizontal distance between NSR to Area A}$

$$\tan \theta = 35.0 / 41$$

$$\theta = 40.5^\circ$$

$$\text{Slant Distance} : \sin 40.5^\circ = 35 / y$$

$$y = \underline{\underline{53.89\text{m}}}$$

NSR to Area B : $\tan \theta = \text{Height of Commercial} / \text{horizontal distance between NSR to Area A}$

$$\tan \theta = 35.0 / 58.5$$

$$\theta = 30.9^\circ$$

$$\text{Slant Distance} : \sin 30.9^\circ = 35.0 / y$$

$$y = \underline{\underline{68.2\text{m}}}$$

$$\underline{\underline{\text{Height (G/F - 25th Floor)}}} : (78.6 / 27) \times 17 + 35$$
$$\underline{\underline{84.5\text{m}}}$$

NSR (25th Floor to Area B) $\tan \theta = \text{Height of 25th Floor} / \text{horizontal distance between NSR to Area A}$

$$\tan \theta = 84.5 / 58.5$$

$$\theta = 55.3^\circ$$

$$\text{Slant Distance} : \sin 55.3^\circ = 81.14 / y$$

$$y = \underline{\underline{98.7\text{m}}}$$

APPENDIX D

Power Mechanical Equipment
for Construction Noise
Assessment (Without Mitigation)

NSR - FEHD Whitfield Depot (Pre-bored H-piles)

| Area | Plant Item | Plant Code | Sound Level dB(A) | No. of Plant | Total Sound Level, dB(A) | Notional Distance, m | Correction, dB(A) | | | Corrected Sound Level For Each Equipment, dB(A) | Cumulative Sound Level For All Equipment, dB(A) |
|------|------------------|------------|----------------------|--------------|-----------------------------|-------------------------|--------------------------------|----------------------|--|--|--|
| | | | | | | | Distance Attenuation, dB(A) | Façade Effect, dB(A) | Total Screened by Island Eastern Corridor, dB(A) | | |
| A | Air Compressor | CNP 002 | 102 | 4 | 108.0 | 54 | -43 | 3 | -10.0 | 58.0 | 66.3 |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 54 | -43 | 3 | -10.0 | 62.0 | |
| | Backhoe | CNP 081 | 112 | 1 | 112.0 | 54 | -43 | 3 | -10.0 | 62.0 | |
| | Generator | CNP 102 | 100 | 1 | 100.0 | 54 | -43 | 3 | -10.0 | 50.0 | |
| | Piling Rig | CNP 166 | 100 | 2 | 103.0 | 54 | -43 | 3 | -10.0 | 53.0 | |
| | Welding Machines | CNP 168 | 100 | 2 | 103.0 | 54 | -43 | 3 | -10.0 | 53.0 | |

| | | | | | | | | | | | |
|---|------------------|---------|-----|---|-------|----|-----|---|-------|------|------|
| B | Air Compressor | CNP 002 | 102 | 4 | 108.0 | 68 | -45 | 3 | -10.0 | 56.0 | 64.3 |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 68 | -45 | 3 | -10.0 | 60.0 | |
| | Backhoe | CNP 081 | 112 | 1 | 112.0 | 68 | -45 | 3 | -10.0 | 60.0 | |
| | Generator | CNP 102 | 100 | 1 | 100.0 | 68 | -45 | 3 | -10.0 | 48.0 | |
| | Piling Rig | CNP 166 | 100 | 2 | 103.0 | 68 | -45 | 3 | -10.0 | 51.0 | |
| | Welding Machines | CNP 168 | 100 | 2 | 103.0 | 68 | -45 | 3 | -10.0 | 51.0 | |

Distance Attenuation = Slant Distance from Piling Works to Podium of Victoria Centre

The cumulative sound level should be lower as the slant distance increase.

NSR - FEHD Whitfield Depot (Bored Pile)

| Area | Plant Item | Plant Code | Sound Level dB(A) | No. of Plant | Total Sound Level, dB(A) | Notional Distance, m | Correction, dB(A) | | | Corrected Sound Level For Each Equipment, dB(A) | Cumulative Sound Level For All Equipment, dB(A) |
|------|------------------------------------|------------|----------------------|--------------|-----------------------------|-------------------------|--------------------------------|----------------------|--|--|--|
| | | | | | | | Distance Attenuation, dB(A) | Façade Effect, dB(A) | Total Screened by Island Eastern Corridor, dB(A) | | |
| A | Air Compressor | CNP 002 | 102 | 2 | 105.0 | 54 | -43 | 3 | -10.0 | 55.0 | 67.8 |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 54 | -43 | 3 | -10.0 | 62.0 | |
| | Piling, Oscillator | CNP 165 | 115 | 1 | 115.0 | 54 | -43 | 3 | -10.0 | 65.0 | |
| | Piling, Reverse Circulation Drill | CNP 166 | 100 | 1 | 100.0 | 54 | -43 | 3 | -10.0 | 50.0 | |
| | Water Pump, Submersible (Electric) | CNP 283 | 85 | 1 | 85.0 | 54 | -43 | 3 | -10.0 | 35.0 | |
| | Concrete Lorry Mixer | CNP 044 | 109 | 1 | 109.0 | 54 | -43 | 3 | -10.0 | 59.0 | |

| | | | | | | | | | | | |
|---|------------------------------------|---------|-----|---|-------|----|-----|---|-------|------|------|
| B | Air Compressor | CNP 002 | 102 | 2 | 105.0 | 68 | -45 | 3 | -10.0 | 53.0 | 65.8 |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 68 | -45 | 3 | -10.0 | 60.0 | |
| | Piling, Oscillator | CNP 165 | 115 | 1 | 115.0 | 68 | -45 | 3 | -10.0 | 63.0 | |
| | Piling, Reverse Circulation Drill | CNP 166 | 100 | 1 | 100.0 | 68 | -45 | 3 | -10.0 | 48.0 | |
| | Water Pump, Submersible (Electric) | CNP 283 | 85 | 1 | 85.0 | 68 | -45 | 3 | -10.0 | 33.0 | |
| | Concrete Lorry Mixer | CNP 044 | 109 | 1 | 109.0 | 68 | -45 | 3 | -10.0 | 57.0 | |

Distance Attenuation = Slant: Distance from Piling Works to Podium of Victoria Centre

The cumulative sound level should be lower as the slant distance increase.

APPENDIX E
Power Mechanical Equipment
for Construction Noise
Assessment
(Without Mitigation & Substantial Barrier)

NSR - FEHD Winfield Depot (Pre-bored H-Pile)

| Area | Plant Item | Plant Code | Sound Level dB(A) | No. of Plant | Total Sound Level, dB(A) | Notional Distance, m | Correction, dB(A) | | | Corrected Sound Level For Each Equipment, dB(A) | Cumulative Sound Level For All Equipment, dB(A) |
|------|------------------|------------|----------------------|--------------|-----------------------------|-------------------------|--------------------------------|----------------------|--|--|--|
| | | | | | | | Distance Attenuation, dB(A) | Façade Effect, dB(A) | Total Screened by Island Eastern Corridor, dB(A) | | |
| B | Air Compressor | CNP 002 | 102 | 4 | 108.0 | 99 | -48 | 3 | 63.0 | 71.3 | |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 99 | -48 | 3 | 67.0 | | |
| | Backhoe | CNP 081 | 112 | 1 | 112.0 | 99 | -48 | 3 | 67.0 | | |
| | Generator | CNP 102 | 100 | 1 | 100.0 | 99 | -48 | 3 | 55.0 | | |
| | Piling Rig | CNP 166 | 100 | 2 | 103.0 | 99 | -48 | 3 | 58.0 | | |
| | Welding Machines | CNP 168 | 100 | 2 | 103.0 | 99 | -48 | 3 | 58.0 | | |

NSR - FEHD Winfield Depot (Bored Pile)

| | | | | | | | | | | |
|---|------------------------------------|---------|-----|---|-------|----|-----|---|------|------|
| B | Air Compressor | CNP 002 | 102 | 2 | 105.0 | 99 | -48 | 3 | 60.0 | 72.8 |
| | Crawler Crane | CNP 048 | 112 | 1 | 112.0 | 99 | -48 | 3 | 67.0 | |
| | Piling, Oscillator | CNP 165 | 115 | 1 | 115.0 | 99 | -48 | 3 | 70.0 | |
| | Piling, Reverse Circulation Drill | CNP 166 | 100 | 1 | 100.0 | 99 | -48 | 3 | 55.0 | |
| | Water Pump, Submersible (Electric) | CNP 283 | 85 | 1 | 85.0 | 99 | -48 | 3 | 40.0 | |
| | Concrete Lorry Mixer | CNP 044 | 109 | 1 | 109.0 | 99 | -48 | 3 | 64.0 | |

Victoria Building is a 35 storey high building

Distance Attenuation = Slant Distance from Piling Works to the 25th Floor
The cumulative sound level should be lower as the slant distance increase.