

Issue No. : 1  
Issue Date : February 2012  
Project No. : 768(2)

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

**FINAL ENVIRONMENTAL  
MONITORING & AUDIT REPORT OF  
OPERATIONAL PHASE**

Prepared By:

**ALLIED ENVIRONMENTAL CONSULTANTS LTD.**

**COMMERCIAL-IN-CONFIDENCE**

**Allied Environmental Consultants Limited**  
Acousticians & Environmental Engineers

19/F., Kwan Chart Tower, 6 Tonnochy Road, Wan Chai, Hong Kong  
Tel: (852) 2815 7028 Fax: (852) 2815 5399 Email: info@aechk.com



Issue No. : 1  
Issue Date : February 2012  
Project No. : 768(2)

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

**FINAL ENVIRONMENTAL  
MONITORING & AUDIT REPORT OF  
OPERATIONAL PHASE**

Prepared By:


**ALLIED ENVIRONMENTAL CONSULTANTS LTD.**

**COMMERCIAL-IN-CONFIDENCE**

Author:

  
Ronan L. H. Chan  
BSc

Checked:

  
Nic H. H. Lam  
BSc(Hons) AMHKIEIA AMHKIOA

Approved:

  
Grace M. H. Kwok  
BEng(Hons) MHKIEIA MHKIOA  
MISWA MIAIA MRAPA LEED AP

This report has been prepared by Allied Environmental Consultants Limited with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.

## **Table of Contents**

<b>Table of Contents</b>	<b>i</b>
<b>List of Tables</b>	<b>ii</b>
<b>List of Figures</b>	<b>ii</b>
<b>List of Appendices</b>	<b>ii</b>
<b>EXECUTIVE SUMMARY</b>	<b>1</b>
<b>1. PROJECT BACKGROUND</b>	<b>3</b>
1.1 Project Organization and Contact Personnel	3
1.2 Works Undertaken during the Operation Period	4
<b>2. SENSITIVE RECEIVERS</b>	<b>4</b>
<b>3. SUMMARY OF EM&amp;A REQUIREMENT</b>	<b>4</b>
<b>4. MONITORING METHODOLOGY</b>	<b>7</b>
4.1 Odour Patrol	7
4.2 Noise Monitoring	7
<b>5. RESULTS</b>	<b>9</b>
5.1 Odour Patrol	9
5.2 Noise	9
5.3 Comparison of Monitoring Results	9
<b>6. NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS</b>	<b>10</b>
<b>7. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</b>	<b>10</b>
<b>8. REVIEW</b>	<b>10</b>
8.1 Review of Effectiveness and Efficiency of the Mitigation Measures	10
8.2 Review of Environmental Monitoring Methodology and EM&A Programme	11
<b>9. CONCLUSIONS</b>	<b>11</b>

## **List of Tables**

Table 1	Contact Details of Key Personnel
Table 2	Synopsis of Works Undertaken during the Entire Operation Period
Table 3	Action and Limit Levels for Operational Phase Odour Patrol
Table 4	Event/Action Plan for Operational Phase Odour Patrol
Table 5	Action and Limit Levels for Operational Phase Noise Monitoring
Table 6	Event/Action Plan for Operational Phase Noise Monitoring
Table 7	Meteorological Data Monitoring Equipment
Table 8	Noise Monitoring Equipment
Table 9	Comparison of EM&A data with EIA predictions

## **List of Figures**

Figure 1	Site Location Plan
Figure 2	Location Plan of Operational Phase Odour Patrol
Figure 3	Location of Noise Monitoring Station

## **List of Appendices**

Appendix A	Graphical Plot of Odour Patrol
Appendix B	Graphical Plot of Noise Monitoring Record in Comparison with Baseline Data
Appendix C	Implementation of Environmental Mitigation Measures for Operational Phase

## **EXECUTIVE SUMMARY**

Allied Environmental Consultants Limited (AEC) has been appointed to conduct an environmental monitoring and audit (EM&A) program for the Joint User Complex and Wholesale Fish Market (WFM) at Area 44, Tuen Mun. The operation of the WFM was commenced on 23<sup>rd</sup> December 2010 and the EM&A programme were carried out on a regular basis during the first year of operation. The EM&A programme would be terminated effective from 31<sup>st</sup> December 2011.

This is the Final Environmental Monitoring and Audit (EM&A) Summary Report of Operational Phase and this report summarizes the EM&A works performed at Joint User Complex and Wholesale Fish Market at Area 44, Tuen Mun from 23<sup>rd</sup> December 2010 to 31<sup>st</sup> December 2011.

### **Environmental Monitoring Works**

#### *Odour Patrol*

The odour intensity ratings in the whole monitoring period were 1-No Odour. During the course of the Operational Phase, all sniff locations of odour patrol were conducted at the designated location. No exceedance of Action Level and Limit Level of odour intensity ratings was recorded.

#### *Noise*

With consideration given to the selected access route of marine traffic, which represent the worst-scenarios in terms of distance to nearby receivers, the highest marine traffic noise levels at nearby sensitive receivers are found to be below the prevailing background noise level they are currently exposed to. The operation of the proposed WFM is not expected to generate additional marine traffic noise within the typhoon shelter and will not cause any deterioration to the existing noise climate in the vicinity of the typhoon shelter. No additional monitoring of marine traffic noise was conducted in the reporting period.

Measured noise monitoring results were at the levels similar or below to that recorded during baseline monitoring.

Four noise exceedances of limit levels were recorded on 8<sup>th</sup> and 22<sup>nd</sup> January 2011, 17<sup>th</sup> February 2011 and 24<sup>th</sup> March 2011. All the four exceedances were found to be the noise emitted by the passed-by vehicles, which is not project-related. Therefore, no adverse noise impacts from the operation of the project to the surroundings are anticipated.

Majority of environmental monitoring data collected during the monitoring period was well below the limit noise level. It is anticipated that the Project is environmentally acceptable.

## **Environmental Complaints and Prosecutions**

During the operational phase, no successful prosecution, environmental complaint, warning and summons were received.

## **Implementation of Mitigation Measures**

Mitigation measures had been implemented to minimize the environmental impacts due to the operation of the WFM. The recommended mitigation measures in the EIA process and the EM&A programme were effective in protecting the environment. As such, the environmental performance during the operational phase was considered satisfactory.

The monitoring results and statistics of non-compliance indicated that the EIA process with its recommended mitigation and EM&A programme were effective for protection of the environment and there was no unacceptable environmental impact posed by the Project.

## 1. PROJECT BACKGROUND

A Joint User Complex and Wholesale Fish Market (WFM Complex) at Area 44 in Tuen Mun is 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 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 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 construction works were commenced on 31<sup>st</sup> July 2008. Major construction works of the Project were substantially completed in September 2010 and handover works were completed in November 2010. The EM&A programme of construction phase was terminated and the EM&A programme of operational phase was commenced effective from 23<sup>rd</sup> December 2010.

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 7104	2314 2866
Environmental Permit Holder	Architecture Services Department	Mr. S.W. Chow Ms. Rio Kwok	2867 3716 2867 3706	2523 9622
Environmental Team Leader	Allied Environmental Consultants Ltd.	Ms. Grace Kwok	2815 7028	2815 5399
Independent Environmental Checker	Cinotech Consultants Ltd.	Dr. Priscilla Choy	2151 2089	3107 1388

## 1.2 Works Undertaken during the Operation Period

The synopsis of work undertaken during the entire operation period is summarized in Table 2.

*Table 2 Synopsis of Works Undertaken during the Entire Operation Period*

<i>Month</i>	<i>Works Undertaken</i>
Dec 2010	- Operation of WFM
Jan 2011	- Operation of WFM
Feb 2011	- Operation of WFM
Mar 2011	- Operation of WFM
Apr 2011	- Operation of WFM
May 2011	- Operation of WFM
Jun 2011	- Operation of WFM
Jul 2011	- Operation of WFM
Aug 2011	- Operation of WFM
Sept 2011	- Operation of WFM
Oct 2011	- Operation of WFM
Nov 2011	- Operation of WFM
Dec 2011	- Operation of WFM

## 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, namely 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. SUMMARY OF EM&A REQUIREMENT

For regular impact monitoring, odour patrol shall be carried out on a regular basis during the first year of operation. Odour patrol shall be carried out once a week during the first three months of operation of the WFM. The odour patrol frequency shall be reviewed afterwards.

According to the approved EM&A Manual, the Action and Limit Levels for operational phase odour patrol are summarized in Table 3.



*Table 3 Action and Limit Levels for Operational Phase Odour Patrol*

Parameter	Action Level	Limit Level
Perceived odour intensity	Higher than or equal to Level 3	Level 5
Incidence of odour complaints	Any incidence of odour complaint received	Two or more odour complaints received within one month

Should non-compliance of the above Action and Limit levels occurs, the Fish Marketing Organization (FMO) shall undertake corresponding in accordance with the Event/Action Plan given in the EM&A Manual. An Event/Action Plan for operational phase odour monitoring is given in Table 4.

*Table 4 Event/Action Plan for Operational Phase Odour Patrol*

EVENT	ACTION		
	WFM Management (FMO)	AFCD	ASD
Action Level	<ol style="list-style-type: none"> <li>1. Identify source/reason of odour nuisance or complaint</li> <li>2. Inform AFCD</li> <li>3. Repeat odour patrol to confirm finding</li> <li>4. Discuss with AFCD on remedial actions required</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify the source/reason of odour nuisance or complaint within one week</li> <li>2. Rectify any unacceptable practice</li> <li>3. Amend working method if appropriate</li> <li>4. Inform ASD if cause of nuisance or complaint is considered to be caused by civil or E&amp;M design problems'</li> <li>5. Implement amended working methods</li> <li>6. Contact complainant within 10 working days to inform the cause of nuisance and action taken</li> </ol>	<ol style="list-style-type: none"> <li>1. Assist AFCD to find the cause of the complaint</li> <li>2. Modify or improve design as appropriate</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Identify source/reason of odour nuisance or complaint</li> <li>2. Inform AFCD</li> <li>3. Repeat odour patrol to confirm finding</li> <li>4. Discuss with AFCD on remedial actions required including retrofitting the scrubber system</li> <li>5. Increase odour patrol frequency to daily</li> <li>6. If the perceived odour intensity reduces, cease additional odour patrol</li> </ol>	<ol style="list-style-type: none"> <li>1. Carry out investigation to identify the source/reason of nuisance or odour complaint</li> <li>2. Rectify any unacceptable practice</li> <li>3. Amend working method if appropriate</li> <li>4. Inform ASD if cause of nuisance or complaint is considered to be caused by civil or E&amp;M design problems</li> <li>5. Ensure remedial measures are properly implemented</li> <li>6. To liaise with ASD on additional odour measures including retrofitting the scrubber system. If odour nuisance continues, consider what portion of the work is responsible for the high level of odour intensity and stop that portion of work until the exceedance is abated</li> <li>7. Contact complainant within 10 days to inform the cause of nuisance and action taken</li> </ol>	<ol style="list-style-type: none"> <li>1. Assist AFCD to find the cause of the nuisance or complaint</li> <li>2. Modify or improve the design of the odour measures including the retrofitting of scrubber system</li> <li>3. Assist AFCD to formulate remedial actions</li> </ol>

For noise monitoring, the operational noise level shall be measured weekly in terms of the A-weighted equivalent continuous sound pressure level (Leq).  $L_{eq(5min)}$  shall be used as monitoring parameter for the period from 0300 to 0630 hours. Each set of measurement shall include at least 3 consecutive  $L_{eq(5min)}$  results. As supplementary information for data auditing, statistical results such as  $L_{10(5min)}$  and  $L_{90(5min)}$  shall also be obtained for reference.

Additional noise monitoring shall not be given for marine traffic noise. With consideration given to the selected access route, which represent the worst-scenarios in terms of distance to nearby receivers, the highest marine traffic noise levels at nearby sensitive receivers are found to be below the prevailing background noise level they are currently exposed to. The operation of the proposed WFM is not expected to generate additional marine traffic noise within the typhoon shelter and will not cause any deterioration to the existing noise climate in the vicinity of the typhoon shelter.

From baseline monitoring results, the Action and Limit Levels for operational phase noise monitoring are summarized in Table 5.

*Table 5 Action and Limit Levels for Operational Phase Noise Monitoring*

Time Period	Action Level	Limit Level
All days during the night-time (2300-0700 hours)	When one documented compliant is received	58dB(A)

Should non-compliance of the above Action and Limit levels occurs, the Fish Marketing Organization (FMO) shall undertake corresponding in accordance with the Event Action Plan given in the EM&A Manual. An Event/Action Plan for operational phase noise monitoring is given in Table 6.

*Table 6 Event/Action Plan for Operational Phase Noise Monitoring*

EVENT	ACTION		
	WFM Management (FMO)	AFCD	ASD
Action Level	<ol style="list-style-type: none"> <li>1. Notify AFCD</li> <li>2. Identify source</li> <li>3. Discuss with AFCD and formulate remedial measures</li> <li>4. Increase monitoring frequency to check mitigation effectiveness</li> </ol>	<ol style="list-style-type: none"> <li>1. Identify the source</li> <li>2. Rectify any unacceptable practice</li> <li>3. Amend working method if appropriate</li> <li>4. Inform ASD if cause of nuisance or complaint is considered to be caused by civil or E&amp;M design problems'</li> <li>5. Implement amended working methods</li> <li>6. Ensure remedial measures are properly implemented</li> </ol>	<ol style="list-style-type: none"> <li>1. Assist AFCD to find the cause of the exceedance</li> <li>2. Modify or improve design as appropriate</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify AFCD</li> <li>2. Identify source</li> <li>3. Repeat measurement to confirm finding</li> <li>4. Increase monitoring frequency</li> <li>5. Discuss with AFCD and formulate remedial measures</li> <li>6. Assess effectiveness of the remedial</li> </ol>	<ol style="list-style-type: none"> <li>1. Carry out investigation to identify the source</li> <li>2. Rectify any unacceptable practice</li> <li>3. Amend working method if appropriate</li> <li>4. Inform ASD if cause of nuisance or complaint is considered to be caused by civil or E&amp;M design problems</li> <li>5. Implement amended working methods</li> <li>6. Ensure remedial measures are properly implemented</li> <li>7. If exceedance continues, consider what</li> </ol>	<ol style="list-style-type: none"> <li>1. Assist AFCD to find the cause of the exceedance</li> <li>2. Modify or improve the design as appropriate</li> <li>3. Assist AFCD to formulate remedial actions</li> </ol>

	actions 7. If exceedance stops, cease additional monitoring	portion of the work is responsible and stop that portion of work until the exceedance is abated	
--	--	---	--

## 4. MONITORING METHODOLOGY

### 4.1 Odour Patrol

Odour patrol shall be conducted to investigate if there is any potential for odour nuisance due to the operation of the Wholesale Fish Market. The patrol shall be carried out by a team of at least two personnel during the peak hours for trading operation at the WFM from 3:00 to 6:30 a.m.

The area covered by the odour patrol shall include Air Sensitive Receivers in the vicinity of the WFM, namely Yuet Wu Villa. The location plan of odour patrol and sniffing locations are shown in Figure 2 and the Meteorological Data Monitoring instrumentation details are given in Table 7. Sniffing Locations L1, L2 and L3 are situated near Yuet Wu Villa Block 4, Block 13 and Block 15 respectively. At each sniffing location, the monitoring time shall be at least five minutes upon arrival to determine the odour intensity rating.

*Table 7 Meteorological Data Monitoring Equipment*

Monitoring Equipment	Brand Name & Model No.	Serial No.	Data monitored
Weather meter	AZ 8909	9174569	Wind Speed, wind direction, temperature and relative humidity

During the patrol, the patrol officers shall identify if there was any odour characterised of that emitted from the WFM and assess the intensity of the odour perceived individually. The following odour intensity rating shall be adopted in the assessment:

1. - no odour
2. - not unpleasant
3. - slightly unpleasant
4. - unpleasant
5. - very unpleasant

Mean value of the odour intensity ratings assessed by the patrol team shall be reported. Location of odour assessment, temperature, wind speed, wind direction, relative humidity and time of patrol shall also be recorded.

If the mean odour intensity rating was higher than or equal to level 3, the patrol officers should investigate from where the odour was originated and identify the source of odour emission, if possible.

### 4.2 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 8. Noise monitoring was conducted at 1.2m above ground level in front of the residential block and at the junction of Wu Sau Street and Wu On Street as given in Figure 3.

*Table 8 Noise Monitoring Equipment*

Manufacturer	Type/Model No.	Equipment
Svantek	Svan-959	Precision Sound Level Analyser with windshield
Svantek	SV-30A	Sound Level Calibrator
AZ	AZ 8909	Weather Meter

Noise level measurements were recorded in terms of five minutes A-weighted equivalent continuous sound pressure level ( $L_{eq(5min)}$ ) on a weekly 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 WFM Complex.

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.

## 5. RESULTS

### 5.1. Odour Patrol

The odour intensity ratings in the whole monitoring period were 1-No Odour. During the course of the Operational Phase, all sniff locations of odour patrol were conducted at the designated location. No exceedance of Action Level and Limit Level of odour intensity ratings was recorded. Therefore, no adverse environmental impacts to the surroundings are anticipated. Graphical plot of odour patrol is provided in Appendix A.

### 5.2. Noise

Measured noise monitoring results were at the levels similar or below to that recorded during baseline monitoring. No additional monitoring of marine traffic noise was conducted in the reporting period.

Four noise exceedances of limit levels were recorded on 8<sup>th</sup> and 22<sup>nd</sup> January 2011, 17<sup>th</sup> February 2011 and 24<sup>th</sup> March 2011. All the four exceedances were found to be the noise emitted by the passed-by vehicles, which is not project-related. Therefore, no adverse noise impacts from the operation of the project to the surroundings are anticipated. Graphical plot of noise monitoring record in comparison with baseline data is provided in Appendix B.

### 5.3. Comparison of Monitoring Results

During the operational phase of the Project, the monitoring results did not show major variations due to the activities being carried out by the Project and weather conditions. The EM&A data was compared with the EIA predictions as summarized in Table 9.

*Table 9 Comparison of EM&A data with EIA predictions*

<i>Parameters</i>	<i>Predicted Level in EIA Report</i>	<i>Measured Level from EM&amp;A data</i>
Perceived maximum odour intensity	Not available	1
Maximum average noise level	L <sub>eq (5min)</sub> of 50 dB(A)	L <sub>eq (5min)</sub> of 65.5 dB(A)

Since no prediction was given in the EIA Report, the perceived maximum odour intensity cannot be compared for the EM&A data of odour intensity. However, the EM&A data of odour patrol recorded 1 – no odour in the whole operational phase and no exceedances of action and limit level was recorded.

The maximum average noise level recorded was at a L<sub>eq (5min)</sub> of 65.5 dB(A), which is higher than the predicted noise level in the EIA Report. The discrepancy between the EM&A data and

EIA predictions is probably due to the increment of noise level from ambient background noise levels and the intermittent traffic noise.

Before the operation of the Project, baseline monitoring was carried out and the ambient background noise level was recorded at  $L_{eq(5min)}$  of 58.0 dB(A). This resulted to an increment to the limit level for the noise in the operational phase. Upon the updated limit levels, four noise exceedances were recorded on 8<sup>th</sup> and 22<sup>nd</sup> January 2011, 17<sup>th</sup> February 2011 and 24<sup>th</sup> March 2011. Under on-site observations, the exceedances were due to the intermittent traffic noise generated by the passed-by vehicles. This was considered not project-related. In the monitoring since 24<sup>th</sup> March 2011, no exceedance was recorded. Majority of environmental monitoring data collected during the monitoring period was well below the limit noise level. It is anticipated that the Project is environmentally acceptable.

## **6. NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

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

## **7. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

The relevant parties have implemented odour and noise mitigation measures which shall include, but not limited to the following:

- The WFM Complex (including the parking area) shall be enclosed to reduce the odour nuisance to the nearby residents;
- Contract specifications on the sound power level of mechanical ventilation system shall be followed;
- Off-route lorries shall not pass along the Wu Shan Road outside Yuet Wu Villa;
- Lorries queuing and vessel's horning shall be controlled by WFM management and AFCD.

All environmental mitigation measures for operational stages stated in approved EIA Report, EM&A Manual and Environmental Permit was carried out throughout the whole operational period as shown in Appendix C. The environmental mitigation measures undertaken were considered adequate. There was no major change in the operation of WFM and no additional environmental mitigation measures shall be given. The odour patrol frequency was reviewed in March 2011 in accordance with EM&A Manual, Section 9.2.2. The odour monitoring frequency is persisted as stated in EM&A Manual.

## **8. REVIEW**

### **8.1. Review of Effectiveness and Efficiency of the Mitigation Measures**

The environmental monitoring results indicated that the construction activities in general were in compliance with the relevant environmental requirements and were environmentally acceptable. The effectiveness and efficiency of the mitigation measures were high as evidenced by a small number of complaints and exceedances.

## **8.2. Review of Environmental Monitoring Methodology and EM&A Programme**

The environmental monitoring methodologies and procedures were regularly reviewed by the ET. No modification to the existing monitoring methodology was made during the monitoring period. The EM&A programme was considered to be successfully conducted during the course of the Operational Phase of the Project.

## **9. CONCLUSIONS**

The operation of the WFM was commenced on 23<sup>rd</sup> December 2010 and the EM&A programme were carried out on a regular basis during the first year of operation. The monitoring period for the first year was completed and the EM&A programme would be terminated effective from 31<sup>st</sup> December 2011.

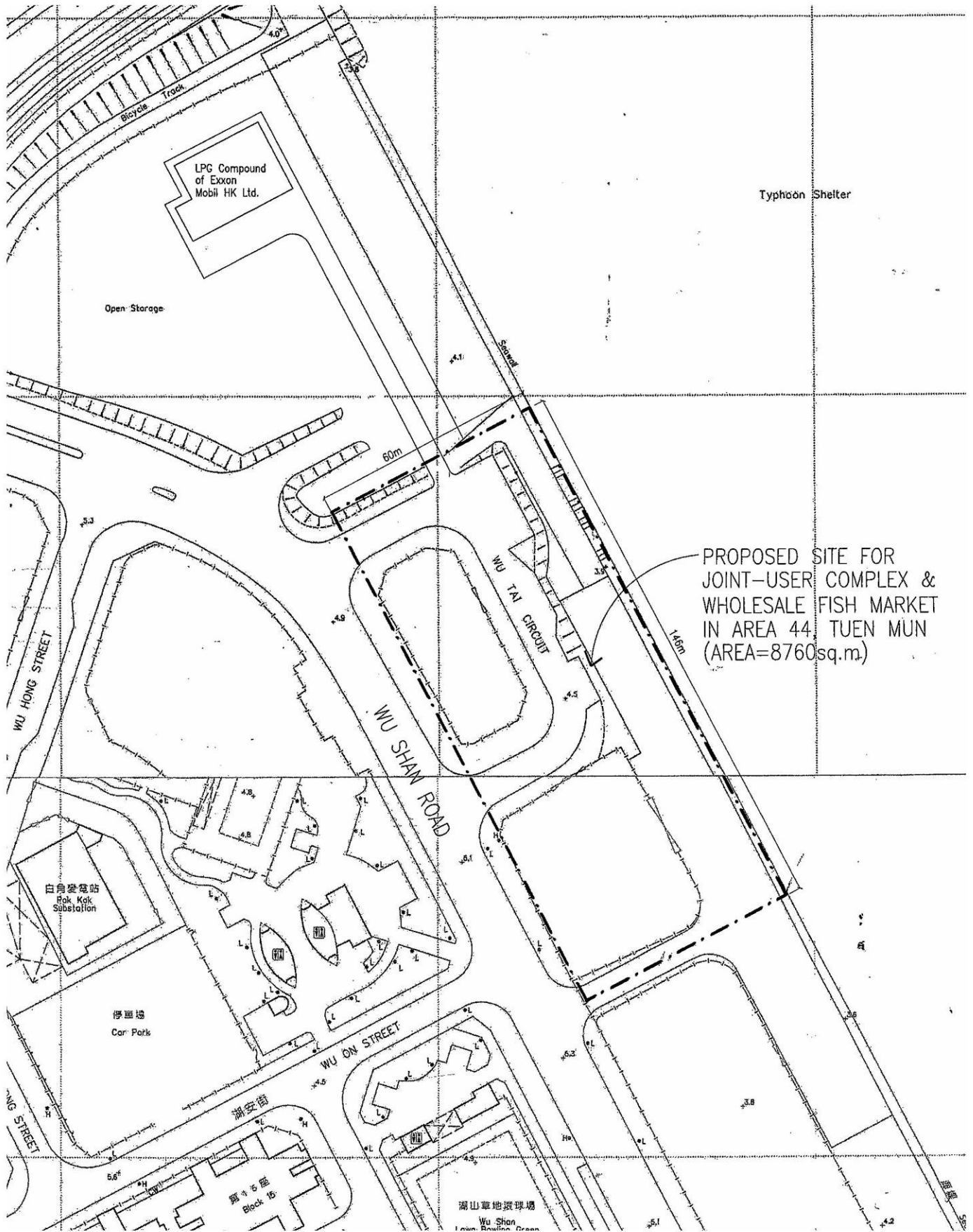
Odour patrol and noise monitoring had been undertaken during the first year of operation in accordance with the EM&A Manual. There was one monitoring stations for air quality and noise monitoring.

During the first year of operation of the project, no exceedances of Action and Limit levels for 1-hour TSP, 24-hour TSP and noise monitoring.

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

Mitigation measures had been implemented by the management office of the WFM to minimize the environmental impacts. The environmental performance during the operation period was considered satisfactory.

The monitoring results and statistics of non-compliance indicated that the EIA process with its recommended mitigation and EM&A programme were effective for protection of the environment and there was no unacceptable environmental impact posed by the Project.



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

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

Figure No.

1

Rev.:

0

Scale

NTS

Date

7/11





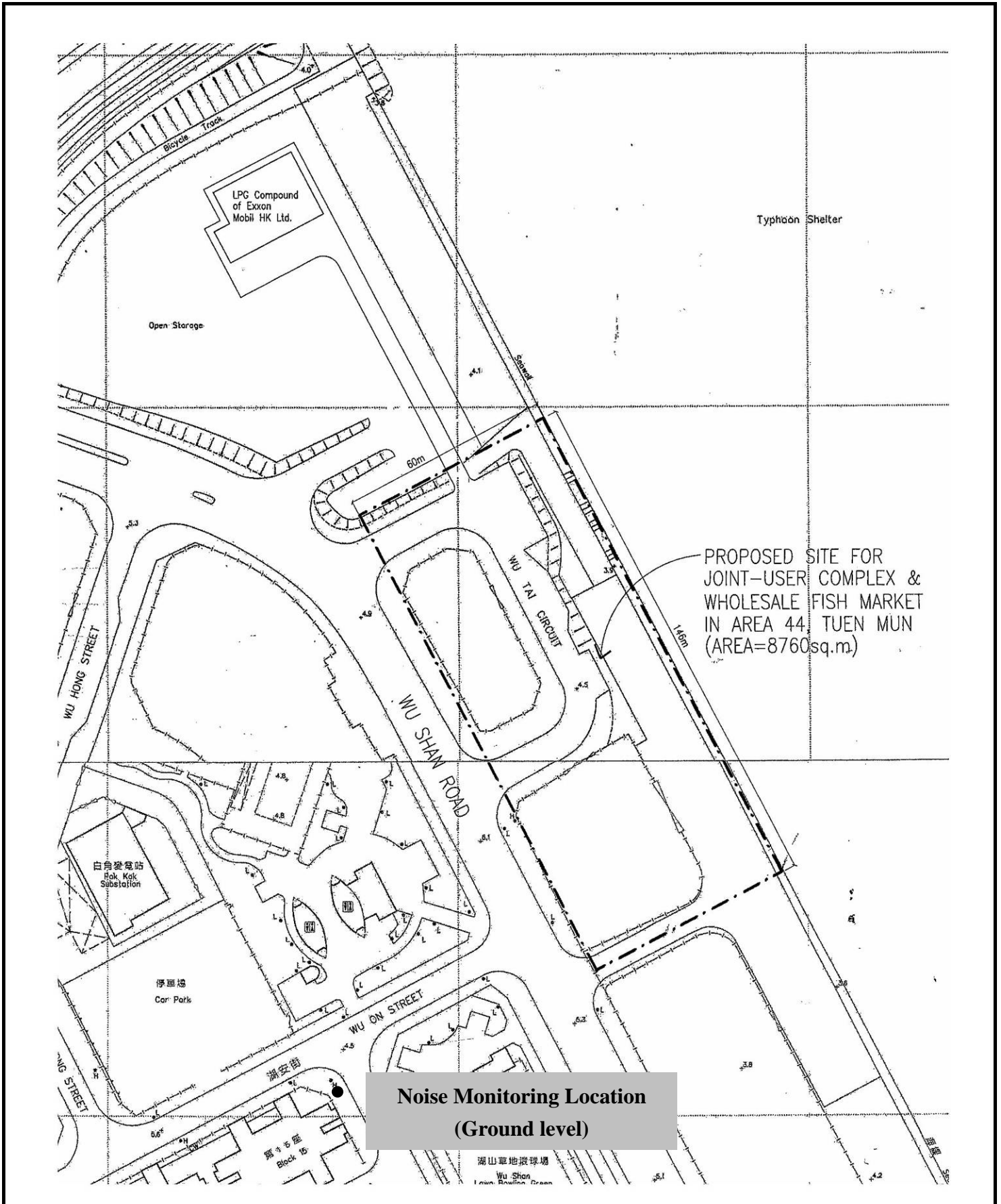


**JOINT USER COMPLEX AND WHOLESALE FISH MARKET AT AREA 44,  
TUEN MUN**

**LOCATION PLAN OF OPERATIONAL PHASE ODOUR PATROL AND SNIFFING LOCATIONS**

Figure No.	Rev.:
2	0
Scale	Date
NTS	7/11





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

Figure No.	Rev.:
3	0
Scale	Date
NTS	7/11

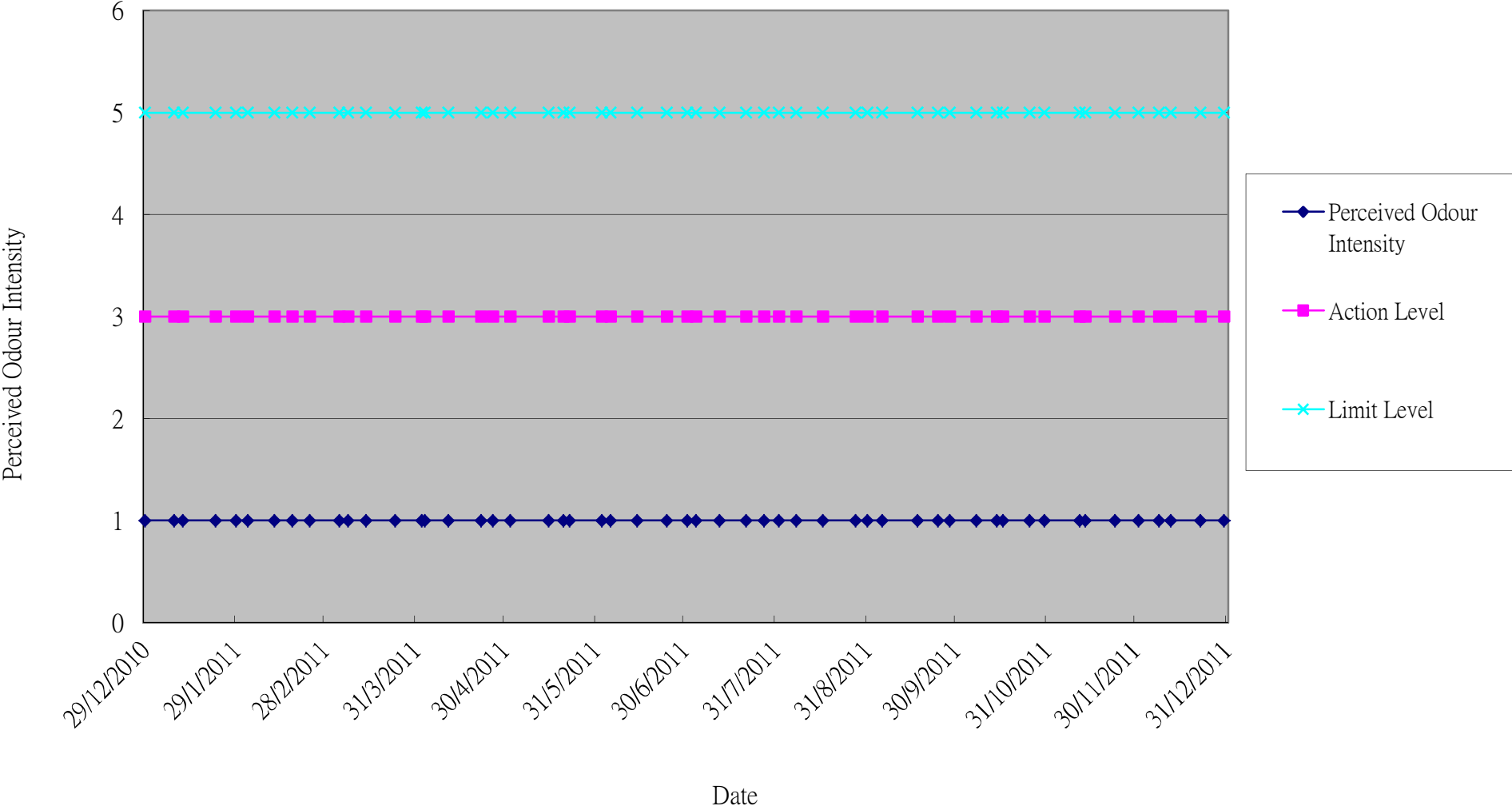


*Appendix A*

---

*Graphical Plot of Odour Patrol*

Odour Monitoring Record

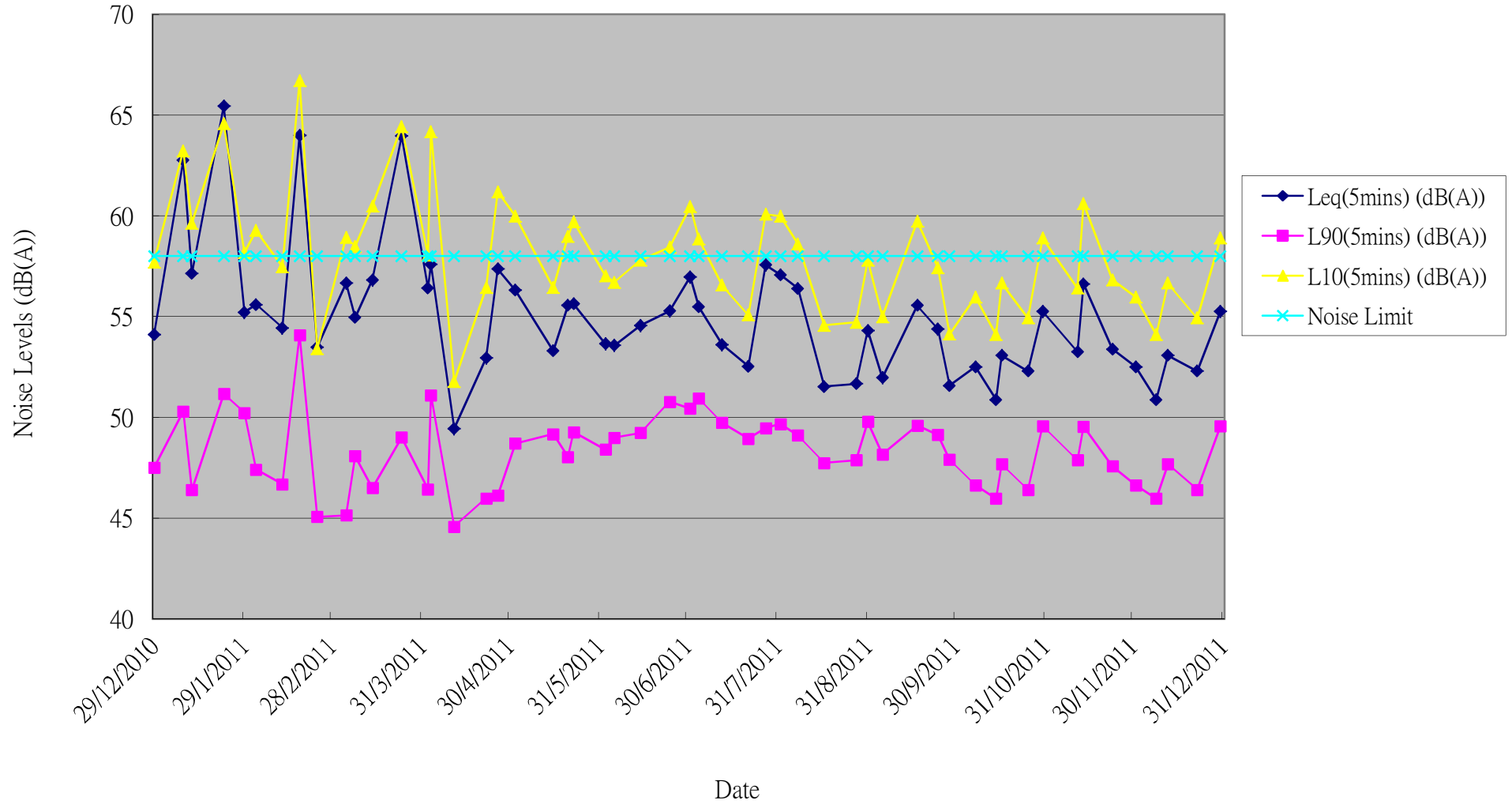


*Appendix B*

---

*Graphical Plot of Noise Monitoring Record in  
Comparison with Baseline Data*

### Noise Monitoring Record



**Remarks:** All the four exceedances were found to be the noise emitted by the passed-by vehicles, which is not project-related.

*Appendix C*

---

*Implementation of Environmental Mitigation  
Measures for Operational Phase*

## MITIGATION MEASURES IMPLEMENTATION SCHEDULE FOR OPERATIONAL STAGE

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Status
4.7	2.8	<p>Air Quality</p> <ul style="list-style-type: none"> <li>• The WFM (including parking area) shall be enclosed with no unprotected openings facing Wu Shan Road to reduce the potential odour nuisance posed to the nearby residents</li> <li>• Exhaust air from the WFM (including parking area) shall be discharged on the eastern elevation facing the typhoon shelter</li> <li>• Contingency provision of future addition of odour removal system for the WFM, if required, will be allowed in the current design</li> <li>• All fresh air intakes for the Community Hall and Other Possible Community Uses shall be sited at levels above 15mPD and 18.5mPD, respectively, and fitted with appropriate filters to remove odour</li> <li>• Exhaust air from the RCP and Marine RCP shall be treated with appropriate deodorisation system prior to discharge to outdoors</li> <li>• Good hygiene and effective operational and waste management practices</li> <li>• Daily washing down of fish market areas and the storage and daily removal of organic wastes</li> <li>• Drains and channels shall be easy to clean and construction materials for the WFM shall be impervious, durable and easy to clean</li> <li>• Measures should be taken to further minimize the potential odour impact during the transportation of fish or other odorous materials, including the use of properly covered containers</li> <li>• Deodourisation systems shall be installed for the public toilets</li> </ul>	<p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p>
5.7	3.7	<p>Noise</p> <ul style="list-style-type: none"> <li>• To avoid a potential night time nuisance to nearby residents a right-turn only junction (northern access road/Wu Shan Road) is provided for vehicles leaving the WFM</li> <li>• Arrangement will be made with drivers to reduce lorry queuing; assistance will be sought from WFM users and vessel operators to avoid loudhailer operation and reduce horn tooting along the seafront</li> <li>• MD and WFM management to encourage vessels to use the eastern harbour entrance</li> <li>• MD and WFM management to encourage the use of silencers at fishing vessels' exhaust</li> <li>• MD to monitor and maintain practical and safe movement within the harbour, and to assist MARPOL and EPD in minimizing where possible noise impact to nearby residents</li> <li>• To request vessel owners to avoid honking except in emergency and to use other means such as phones to notify their presence</li> <li>• The WFM (including parking area) shall be enclosed with no unprotected openings facing Wu Shan Road to reduce potential noise nuisance posed to the nearby residents</li> <li>• A canopy is to be provided to cover all the fish unloading areas on the quay to increase noise screening to NSRs</li> <li>• Mechanical plant exhausts shall be directed towards the typhoon shelter and appropriately screened from Wu Shan Road and nearby NSRs</li> <li>• Suitable noise control measures will be included in building services system design, such as provision of silencers and acoustic louvers to mechanical plant and plantroom</li> </ul>	<p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p>

Remarks:    ^    Compliance of mitigation measure;  
                   N/A    Not Applicable at this stage;

                  X    Non-compliance of mitigation measure;  
                   \*    Not satisfactory but rectified by the contractor.



## MITIGATION MEASURES IMPLEMENTATION SCHEDULE FOR OPERATIONAL STAGE

EIA Ref. Section	EM&A Ref. Section	Environmental Protection Measures	Status
6.7	4.1	<p>Water Quality</p> <ul style="list-style-type: none"> <li>• Surface drainage channels of operational areas shall be easily cleaned and connected to foul sewerage</li> <li>• Wastewater from toilets, kitchen, and other users of the WFM market shall be discharged into a foul sewer or a sewage treatment facility. No effluent discharge into the nullah will be allowed</li> <li>• The flushing water storage tank shall be properly designed so as to minimize the amount of water for each flush</li> <li>• Wastewater resulting from cleansing of floors of the fish market and the refuse collection units (RCP) should be discharged into a foul sewer to avoid direct discharge of wastewater to the nullah</li> <li>• Chemical toilets shall be provided to cope with the additional sewage generated on the day of Dragon Boat Festival</li> </ul>	<p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p>
7.2	5.1	<p>Waste Management</p> <ul style="list-style-type: none"> <li>• In order to minimize the amount of waste disposal, durable and reusable containers should be used, where practicable, instead of plastic bags</li> <li>• Organic matter shall be collected and sealed in plastic bags after each operation and removed daily</li> <li>• The design shall allow for separation and suitable storage of broken polyfoam casings prior to collection</li> <li>• Municipal solid waste generated from community hall, library and offices will be segregated</li> </ul>	<p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p>
8.7	6.1	<p>Hazard to Life</p> <ul style="list-style-type: none"> <li>• Manually operated warning siren shall be installed to instruct people to take timely shelter</li> <li>• Fire drill exercises shall be organized for the workers at the site and users of the WFM</li> <li>• Pedestrian access to the area of podium within the 150m consultation zone should be minimized by design</li> <li>• LPG deliveries shall be avoided during the hours when the spectator stand is fully occupied on the day of Dragon Boat Festival</li> <li>• Reference shall be made to the Code of Practice for the Provision of Means of Escape in Case of Fire (Hong Kong Buildings Department [1997]) and the Code of Practice for Minimum Fire Service Installations and Equipment and Inspection, Testing and Maintenance of Installations and Equipment (Hong Kong Fire Services Department [1997])</li> </ul>	<p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p> <p style="margin-left: 40px;">^</p>

Remarks:    ^    Compliance of mitigation measure;  
                   N/A    Not Applicable at this stage;

X    Non-compliance of mitigation measure;  
 \*    Not satisfactory but rectified by the contractor.

As updated on 6 February 2012