

Issue No. : 1
Issue Date : March 2009
Project No. : 768

**JOINT USER COMPLEX AND
WHOLESALE FISH MARKET AT
AREA 44, TUEN MUN**

**ENVIRONMENTAL MONITORING &
AUDIT REPORT
(FEBRUARY 2009)**

Prepared By:

ALLIED ENVIRONMENTAL CONSULTANTS LTD.

COMMERCIAL-IN-CONFIDENCE

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EXECUTIVE SUMMARY

Allied Environmental Consultants Limited (AEC) has been appointed to conduct an environmental monitoring and audit (EM&A) program for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun. The construction works were commenced on 31st July 2008. This report is the seventh monthly EM&A report, which detailed the environmental monitoring and audit results recorded during the period from 1st February 2009 to 28th February 2009.

Impact environmental monitoring for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun has been carried out on 4th, 10th, 16th, 21st and 27th February 2009 at Block 15, Yuet Wu Villa. 1-hr TSP and noise monitoring were conducted within the period of 0700-1900 hours, where 24-hr TSP monitoring was conducted continuously for a 24-hour period.

1-hour TSP monitoring results at the monitoring location ranged from 136 $\mu\text{g}/\text{m}^3$ to 191 $\mu\text{g}/\text{m}^3$ with an average of 165 $\mu\text{g}/\text{m}^3$. 24-hour TSP monitoring results ranged from 71 $\mu\text{g}/\text{m}^3$ to 85 $\mu\text{g}/\text{m}^3$ with an average of 78 $\mu\text{g}/\text{m}^3$.

Noise monitoring results at the monitoring location ranged from 60.2dB(A) to 64.2dB(A) with an average of 62.2dB(A).

Based on the monitoring results, the air quality and construction noise level complied with the environmental requirements in EM&A Manual. There were no breaches of the action and limit levels. There were no environmental complaints received in the reporting month. No notification of summons or prosecution was received.

Construction activities will be undertaken in March 2009 include underground foundation works and drainage diversion. Potential environmental impacts include dust generation from stockpiles of dusty materials and the underground drainage work; noise from operation of the equipments and jack piling, runoff from drainage diversion works and the storage of various C&D and chemical wastes. The Contractor should properly implement the required environmental mitigation measures as per the implementation schedule in the EM&A manual to ensure no significant adverse environmental impacts to be arisen from the construction works. The Contractor was reminded to maintain good housekeeping throughout the construction phase.

1. PROJECT BACKGROUND

A Joint User Complex and Wholesale Fish Market (WFM Complex) at Area 44 in Tuen Mun is proposed to be designed and built by Architectural Services Department on behalf of Agriculture, Fisheries and Conservation Department, Marine Department, Home Affairs Department, and Food and Environmental Hygiene Department of the Hong Kong SAR. The WFM Complex is to provide a permanent site for the relocation of the existing temporary wholesale fish market at Tuen Mun Area 27 and to accommodate a community hall, a dragon boat racing spectator stand, and other community facilities for public use. The proposed development is a 3-storey complex to accommodate a wholesale fish market, a public toilet, a refuse collection point and a marine refuse collection point at the ground floor, a community hall on the first floor, and a dragon boat race spectator stand with landscaped deck on roof level. The proposed Wholesale Fish Market is categorized as a designated project under the Environmental Impact Assessment Ordinance (EIAO) and therefore a detailed Environmental Impact Assessment (EIA-085/2002) has been conducted in year 2002 and an Environmental Permit (EP-296/2007) was issued by Environmental Protection Department in December 2007.

The subject site is located at Castle Peak Bay of Tuen Mun given in Figure 1. The subject site is bounded to the north by a future local open space presently used as a temporary car park, to the east by Castle Peak Bay typhoon shelter, to the south by a future lorry park and to the west by Wu Shan Road. Yuet Wu Villa being the nearest residential establishment is located at around 85m from the site boundary.

1.1 Project Organization and Contact Personnel

Key personnel and contact particulars are summarized in Table 1.

Table 1 Contact Details of Key Personnel

Role	Department / Company	Names	Contact Number	Fax Number
Lead User Department	Agriculture, Fisheries, and Conservation Department	Mr. K.H. Chan Ms. Louise Li	2150 7092 2150 7140	2314 2866
Environmental Permit Holder	Architecture Services Department	Mr. S.W. Chow Ms. Susana Chan	2867 3716 2867 6706	2523 9622
Architect	P&T Architects and Engineers Ltd.	Ms. Sarah Ng Ms. Vivian Law	2835 3548 2832 3046	2891 3834
Main Contractor	W. Hing Construction Co. Ltd.	Mr. Andy Chan Mr. Tim Wong	9630 7404 6478 4623	8343 9188
Environmental Team Leader	Allied Environmental Consultants Ltd.	Ms. Grace Kwok	2815 7028	2815 5399
Independent Environmental Checker	Cinotech Consultants Ltd.	Mr. Alex Ngai	2151 2083	3107 1388

2. SENSITIVE RECEIVERS

Air Sensitive Receivers (ASRs) within 500m include Yuet Wu Villa, lawn bowling field, tennis court, which are less than 100m away from the subject site. Tuen Mun Wu Hong Clinic is located to the west at about 100m to the site boundary. Two secondary schools, Ka Chi Secondary School and South Tuen Mun Government Secondary School, are approximately 300m to the south of the site boundary.

Noise Sensitive Receivers (NSRs) within 300m are Yuet Wu Villa, Siu Hei Court, Yan Chai Hospital Low Chan Chor Si Primary School and Wu King Estate. The nearest NSR will be Block 15 of Yuet Wu Villa.

3. CONSTRUCTION WORKS & PROGRAMME

The major works undertaken and/or completed during the monitoring period are listed below:

- Foundation works
- Underground drainage works

Table 2 shows the interrelationship between construction activities and environmental mitigation measures for the reporting month.

Table 2 Interrelationship between Construction Activities and Mitigation Measures

Construction Works	Major Environmental Impact	Mitigation Measures
Foundation works	Noise impact	Well-maintained plants were used
Underground Drainage Works	Air quality, and water quality impacts	Water spraying, avoided rainy days

4. SUMMARY OF EM&A REQUIREMENT

For regular impact monitoring, the sampling frequency of at least once in every six-days, shall be strictly observed at the monitoring station for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs. For noise monitoring, one set of measurement between 0700-1900 hours on normal weekdays. Leq(30 min) shall be used as the monitoring parameter.

From baseline monitoring results, the proposed Action and Limit Levels for air quality are summarized in Table 3. The average baseline 1-hr TSP value of 129 $\mu\text{g}/\text{m}^3$ and 24-hr TSP value of 65 $\mu\text{g}/\text{m}^3$ measured at Block 15, Yuet Wu Villa was used to determine the action and limit level for air quality impact monitoring. The proposed Action and Limit Levels for construction noise are summarized in Table 4.

Table 3 Action and Limit Level for Air Quality Impact Monitoring at Yuet Wu Villa

Parameters	Baseline Level ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
24-Hour TSP Level	65	173	260
1-Hour TSP Level	129	334	500

Table 4 Action and Limit Levels for Construction Noise Impact Monitoring

Time Period	Action Level	Limit Level
Daytime (0700-1900 hours) on weekdays	When one documented compliant is received	Dwelling 75dB(A) ¹ School 70dB(A) ¹ (65dB(A) during examinations) ¹
1900-2300 on any day and 0700-2300 on Sunday and general holidays, for use of PME ²	When one documented compliant is received	65dB(A) ³
All days during the night-time (2300-0700 hours) ²	When one documented compliant is received	50dB(A) ³

Note: 1. Construction noise criteria stipulated in the TM-EIAO

2. A Construction Noise Permit (CNP) shall be required for the carrying out of the construction work during the restricted hours (1900-2300 on any day and 0700-2300 on Sunday and general holidays, for use of PME; and All days during the night-time (2300-0700 hours))

3. Area sensitivity rating of the monitoring location is "B".

Should non-compliance of the above Action and Limit levels occurs, the contractor shall undertake corresponding in accordance with the proposed Event Action Plan given in the EM&A Manual. A summarized general Event Action Plan is given in Table 5. Details should be referred to the Event Action Plan in the EM&A Manual.

Table 5 *Event Action Plan*

Level	Step 1	Step 2	Step 3
Action	<ul style="list-style-type: none"> Identify source Check monitoring data and working methods 	<ul style="list-style-type: none"> Contact project manager to discuss and implement remedial action Rectify any unacceptable practice Amend working methods if appropriate If exceedance continues, commence additional monitoring 	<ul style="list-style-type: none"> Notify client/project manager following correct of the situation Cease additional monitoring if exceedance stops
Limit	<ul style="list-style-type: none"> Identify source Notify client/project manager Check monitoring data and working methods Repeat measurement to confirm finding Commence additional monitoring 	<ul style="list-style-type: none"> Take immediate action to avoid further exceedance Submit proposal for remedial actions to client/project manager within 3 working days Implement the agreed proposal If exceedance continues, amend and resubmit the proposal 	<ul style="list-style-type: none"> Notify client/project manager following correction of the situation Cease additional monitoring if exceedance stops

5. MONITORING METHODOLOGY

5.1 Monitoring Programme

Air quality monitoring and noise monitoring were conducted at Block 15, Yuet Wu Villa on 4th, 10th, 16th, 21st and 27th February 2009. Air quality monitoring station was set up at the roof top of the residential block and noise monitoring was conducted at 1.2m above ground level at the junction of Wu Sau Street and Wu On Street as given in Figure 2 and 3. Figure 4 and 5 show photos taken during monitoring at the two locations.

A construction site for the proposed Junior Police Officers' Married Quarters is located at Wu Hong Street which is 110m away from the monitoring location, which can be a major source of the noise and TSP generation during the monitoring period. Figure 6 shows the photo of the construction site.

5.2 Air Quality Monitoring

1-hour and 24-hour TSP air quality monitoring was conducted at the designated air quality monitoring location using a High Volume TSP Sampler (Model No: Anderson GMWS-2310 ACCU-VOL) at the designated location. The Calibration Record of the High-Volume TSP Sampler is given in Appendix A. 24-hour TSP samples were taken every six days. 1-hour TSP samples were taken three times a day between 0700-1900 hours.

5.3 Noise Monitoring

Noise monitoring was conducted at the designated noise monitoring location between 0700-1900 hours using a sound level meter which complies with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Noise instrumentation details are given in Table 6 and the Calibration Certificate for the sound level meter and calibrator is given in Appendix B.

Table 6 Noise Monitoring Equipment

Manufacturer	Type/Model No.	Equipment
RION	Model NL 31	Precision Sound Level Analyser with windshield
RION	Model NC 73	Calibrator

Noise level measurements were recorded in terms of thirty minutes A-weighted equivalent continuous sound pressure level ($Leq(30min)$) on a daily basis. The sound level meter was calibrated immediately prior to and following each noise measurement. The meter was mounted on a tripod at a height of 1.2m and the microphone was positioned at 1m away the building façade of the noise monitoring station facing the construction site.

Noise measurements were not made in the presence of fog, rain, and wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed was checked with a portable anemometer capable of measuring the wind speed in m/s.

6. RESULTS

6.1. Air Quality

1-hour and 24-hour TSP monitoring results are summarized in Table 7 and 8 and serve as the basis for determining the action and limit levels. The minimum and maximum 1-hour TSP measured at Yuet Wu Villa was $136\mu g/m^3$ and $191\mu g/m^3$ respectively with an average of $165\mu g/m^3$. The minimum and maximum 24-hour TSP measured was $71\mu g/m^3$ and $85\mu g/m^3$ respectively with an average of $78\mu g/m^3$. Summary of air quality monitoring record is provided in Appendix C and D.

Table 7 *1-Hour TSP Monitoring Results*

Day	Date	1-hr TSP ($\mu\text{g}/\text{m}^3$)				Average ($\mu\text{g}/\text{m}^3$)
		Reading 1	Reading 2	Reading 3	Average	
1	4 Feb 2009	147	171	178	165	165
2	10 Feb 2009	147	182	191	173	
3	16 Feb 2009	163	171	179	171	
4	21 Feb 2009	136	145	156	146	
5	27 Feb 2009	161	174	173	169	

Table 8 *24-Hour TSP Monitoring Results*

Day	Date	24-hr TSP ($\mu\text{g}/\text{m}^3$)
1	4 Feb 2009	82
2	10 Feb 2009	85
3	16 Feb 2009	76
4	21 Feb 2009	71
5	27 Feb 2009	76
	Average	78

6.2. Noise

Noise monitoring results in terms of $L_{\text{eq}(30\text{min})}$, $L_{10(30\text{min})}$ $L_{90(30\text{min})}$ measured at the designated noise monitoring location are summarized in Table 9. L_{10} and L_{90} represent sound levels that are exceeded 10% and 90% of the time respectively. Normally, L_{10} measurements can be considered as the average peak levels, whilst L_{90} levels can be considered as the average background noise levels.

During the reporting month, the minimum and maximum noise level measured at Yuet Wu Villa was 60.2dB(A) $L_{\text{eq}(30\text{min})}$ and 64.2dB(A) $L_{\text{eq}(30\text{min})}$ respectively with an average of 62.2dB(A) $L_{\text{eq}(30\text{min})}$. No exceedance was recorded in this reporting period. Summary of noise monitoring record will be provided in Appendix E.

Table 9 *Noise Monitoring Results*

Day	Date	L_{10(30mins)} (dB(A))	L_{90(30mins)} (dB(A))	L_{eq(30mins)} (dB(A))
1	4 Feb 2009	66.2	61.9	64.2
2	10 Feb 2009	64.2	59.8	62.7
3	16 Feb 2009	63.5	58.7	61.2
4	21 Feb 2009	61.9	58.2	60.2
5	27 Feb 2009	64.3	59.7	62.9
	<i>Average</i>	64.0	59.7	62.2

6.3. Weather Conditions

Weather data of the monitoring station were obtained from the nearest Hong Kong Observatory (HKO) Tuen Mun automatic weather station located at Tuen Mun Town Park (63 mPD). Table 10 summarizes the wind data during the monitoring dates. Wind record from HKO is shown in Appendix F.

Table 10 *Summary of Weather Conditions during the Monitoring Period*

Date	Weather	Prevailing Wind direction	Daily Average Wind speed (m/s)
4 Feb 2009	Sunny	S	2.11
10 Feb 2009	Sunny	SW	1.57
16 Feb 2009	Cloudy	S	2.97
21 Feb 2009	Sunny	SE	4.09
27 Feb 2009	Cloudy	S	2.41

7. SITE INSPECTION & AUDIT

4 site inspections were conducted by the Environmental Team (ET) in this reported period. During site inspections in the reporting month, no non-conformance of implementation of environmental mitigation measures was identified. All environmental mitigation measures for construction stages stated in approved EIA Report, EM&A Manual and Environmental Permit shall be carried out throughout the whole construction period as shown in Appendix G.

8. NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS

In this reporting period, no complaint, inspection notice, notification of summons or prosecution was received. No non-compliance was recorded.

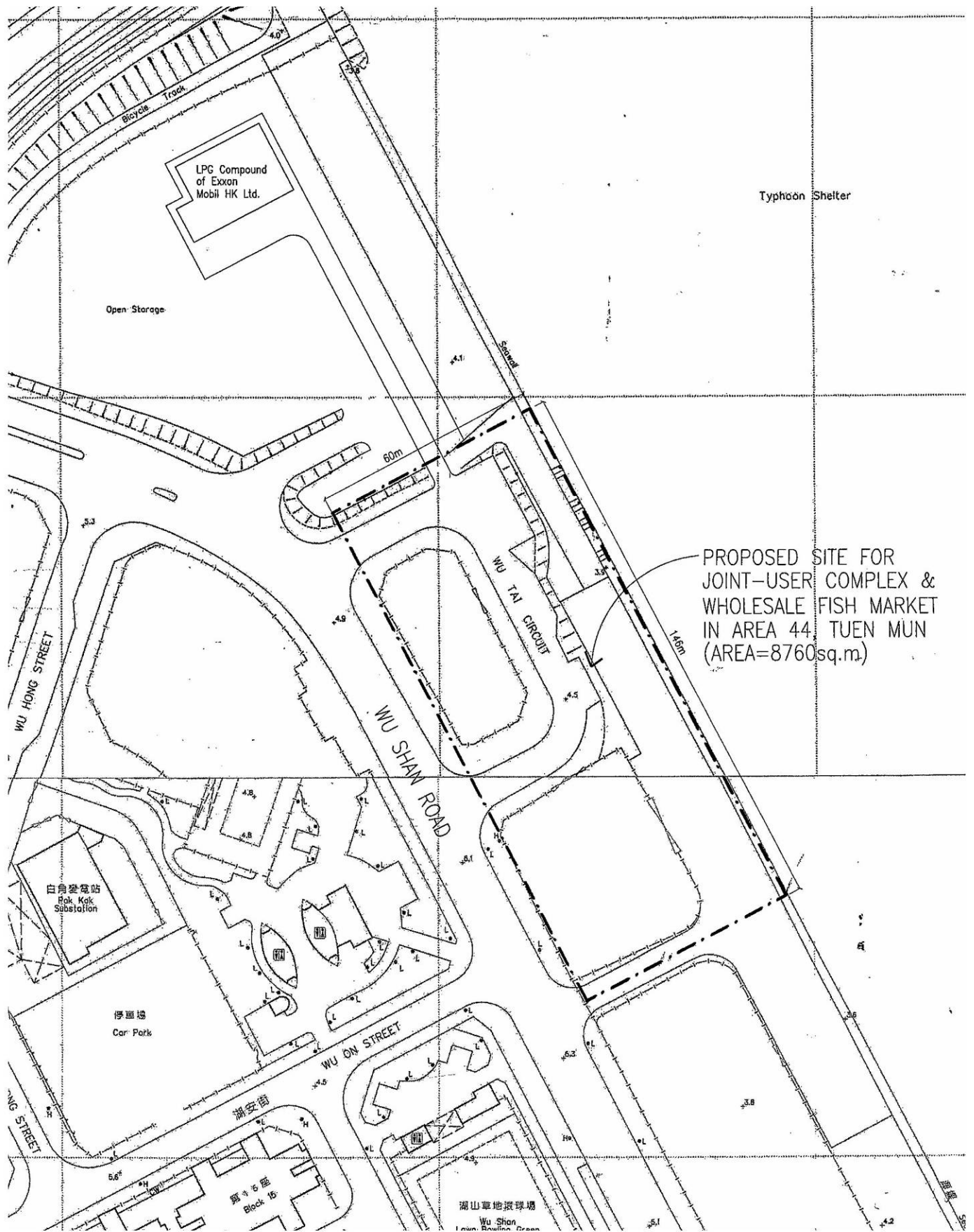
9. OTHERS

6257.7 inert C&D waste was disposed of at public fill. 5.87 tonnes of waste was disposed to landfill. No chemical waste was transported off site in this reporting period.

10. CONCLUSIONS

Environmental monitoring has been carried out for the proposed Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun. 1-hour and 24-hour TSP air quality monitoring and noise monitoring was conducted at Block 15, Yuet Wu Villa during the period from 1st February 2009 to 28th February 2009.

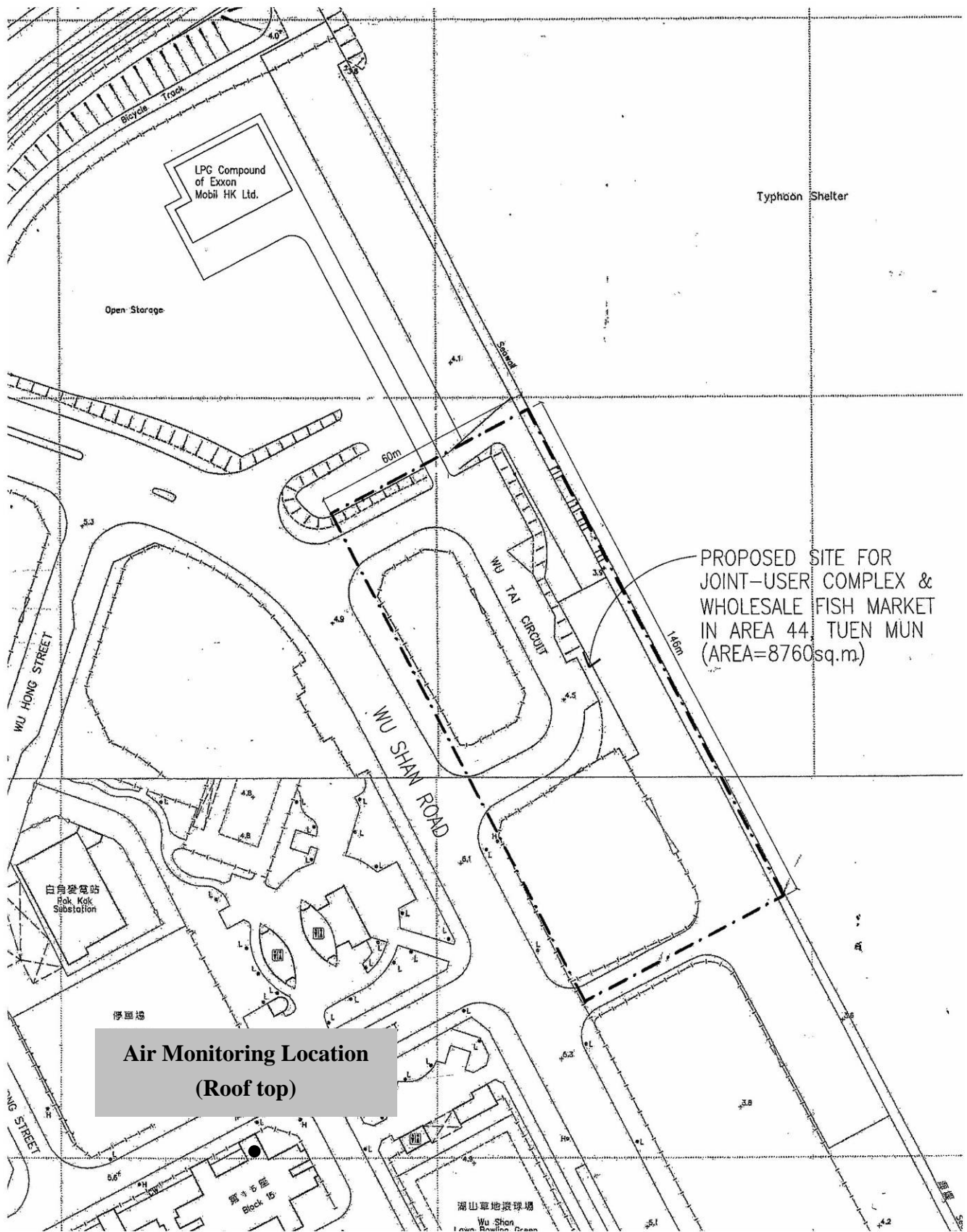
The average 1-hour TSP level is $165\mu\text{g}/\text{m}^3$ and average 24-hour TSP level is $78\mu\text{g}/\text{m}^3$. For impact noise monitoring, the Average $L_{\text{eq}(30\text{min})}$ is 62.2dB(A). All monitoring results complied with the relevant action and limit levels.



**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
TUEN MUN
SITE LOCATION PLAN**

Figure No.	Rev.:
1	0
Scale	Date
NTS	3/09





PROPOSED SITE FOR
 JOINT-USER COMPLEX &
 WHOLESALE FISH MARKET
 IN AREA 44, TUEN MUN
 (AREA=8760sq.m)

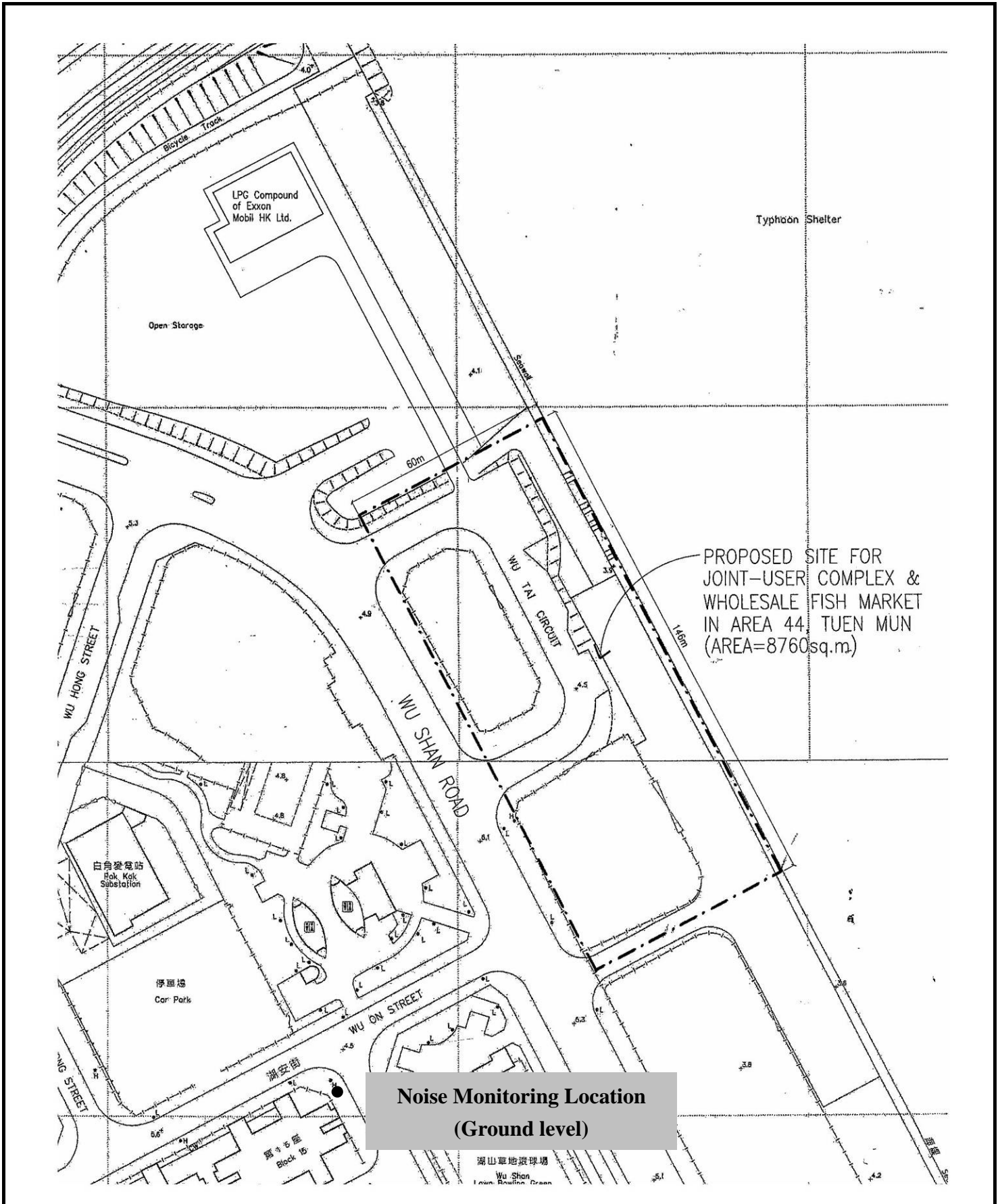
**Air Monitoring Location
 (Roof top)**

**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
 TUEN MUN**

LOCATION OF AIR QUALITY MONITORING STATION

Figure No.	Rev.:
2	0
Scale	Date
NTS	3/09





**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
TUEN MUN
LOCATION OF NOISE MONITORING STATION**

Figure No.	3	Rev.:	0
Scale	NTS	Date	3/09





Roof top of Block 15, Yuet Wu Villa



High-Volume Dust Sampler

**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
TUEN MUN
PHOTOS OF AIR QUALITY MONITORING STATION**

Figure No.

4

Rev.:

0

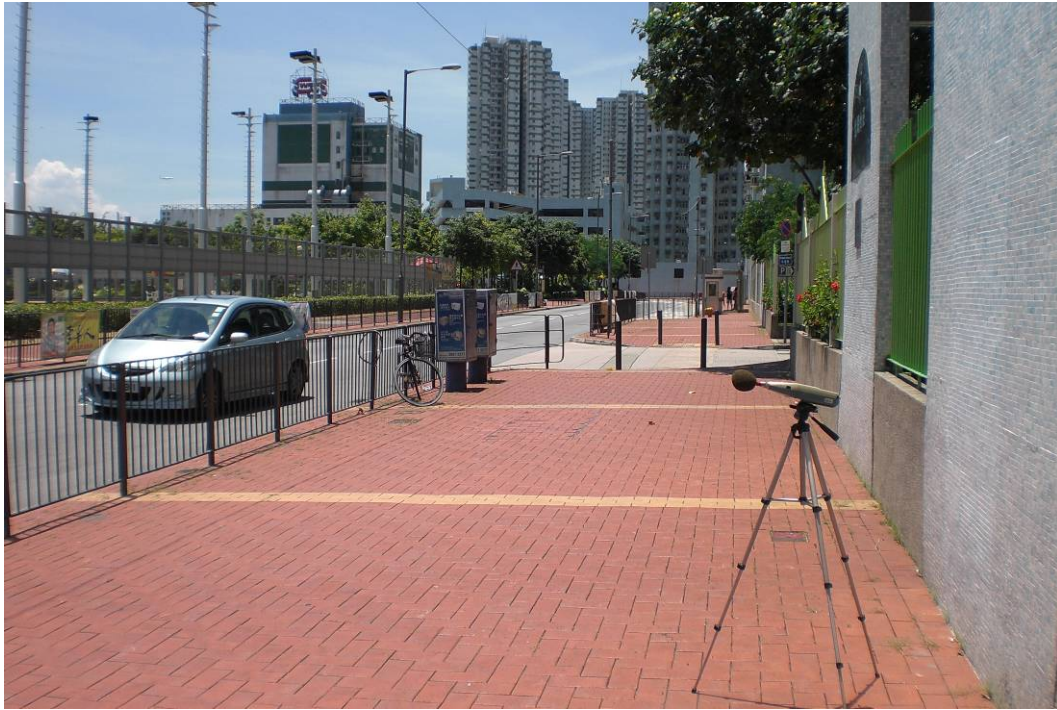
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NTS

Date

3/09





Noise monitoring station



View from the noise monitoring station

**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
TUEN MUN
PHOTOS OF NOISE MONITORING STATION**

Figure No.

5

Rev.:

0

Scale

NTS

Date

3/09





**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,
TUEN MUN**

PHOTO OF CONSTRUCTION SITE FOR JUNIOR POLICE OFFICERS' MARRIED QUARTERS

Figure No.

6

Rev.:

0

Scale

NTS

Date

3/09



Appendix A

Calibration Record of High-Volume TSP Sampler

High-Volume TSP Sampler
1-Point Calibration Record

Location : A1
Calibrated by : P.F. Yeung
Date : 5/1/09

Sampler

Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 0890

Calibration Office and Standard Calibration Relationship

Serial Number : CM-AIR-43
Service Date : 10 July 2008
Slope (m) : 0.056389
Intercept (b) : -0.025123
Correlation Coefficient(r) : 0.999909

Standard Condition

Pstd (hpa) : 1013
Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1012
Ta(K) : 290

IC (Indicated flow) : 42 cfm

Actual flow : 1.21 m³/min

Checked by: Magnum Fan

Date: 6/01/09

Appendix B

*Calibration Certification of the Sound Level Meter
and Calibrator*



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C081909

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Meter

Manufacturer : Rion

Model No. : NL-31

Serial No. : 00410224

*has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C081909.*

The equipment is supplied by

Co. Name : Envirotech Services Co.

*Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road,
Hong Kong*

Date of Issue : 14 April 2008

Certified by :

K C Lee

The test equipment used for testing are traceable to the National Standards as specified in this report.
This report shall not be reproduced except in full and with prior written approval from this laboratory.

Calibration and Testing Laboratory of Sun Creation Engineering Limited

c/o 401 Tsing Shan Wai Exchange Building, 1 Ring On Lane, Tuen Mun, New Territories, Hong Kong

Tel: 2927 2606

Fax: 2744 8986

E-mail: callab@suncreation.com

Website: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C083194

Certificate of Calibration

This is to certify that the equipment

Description : Sound Level Calibrator

Manufacturer : Rion

Model No. : NC-73

Serial No. : 10997142

*has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C083194.*

The equipment is supplied by

Co. Name : Envirotech Services Co.

*Address : Shop 6, G/F., Casio Mansion, 209 Shaukeiwan Road,
Hong Kong*

Date of Issue : 25 June 2008

Certified by :

K. Q. Lee

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E-mail: callab@suncreation.com

Website: www.suncreation.com

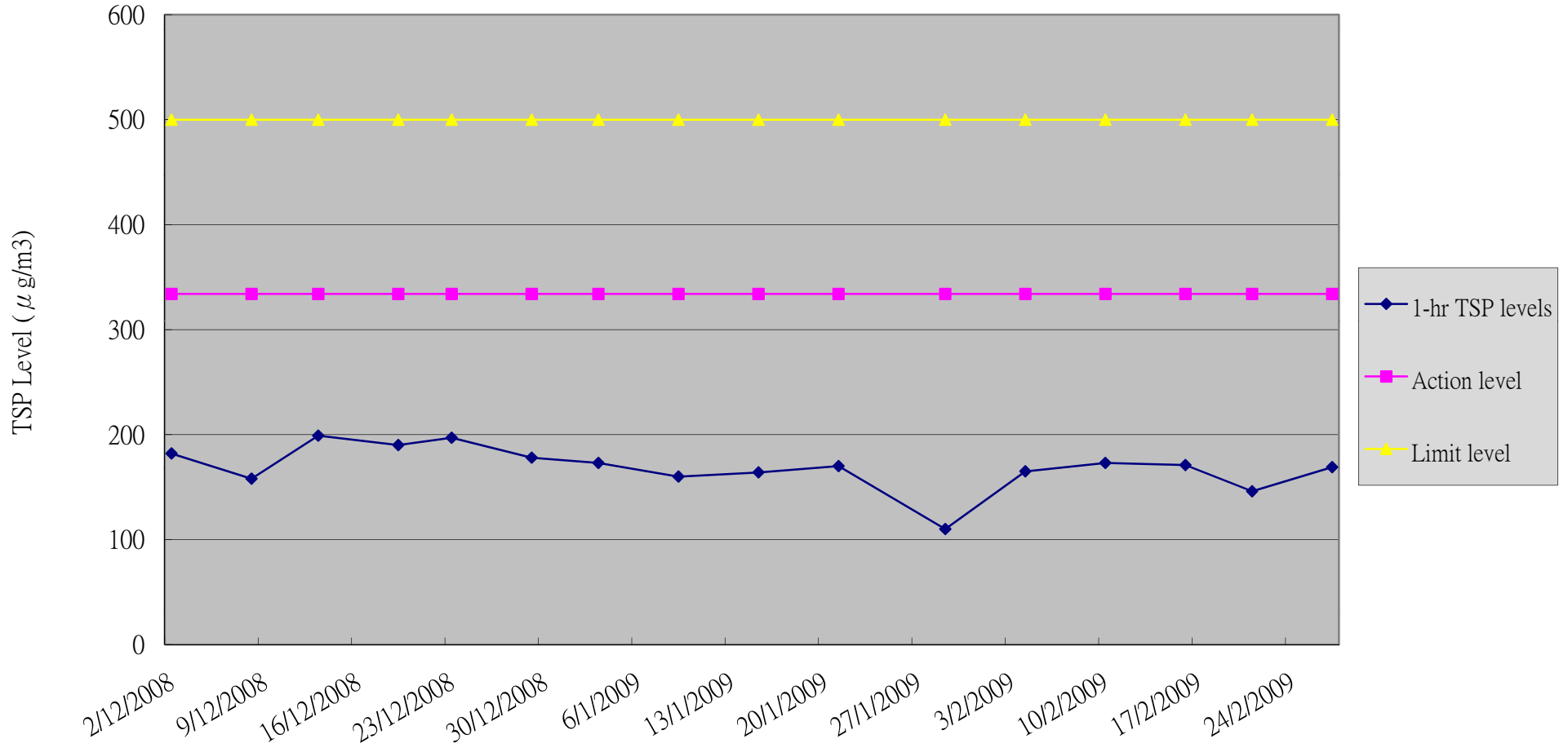
Appendix C

*Summary and Graphical Plot of 1-Hour TSP
Monitoring Record*

Impact Monitoring for Fish Market Project in Tuen Mun
Air Quality monitoring: 1-hour TSP
Month: February 2009

Date	Time	1-hr TSP ($\mu\text{g}/\text{m}^3$)	Average
4-Feb-09	08:40 - 09:40	147	165
	09:40 - 10:40	171	
	10:40 - 11:40	178	
10-Feb-09	08:40 - 09:40	147	173
	09:40 - 10:40	182	
	10:40 - 11:40	191	
16-Feb-09	08:50 - 09:50	163	171
	09:50 - 10:50	171	
	10:50 - 11:50	179	
21-Feb-09	08:40 - 09:40	136	146
	09:40 - 10:40	145	
	10:40 - 11:40	156	
27-Feb-09	08:40 - 09:40	161	169
	09:40 - 10:40	174	
	10:40 - 11:40	173	
		Average	165

1-hr TSP Levels



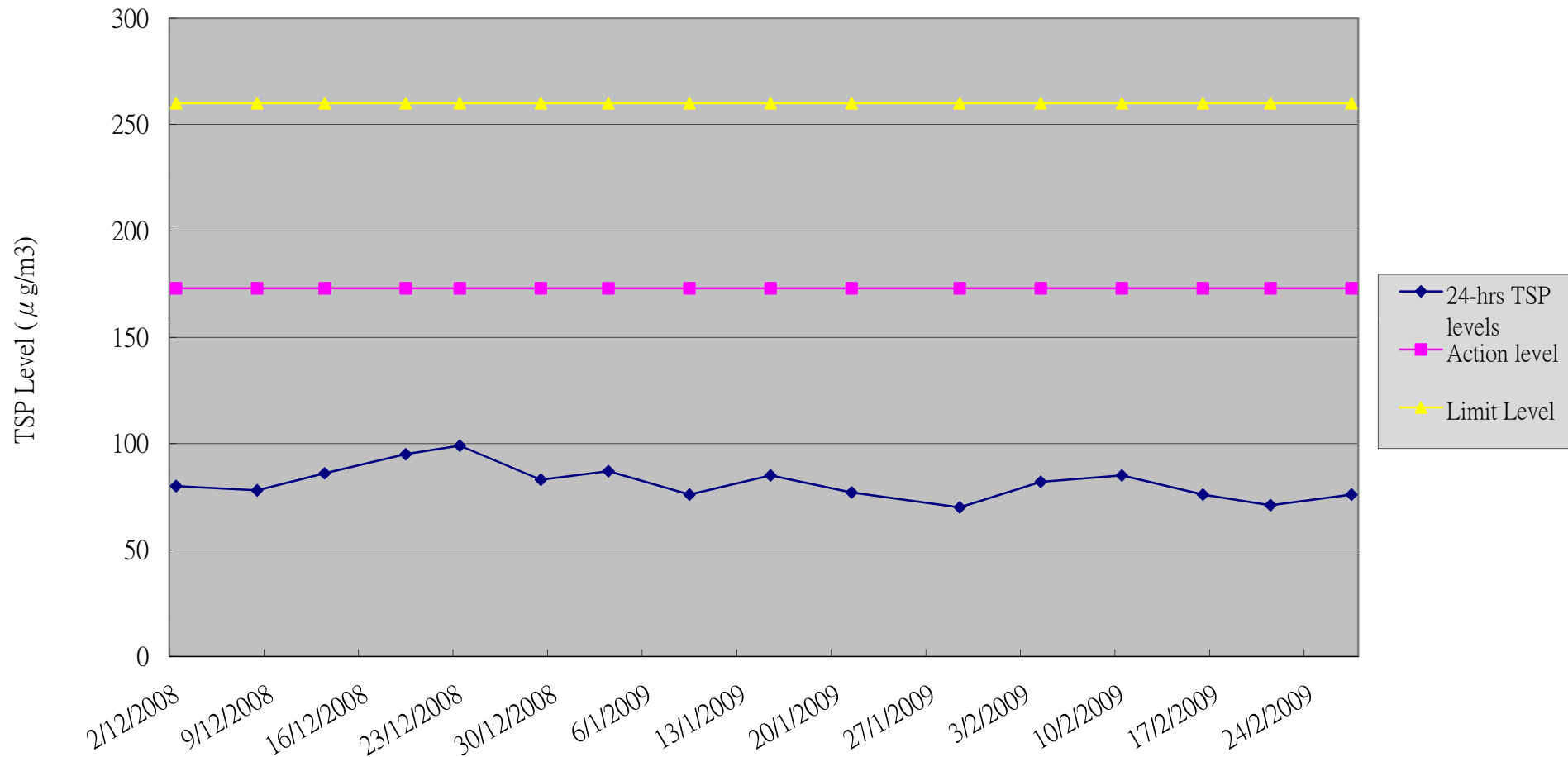
Appendix D

*Summary and Graphical Plot of 24-Hour TSP
Monitoring Record*

Impact Monitoring for Fish Market Project in Tuen Mun
Air Quality monitoring: 24-Hour TSP
Month: February 2009

Date	Start time	24-hr TSP ($\mu\text{g}/\text{m}^3$)
4-Feb-09	11:40	82
10-Feb-09	11:40	85
16-Feb-09	11:50	76
21-Feb-09	11:40	71
27-Feb-09	11:40	76
Average		78

24-hour TSP Levels



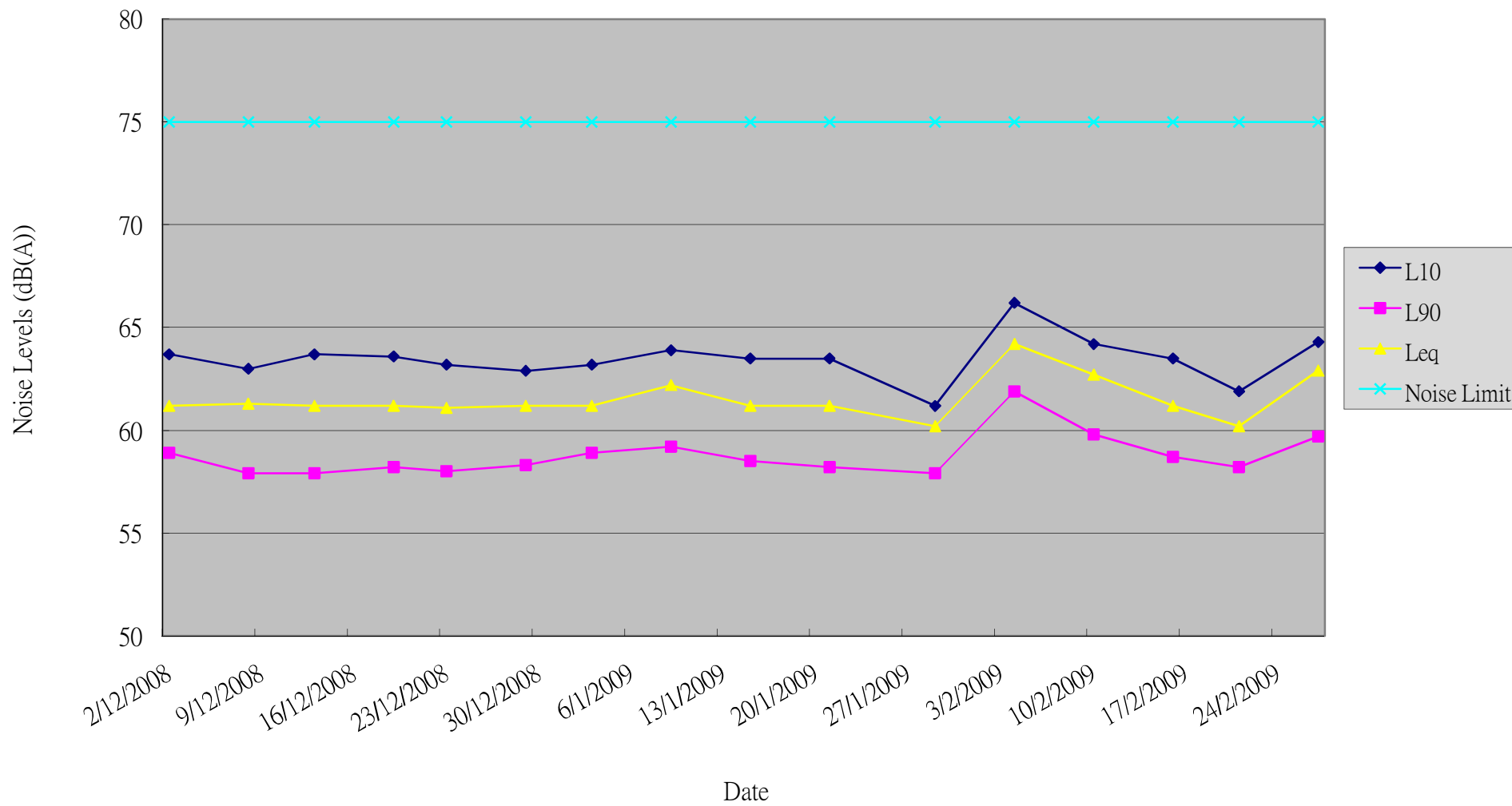
Appendix E

*Summary and Graphical Plot of Noise Monitoring
Record*

Impact Monitoring for Fish Market Project in Tuen Mun
Noise Monitoring
Month: February 2009

Date	Time	L10(30mins) (dB(A))	L90(30mins) (dB(A))	Leq(30mins) (dB(A))
4-Feb-09	09:05 - 09:35	66.2	61.9	64.2
10-Feb-09	08:50 - 09:20	64.2	59.8	62.7
16-Feb-09	09:00 - 09:30	63.5	58.7	61.2
21-Feb-09	09:00 - 09:30	61.9	58.2	60.2
27-Feb-09	09:05 - 09:35	64.3	59.7	62.9
Average		64.0	59.7	62.2

Noise Monitoring Record

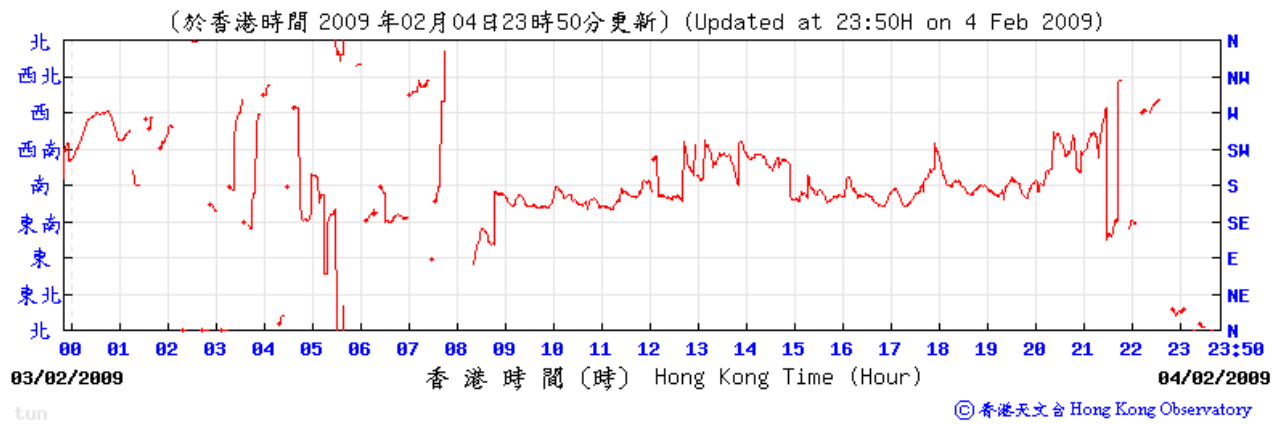


Appendix F

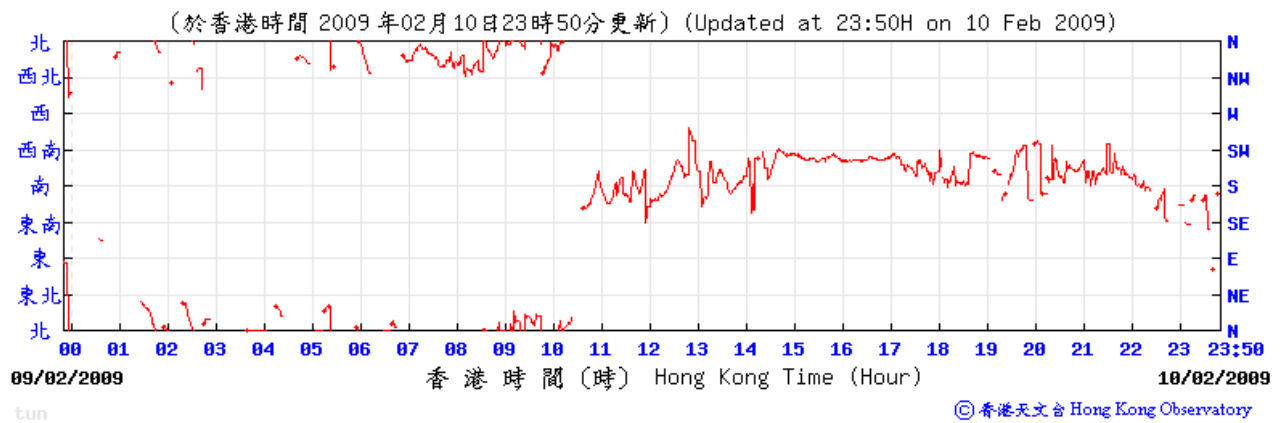
Wind Record from Hong Kong Observatory

Wind Direction at Hong Kong Observatory Tuen Mun Automatic Weather Station

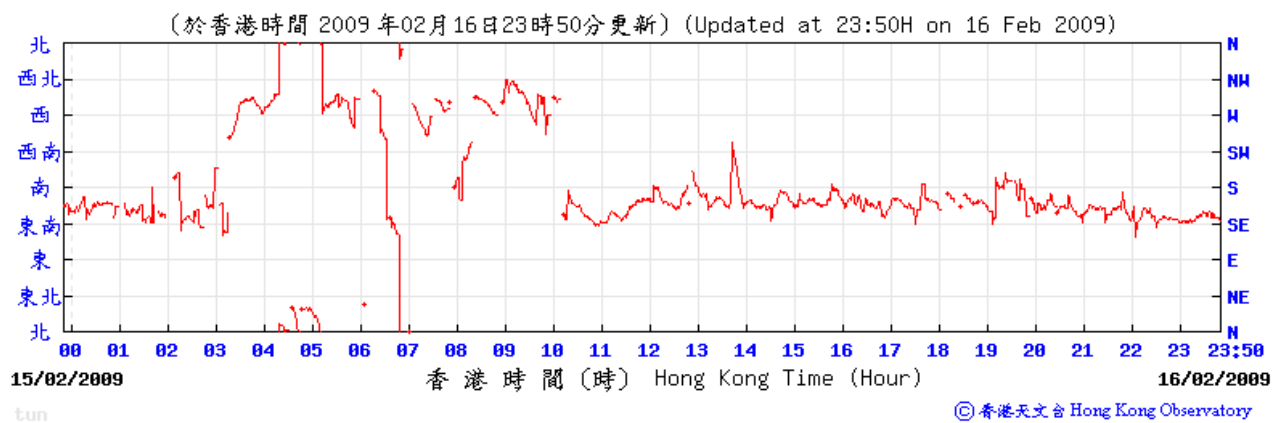
4/2/2009



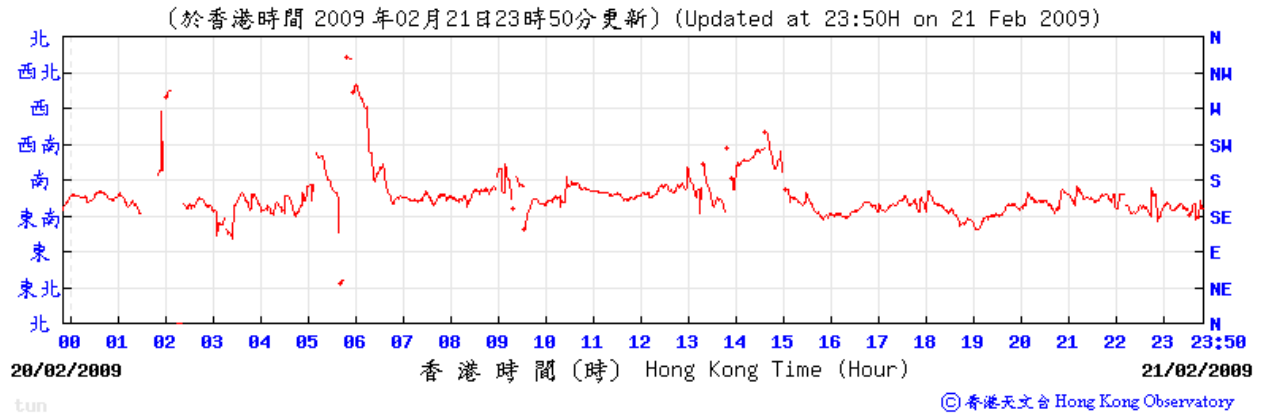
10/2/2009



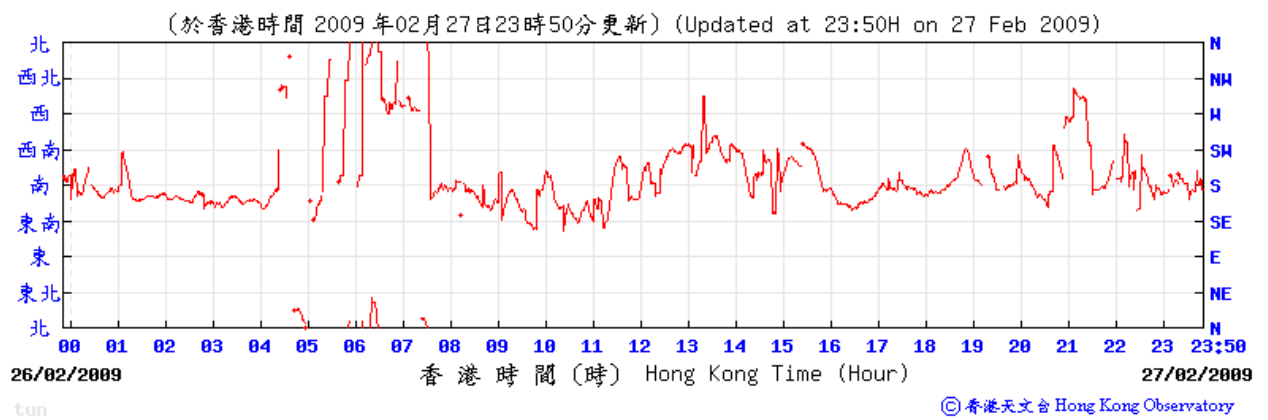
16/2/2009



21/2/2009



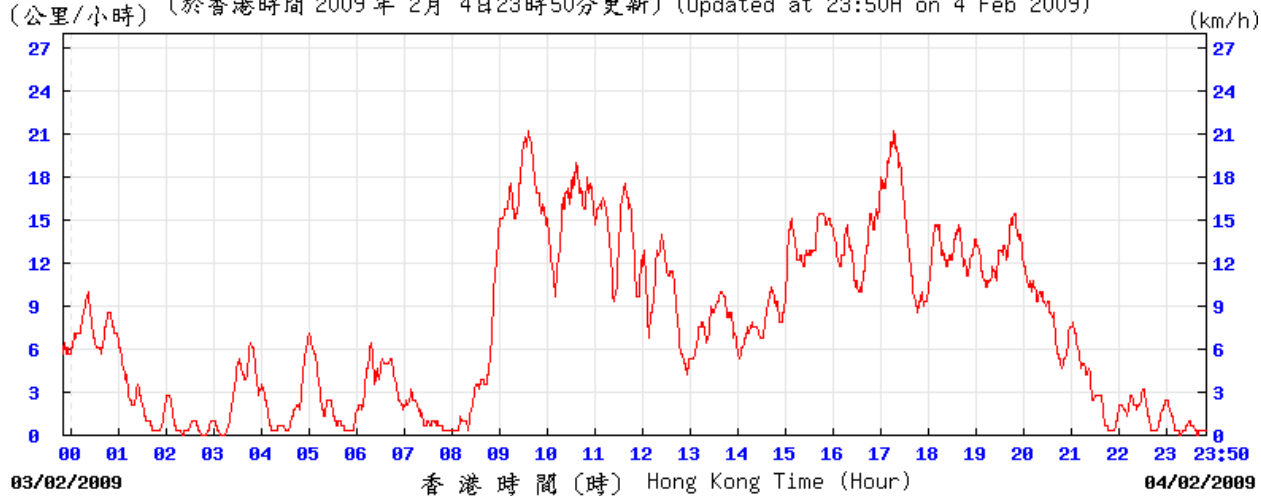
27/2/2009



Wind Speed at Hong Kong Observatory Tuen Mun Automatic Weather Station

4/2/2008

(公里/小時) (於香港時間 2009 年 2 月 4 日 23 時 50 分更新) (Updated at 23:50H on 4 Feb 2009)

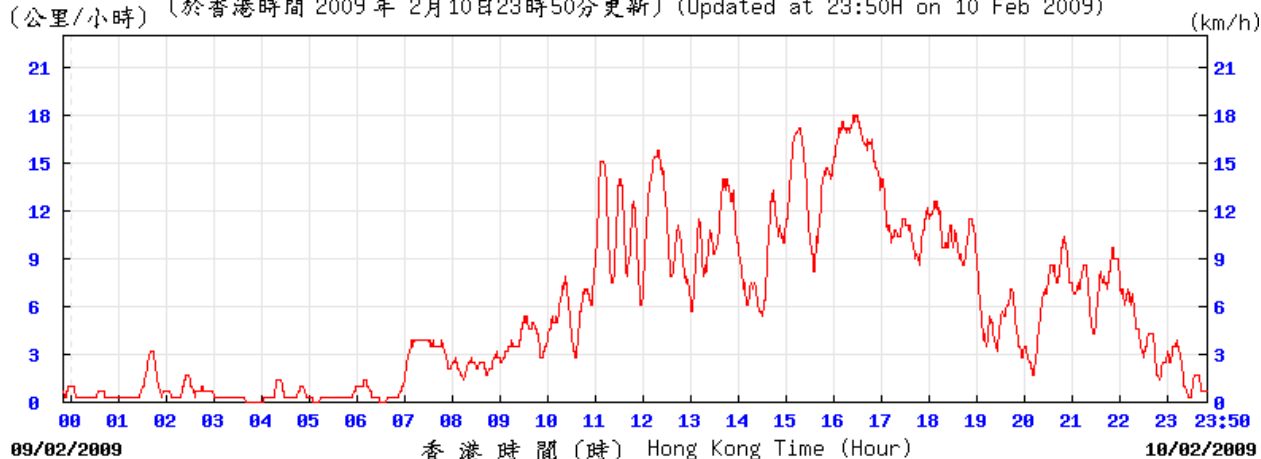


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10/2/2009

(公里/小時) (於香港時間 2009 年 2 月 10 日 23 時 50 分更新) (Updated at 23:50H on 10 Feb 2009)

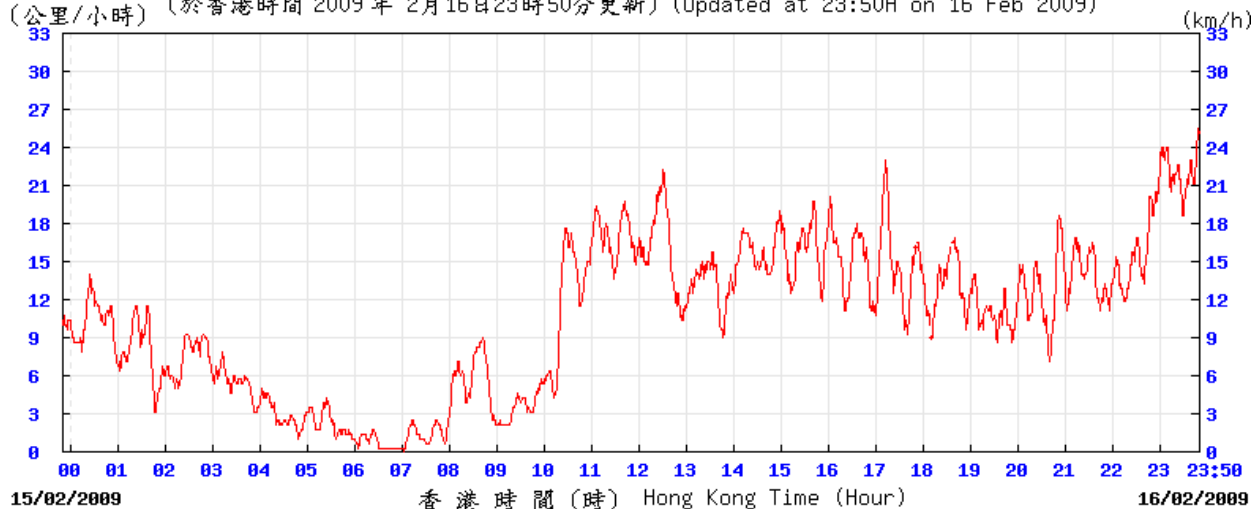


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16/2/2009

(公里/小時) (於香港時間 2009 年 2 月 16 日 23 時 50 分更新) (Updated at 23:50H on 16 Feb 2009)

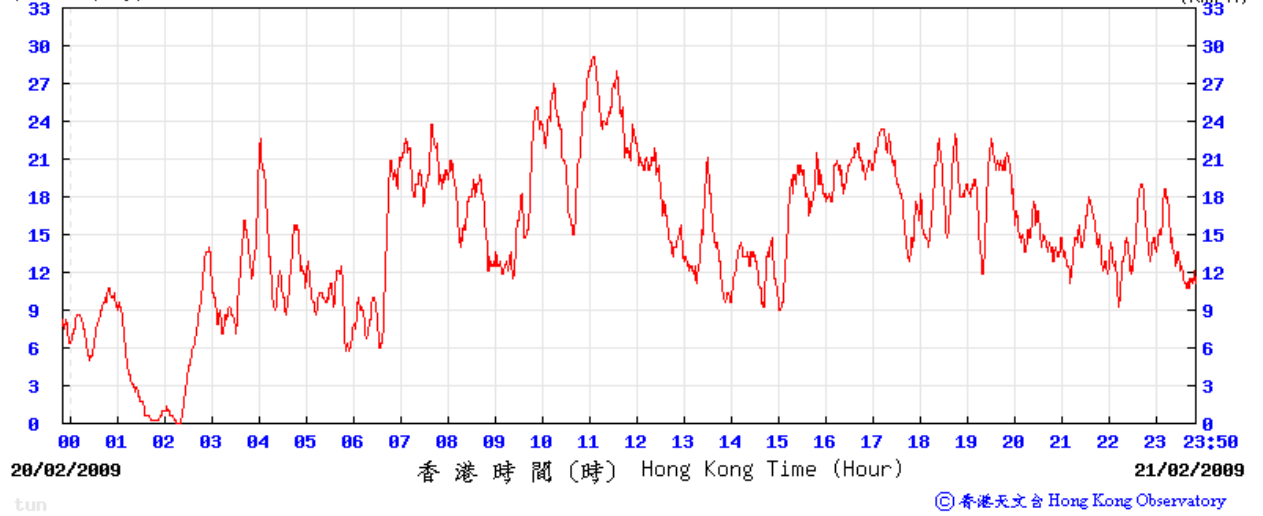


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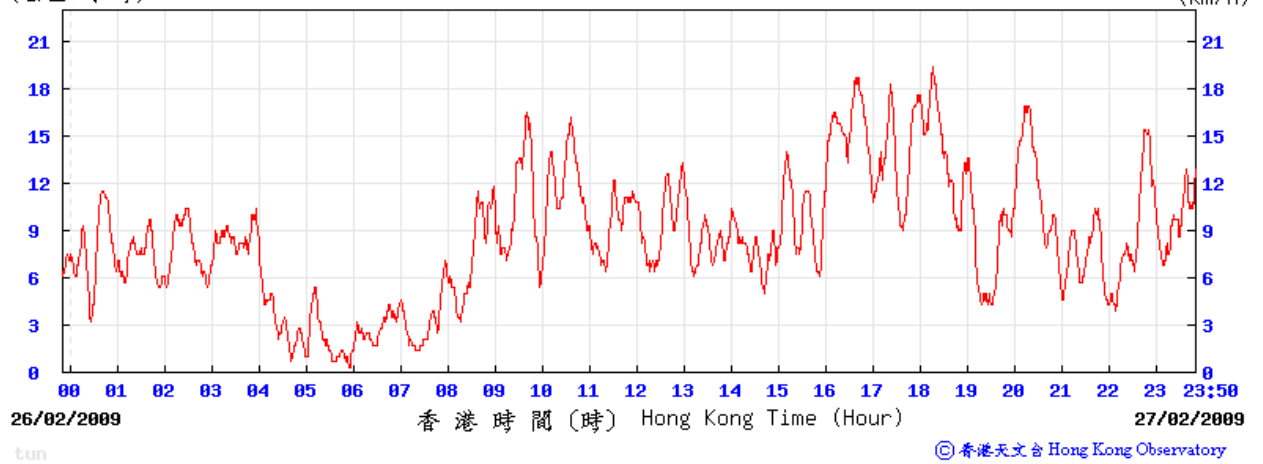
21/2/2009

(公里/小時) (於香港時間 2009 年 2月21日23時50分更新) (Updated at 23:50H on 21 Feb 2009)



27/2/2009

(公里/小時) (於香港時間 2009 年 2月27日23時50分更新) (Updated at 23:50H on 27 Feb 2009)



Appendix G

*Mitigation Measures Implementation Schedule for
Construction Stage*

MITIGATION MEASURES IMPLEMENTATION SCHEDULE FOR CONSTRUCTION STAGE

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Location/Duration of Measures/ Timing of completion measures	Relevant Legislation & Guidelines
4.7	2.8	<p>Air Quality</p> <ul style="list-style-type: none"> • Hoarding of not less than 2.4m high shall be provided along the site boundary section adjoins a road, street, service land or other area accessible to the public • Spray water to where excavation to be taken place immediately prior to, during and after excavation • Any stockpile of dusty material shall be either: (a) covered entirely by impervious sheeting; (b) placed in an area sheltered on the top and the three sides; or (c) sprayed with water or a dust suppression chemical so as to maintain the entire surface wet • Cement bags or any other dusty materials collected during the work should be disposed of in totally enclosed containers • All dusty materials should be sprayed with water immediately prior to any loading, unloading or transfer operation so as to minimise the dusty materials wet • Any dusty material remaining after a stockpile of cement or other materials is removed should be wetted and removed from the surface of roads • Where a vehicle leaving the construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle • Conveyor belts shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed and fitted with belt cleaners • Skip hoist for the transport of construction wastes should be properly enclosed • Vehicle washing facilities including a high pressure water jet shall be provided at the designated vehicle exit point and every vehicle immediately before leaving the construction site shall be washed to remove any dusty materials from its body and wheels • Every main haul road, vehicle washing areas and the section of road between the washing facilities and the exit point shall be paved with concrete, bituminous materials, hardcore or metal plates and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet • Debris from the construction of the WFM shall be covered entirely by impervious sheeting or stored in a sheltered debris collection area 	Construction site of the proposed WFM/ Throughout the construction period	APCO/EIA Study
5.7	3.7	<p>Noise</p> <ul style="list-style-type: none"> • Use quiet construction equipment • Use silencers / mufflers, noise barriers / enclosure where practicable • The Contractor is required to determine the number and type of construction equipment taking 	Construction site of the proposed WFM throughout the	NCO/EIA Study

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Location/Duration of Measures/ Timing of completion measures	Relevant Legislation & Guidelines
		<p>into account the use of quiet plant while devising a feasible work programme</p> <ul style="list-style-type: none"> • Only well-maintained plant shall be operated on-site and all equipment shall be routinely checked • Turn off or throttle down idle plant • Plants known to emit noise strongly shall be oriented away from NSRs • Mobile plants shall be sited as far away from NSRs as possible • Stockpiles and other structures shall be effectively utilised as practicable to screen noise from on-site construction activities • Obtain valid noise permits for construction work during restricted hours 	construction period	
6.7	4.1	<p>Water Quality</p> <ul style="list-style-type: none"> • Site shall be kept clean and tidy to avoid construction materials and waste being washed off from site • Works shall be planned to avoid rainy season so as to minimize the runoff and reduce the amount of soil that can be carried offsite • Surface run-off from the construction site shall be directed to silt traps or sedimentation basin before reuse or discharge with help of channels, earth bunds or sand bag barriers for suspended solids removal prior to its being discharged to storm water drain. Silt trap design shall conform to the guidelines laid down in Appendix A1 of ProPECC PN 1/94 • Wastewater likely to be contaminated with oil or grease should be passed through an oil separator or grease trap before entering the site drainage system • Hoarding gaps should be tightly sealed to avoid the seepage of wastewater to the nullah and outside the site • Perimeter channels shall be provide at site boundaries, where necessary, to intercept storm-water runoff from outside the site • Silt traps, sedimentation basins, channels and manholes shall be regularly cleaned to remove the deposited silt and grit • Temporarily exposed slope surfaces and construction material stockpiles shall be covered with tarpaulin or similar fabric to prevent erosion • Wastewater generated from bored-piling shall be re-circulated after sedimentation as practicable. The final discharge of the wastewater shall be via silt removal facilities • All fuel tanks and chemical storage areas shall be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters • Obtain valid discharge license for construction site discharges • Chemical toilets shall be provided on site • Monitor the quality of water discharge to ensure compliance of the license condition 	Construction site of the proposed WFM Throughout the construction period	WPCO/EIA Study

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Location/Duration of Measures/ Timing of completion measures	Relevant Legislation & Guidelines
		<ul style="list-style-type: none"> • Sufficient guidance shall be given to all workers before carrying out excavation in the vicinity of pipelines • Manually operated warning siren shall be installed to instruct people to take timely shelter • Fire drill exercises shall be organized for the workers at the site and users of the WFM 		