AECOM

# Highways Department

## Contract No. HY/2007/13

## Environmental Team for Deep Bay Link

### Final EM&A Summary Report

12/2009

| | Name | Signature |
|---|---|---|
| Prepared & Checked: | Edith Ng | |
| Reviewed & Approved: | Y T Tang | |

| Version: | 0 | Date: 24 December 2009 |
|---|---|---|



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**Important Message**
**Rebranding as AECOM**
To better serve our clients, all Maunsell AECOM operations in Hong Kong have been integrated into one operating entity and rebranded as AECOM. The ENSR Asia (HK) Limited operation is now part of AECOM Asia Co. Ltd.

## INTRODUCTION

### Background

Deep Bay Link (DBL) is an expressway/trunk road of dual-3 lane standard with hard shoulders providing a strategic link between the proposed Hong Kong - Shenzhen Western Corridor (HK-SWC) at its landing point at Ngau Hom Shek and a proposed interchange with the Yuen Long Highway (YLH) and the proposed Route 10-North Lantau to Yuen Long Highway (R10-NLYLH) at Lam Tei. The layout of the DBL is provided in Figure 1.1.

Construction Phase

Maunsell Environmental Management Consultants Limited (MEMCL), which changed the name to ENSR Asia (HK) Ltd. on 1 May 2007, was appointed by China State Joint Venture (CSJV) to undertake Environmental Monitoring and Audit (EM&A) for "Deep Bay Link – Southern Section" and by Gammon Construction Limited to undertake Environmental Monitoring and Audit (EM&A) for "Deep Bay Link – Northern Section". Under the requirements of Section 4 of Environmental Permit EP-163/2003 and its variations, EM&A programme as set out in the EM&A Manual is required to be implemented.

In accordance with the EM&A Manual, environmental monitoring on air quality and noise are required for the "Southern Section" of the Project, while environmental monitoring on air quality, noise, local stream water quality and coastal water quality are required for "Northern Section" of the Project.

The major construction period of the entire Project (both Southern and Northern Section) was 46 months from September 2003 to June 2007.

Operation Phase

Maunsell Consultants Asia Ltd. (MCAL), which was integrated into AECOM Asia Company Limited as of 1 May 2009, was appointed by Highways Department to undertake Environmental Monitoring and Audit for "Deep Bay Link" during operational phase. Under the requirements of Section 6 of Environmental Permit EP-163/2003/G, EM&A programme as set out in the EM&A Manual is required to be implemented.

In accordance with the Environmental Permit and the EM&A Manual, environmental monitoring of operational noise, water quality and ecology are required for the Project.

Operation of Deep Bay Link commenced on 1 July 2007 and the operational phase EM&A programme commenced on 1 October 2007.

Scope of the Report

This report summarises the environmental monitoring and audit works performed in the period of the whole construction phase EM&A programme from 17 September 2003 to 30 June 2007 and the operation phase EM&A programme from 1 October 2007 to 31 October 2009.

Structure of the Report

Section 1: Deep Bay Link – Southern Section Final EM&A Summary Report for Construction Phase

Section 2: Deep Bay Link – Northern Section Final EM&A Summary Report for Construction Phase

Section 3: Deep Bay Link – Final EM&A Summary Report for Operation Phase

**SECTION 1**

**Deep Bay Link – Southern Section**

**Final EM&A Summary Report for Construction Phase**

**China State Joint Venture**

Contract No. HY/2002/23

**Deep Bay Link – Southern Section**

# Final EM&A Summary Report for Construction Phase

September 2007

| | Name | Signature |
|---|---|---|
| Reviewed & Checked: | Connie Wong | |
| Approved: | Y T Tang | |

| Version: | 0 | Date: 27 September 2007 |
|---|---|---|



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Our Ref.: HYDDBLWCEM00/3/10847

Date: 28 September 2007

Ove Arup & Partners Hong Kong Limited
Level 5, Festival Walk,
80 Tat Chee Avenue,
Kowloon Tong, Kowloon,
Hong Kong.

By Fax (2448 3361) and Post

Attention: Ir. Jackson Wong

Dear Ir. Wong,

**Re: Environmental Permit No. EP-163/2003/G**
**Contract No. HY/2002/23 Deep Bay Link – Southern Section**
**Final EM&A Summary Report for Construction Phase**

Reference is made to ET's e-mail correspondences enclosed with a copy of the Final EM&A Summary Report for Construction Phase and revised pages for the captioned project. We have no further comment on the captioned report.

We are pleased to inform you that the Final EM&A Summary Report for Construction Phase for Deep Bay Link Southern Section, which had been certified by the Environmental Team Leader and verified by IEC in compliance with Condition 1.9 of the Environmental Permit (No.EP-163/2003/G) and Section 1.4 and 1.5 of the IEC Brief.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned or our Mr. Roy Leung if you have any queries.

Yours sincerely,

Billy Yu
Independent Environmental Checker

c.c. Mr. Y. T. Tang ENSR By Fax: 2891 0305

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## TABLE OF CONTENTS

## List of Tables



## List of Figures



## List of Appendices

## EXECUTIVE SUMMARY

This is the Final Environmental Monitoring and Audit (EM&A) Summary Report for Construction Phase prepared by ENSR Asia (HK) Ltd. (formerly Maunsell Environmental Management Consultants Ltd.), the designated Environmental Team (ET), for the Project "Deep Bay Link – Southern Section". Majority of construction works were completed since June 2007. The construction phase environmental monitoring and audit (EM&A) was ceased on 30 June 2007.

This report summarizes the EM&A works performed in the period of the whole EM&A programme from 17 September 2003 to 30 June 2007.

### Environmental Monitoring Works

#### *Air Quality*

Both of the 1-hour Total Suspended Particulates (TSP) and 24-hour TSP were monitored at four designated locations (AN6, AN7, E1 and E2). Subject to the first EPD's approval on 31 August 2006, air quality monitoring at AN7 and E2 were terminated on 5 September 2006, while air quality monitoring at AN6 and E1 were continued until 12 March 2007 (the second EPD's approval on the termination of air quality monitoring on 12 March 2007). There were 109 Action Level and 65 Limit Level exceedances recorded and 8 of them were related to the Project's work.

#### *Noise*

Construction noise was monitored at five designated locations (N5, AN6, AN7, E1 and E2). Termination of noise monitoring at AN7 and E2 was approved by EPD on 31 August 2006 and thus noise monitoring was terminated at AN7 and E2 on 5 September 2006. Noise monitoring at AN6 and E1 were also terminated on 13 March 2007 subject to the EPD's approval on the termination of noise monitoring on 13 March 2007, while noise monitoring at N5 was continued until 30 June 2007. There were 59 exceedances of Limit Level recorded. There were 4 exceedances of Action Level as 4 valid complaints were received during the reporting period.

#### *Environmental Complaints and Prosecutions*

There were 57 environmental complaints received during the reporting period. A total of 28 complaints were related to the Project's work. All valid complaints were properly followed up and rectified.

Two summonses and one successful prosecution were made against the Project since commencement. One pink form was issued to the Contractor regarding an improper discharge into the u-channel at Fuk Hang Tsuen Road on 15 January 2004. The Contractor was summoned on 9 July 2004 and denied the case. The prosecution offered no evidence. Another summon was issued to the Contractor regarding construction works beyond working hour without valid CNP on 4 March 2004. The Contractor pledged guilty to the charge during the court appearance on 15 December 2004.

# 1. INTRODUCTION

## Background

1.1 Maunsell Environmental Management Consultants Limited (MEMCL), which changed the name to ENSR Asia (HK) Ltd. on 1 May 2007 (hereinafter called the "ET") was appointed by China State Joint Venture (CSJV) (hereinafter called the "Contractor") to undertake Environmental Monitoring and Audit (EM&A) for "Deep Bay Link – Southern Section" (hereinafter called the "Project"). Under the requirements of Section 4 of Environmental Permit EP-163/2003 and its variations, EM&A programme as set out in the EM&A Manual [2] is required to be implemented.

1.2 In accordance with the EM&A Manual [2], environmental monitoring of air quality and noise are required for the Project. The major construction period of the Project was 46 months from September 2003 to June 2007.

1.3 Deep Bay Link (DBL) is an expressway/trunk road of dual-3 lane standard with hard shoulders providing a strategic link between the proposed Hong Kong - Shenzhen Western Corridor (HK-SWC) at its landing point at Ngau Hom Shek and a proposed interchange with the Yuen Long Highway (YLH) and the proposed Route 10-North Lantau to Yuen Long Highway (R10-NLYLH) at Lam Tei. The layout of the DBL is provided in Figure 1.1.

# 2. PROJECT CHARACTERISTICS

## Project Organisation and Contacts of Key Management

2.1 The Project Proponent was Highways Department (HyD); the Engineer Representative (ER) was Ove Arup & Partners Hong Kong Limited; the Contractor was China State Joint Venture (CSJV); the Independent Environmental Checker (IEC) was CH2M HILL Hong Kong Limited, and the ET was ENSR Asia (HK) Ltd. (formerly Maunsell Environmental Management Consultants Ltd.).

2.2 An Organisation Chart of the Project is provided in Figure 2.1.

2.3 The responsibilities of respective parties are detailed in Section 1.4 of the EM&A Manual[2]. The contacts of key management for the Project are summarized in Appendix A.

## Construction Activities

2.4 The major construction work was commenced on 17 September 2003 and completed in June 2007.

2.5 The major components of this Project are listed below:

*Preparation works:*
- Site Clearance
- Site investigation

*Construction works:*
- Form site access
- Utilities diversion
- Bored piling
- Excavation and backfilling
- Preliminary loading test
- Construct box culvert
- Sheet piling
- Installation of stone column, noise barriers, skin parapet and aluminium railings
- Construction of pile cap, retaining walls, local road and in-situ bridge deck
- Extension of subways
- Slope stabilization and ground improvement
- Launching of girder
- Pier and bearing construction / Pier-head segment
- Bridge segment installation / Bridge construction
- Modification of existing bridge
- Modification of sign gantry sign face
- Widening of Yuen Long Highway
- Segment erection
- Parapet construction
- Sign gantry erection
- Drainage works and drainage connection
- Removal of contaminated soil
- Waterproofing Works
- Asphalt laying
- Installation of irrigation pipes and irrigation connection
- Landscaping
- Chaining fence erection
- Sign face installation
- Boundary fences, type II and tubular railing erection
- Local road and slope final servicing
- Profiling of local road, slope, utilities and open yard area

# 3. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

## Monitoring Parameters and Locations

3.1 The EM&A Manual [2] designates locations for the ET to monitor environmental impacts in terms of air quality and noise. The air quality and noise monitoring stations for this Project are shown in Figure 3.1 to 3.2 respectively. Appendix B gives the details of the monitoring requirements.

## Environmental Quality Performance Limits (Action and Limit Levels)

3.2 The environmental quality performance limits, i.e. Action and Limit levels (AL Levels) were derived from the baseline monitoring results [3] & [4] and/or other approaches as detailed in the EM&A Manual [2]. Should the measured environmental quality parameters exceed the AL Levels, the respective action plans would be implemented. The AL Levels for each environmental parameter are given in Appendix C.

## Environmental Mitigation Measures

3.3 Relevant mitigation measures as recommended in the Project EIA Report [1] had been stipulated in the EM&A Manual [2] for the Contractor to adopt. A list of mitigation measures is given in Appendix F.

# 4. MONITORING RESULTS

4.1 A summary of monitoring conducted in the reporting period are summarized in Table 4.1.

**Table 4.1 Summary of monitoring conducted in the reporting period**

| Parameter | No. of Sessions | Period |
|---|---|---|
| 1-hour Total Suspended Particulates (TSP) monitoring at AN6 | 654 | From 20 Sep 03 to 12 Mar 07 |
| 1-hour TSP monitoring at AN7 | 552 | From 20 Sep 03 to 04 Sep 06 |
| 1-hour TSP monitoring at E1 | 624 | From 15 Nov 03 to 12 Mar 07 |
| 1-hour TSP monitoring at E2 | 528 | From 15 Nov 03 to 04 Sep 06 |
| 24-hour TSP monitoring at AN6 | 217 | From 18 Sep 03 to 12 Mar 07 |
| 24-hour TSP monitoring at AN7 | 185 | From 18 Sep 03 to 04 Sep 06 |
| 24-hour TSP monitoring at E1 | 210 | From 14 Nov 03 to 12 Mar 07 |
| 24-hour TSP monitoring at E2 | 177 | From 14 Nov 03 to 04 Sep 06 |
| Daytime noise monitoring at N5 | 199 | From 19 Sep 03 to 30 Jun 07 |
| Daytime noise monitoring at AN6 | 183 | From 19 Sep 03 to 12 Mar 07 |
| Daytime noise monitoring at AN7 | 156 | From 19 Sep 03 to 04 Sep 06 |
| Daytime noise monitoring at E1 | 174 | From 15 Nov 03 to 12 Mar 07 |
| Daytime noise monitoring at E2 | 147 | From 15 Nov 03 to 04 Sep 06 |
| Evening noise monitoring at N5 | 81 | From 21 Nov 03 to 30 Jun 07 |
| Evening noise monitoring at AN6 | 81 | From 21 Nov 03 to 12 Mar 07 |
| Evening noise monitoring at E1 | 85 | From 12 Jul 05 to 12 Mar 07 |
| Evening noise monitoring at E2 | 60 | From 12 Jul 05 to 04 Sep 06 |
| Night time noise monitoring at N5 | 14 | From 16 Jul 04 to 30 Jun 07 |
| Night time noise monitoring at AN6 | 14 | From 16 Jul 04 to 12 Mar 07 |
| Night time noise monitoring at E1 | 10 | From 10 Sep 04 to 12 Mar 07 |
| Night time noise monitoring at E2 | 5 | From 10 Sep 04 to 04 Sep 06 |
| Holiday noise monitoring at N5 | 82 | From 23 Nov 03 to 30 Jun 07 |
| Holiday noise monitoring at AN6 | 82 | From 23 Nov 03 to 12 Mar 07 |
| Holiday noise monitoring at E1 | 84 | From 17 Jul 05 to 12 Mar 07 |
| Holiday noise monitoring at E2 | 60 | From 17 Jul 05 to 04 Sep 06 |

## Air Quality

4.2 All the 1-hour TSP monitoring results complied with the AL Levels and no exceedance was recorded during the reporting period.

4.3 A total of 174 exceedances (109 Action Level and 65 Limit Level) for 24-hour TSP were recorded and 8 exceedances (6 Action Level and 2 Limit Level) were related to the Project's work. Table 4.2 summarizes the number of air quality exceedances.

**Table 4.2 Summary of air quality exceedances**

| Parameters | 1-hour TSP | | 24-hour TSP | | Total |
|---|---|---|---|---|---|
| | Action | Limit | Action | Limit | |
| AN6 | 0 (0) | 0 (0) | 24 (3) | 2 (0) | 26 (3) |
| AN7 | 0 (0) | 0 (0) | 30 (0) | 37 (0) | 67 (0) |
| E1 | 0 (0) | 0 (0) | 12 (2) | 7 (2) | 19 (4) |
| E2 | 0 (0) | 0 (0) | 43 (1) | 19 (0) | 62 (1) |
| Total | 0 (0) | 0 (0) | 109 (6) | 65 (2) | 174 (8) |

*Remarks: ( ) exceedances related to the Project's work.

4.4 The one project related Action Level exceedance at E2 was generated from the paving work and the traffic dust at To Yuen Wai on 14 November 2003. Three Action Level exceedances at AN6 were identified due to improper covering of the stockpile during dry season at Tsoi Yuen Tsuen (South) on 27

February 2004, 4 and 5 March 2004. One Limit Level and one Action Level exceedances at E1 recorded on 6 and 11 October 2004 were also identified by the partially uncovered stockpile during dry season at To Yuen Wai. Another one Limit Level and one Action Level exceedances at E1 recorded on 16 and 22 November 2004 were due to the excavation and concrete breaking without enough water spraying during the dry season.

4.5 Graphical presentations of both 1-hour TSP and 24-hour TSP monitoring results during the reporting period are provided in Appendix D.

4.6 It was observed from the graphs that higher TSP levels were recorded between October and March of the next year in each year, particularly from 2003 to 2005. Such elevation of TSP levels was likely triggered by the elevated ambient dust, nearby traffic dust influence or general air quality pollution level during dry season. In fact, as the baseline monitoring for air quality was carried out in July and August 2003, during which the weather condition was mainly wet, the baseline TSP level was relatively low. Upon completion of most construction works after January 2006, the TSP levels gradually returned to the baseline level and much dominated by the change in ambient air quality and weather condition.

**Noise**

4.7 There were 28 Limit Level exceedances recorded for daytime noise, 30 Limit Level exceedances for night time noise and 1 Limit Level exceedance for holiday daytime noise during the reporting period. Table 4.3 summarizes the number of noise level exceedances.

**Table 4.3 Summary of noise exceedance**

| Station | Daytime (0700-1900) | | Evening Time (1900-2300) | | Night Time (2300-0700 of the next day) | | Holiday Daytime | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Limit | Action | Limit | Action | Limit | Action | Limit | Action | Limit | Action |
| N5 | 0 | 0 | 0 | 0 | 13 (0) | 0 | 1 (0) | 0 | 14 (0) | 0 |
| AN6 | 0 | 0 | 0 | 0 | 3 (0) | 0 | 0 | 0 | 3 (0) | 0 |
| AN7 | 28 (1) | 1 (1) | - | - | - | - | - | - | 28 (1) | 1 (1) |
| E1 | 0 | 3 (3) | 0 | 0 | 8 (0) | 0 | 0 | 0 | 8 (0) | 3 (3) |
| E2 | 0 | 0 | 0 | 0 | 6 (0) | 0 | 0 | 0 | 6 (0) | 0 |
| Total | 28 (1) | 4 (4) | 0 | 0 | 30 (0) | 0 | 1 (0) | 0 | 59 (1) | 4 (4) |

*Remarks: ( ) exceedances related to the Project's work.

4.8 A total of 28 daytime Limit Level exceedances were recorded and one exceedance was related to the Project's work. The one project related exceedance was generated by the drilling machine operation at AN7 on 18 November 2003. All other exceedances were concluded not due to the project.

4.9 All 30 night time noise exceedances were concluded not due to the Project's work. The night time construction works were also complied with the CNP issued by EPD. Actually, the Limit Level of 50dB(A) during this period is much more stringent than the normal daytime or even the evening time and background sound levels at the stations already exceeded it. Therefore, the noise levels as measured during the monitoring events produced exceedances. The major noise sources were caused by general traffic at Yuen Long Highway and background noise from the nearby village.

4.10 Only 1 Limit Level exceedance was recorded at N5 for holiday daytime noise and the exceedance was concluded not due to the Project works. The cause of the holiday daytime noise by the villager activities (e.g. dog barking).

4.11 There were 8 noise complaints received and 4 of them were Project's related and considered as triggering the Action Level exceedance. Thus, 4 Action Level exceedances were recorded during the reporting period. The identified noise source for the first valid complaint was due to the drilling machine operation and generated noise to Lam Tei Gospel School on 18 November 2003. The Contractor had provided shielding to the drilling machine and strategically placed sedimentation tank to form a barrier.

For the other three valid noise complaints, the noise nuisances were due to the breaking of existing concrete footing on 18 February 2005, the concrete breaking and road construction works on 6 September 2005 and the sheet piling works on 4 January 2006. The Contractor had installed the movable barrier for the concrete breaking and sheet piling works to minimize the noise nuisance and there was no Limit Level exceedance recorded. Details of noise complaints are given in Appendix H.

4.12 The graphical presentations of the noise monitoring results are provided in Appendix E.

4.13 It was observed from the graphs that higher noise levels were recorded during early stage of the construction works for daytime noise monitoring. The graphs also showed clearly that all Limit Level exceedances were recorded for daytime noise monitoring during the period from November 2003 to June 2006, night time noise monitoring during the period from July 2004 to November 2005 and holiday noise monitoring in February 2004. Upon completion of most construction works, noise levels gradually returned to the baseline level and consistently lower than 65dB(A) for Daytime noise.

## 5. AUDIT RESULTS

### Implementation Status of Environmental Mitigation Measures

5.1 The Contractor implemented mitigation measures to minimize the environmental impacts caused by construction activities. Regarding a few minor observations as noted during ET's site inspections, the Contractor rectified most of the problems and no major environmental deficiency was induced.

5.2 The implementation status of environmental mitigation measures (EMIS) is given in Appendix F.

### Status of Environmental Licensing and Permitting

5.3 Environmental licenses and permits including Environmental Permit for the Project, construction noise permit and effluent discharge license were in place and valid during the Construction Phase. The status of licences and permits is summarized in Appendix G.

### Advice on Solid and Liquid Waste Management Status

5.4 The solid waste generated from the Project included inert and non-inert C&D waste, chemical waste, excavated material, site clearance waste and general refuse. Table 5.1 summarizes the actual waste generated throughout the construction period.

**Table 5.1a Actual Waste Generation throughout the Construction Period (Sep 03 to Feb 04)**

| Waste Type | Examples | Amount | Disposal Locations |
|---|---|---|---|
| Site clearance waste | Vegetation, refuse on land | 3,560.4 $m^3$ | WENT Landfill / NENT Landfill |
| General refuse | Food, packaging waste & office waste | | |
| Excavated material | Rock and soil | 18,710.4 $m^3$ | Tuen Mun Area 38 |
| Public fill (inert) | Concrete, brick, aggregates | 294 $m^3$ | Tuen Mun Area 38 |
| C & D waste (non-inert) | Plastic, wood and bamboo | Nil | Not applicable |

**Table 5.1b Actual Waste Generation throughout the Construction Period (Mar 04 to Jun 07)**

| Waste Type | Examples | Amount | Disposal Locations |
|---|---|---|---|
| Site clearance waste | Vegetation, refuse on land | 4,008.8 $m^3$ | WENT Landfill |
| General refuse | Food, packaging waste & office waste | | |
| Public fill (inert) | Excavated material (rocks & soil), concrete, brick, aggregates | 88,090.3 $m^3$ | Tuen Mun Area 38, PFF |
| C & D waste (non-inert) | Plastic, wood and bamboo | Nil | WENT Landfill |
| Chemical waste | Used oil, spent solvent | 4,010 L | Chemical Waste Treatment Centre |
| Contaminated Soil | Excavated material from the contaminated land | 1,422 $m^3$ | WENT Landfill |
| Fill material | Soil material | 7,338 $m^3$ | Deep Bay Link – Northern Section |

# 6. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)

## Summary of Exceedances

6.1 All measured 1-hour TSP concentrations in the reporting period were below the Action and Limit Levels.

6.2 For 24-hour TSP monitoring, a total of 109 Action Level and 65 Limit Level exceedances were recorded in the reporting period. It was concluded that only 8 exceedances were due to the Project's work.

6.3 For the construction noise monitoring, a total of 59 Limit Level exccedances were recorded in the reporting period. It was concluded that only 1 Limit Level exceedance for daytime noise monitoring and 4 Action Level exceedances as 4 valid complaints for noise monitoring were due to the Project's work.

## Review of the Reasons for and the Implications of Non-compliance

6.4 No exceedance of Action or Limit Level for 1-hour TSP measurement was recorded in the construction phase period.

6.5 Regarding the exceedances recorded for 24-hour TSP concentration in the reporting period, there were 6 Action Level and 2 Limit Level exceedances concluded due to the Project's work. The identified dust sources were the paving work and the traffic at E2, improper covering of the stockpile during dry season at AN6, the excavation and concrete breaking without adequate water spraying and uncovered stockpile during dry season at E1.

6.6 All the 30 night time noise Limit Level exceedances and 1 holiday daytime noise Limit Level exceedances were concluded not due to the Project's work. They were mainly due to the background sound level such as background noise from the nearby village and the general traffic at Yuen Long Highway and Fuk Hang Tsuen Road.

6.7 Regarding the daytime noise Limit Level exceedance recorded in the reporting period, 1 exceedance was related to the Project's work on 18 November 2003. The identified noise source was generated by the drilling machine operation at AN7.

6.8 Four valid noise complaints were received during the reporting period. The identified noise source for the first valid complaint was due to the drilling machine operation and generated noise to Lam Tei Gospel School on 18 November 2003. For the other three valid noise complaints, the noise nuisances were due to the breaking of existing concrete footing on 18 February 2005, the concrete breaking and road construction works on 6 September 2005 and the sheet piling works on 4 January 2006. Details of the complaints are given in Appendix H.

6.9 The work related exceedances were short in duration. The Contractor generally implemented the required mitigation measures to rectify the environmental impacts. There was thus no long term implication to the environment.

## Summary of Actions Taken

6.10 The Contractor generally implemented all the required mitigation measures to suppress the environmental impacts.

6.11 8 exceedances for air quality were concluded due to the Project's work. The Contractor had provided the cover for and removed the stockpiles, increased the frequency of water spraying during the dry season to rectify the problem. All other exceedances were concluded not due to Project's works. No further action was required.

6.12 1 exceedance for noise monitoring was concluded due to the Project's work. The Contractor had provided shielding to the drilling machine and strategically placed sedimentation tank to form a barrier. All other exceedances were concluded not due to Project's works. No further action was required.

6.13 For the 4 Action Level exceedances for noise monitoring, the first exceedance was due to operation of drilling machine. The Contractor thus provided shielding to the drilling machine and strategically placed sedimentation tank to form a barrier. The major noise nuisance for the other three was due to breaking of existing concrete footing, concrete breaking, road construction works and sheet piling works. The Contractor thus installed the movable barrier to rectify the problem and there was no Limit Level exceedance recorded.

# 7. COMPARISON OF EM&A DATA WITH EIA PREDICTION

## 1-hour TSP and 24-hour TSP Monitoring

7.1 The environmental monitoring data collected during the construction period were generally in line with the prediction of Deep Bay Link Environmental Impact Assessment (EIA) Report [1] and Deep Bay Link – Southern Section Baseline Monitoring Report [3] & [4] as the monitoring results were within the acceptable levels as stipulated in the EIA report [1].

## Noise Monitoring

7.2 Except for those non-project related exceedances, the environmental monitoring data collected during the construction period were generally in line with the prediction of the EIA Report [1].

## Review of Environmental Monitoring Methodology and EM&A Programme

7.3 The environmental monitoring methodologies and procedures were regularly reviewed by the ET. No modification to the existing monitoring methodology was made during the construction period.

7.4 The EM&A programme, the effectiveness and efficiency of the mitigation measures were successful during the construction period.

## Environmental Acceptability of the Project

7.5 Even though 174 exceedances of air quality and 63 exceedances of noise level were reported, most of them were concluded not related to the Project's work. It was concluded that only 8 air quality exceedances (4.6%), 1 daytime noise exceedance and 4 noise exceedances in the form of valid noise complaint (7.9%) were due to the Project's work and they were rectified accordingly. The environmental monitoring results indicated that the construction activities in general complied with the relevant environmental requirements and were environmentally acceptable.

## 8. ENVIRONMENTAL COMPLAINTS

8.1 All complaints were handled in accordance with the EM&A Manual [2]. The complaint handling procedure is provided in Appendix H.

8.2 There were 57 complaints received during the reporting period. The complaints were mainly about air quality (particularly dust), noise, water quality and housekeeping problems. The Contractor was notified of all these complaints. 28 of the complaints were project related and were followed up and rectified. Regarding the invalid complaints, the Contractor had maintained sufficient mitigation measures to prevent them from happening.

8.3 Summary record of the complaints, investigation and follow-up actions undertaken are provided in Appendix H.

## 9. NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

9.1 Two summonses and one successful prosecution were made against the Project since commencement. A pink form was issued to the Contractor during EPD's inspection on 15 January 2004 regarding an improper discharge into the u-channel from the works area at Fuk Hang Tsuen Road. The Contractor was summoned on 9 July 2004 and denied the case. The prosecution offered no evidence and thus the charge was dismissed by Magistrate on 10 September 2004.

9.2 The second summons was issued on 26 August 2004 regarding construction works beyond working hour without CNP on 4 March 2004. The Contractor was summoned on 22 September 2004 and prosecuted regarding the construction works beyond working hour without valid CNP. The Contractor pledged guilty to the charge during the court appearance on 15 December 2004.

## 10. COMMENTS AND CONCLUSIONS

10.1 The ET carried out air quality, noise and weekly site inspection in accordance with the EM&A Manual [2].

10.2 No exceedance of AL Levels for 1-hour TSP monitoring was recorded in the reporting period.

10.3 There were 174 exceedances for 24-hour TSP concentration recorded in the reporting period. Mitigation measures for the construction dust were generally implemented. It was concluded that only 8 exceedances were due to the Project's work and they were rectified accordingly.

10.4 There were 63 exceedances (59 Limit Level and 4 Action Level) for noise monitoring recorded in the reporting period. Only 4 valid noise complaints (Action Level exceedances) and 1 Limit Level exceedance were related to the Project's work. The Contractor thus provided shielding to the drilling machine and strategically placed sedimentation tank to form a barrier and installed the movable barrier to rectify the problem.

10.5 57 complaints were made against this Project since commencement of the Project. 28 complaints were considered related to the Project's work and valid, and were followed up and rectified accordingly.

10.6 Two summonses and one successful prosecution were made against the Project during the reporting period.

10.7 Upon completion of the project, environmental qualities returned to the ambient levels. No significant impact to the adjacent environment was noted, which concurs with the EIA Report [1] findings.

10.8 The implemented EM&A programme readily detected any environmental impacts to the receivers and timely actions could be taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental acceptability of the Project. Weekly site inspections checked that the EIA's recommended mitigation measures were effectively implemented. There had be no particular recommendation advised for improvement in the EM&A programme in the reporting period.

## 11. REFERENCES

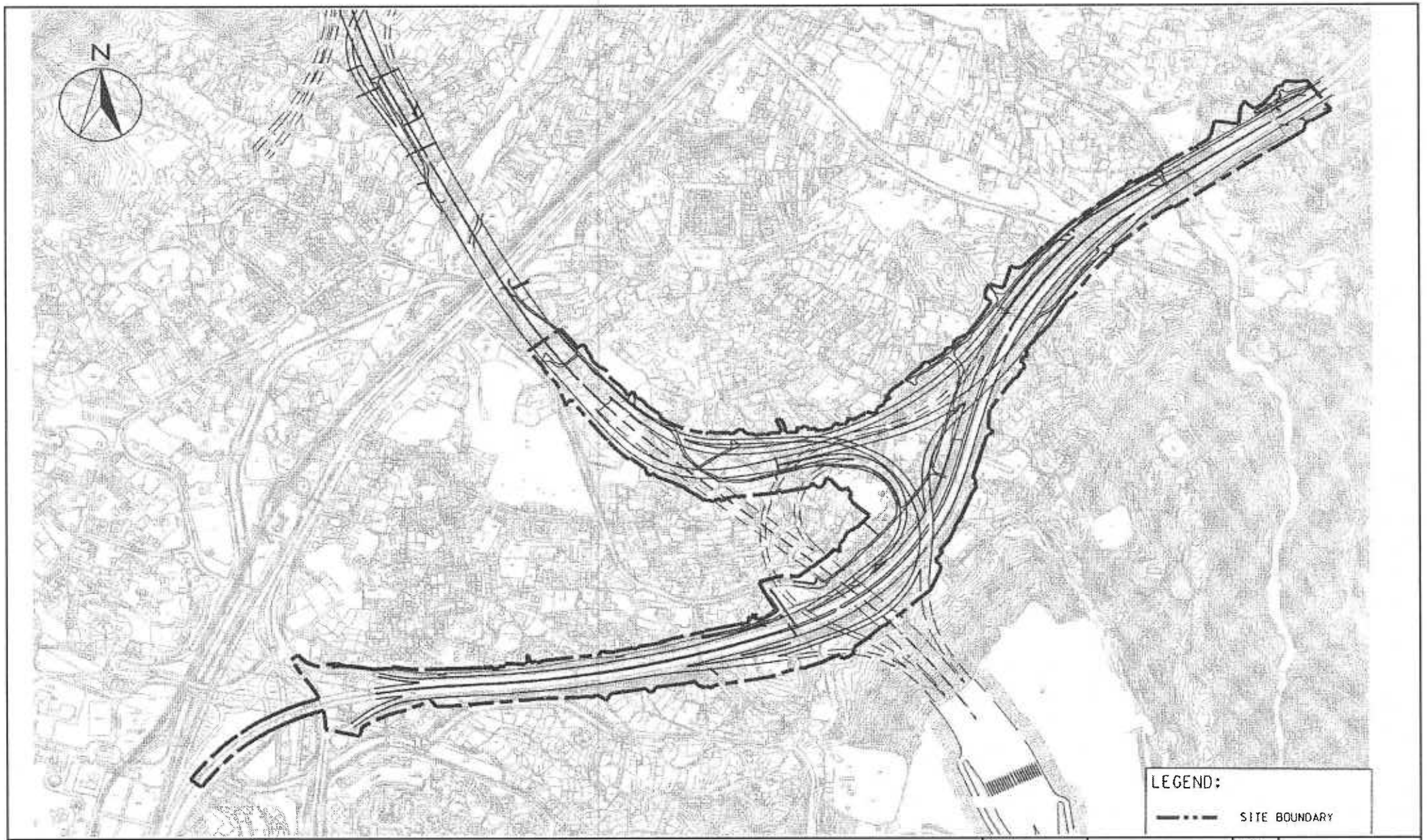
[1] Ove Arup & Partners Hong Kong Ltd. May 2002. Agreement No. CE109/98, Deep Bay Link – Investigation and Preliminary Design, Environmental Impact Assessment Report Volume 1 of 3 – Text.

[2] Ove Arup & Partners Hong Kong Ltd. May 2002. Agreement No. CE109/98, Deep Bay Link – Investigation and Preliminary Design, Final Environmental Impact Assessment Report, Environmental Monitoring and Audit Manual.

[3] Maunsell Environmental Management Consultants Ltd. August 2003. Contract No. HY/2002/23 Deep Bay Link – Southern Section, Baseline Monitoring Report (Revision 0).

[4] Maunsell Environmental Management Consultants Ltd. November 2003. Contract No. HY/2002/23 Deep Bay Link – Southern Section Baseline Monitoring Report (E1 & E2 only) (Revision 0).

# FIGURES



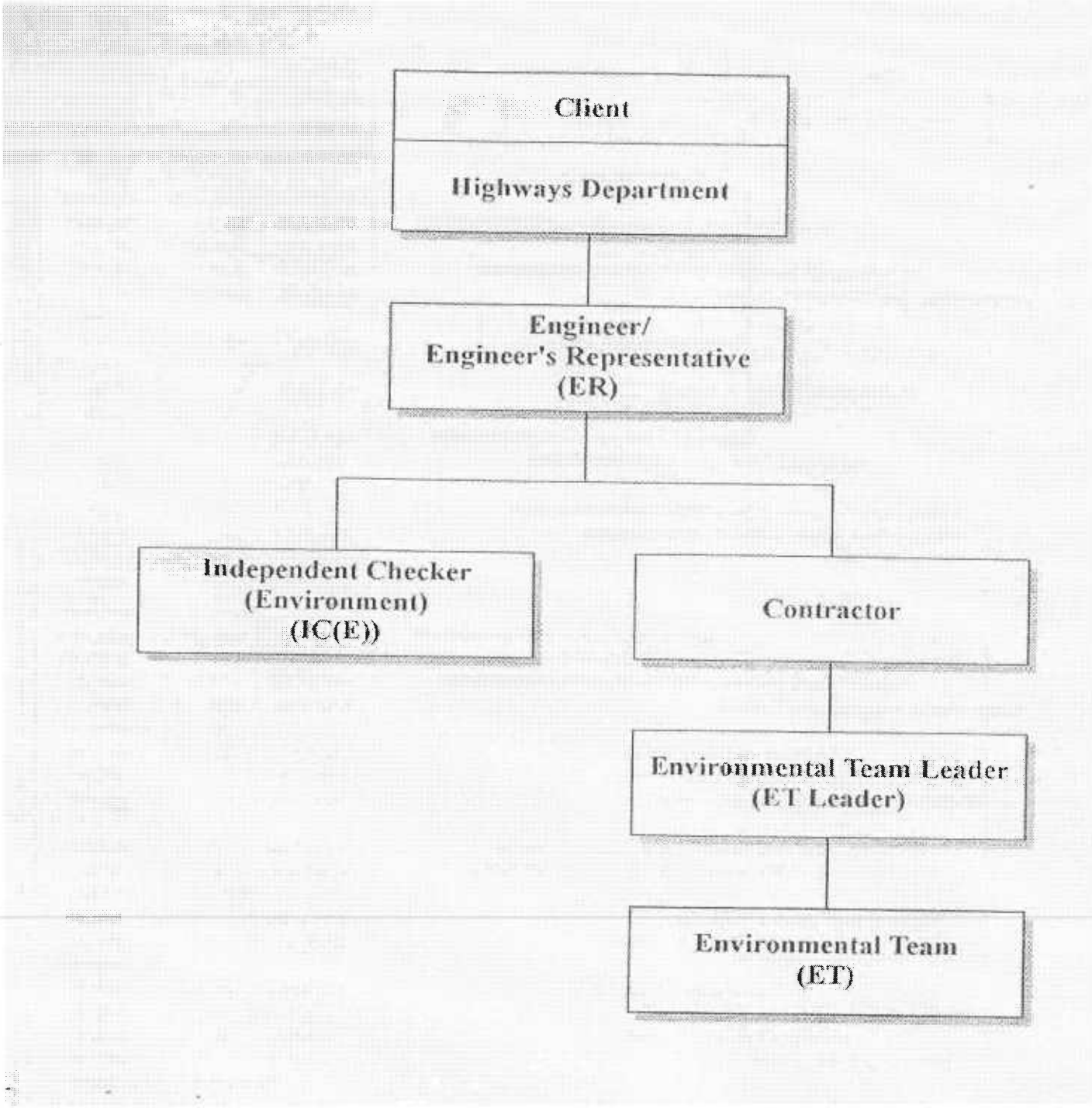

ENSR | AECOM

CONTRACT NO. HY/2002/23

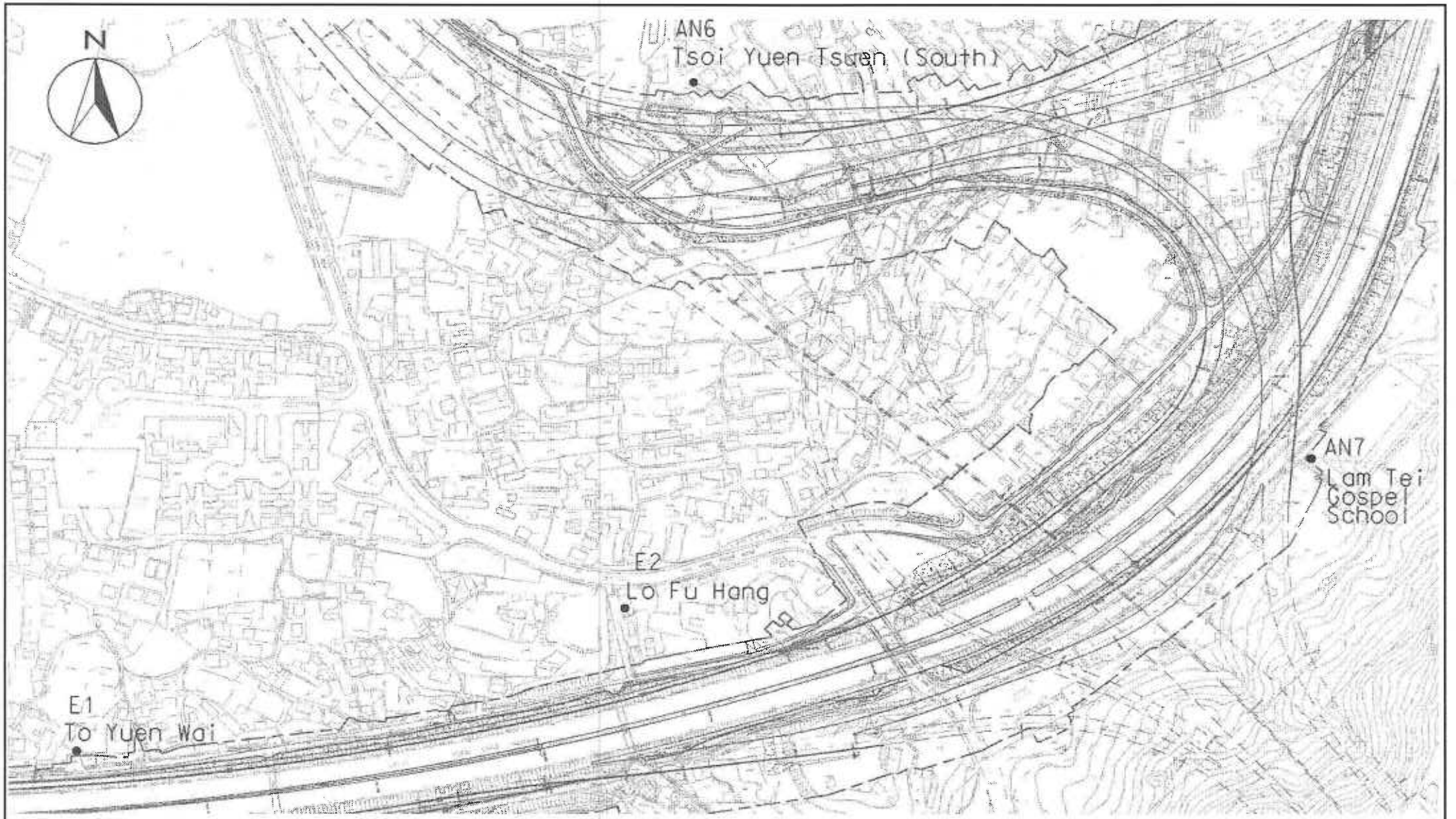
DEEP BAY LINK - SOUTHERN SECTION

**LAYOUT OF WORK SITE**

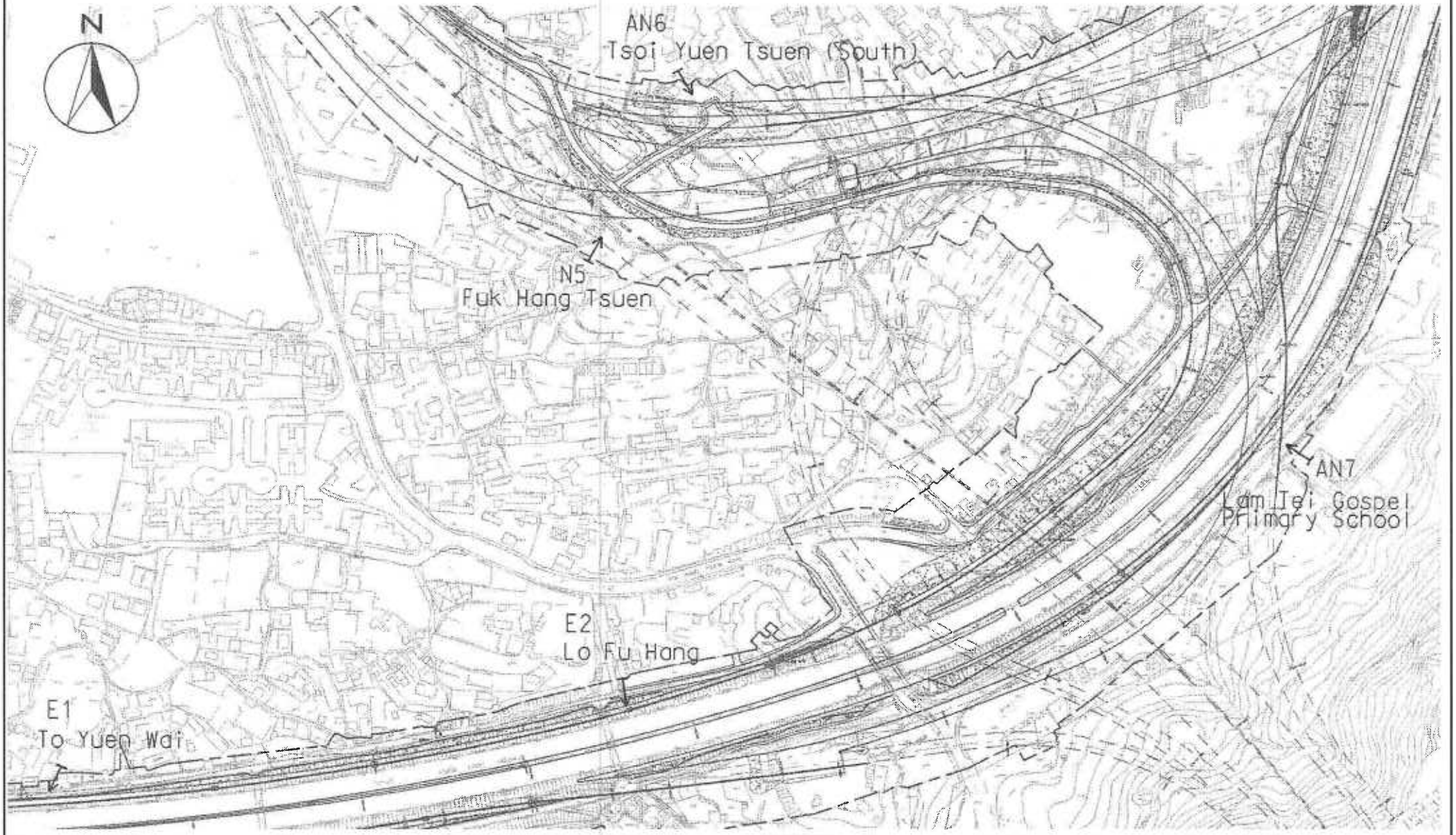
| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016783 | FIGURE No. 1.1 | Rev - |




| | | | | | | |
|---|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/23<br>Deep Bay Link - Southern Section<br>**Project Organisation** | SCALE | N.T.S. | DATE | 2007 | |
| | | CHECK | PTPM | DRAWN | YSL | |
| | | JOB NO. | 60016783 | FIGURE No. | 2.1 | Rev. - |




| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | CONTRACT NO. HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | DEEP BAY LINK - SOUTHERN SECTION | CHECK | PTPM | DRAWN | LLCM |
| | **LOCATIONS OF AIR QUALITY MONITORING STATIONS** | JOB NO. | 60016783 | FIGURE No. 3.1 | Rev - |




ENSR | AECOM

CONTRACT NO. HY/2002/23

DEEP BAY LINK - SOUTHERN SECTION

**LOCATIONS OF NOISE MONITORING STATIONS**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016783 | FIGURE No. 3.2 | Rev - |

# APPENDIX A
# CONTACT DETAILS OF KEY MANAGEMENT

**Contacts of Key Environmental Staff**

| | Name | Telephone | Fax |
|---|---|---|---|
| **EPD** | | | |
| Environmental Protection Officer | Dr. Derek Wong | 2417 6162 | 2415 7191 |
| **ER** | | | |
| **Ove Arup & Partners HK Limited** | | | |
| Chief Resident Engineer | Mr. Simon Tong | 3476 3888 | 2448 3361 |
| Resident Engineer | Mr. Paul Lee | 3476 3888 | 2448 3361 |
| **IEC** | | | |
| **CH2M HILL HK Limited** | | | |
| Independent Environmental Checker | Mr. Billy Yu | 2507 2203 | 2507 2293 |
| **Contractor** | | | |
| **China State JV** | | | |
| Project Manager | Mr. J. Yeung | 2460 9487 | 2464 0350 |
| Safety Manager | Mr. K. F. Ng | 2460 9487 | 2464 0350 |
| **ET** | | | |
| **ENSR Asia (HK) Limited** | | | |
| Environmental Team Leader | Mr. Y. T. Tang | 2893 1551 | 2891 0305 |
| Senior Environmental Scientist | Ms. Connie Wong | 2893 1551 | 2891 0305 |

# APPENDIX B
# ENVIRONMENTAL MONITORING PROGRAMME

## Appendix B Environmental Monitoring Programme

### Table B1 Air Quality Monitoring Parameters and Frequency

| Parameter | Duration | Frequency |
|---|---|---|
| 1-hour TSP | 1 hour | 3 times every 6 days |
| 24-hour TSP | 24 hours | Once every six days |

### Table B2 Noise Monitoring Parameters, Period and Frequency

| Time Period | Duration (min) | Parameters | Frequency |
|---|---|---|---|
| Normal Daytime (0700 to 1900) | 30 | $L_{eq}$ | Once per week |
| *Evening (1900 to 2300) | 15 | $L_{eq}$ | Three consecutive $L_{eq(5mins)}$ per week when construction work is in progress |
| *Night-time (2300 to 0700 of next day) | | | |
| *Holiday Daytime (0700 to 1900) | | | |

*Noise monitoring to be conducted only when construction work is in progress.

# APPENDIX C
# ACTION AND LIMIT LEVELS

## Appendix C – Action and Limit Levels

### Action and Limit Levels for A-hour TSP and 24-hour TSP

| Parameter | Location | Action Level, $\mu g/m^3$ | Limit Level, $\mu g/m^3$ |
|---|---|---|---|
| 1-hour TSP | AN6 | 319.9 | 500 |
| | AN7 | 304.7 | |
| | E1 | 304.0 | |
| | E2 | 297.4 | |
| 24-hour TSP | AN6 | 164.8 | 260 |
| | AN7 | 189.8 | |
| | E1 | 210.0 | |
| | E2 | 182.3 | |

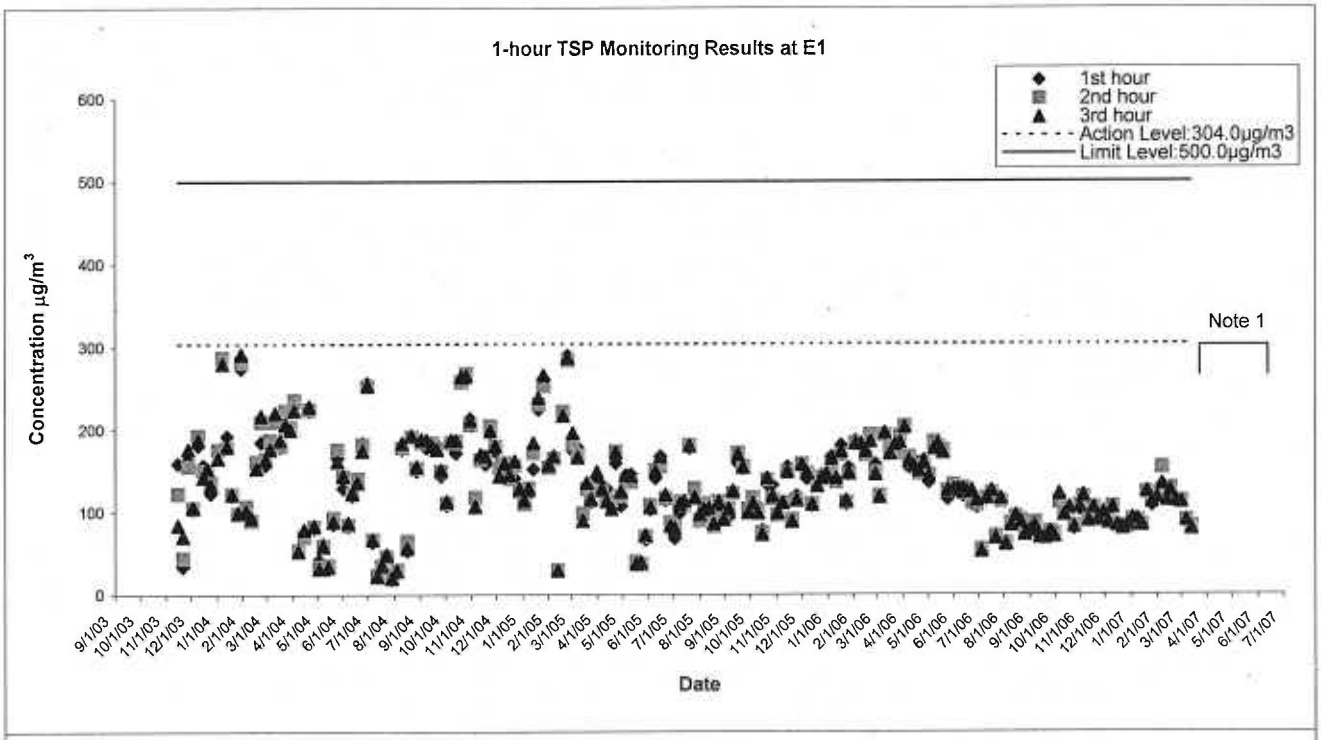
### Action and Limit Levels ($L_{eq}$) for Construction Noise

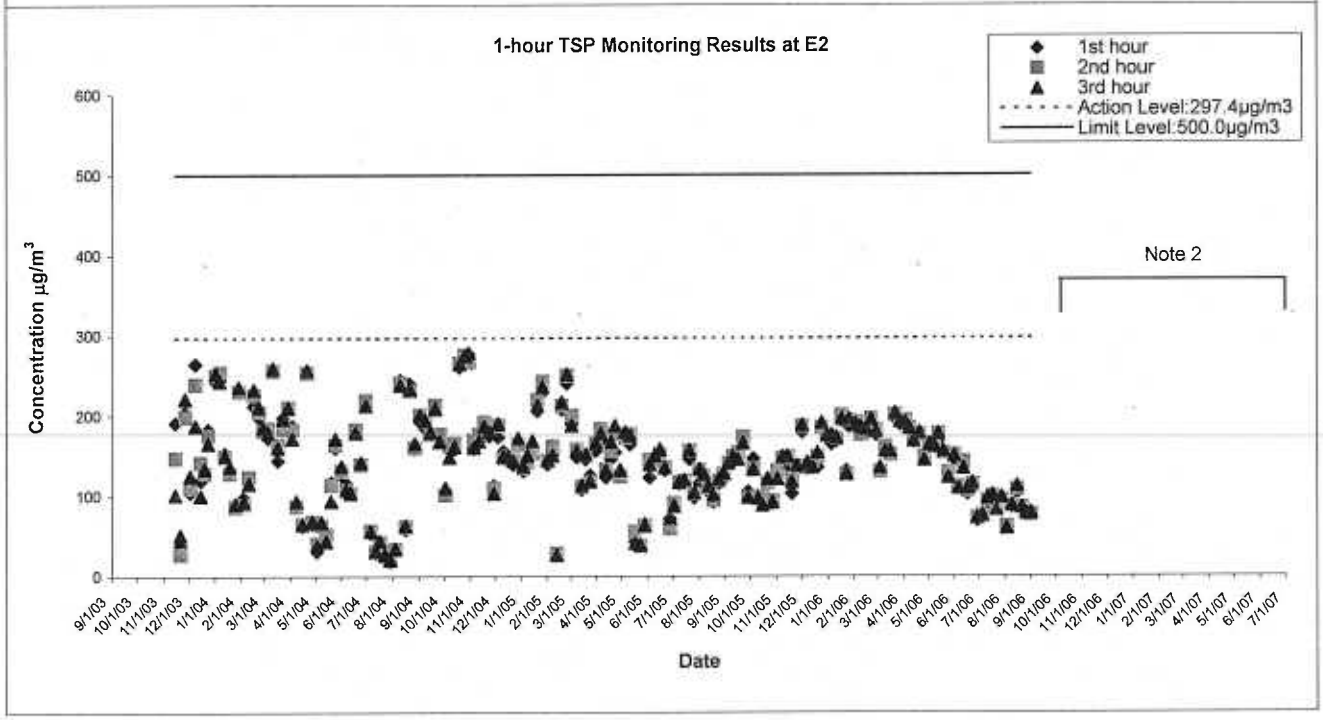
| Time Period | Action Level | Limit Level, dB(A) | | | | |
|---|---|---|---|---|---|---|
| | | N5 | AN6 | AN7# | E1 | E2 |
| 0700 – 1900 hours on normal weekdays | When one documented complaint is received from any one of the sensitive receivers | 75 | 75 | 70/65* | 75 | 75 |
| 0700 – 2300 hours on general holiday<br>1900 – 2300 hours on all other days | | 65 | 65 | - | 65 | 65 |
| 2300 – 0700 hours of next day | | 50 | 50 | - | 50 | 50 |

* Reduced to 65 dB(A) during examination periods

\# Not consider as a sensitive receiver during restricted hours.

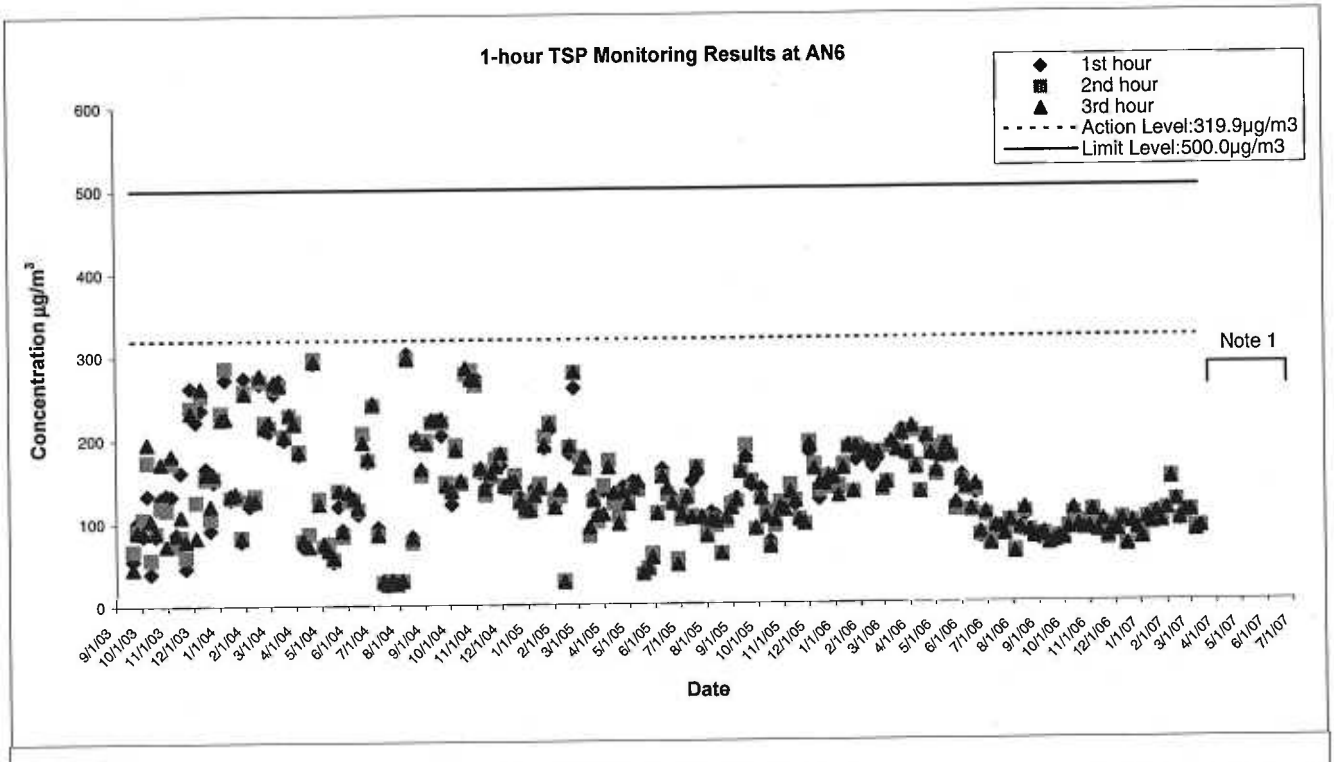
# APPENDIX D
# GRAPHICAL PRESENTATION OF AIR QUALITY MONITORING RESULTS

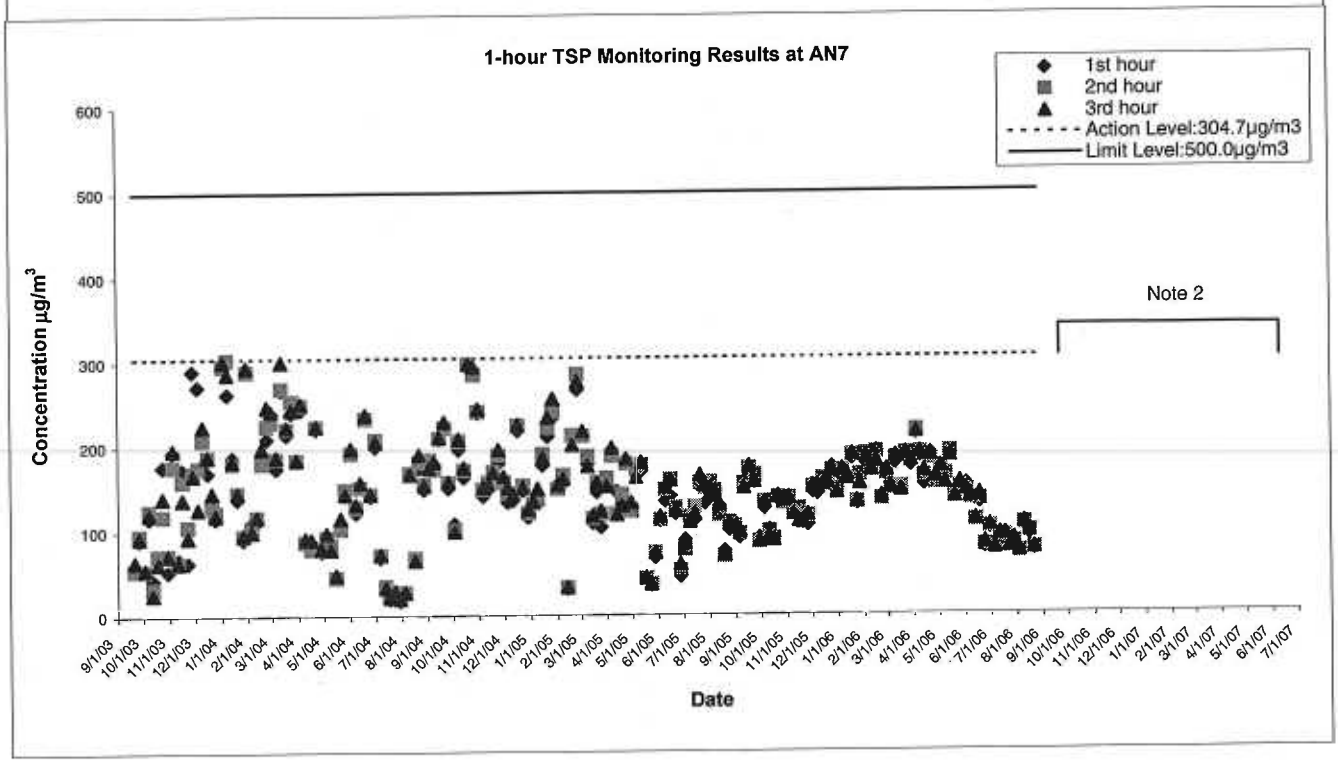



Note 1: Air quality monitoring was terminated at E1 on 13 Mar 07.
Note 2: Air quality monitoring was terminated at E2 on 5 Sep 06.

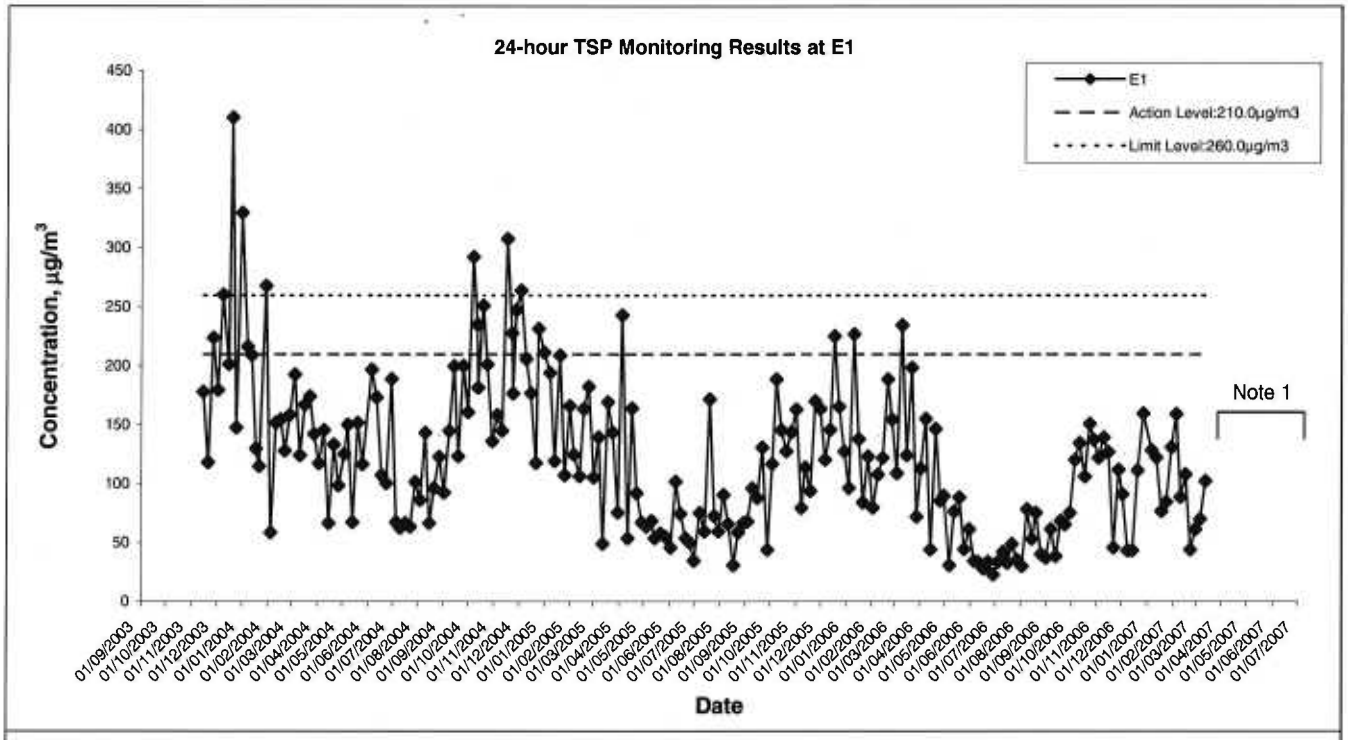
| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of 1-hour TSP Monitoring Results for Locations E1 and E2** | JOB NO. | 60016783 | **APPENDIX No.** D | **Rev.** - |

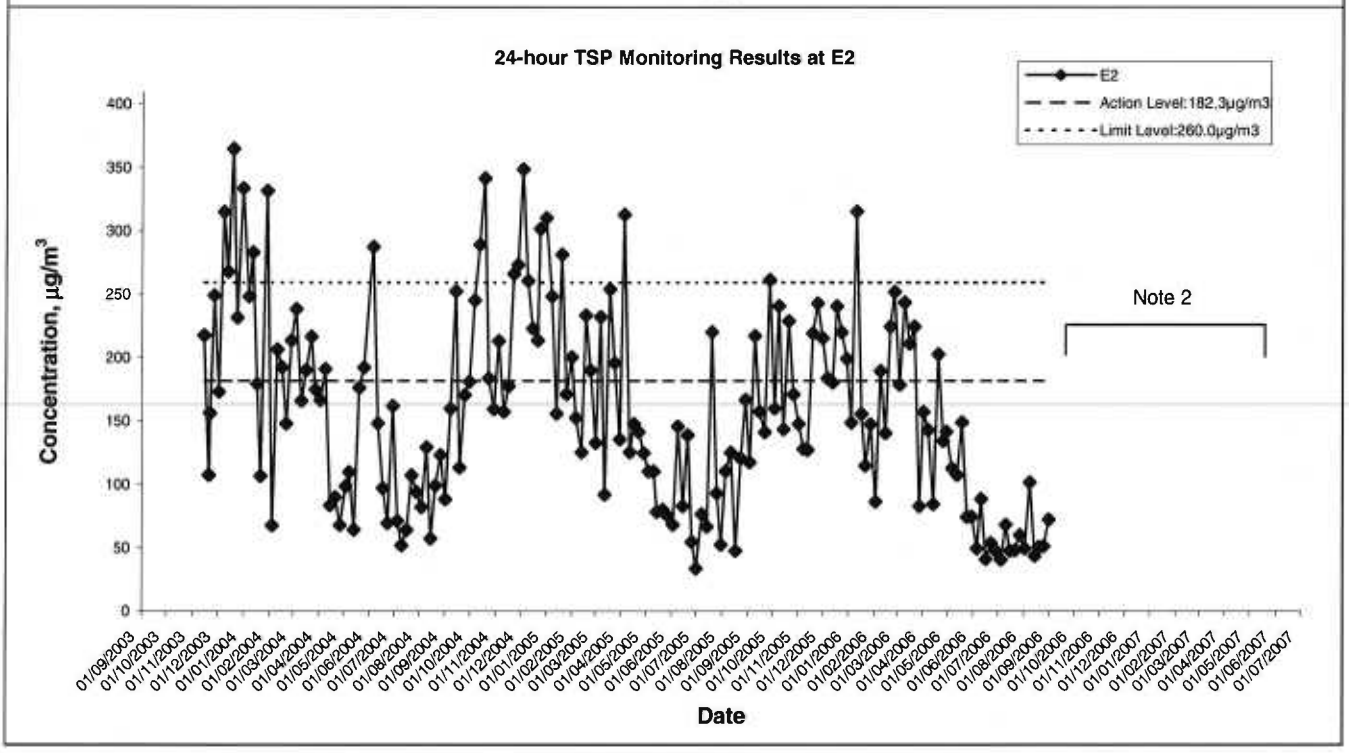



Note 1: Air quality monitoring was terminated at AN6 on 13 Mar 07.
Note 2: Air quality monitoring was terminated at AN7 on 5 Sep 06.

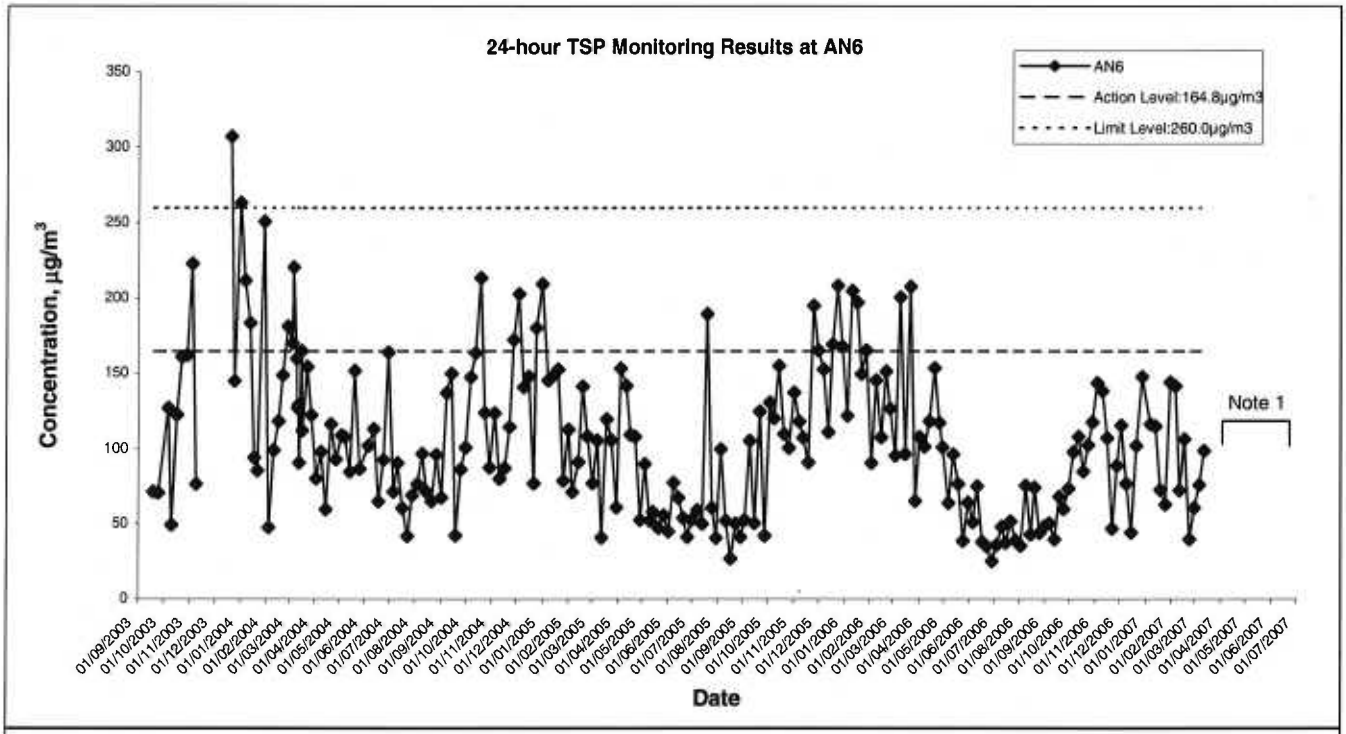
| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23<br>Deep Bay Link-Southern Section<br>**Graphical Presentation of 1-hour TSP Monitoring Results for Locations AN6 and AN7** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016783 | APPENDIX No. D | Rev. - |

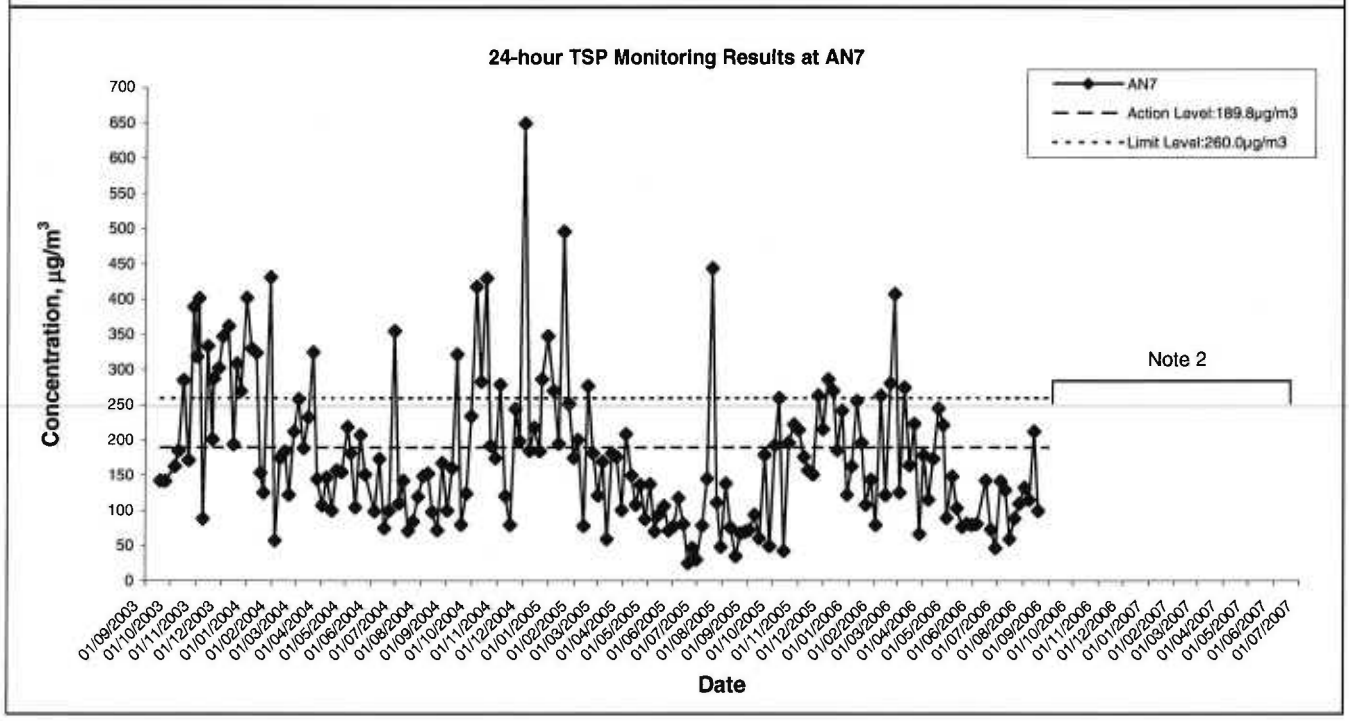



Note 1: Air quality monitoring was terminated at E1 on 13 Mar 07.
Note 2: Air quality monitoring was terminated at E2 on 5 Sep 06.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of 24-hour TSP Monitoring Results for Locations E1 and E2** | JOB NO. | 60016783 | **APPENDIX No.** D | **Rev.** - |

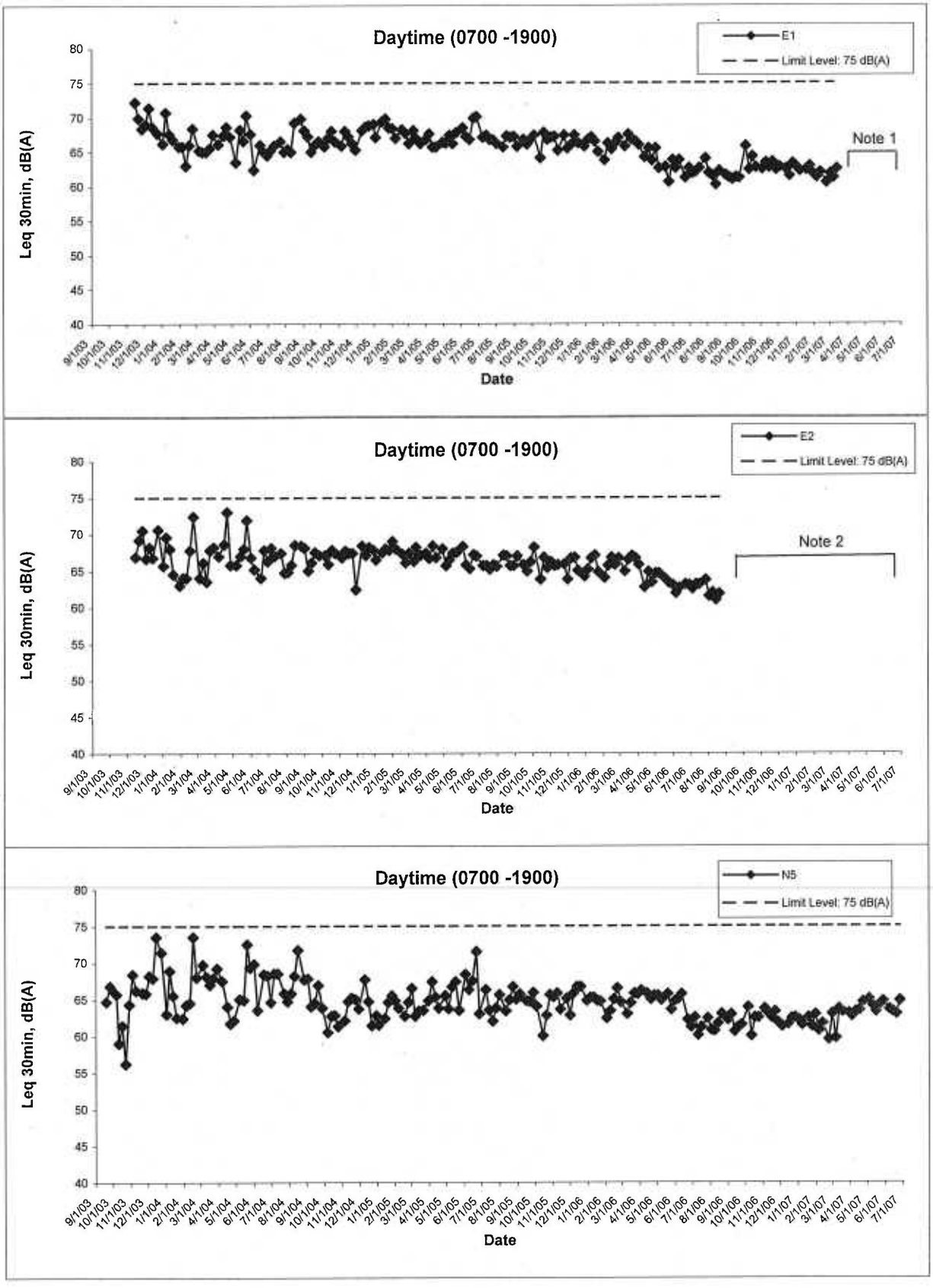



Note 1: Air quality monitoring was terminated at AN6 on 13 Mar 07.
Note 2: Air quality monitoring was terminated at AN7 on 5 Sep 06.

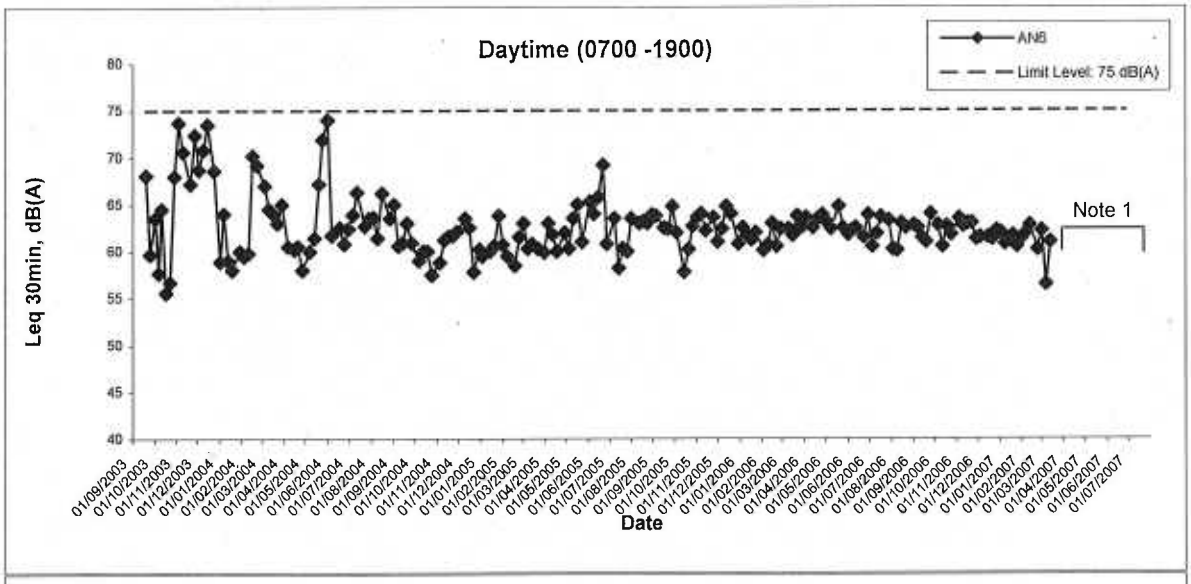
| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of 24-hour TSP Monitoring Results for Locations AN6 and AN7** | JOB NO. | 60016783 | **APPENDIX No.** D | **Rev.** - |

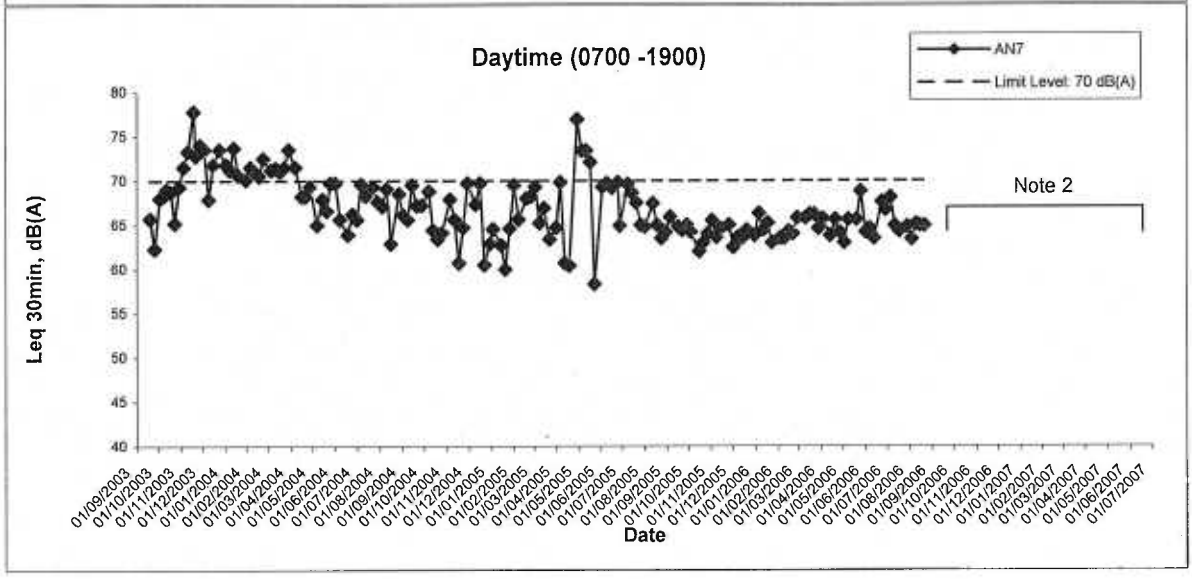
# APPENDIX E
# GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS




Note 1: Noise monitoring was terminated at E1 on 13 Mar 07.
Note 2: Noise monitoring was terminated at E2 on 5 Sep 06.

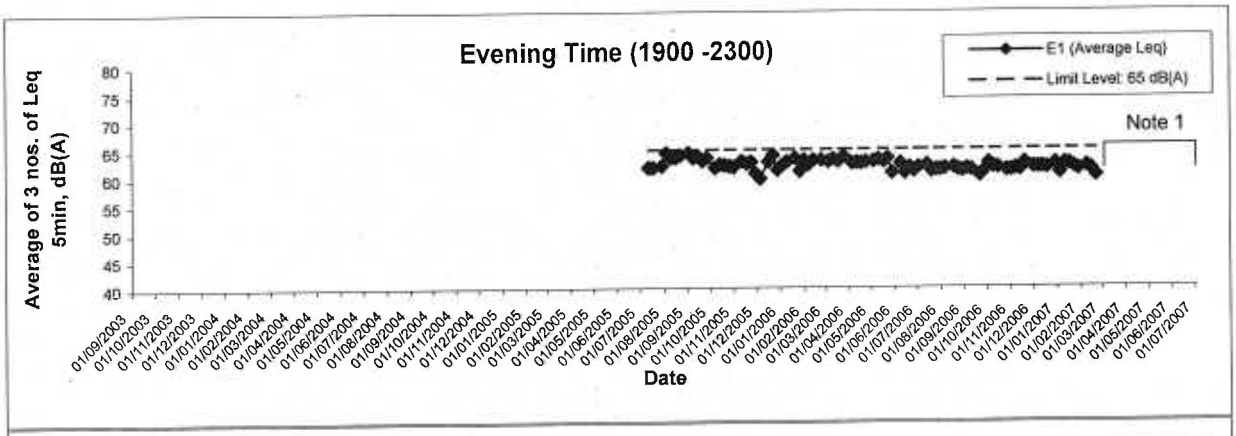
| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of Noise Monitoring Results** | JOB NO. | 60016783 | APPENDIX No. E | Rev. - |

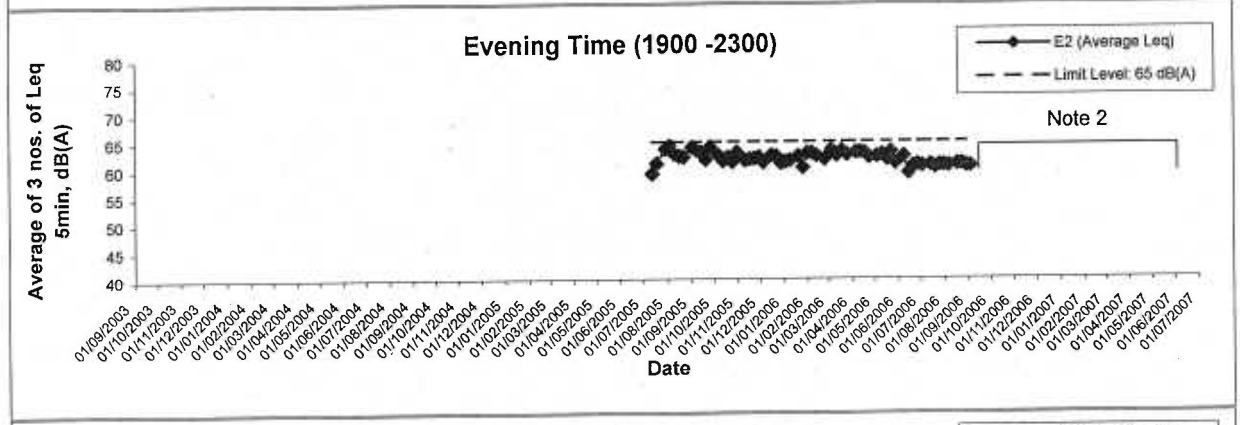


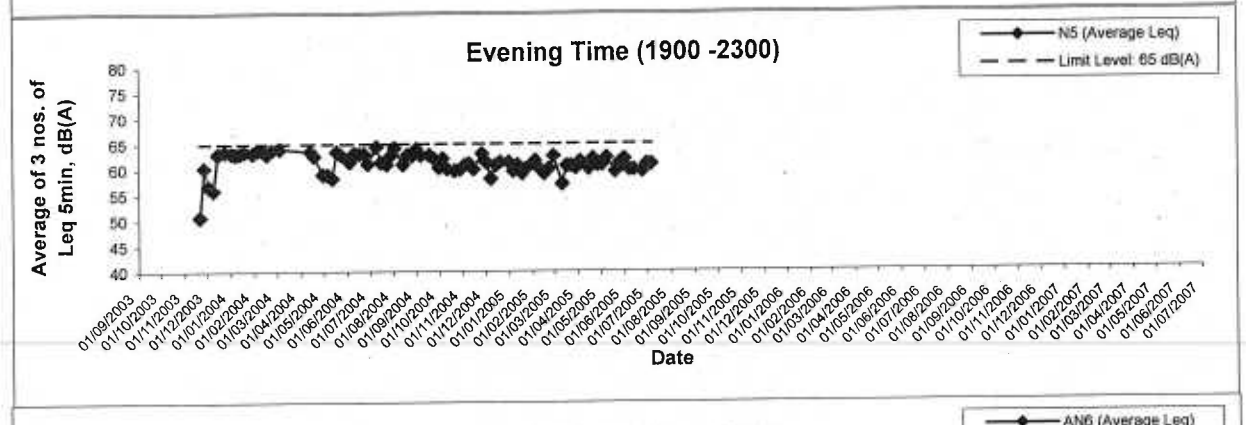



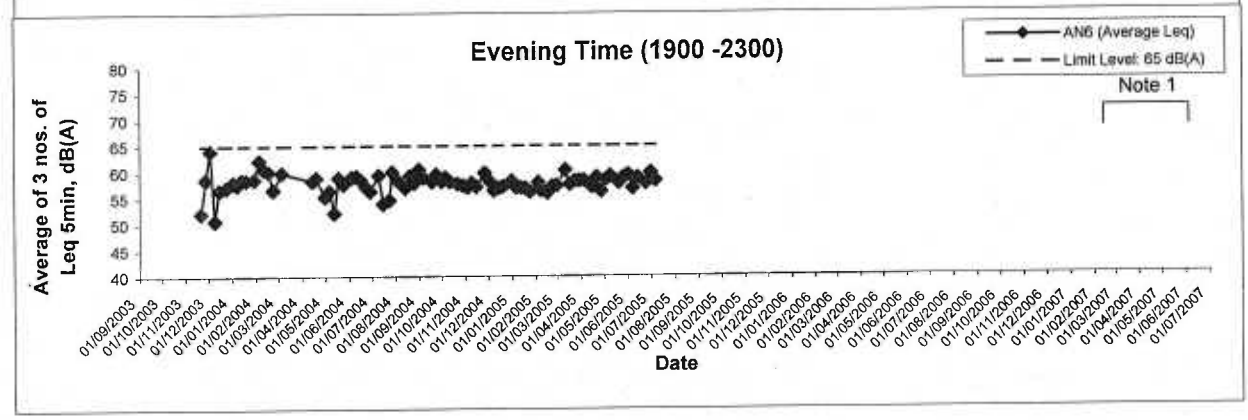

Note 1: Noise monitoring was terminated at AN6 on 13 Mar 07.
Note 2: Noise monitoring was terminated at AN7 on 5 Sep 06.
Note 3: Limit level was reduced to 65 dB(A) at AN7 during the school examination periods. Two Limit Level exceedances were recorded on 30 Jun 04 and 28 Jun 06 during the examination periods .

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23<br>Deep Bay Link-Southern Section<br>**Graphical Presentation of Noise Monitoring Results** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016783 | APPENDIX No. E | Rev. - |



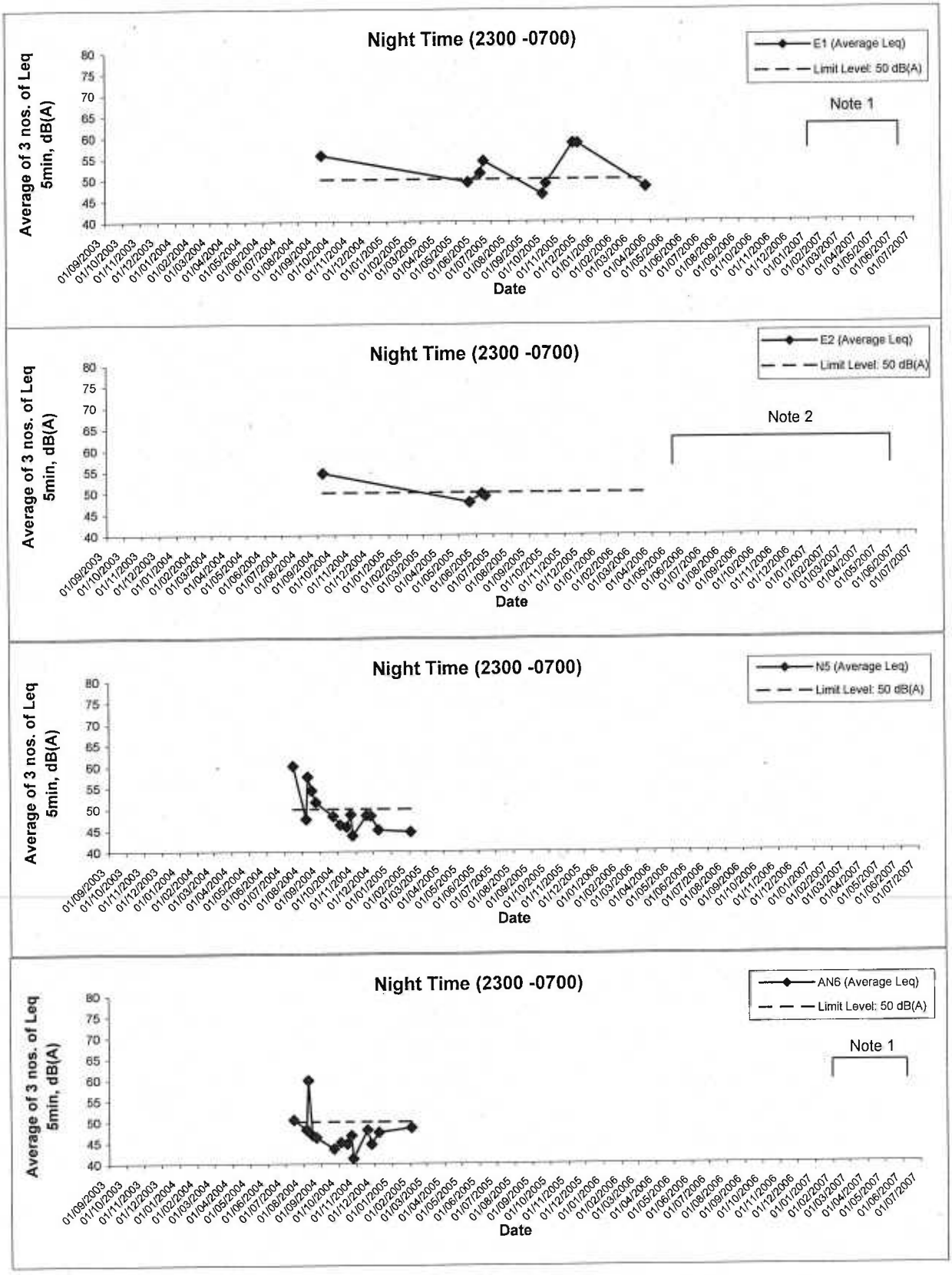



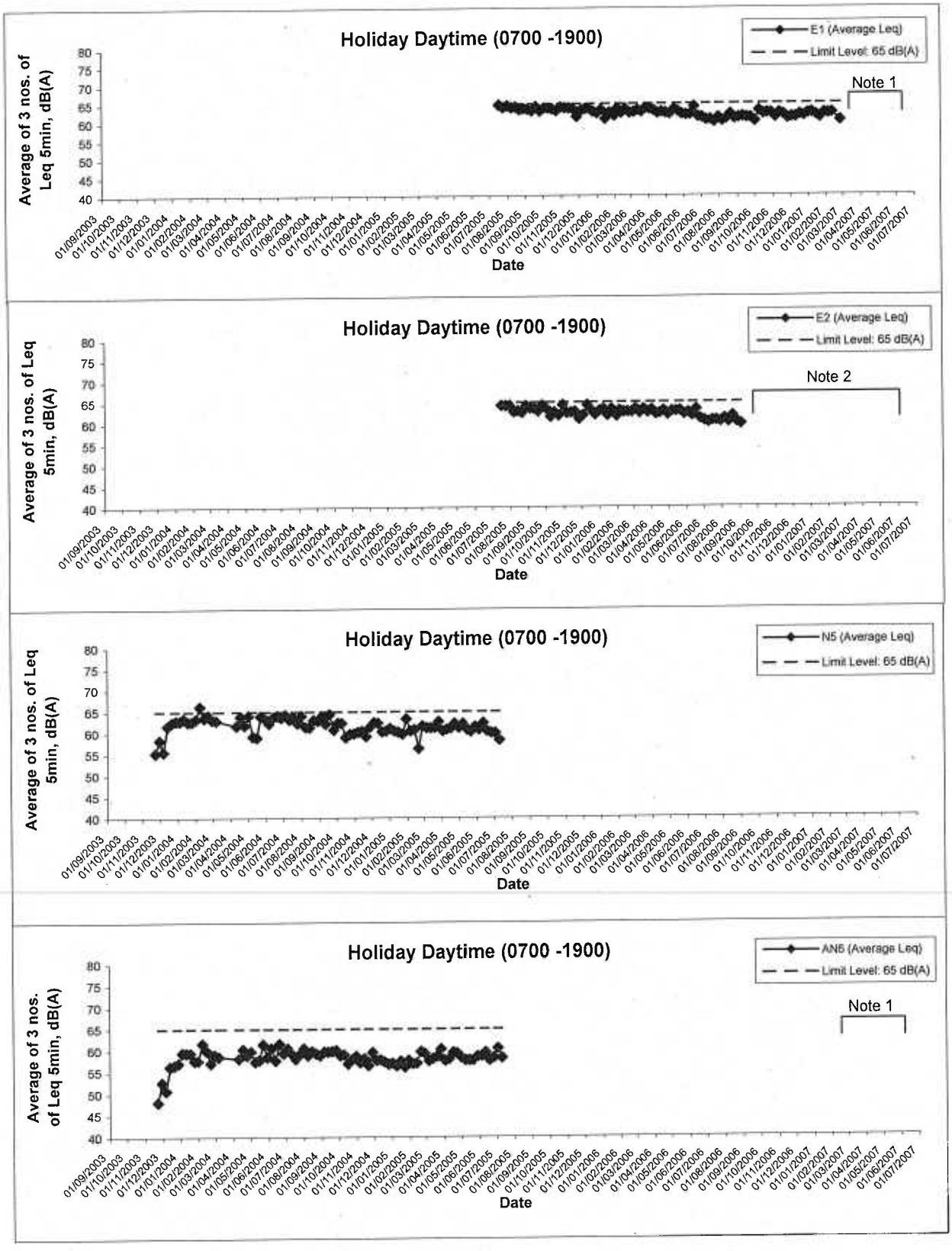

Note 1: Noise monitoring was terminated at E1 and AN6 on 13 Mar 07.
Note 2: Noise monitoring was terminated at E2 on 5 Sep 06.
Note 3: Evening time noise monitoring was carried out only when there was evening time construction work undertaken during the period from 1900-2300.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of Noise Monitoring Results** | JOB NO. | 60016783 | APPENDIX No. E | Rev. - |




Note 1: Noise monitoring was terminated at E1 and AN6 on 13 Mar 07.
Note 2: Noise monitoring was terminated at E2 on 5 Sep 06.
Note 3: Night time noise monitoring was carried out only when there was night time construction work undertaken during the period from 2300-0700 of next day.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of Noise Monitoring Results** | JOB NO. | 60016783 | APPENDIX No. E | Rev. - |




Note 1: Noise monitoring was teminated at E1 and AN6 on 13 Mar 07.
Note 2: Noise monitoring was terminated at E2 on 5 Sep 06.
Note 3: Holiday daytime noise monitoring was carried out only when there was holiday daytime construction work undertaken during the period from 0700-1900 on general holidays and Sunday.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No: HY/2002/23 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link-Southern Section | CHECK | PTPM | DRAWN | YSL |
| | **Graphical Presentation of Noise Monitoring Results** | JOB NO. | 60016783 | APPENDIX No. E | Rev. - |

# APPENDIX F
# SUMMARY OF IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

## Appendix F — Summary of Environmental Mitigation Implementation Schedule

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| Air Quality | | |
| Site clearance and demolition of existing structures | • The working area for the uprooting of trees, shrubs or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures shall be sprayed with water or a dust suppression chemical immediately | √ |
| | • All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures debris, rubbish and other items arising from site clearance) that may dislodge dust particles shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition | √ |
| Site boundary and entrance | • Vehicle washing facilities including a high pressure jet shall be provided at every vehicle exit point; | √ |
| | • The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous materials or hardcores; | √ |
| | • Where a site boundary adjoins a road, streets or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length except for a site entrance or exit; | N/A |
| Access road | • Every main haul road (i.e. any course inside a construction site having a vehicle passing rate higher than 4 in any 30 minutes) shall be sealed and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet; | √ |
| | • The portion of any road leading only to a construction site that is within 30m of discernible or designated vehicle entrance or exit shall be kept clear of dusty materials; | √ |
| Use of vehicle | • Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels; | √ |
| | • Where a vehicle leaving a 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; | √ |
| | • Vehicle speed within the worksite shall be limited to 10 kph, except for properly formed and maintained access roads; | √ |
| Concrete production | • The concrete batching plant shall be located away from any air sensitive receiver as far as practicable; | √ |
| | • If the total silo capacity of the concrete batching plant exceed 50 tonne, the project proponent is required to obtain a Specified Process licence to ensure that any potential dust emission would be properly controlled | N/A |
| | • Cement delivered in bulk shall be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line such that, in the event of the silo approaching an overfilling condition, an audible alarm is triggered and the material filling stops within one minute; | N/A |
| | • Silo used for the storage of cement shall not be overfilled; | N/A |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| | • The loading, unloading, transfer, handling or storage of any cement shall be carried out in a totally enclosed system or facility, and any vent or exhaust shall be fitted with an effective fabric filter or equivalent air pollution control system or equipment; | N/A |
| | • Cement collected by fabric filters or other pollution control system or equipment shall be disposed of in a totally enclosed containers; | N/A |
| Excavation and earth moving | • The working area of any excavation or earth moving operation shall be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; | √ |
| | • Exposed earth shall be properly treated by compaction, turfing Hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies; | √ |
| Stockpiling of dusty materials | • If a stockpile of dusty materials is more than 1.2 m high and lies within 50 m from any site boundary that adjoins a road, street, or other area accessible to the public, it shall be properly treated and sealed with latex, vinyl, bitumen or other suitable surface stabilizer; | √ |
| | • All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; | √ |
| Noise | | |
| Good site practice | • The Contractor should site noisy equipment and activities as far from sensitive receivers as practical. Also, temporary site offices (and other similar structures) should be located, as far as is possible, such that sensitive receivers are screened by these structures form the line of sight of the construction areas | √ |
| | • Intermittent noisy activities should be scheduled to minimise exposure of nearby NSRs to high levels of construction noise. For example, noisy activities could be scheduled at times coinciding with periods when the schools are likely to be unoccupied. Prolonged operation of noisy equipment close to the schools should be avoided | √ |
| | • Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary | √ |
| | • Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided | √ |
| | • Where possible, the numbers of concurrently operating items of plant should be reduced through sensitive programming | √ |
| | • Construction plant should be properly maintained and operated. Construction equipment often has silencing measures built in or added on, e.g. compressor panels, and mufflers. Silencing measures should be properly maintained and utilized | √ |
| Water Quality | | |
| Local Stream Courses, Pipeworks and drains | • Local stream courses should be realigned or diverted in the sections where the proposed road alignment intersects with the local stream courses to ensure that there would be no discontinuity of flows downstream from the construction sites | √ |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| | • Box culverts and diversion channels should be constructed to divert the stream flows downstream | √ |
| | • Supporting columns and piers for the elevated sections of the DBL should be located away from existing stream courses as far as possible | √ |
| | • The design of diverted sections of the stream courses should minimise loss of flow section and avoid generating unstable flow conditions | √ |
| | • The construction period for re-alignment or diversion of stream courses should be shortened as far as possible through a better coordination with the other DBL construction activities | √ |
| | • A construction site drainage layout and management plan should be developed by the Contractor to detail the procedures for control of construction site runoff. The plan should be submitted to the ET prior to the commencement of the DBL construction works to ensure a better site management and control of surface runoff on site | √ |
| | • The existing pipes, which would be affected by the DBL project due to the increased runoff from DBL, should be upsized to increase the pipe capacity | √ |
| | • A discharge license from EPD for discharge of effluent should be obtained | √ |
| Excavation and Filling | • In areas where extensive excavation and filling are carried out, temporary earth bunds should be built. Sand bags may be sued to confine the runoff or wastewater generated from the construction activities | √ |
| | • Excavation works should be minimised in rainy season | √ |
| | • Open stockpiles of construction materials and dusty materials should be covered with tarpaulin during rainstorms. These materials should not be placed near the stream courses. This avoids the release of materials into the stream water | √ |
| | • The carrying our of trench and hole digging should be in short sections. Trenches and holes should be immediately back-filled after the completion of a section of works to minimise the inflow of rainwater during rainstorms | √ |
| | • To prevent runoff from washing across exposed soil surface, intercepting channels should be provided. It is recommended to pave haul roads with concrete and protect temporary access roads using crushed stone or gravel. The exposed slope surfaces should be line or hydroseeded. | √ |
| Construction of Foundation and Road Sections | • The waste water generated from bored pile foundation construction and related activities should be collected and recycled | √ |
| | • Bentonite slurries used in bore-piling works or diaphragm wall construction should be reconditioned and reused whenever practicable | √ |
| | • Adequate surface channels should be constructed along the site boundaries to avoid release of surface and storm runoffs out of the sites | √ |
| | • The channel system to collect the runoffs in the construction sites should be well designed prior to the commencement of the site formation works | √ |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| | • Provisions of drains at the lowest points of the sites could effectively collect the runoff. Site and sand traps, which remove large soil particles in the runoffs, should be provided in the channels. Regular maintenance and cleaning of the channels would ensure that the channel system is in good condition and is not obstructed by sediments | √ |
| | • Wastewater generated from the vehicle wheel washing facilities should be recycled wherever practicable. Excess wastewater should be transferred to suitable treatment systems for removal of suspended solids. | √ |
| | • Wastewater generated from washing of concrete lorry mixers should be pre-treated by discharging into a sedimentation pit, which provides a quiescent environment for the concrete particles to settle and consolidate. The upper later water in the sedimentation pit with low concentration of concrete particles should be further treated to the standards acceptable for final discharge. The concrete wastes deposited on the bottom of the pit should be removed regularly. | √ |
| | • Covers should be provided to the newly constructed manholes to prevent any kinds of wastewater from entering into the drainage systems during the construction phase. | √ |
| | • Pipes connected to the manholes should be temporarily sealed to avoid debris and construction materials get into the drainage systems | √ |
| | • A wastewater treatment system comprising of chemical coagulation, sedimentation and pH control processes should be used to treat the site runoffs and the wastewater generated from various construction activities | √ |
| | • Chemical toilets should be provided on site for collection and temporary storage of sewage. Alternatively, sewage storage tank should be provided . The collected sewage should be tinkered away by a licensed waste collector for off-site disposal. | √ |
| *Chemical Waste* | *Storage and Handling of Oil, Other Petroleum Products and Chemicals*<br>• All fuel tanks and chemical storage areas shall be provided with locks and be sited on sealed areas. The 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. The Contractors shall prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals. | √ |
| *Waste* | Details are provided in the Waste Management Plan. | |
| *Landscape and Visual* | ▪ Temporary hydroseeding to reclamation if lapse time between completion of the reclamation and subsequent development is one year or more. | N/A |

Note:

| | |
|---|---|
| √ | Compliance of mitigation measure |
| × | Non-compliance of mitigation measures |
| N/A | Not applicable |

# APPENDIX G
# STATUS OF ENVIRONMENTAL LICENSES AND PERMITS

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| **Environmental Permit** | | | |
| EP-163/2000 | 02 Apr 03 | 20 May 04 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a duel 2-lane to a dual 3-lane. |
| EP-163/2003/A | 21 May 04 | 31 Aug 04 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/B | 1 Sep 04 | 7 Dec 04 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/C | 8 Dec 04 | 10 May 05 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/D | 11 May 05 | 8 Sep 05 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/E | 9 Sep 05 | 1 Mar 06 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/F | 2 Mar 06 | 26 Oct 06 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/G | 27 Oct 06 | N/A | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| **Construction Noise Permit** | | | |
| PP-TW0044-03 | 01 Sep 03 | 28 Feb 04 | • Hydraulic hammer (double acting) x2, driving steel pile and drop hammer driving steel pile x1;<br>• Time: 1200-1330 and 1630-1800 on any day not being a general holiday. |
| PP-TW0052-03 | 20 Oct 03 | 19 Jul 04 | • Hydraulic hammer (double acting) x2, driving steel pile and drop hammer driving steel pile x1;<br>• Time: 0800-1000 and 1230-1330 and 1630-1830 on any day not being a general holiday. |
| PP-TW0053-03 | 22 Oct 03 | 21 Jul 04 | • Hydraulic hammer (double acting) driving steel pile x2; and drop hammer driving steel pile x1;<br>• Time: 0800–0900, 1230–1330 and 1630–1730 on any day not being a general holiday. |
| PP-TW0054-03 | 3 Nov 03 | 2 May 04 | • Hydraulic hammer (double acting) driving steel pile x2; and drop hammer driving steel pile x1;<br>• Time: 0800–0900, 1230–1330 and 1630–1730 on any day not being a general holiday. |
| PP-TW0055-03 | 20 Oct 03 | 19 Jul 04 | • Hydraulic hammer (double acting) driving steel pile x2; and drop hammer driving steel pile x1;<br>• Time: 0800–0900 and 1630–1830 on any day not being |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | a general holiday. |
| GW-TW0364-03 | 3 Nov 03 | 3 Mar 04 | • Air compressor (with a SWL of ≦104dB(A)) x1, piling x1, large diameter bored, reverse circulation drill;<br>• Time: 0700-2300, general holiday including Sundays; 1900-2300 any day not being a genera holiday. |
| GW-TW0445-03 | 27 Dec 03 | 10 Jan 04 | • Concrete lorry mixer x1, crane x1, mobile (diesel), generator x2, silences, ≦75dB(A) at 7m, water pump x 2 , submersible (electric);<br>• Only two nights withn the validity period between 1900-2300 hours on any day not being a general holiday. |
| GW-TW0074-04 | 18 Mar 04 | 17 Sep 04 | • Air compressor (with a SWL of ≦104dB(A)) x1, piling x1, large diameter bored, reverse circulation drill;<br>• Time: 0700-2300, general holiday including Sundays; 1900-2300 any day not being a genera holiday. |
| GW-TW0094-04 | 6 Apr 04 | 30 Sep 04 | • Air compressor (with a SWL of ≦104dB(A)) x1, piling x1, large diameter bored, reverse circulation drill, power pack; generator X 1;<br>• Time: 0700-2300, general holiday including Sundays; 1900-2300 any day not being a genera holiday. |
| GW-TW0095-04 | 6 Apr 04 | 30 Sep 04 | • Air compressor (with a SWL of ≦104dB(A)) x1, piling x1, large diameter bored, reverse circulation drill, power pack, generator x 1;<br>• Time: 0700-2300, general holiday including Sundays; 1900-2300 any day not being a genera holiday. |
| GW-TW0110-04 | 14 Apr 04 | 30 Apr 04 | • Dump truck x1, excavator x1, roller x1, vibratory, power rammer x1, compactor x1;<br>• Time: 0700-2300 general holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-TW0137-04 | 12 May 04 | 21 Oct 04 | • Air compressor (with a SWL of ≦102dB(A), generator x1, silences, ≦75dB(A) at 7m, piling x1, large diameter bored, reverse circulation drill, crane x 1(diesel);<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-TW0157-04 | 17 Jun 04 | 27 Aug 04 | • Articulated vehicle x2;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-TW0174-04 | 17 Jun 04 | 27 Aug 04 | • Articulated vehicle x2;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-TW0176-04 | 12 Jun 04 | 11 Dec 04 | • Bending Yard 1 (H1-2 &3): Bar bender and cutter x5;<br>• Bending Yard 2 (FHT): Bar bender and cutter x5;<br>• Time: 0700-2300 general holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-TW0177-04 | 17 Jun 04 | 16 Oct 04 | • Bar bender and cutter (electric) x1, generator x1, silenced, ≦75dB(A) at 7m, Saw (electric) x1, lorry x1, with crane, 5.5 tonne < gross vehicle weight ≦38 tonne, crane x1, mobile (diesel)<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-TW0194-04 | 28 Jun 04 | 31 Oct 04 | • Crane x1, mobile (diesel), generator x1, silenced, ≦75dB(A) at 7m;<br>• Time: 4 days only within the validifity period between 1900-2300. |
| GW-TW0206-04 | 10 Jul 04 | 27 Aug 04 | • Articulated vehicle x2;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-TW0207-04 | 10 Jul 04 | 27 Aug 04 | • Articulated vehicle x2;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-RW0369-04 | 11 Aug 04 | 11 Nov 04 | • Crane x1, mobile (diesel), generator x1, silenced, ≦75dB(A) at 7m, concrete lorry mixer x1, air compressor |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | x1 (with a SWL of ≦102dB(A)), piling x1, large diameter bored, reverse circulation drill, water pump x1, submersible (electric)<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0402-04 | 30 Aug 04 | 12 Sep 04 | • Crane x1, mobile (diesel);<br>• Time: 2 days only within the validity period between 0000-0600. |
| GW-RW0403-04 | 27 Aug 04 | 26 Feb 05 | • Excavator x1, tracker, road roller x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday |
| GW-RW0415-04 | 31 Aug 04 | 16 Sep 04 | • Articulated vehicle x3;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-RW-0447-04 | 16 Sep 04 | 15 Nov 04 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0448-04 | 16 Sep 04 | 15 Nov 04 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0455-04 | 20 Sep 04 | 11 Nov 04 | • Tractor x3, trailer x4;<br>• Time: Any day in the validity period between 0000-0600 hours on next day. |
| GW-RW-0456-04 | 20 Sep 04 | 11 Nov 04 | • Tractor x3, trailer x4;<br>• Time: Any day in the validity period between 0000-0600 hours on next day. |
| GW-RW-0498-04 | 20 Sep 04 | 11 Nov 04 | • Articulated vehicle x4;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-RW-0499-04 | 20 Sep 04 | 11 Nov 04 | • Articulated vehicle x4;<br>• Time: any day in the validity period between 2300-0700 hours on next day. |
| GW-RW-0535-04 | 19 Oct 04 | 18 Jan 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0547-04 | 23 Oct 04 | 22 Jan 05 | • Air compressor x1, RCD x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0571-04 | 28 Oct 04 | 30 Nov 04 | • Lorry with crane x2 (road division);<br>• Time: 2 night time only within the validity period between 2100-0700. |
| GW-RW-0595-04 | 2 Nov 04 | 1 Dec 04 | • Generator x2, silenced, ≦75dB(A) at 7m, crane x1(diesel), concrete lorry mixer x1, pump x1;<br>• Time: any one day not being a general holiday within the validity period between 1900-2300. |
| GW-RW-0605-04 | 12 Nov 04 | 16 Dec 04 | • Articulated vehicle x5;<br>• Time: Any day in the validity period between 2300-0700 hours on next day. |
| GW-RW-0606-04 | 12 Nov 04 | 16 Dec 04 | • Articulated vehicle x5;<br>• Time: Any day in the validity period between 2300-0700 hours on next day. |
| GW-RW-0620-04 | 6 Nov 04 | 31 Dec 04 | • Crane, mobile (diesel) x1, generator x1, silenced, ≦75dB(A) at 7m;<br>• Time: two days only within the validity period between 1900-2300 hours. |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| GW-RW-0635-04 | 16 Nov 04 | 28 Feb 05 | • Air compressor x1, with noise emission label showing a sound power level ≦102dB(A), crane, mobile (diesel) x1, generator x1, silenced, ≦75dB(A) at 7m, concrete lorry mixer x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0654-04 | 18 Nov 04 | 17 Feb 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including sundays; 1900-2300 day not being a general holiday. |
| GW-RW-0689-04 | 26 Nov 04 | 25 Feb 05 | • Air compressor x1, generator x1, RCD x1, power pack x1, pump x1;<br>• Time: 0700-2300 General holiday including sundays; 1900-2300 day not being a general holiday. |
| GW-RW-0709-04 | 25 Nov 04 | 28 Nov 04 | • Lorry with crane x2 (road division);<br>• Time: 2 night time only within the validity period between 2000-0600 |
| GW-RW-0728-04 | 1 Dec 04 | 19 Dec 04 | • Lorry with crane x2 (road division);<br>• Time: 2 night time only within the validity period between 2200-0600. |
| GW-RW0737-04 | 17 Dec 04 | 25 Apr 05 | • Articulated vehicle x5;<br>• Time: Any day in the validity period between 2300-0700 hours on next day |
| GW-RW-0760-04 | 22 Dec 04 | 15 Jan 05 | • Lorry with crane x2 (road division);<br>• Time: 4 night time only within the validity period between 2200-0600 |
| GW-RW-0761-04 | 22 Dec 04 | 21 Mar 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, strand pusher x1, permanent stress pump x1, temporary stress pump x 1;<br>• Time: 0700-2300 General holiday including sundays; 1900-2300 day not being a general holiday. |
| GW-RW-0811-04 | 11 Jan 05 | 31 Jan 05 | • Hand-held electric breaker x1, mass ≦10kg, generator, portable x1;<br>• Time: 3 days only within the validity period between 2000-2300 |
| GW-RW-0812-04 | 10 Jan 05 | 31 Jan 05 | • Hand-held electric breaker x1, mass ≦10kg, generator, portable x1, lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 3 days only within the validity period between 2000-2300 but not being a general holiday. |
| GW-RW-0815-04 | 13 Jan 05 | 12 Feb 05 | • Air compressor x1, with noise emission lable showing a sound power level ≦100dB(A), crane, mobile (diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced, ≦75dB(A) at 7m, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: 1900-2300 any day not being a general holiday. |
| GW-RW-0019-05 | 17 Jan 05 | 16 Jul 05 | • Crane x1, mobile (diesel), saw x1, circular wood, lorry with crane x1, 5.5 tonne < gross vehicle weight ≦ 38 tonne;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0020-05 | 17 Jan 05 | 28 Feb 05 | • Lorry with crane x2, 5.5 tonne <gross vehicle weight ≦38 tonne;<br>• Time: 3 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW-0024-05 | 17 Jan 05 | 16 Apr 05 | • Lorry with crane x1, 5.5 tonne < gross vehicle weight ≦ 38 tonne;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0038-05 | 17 Jan 05 | 16 Apr 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW-0039-05 | 14 Jan 05 | 28 Feb 05 | • Road miller x1, dump truck x1, gross vehicle weight ≦38 tonne, road sweeper x1, asphalt paver x1, roller x1, vibratory;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW-0040-05 | 17 Jan 05 | 5 Feb 05 | • Lorry with crane x1, 5.5 tonne < gross vehicle weight ≦ 38 tonne<br>• Time: 4 days only within the validity period between 1900-2300. |
| GW-RW0068-05 | 14 Feb 05 | 14 Mar 05 | • Hand-held breaker (hydraulic) x2, hydraulic power pack, ≦86dB(A) at 7m x2;<br>• Time: 0900-1900 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0071-05 | 3 Feb 05 | 28 Feb 05 | • Lorry with crane x3, 5.5 tonne < gross vehicle weight ≦ 38 tonne;<br>• Time: 4 days only within the validity period between 2000-0600 but not being a general holiday. |
| GW-RW0077-05 | 16 Feb 05 | 14 May 05 | • Road miller x1, dump truck x1, road sweeper x1, asphalt paver x1, roller x1 (vibratory), road roller x1, lorry with crane x2, 5.5 tonne < gross vehicle≦38 tonne<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0078-05 | 16 Feb 05 | 19 Feb 05 | • Crane, mobile (diesel) x2, generator x2, silenced, ≦ 75dB(A) at 7m, lorry with crane x2, 5.5 tonne <gross vehicle ≦38 tonne;<br>• Time: any day not being a general holiday between 0000-0600 hrs. |
| GW-RW0087-05 | 16 Feb 05 | 15 Aug 05 | • Crane, tower (electric) x1, generator, silenced, ≦75dB(A) at 7m x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0091-05 | 23 Feb 05 | 26 Feb 05 | • Crane, mobile (diesel) x2, generator x2, silenced, ≦ 75dB(A) at 7m, lorry with crane x2, 5.5 tonne < gross vehicle ≦38 tonne;<br>• Time: any day not being a general holiday between 0000-0600 hours. |
| GW-RW0097-05 | 16 Feb 05 | 28 Feb 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle ≦38 tonne;<br>• Time: any day only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0115-05 | 1 Mar 05 | 15 Mar 05 | • Crane, mobile (diesel) x1;<br>• Time: 3 days only within the validity period, 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0144-05 | 16 Mar 05 | 30 Apr 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 3 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0157-05 | 22 Mar 05 | 10 Apr 05 | • Crane, mobile (diesel) x1;<br>• Time: 14 days only within the validity period, 0700-2300 general holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0167-05 | 23 Mar 05 | 11 Apr 05 | • Lorry with crane x1, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 3 nights only within the validity period between 1900-2300. |
| GW-RW0177-05 | 25 Mar 05 | 31 Mar 05 | • Generator, silenced, ≦75dB(A) at 7m x2, crane, mobile(diesel) x2, lorry with crane x2, 5.5 tonne < gross |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 0100-0530. |
| GW-RW0178-05 | 25 Mar 05 | 24 Jun 05 | • Crane, mobile (diesel) x1, saw, circular, wood x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0179-05 | 25 Mar 05 | 24 May 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile (diesel) x1, lorry mounted, generator x1, silence, ≦70dB(A) at 7m, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: any day within the validity period between 1900-2300. |
| GW-RW0184-05 | 25 Mar 05 | 24 Apr 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile (diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced ≦70 dB(A) at 7m, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: any day within the validity period between 1900-2300. |
| GW-RW0185-05 | 30 Mar 05 | 29 Sep 05 | • Crane, tower (electric) x1, generator, silenced, ≦75dB(A) at 7m x1;<br>• Time: any day within the validity period between 1900-2300. |
| GW-RW0196-05 | 2 Apr 05 | 31 May 05 | • Crane x 1, air compressor x1;<br>• Time: 12 days only within the validity period between 1900-2300. |
| GW-RW0197-05 | 2 Apr 05 | 31 May 05 | • Crane x 1, air compressor x1;<br>• Time: 12 days only within the validity period between 1900-2300. |
| GW-RW0201-05 | 4 Apr 05 | 30 Apr 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0209-05 | 7 Apr 05 | 6 Jul 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3, epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0221-05 | 12 Apr 05 | 30 Jun 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0241-05 | 19 Apr 05 | 11 Jul 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0246-05 | 17 Apr 05 | 24 Apr 05 | • Crane, mobile (diesel) x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0253-05 | 26 Apr 05 | 16 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38tonne;<br>• Time: 0700-2300 general holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0254-05 | 24 Apr 05 | 8 May 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 0700-2100 general holiday including Sundays. |
| GW-RW0272-05 | 30 Apr 05 | 30 Jun 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile(diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, concrete lorry mixer x1, poker x1, |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | vibratory, hand-held(electric);<br>• Time: Any day within the validity period between 1900-2300. |
| GW-RW0297-05 | 7 May 05 | 30 Jun 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RN8027-05 | 10 May 05 | 13 Jun 05 | • Breaker, excavator mounted (pneumatic) x1, excavator, tracked x1, lorry, with crane, 5.5 tonne < gross vehicle weight ≦38 tonne x1, compactor, vibratory (petrol) x1;<br>• Time: any day being a general holiday within the validity period between 0700-1600 hours. |
| GW-RW0314-05 | 18 May 05 | 31 Jul 05 | • Generator x1, lifting winch x1, transverse winch x1, hydraulic pump x3 , epoxy mixer x1, temp stress pump x1, strand pusher x1, permanent stress pump x1;<br>• Time: 0700-2300 General holiday including Sundays; 1900-2300 any day not being a general holiday. |
| GW-RW0323-05 | 19 May 05 | 31 May 05 | • Lorry with crane x1, 5.5 tonne < gross vehicle weight ≦38 tonne, crane, mobile (diesel) x1;<br>• Time: 4 days only within the validity period in any day not being a general holiday between 0100-0500. |
| GW-RW0335-05 | 25 May 05 | 24 Jul 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile (diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: Any day within the validity period between 1900-2300. |
| GW-RW0356-05 | 6 Jun 05 | 31 Aug 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RW0367-05 | 6 Jun 05 | 31 Aug 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2200-0600 but not being a general holiday. |
| GW-RN8039-05 | 13 Jun 05 | 12 Jul 05 | • Crane x1, mobile (diesel);<br>• Time: 10 days only within the validity period between 1900-0700 but not being a general holiday. |
| GW-RW0383-05 | 20 Jun 05 | 30 Jul 05 | • Crane x1, mobile (diesel);<br>• Time: 14 days only within the validity period between 1900-0700 but not being a general holiday. |
| GW-RW0400-05 | 24 Jun 05 | 20 Sep 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne<br>• Time: 6 days only within the validity period between 2100-0600 but not being a general holiday. |
| GW-RW0417-05 | 2 Jul 05 | 30 Sep 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2000-2400 but not being a general holiday. |
| GW-RW0418-05 | 2 Jul 05 | 17 Sep 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile(diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: 8 days within the validity period between 1900-2300 but not being a general holiday. |
| GW-RW0419-05 | 2 Jul 05 | 17 Sep 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), crane, mobile(diesel) x1, concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, concrete lorry mixer x1, poker x1, |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | vibratory, hand-held (electric);<br>• Time: 8 days within the validity period between 1900-2300 but not being a general holiday. |
| GW-RW0423-05 | 2 Jul 05 | 26 Jul 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne, crane x1, mobile(diesel), lorry x2;<br>• Time: 14 days only within the validity period between 0000-0530 but not being a general holiday. |
| GW-RW0474-05 | 25 Jul 05 | 24 Sep 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, crane, mobile (diesel) x1, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: any days within the validity period between 1900-2300. |
| GW-RW0475-05 | 21 Jul 05 | 19 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2000-0600 but not being a general holiday. |
| GW-RW0476-05 | 21 Jul 05 | 19 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2100-0600 but not being a general holiday. |
| GW-RW0495-05 | 1 Aug 05 | 29 Oct 05 | • Lorry with crane x1, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2000-0600 but not being a general holiday. |
| GW-RW0510-05 | 8 Aug 05 | 29 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2000-0600 but not being a general holiday. |
| GW-RW0520-05 | 8 Aug 05 | 19 Oct 05 | • Road miller x1, dump truck x1, road sweeper x1, asphalt paver x1, roller, vibratory x1, road roller x1, lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2000-0600 but not being a general holiday. |
| GW-RW0521-05 | 8 Aug 05 | 19 Oct 05 | • Road miller x1, dump truck x1, road sweeper x1, asphalt paver x1, roller, vibratory x1, road roller x1, lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 4 days only within the validity period between 2100-0600 but not being a general holiday. |
| GW-RW0533-05 | 17 Aug 05 | 15 Sep 05 | • Lorry with crane X2, 5.5 tonne < gross vehicle weight ≦ 38 tonne, Crane, mobile (diesel) X1, Lorry X2, 5.5 tonne < gross vehicle weight ≦38 tonne<br>• Time: 8 days only within the validity period in any day not being a general holiday between 0100-0530 hours. |
| GW-RW0550-05 | 24 Aug 05 | 30 Nov 05 | • Group A: Asphalt paver x1, roller, vibratory x1;<br>• Group B: Asphalt paver x1, road roller x1;<br>• Time: 6 days only within the validity period between 1900-2300 hours in any day and general holiday between 0700-2100 hours. |
| GW-RW0566-05 | 1 Sep 05 | 13 Sep 05 | • Lorry with crane x1, 5.5 tonne <gross vehicle weight ≦38 tonne, crane, mobile (diesel) x1;<br>• Time: 6 days ony within the validity period between 1900-0600 hours in any day not being a general holiday. |
| GW-RW0574-05 | 5 Sep 05 | 17 Sep 05 | • Group A: Road miller x1, dump truck x1;<br>• Group B: Asphalt paver x1, road roller x1;<br>• Time: 6 days only within the validity period between 1900-0700 hours but not being a general holiday. |
| GW-RW0575-05 | 11 Sep 05 | 30 Oct 05 | • Excavator, tracked x1, lorry with crane x1, 5.5 tonne < gross vehicle weight ≦38 tonne, compactor, vibratory x1;<br>• Time: 5 general holidays (including Sundays) within the |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | validity period between 0700-1600 hours. |
| GW-RW0582-05 | 12 Sep 05 | 30 Sep 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne, crane, mobile (diesel) x1, lorry x2;<br>• Time: 14 days only within the validity period between 0100-0530 hours in any day not being a general holiday. |
| GW-RW0596-05 | 18 Sep 05 | 30 Oct 05 | • Breaker, hand-held (hydraulic) x2, power pack for hand-held item of PME x2, excavator, tracked x1, lorry with crane x1, 5.5 tonne < gross vehicle weight ≦38 tonne, compactor, vibratory x1;<br>• Time: 5 general holidays (uincluding Sundays) within the validity period between 0900-1600hours. |
| GW-RW0608-05 | 23 Sep 05 | 19 Dec 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, crane, mobile (diesel) x1, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: 4 days only within the validity period in any day not being a general holiday between 1900-2300 hours. |
| GW-RW0609-05 | 26 Sep 05 | 24 Dec 05 | • Air compressor x1, with noise emission label showing a sound power level ≦100dB(A), concrete pump x1, lorry mounted, generator x1, silenced, ≦70dB(A) at 7m, crane, mobile (diesel) x1, concrete lorry mixer x1, poker x1, vibratory, hand-held (electric);<br>• Time: 8 days only within the validity period in any day not being a general holiday between 1900-2300 hours. |
| GW-RW0610-05 | 27 Sep 05 | 20 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 5 days only within the validity period in any day not being a general holiday between 0000-0600 hours. |
| GW-RW0611-05 | 23 Sep 05 | 20 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 5 days only within the validity period in any day not being a general holiday between 0030-0530 hours. |
| GW-RW0618-05 | 28 Sep 05 | 10 Oct 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne, Lorry x2, 5.5 tonne < gross vehicle weight ≦38 tonne, crane x 1;<br>• Time: Any day not being a general holiday between 0100-0530 hours. |
| GW-RW0619-05 | 28 Sep 05 | 22 Dec 05 | • Lorry with crane x2, 5.5 tonne < gross vehicle weight ≦38 tonne;<br>• Time: 14 days only within the validity period between 2100-0600 hours in any day not being a general holiday. |
| GW-RW0638-05 | 4 Oct 05 | 5 Dec 05 | • Lorry with crane x1;<br>• Time: 8 days only within the validity period in any day not being a general holiday between 0000-0530 hours. |
| GW-RW0639-05 | 16 Oct 05 | 28 Nov 05 | • Hand-held electric breaker x10, generator x2, poker, vibratory, hand-held x2, concrete lorry, mixer x1, lorry with crane x1, drill, hand-held x2, grinder, hand-held x2;<br>• Time: 30 hours from 0000 Sun to 0530 on next day. |
| GW-RW0640-05 | 11 Oct 05 | 28 Nov 05 | • Hand-held electric breaker x10, generator x2, poker, vibratory, hand-held x2, concrete lorry, mixer x1, lorry with crane x1, drill, hand-held x2, grinder, hand-held x2;<br>• Time: 30 hours from 0000 Sun to 0530 on next day. |
| GW-RN8072-05 | 8 Oct 05 | 31 Dec 05 | • Lorry with crane x2;<br>• Time: immediately following a general holiday 1900-2400, other day 0000-0700 and 1900-2400. |
| GW-RW0691-05 | 8 Nov 05 | 7 Jan 06 | • Lorry with crane x2, lorry x2;<br>• Time: 4 weekdays 0100-0530. |
| GW-RW0692-05 | 1 Nov 05 | 31 Jan 06 | • Lorry with crane x2;<br>• Time: 8 weekdays 2100-0600. |
| GW-RW8083-05 | 1 Nov 05 | 31 Jan 06 | • Lorry with crane x2; |

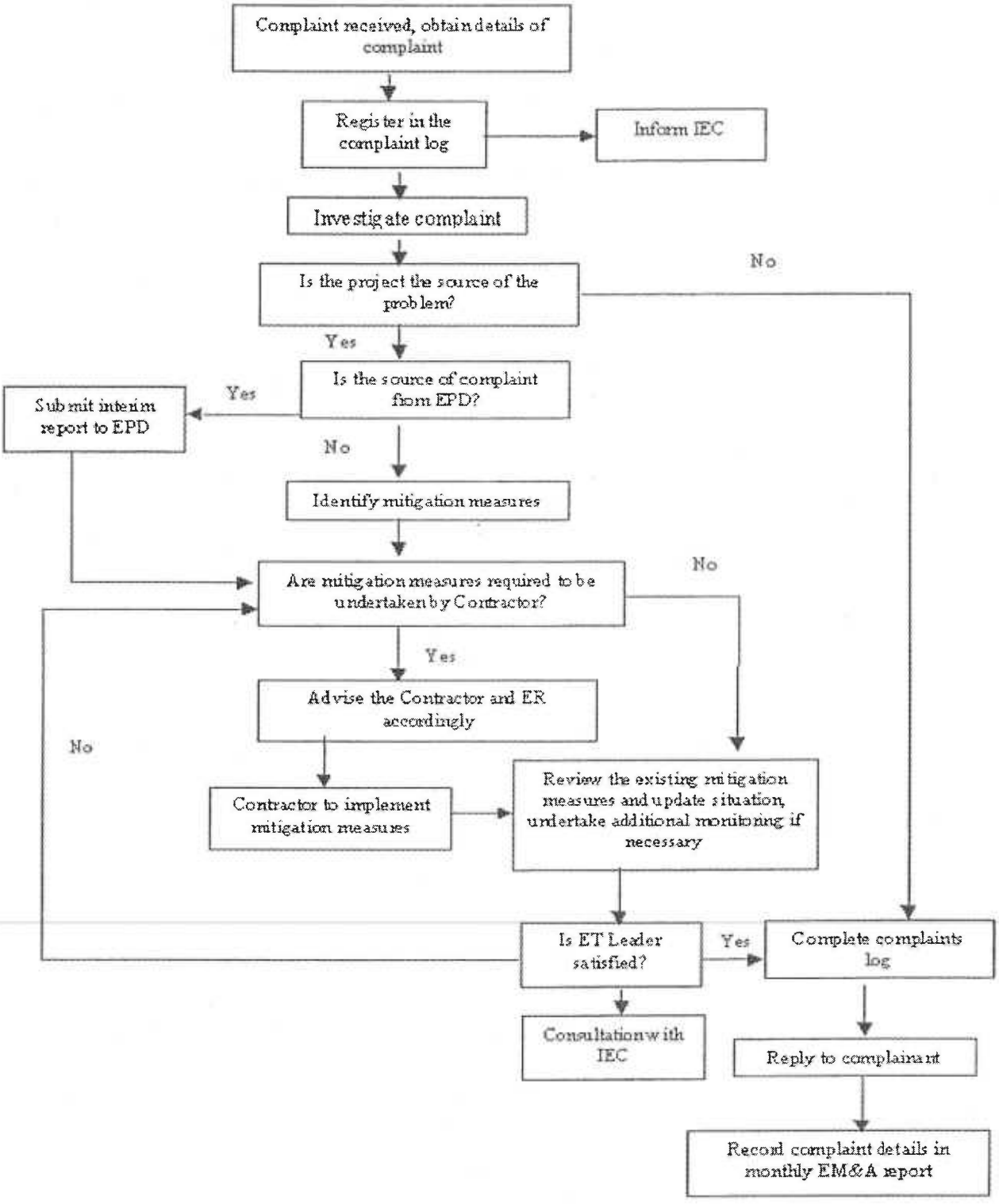
| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | • Time: 14 weekdays 2100-0600. |
| GW-RW0702-05 | 7 Nov 05 | 31 Jan 06 | • Lorry with crane x1;<br>• Time: 14 weekdays 2000-0600. |
| GW-RW0704-05 | 1 Nov 05 | 31 Jan 06 | • Concrete lorry mixer x1, concrete pump x1, poker vibratory x2, generator x1, air compressor x1;<br>• Time: 10 days 2000-0600 |
| GW-RW0766-05 | 29 Nov 05 | 31 Jan 06 | • Lorry with crane x2;<br>• Time: 2100-0600 or 2100-2400 immediately following a general holiday. |
| GW-RW0774-05 | 4 Dec 05 | 30 Jan 06 | • Hand-held electric breaker x8, generator x2, lorry with crane x1, poker, vibrating, hand-held x2, concrete lorry mixer x1, drill, hand-held x2, grinder, hand-held x2;<br>• Time: 30 hrs from 0030 sun to 0530 on next day. |
| GW-RW0806-05 | 22 Dec 05 | 31 Mar 06 | • Lorry with crane x2;<br>• Time: 14 weekdays 2100-0600. |
| GW-RW0807-05 | 17 Dec 05 | 28 Feb 06 | • Crane x1, lorry crane x1, mobile working platform x1, articulated vehicle x1 (install sign gantry);<br>• Time: Any 14 days 0001-0530. |
| GW-RW0808-05 | 17 Dec 05 | 28 Feb 06 | • Crane x1, lorry with crane x1, articulated vehicle x1 (install noise barrier panels);<br>• Time: Any days 2100-0600. |
| GW-RW0809-05 | 16 Dec 05 | 28 Feb 06 | • Lorry with crane x1, excavator x1, dump truck < 38 tonnes x1, poker, vibrating, hand-held x1, concrete lorry mixer x1;<br>• Time: Any 14 days 2000-0600 |
| GW-RW0810-05 | 18 Dec 05 | 31 Dec 05 | • Road miller x1, dump truck x1, asphalt paver x1, road roller x1;<br>• Time: 4 days 0700-1900 holiday/ 1900-2100 weekdays. |
| GW-RW0834-05 | 28 Dec 05 | 30 Mar 06 | • Concrete lorry mixer x1, concrete pump x1, poker vibratory x2, generator x1, air compressor x1, mobile crane x1;<br>• Time: 1900-2300 |
| GW-RW0855-05 | 9 Jan 06 | 31 Mar 06 | • Lorry with crane, 5.5 tonne < gross vehicle weight ≦38 tonne x2;<br>• Time: Any 8 weekdays 2100-0600. |
| GW-RW0017-06 | 24 Jan 06 | 31 Mar 06 | • Crane, mobile (diesel) x1, lorry with crane, 5.5 tonne < gross vehicle weight≦38 tonne x1, articulated vehicle x1;<br>• Time: Any 14 weekdays 2000-0600. |
| GW-RW0018-06 | 24 Jan 06 | 28 Feb 06 | • Asphalt paver x1, roller, vibratory x1, road roller x1, dump truck, 5.5 tonne < gross vehicle weight ≦38 tonne x1;<br>• Time: 10 days 0700-1900 Holiday/ 1900-2100 weekdays. |
| GW-RW0019-06 | 24 Jan 06 | 28 Feb 06 | • Asphalt paver x1, roller, vibratory x1, road roller x1, dump truck, 5.5 tonne < gross vehicle weight ≦38 tonne x1;<br>• Time: 8 days 0700-1900 Holiday/ 1900-2100 weekdays. |
| GW-RW0020-06 | 24 Jan 06 | 28 Feb 06 | • Asphalt paver x1, roller, vibratory x1, road roller x1, dump truck, 5.5 tonne < gross vehicle weight ≦38 tonne x1;<br>• Time: 14 days 0700-1900 Holiday/ 1900-2100 weekdays. |
| GW-RW0074-06 | 28 Jan 06 | 5 Feb 06 | • Asphalt paver x1, roller, vibratory x1, road roller x1, dump truck, 5.5 tonne < gross vehicle weight ≦38 tonne x1, lorry, with crane, 5.5 tonne < gross vehicle weight ≦38 tonne x1;<br>• Time: 5 days 0700-1900 Holiday/ 1900-2100 weekdays. |
| GW-RW0034-06 | 23 Jan 06 | 31 Mar 06 | • Lorry with crane x2 (for dismantling the falsework at bridge 2);<br>• Time: 5 weekdays 0000-0600. |
| GW-RW0035-06 | 23 Jan 06 | 31 Mar 06 | • Lorry with crane x2 (for dismantling the falsework at bridge 2);<br>• Time: 5 weekdays 0045-0600. |
| GW-RW0054-06 | 5 Feb 06 | 30 Apr 06 | • Hydraulic breaker, hand-held x1, power pack x1, excavator, tracked x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, poker vibratory x1, generator x1, |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | air compressor x1, crane lorry x1, compactor vibratory x1;<br>• Time: 14 general holidays 0000-2359. |
| GW-RW0055-06 | 2 Feb 06 | 30 Apr 06 | • Concrete lorry mixer x1, concrete pump x1, poker vibratory x1, generator x1, air compressor x1, crane x1, crane lorry <38 tonnes x1;<br>• Time: 14 weekdays 2000-0600. |
| GW-RW0076-06 | 13 Feb 06 | 28 Feb 06 | • Hydraulic Breaker, Hand-held x1, Power Pack x1, excavator, tracked x1, dump truck <38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1, compactor vibratory x1<br>• Time: 7 weekdays 2000-0600. |
| GW-RW0077-06 | 13 Feb 06 | 28 Mar 06 | • Lorry with crane x1;<br>• Time: 8 weekdays 0145-0500. |
| GW-RW0081-06 | 18 Feb 06 | 7 May 06 | • Crane x1, lorry with crane x1, mobile working platform x1, articulated vehicle x1;<br>• Time: 14 days 0800-2400 holiday 2000-0600 weekdays. |
| GW-RW0084-06 | 19 Feb 06 | 30 Apr 06 | • Hydraulic Breaker, Hand-held x1, power pack x1, grab lorry <38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1<br>• Time: 8 general holidays 0800-1800 |
| GW-RW0129-06 | 16 Mar 06 | 30 May 06 | • Hydraulic Breaker, Hand-held x1, Power pack x1, grab lorry < 38 tonnes x1, concrete Lorry Mixer x1, Crane lorry x1, Poker Vibratory x1, Generator x1, Air compressor x1<br>• Time: 8 general holidays 0800-1800 |
| GW-RW0137-06 | 18 Mar 06 | 30 May 06 | • Excavator, tracked x1, Dump truck < 38 tonnes x1, Concrete Lorry Mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1, crane lorry x1, compactor vibratory x1<br>• Time: 14 weekdays 2000-0600 |
| GW-RW0149-06 | 23 Mar 06 | 29 Apr 06 | • Crane x 1, lorry with crane x1, mobile working platform x1;<br>• Time: 3 weekdays 0001-0530. |
| GW-RW0150-06 | 23 Mar 06 | 30 May 06 | • Crane x 1, lorry with crane x1, mobile working platform x1;<br>• Time: 9 weekdays 0001-0500. |
| GW-RW0151-06 | 25 Mar 06 | 30 Apr 06 | • Hydraulic Breaker, hand-held x1, power pack x1, grab lorry < 38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1<br>• Time: 33 hrs from 2100 Saturday to 0600 on the following Monday including general holiday |
| GW-RW0152-06 | 23 Mar 06 | 31 Mar 06 | • Hydraulic Breaker, Hand-held x1, Power Pack x1, Excavator, tracked x1, Dump truck < 38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1, crane lorry x1, compactor vibratory x1<br>• Time: 0000-0600 Any day, not being a general holidays include Sundays |
| GW-RW0164-06 | 13 Mar 06 | 30 Jun 06 | • Asphalt paver x1, roller, vibratory x1, crane lorry x1, asphalt paver x1, road roller x1, crane lorry x1, asphalt paver x1, dump truck < 38 tonnes x1, road miller x1, dump truck < 38 tonnes x1, crane lorry x1, hydraulic breaker, hand-held x1, power pack x1;<br>• Time: 18 days 0800-1800, holiday, 2100-0600 weekdays. |
| GW-RW0184-06 | 22 Mar 06 | 30 Apr 06 | • Asphalt paver x1, roller, vibratory x1, asphalt paver x1, road roller x1, asphalt paver x1, dump truck < 38 tonnes x1;<br>• Time: 12 days 0700-1900, holiday, 1900-2100 weekdays. |
| GW-RW0185-06 | 22 Mar 06 | 29 Apr 06 | • Hydraulic breaker, hand-held x1, power pack x1, excavator, tracked x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, air compressor x1 crane lorry x1, compactor vibratory x1;<br>• Time: 4 weekdays 2000-0600. |
| GW-RW0214-06 | 14 Apr 06 | 2 May 06 | • Asphalt Paver x1, Roller, Vibratory x1, Road Roller x1, |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | • Dump Truck < 38 tonnes x1;<br>• Time: 5 days 0700-1900, holiday/ 1900-2100 weekdays |
| GW-RW0215-06 | 14 Apr 06 | 31 May 06 | • Mobile working platform x1, Drill, Handheld (Battery) x1;<br>• Time: 10 days 0700-1900, holiday/ 1900-2300 weekdays |
| GW-RW0224-06 | 17 Apr 06 | 28 May 06 | • Asphalt Paver x1, Roller, Vibratory x1, Road Roller x1, Dump Truck < 38 tonnes x 1;<br>• Time: 5 days 0700-1900, holiday/ 1900-2100 weekdays |
| GW-RW0225-06 | 17 Apr 06 | 31 May 06 | • Asphalt Paver x1, Roller x1, Vibratory x1, Road Roller x1, Dump Truck<38 tonnes x1;<br>• Time: 5 days 0700-1900, holiday/ 1900-2100 weekdays |
| GW-RW0226-06 | 17 Apr 06 | 15 May 06 | • Asphalt Paver x1, Roller, Vibratory x1, Road Roller x1, Dump Truck<38 tonnes x1;<br>• Time: 3 days 0700-1900, holiday/ 1900-2100 weekdays |
| GW-RW0223-06 | 18 Apr 06 | 31 May 06 | • Mobile crane x1;<br>• Time: 8 days 0700-1900, holiday/ 1900-2300 weekdays. |
| GW-RW0247-06 | 3 May 06 | 30 Jun 06 | • Crane x1, Lorry with crane x1, Mobile working platform x1;<br>• Time: 6 weekdays 0001-0530 |
| GW-RW0242-06 | 30 Apr 06 | 30 Jul 06 | • Mobile Crane x1, Mobile working platform x1, Crane Lorry x1, Mobile working platform x1, Mobile working platform x1, Drill, Handheld (Battery) x1;<br>• Time: 14 days 0800-1800, Holiday/ 2100-0600 weekdays |
| GW-RW0243-06 | 30 Apr 06 | 30 Jul 06 | • Crane Lorry x1, Electric Breaker, Hand-held x1, Generator x1, Compactor Vibratory x1, Mobile Crane x1, Mobile working platform x1, Drill, Handheld (Battery) x1;<br>• Time: Any days 0800-1800, holiday/ 2000-0700 weekdays |
| GW-RW0251-06 | 29 Apr 06 | 2 May 06 | • Dump truck<38 tonnes x1, Excavator x1;<br>• Time: 58 Hours from 2000 Saturday to 0600 on the following Tuesday including General Holiday |
| GW-RW0320-06 | 30 Jun 06 | 3 Jul 06 | • Excavator, tracked x1, Hydraulic Breaker, Hand-held x1, Power pack x1, Dump truck < 38 tonnes x1, Concrete Lorry Mixer x1, Crane Lorry x1, Poker Vibratory x1, Generator x1, Asphalt Paver x1, Roller, Vibratory x1, Road Roller x1, Dump Truck < 38 tonnes x1, Asphalt Paver x1, Road Miller x1;<br>• Time: 57 hours only within the validity period 2100 hours on Friday to 0600 hours on the following Monday. |
| GW-RW0402-06 | 1 Aug 06 | 31 Aug 06 | • Excavator, tracked x1, hydraulic breaker, hand-held x1, power pack x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, crane lorry x1, poker vibratory x1, generator x1, asphalt paver x1, roller, vibratory x1, road roller x1, dump truck<38 tonnes x1, asphalt paver x1, road miller x1, dump truck<38 tonnes x1, lorry with crane x1, mobile working platform x1;<br>• Time: Any days at 2100-0600 and general holiday at 2000-0800 weekdays |
| GW-RW0459-06 | 1 Sep 06 | 31 Oct 06 | • Excavator, tracked x1, hydraulic breaker, hand-held x1, power pack x1, dump truck<38 tonnes x1, concrete lorry mixer x1, Lorry, with crane, 5.5 tonne<gross vehicle weight < 38 tonne, generator, with sound pressure level of <70 dB (A) measured at 7m from the centre of the generator, poker vibratory x1, asphalt paver x1, roller, vibratory x1, road roller x1, dump truck < 38 tonnes x1, asphalt paver x1, road miller x1, dump truck <3 8 tonnes x1, mobile working platform x1, lorry, with crane < 38 tonnes<br>• Time: Any day at 2100-0600 and general holidays 0800-2000 (including Sundays); |
| GW-RW0550-06 | 26 Sep 06 | 23 Dec 06 | • Lorry, with crane x1, 5.5 tonne < gross vehicle weight < 38 tonne, crane x1, mobile (diesel), working platform x1, mobile, generator x1, with sound pressure level of <70 dB (A) measured at 7m from the centre of the generator x1, drill x1, hand-held (battery); |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | • Time: 0000 - 0530 hrs. General holidays (including Sundays); Any day, not being a general holiday (including Sundays). |
| GW-RW0551-06 | 26 Sep 06 | 23 Dec 06 | • Lorry, with crane x1, 5.5 tonne < gross vehicle weight < 38 tonne, crane x1, mobile (diesel), working platform x1, mobile, generator x1, with sound pressure level of <70 dB(A) measured at 7m from the centre of the generator x1, drill x1, hand-held (battery);<br>• Time: 0100 - 0530 hrs. General holidays (including Sundays); any day, not being a general holiday (including Sundays). |
| GW-RW0621-06 | 1 Nov 06 | 31 Jan 07 | • Excavator, tracked x1, hydraulic breaker, hand-held x1, power pack x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, Lorry, with crane x1, 5.5 tonne < gross vehicle weight<38 tonne, generator x1, with sound pressure level of <70 dB (A) measured at 7m from the centre of the generator, poker vibratory x1, asphalt paver x1, roller, vibratory x1, road roller x1, dump truck < 38 tonnes x1, asphalt paver x1, road miller x1, dump truck < 38 tonnes x1, mobile working platform x1, lorry, with crane < 38 tonnes x1;<br>• Time: Any day at 2100-0600 and general holidays 0800-2000 (including Sundays); |
| GW-RW0046-07 | 7 Feb 07 | 30 Apr 07 | • Excavator, tracked x1, hydraulic breaker, hand-held x1, power pack x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, Lorry, with crane, 5.5 tonne<gross vehicle weight<38 tonne, generator, with sound pressure level of <70 dB (A) measured at 7m from the centre of the generator, poker vibratory x1, asphalt paver x1, roller, vibratory x1, road roller x1, asphalt paver x1, road miller x1, dump truck < 38 tonnes x1, mobile working platform x1, lorry, with crane<38 tonnes<br>• Time: Any day at 2100-0600 and general holidays 0800-2000 (including Sundays); |
| GW-RW0212-07 | 8 May 07 | 31 Jul 07 | • Excavator, tracked x1, hydraulic breaker, hand-held x1, power pack x1, dump truck < 38 tonnes x1, concrete lorry mixer x1, Lorry, with crane x1, 5.5 tonne<gross vehicle weight < 38 tonne, generator x1, with sound pressure level of <70 dB (A) measured at 7m from the centre of the generator, poker vibratory x1, asphalt paver x1, roller, vibratory x1, road roller x1, asphalt paver x 1, road miller x1, dump truck<38 tonnes x1, mobile working platform x1, lorry, with crane < 38 tonnes x1;<br>• Time: Any day at 2100-0600 and general holidays 0800-2000 (including Sundays); |
| **Notification of Construction Work under APCO** | | | |
| SC20030723-001 | - | - | - |
| **Effluent Discharge License** | | | |
| 1T317/1 | 30 Sep 03 | 30 Sep 08 | Deep Bay Water Control Zone Discharge point – WQ11 |
| W7HI8-9 | 13 Oct 03 | 31 Oct 08 | North Western Water Control Zone Discharge points – WQ7, WQ9 and WQ10 |
| W7HI8-10 | 12 Dec 03 | 31 Dec 08 | North Western Water Control Zone Discharge points – WQ8 |
| W7HI8-11 | 12 Dec 03 | 31 Dec 08 | North Western Water Control Zone Discharge points – WQA1 |
| **Chemical Waste Registration** | | | |
| 5111-411-C3275-01 | 29 Aug 03 | N/A | Used battery, used lubrication oil and lubricating oil/ gasoline/ diesel contaminated soil. |

# APPENDIX H
# COMPLAINT FLOW DIAGRAM AND COMPLAINT LOG




| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/23<br>Deep Bay Link - Southern Section<br>**Environmental Complaint Handling Procedure** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016783 | APPENDIX No. H | Rev. - |

**Appendix H – Environmental Complaints Log**

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 001 | Nai Wai | 25 Oct 03 | Local resident via HAD, LandsD, EPD | Air & Mosquito | Dust and mosquito nuisance was complained. The dust problem was mainly due to the dry season and the pesticides were used three times a week. | No | |
| 002 | Hung Shui Kiu Main Nullah | 5 Nov 03 | Local resident via DSD | Water | Muddy water was generated from the bored piling activities and discharged into the Main nullah. | Yes | Measures below were undertaken:<br>1. The wastewater generated was collected and recycled;<br>2. Wastewater treatment system was installed;<br>3. Excess wastewater was treated to acceptable level prior discharge. |
| 003 | Fuk Hang Tsuen Road - CPR2 | 10 Nov 03 | EPD | Air | Construction dust nuisance caused by mishandling of cement. Mitigation measures were properly conducted for cement handling and storage. | No | |
| 004 | Lam Tei Gospel School | 18 Nov 03 | Lam Tei Gospel School | Noise | Construction noise nuisance experienced due to the operation of drilling machine. | Yes | Measures below were undertaken:<br>1. Acoustic shielding was provided to the drilling machine;<br>2. Placed temporary structure such as sedimentation tank to form a barrier. |
| 005 | To Yuen Wai | 16 Dec 03 | EPD | Air | Construction dust nuisance affecting the local resident. The dust sources were mainly due to poor regional air quality and the villager renovation. | No | |
| 006 | To Yuen Wai | 17 Dec 03 | EPD | Air | Construction dust nuisance affecting the local resident. The dust sources were mainly due to poor regional air quality and the villager renovation. | No | |
| 007 | Botania Villa | 19 Dec 03 | Local resident via HyD | Noise | Traffic noise nuisance from Yuen Long Highway due to the removal of trees. Mitigation measures were properly conducted. | No | As for the potential noise elevation for YLH, the removal of trees was carried out in accordance with the road widening design. Such impact would be mitigation when the proposed noise barriers are erected. |
| 008 | Fuk Hang Tsuen Road | 29 Dec 03 | EPD | Air | Mud trail was caused by the dump trucks leaving the site brought mud to the road. | Yes | Measures below were undertaken:<br>1. The current wheel-washing facilities was rearranged;<br>2. Manual wheel washing was provided further away from FHTR. |
| 009 | Fuk Hang Tsuen Road | 2 Jan 04 | EPD | Air | Construction dust nuisance was complained at FHTR Rural Committee Office. However, the major dust source was mainly due to the poor regional air quality. | No | |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 010 | Fuk Hang Tsuen Road | 7 Jan 04 | EPD | Air | Mud trail nuisance was identified by mud deposited from dump trucks leaving the site. | Yes | Measures below were undertaken:<br>1. Vehicle washing facilities were provided;<br>2. The vehicle washing area, the road &the exit was paved with concrete. |
| 011 | Fuk Hang Tsuen Road | 7 Jan 04 | EPD | Air | Construction dust nuisance was complained. However, the dust problem was mainly due to poor regional air quality. | No | |
| 012 | Shun Tat Street | 8 Jan 04 | EPD | Air | Muddy road surface nuisance was identified by mud deposited from dump trucks leaving the site. | Yes | Measures below were undertaken:<br>1. Vehicle washing facilities were provided;<br>2. The vehicle washing area, the road & the exit was paved with concrete;<br>3. The muddy road was cleaned up immediately;<br>4. Workers was brushed the public access road prior the entrance at STS. |
| 013 | Fuk Hang Tsuen Road | 16 Jan 04 | EPD | Water | Muddy water was discharged into the u-channel. The channel was blocked with wastes, leaves and dead plants not belong to the site. However, the high volume of vehicles were entering the site and generated muddy water from wheel washing activities overflow from the sedimentation tank and entered a nearby u-channel. | Yes (Pink form was issued) | Measures below were undertaken:<br>1. Wheel wash bay was provided;<br>2. The road surface was concrete paved;<br>3. high-pressure water jet was provided for additional manual wheel wash;<br>4. Concrete bunding was built in order to divert the wastewater back to the sedimentation tank for recycle used. |
| 014 | Yuen Long Highway | 19 Jan 04 | HyD | Noise | Traffic noise nuisance from YLH due to the removal of trees either side of the highway. Mitigation measures were properly conducted. | No | As for the potential noise elevation for YLH, the removal of trees was carried out in accordance with the road widening design. Such impact would be mitigation when the proposed noise barriers are erected. |
| 015 | Shun Tat Street & Fuk Hang Tsuen Road | 19 Jan 04 | HyD | Site tidiness & Air | Site tidiness and dust nuisance due to the mud deposited from dump trucks traveling the road and less frequency of providing water spraying on the site works. | Yes | Measures below were undertaken:<br>1. Wheel washing facility was installed at all the site exits;<br>2. High-pressure water jet was provided for additional manual wheel wash;<br>3. Workers were on duty for brushing the floor;<br>4. Water spraying was provided for the main haul road, and the working areas of excavation. |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 016 | Shun Tat Street & Fuk Hang Tsuen Road | 26 Jan 04 | Media | Site tidiness | Dust nuisance due to the mud deposited from dump trucks traveling the road and less frequency of providing water spraying on the site works. | Yes | Measures below were undertaken:<br>1. Wheel washing facility was installed at all the site exits;<br>2. High-pressure water jet was provided for additional manual wheel wash;<br>3. Workers were on duty for brushing the floor;<br>4. Water spraying was provided for the main haul road, and the working areas of excavation. |
| 017 | Tan Kwai Tsuen | 4 Feb 04 | DSD | Water | Muddy water was discharged into drainage channel. However, the appearance of the muddy water discharging into the TKT was grey and not similar to any wastewater generated from site. It was suspect that the muddy water was from other vicinity construction site. | No | |
| 018 | Fuk Hang Tsuen | 14 Feb 04 | EPD | Water | Polluting effluent discharged was complained. The wastewater was discharged by the local residents from other discharge drain. | No | |
| 019 | On Construction site | 8 Mar 04 | EPD | Air | Construction dust nuisance due to the concrete lorries traveling within the site. | Yes | Measures below were undertaken:<br>1. Tarpaulins were fully covered the stockpiles;<br>2. Additional water truck was used on site. |
| 020 | Shun Tat Street | 8 Mar 04 | EPD | Water | Muddy water was discharged to STS. The muddy water was likely from the excess wastewater of wheel washing facilities when the trucks traveling out of the site. | Yes | Measures below were undertaken:<br>1. Excess wastewater generated was transferred/ diverted to sedimentation tank;<br>2. Sandbags were installed along the wheel washing facilities. |
| 021 | Fuk Hang Tsuen Road | 15 Mar 04 | EPD | Air | Construction dust nuisance was complained. However, the major dust sources were the dump trucks traveling from the nearby quarry site and parked at the unpaved area in FHTR. Uncovered stockpiles and excavation works (not part of DBL-S) were observed within the unpaved area in FHTR. | No | |
| 022 | Fuk Hang Tsuen Road | 8 Apr 04 | EPD | Water | Muddy water was discharged to the road. However, there was no soil or muddy water observed at the site of FHTR on the day of complaint. | No | |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 023 | Fuk Hang Tsuen (near Botania Villa) | 10 May 04 | EPD & F&EHD | Air | Construction dust nuisance was complained. The major dust source was generated by the dump trucks traveling from the nearby quarry site or the villager workshop. | No | |
| 024 | Lok On Pai | 17 Jun 04 | EPD | EP Condition 3.11 | Storage of materials other than bridge segments. | Yes | Measures below were undertaken:<br>1. All materials were removed from Lok On Pai site area;<br>2. The materials other than pre-cast bridge segment were not stored at Lok On Pai. |
| 025 | Fuk Hang Tsuen Road | 14 Jul 04 | EPD | Water | Polluting effluent was discharged to the road. The foul water overflowed from the site office's toilet due to breakage of one of the water pipe. | Yes | Measures below were undertaken:<br>1. The overflow was controlled and the seepage was cleaned up at the nearby area. |
| 026 | Fuk Hang Tsuen Road | 27 Jul 04 | EPD | Water | Polluting effluent was discharged from site. The muddy water flowing to the villager open area was due to heavy rain and the house was actually located lower than the site ground level. | No | |
| 027 | Fuk Hang Tsuen | 18 Aug 04 | EPD | Air | Dust nuisance due to the trucks entering and leaving the site. The major dust source was generated by the dump trucks traveling to nearby quarry site or other nearby construction sites or the villager workshop. | No | |
| 028 | Fuk Hang Tsuen Road & Castle Peak Road | 6 Sep 04 | EPD | Water | Soil / muddy water was complained due to the trucks in & out of the site. However, no soil / muddy water was observed at the site exit of FHTR and the wheel washing facilities was provided. | No | |
| 029 | Fuk Hang Tsuen Road | 6 Oct 04 | EPD | Air | Construction dust nuisance due to the roadwork near Lam Tei Gospel School. The major dust source was generated by the dump trucks traveling to nearby quarry site. | No | |
| 030 | Fuk Hang Tsuen Road (near Botania Villa) | 11 Oct 04 | EPD | Air | Construction dust was complained. However, fugitive dust was generated by the dump trucks traveling in high speed along the nearby quarry site at FHTR. | No | |
| 031 | Lok On Pai | 2 Nov 04 | EPD | EP Condition 3.11 (a) | Segment loading/ unloading carried out at the complaint night. However, there was no construction works and segment movement was carried out on the day (night time) of the complaint. | No | |
| 032 | Lok On Pai | 9 Nov 04 | EPD | Noise | Noise generation due to the vehicles traveling at the site entrance of Lok On Pai. However, there were only two tractors operating on-site only during the non-restricted hours, which was comply with the EP Condition 3.11. | No | |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 033 | Tsoi Yuen Tsuen | 17 Nov 04 | EPD | Air | No water spraying was complained at Tsoi Yuen Tsuen and caused fugitive dust. However, The stockpiles were covered by tarpaulin and water spraying was provided at the regular basis. | No | |
| 034 | To Yuen Wai | 2 Dec 04 | EPD | Air | Construction dust nuisance was affecting the local residents. | Yes | Measures below were undertaken:<br>1. The stockpiles were covered with tarpaulin or impervious sheeting;<br>2. The frequency of water spraying was increased by the water tankers and during concrete breaking. |
| 035 | To Yuen Wai | 2 Dec 04 | EPD | Air | Construction dust nuisance was affecting the local residents. | Yes | Measures below were undertaken:<br>1. The stockpiles were covered with tarpaulin or impervious sheeting;<br>2. The frequency of water spraying was increased by the water tankers and during concrete breaking. |
| 036 | Fuk Hang Tsuen Road | 8 Dec 04 | EPD | Air | Construction Dust nuisance was complained. However, the major dust source was generated by the dump trucks traveling in high speed along the nearby quarry site at FHTR. | No | |
| 037 | To Yuen Wai | 14 Dec 04 | EPD | Air | Construction dust nuisance was affecting the local residents. | Yes | Measures below were undertaken:<br>1. All the stockpiles stored were covered with tarpaulin or impervious sheeting;<br>2. The frequency of water spraying was increased by the water tankers and during concrete breaking. |
| 038 | Fuk Hang Tsuen Road | 3 Jan 05 | EPD | Water | Polluting effluent was complained at FHTR. The water was observed from the leakage of the underground pipe belong to WSD. | No | |
| 039 | Shun Tat Street | 17 Jan 05 | EPD | Air | Construction dust nuisance affecting the refuse transfer station in STS. | Yes | Measures below were undertaken:<br>1. Water spraying was provided;<br>2. Workers were on duty for cleaning mud trails and brushing up the dusty materials. |
| 040 | Tsoi Yuen Tsuen | 16 Feb 05 | EPD | Noise | Night-time construction noise nuisance was complained. The Contractor obtained valid CNP for the construction works. | No | |
| 041 | To Yuen Wai | 18 Feb 05 | Local resident | Noise | Noise nuisance was generated due to breaking of existing concrete footing. | Yes | Measures below were undertaken:<br>1. The movable noise barrier was installed. |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 042 | To Yuen Wai | 20 Apr 05 | EPD | Dust | Dust nuisance was complained. The major dust source was generated by the high volume of traffic at YLH. | No | |
| 043 | Fu Hang Road | 31 May 05 | EPD | Water | Muddy water was discharged to the drains at FHR and the nearby farmland caused blockage. However, no blockage at the drain or at the farmland was observed. The temporary drain was in used and no construction work was carried out on the day of complaint. | No | |
| 044 | Tsoi Yuen Tsuen | 24 Jun 05 | EPD | Water | Muddy water was discharged to Scrap Metal Recycling Site during the red rainstorm signal. | Yes | Measures below were undertaken:<br>1. Temporary drain was excavated;<br>2. The concrete bars were placed at the nearby area;<br>3. Temporary stockpiles were covered;<br>4. The drain and mud trail near the Recycling Site was cleaned up. |
| 045 | Fuk Hang Tsuen Road | 26 Jul 05 | EPD | Air | Construction dust of roadwork was complained. However, the major dust source was generated by the dump trucks traveling in high speed along the nearby quarry site at FHTR. | No | |
| 046 | To Yuen Wai | 12 Aug 05 | EPD | Air | Construction dust of roadwork was complained. However, no evidence proved the incidence was related to Project activities. | No | |
| 047 | Fuk Hang Tsuen Road | 24 Aug 05 | EPD | Water | Muddy water was flooding and accumulated at the subway near Lam Tei Gospel School. The amber rainstorm warming was held on the day of complaint and caused flooding and minor surface runoff at the subway. | Yes | Measures below were undertaken:<br>1. The accumulated wastewater was cleaned up immediately;<br>2. Exposed surface within the site boundary was covered;<br>3. Sandbags were provided for the slope surface. |
| 048 | To Yuen Wai | 6 Sep 05 | EPD | Dust & Noise | Noise and dust nuisance due to the concrete breaking and road construction works. Regular water trucks were provided on site and water spraying on the haul road was conducted in regular basis. | Yes (for Noise only) | Measures below were undertaken:<br>1. The movable barrier was installed; |
| 049 | To Yuen Wai | 12 Oct 05 | EPD | Air | Construction dust nuisance due to no water spraying and covering of soil heaps. | Yes | Measured below were undertaken:<br>1. Water truck was provided frequently on the haul road;<br>2. On-site worker was on duty for additional manual water spraying. |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 050 | Choi Yuen Tsuen | 14 Nov 05 | EPD | Waste | Environmental and hygiene nuisance due to waste mishandling. The accumulation of refuse was identified to be a domestic type and from house decoration. Refuse generated by the Project was regularly collected and properly disposed. | No | |
| 051 | To Yuen Wai | 4 Jan 06 | Local resident | Noise | Noise nuisance due to sheeting piling works. | Yes | Measures below were undertaken:<br>1. The movable noise barrier was provided. |
| 052 | To Yuen Wai | 9 Jan 06 | EPD | Water | Polluting effluent was discharged during the drainage works and retaining wall construction by pumping out the groundwater. The groundwater was polluted by underground mud and the workers pumped out directly with no treatment. | Yes | Measures below were undertaken:<br>1. Three sedimentation tanks were installed for the groundwater treatment; |
| 053 | Fuk Hang Tsuen Road | 16 Mar 06 | EPD | Water | Polluting effluent was discharged by the trucks after passing through the wheel washing facilities. As the road surface was uneven and some effluent was accumulated at the uneven part of the road. | Yes | Measures below were undertaken:<br>1. Mud trail and effluent was cleaned immediately. |
| 054 | Tsoi Yuen Tsuen, Shun Tat Street | 22 Jun 06 | EPD | Air | Dusty road surface nuisance due to lots of dust and sand on the road caused by vehicles leaving the site. | Yes | Measures below were undertaken:<br>1. The frequency of water spraying was increased;<br>2. On-site worker was on duty for providing additional manual water spraying. |
| 055 | Shun Tat Street | 9 Aug 06 | EPD | Air | Dust nuisance due to insufficient use of water spraying. | Yes | Measures below were undertaken:<br>1. The frequency of water spraying was increased;<br>2. Bunding was provided for the gullies. |
| 056 | Fuk Hang Tsuen Road | 31 Aug 06 | EPD | Air | Dusty nuisance due to the heaps of soil deposited from site. Utilities works were on-going by other contractor within the site and minor soil was located at the nearby location for the purpose of backfilling. | Yes | Measures below were undertaken:<br>1. Water spraying was provided for the haul road;<br>2. The soil was backfilled for the complaint area. |
| 057 | Shun Tat Street | 28 Nov 06 | EPD | Air | Dust nuisance due to insufficient use of water spraying | Yes | Measures below were undertaken:<br>1. Sandbags were provided for the construction works area;<br>2. The frequency of watering was increased for the haul road. |

**SECTION 2**

**Deep Bay Link – Northern Section**

**Final EM&A Summary Report for Construction Phase**

**Gammon Construction Limited**

**Contract No. HY/2002/24**

**Deep Bay Link – Northern Section**

# Final EM&A Summary Report for Construction Phase

September 2007

| | Name | Signature |
|---|---|---|
| Reviewed & Checked: | Connie Wong | |
| Approved: | Y T Tang | |

| Version: | 0 | Date: 5 September 2007 |
|---|---|---|



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Our Ref.: HYDDBLWCEM00/2/10809

Date: 5 September 2007

Ove Arup & Partners Hong Kong Limited
Level 5, Festival Walk,
80 Tat Chee Avenue,
Kowloon Tong, Kowloon,
Hong Kong.

By Fax (2448 3361) and Post

Attention: Ir. Jackson Wong (Senior Resident Engineer)

Dear Ir. Wong,

**Re: Environmental Permit No. EP-163/2003/G**
**Contract No. HY/2002/24 Deep Bay Link – Northern Section**
**EP Condition 1.9 Final EM&A Summary Report for Construction Phase**

Reference is made to ET's e-mail correspondences enclosed with a copy of the Final EM&A Summary Report for Construction Phase and revised pages for the captioned project. We have no further comment on the captioned report.

We are pleased to inform you that the Construction Phase Final EM&A Summary Report for Deep Bay Link Northern Section, which had been certified by the Environmental Team Leader, is verified by IEC in compliance with Condition 1.9 of the Environmental Permit (No.EP-163/2003/G) of the project.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned or our Mr. Roy Leung if you have any queries.

Yours sincerely,

Billy Yu
Independent Environmental Checker

c.c. Mr. Y. T. Tang ENSR By Fax: 2891 0305

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## TABLE OF CONTENTS

## List of Tables



## List of Figures



## List of Appendices

## EXECUTIVE SUMMARY

This is the Final Environmental Monitoring and Audit (EM&A) Summary Report for Construction Phase prepared by ENSR Asia (HK) Ltd. (formerly Maunsell Environmental Management Consultants Ltd.), the designated Environmental Team (ET), for the Project "Deep Bay Link – Northern Section". Majority of construction works were completed since June 2007. The construction phase environmental monitoring and audit (EM&A) programme was ceased on 18 June 2007. The post-project local stream water quality monitoring was conducted from 20 June 2007 to 18 July 2007.

This report summarizes the EM&A works performed in the period of the whole EM&A programme from 17 September 2003 to 18 July 2007.

### Environmental Monitoring Works

***Air Quality***
Both of the 1-hour Total Suspended Particulates (TSP) and 24-hour TSP monitoring were conducted at one designated location from 18 September 2003 to 9 February 2007 subject to EPD's approval on the termination of air quality monitoring at this location on 8 February 2007. There were 32 Action Level and 3 Limit Level exceedances recorded and 1 of them were related to the Project's work.

***Noise***
Construction noise was monitored at two designated locations. Subject to EPD's approval on 8 February 2007, noise monitoring at AN3 was terminated on 9 February 2007, while noise monitoring at N4 was continued until 18 June 2007. There were 64 exceedances of Limit Level recorded. 3 valid complaints and 6 Limit Level exceedances were related to the Project's work.

***Local Stream Water Quality***
Local stream water quality monitoring was undertaken at 9 sampling locations (S1-S4, S6-S10) during the period from 18 September 2003 to 9 February 2007. Termination of part of construction phase EM&A programme was approved by EPD on 8 February 2007, local stream water quality monitoring at two sampling locations (S3 and S4) were carried on from 10 February 2007 to 18 June 2007. A post-project monitoring was conducted from 20 June 2007 to 18 July 2007.

A total of 1138 exceedances (164 Action Level and 974 Limit Level) were recorded for local stream water quality monitoring during the period from 18 September 2003 to 9 February 2007. No exceedance was recorded at S3 and S4 for the local stream water quality monitoring from 9 February 2007 to 18 June 2007. A total of 340 exceedances were due to the Project's work. These work-related exceedances were likely due to muddy surface runoff discharged into the stream, soil loss and silt deposited in the stream, or wastewater generated from haul road dampening activities. Post-project local stream water quality monitoring results were comparable to the baseline levels, i.e. the ambient conditions.

***Coastal Water Quality***
Coastal water quality monitoring was carried out under the EM&A programme of Hong Kong – Shenzhen Western Corridor (HK-SWC). Monitoring data of W1, W2, W15 and W16 were presented in this report. A total of 259 exceedances (242 Action Level and 17 Limit Level) were recorded for coastal water quality monitoring during the period from 15 October 2003 to 6 February 2007. All exceedances were concluded not due to the Project's works. While direct relationship between the works and the exceedances could not be established, the exceedances might have been due to variation of regional water quality.

***Environmental Complaints and Prosecutions***
There were 28 environmental complaints received during the reporting period. A total of 11 complaints were related to the Project's work. All valid complaints were properly followed up and rectified.

One summons and successful prosecution was made against the Project regarding an improper discharge into San Hang Nullah from the works area at Tsing Chuen Wai on 24 March 2005. The Contractor pledged guilty to the charge on 15 November 2005.

Five yellow forms were issued by EPD during the reporting period. The Contractor properly rectified the events addressed in yellow forms.

# 1. INTRODUCTION

## Background

1.1 Maunsell Environmental Management Consultants Limited (MEMCL) (hereinafter called the "ET"), which changed the name to ENSR Asia (HK) Ltd. on 1 May 2007 was appointed by Gammon Construction Limited (hereinafter called the "Contractor") to undertake Environmental Monitoring and Audit (EM&A) for "Deep Bay Link – Northern Section" (hereinafter called the "Project"). Under the requirements of Section 4 of Environmental Permit EP-163/2003 and its variations, EM&A programme as set out in the EM&A Manual [2] is required to be implemented.

1.2 In accordance with the EM&A Manual [2], environmental monitoring of air quality, noise, local stream water quality and coastal water quality are required for the Project. The major construction period of the Project was 46 months from September 2003 to June 2007.

1.3 Deep Bay Link (DBL) is an expressway/trunk road of dual-3 lane standard with hard shoulders providing a strategic link between the proposed Hong Kong - Shenzhen Western Corridor (HK-SWC) at its landing point at Ngau Hom Shek and a proposed interchange with the Yuen Long Highway (YLH) and the proposed Route 10-North Lantau to Yuen Long Highway (R10-NLYLH) at Lam Tei. The layout of the DBL is provided in Figure 1.1.

# 2. PROJECT CHARACTERISTICS

## Project Organization and Contacts of Key Management

2.1 The Project Proponent was Highways Department (HyD); the Engineer Representative (ER) was Ove Arup & Partners Hong Kong Limited; the Contractor was Gammon Construction Limited; the Independent Environmental Checker (IEC) was CH2M HILL Hong Kong Limited, and the ET was ENSR.

2.2 The responsibilities of respective parties are detailed in Section 1.4 of the EM&A Manual[2]. The contacts of key management for the Project are summarized in Appendix A.

2.3 An Organization Chart of the Project is provided in Figure 2.1.

## Construction Activities

2.4 The major construction work was commenced on 17 September 2003 and completed in June 2007.

2.5 The major components of this Project are listed below:

*Preparation works:*
- Site Clearance
- Site investigation

*Construction works:*
- Form site access
- Utilities diversion
- Bored piling
- Construction of pier, pier head, pile cap, portal and kicker
- Excavation and backfilling
- Retaining wall and detention pond construction
- Pre-bored H-piles
- Soil nail construction
- Slope cutting
- Setting up of launching girder
- Segment erection
- Erection of form traveler and launching girder
- Installation of pugmill
- Contaminated soil treatment
- Parapet installation
- Medium barrier installation
- Drainage works
- Dismantling of form traveler
- Noise barrier erection
- Pipe jacking
- Raking Drain construction
- Asphalt paving
- Landscaping works
- Water mains and fire main works
- Road marking
- Fish pond 15 construction
- Erection of fencing
- Cleaning of manhole, U channel, pipeline and drainage pipe
- Construction of additional U channel
- Installation of road barrier
- Remedial works

2.6 A layout plan of the Project is provided in Figure 1.1.

# 3. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

## Monitoring Parameters and Locations

3.1 The EM&A Manual [2] designates locations for the ET to monitor environmental impacts in terms of air quality, noise, local stream water quality and coastal water quality. The air quality, noise, local stream water quality and marine water quality monitoring stations for this Project are shown in Figure 3.1 to 3.4 respectively. Appendix B gives the details of the monitoring requirements.

## Environmental Quality Performance Limits (Action and Limit Levels)

3.2 The environmental quality performance limits, i.e. Action and Limit levels (AL Levels) were derived from the baseline monitoring results [3] and/or other approaches as detailed in the EM&A Manual [2]. Should the measured environmental quality parameters exceed the AL Levels, the respective action plans would be implemented. The AL Levels for each environmental parameter are given in Appendix C.

## Environmental Mitigation Measures

3.3 Relevant mitigation measures as recommended in the Project EIA Report [1] had been stipulated in the EM&A Manual for the Contractor to adopt. A list of mitigation measures is given in Appendix H.

# 4. MONITORING RESULTS

4.1 A summary of monitoring conducted in the reporting period are summarized in Table 4.1.

**Table 4.1 Summary of monitoring conducted in the reporting period**

| | |
|---|---|
| 1-hour Total Suspended Particulates (TSP) monitoring | 657 sessions |
| 24-hour TSP monitoring | 219 sessions |
| Daytime noise monitoring at AN3 | 179 sessions |
| Daytime noise monitoring at N4 | 197 sessions |
| Evening noise monitoring at AN3 | 140 sessions |
| Evening noise monitoring at N4 | 140 sessions |
| Night time Noise monitoring at AN3 | 10 sessions |
| Night time Noise monitoring at N4 | 10 sessions |
| Holiday noise monitoring at AN3 | 140 sessions |
| Holiday noise monitoring at N4 | 140 sessions |
| Local Stream Water Quality Monitoring at S1, S2, S6-S10 | 521 sessions |
| Local Stream Water Quality Monitoring at S3 and S4 | 575 sessions |
| SWC - Marine Water Quality Monitoring (W2 & W16) | 507 sessions |
| SWC - Marine Water Quality Monitoring (W1 & W15) | 509 sessions |

* For some of the sessions, some of the monitoring locations were dry in winter.

## Air Quality

4.2 All the 1-hour TSP monitoring results complied with the AL Levels and no exceedance was recorded during the period from 18 September 2003 to 8 February 2007.

4.3 A total of 35 exceedances (32 Action Level and 3 Limit Level) for 24-hour TSP were recorded and 1 Action Level exceedance was related to the Project's work. Table 4.2 summarizes the number of air quality exceedances.

**Table 4.2 Summary of air quality exceedances**

| Parameters | 1-hour TSP | | 24-hour TSP | | Total |
|---|---|---|---|---|---|
| | Action | Limit | Action | Limit | |
| AN3 | 0 (0) | 0 (0) | 32 (1) | 3 (0) | 35 (1) |

*Remarks: ( ) exceedances related to the Project's work.

4.4 One exceedance recorded on 6 October 2004 was considered partially due to the Project's work. The identified dust source was the generation of fugitive dust by dump trucks movements at Tsing Chuen Wai.

4.5 Graphical presentations of both 1-hour TSP and 24-hour TSP monitoring results during the period from 18 September 2003 to 9 February 2007 are provided in Appendix D.

4.6 It was observed from the graphs that higher TSP levels were recorded between November and February of the next year in each year, particular in 2003 and 2004. Such elevation of TSP levels was likely triggered by the elevated ambient dust or general air quality pollution level during dry season. In fact, as the baseline monitoring for air quality was carried out in August 2003, during which the weather condition was mainly wet, the baseline TSP level was relatively low. Upon completion of most construction works after May 2006, the TSP levels gradually returned to the baseline level and much dominated by the change in ambient air quality and weather condition.

## Noise

4.7 All measured daytime noise monitoring results at AN3 were below the Limit Level during the reporting period from 18 September 2003 to 8 February 2007.

4.8 Termination of part of construction phase EM&A programme was approved by EPD on 8 February 2007. Monitoring of noise level at N4 was carried on during the period from 9 February 2007 to 18 June 2007. All measured daytime noise monitoring results at N4 were below the Limit Level.

4.9 There were 51 exceedances for night time noise monitoring, 13 exceedances for holiday noise monitoring and no exceedance for evening time noise monitoring. Table 4.3 summarizes the number of noise level exceedances. The graphical presentations of the noise monitoring results are provided in Appendix E.

**Table 4.3 Summary of noise exceedances**

| Time Period | Stations | No. of Limit Level Exceedances* | No. of Action Level Exceedances# | Total |
|---|---|---|---|---|
| Daytime (0700 – 1900) | AN3 | 0 | 2(2) | 2(2) |
| | N4 | 0 | 0 | 0 |
| Evening Time (1900 – 2300) | AN3 | 0 | 0 | 0 |
| | N4 | 0 | 0 | 0 |
| Night Time (2300 – 0700 of Next Day) | AN3 | 21(6) | 1(1) | 22(7) |
| | N4 | 30(0) | 0 | 30(0) |
| Holiday Daytime | AN3 | 0 | 0 | 0 |
| | N4 | 13(0) | 0 | 13(0) |
| Total | AN3 | 21(6) | 3(3) | 24(9) |
| | N4 | 43(0) | 0(0) | 43(0) |

*Remarks: ( ) exceedances related to the Project's work.
#Remarks: Only valid compliant was regarded as Action Level exceedance.

4.10 All exceedances were recorded during the aforementioned restricted hour periods, particularly the night time period. Actually, the Limit Level of 50dB(A) during this period is much more stringent than the normal daytime or even the evening time and background sound levels at the stations already exceeded it. Therefore, the noise levels as measured during the monitoring events produced exceedances. Yet, the six exceedances (3 x Leq-5 mins) recorded at AN3 on 27 May 2004 and 10 August 2004 were considered due to night-time construction works at Tsing Cheun Wai, which complied with the valid CNP conditions. No specific mitigation measure was thus applicable.

4.11 Other than the Limit Level exceedances, there were 6 noise complaints received. Yet, only 3 of them were considered Project's related and considered as triggering the Action Level exceedance. In these 3 noise complaints, the Contractor did not violate the Noise Control Ordinance (NCO) and there was no Limit Level exceedance recorded. Details of noise complaints are given in Appendix J.

4.12 It was observed from the graphs that higher noise levels were recorded during early stage of the construction works for daytime and during the middle stage of the construction works for evening time noise monitoring. The graphs showed clearly that all Limit Level exceedances were recorded for night time and holiday noise monitoring from the period of May 2004 to July 2005. Upon completion of most construction works, noise levels were consistently lower than Limit Level.

### Local Stream Water Quality

4.13 In accordance with the EM&A Manual [2], local stream water quality monitoring had to be carried out at 10 sampling locations (S1-S10) three times per week. Parameters including dissolved oxygen (DO), turbidity and suspended solids (SS) were monitored for stations S1-S4 and S6-S10 only.

4.14 The stream leading up to S5 was not accessible due to dense vegetation and steep landscapes. Besides it appeared that the proposed stream leading up to S5 might not be in the same water body as its downstream counterpart (S6). Therefore, no local stream water quality monitoring was carried out at S5.

4.15 Construction phase local stream water quality monitoring at 9 sampling locations (S1-S4, S6-S10) were carried out from 18 September 2003 to 8 February 2007. Termination of part of construction phase EM&A programme was approved by EPD on 8 February 2007, local stream water quality monitoring at

two sampling locations (S3 and S4) were carried on from 9 February 2007 to 18 June 2007. There were a total of 1138 water quality exceedances, in which 164 Action Level and 974 Limit Level exceedances were recorded. Among these exceedances, there were 532 of DO level, 287 of turbidity and 319 of SS exceedances. Table 4.4 summarizes the number of local stream water quality exceedances.

**Table 4.4 Summary of local stream water quality exceedances**

| Monitoring Station | Exceedance Level | Parameters | | | |
|---|---|---|---|---|---|
| | | DO | Turbidity | SS | Total |
| S2 | Action | 49 (6) | 9 (1) | 7 (1) | 65 (8) |
| | Limit | 25 (7) | 69 (28) | 93 (27) | 187 (62) |
| S4 | Action | 0 (0) | 0 (0) | 5 (0) | 5 (0) |
| | Limit | 23 (1) | 34 (12) | 35 (13) | 92 (26) |
| S6 | Action | 65 (19) | 2 (0) | 3 (0) | 70 (19) |
| | Limit | 112 (23) | 94 (69) | 89 (56) | 295 (148) |
| S8 | Action | 0 (0) | 1 (0) | 11 (1) | 12 (1) |
| | Limit | 110 (1) | 24 (2) | 15 (1) | 149 (4) |
| S10 | Action | 0 (0) | 6 (2) | 6 (1) | 12 (3) |
| | Limit | 148 (18) | 48 (26) | 55 (25) | 251 (69) |
| Total | Action | 114 (25) | 18 (3) | 32 (3) | 164 (31) |
| | Limit | 418 (50) | 269 (137) | 287 (122) | 974 (309) |

*Remarks: ( ) exceedances related to the Project's work.

4.16 Termination of part of construction phase EM&A programme was approved by EPD on 8 February 2007. Local stream water quality monitoring at only two sampling locations (S3 and S4) were carried on during the period from 9 February 2007 to 18 June 2007. No exceedance was recorded during this monitoring period.

4.17 A total of 340 exceedances (75 of DO level, 140 of turbidity and 125 of SS) were due to the Project's works during the period. They were likely due to muddy surface runoff discharged into the stream, soil loss and silt deposited in the stream or wastewater generated from haul road dampening activities. All work-related exceedances were recorded from October 2003 to September 2005, during which most construction activities were undertaken. As the scale of construction works reduced in 2006, there has been no work-related exceedance recorded since October 2005.

4.18 A post-project local stream water quality monitoring was carried out for 4 weeks from 20 June 2007 to 18 July 2007 after completion of construction. Monitoring was not carried out at S6 and S9 since the stream was dried out at S6 and the access was blocked at S9 after the operation of Ha Tusen Weigh Station. The monitoring results obtained from other monitoring stations were comparable to the baseline levels, i.e. the ambient conditions. The monitoring data are presented in Appendix F.

4.19 Graphical presentations of all the monitoring results are provided in Appendix F.

4.20 It could be observed from the graphs that there was a greater fluctuation in SS and turbidity during the period from April 2004 to November 2004 and from July 2005 to October 2005 during which was the peak construction period. However, most SS and turbidity were comparable to those of the baseline. Those SS and turbidity exceedances were considered as the surface runoff and muddy water discharged into the stream which directly related to the Project.

4.21 As shown on the graphs showing DO at different monitoring stations, a seasonal trend could be observed. It was noted that higher DO levels were recorded during winter time, with crests usually happened from September to November of each year.

4.22 Upon completion of construction works, the local stream water quality gradually returned within the baseline levels. The 4-week post-project local stream water quality monitoring results as 1-20 mg/L of SS, 3-7.5 mg/L of turbidity, 4.1-7.1mg/L of Dissolved Oxygen and 43.5-79.6% of DO saturation were comparable to the baseline levels (1-391 mg/L of SS, 1.14-276 mg/L of turbidity, 1.95-7.88 of DO and 26.5-103.6% of DO saturation) showing a return to the ambient conditions.

**Coastal Water Quality**

4.23 Monitoring of coastal water quality in Deep Bay was undertaken by the Environmental Team of Hong Kong – Shenzhen Western Corridor (HK-SWC). As required by the EM&A Manual, monitoring results collected at stations W1, W2, W15 and W16 were required to analyse the coastal water quality impact from the Project during the period from 15 October 2003 to 6 February 2007.

4.24 There were a total of 259 water quality exceedances, in which 242 Action and 17 Limit Level exceedances respectively, recorded from the monitoring events during the period from 15 October 2003 to 6 February 2007. Among these exceedances, there were 147 DO level, 49 of turbidity and 63 of SS exceedances. All exceedances were concluded not due to the Project's work. The number of exceedances at each monitoring station is summarized in Table 4.5.

**Table 4.5 Summary of coastal water quality exceedances**

| Tide | Station | Exceedance Level | Dissolved Oxygen | Turbidity | Suspended Solids | Total |
|---|---|---|---|---|---|---|
| Mid-Flood | W1 | Action | 44 | 4 | 10 | 58 |
| | | Limit | 0 | 0 | 0 | 0 |
| | W15 | Action | 40 | 18 | 13 | 71 |
| | | Limit | 0 | 5 | 8 | 13 |
| Mid-Ebb | W2 | Action | 32 | 4 | 6 | 42 |
| | | Limit | 0 | 0 | 1 | 1 |
| | W16 | Action | 31 | 17 | 23 | 71 |
| | | Limit | 0 | 1 | 2 | 3 |
| **TOTAL** | | **Action** | **147** | **43** | **52** | **242** |
| | | **Limit** | **0** | **6** | **11** | **17** |

4.25 Graphical presentations of all the monitoring results are provided in Appendix G.

4.26 ET investigated the possible reasons for each exceedance. In fact, all of them were evaluated not related to the Project's activities. As the wastewater and surface runoff generated from the Project was sufficiently treated by the large sedimentation ponds located at Ngau Hom Shek before discharge into Deep Bay, the effluent was usually in low SS and hence turbidity levels. Regarding DO exceedances, they were less related to the construction impacts. In reviewing the reasons of these exceedances, they were likely due to poor ambient water quality around the monitoring stations and potential local discharges from the nearby villages or poultry farms.

4.27 It could be observed from the graphs that there was a greater fluctuation in SS and turbidity from the end of 2003 to end of 2004, which was likely correlate to the marine construction of adjacent project. However, most SS and turbidity levels were comparable to those of the baseline. For the most cases, high levels of SS and turbidity, and occasion low levels of DO recorded at W1, W2, W15 and W16 were caused by poor regional water quality and/ or local water quality impact which were not related to the Project.

# 5. AUDIT RESULTS

## Implementation Status of Environmental Mitigation Measures

5.1 The Contractor implemented mitigation measures to minimize the environmental impacts due to construction activities. Regarding a few minor observations as noted during ET's site inspections, the Contractor rectified most of the problems and no major environmental deficiency was induced.

5.2 The implementation status of environmental mitigation measures (EMIS) is given in Appendix H.

## Status of Environmental Licensing and Permitting

5.3 Environmental licenses and permits including Environmental Permit for the Project, construction noise permit and effluent discharge license were in place and valid during the Construction Phase. A summary status of licences and permits is given in Appendix I.

## Advice on Solid and Liquid Waste Management Status

5.4 The solid waste generated from the Project included inert and non-inert C&D waste, chemical waste, excavated material, site clearance waste and general refuse. Table 5.1 summarizes the actual waste generated throughout the construction period.

**Table 5.1 Actual Waste Generation throughout the Construction Period**

| Waste Type | Examples | Amount | Disposal Locations |
|---|---|---|---|
| Site clearance waste | Vegetation, refuse on land | 5,409 $m^3$ | WENT Landfill |
| Excavated material | Rock and soil | 36,956 $m^3$ | Tuen Mun Area 38, WENT Landfill |
| Public fill (inert) | Concrete, brick, aggregates | 12,401 $m^3$ | Tuen Mun Area 38 |
| C & D waste (non-inert) | Plastic, wood and bamboo | 6,194 $m^3$ | WENT Landfill |
| Chemical waste | Used oil, spent solvent | 1,990 L | Chemical Waste Treatment Centre |
| General refuse | Food and packaging waste, office waste | 5,857 $m^3$ | WENT Landfill |

# 6. NON-COMPLIANCE (EXCEEDANCES) OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS (ACTION AND LIMIT LEVELS)

## Summary of Exceedances

6.1 All measured 1-hour TSP concentrations in the reporting period were below the Action and Limit Levels.

6.2 For 24-hour TSP monitoring, a total of 32 Action Level and 3 Limit Level exceedances were recorded in the reporting period. It was concluded that only 1 exceedance of Action Level was due to the Project's work.

6.3 For the construction noise monitoring, a total of 64 Limit Level exccedances were recorded in the reporting period. It was concluded that 6 of them were due to the Project's work. Three Action Level exceedances for noise monitoring were recorded as 3 valid complaints were received during the reporting period.

6.4 For local stream water quality monitoring, a total of 1138 exceedances (164 Action Levels and 974 Limit Levels) were recorded in the reporting period. It was concluded that 340 exceedances were due to the Project's work.

6.5 For coastal water quality monitoring, a total of 259 exceedances (242 Action Levels and 17 Limit Levels) were recorded in the reporting period. All exceedances were concluded not due to the Project's work.

## Review of the Reasons for and the Implications of Non-compliance

6.6 No exceedance of Action or Limit Level for 1-hour TSP measurement was recorded in the reporting quarter.

6.7 Regarding the exceedances recorded for 24-hour TSP concentration in the reporting period, only 1 exceedance was considered partially due to the generation of fugitive dust by dump trucks movements at Tsing Chuen Wai on 6 October 2004.

6.8 All the 13 exceedances for holiday daytime noise monitoring were concluded not due to the Project's work. They were mainly due to the background sound levels.

6.9 Regarding the Limit Level exceedances recorded for night time noise monitoring in the reporting period, six of them were related to the Project's work on 27 May 2004 and 10 August 2004. These exceedances were considered due to night-time construction works at Tsing Chuen Wai, which complied with the valid CNP conditions. No specific mitigation measures was thus applicable.

6.10 Three valid noise complaints were received during the reporting period. Details of the complaints are given in Appendix J.

6.11 For local stream water quality monitoring, only 340 exceedances (75 of DO level, 140 of turbidity and 125 of SS) were due to the Project's works during the reporting period. They were likely due to muddy surface runoff discharged into the stream, soil loss and silt deposited in the stream or wastewater generated from haul road dampening activities.

6.12 All the 259 exceedances for coastal water quality monitoring were concluded not due to the Project's work. They were likely due to poor regional water quality and/ or local water quality impact which were not related to the Project.

6.13 These work related exceedances (24-hour TSP, night time noise and local stream water quality) were short in duration. The Contractor generally implemented the required mitigation measures to rectify the environmental impacts. There was thus no long term implication to the environment.

**Summary of Actions Taken**

6.14 The Contractor generally implemented all the required mitigation measures to suppress the environmental impacts.

6.15 One exceedance for air quality was concluded partially due to the Project's work. The Contractor had stepped-up the frequency of water spraying programme to rectify the problem. All other exceedances were concluded not due to works. No further action was required.

6.16 Other than the limit level exceedances, there were 6 noise complaints received. Yet, only 3 of them were considered project related, in which the Contractor did not violate the Noise Control Ordinance (NCO) and there was no limit exceedance recorded. Details of noise complaints refer to Appendix J. While most complaints were made against the construction works during restricted hours, site records demonstrated that the construction activities were complied with the CNP condition. No further action was thus required.

6.17 A total of 340 exceedances (75 of DO level, 140 of turbidity and 125 of SS) for local stream water quality were concluded due to the Project's work. The Contractor generally cleaned the accumulated silt more frequently and enhanced the performance of silt trap in order to rectify the problem. All other exceedances were concluded not due to works. No further action was required.

6.18 As all the 259 exceedances for coastal water quality monitoring were concluded not due to the Project's work, no further action was required.

# 7. COMPARISON OF EM&A DATA WITH EIA PREDICTION

### 1-hour TSP and 24-hour TSP Monitoring

7.1 The environmental monitoring data collected during the construction period were generally in line with the prediction of Deep Bay Link – Northern Section Environmental Impact Assessment (EIA) Report [1] / Deep Bay Link – Northern Section Baseline Monitoring Report [3] as the monitoring results were within the acceptable levels as stipulated in the EIA report [1].

### Noise Monitoring

7.2 All the daytime noise monitoring results were below the Limit Levels. The trend of daytime $L_{eq}$ showed no noticeable noise impact from the Project during the reporting period and all daytime noise monitoring results were in line with the prediction in the EIA Report [1].

### Local Stream Water Quality Monitoring

7.3 Except the occasional exceedances of local stream water quality monitoring, the environmental monitoring data collected during the construction period were generally in line with the baseline condition as shown in the Baseline Monitoring Report [3] as the monitoring results were within the acceptable levels as stipulated in this report. The post-construction monitoring results also showed a return to the ambient conditions, as the monitoring results were comparable to the baseline levels.

### Coastal Water Quality Monitoring

7.4 There was no project related exceedance. The environmental monitoring data collected during the construction period were generally in line with the prediction of water quality impact assessment for the EIA Report [1] as the monitoring results were within the acceptable levels as stipulated in this report.

### Review of Environmental Monitoring Methodology and EM&A Programme

7.5 The environmental monitoring methodologies and procedures were regularly reviewed by the ET. No modification to the existing monitoring methodology was made during the construction period.

7.6 The EM&A programme, the effectiveness and efficiency of the mitigation measures were successful during the construction period.

### Environmental Acceptability of the Project

7.7 Even though 1138 exceedances of local stream water quality, 259 exceedances of coastal water quality, 35 exceedances of air quality and 67 exceedances of noise limit level were reported. 97% of air quality exceedance, 87% of noise level exceedance, 70% of local stream water quality exceedance and all exceedance of coastal water quality were concluded not related to the Project's work. The environmental monitoring results indicated that the construction activities in general complied with the relevant environmental requirements and were environmentally acceptable.

## 8. ENVIRONMENTAL COMPLAINTS

8.1 All complaints were handled in accordance with the EM&A Manual [2]. The complaint handling procedure is provided in Appendix J.

8.2 There were 28 complaints received during the reporting period. The complaints were mainly about air quality (particularly dust), noise and water quality problems. The Contractor was notified of all these complaints. 11 of the complaints were project related and were followed up and rectified. Regarding the invalid complaints, the Contractor had maintained sufficient mitigation measures to prevent them from happening.

8.3 Summary record of the complaints, investigation and follow-up actions undertaken are provided in Appendix J.

## 9. NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

9.1 One summons and successful prosecution was made against the Project since commencement. During EPD's inspection on 24 March 2005, a pink form was issued to the Contractor regarding an improper discharge into San Hang Nullah from the works area at Tsing Chuen Wai. The Contractor was later summoned and prosecuted under the Water Pollution Control Ordinance. The Contractor pledged guilty to the charge during the court appearance on 15 November 2005.

9.2 There were 5 yellow forms issued by EPD during the reporting period. The Contractor properly rectified the events addressed in yellow forms. Summary records of the yellow forms are provided in Appendix K.

## 10. COMMENTS AND CONCLUSIONS

10.1 The ET carried out air quality, noise, local steam water quality, coastal water quality monitoring and weekly site inspection in accordance with the EM&A Manual [2].

10.2 No exceedance of AL Levels for 1-hour TSP monitoring was recorded in the reporting period.

10.3 There were 35 exceedances for 24-hour TSP concentration recorded in the reporting period. Mitigation measures for the construction dust were generally implemented. It was concluded that only one exceedance was due to the Project's work and the exceedance was rectified.

10.4 There were 64 exceedances for noise monitoring recorded in the reporting period. Only 3 valid noise complaints (Action Level exceedances) and 6 Limit Level exceedances were related to the Project's work. Mitigation measures for the construction noise were generally implemented.

10.5 For local stream water quality monitoring, 1138 exceedances were recorded. It was concluded that 340 exceedances were due to the Project's work and the exceedances were rectified. Post-project local stream water quality monitoring also showed a return to the ambient conditions.

10.6 For coastal water quality monitoring, all 259 exceedances were concluded not due to the works and no further action was required.

10.7 28 complaints were made against this Project since commencement of the Project. 11 complaints were considered related to the Project's work and valid, and were followed up and rectified.

10.8 One summon and successful prosecution was made against the Project during the reporting period.

10.9 Five yellow forms were issued by EPD during the reporting period. The Contractor had rectified the events addressed in yellow forms.

10.10 Upon completion of the project, environmental qualities returned to the ambient levels. No significant impact to the adjacent environment was noted, which concurs with the EIA Report [1] findings.

10.11 The implemented EM&A programme ensured that any environmental impacts to the receivers would be

readily detected and timely actions could be taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental acceptability of the Project. Weekly site inspections checked that the EIA's recommended mitigation measures were effectively implemented. No particular recommendation was advised for improvement in the EM&A programme.

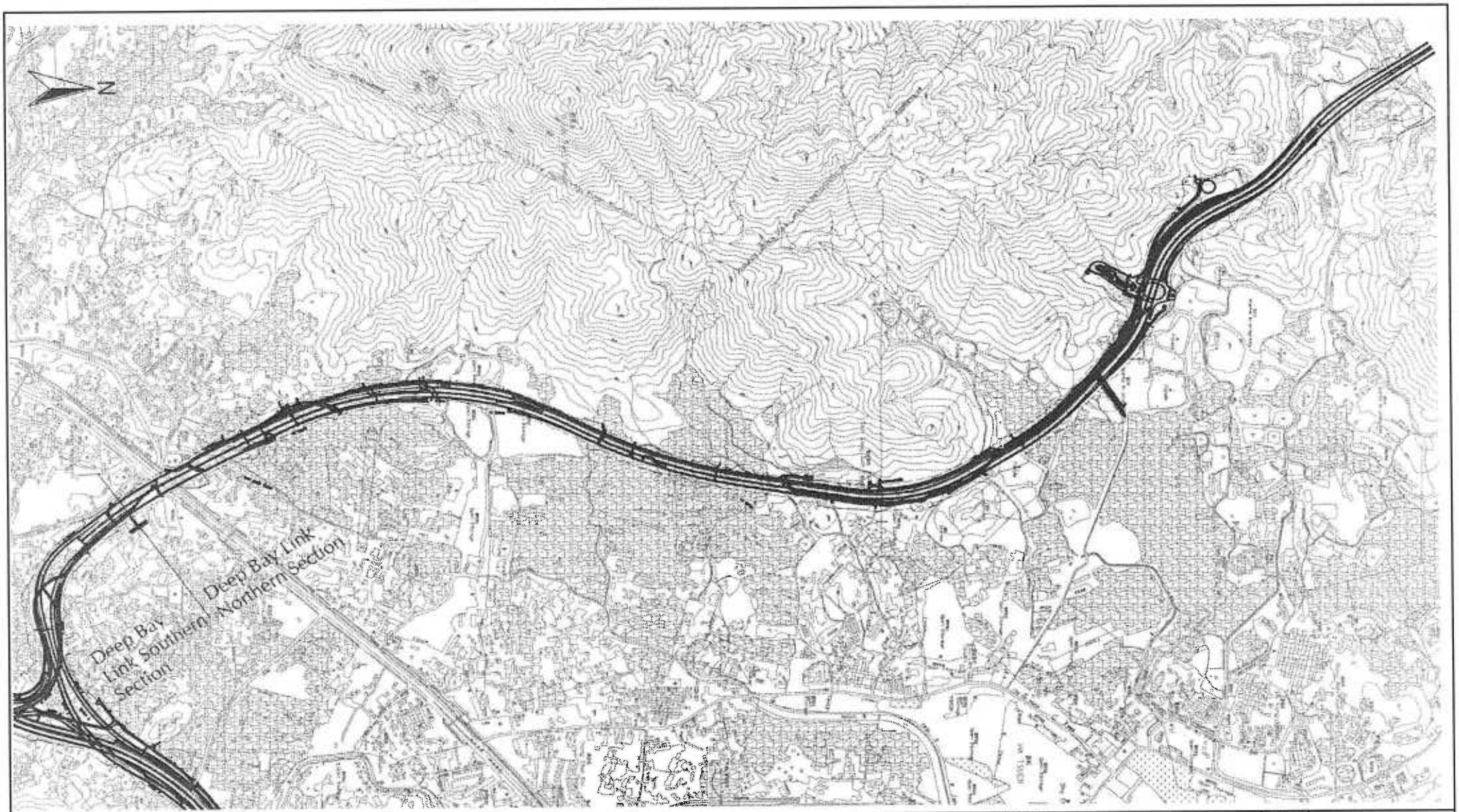
## 11. REFERENCES

[1] Ove Arup & Partners Hong Kong Ltd. May 2002. Agreement No. CE109/98, Deep Bay Link – Investigation and Preliminary Design, Environmental Impact Assessment Report Volume 1 of 3 – Text.

[2] Ove Arup & Partners Hong Kong Ltd. May 2002. Agreement No. CE109/98, Deep Bay Link – Investigation and Preliminary Design, Final Environmental Impact Assessment Report, Environmental Monitoring and Audit Manual.

[3] Maunsell Environmental Management Consultants Ltd. August 2003. Contract No. HY/2002/24 Deep Bay Link – Northern Section, Baseline Monitoring Report (Revision 1).

# FIGURES



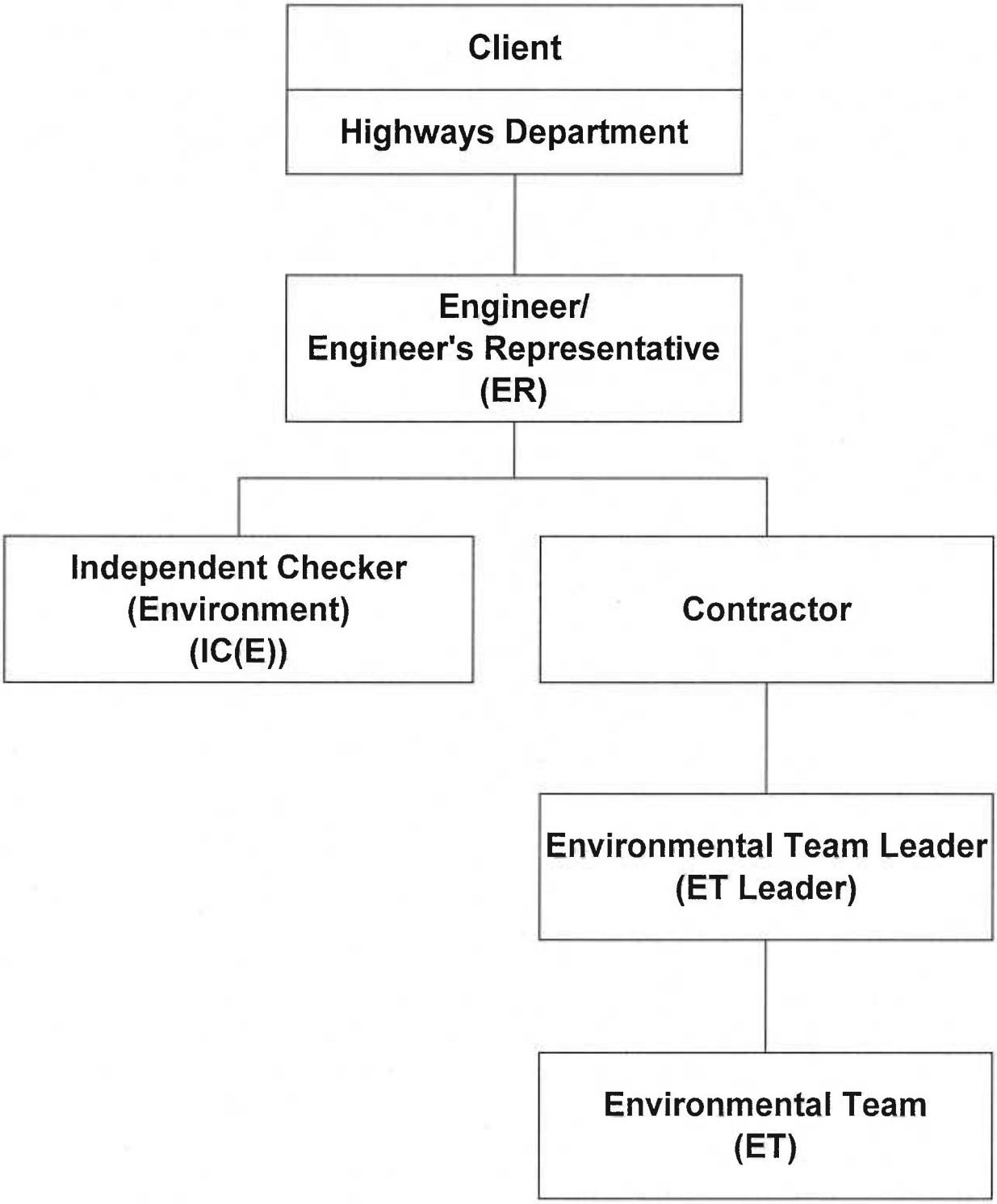

ENSR | AECOM

CONTRACT NO. HY/2002/24

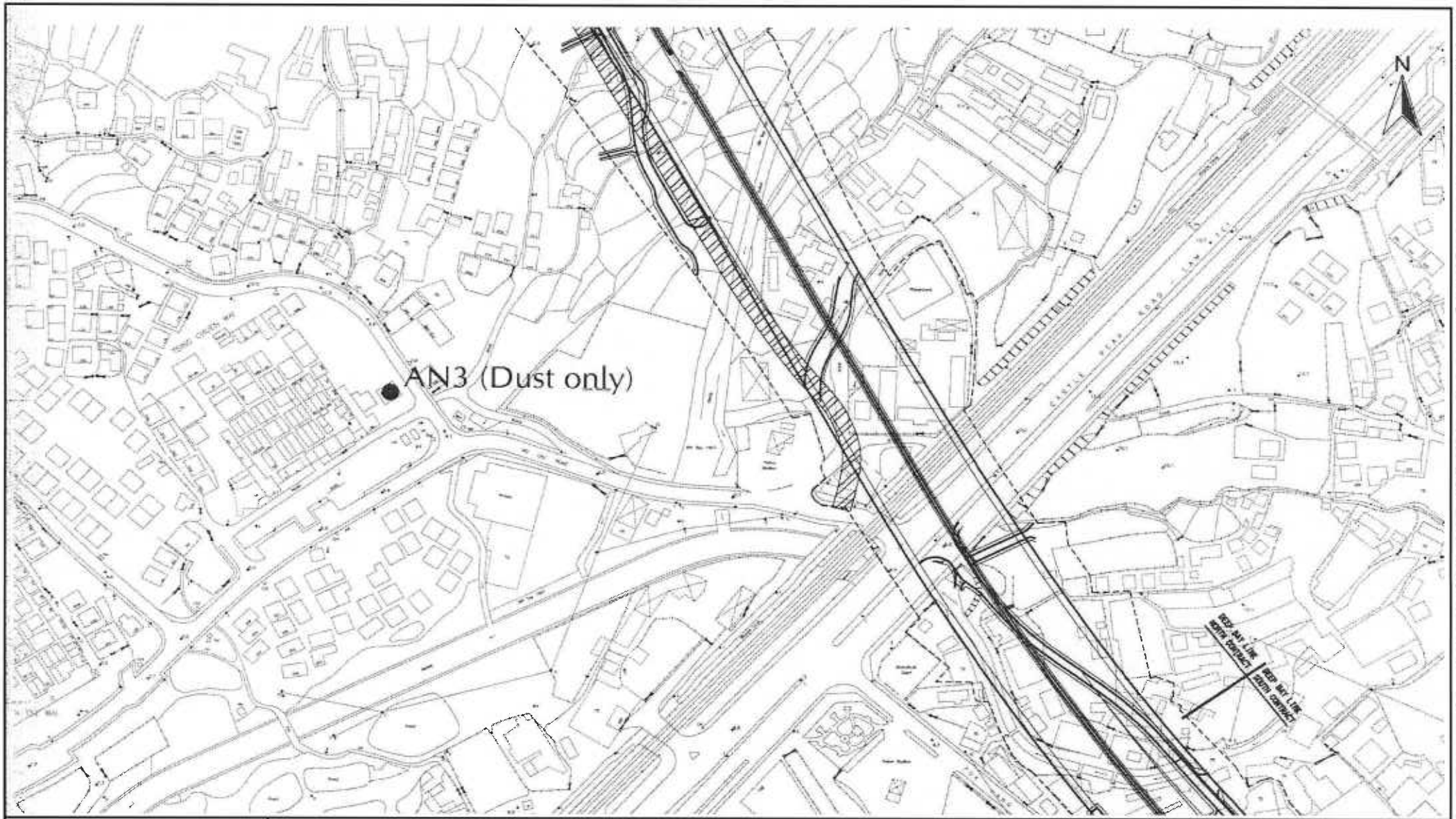
DEEP BAY LINK - NORTHERN SECTION

**LAYOUT OF WORK SITE**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016782 | FIGURE No. 1.1 | Rev - |




| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24 | SCALE | N.T.S. | DATE | 2007 |
| | Deep Bay Link - Northern Section | CHECK | PTPM | DRAWN | LLMC |
| | Project Organization | JOB NO. | 60016782 | FIGURE No. 2.1 | Rev. - |



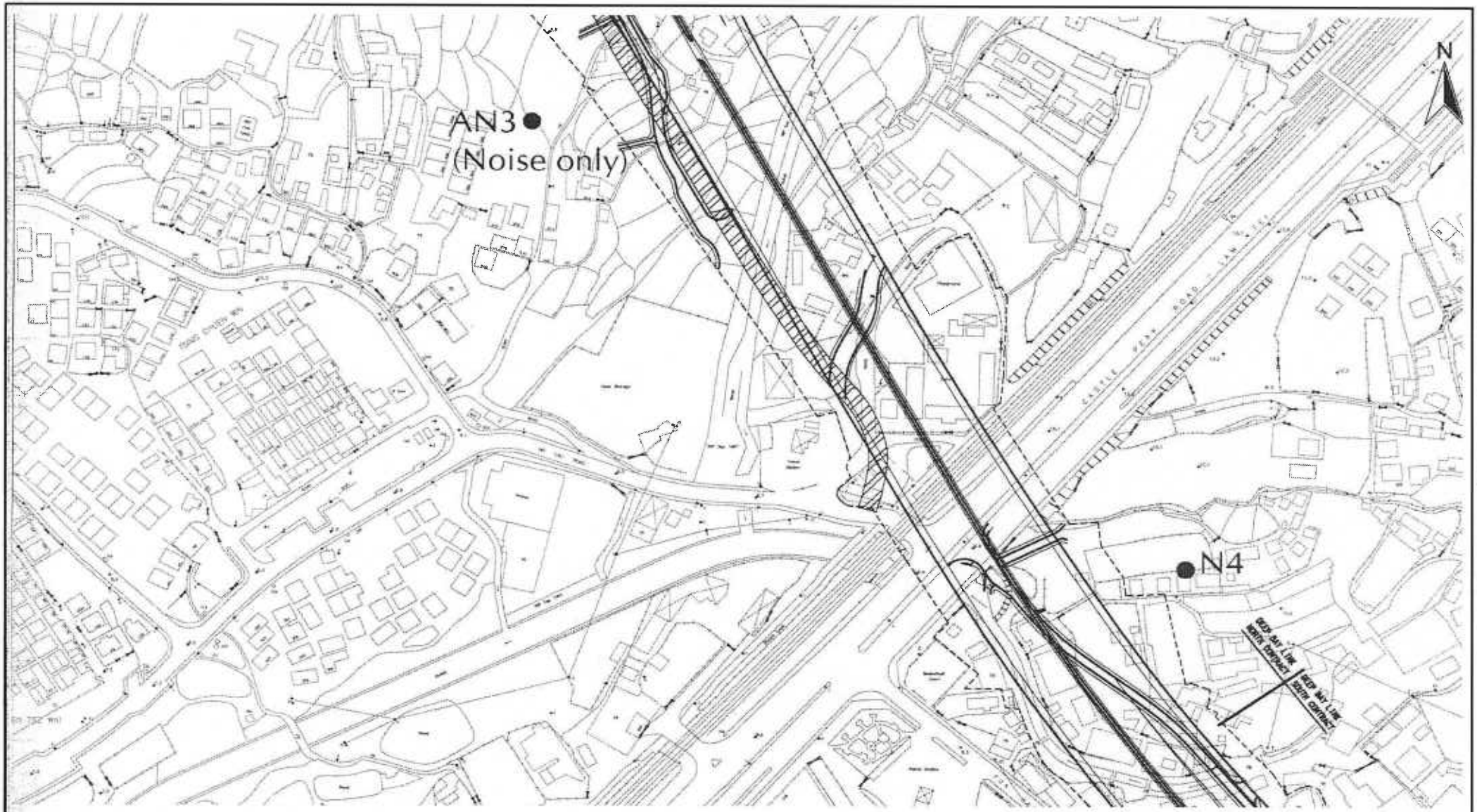

ENSR | AECOM

CONTRACT NO. HY/2002/24

DEEP BAY LINK - NORTHERN SECTION

**LOCATION OF AIR QUALITY MONITORING STATIONS**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016782 | FIGURE No. 3.1 | Rev - |



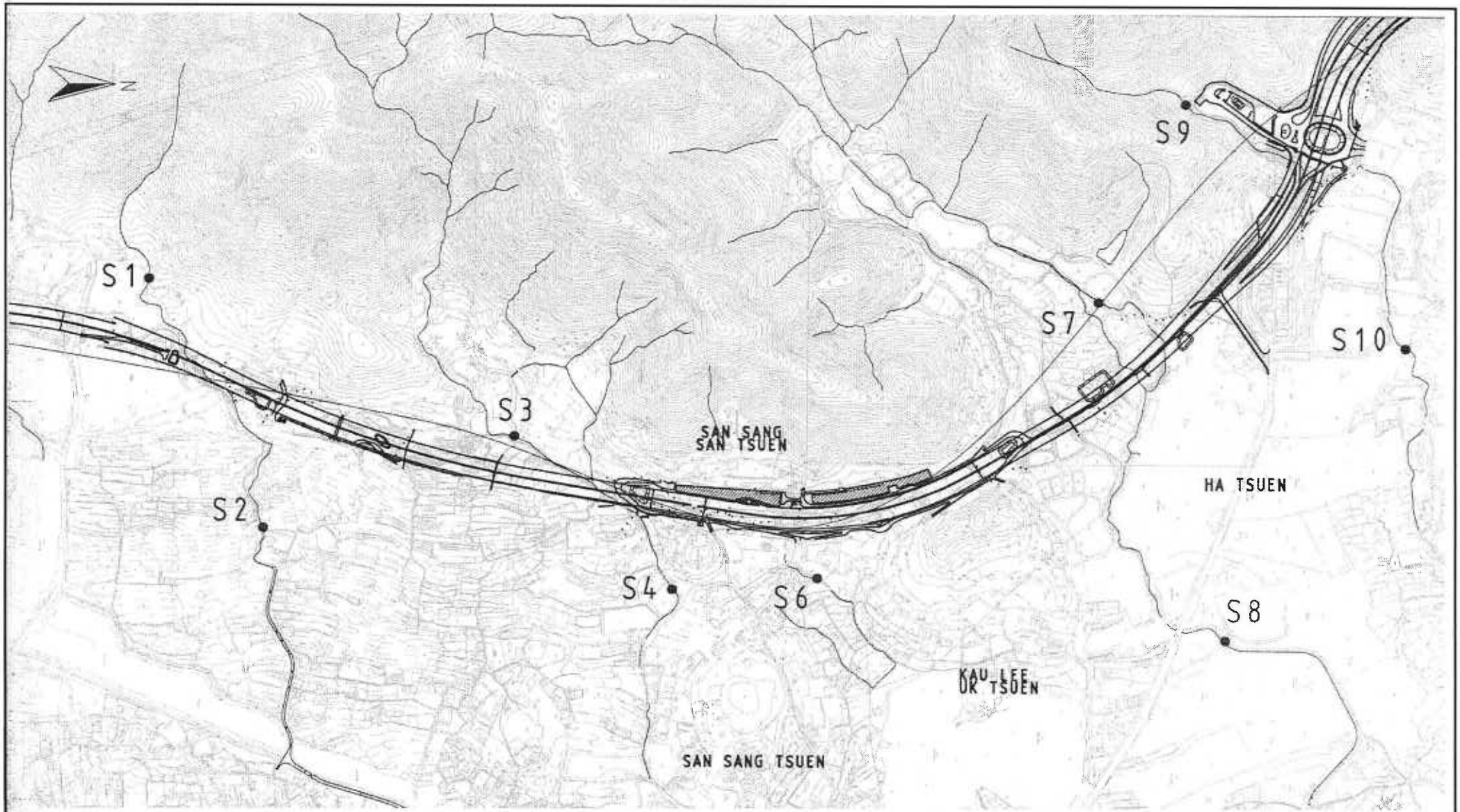

ENSR | AECOM

CONTRACT NO. HY/2002/24

DEEP BAY LINK - NORTHERN SECTION

**LOCATION OF NOISE MONITORING STATIONS**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016782 | FIGURE No. 3.2 | Rev - |



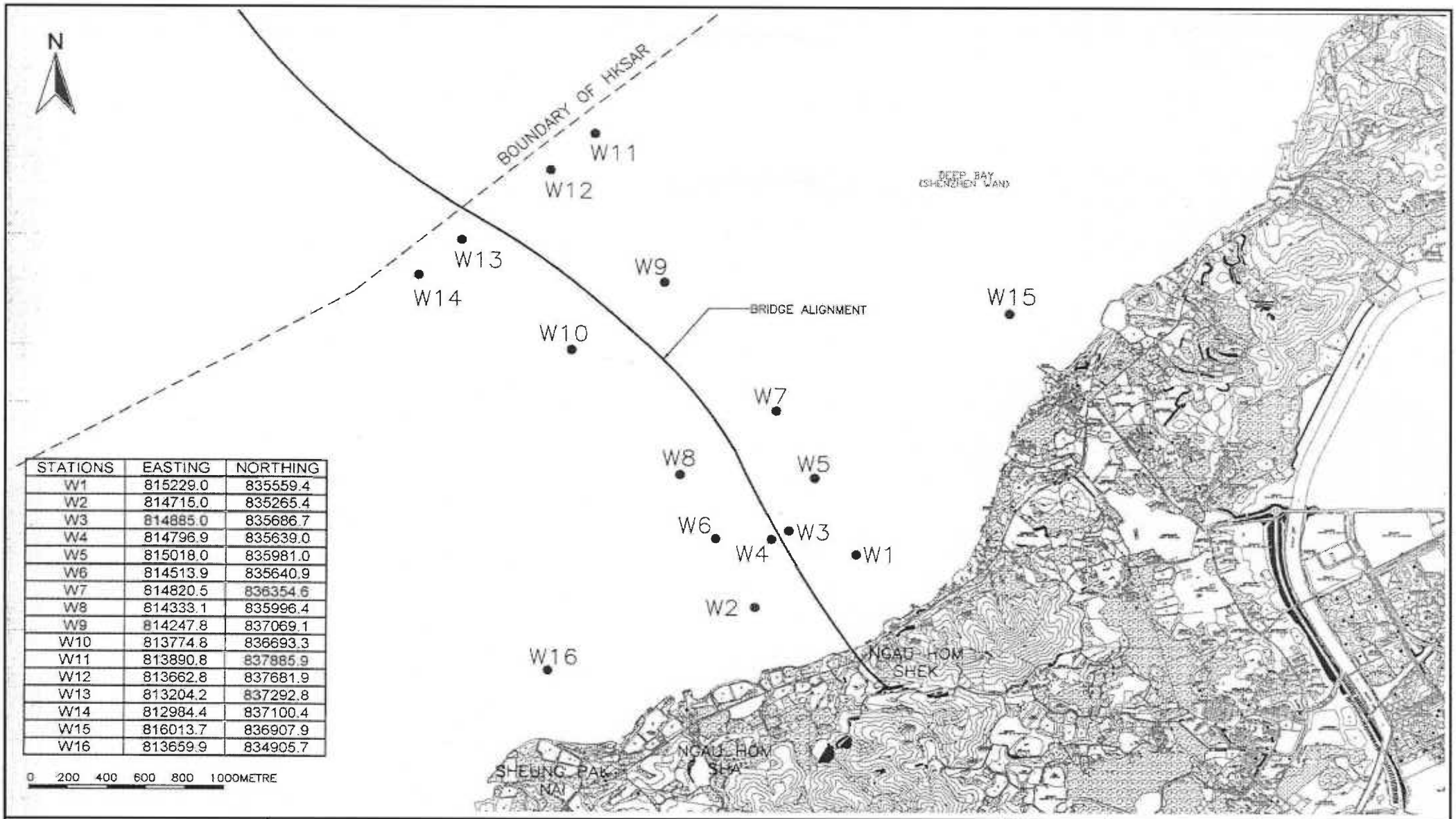

ENSR | AECOM

CONTRACT NO. HY/2002/24

DEEP BAY LINK - NORTHERN SECTION

**LOCATIONS OF LOCAL STREAM WATER QUALITY MONITORING STATIONS**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016782 | FIGURE No. | 3.3 |
| | | Rev | - |




| STATIONS | EASTING | NORTHING |
|---|---|---|
| W1 | 815229.0 | 835559.4 |
| W2 | 814715.0 | 835265.4 |
| W3 | 814885.0 | 835686.7 |
| W4 | 814796.9 | 835639.0 |
| W5 | 815018.0 | 835981.0 |
| W6 | 814513.9 | 835640.9 |
| W7 | 814820.5 | 836354.6 |
| W8 | 814333.1 | 835996.4 |
| W9 | 814247.8 | 837069.1 |
| W10 | 813774.8 | 836693.3 |
| W11 | 813890.8 | 837885.9 |
| W12 | 813662.8 | 837681.9 |
| W13 | 813204.2 | 837292.8 |
| W14 | 812984.4 | 837100.4 |
| W15 | 816013.7 | 836907.9 |
| W16 | 813659.9 | 834905.7 |

ENSR | AECOM

CONTRACT NO. HY/2002/24

DEEP BAY LINK - NORTHERN SECTION

**LOCATIONS OF COASTAL WATER QUALITY MONITORING STATIONS**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | LLCM |
| JOB NO. | 60016782 | FIGURE No. | 3.4 |
| | | Rev | - |

# APPENDIX A
# CONTACT DETAILS OF KEY MANAGEMENT

**Contacts of Key Environmental Staff**

| | Name | Telephone | Fax |
|---|---|---|---|
| **EPD** | | | |
| Environmental Protection Officer | Mr. K. W. Ng | 2411 9622 | 2611 9149 |
| **ER** | | | |
| **Ove Arup & Partners HK Limited** | | | |
| Senior Resident Engineer | Mr. Jackson Wong | 2448 8290 | 2448 3361 |
| Resident Environmental Protection Officer | Ms. T. C. Wong | 2448 8290 | 2448 3361 |
| **IEC** | | | |
| **CH2M HILL HK Limited** | | | |
| Independent Environmental Checker | Mr. Billy Yu | 2507 2203 | 2507 2293 |
| **Contractor** | | | |
| **Gammon Construction Limited** | | | |
| Project Director | Mr. Rayland Lee | 2448 8682 | 2448 8019 |
| Project Manager / Site Agent | Mr. Bernard Rooney | 2448 8682 | 2448 8019 |
| Environmental Engineer | Mr. Leo Chow | 2448 8682 | 2448 8019 |
| **ET** | | | |
| **ENSR Asia (HK) Limited** | | | |
| Environmental Team Leader | Mr. Y. T. Tang | 2893 1551 | 2891 0305 |
| Senior Environmental Scientist | Ms. Connie Wong | 2893 1551 | 2891 0305 |

# APPENDIX B
# ENVIRONMENTAL MONITORING PROGRAMME

## Appendix B Environmental Monitoring Programme

### Table B1 Air Quality Monitoring Parameters and Frequency

| Location | Parameter | Duration | Frequency |
|---|---|---|---|
| AN3 | 1-hour TSP | 1 hour | 3 times every 6 days |
| | 24-hour TSP | 24 hours | Once every six days |

### Table B2 Noise Monitoring Parameters, Period and Frequency

| Location | Time Period | Parameter | Frequency |
|---|---|---|---|
| AN3, N4 | Normal weekday Daytime (0700 to 1900) | $L_{eq\ (30\text{-}min)}$ | Once per week |
| | *Evening (1900 to 2300) | $L_{eq\ (15\text{-}min)}$ or 3 nos.$L_{eq\ (5\text{-}min)}$ | |
| | *Night-time (2300 to 0700 of next day) | | |
| | *Holiday Daytime (0700 to 1900) | | |

*Noise monitoring to be conducted only when construction work is in progress.

### Table B3 Local Stream Water Quality Monitoring Parameters, Period and Frequency

| Monitoring Station | Parameters, unit | Frequency | No. of Depths |
|---|---|---|---|
| S1 – S10# | Temperature, °C*<br>Dissolved Oxygen, mg/L*<br>Dissolved Oxygen Saturation, %*<br>Turbidity, NTU*<br>Suspended Solids, mg/L | Three times per week | 1 (Surface) |

* Parameters measured *in-situ*, otherwise by laboratory analysis.
# Monitoring at S5 was omitted from the impact monitoring programme as it was found not accessible.

### Table B4 Coastal Water Quality Monitoring Parameters, Period and Frequency

Monitoring of coastal water quality of Deep Bay was undertaken in the EM&A programme of Hong Kong-Shenzhen Western Corridor (HK-SWC).

| Monitoring Station | Parameters, unit | Frequency | No. of Depths |
|---|---|---|---|
| W1 – W16 | Water Depth, m*<br>Temperature, °C*<br>Salinity, ppt*<br>Dissolved Oxygen, mg/L*<br>Dissolved Oxygen Saturation, %*<br>Turbidity, NTU*<br>pH*<br>Suspended Solids, mg/L | Three times per week during mid-ebb and mid-flood tides | 1 (Mid-depth) |
| W1 – W6 | Tributyltin, µg/L | Two times per week during mid-ebb and mid-flood tides | 1 (Mid-depth) |

*Parameters measured *in-situ*, otherwise by laboratory analysis.

# APPENDIX C
# ACTION AND LIMIT LEVELS

## Appendix C – Action and Limit Levels

### Action and Limit Levels for 1-hour TSP and 24-hour TSP

| Parameter | Location | Action Level, $\mu g/m^3$ | Limit Level, $\mu g/m^3$ |
|---|---|---|---|
| 1-hour TSP | AN3 | 297.7 | 500 |
| 24-hour TSP | | 158.4 | 260 |

### Action and Limit Levels for Construction Noise

| Time Period | Action Level | Limit Level, dB(A) | |
|---|---|---|---|
| | | AN3 (Tsing Chuen Wai) | N4 (Tsoi Yuen Tsuen (West)) |
| 0700 – 1900 hours on normal weekdays ($L_{eq, 30mins}$) | When one documented complaint is received from any one of the sensitive receivers | 75 | 75 |
| 1900 – 2300 hours on all days ($L_{eq, 15mins}$) | | 65 | 65 |
| 0700 – 1900 hours on general holiday ($L_{eq, 15mins}$) | | 65 | 65 |
| 2300 – 0700 hours on all days ($L_{eq, 15mins}$) | | 50 | 50 |

### Action and Limit Levels for Coastal Water Quality Monitoring

Carried out under the EM&A programme of HK-SWC

| Parameter | Action | Limit |
|---|---|---|
| DO, mg/L [1] | 4.2 | 2.0 |
| Turbidity, NTU [1] | **50.8** and 120% of upstream control station's turbidity at the same tide of the same day | **101.5** and 130% of upstream control station's turbidity at the same tide of the same day |
| SS, mg/L [1] | **50.6** and 120% of upstream control station's SS at the same tide of the same day | **86.3** and 130% of upstream control station's SS at the same tide of the same day |

Notes:
1. The Action and Limit Levels are applied to W1 & W15 during mid-flood tide; and W2 & W16 during mid-ebb tide only

### Limit Level for Tributyltin (TBT)

Carried out under the EM&A programme of HK-SWC

| Parameter | Limit Level |
|---|---|
| TBT [1] | 0.002 µg/L |

Notes:
1. The Limit Level is applied to W1 during mid-flood tide and W2 during mid-ebb tide only

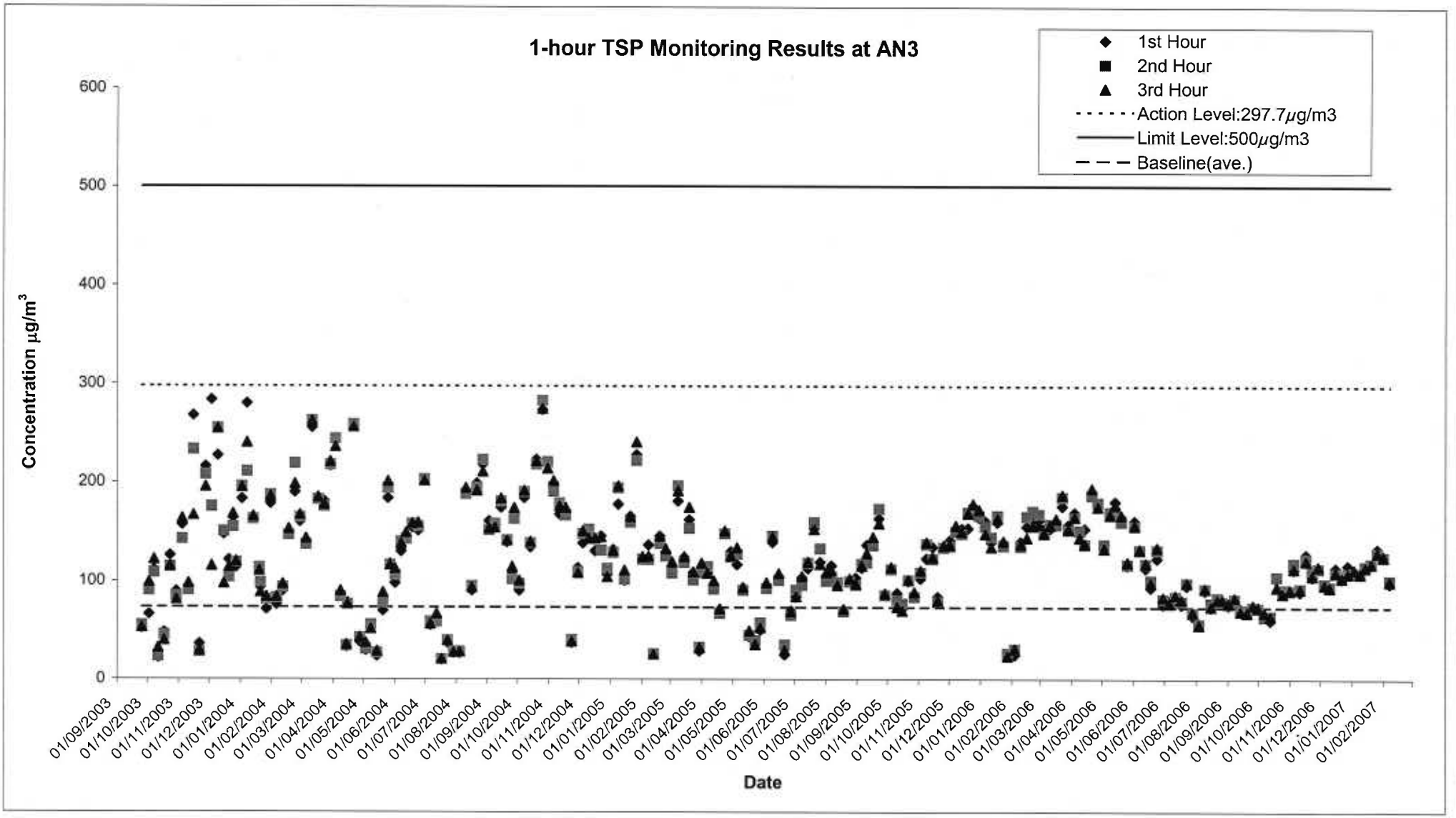
## Action and Limit Levels for Local Stream Water Quality Monitoring

| Station | Parameter | Action | Limit |
|---|---|---|---|
| S2 | DO, mg/L | **4.61** | 4 mg/L or 40% saturation at 15$^{O}$C |
| | Turbidity, NTU | **43.0** and 120% of upstream control station's turbidity at the same tide of the same day | **60.2** and 130% of upstream control station's turbidity at the same tide of the same day |
| | SS, mg/L | **28.8** and 120% of upstream control station's SS at the same tide of the same day | **30.6** and 130% of upstream control station's SS at the same tide of the same day |
| S4 | DO, mg/L | 4 mg/L or 40% saturation at 15$^{O}$C* | 4 mg/L or 40% saturation at 15$^{O}$C |
| | Turbidity, NTU | **16.7** and 120% of upstream control station's turbidity at the same tide of the same day | **19.4** and 130% of upstream control station's turbidity at the same tide of the same day |
| | SS, mg/L | **25.3** and 120% of upstream control station's SS at the same tide of the same day | **31.5** and 130% of upstream control station's SS at the same tide of the same day |
| S6# | DO, mg/L | **4.53** | 4 mg/L or 40% saturation at 15$^{O}$C |
| | Turbidity, NTU | **15.9** | **21.2** |
| | SS, mg/L | **20.5** | **22.5** |
| S8 | DO, mg/L | 4 mg/L or 40% saturation at 15$^{O}$C* | 4 mg/L or 40% saturation at 15$^{O}$C |
| | Turbidity, NTU | **251.0** and 120% of upstream control station's turbidity at the same tide of the same day | **271.0** and 130% of upstream control station's turbidity at the same tide of the same day |
| | SS, mg/L | **247.5** and 120% of upstream control station's SS at the same tide of the same day | **362.3** and 130% of upstream control station's SS at the same tide of the same day |
| S10 | DO, mg/L | 4 mg/L or 40% saturation at 15$^{O}$C* | 4 mg/L or 40% saturation at 15$^{O}$C |
| | Turbidity, NTU | **48.5** and 120% of upstream control station's turbidity at the same tide of the same day | **70.5** and 130% of upstream control station's turbidity at the same tide of the same day |
| | SS, mg/L | **45.1** and 120% of upstream control station's SS at the same tide of the same day | **49.0** and 130% of upstream control station's SS at the same tide of the same day |

* Since 5%-ile of the baseline data is less than 4 mg/L (the Limit Level), the dissolved oxygen Limit Level was adopted as its Action Level.

\# No appropriate upstream monitoring station could be identified for S6. For future turbidity and suspended solids assessment, water quality at S6 would be compared with its baseline data only.

# APPENDIX D
# GRAPHICAL PRESENTATION OF AIR QUALITY MONITORING RESULTS



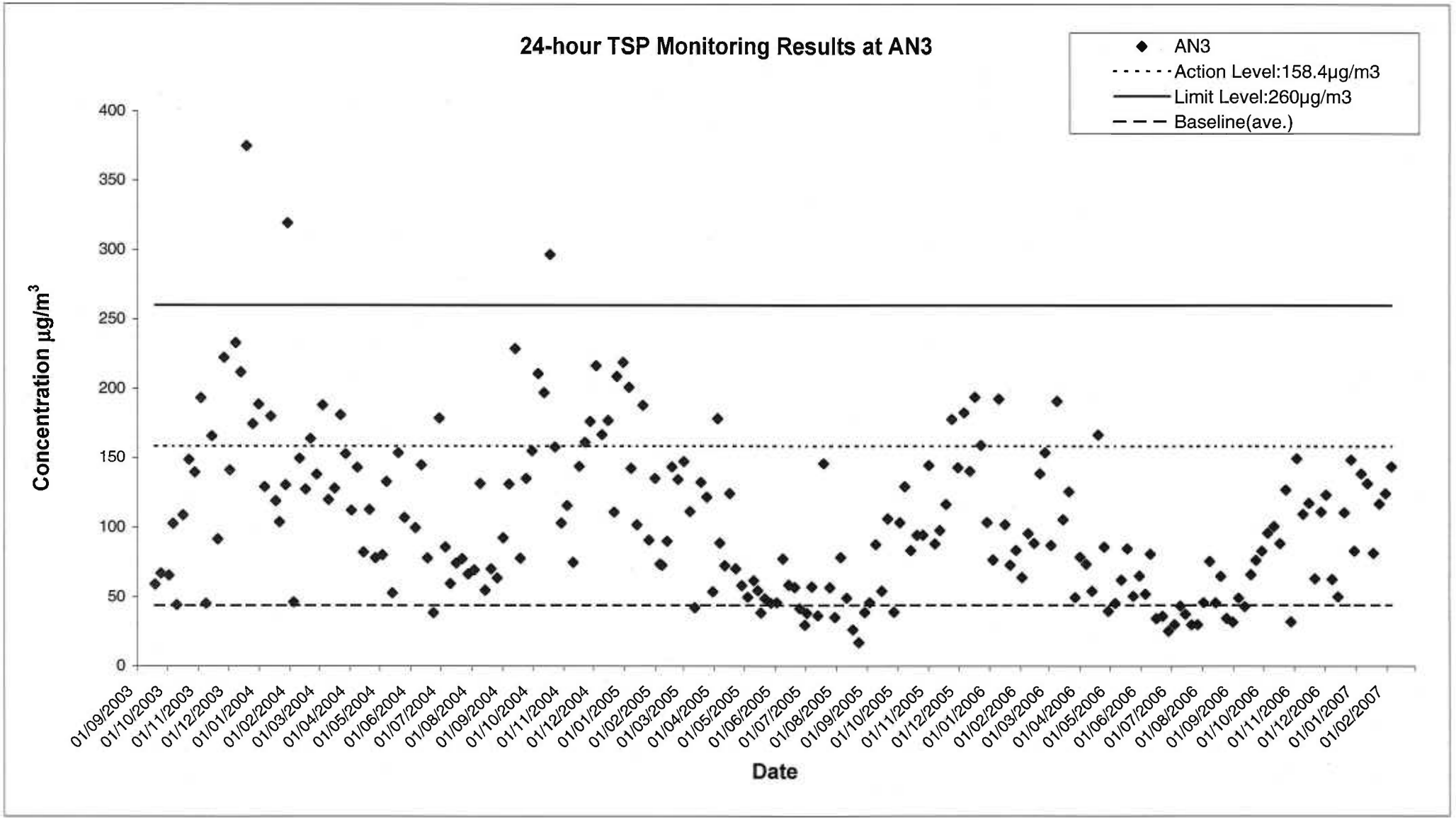

ENSR | AECOM

Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of 1-hour Air Quality Monitoring Result (September 2003-February 2007)**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | YSL |
| JOB NO. | 60016782 | APPENDIX No. D | Rev. - |




ENSR | AECOM

Contract No.: HY/2002/24

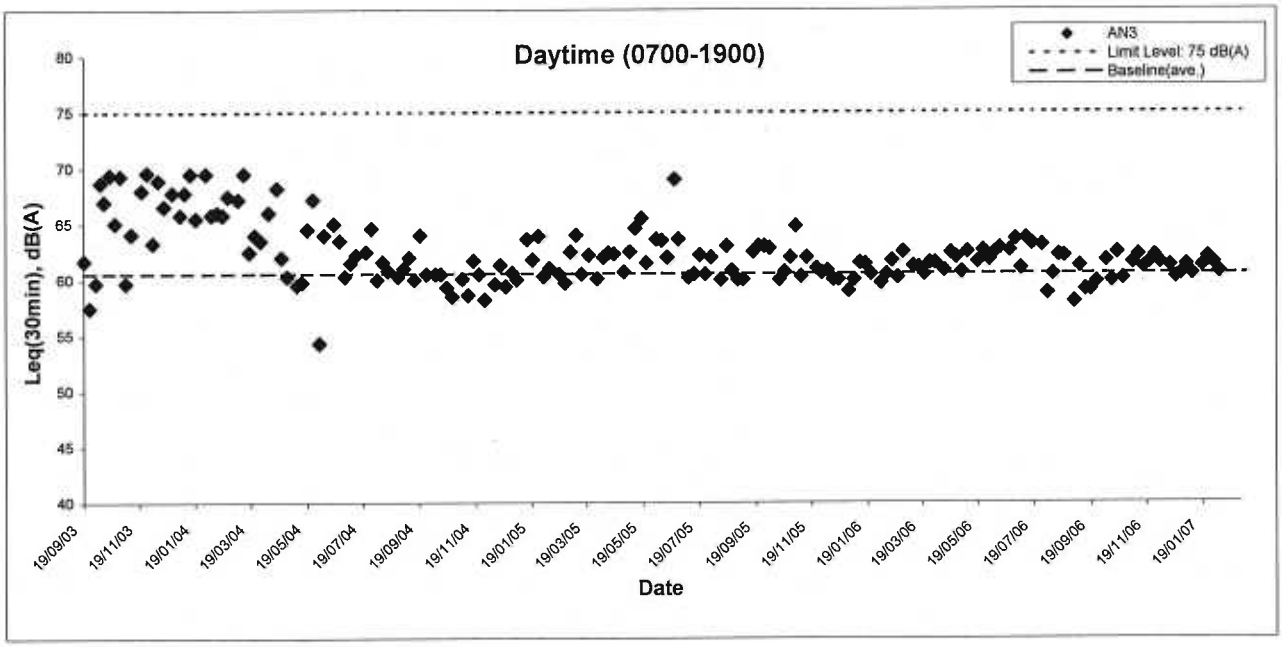
Deep Bay Link Northern Section

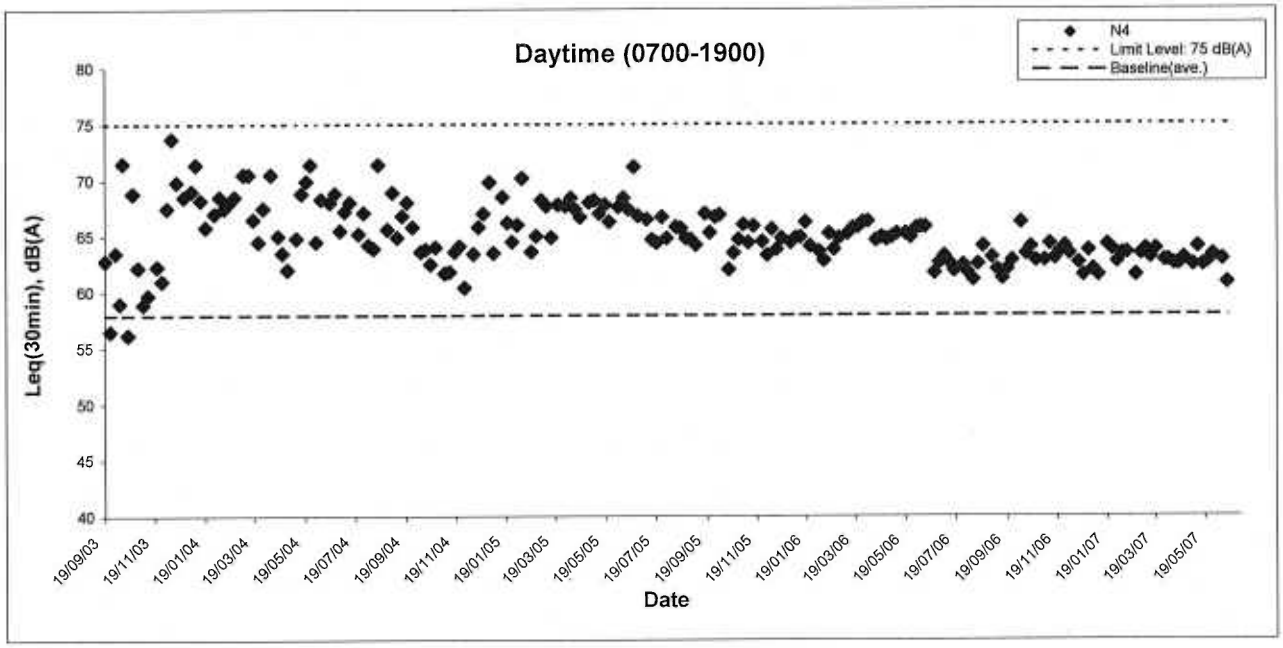
**Graphical Presentation of 24-hour Air Quality Monitoring Result (September 2003-February 2007)**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | PTPM | DRAWN | YSL |
| JOB NO. | 60016782 | APPENDIX No. D | Rev. - |

# APPENDIX E
# GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS

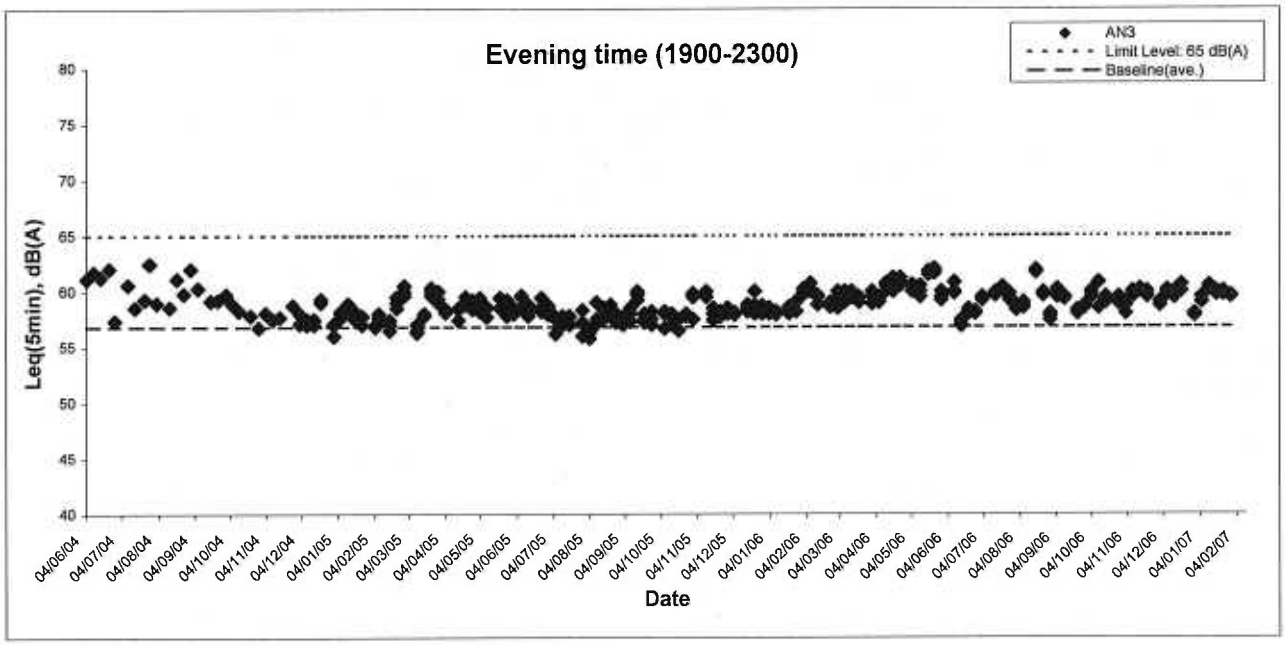
# Noise Monitoring Results

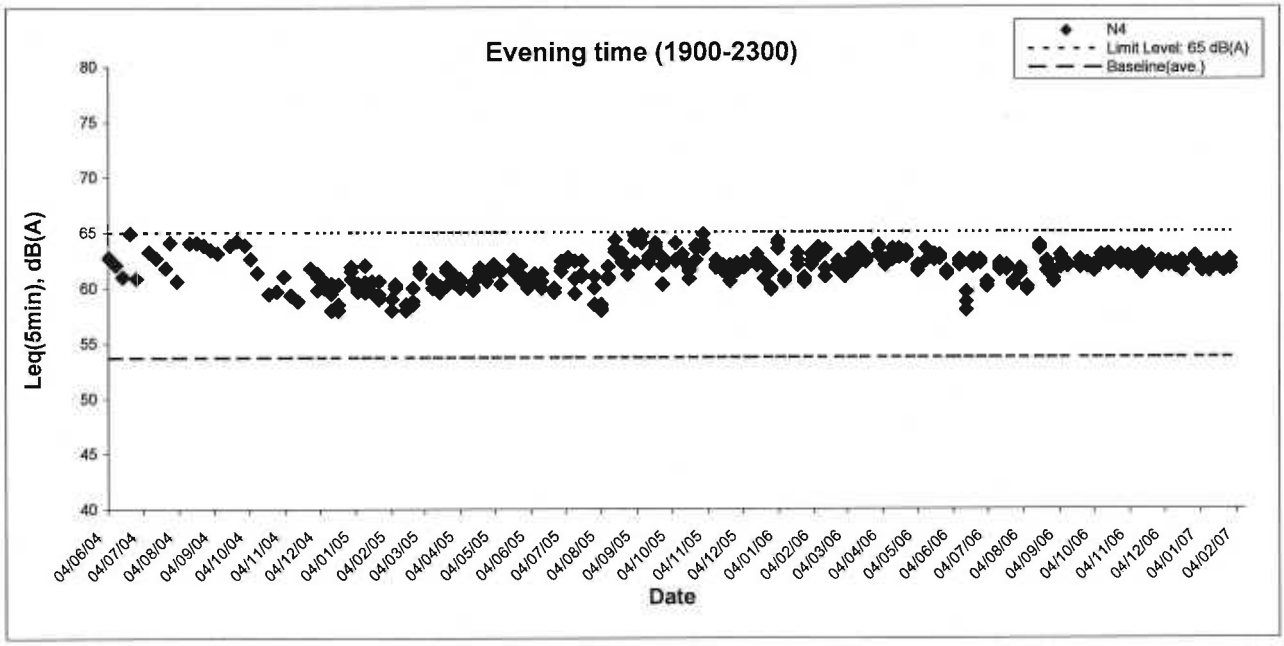



| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24<br>Deep Bay Link - Northern Section<br>**Graphical Presentation of Noise Monitoring Results (September 2003- June 2007)** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016782 | APPENDIX No. E | Rev. - |

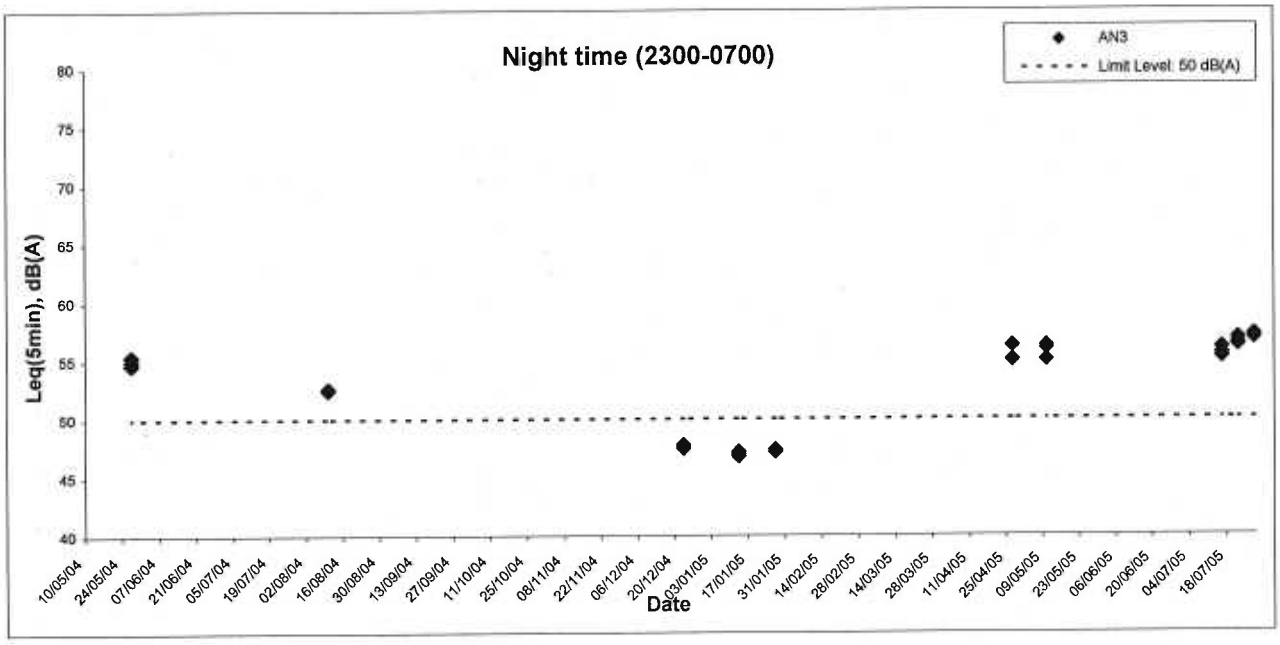
# Noise Monitoring Results

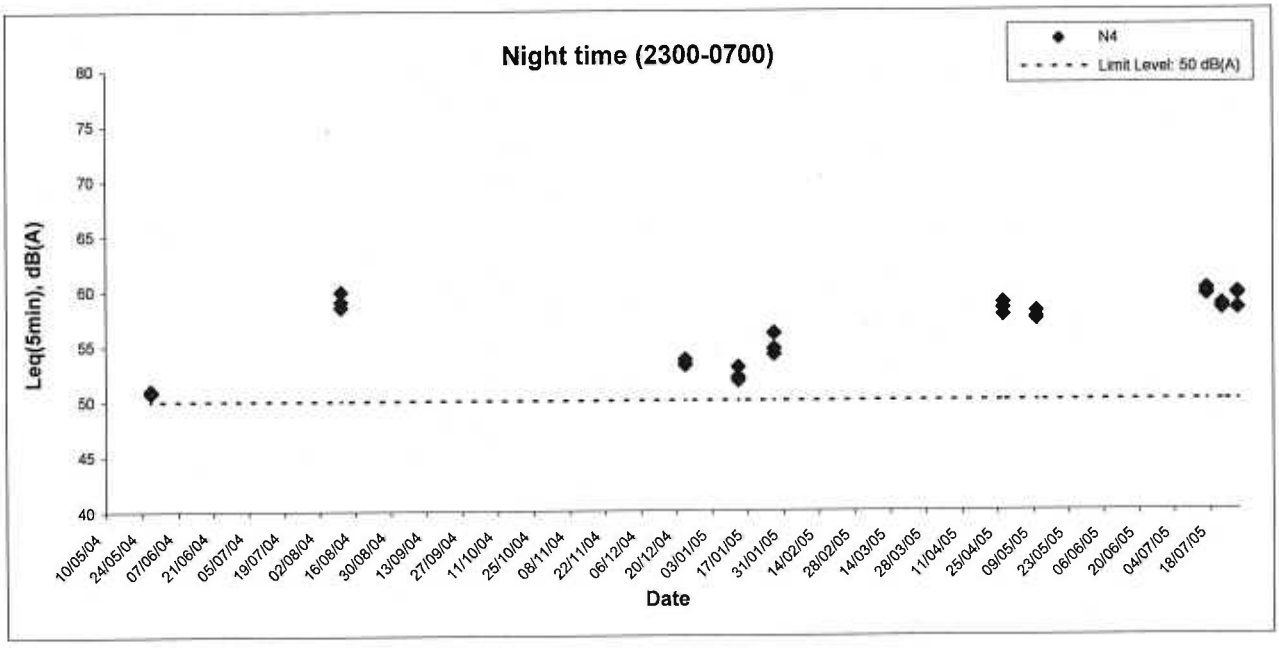



| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24<br>Deep Bay Link - Northern Section<br>**Graphical Presentation of Noise Monitoring Results (June 2004- January 2007)** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016782 | APPENDIX No. E | Rev. - |

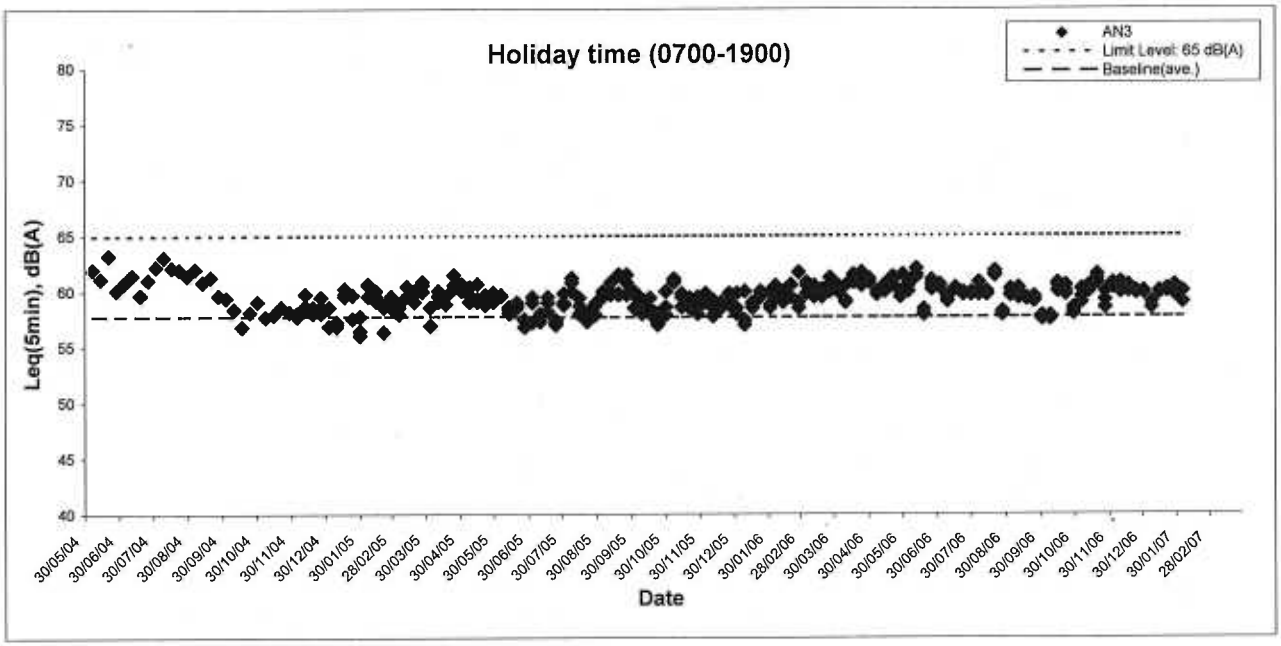
# Noise Monitoring Results

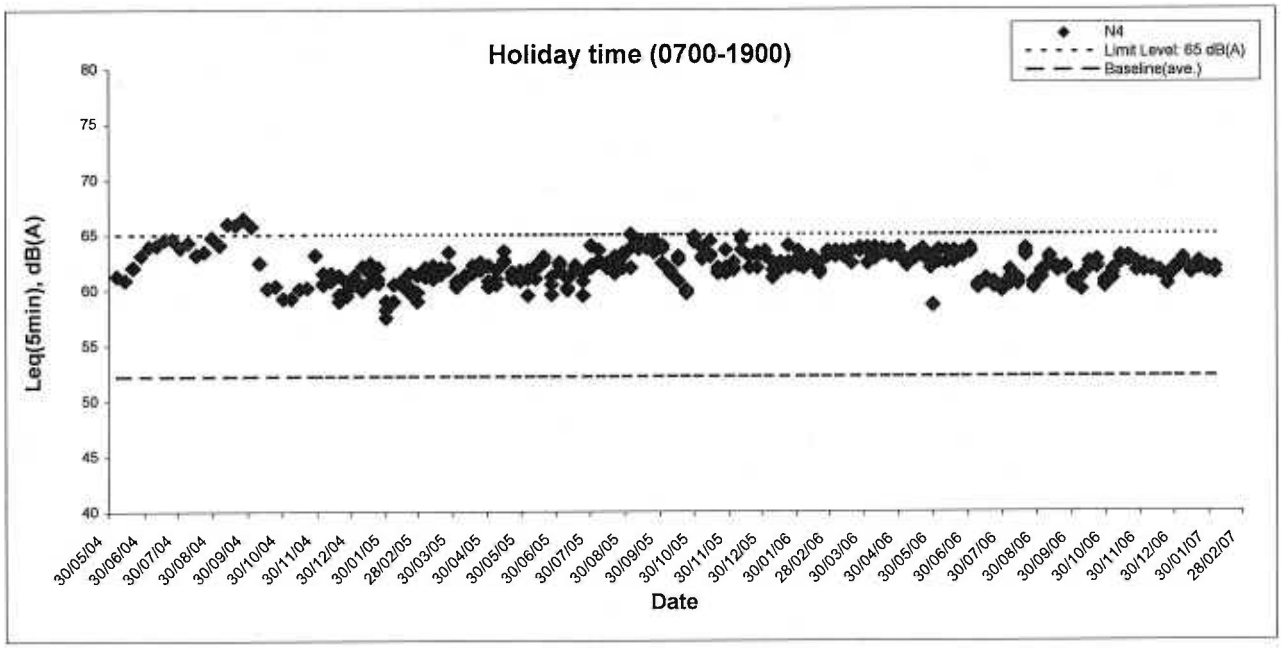



| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24<br>Deep Bay Link - Northern Section<br>**Graphical Presentation of Noise Monitoring Results (May 2004- July 2005)** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016782 | APPENDIX No. E | Rev. - |

# Noise Monitoring Results




| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24<br>Deep Bay Link - Northern Section<br>**Graphical Presentation of Noise Monitoring Results (May 2004- February 2007)** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016782 | APPENDIX No. E | Rev. - |

# APPENDIX F
# POST-PROJECT STREAM WATER QUALITY MONITORING RESULTS AND GRAPHICAL PRESENTATION OF STREAM WATER QUALITY MONITOIRNG RESULTS

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S1

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 11:45 | 29.6<br>29.4 | 29.5 | 52.3<br>52.1 | 52.2 | 5.13<br>5.10 | 5.12 | 3.76<br>4.06 | 3.9 | 16 |
| 22/06/2007 | Sunny | 11:20 | 28.6<br>28.6 | 28.6 | 51.8<br>52.1 | 52.0 | 5.19<br>5.23 | 5.21 | 3.06<br>3.00 | 3.0 | 3 |
| 26/06/2007 | Sunny | 11:00 | 29.7<br>29.7 | 29.7 | 51.7<br>51.5 | 51.6 | 5.16<br>5.15 | 5.16 | 3.06<br>3.05 | 3.1 | 3 |
| 28/06/2007 | Sunny | 14:30 | 28.6<br>28.6 | 28.6 | 50.0<br>50.1 | 50.1 | 5.03<br>5.02 | 5.03 | 3.46<br>3.50 | 3.5 | 1 |
| 30/06/2007 | Sunny | 16:05 | 27.6<br>27.6 | 27.6 | 60.5<br>61.0 | 60.8 | 5.76<br>5.79 | 5.78 | 3.16<br>3.10 | 3.1 | 7 |
| 03/07/2007 | Sunny | 17:00 | 28.6<br>28.6 | 28.6 | 70.5<br>69.7 | 70.1 | 5.64<br>5.58 | 5.61 | 5.01<br>4.98 | 5.0 | 5 |
| 05/07/2007 | Sunny | 17:05 | 29.0<br>29.0 | 29.0 | 79.6<br>79.0 | 79.3 | 7.08<br>7.01 | 7.05 | 7.08<br>7.01 | 7.1 | 4 |
| 07/07/2007 | Sunny | 16:00 | 29.1<br>29.1 | 29.1 | 72.4<br>71.9 | 72.2 | 6.10<br>6.05 | 6.08 | 3.57<br>3.60 | 3.6 | 1 |
| 09/07/2007 | Sunny | 14:30 | 29.2<br>29.2 | 29.2 | 55.6<br>55.0 | 55.3 | 4.91<br>4.87 | 4.89 | 3.70<br>3.63 | 3.7 | 2 |
| 11/07/2007 | Sunny | 17:15 | 29.2<br>29.2 | 29.2 | 70.7<br>70.0 | 70.4 | 6.68<br>6.60 | 6.64 | 3.50<br>3.42 | 3.5 | 1 |
| 13/07/2007 | Sunny | 10:00 | 29.3<br>29.3 | 29.3 | 56.0<br>55.0 | 55.5 | 5.26<br>5.17 | 5.22 | 3.00<br>3.09 | 3.1 | 1 |
| 16/07/2007 | Sunny | 08:40 | 29.5<br>29.5 | 29.5 | 50.9<br>50.1 | 50.5 | 4.78<br>4.70 | 4.74 | 3.07<br>3.15 | 3.1 | 1 |
| 18/07/2007 | Sunny | 14:00 | 29.4<br>29.4 | 29.4 | 57.4<br>56.9 | 57.2 | 5.11<br>5.04 | 5.08 | 3.11<br>3.05 | 3.1 | 1 |
| | | Min | 27.6 | | 50.0 | | 4.7 | | 3.0 | | 1 |
| | | Max | 29.7 | | 79.6 | | 7.1 | | 7.1 | | 16 |

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S2

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 11:56 | 29.3<br>29.2 | 29.3 | 51.2<br>50.9 | 51.1 | 5.06<br>5.03 | 5.05 | 4.97<br>5.18 | 5.1 | 18 |
| 22/06/2007 | Sunny | 11:31 | 28.6<br>28.6 | 28.6 | 49.8<br>49.6 | 49.7 | 4.98<br>4.97 | 4.98 | 3.43<br>3.49 | 3.5 | 2 |
| 26/06/2007 | Sunny | 11:09 | 29.8<br>29.7 | 29.8 | 49.4<br>49.6 | 49.5 | 4.95<br>4.95 | 4.95 | 3.42<br>3.44 | 3.4 | 2 |
| 28/06/2007 | Sunny | 14:42 | 28.6<br>28.6 | 28.6 | 49.0<br>48.8 | 48.9 | 4.90<br>4.89 | 4.90 | 4.12<br>4.14 | 4.1 | 1 |
| 30/06/2007 | Sunny | 16:21 | 27.6<br>27.6 | 27.6 | 62.2<br>62.6 | 62.4 | 6.00<br>6.02 | 6.01 | 3.58<br>3.54 | 3.6 | 2 |
| 03/07/2007 | Sunny | 17:14 | 28.8<br>28.8 | 28.8 | 65.4<br>65.0 | 65.2 | 5.16<br>5.13 | 5.15 | 6.17<br>6.20 | 6.2 | 5 |
| 05/07/2007 | Sunny | 17:18 | 29.1<br>29.1 | 29.1 | 76.2<br>75.8 | 76.0 | 6.75<br>6.69 | 6.72 | 6.75<br>6.69 | 6.7 | 5 |
| 07/07/2007 | Sunny | 16:13 | 29.2<br>29.2 | 29.2 | 71.0<br>70.7 | 70.9 | 5.97<br>5.95 | 5.96 | 3.86<br>3.80 | 3.8 | 1 |
| 09/07/2007 | Sunny | 14:44 | 29.4<br>29.4 | 29.4 | 60.3<br>59.8 | 60.1 | 5.36<br>5.31 | 5.34 | 3.98<br>4.05 | 4.0 | 3 |
| 11/07/2007 | Sunny | 17:28 | 29.3<br>29.3 | 29.3 | 72.3<br>71.5 | 71.9 | 6.90<br>6.84 | 6.87 | 3.61<br>3.69 | 3.7 | 1 |
| 13/07/2007 | Sunny | 10:13 | 29.4<br>29.4 | 29.4 | 52.6<br>52.1 | 52.4 | 4.91<br>4.85 | 4.88 | 3.16<br>3.10 | 3.1 | 5 |
| 16/07/2007 | Sunny | 08:53 | 29.3<br>29.3 | 29.3 | 52.1<br>51.6 | 51.9 | 4.90<br>4.85 | 4.88 | 3.22<br>3.29 | 3.3 | 1 |
| 18/07/2007 | Sunny | 14:13 | 29.6<br>29.6 | 29.6 | 53.6<br>53.0 | 53.3 | 4.71<br>4.65 | 4.68 | 3.36<br>3.31 | 3.3 | 1 |
| | | Min | | 27.6 | | 48.8 | | 4.7 | | 3.1 | 1 |
| | | Max | | 29.8 | | 76.2 | | 6.9 | | 6.8 | 18 |

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S3

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 12:04 | 29.1<br>29.2 | 29.2 | 47.6<br>47.0 | 47.3 | 4.58<br>4.52 | 4.55 | 4.46<br>4.58 | 4.5 | 18 |
| 22/06/2007 | Sunny | 11:43 | 28.7<br>28.7 | 28.7 | 50.6<br>50.0 | 50.3 | 5.03<br>5.00 | 5.02 | 3.25<br>3.22 | 3.2 | 3 |
| 26/06/2007 | Sunny | 11:21 | 29.6<br>29.6 | 29.6 | 50.0<br>50.1 | 50.1 | 5.00<br>5.02 | 5.01 | 3.30<br>3.33 | 3.3 | 2 |
| 28/06/2007 | Sunny | 14:53 | 28.7<br>28.7 | 28.7 | 49.7<br>49.6 | 49.7 | 4.96<br>4.96 | 4.96 | 3.80<br>3.82 | 3.8 | 1 |
| 30/06/2007 | Sunny | 16:34 | 27.8<br>27.8 | 27.8 | 64.0<br>63.8 | 63.9 | 6.09<br>6.07 | 6.08 | 3.27<br>3.29 | 3.3 | 6 |
| 03/07/2007 | Sunny | 17:29 | 28.9<br>28.9 | 28.9 | 62.3<br>62.7 | 62.5 | 4.96<br>4.93 | 4.95 | 6.01<br>6.07 | 6.0 | 6 |
| 05/07/2007 | Sunny | 17:31 | 29.2<br>29.2 | 29.2 | 71.5<br>71.1 | 71.3 | 6.19<br>6.15 | 6.17 | 6.19<br>6.15 | 6.2 | 5 |
| 07/07/2007 | Sunny | 16:26 | 29.3<br>29.3 | 29.3 | 68.4<br>68.0 | 68.2 | 5.73<br>5.70 | 5.72 | 4.10<br>4.18 | 4.1 | 5 |
| 09/07/2007 | Sunny | 14:57 | 29.3<br>29.3 | 29.3 | 58.7<br>58.0 | 58.4 | 5.12<br>5.05 | 5.09 | 4.44<br>4.38 | 4.4 | 5 |
| 11/07/2007 | Sunny | 17:41 | 29.0<br>29.0 | 29.0 | 68.4<br>67.9 | 68.2 | 6.41<br>6.34 | 6.38 | 4.01<br>4.06 | 4.0 | 4 |
| 13/07/2007 | Sunny | 10:26 | 29.5<br>29.5 | 29.5 | 51.0<br>51.5 | 51.3 | 4.78<br>4.81 | 4.80 | 3.52<br>3.43 | 3.5 | 5 |
| 16/07/2007 | Sunny | 09:06 | 29.3<br>29.3 | 29.3 | 58.2<br>57.7 | 58.0 | 5.49<br>5.44 | 5.47 | 3.69<br>3.73 | 3.7 | 1 |
| 18/07/2007 | Sunny | 14:27 | 29.5<br>29.5 | 29.5 | 50.0<br>49.5 | 49.8 | 4.43<br>4.39 | 4.41 | 3.67<br>3.74 | 3.7 | 1 |
| | | Min | 27.8 | | 47.0 | | 4.4 | | 3.2 | | 1 |
| | | Max | 29.6 | | 71.5 | | 6.4 | | 6.2 | | 18 |

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S4

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 12:13 | 29.0<br>28.8 | 28.9 | 48.2<br>49.0 | 48.6 | 4.69<br>4.74 | 4.72 | 4.84<br>4.72 | 4.8 | 20 |
| 22/06/2007 | Sunny | 11:56 | 28.7<br>28.6 | 28.7 | 48.7<br>48.8 | 48.8 | 4.88<br>4.89 | 4.89 | 3.49<br>3.53 | 3.5 | 2 |
| 26/06/2007 | Sunny | 11:29 | 29.7<br>29.7 | 29.7 | 48.8<br>49.0 | 48.9 | 4.90<br>4.92 | 4.91 | 3.57<br>3.51 | 3.5 | 3 |
| 28/06/2007 | Sunny | 15:06 | 28.8<br>28.7 | 28.8 | 44.7<br>44.2 | 44.5 | 4.45<br>4.42 | 4.44 | 4.01<br>4.09 | 4.1 | 1 |
| 30/06/2007 | Sunny | 16:49 | 27.7<br>27.7 | 27.7 | 65.4<br>65.0 | 65.2 | 6.12<br>6.10 | 6.11 | 4.00<br>4.02 | 4.0 | 2 |
| 03/07/2007 | Sunny | 17:43 | 28.9<br>28.9 | 28.9 | 64.4<br>64.0 | 64.2 | 5.07<br>5.04 | 5.06 | 6.24<br>6.30 | 6.3 | 6 |
| 05/07/2007 | Sunny | 17:44 | 29.1<br>29.1 | 29.1 | 69.9<br>69.4 | 69.7 | 6.01<br>5.97 | 5.99 | 6.01<br>5.97 | 6.0 | 4 |
| 07/07/2007 | Sunny | 16:39 | 29.3<br>29.3 | 29.3 | 67.5<br>66.8 | 67.2 | 5.65<br>5.57 | 5.61 | 4.30<br>4.40 | 4.4 | 6 |
| 09/07/2007 | Sunny | 15:10 | 29.3<br>29.3 | 29.3 | 61.1<br>60.5 | 60.8 | 5.42<br>5.35 | 5.39 | 4.78<br>4.85 | 4.8 | 5 |
| 11/07/2007 | Sunny | 17:54 | 29.3<br>29.3 | 29.3 | 65.8<br>65.1 | 65.5 | 6.16<br>6.10 | 6.13 | 4.17<br>4.21 | 4.2 | 4 |
| 13/07/2007 | Sunny | 10:39 | 29.5<br>29.5 | 29.5 | 53.3<br>52.8 | 53.1 | 5.06<br>5.02 | 5.04 | 3.28<br>3.35 | 3.3 | 7 |
| 16/07/2007 | Sunny | 09:19 | 29.4<br>29.4 | 29.4 | 54.5<br>53.8 | 54.2 | 5.17<br>5.09 | 5.13 | 3.61<br>3.67 | 3.6 | 1 |
| 18/07/2007 | Sunny | 14:41 | 29.5<br>29.5 | 29.5 | 47.7<br>48.1 | 47.9 | 4.12<br>4.17 | 4.15 | 3.26<br>3.32 | 3.3 | 2 |
| | | Min | 27.7 | | 44.2 | | 4.1 | | 3.3 | | 1 |
| | | Max | 29.7 | | 69.9 | | 6.2 | | 6.3 | | 20 |

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S7

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 12:28 | 28.4<br>28.0 | 28.2 | 54.2<br>51.8 | 53.0 | 5.21<br>5.07 | 5.14 | 3.84<br>3.71 | 3.8 | 19 |
| 22/06/2007 | Sunny | 12:11 | 28.6<br>28.6 | 28.6 | 53.1<br>53.0 | 53.1 | 5.32<br>5.30 | 5.31 | 3.72<br>3.76 | 3.7 | 2 |
| 26/06/2007 | Sunny | 11:42 | 29.8<br>29.8 | 29.8 | 50.7<br>50.6 | 50.7 | 5.06<br>5.05 | 5.06 | 3.27<br>3.29 | 3.3 | 1 |
| 28/06/2007 | Sunny | 15:30 | 28.7<br>28.7 | 28.7 | 49.0<br>49.4 | 49.2 | 4.90<br>4.91 | 4.91 | 4.42<br>4.40 | 4.4 | 1 |
| 30/06/2007 | Sunny | 17:02 | 27.7<br>27.7 | 27.7 | 60.7<br>60.5 | 60.6 | 5.71<br>5.69 | 5.70 | 3.22<br>3.20 | 3.2 | 2 |
| 03/07/2007 | Sunny | 18:00 | 28.8<br>28.8 | 28.8 | 61.2<br>61.0 | 61.1 | 4.85<br>4.82 | 4.84 | 5.57<br>5.60 | 5.6 | 4 |
| 05/07/2007 | Sunny | 17:58 | 29.0<br>29.0 | 29.0 | 66.7<br>66.0 | 66.4 | 5.55<br>5.50 | 5.53 | 5.55<br>5.50 | 5.5 | 5 |
| 07/07/2007 | Sunny | 16:53 | 29.3<br>29.3 | 29.3 | 70.5<br>70.0 | 70.3 | 5.99<br>5.94 | 5.97 | 4.58<br>4.66 | 4.6 | 1 |
| 09/07/2007 | Sunny | 15:24 | 29.5<br>29.5 | 29.5 | 57.7<br>57.2 | 57.5 | 5.03<br>4.98 | 5.01 | 4.16<br>4.05 | 4.1 | 5 |
| 11/07/2007 | Sunny | 18:07 | 29.4<br>29.4 | 29.4 | 69.0<br>68.1 | 68.6 | 6.60<br>6.52 | 6.56 | 3.98<br>4.06 | 4.0 | 1 |
| 13/07/2007 | Sunny | 10:53 | 29.3<br>29.3 | 29.3 | 54.6<br>54.0 | 54.3 | 5.09<br>5.02 | 5.06 | 3.17<br>3.23 | 3.2 | 1 |
| 16/07/2007 | Sunny | 09:32 | 29.4<br>29.4 | 29.4 | 56.7<br>56.1 | 56.4 | 5.32<br>5.26 | 5.29 | 3.02<br>3.09 | 3.1 | 1 |
| 18/07/2007 | Sunny | 14:55 | 29.2<br>29.2 | 29.2 | 51.0<br>50.6 | 50.8 | 4.50<br>4.45 | 4.48 | 3.46<br>3.53 | 3.5 | 1 |
| | | Min | 27.7 | | 49.0 | | 4.5 | | 3.0 | | 1 |
| | | Max | 29.8 | | 70.5 | | 6.6 | | 5.6 | | 19 |

## Appendix F - Water Quality Monitoring Results

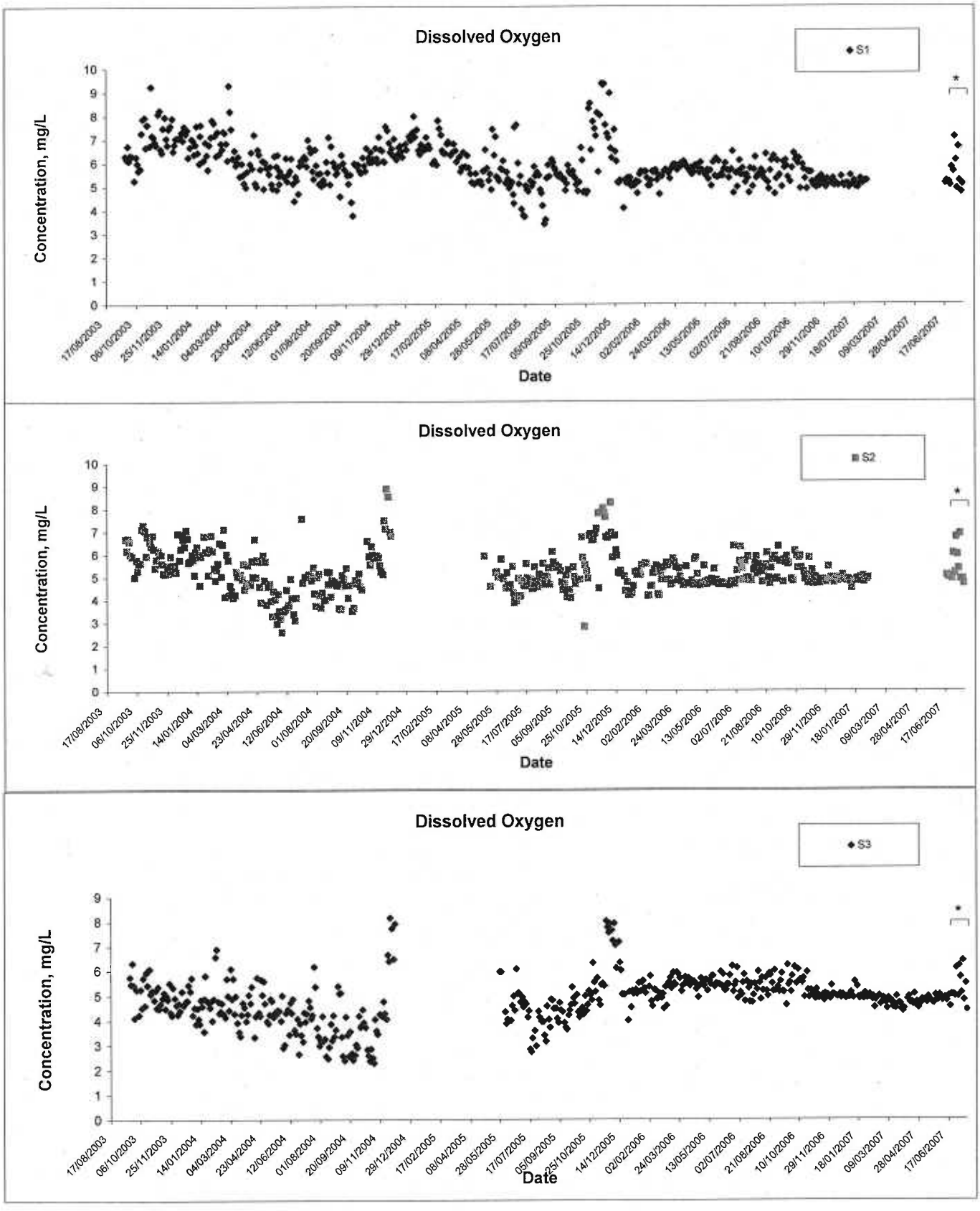
### Water Quality Monitoring Results at S8

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 13:04 | 28.7<br>28.7 | 28.7 | 49.2<br>48.7 | 49.0 | 4.71<br>4.64 | 4.68 | 4.68<br>4.99 | 4.8 | 18 |
| 22/06/2007 | Sunny | 12:38 | 28.7<br>28.7 | 28.7 | 46.4<br>46.6 | 46.5 | 4.65<br>4.68 | 4.67 | 4.25<br>4.26 | 4.3 | 3 |
| 26/06/2007 | Sunny | 12:06 | 29.9<br>29.9 | 29.9 | 49.4<br>49.2 | 49.3 | 4.93<br>4.93 | 4.93 | 4.68<br>4.63 | 4.7 | 2 |
| 28/06/2007 | Sunny | 15:49 | 28.8<br>28.8 | 28.8 | 45.7<br>45.9 | 45.8 | 4.60<br>4.60 | 4.60 | 5.63<br>5.66 | 5.7 | 1 |
| 30/06/2007 | Sunny | 17:15 | 27.8<br>27.8 | 27.8 | 64.0<br>63.8 | 63.9 | 6.02<br>6.00 | 6.01 | 3.66<br>3.63 | 3.7 | 2 |
| 03/07/2007 | Sunny | 18:15 | 28.7<br>28.7 | 28.7 | 66.2<br>66.5 | 66.4 | 5.25<br>5.27 | 5.26 | 5.24<br>5.26 | 5.3 | 7 |
| 05/07/2007 | Sunny | 18:10 | 29.0<br>29.0 | 29.0 | 69.2<br>69.0 | 69.1 | 6.06<br>6.03 | 6.05 | 6.06<br>6.03 | 6.1 | 5 |
| 07/07/2007 | Sunny | 17:07 | 29.3<br>29.3 | 29.3 | 67.9<br>67.2 | 67.6 | 5.81<br>5.76 | 5.79 | 4.79<br>4.86 | 4.8 | 1 |
| 09/07/2007 | Sunny | 15:37 | 29.4<br>29.4 | 29.4 | 60.4<br>60.0 | 60.2 | 5.32<br>5.29 | 5.31 | 4.33<br>4.27 | 4.3 | 5 |
| 11/07/2007 | Sunny | 18:20 | 29.2<br>29.2 | 29.2 | 65.8<br>65.1 | 65.5 | 6.09<br>6.02 | 6.06 | 3.78<br>3.85 | 3.8 | 7 |
| 13/07/2007 | Sunny | 11:06 | 29.4<br>29.4 | 29.4 | 52.3<br>52.0 | 52.2 | 4.85<br>4.83 | 4.84 | 3.96<br>4.02 | 4.0 | 1 |
| 16/07/2007 | Sunny | 09:46 | 29.4<br>29.4 | 29.4 | 54.5<br>54.1 | 54.3 | 5.17<br>5.13 | 5.15 | 3.96<br>3.91 | 3.9 | 1 |
| 18/07/2007 | Sunny | 15:09 | 29.3<br>29.3 | 29.3 | 49.2<br>48.8 | 49.0 | 4.35<br>4.31 | 4.33 | 4.08<br>4.00 | 4.0 | 1 |
| | | Min | | 27.8 | | 45.7 | | 4.3 | | 3.6 | 1 |
| | | Max | | 29.9 | | 69.2 | | 6.1 | | 6.1 | 18 |

## Appendix F - Water Quality Monitoring Results

### Water Quality Monitoring Results at S10

| Date | Weather Condition | Sampling Time | Temperature (°C) | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | Turbidity(NTU) | | Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Value | Average | Value | Average | Value | Average | Value | Average | Value |
| 20/06/2007 | Fine | 12:50 | 28.5<br>28.4 | 28.5 | 44.1<br>43.5 | 43.8 | 4.19<br>4.14 | 4.17 | 5.06<br>5.17 | 5.1 | 20 |
| 22/06/2007 | Sunny | 12:23 | 28.6<br>28.6 | 28.6 | 43.6<br>43.8 | 43.7 | 4.37<br>4.39 | 4.38 | 4.86<br>4.79 | 4.8 | 5 |
| 26/06/2007 | Sunny | 11:52 | 29.7<br>29.7 | 29.7 | 47.4<br>47.0 | 47.2 | 4.73<br>4.71 | 4.72 | 4.82<br>4.80 | 4.8 | 1 |
| 28/06/2007 | Sunny | 15:43 | 28.7<br>28.7 | 28.7 | 45.0<br>44.2 | 44.6 | 4.48<br>4.46 | 4.47 | 5.74<br>5.71 | 5.7 | 1 |
| 30/06/2007 | Sunny | 17:30 | 27.9<br>27.9 | 27.9 | 59.4<br>59.0 | 59.2 | 5.62<br>5.60 | 5.61 | 4.10<br>4.05 | 4.1 | 2 |
| 03/07/2007 | Sunny | 18:30 | 28.9<br>28.9 | 28.9 | 60.7<br>60.3 | 60.5 | 4.81<br>4.77 | 4.79 | 7.50<br>7.45 | 7.5 | 6 |
| 05/07/2007 | Sunny | 18:23 | 29.0<br>29.0 | 29.0 | 63.7<br>63.0 | 63.4 | 5.22<br>5.18 | 5.20 | 5.22<br>5.18 | 5.2 | 7 |
| 07/07/2007 | Sunny | 17:20 | 29.2<br>29.2 | 29.2 | 66.7<br>66.3 | 66.5 | 5.62<br>5.60 | 5.61 | 5.07<br>5.13 | 5.1 | 6 |
| 09/07/2007 | Sunny | 15:51 | 29.4<br>29.4 | 29.4 | 56.7<br>56.2 | 56.5 | 4.89<br>4.83 | 4.86 | 5.01<br>4.97 | 5.0 | 5 |
| 11/07/2007 | Sunny | 18:33 | 29.3<br>29.3 | 29.3 | 64.3<br>63.8 | 64.1 | 5.96<br>5.89 | 5.93 | 4.17<br>4.22 | 4.2 | 4 |
| 13/07/2007 | Sunny | 11:19 | 29.4<br>29.4 | 29.4 | 51.0<br>50.8 | 50.9 | 4.74<br>4.70 | 4.72 | 4.56<br>4.42 | 4.5 | 1 |
| 16/07/2007 | Sunny | 09:59 | 29.3<br>29.3 | 29.3 | 51.7<br>51.3 | 51.5 | 4.85<br>4.81 | 4.83 | 3.81<br>3.88 | 3.9 | 1 |
| 18/07/2007 | Sunny | 15:23 | 29.2<br>29.2 | 29.2 | 48.5<br>48.0 | 48.3 | 4.27<br>4.23 | 4.25 | 4.33<br>4.41 | 4.4 | 1 |
| | | Min | | 27.9 | | 43.5 | | 4.1 | | 3.8 | 1 |
| | | Max | | 29.7 | | 66.7 | | 6.0 | | 7.5 | 20 |

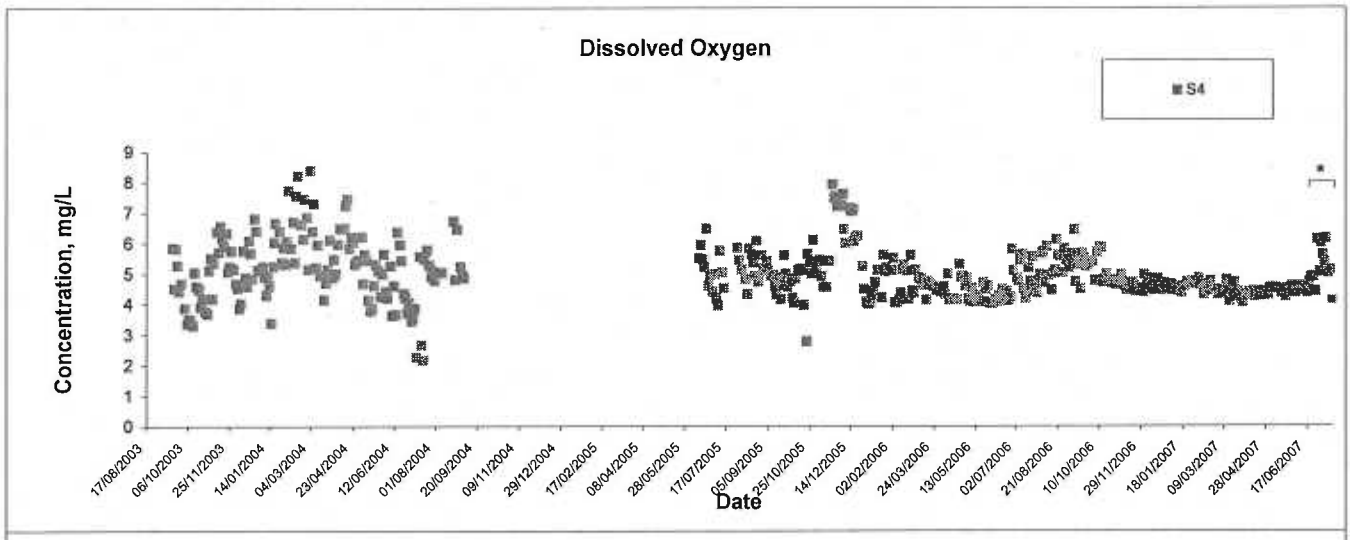


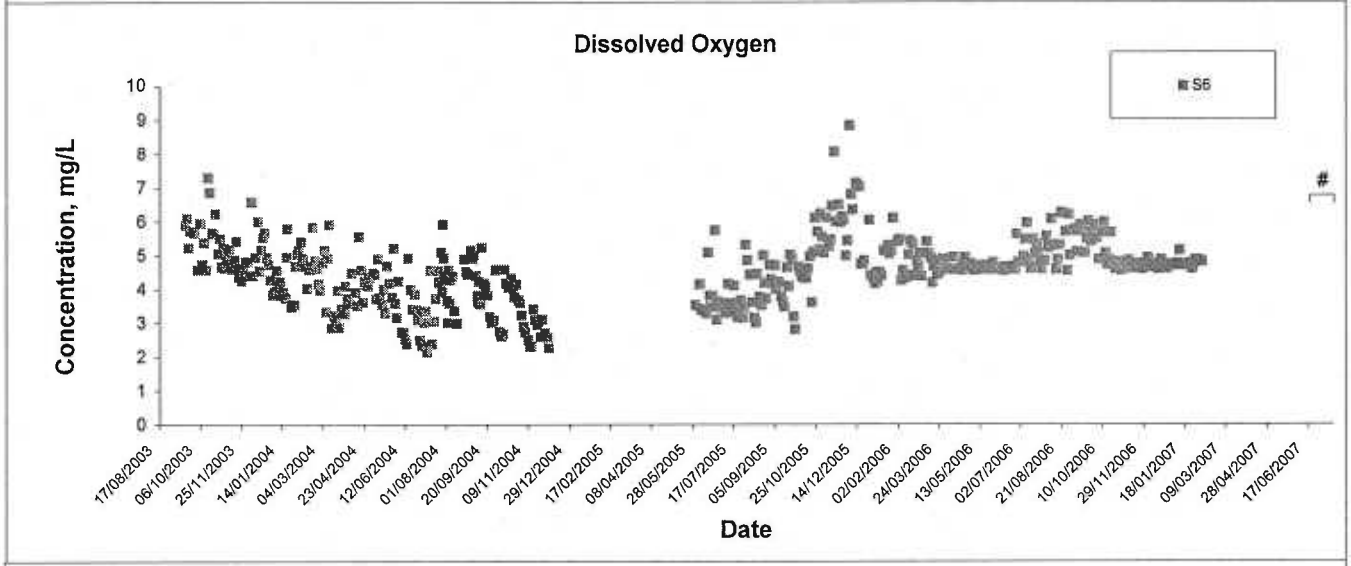

Note 1: Monitoring streams were dried up, and monitoring could not be conducted at S2 and S3 during the period for Dec 04 to May 05.

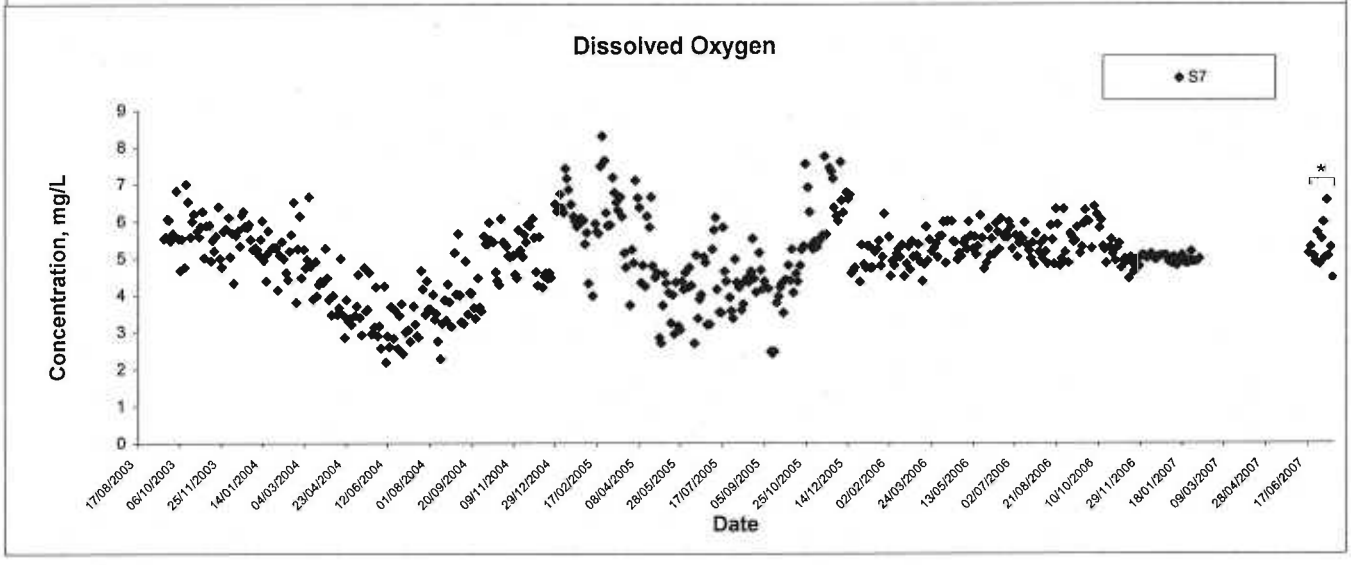
Note 2: The construction phase stream water quality monitoring for S1 and S2 was terminated on 9 Feb 07.

* Post-project local stream water quality monitoring was conducted at S1, S2 and S3 from 20 Jun 07 to 18 Jul 07.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S4 during the period for Sep 04 to Jun 05.

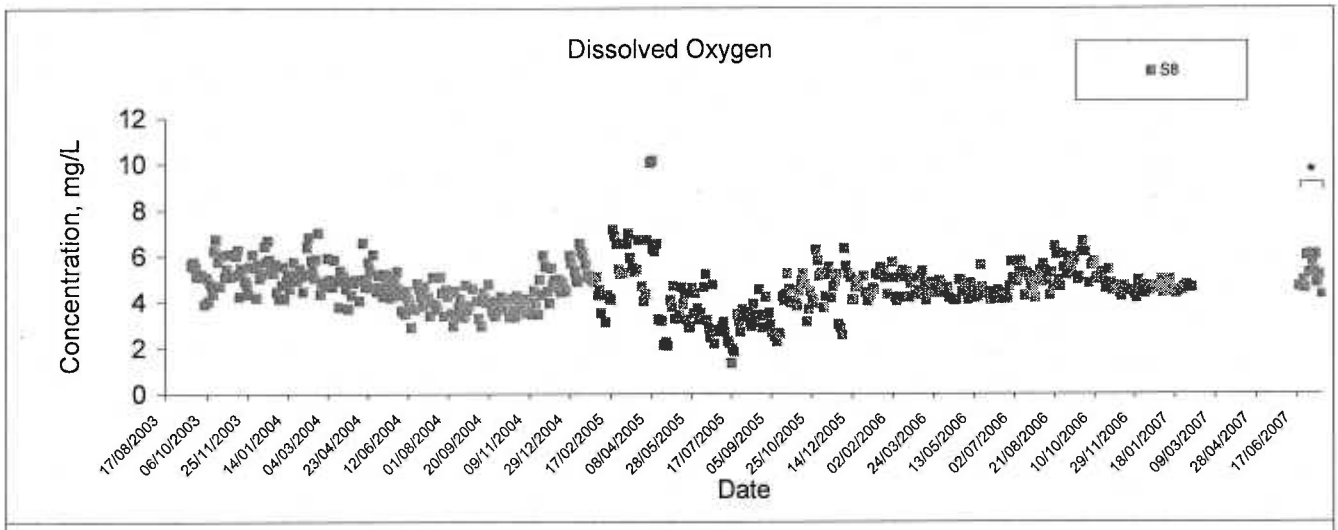
Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S6 during the period for Dec 04 to May 05.

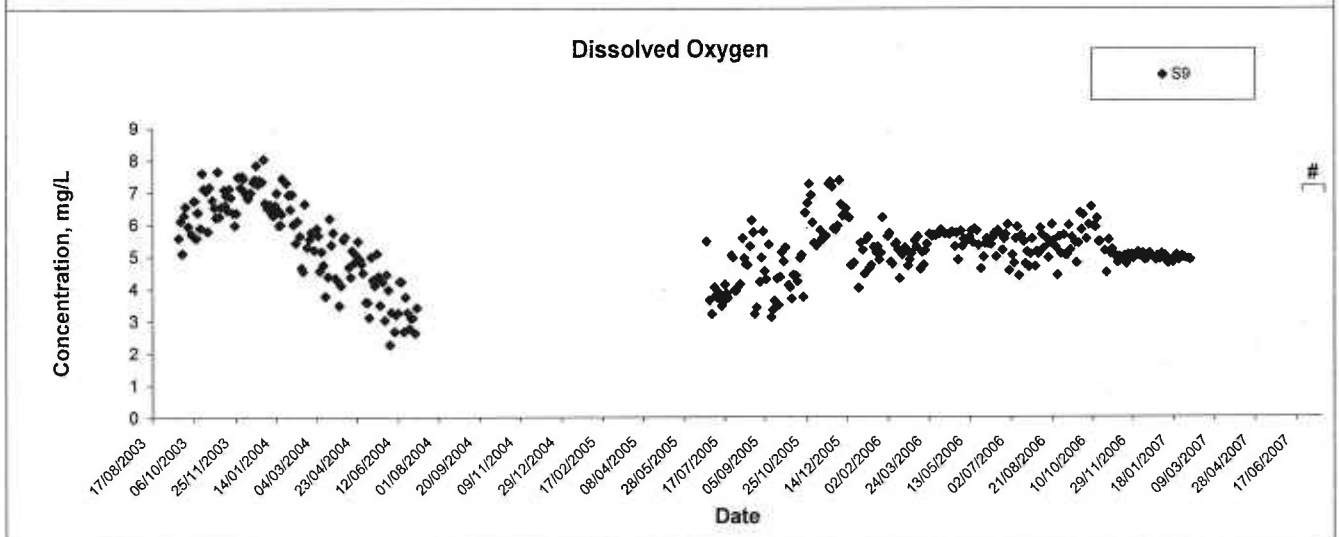
Note 3: The construction phase stream water quality monitoring for S6 and S7 was terminated on 9 Feb 07.

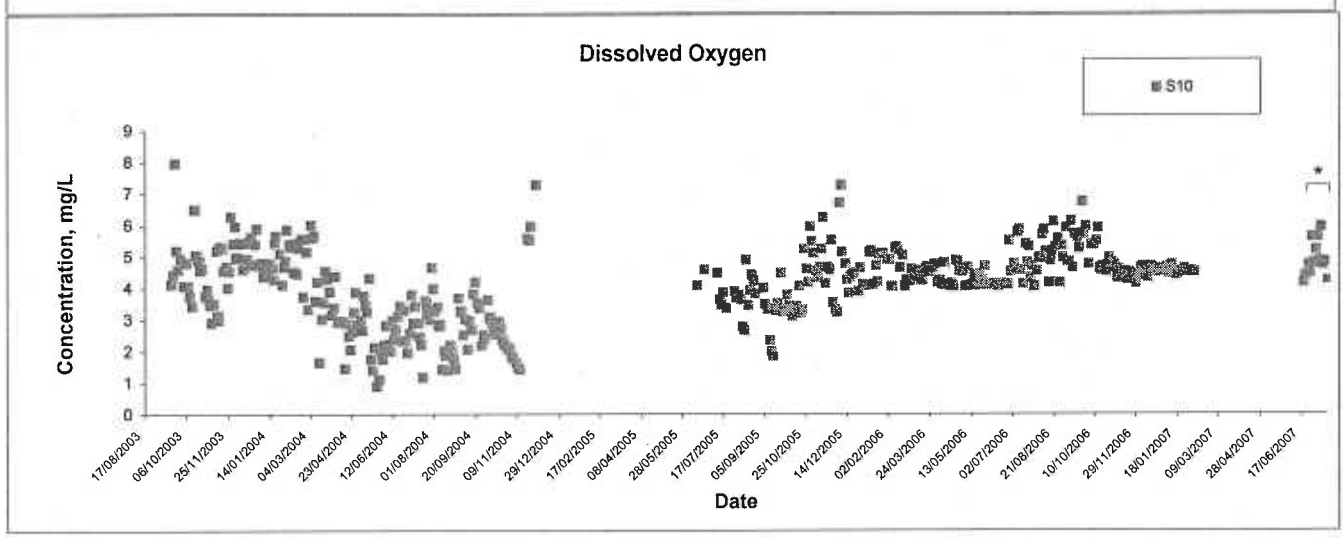
* Post-project local stream water quality monitoring was conducted at S4 and S7 from 20 Jun 07 to 18 Jul 07.

# No post-project local stream water quality monitoring was conducted at S6 since the stream was dried out.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX | F |
| | | | | Rev | - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S9 during the period for Jul 04 to Jun 05.

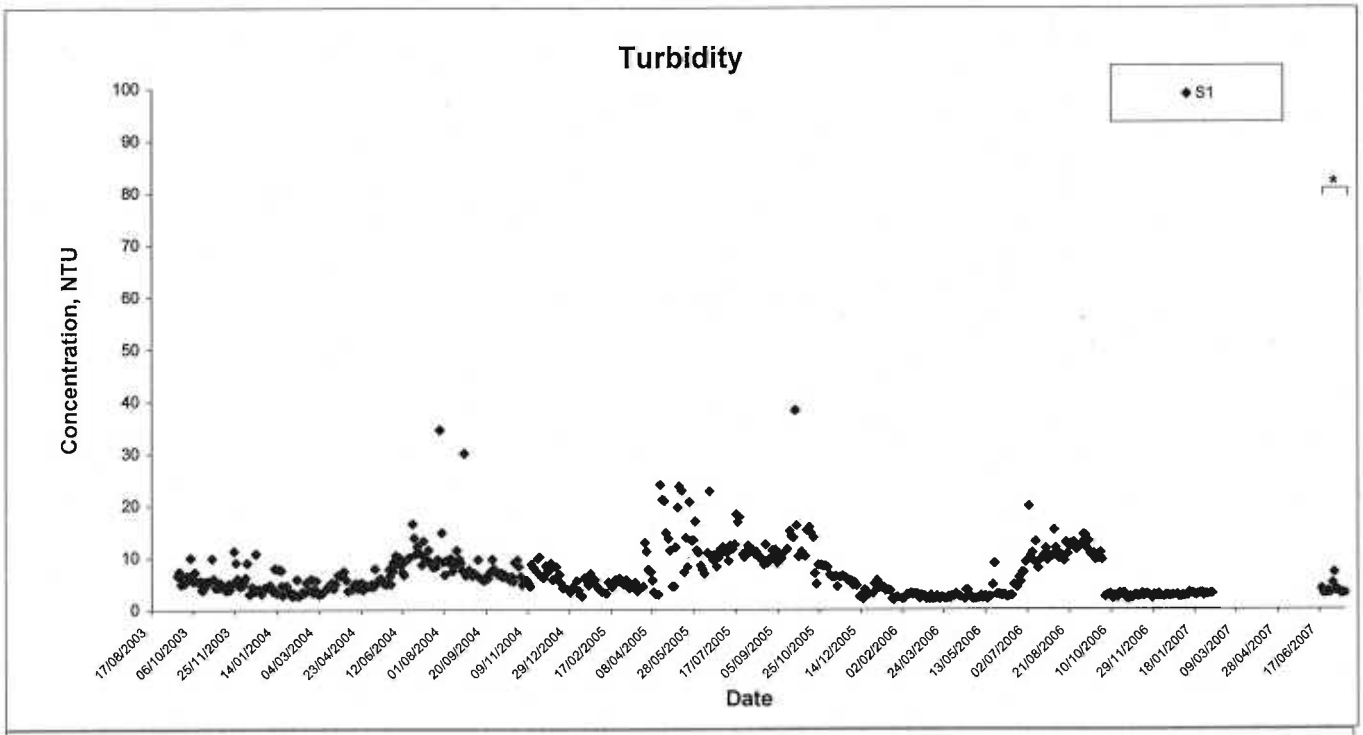
Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S10 during the period for Dec 04 to Jun 05.

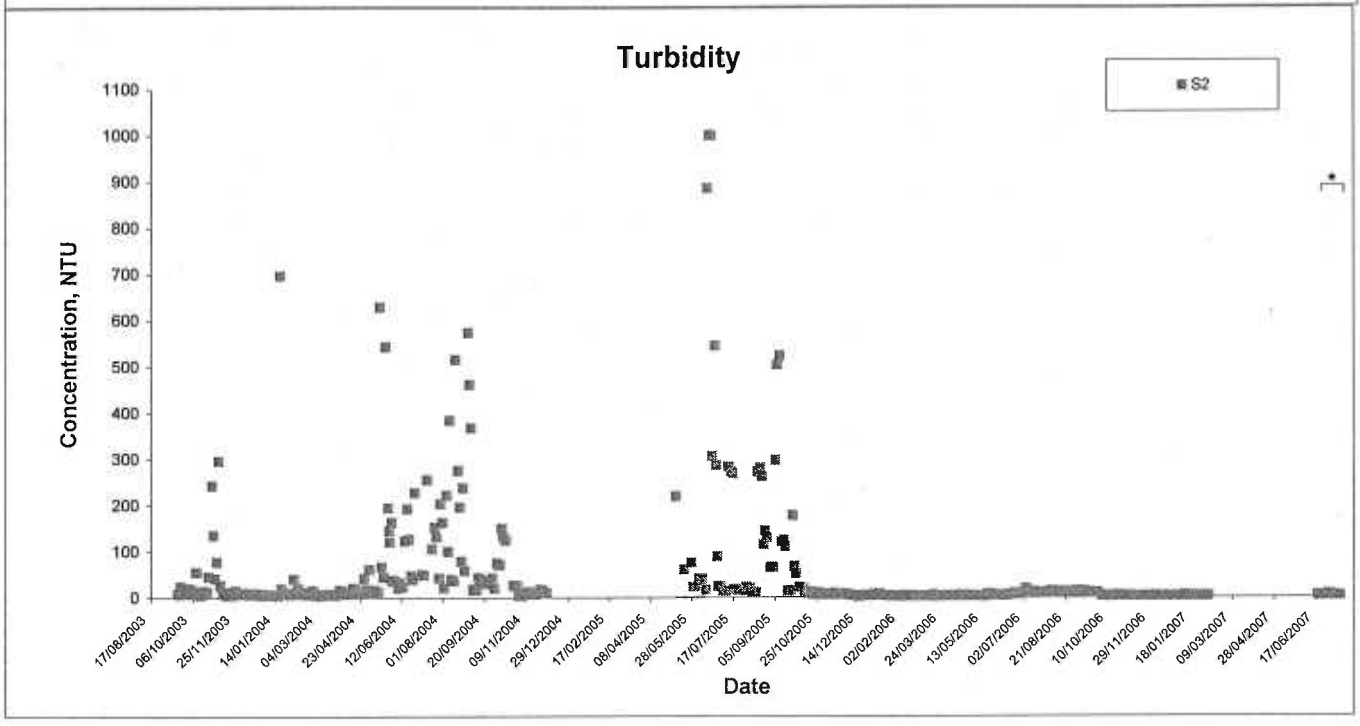
Note 3: The construction phase stream water quality monitoring for S8, S9 and S10 was terminated on 9 Feb 07.

* Post-project local stream water quality monitoring was conducted at S8 and S10 from 20 June 07 to 18 July 07.

# No post-project local stream water quality monitoring was conducted at S9 since the access was blocked after the operation of Ha Tusen Weigh Station.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |



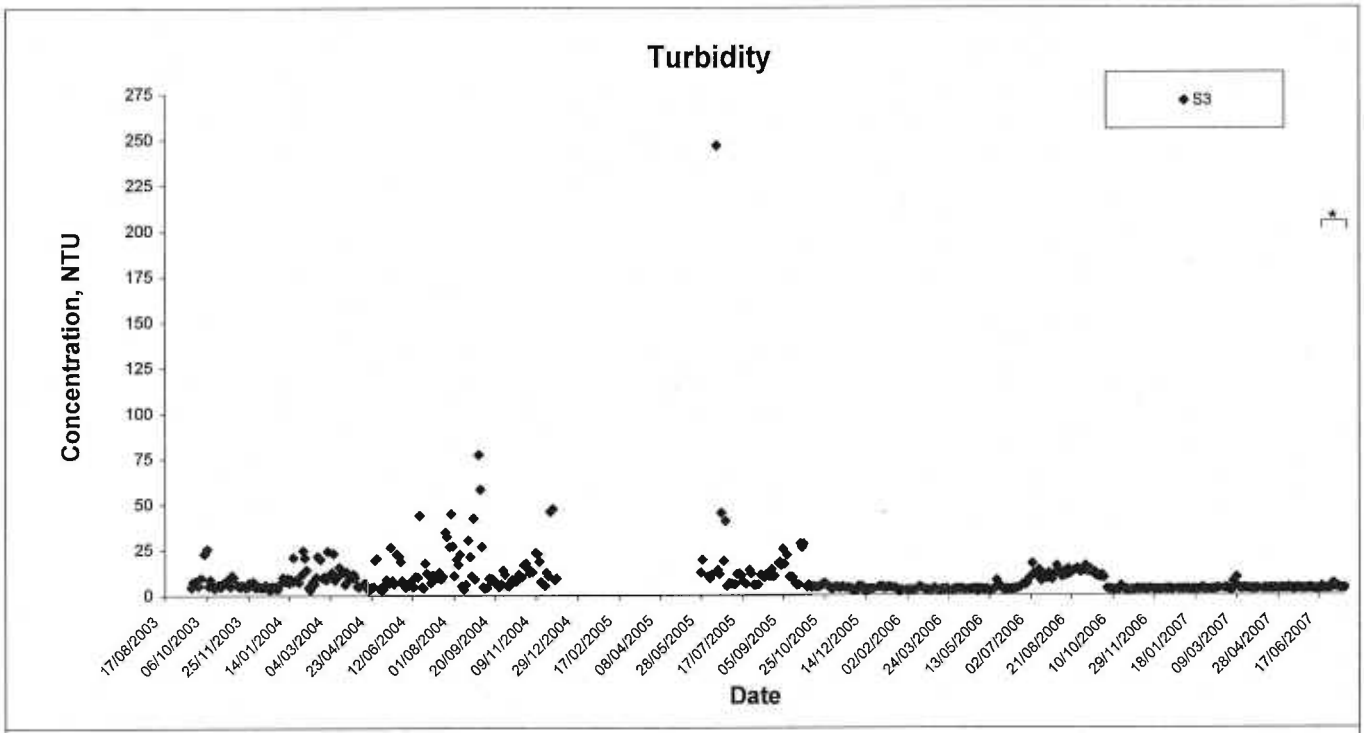

Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S2 during the period for Dec 04 to May 05.

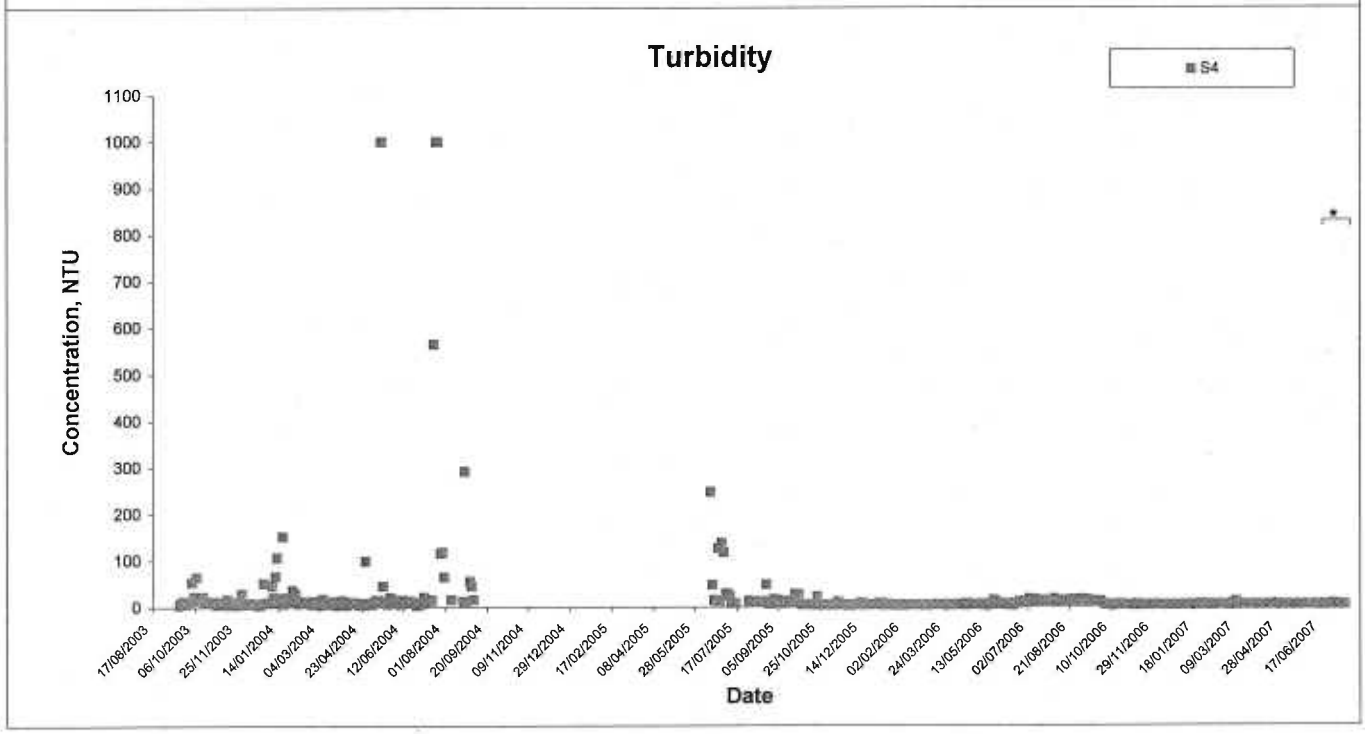
Note 2: The construction phase stream water quality monitoirng for S1 and S2 was terminated on 9 Feb 07.

Note 3: The turbidity result of S2 was over 1000 NTU on 20 Jun 05 since the muddy surface runoff was generated during heavy rainfall.

* Post-project local stream water quality monitoring was conducted at S1 and S2 from 20 Jun 07 to 18 Jul 07.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |



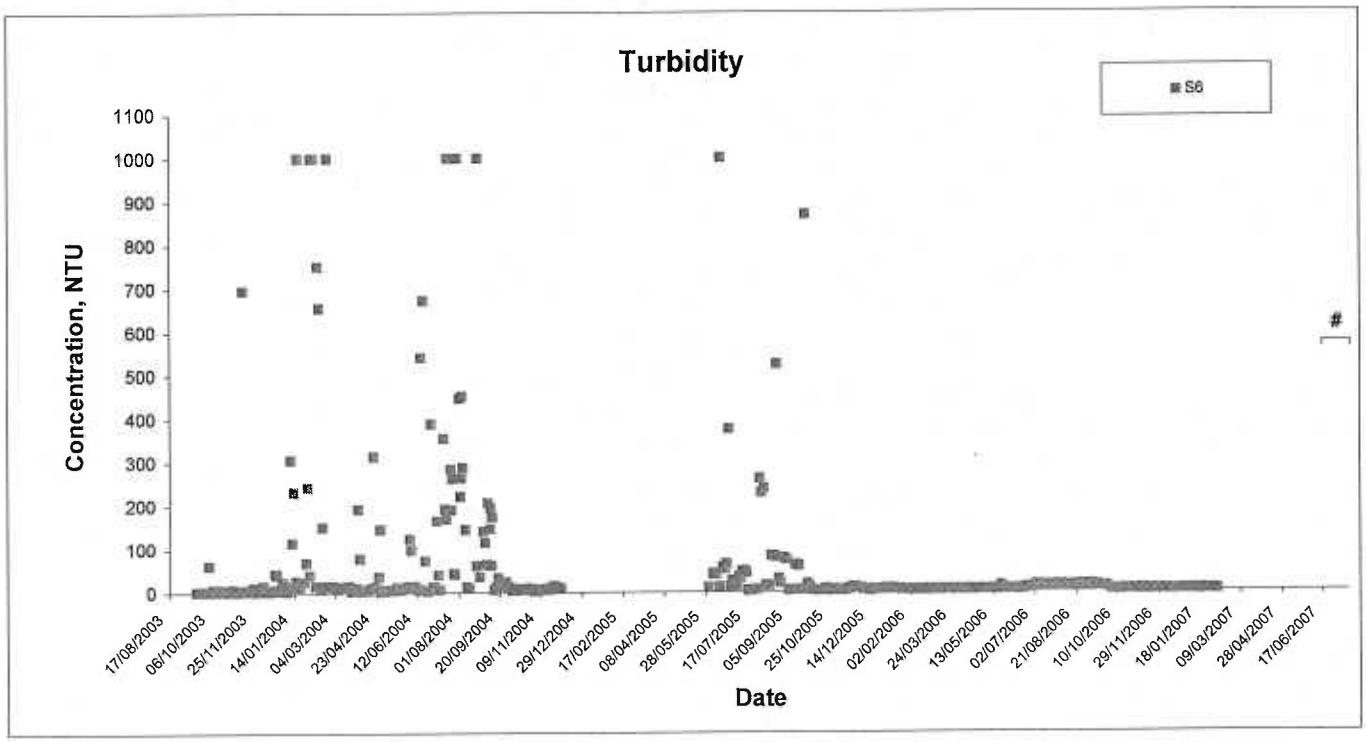

Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S3 during the period for Dec 04 to May 05.

Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S4 during the period for Sep 04 to Jun 05.

Note 3: The turbidity results of S4 were over 1000 NTU on 17 May 04 and 24 Jul 04 since the muddy surface runoff entered into the stream.

* Post-project local stream water quality monitoring was conducted at S3 and S4 from 20 Jun 07 to 18 Jul 07.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S6 during the period for Dec 04 to May 05.

Note 2: The construction phase stream water quality monitoring for S6 was terminated on 9 Feb 07.

Note 3: The turbidity results were over 1000 NTU on 19 Jan 04 and 7 Feb 04 since the muddy surface runoff entered into the stream during rainy weather.

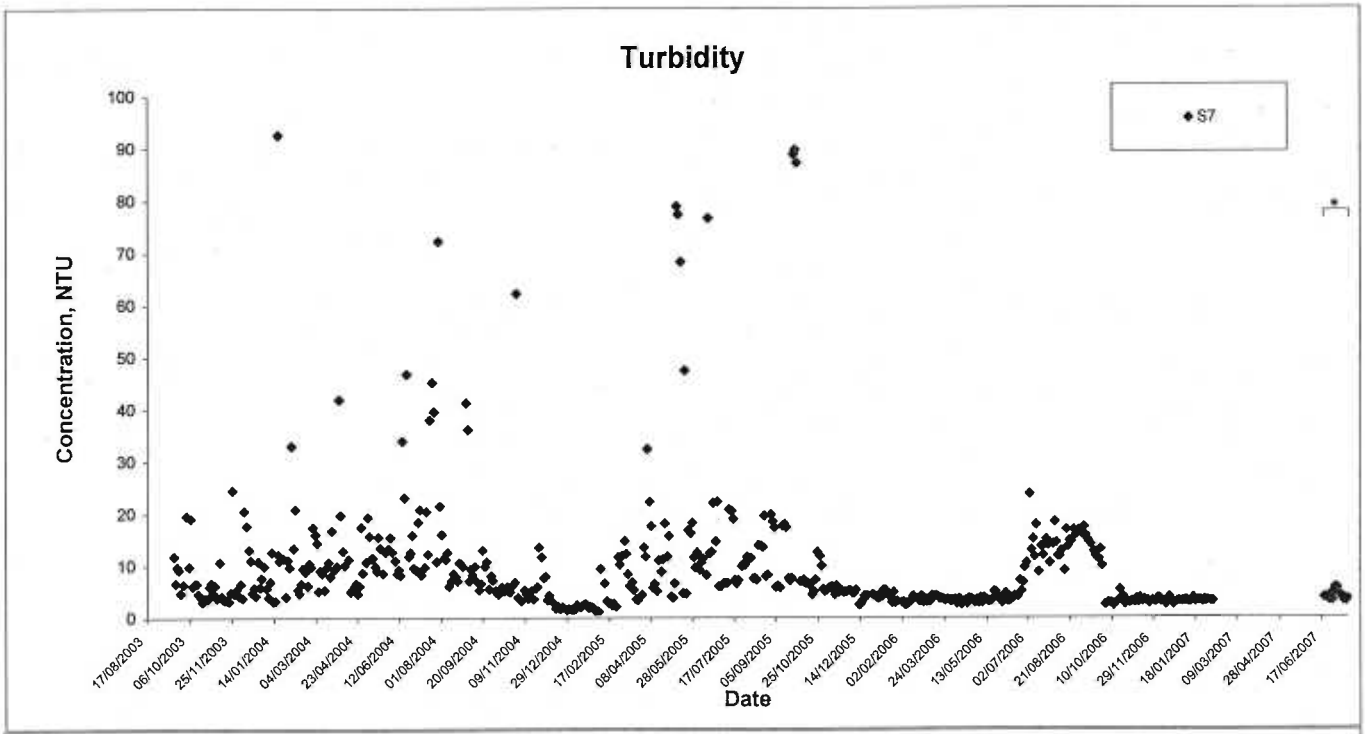
Note 4: The turbidity results were over 1000 NTU on 24 Feb 04, 19 & 31 Jul 04 since the muddy surface runoff was generated from the washing vehicle by water hose and entered into the stream.

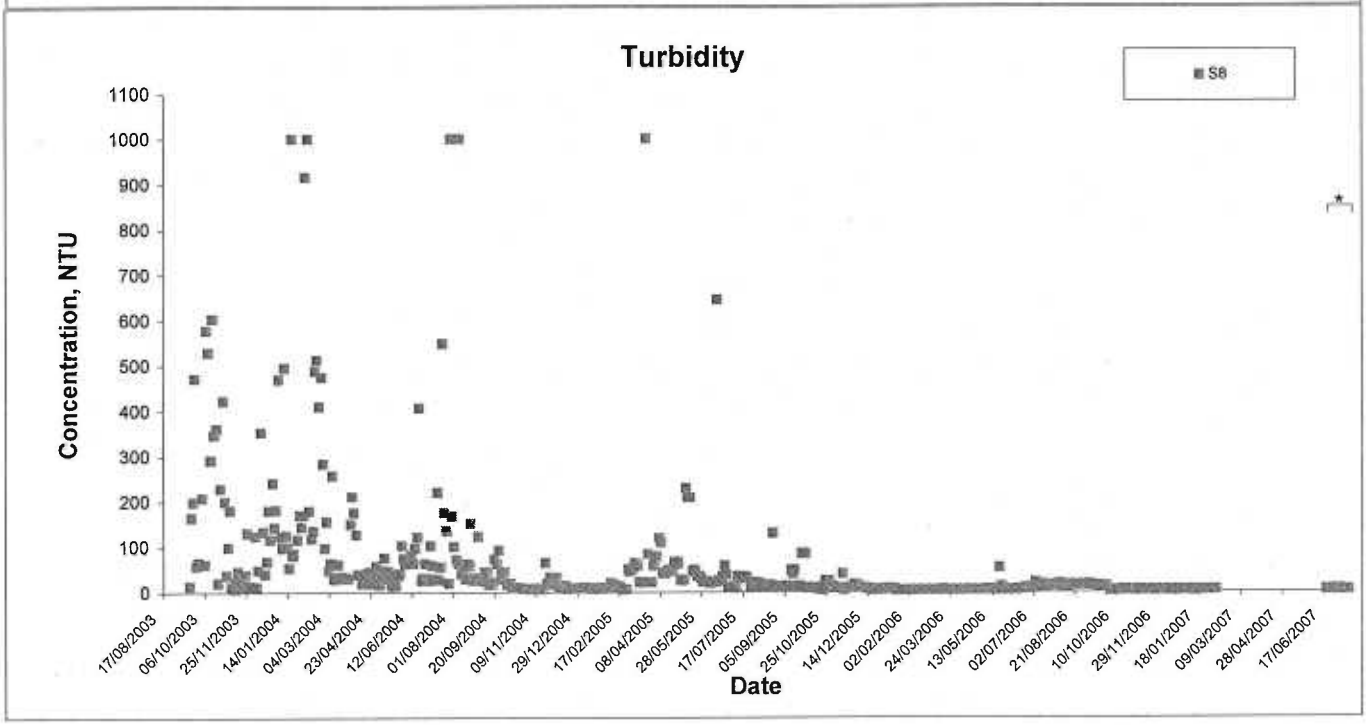
Note 5: The turbidity result was over 1000 NTU on 25 Aug 04 since the muddy surface runoff was generated from the haul road watering and entered into the stream.

Note 6: The turbidity result was over 1000 NTU on 16 Jun 05 since the muddy surface runoff was generated during heavy rainfall.

# No post-project local stream water quality was conducted at S6 since the stream was dried out.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: The construction phase stream water quality monitoring for S7 and S8 was terminated on 9 Feb 07.

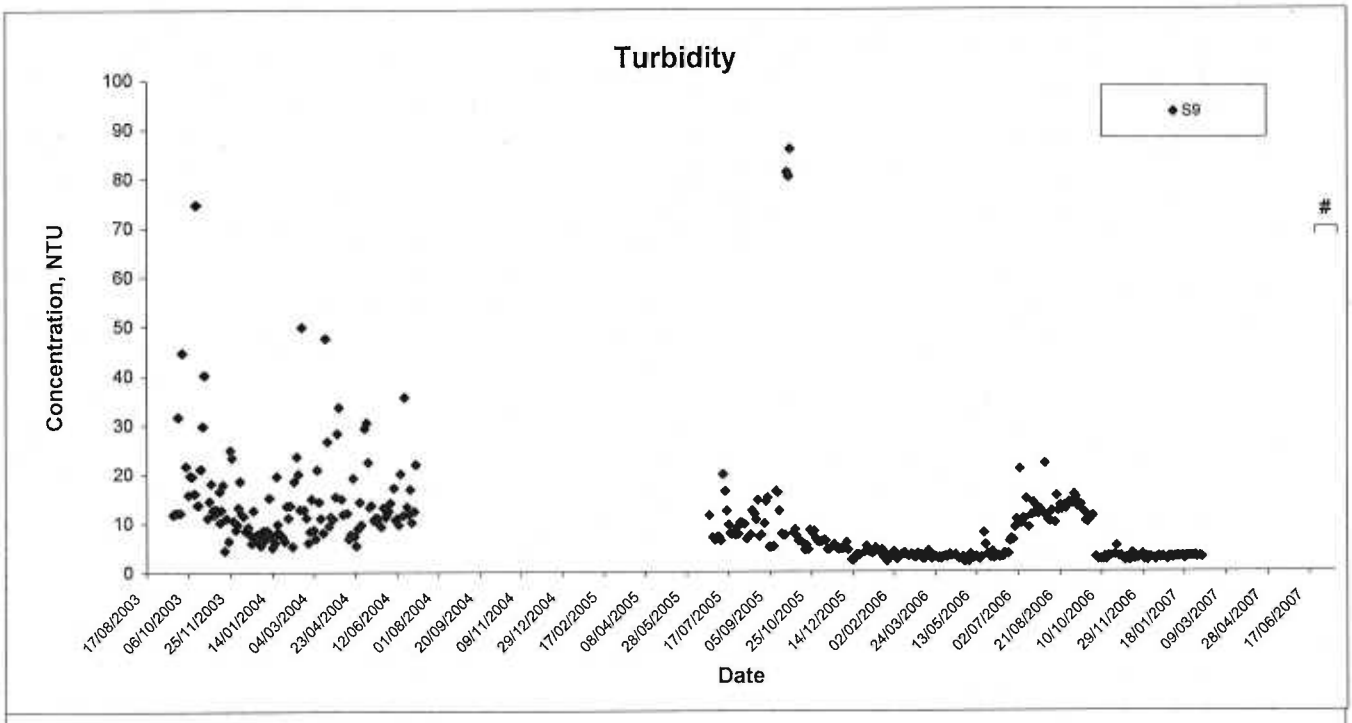
Note 2: The turbidity result of S8 was over 1000 NTU on 19 Jan 04 since the muddy surface water entered into the stream during heavy rainfall.

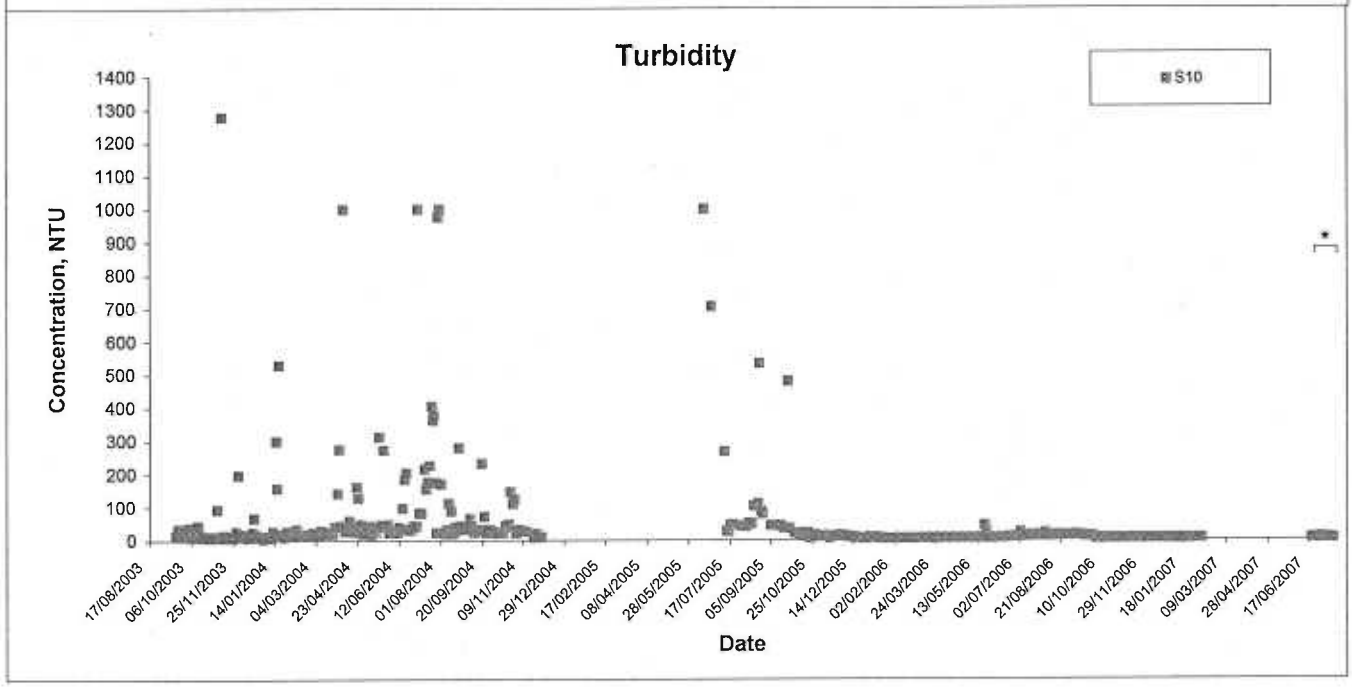
Note 3: The turbidity results of S8 were over 1000 NTU on 7 Feb 04, 9 Aug 04 and 22 Mar 05 because the highly turbid water in black/grey colour from nearby road entered into the stream.

Note 4: The turbidity result of S8 was over 1000 NTU on 29 Jul 04 because of the non-project related effluents being discharged to the stream.

* Post-project local stream water quality monitoring was conducted at S7 and S8 from 20 Jun 07 to 18 Jul 07.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX | F |
| | | | | Rev | - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S9 during the period for Jul 04 to Jun 05

Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S10 during the period for Dec 04 to Jun 05

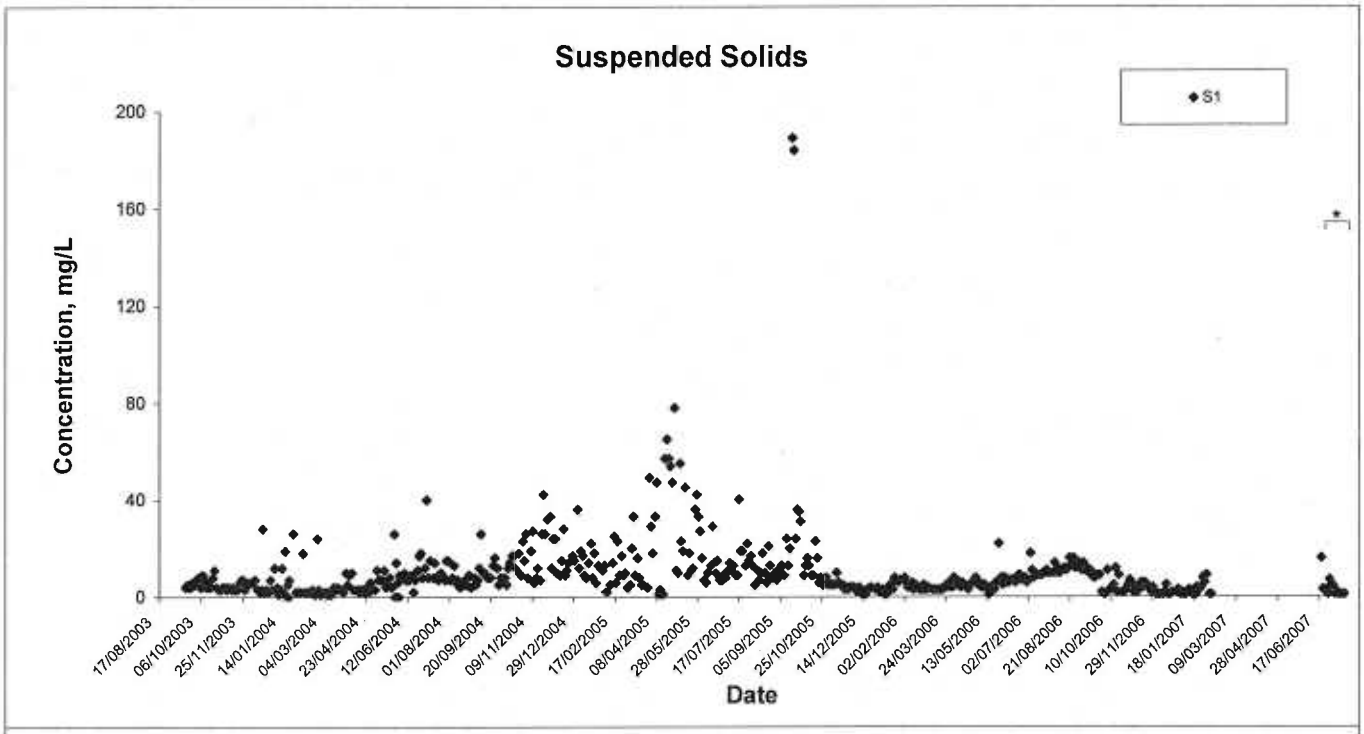
Note 3: The construction phase stream water quality monitoring for S9 and S10 was terminated on 9 Feb 07.

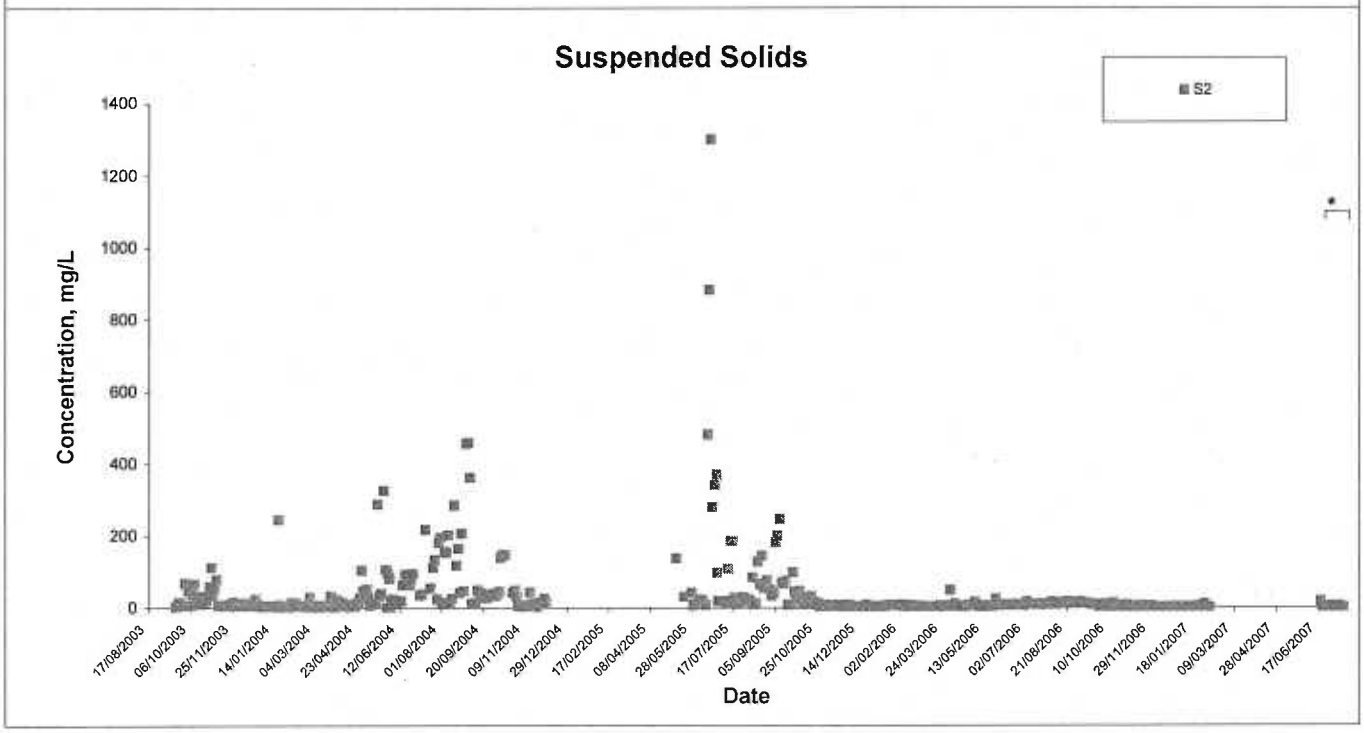
Note 4: The turbidity result of S10 was over 1000 NTU on 11 Nov 03 because muddy water was overflowing from the wastewater treatment system and discharged to the stream.

* Post-project local stream water quality monitoring at S10 was conducted from 20 Jun 07 to 18 Jul 07.

# No post-project local stream water quality monitoring was conducted at S9 since the access was blocked after the operation of Ha Tusen Weigh Station.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |



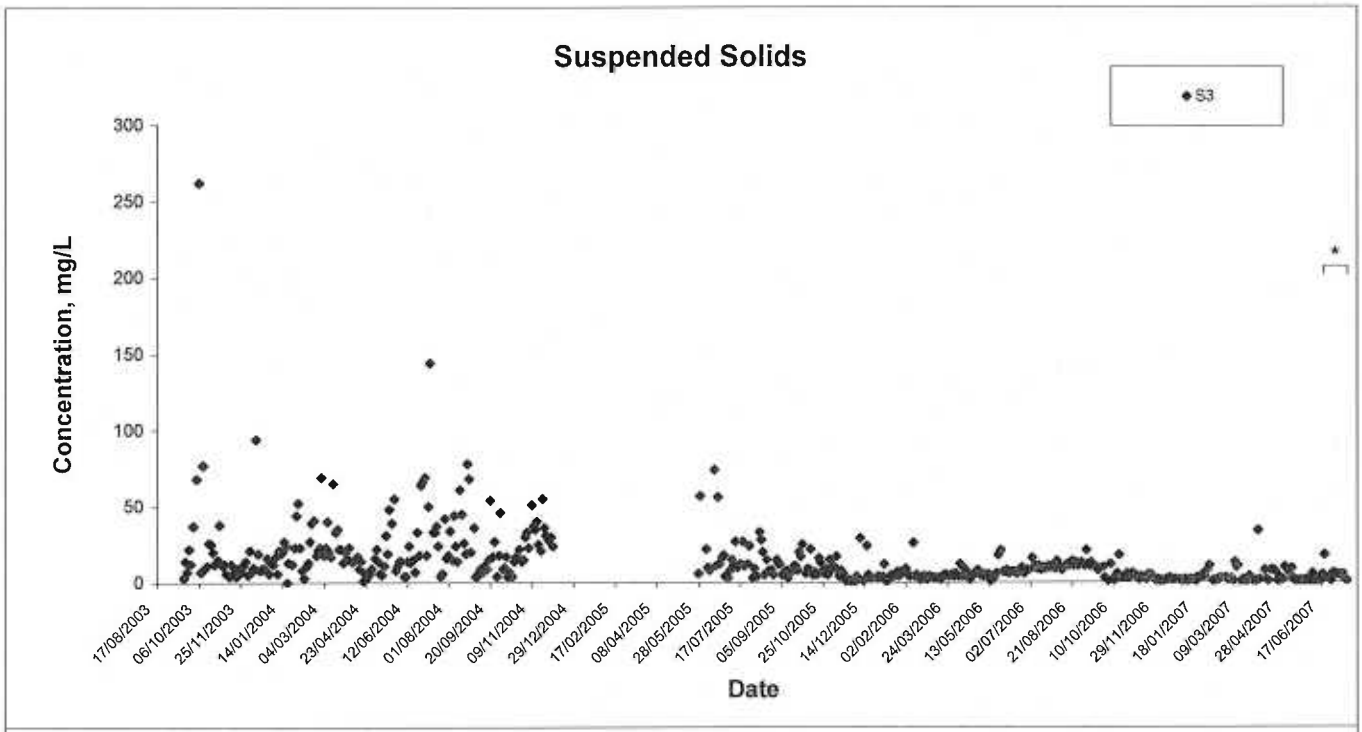



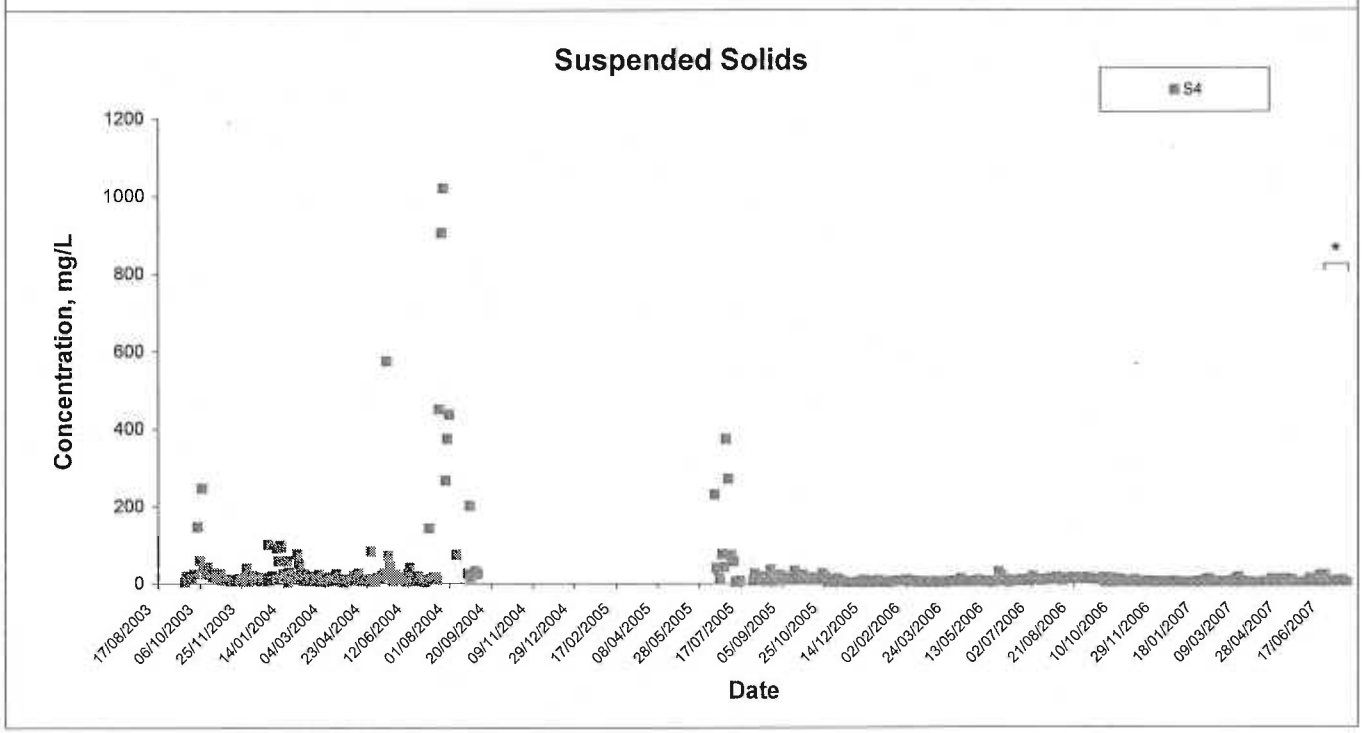

Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S2 during the period for Dec 04 to May 05.

Note 2: The cosntruction phase stream water quality monitoring for S1 and S2 was terminated on 9 Feb 07.

* Post-project local stream water quality monitoring was conducted at S1 and S2 from 20 Jun 07 to 18 Jul 07.

| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract No.: HY/2002/24 | SCALE | N.T.S. | DATE | Jul-07 |
| | Deep Bay Link Northern Section | CHECK | PTPM | DRAWN | LLMC |
| | **Graphical Presentation of Stream Water Quality Monitoring Results** | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S3 during the period for Dec 04 to May 05.

Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S4 during the period for Sep 04 to Jun 05.

* Post-project local stream water quality monitoring was conducted at S3 and S4 from 20 June 07 to 18 July 07.

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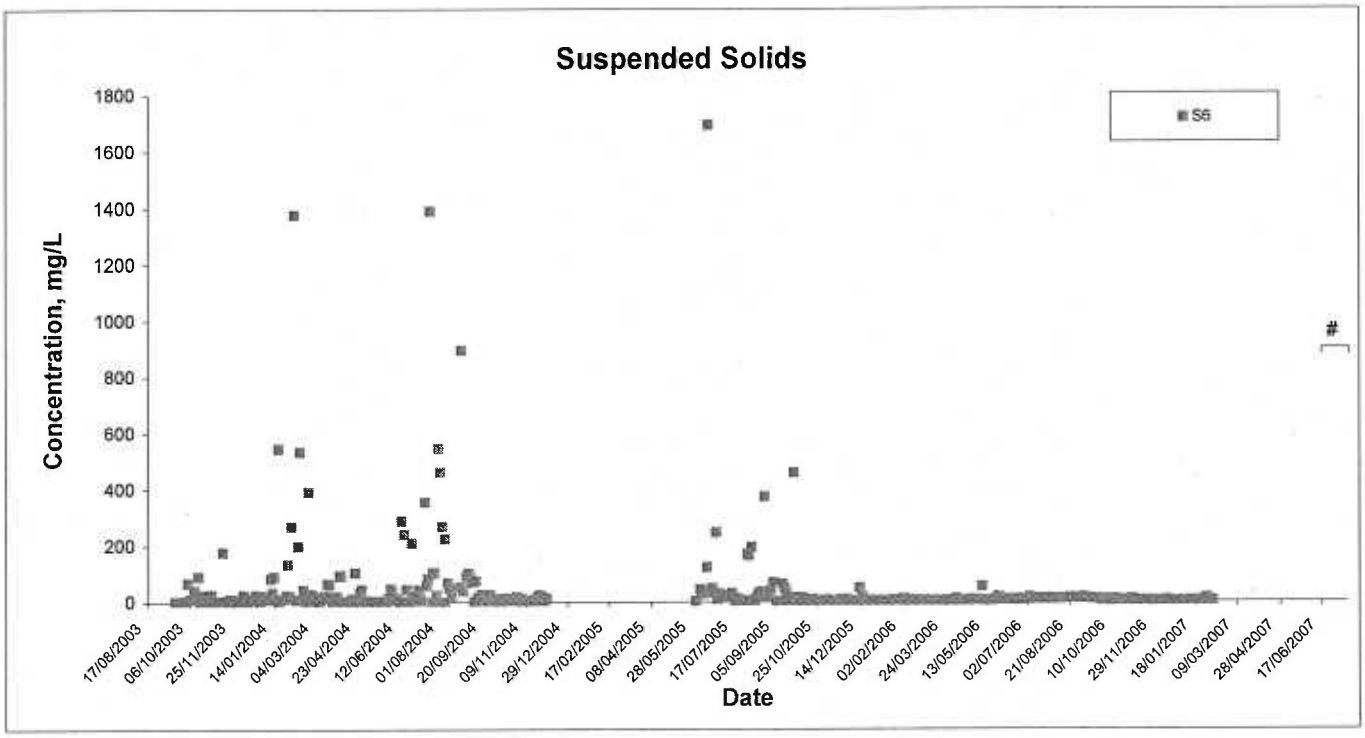
| ENSR \| AECOM | Contract No.: HY/2002/24 | SCALE | N.T.S. | DATE | Jul-07 |
| | Deep Bay Link Northern Section | CHECK | PTPM | DRAWN | LLMC |
| | **Graphical Presentation of Stream Water Quality Monitoring Results** | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S6 during the period for Dec 04 to May 05

Note 2: The construciton phase stream water quality monitoring for S6 was terminated on 9 Feb 07.

# No post-project local stream water quality monitoring was conducted at S6 since the stream was dried out.

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| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
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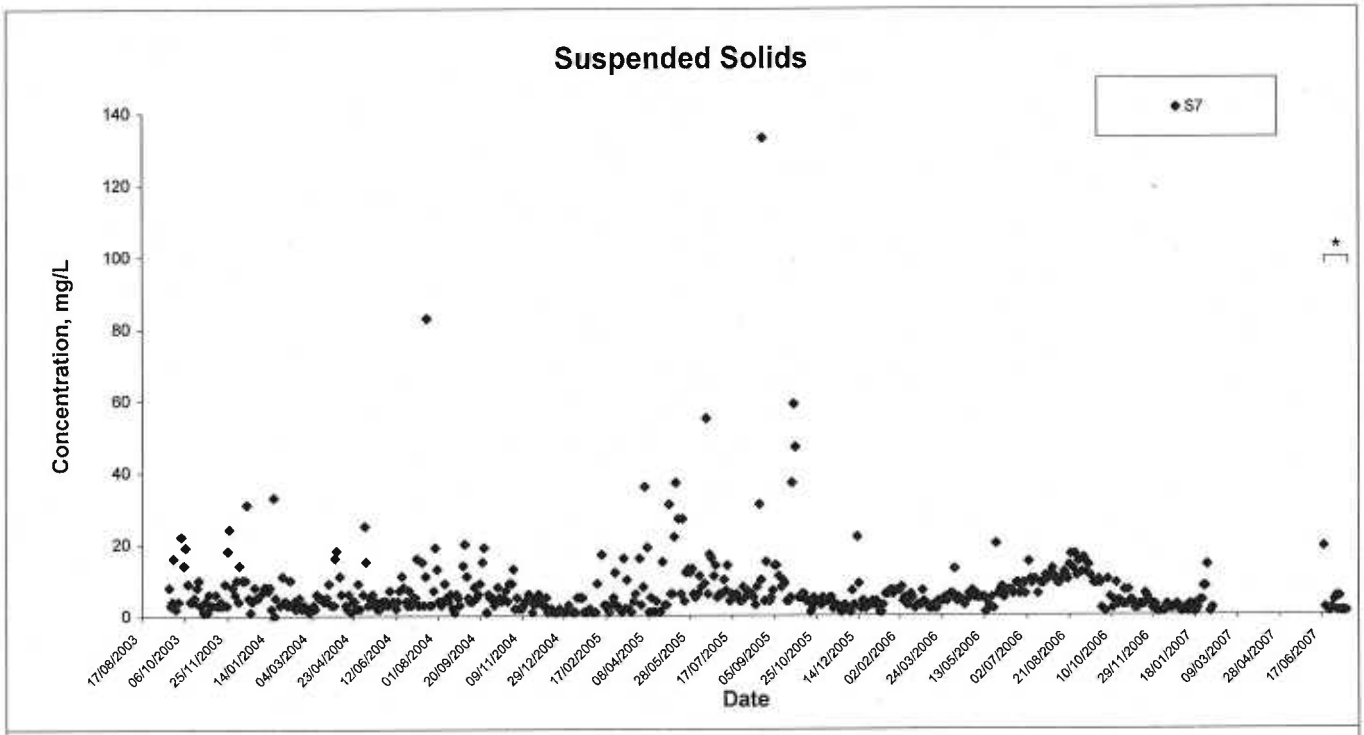
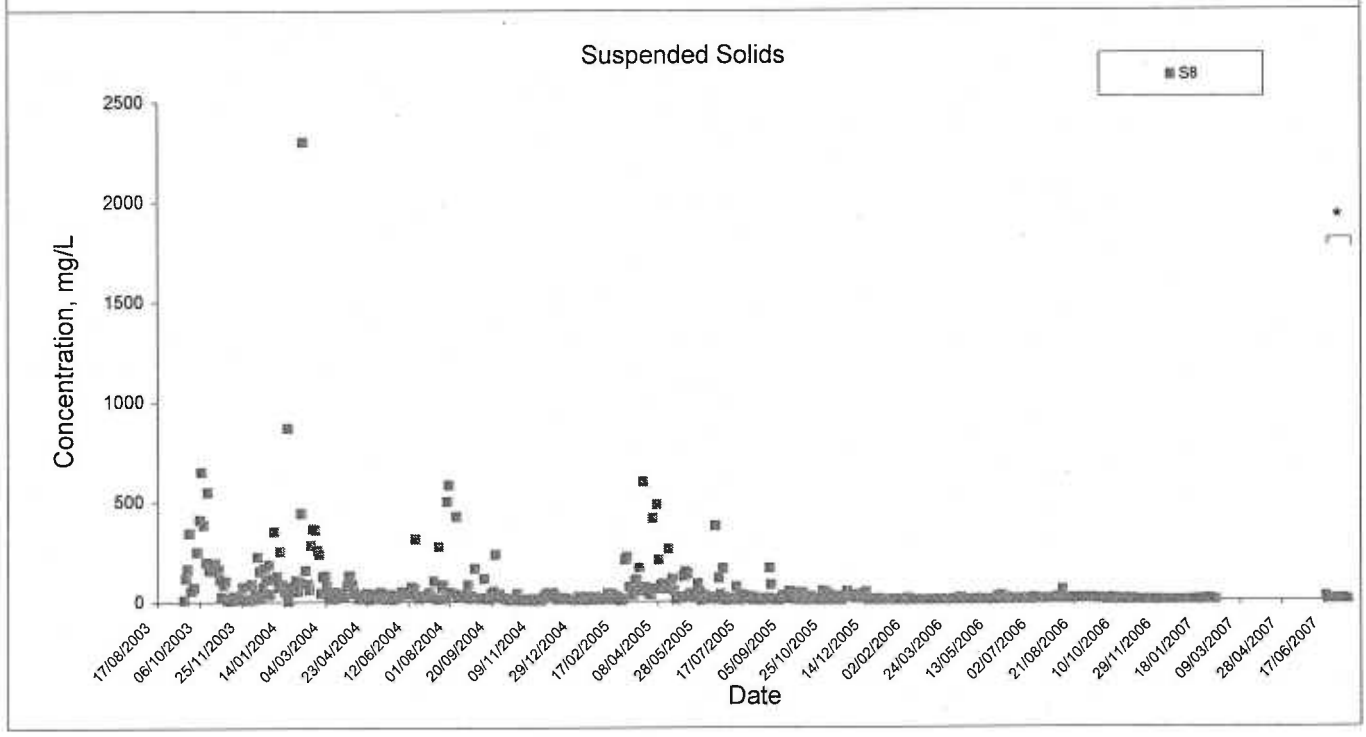
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: The costruction phase stream water quality monitoring for S7 and S8 was terminated on 9 Feb 07.

* Post-project local stream water quality monitoring was conducted at S7 and S8 from 20 Jun 07 to 18 Jul 07.

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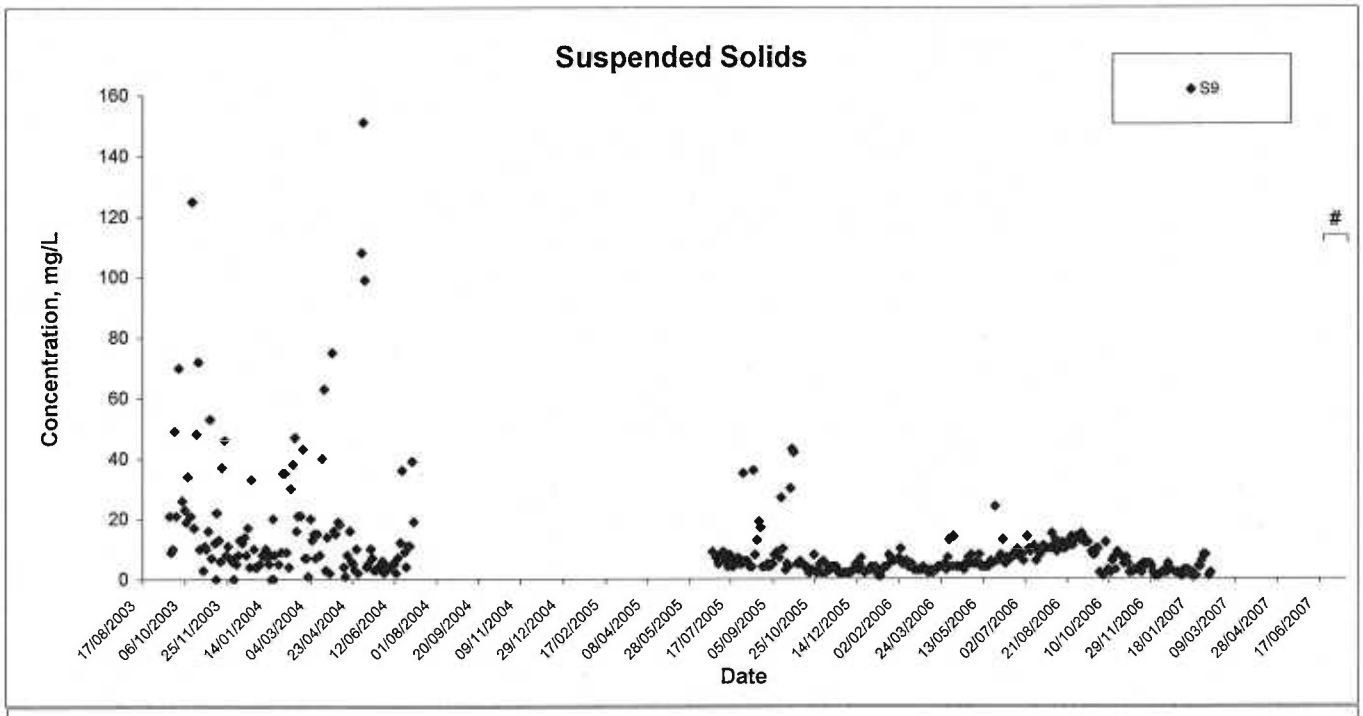
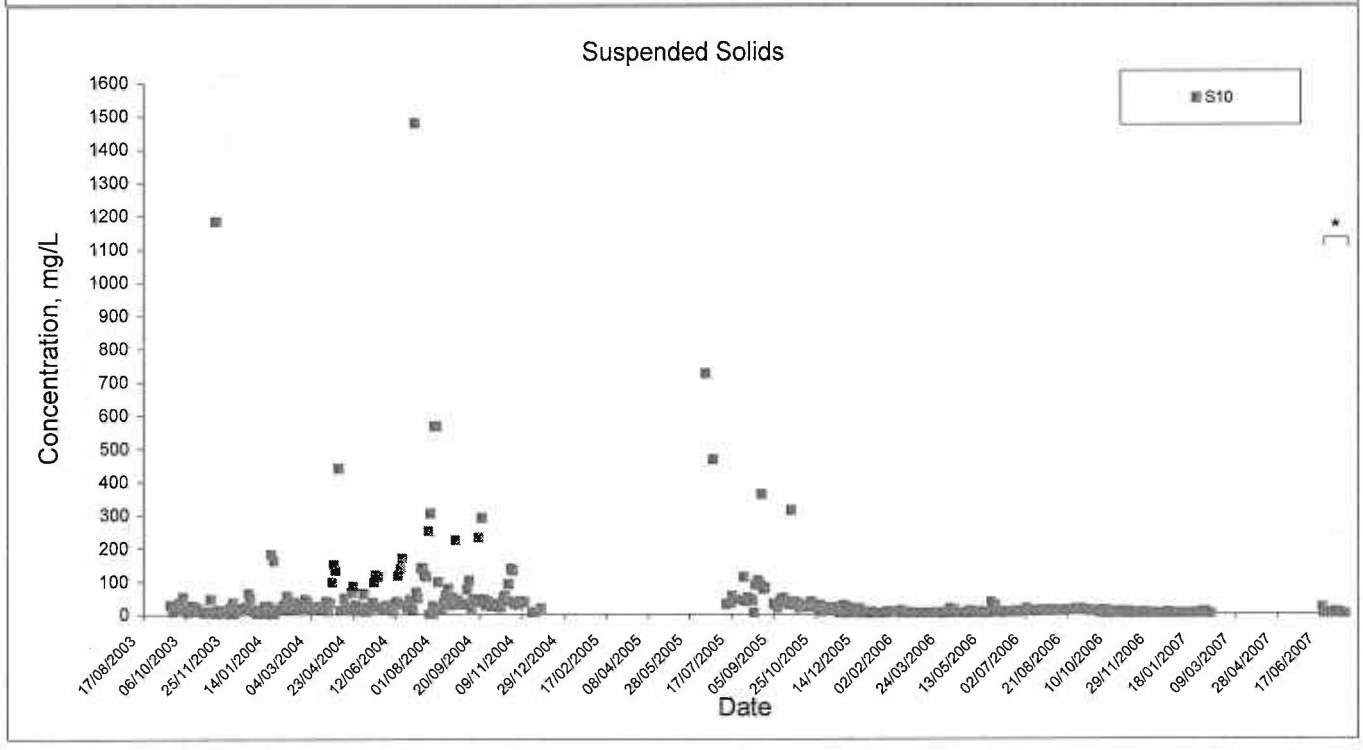
| ENSR \| AECOM | Contract No.: HY/2002/24 | SCALE | N.T.S. | DATE | Jul-07 |
| | Deep Bay Link Northern Section | CHECK | PTPM | DRAWN | LLMC |
| | **Graphical Presentation of Stream Water Quality Monitoring Results** | JOB NO. | 60016782 | APPENDIX F | Rev - |




Note 1: Monitoring stream was dried up, and monitoring could not be conducted at S9 during the period for Jul 04 to Jun 05.

Note 2: Monitoring stream was dried up, and monitoring could not be conducted at S10 during the period for Dec 04 to Jun 05.

Note 3: The construction phase stream water quality monitoring for S9 and S10 was terminated on 9 Feb 07.

* Post-project local stream water quality monitoring at S10 was conducted from 20 Jun 07 to 18 Jul 07.

# No post-project stream water quality monitoring was conducted at S9 since the access was blocked after the operation of Ha Tusen Weigh Station.

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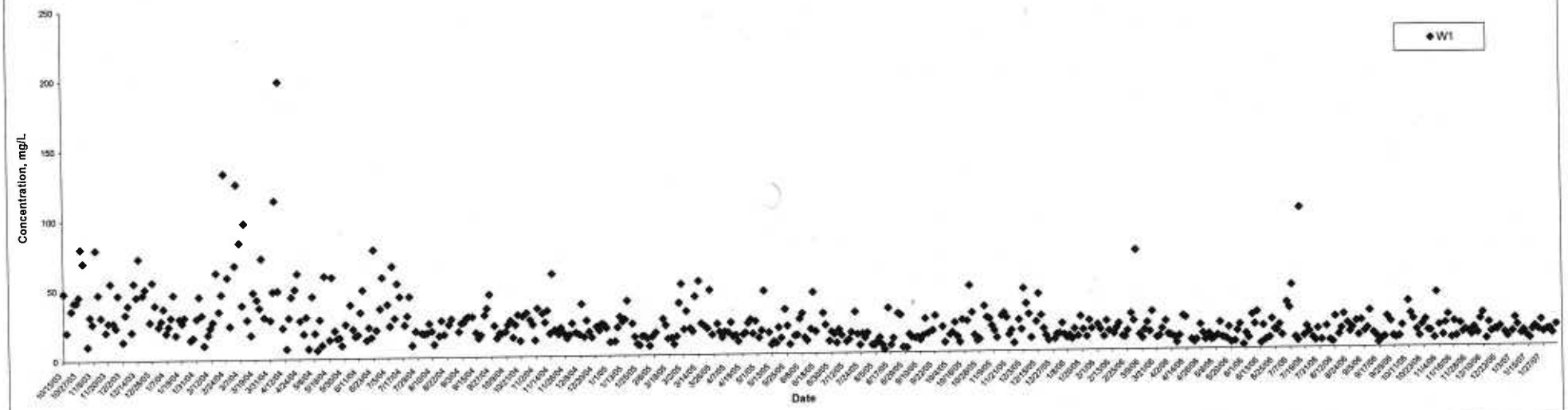
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Stream Water Quality Monitoring Results** | SCALE | N.T.S. | DATE | Jul-07 |
| | | CHECK | PTPM | DRAWN | LLMC |
| | | JOB NO. | 60016782 | APPENDIX F | Rev - |

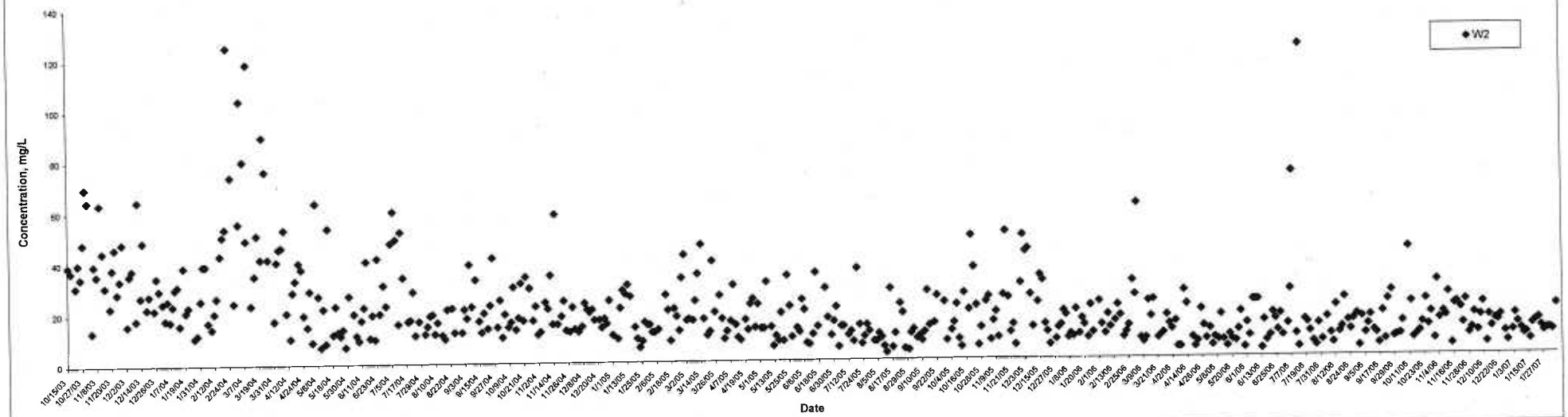
# APPENDIX G
# GRAPHICAL PRESENTATION OF COASTAL WATER QUALITY MONITORING RESULTS (FROM EM&A PROGRAMME OF HK-SWC)

## Suspended Solids at Mid-Ebb Tide

### W1




### W2

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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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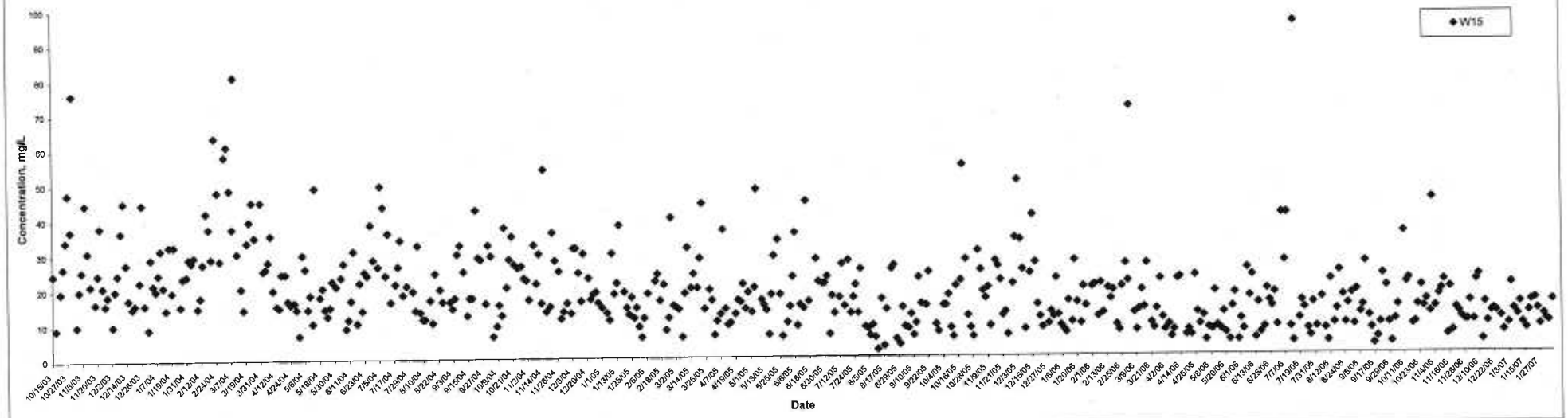
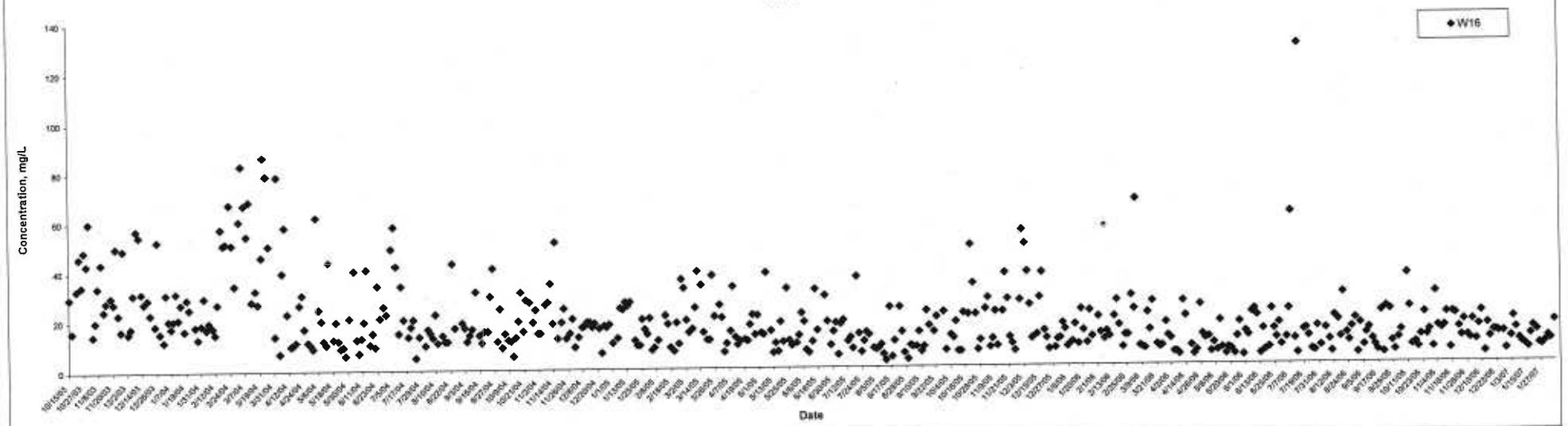
| SCALE | N.T.S. | DATE | Jul-07 |
| CHECK | PTPM | DRAWN | LLMC |
| JOB NO. | 60016782 | APPENDIX | G |
| | | Rev | - |

## Suspended Solids at Mid-Ebb Tide

### W15




### W16




ENSR | AECOM

Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| SCALE | N.T.S. | DATE | Jul-07 |
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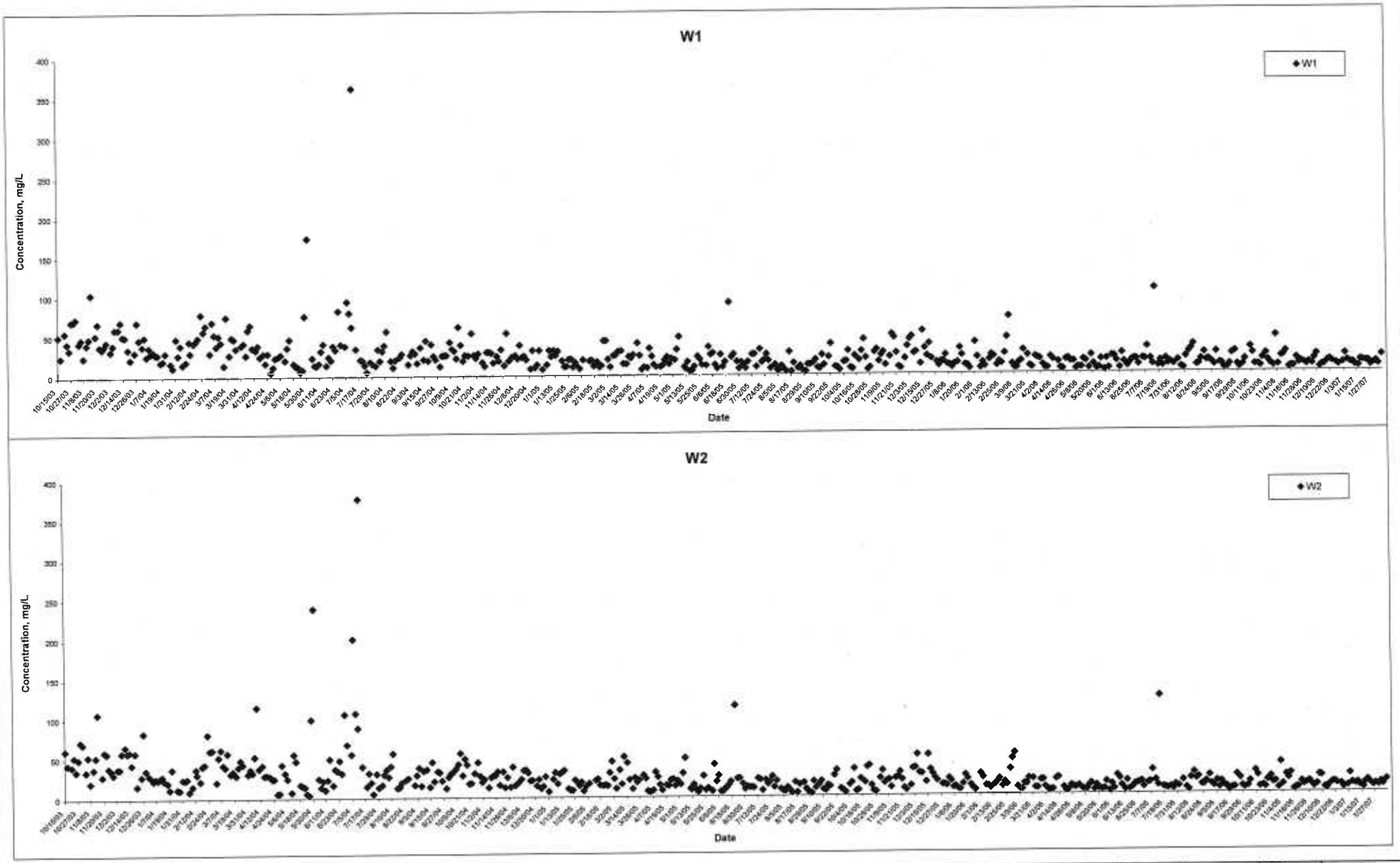
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Suspended Solids at Mid-Flood Tide




ENSR | AECOM

Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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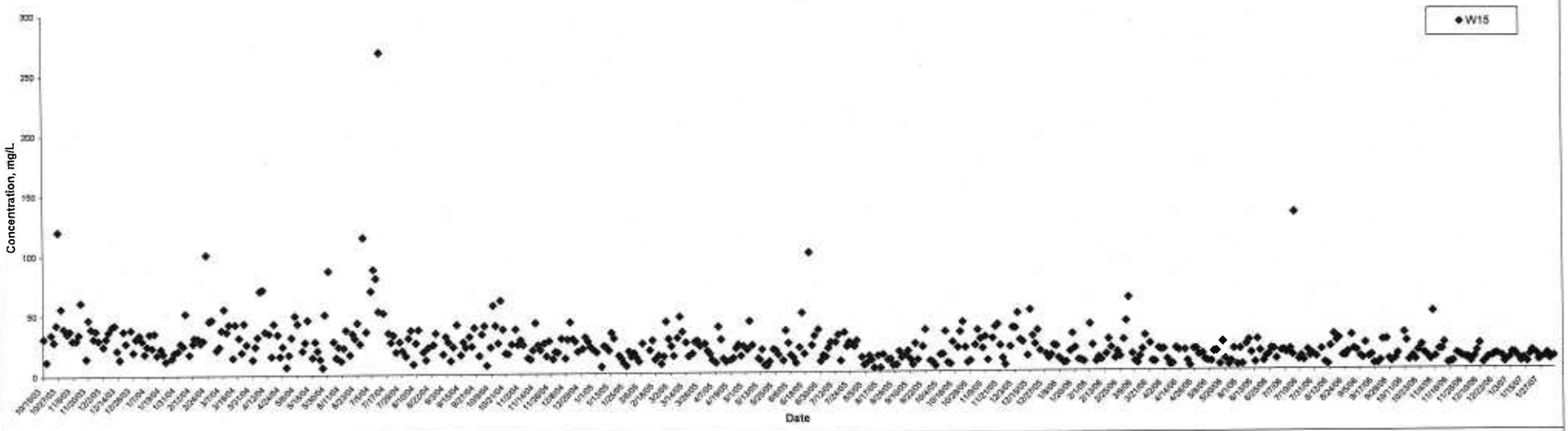
| SCALE | N.T.S. | DATE | Jul-07 |
| CHECK | PTPM | DRAWN | LLMC |
| JOB NO. | 60016782 | APPENDIX | G |
| | | Rev | - |

## Suspended Solids at Mid-Flood Tide

### W15

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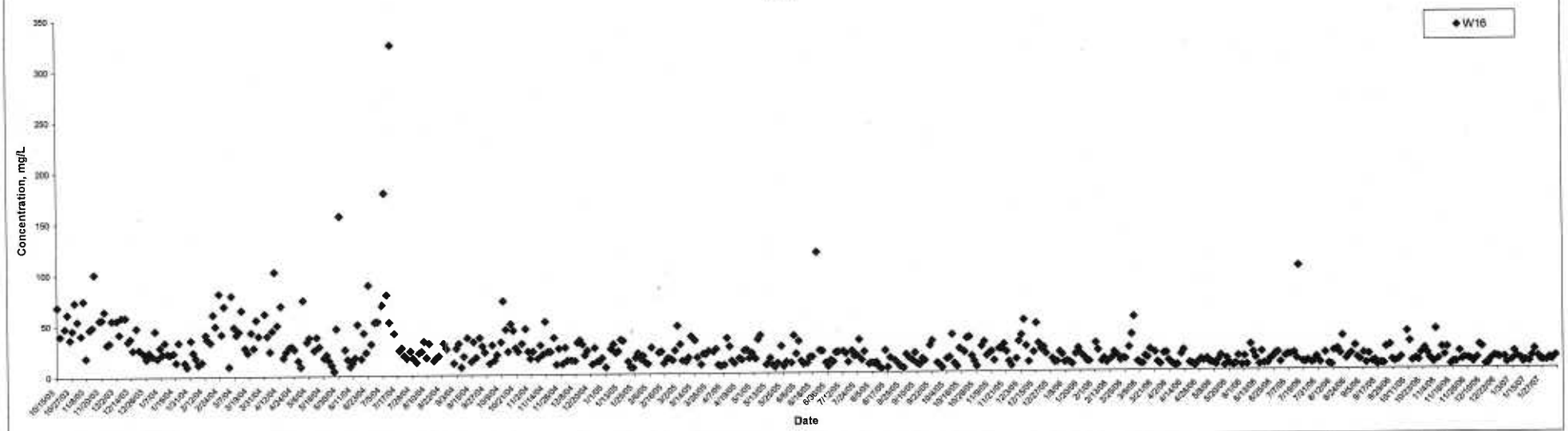


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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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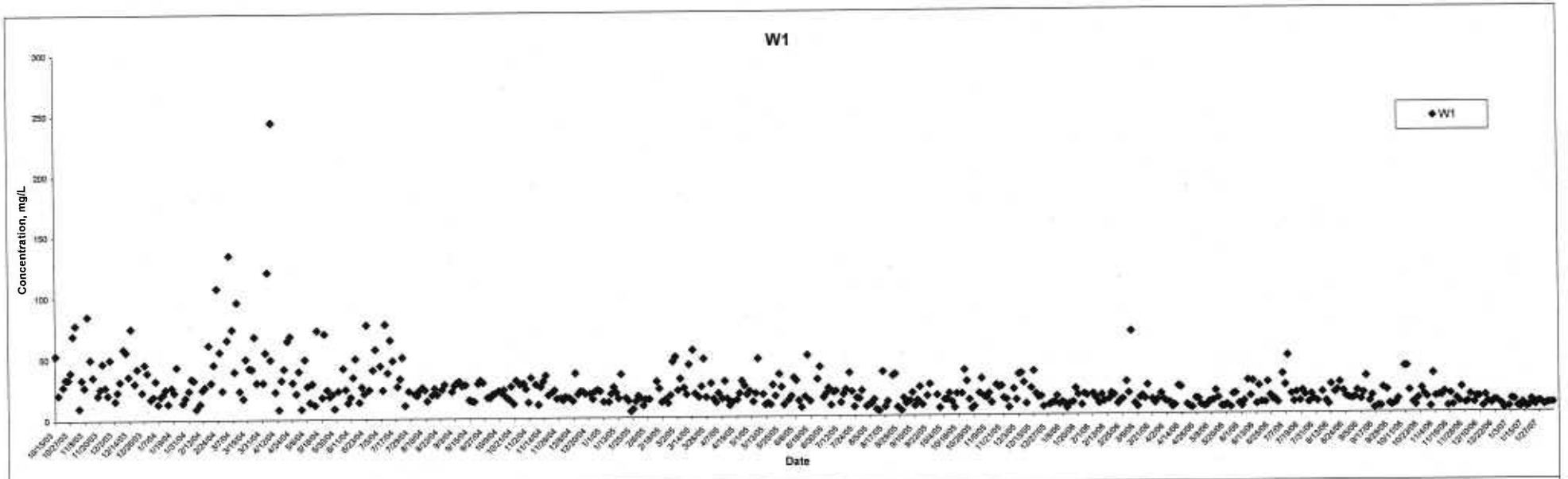
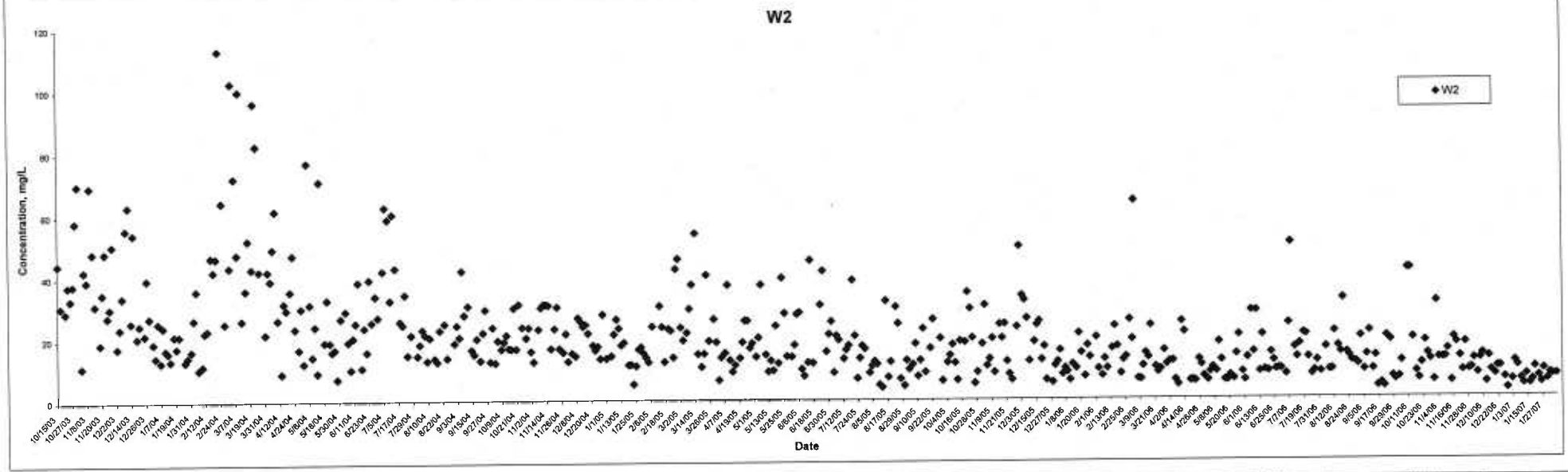
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Turbidity at Mid-Ebb Tide




ENSR | AECOM

Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| SCALE | N.T.S. | DATE | Jul-07 |
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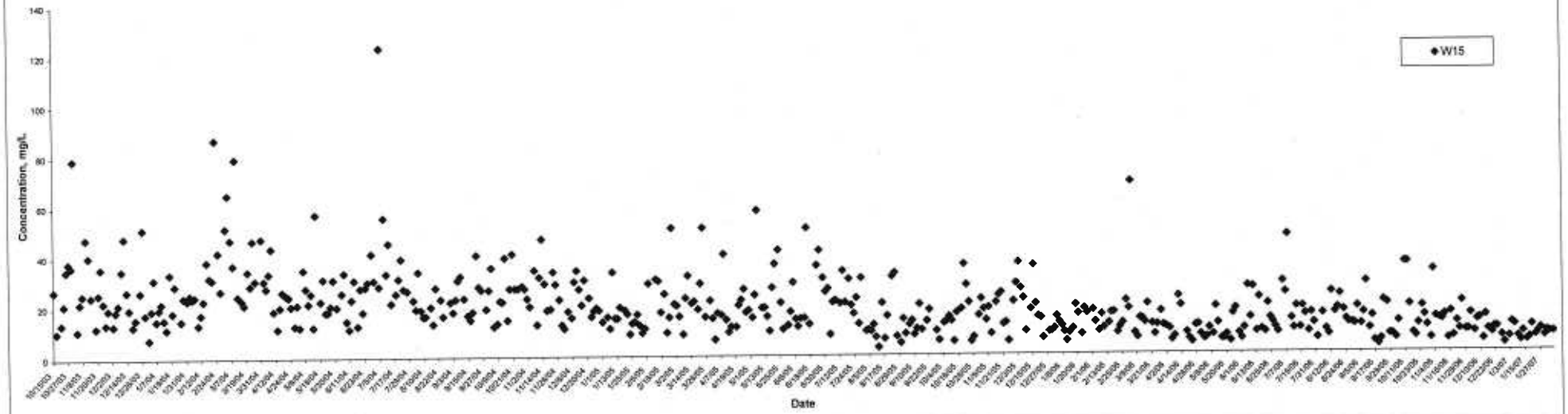
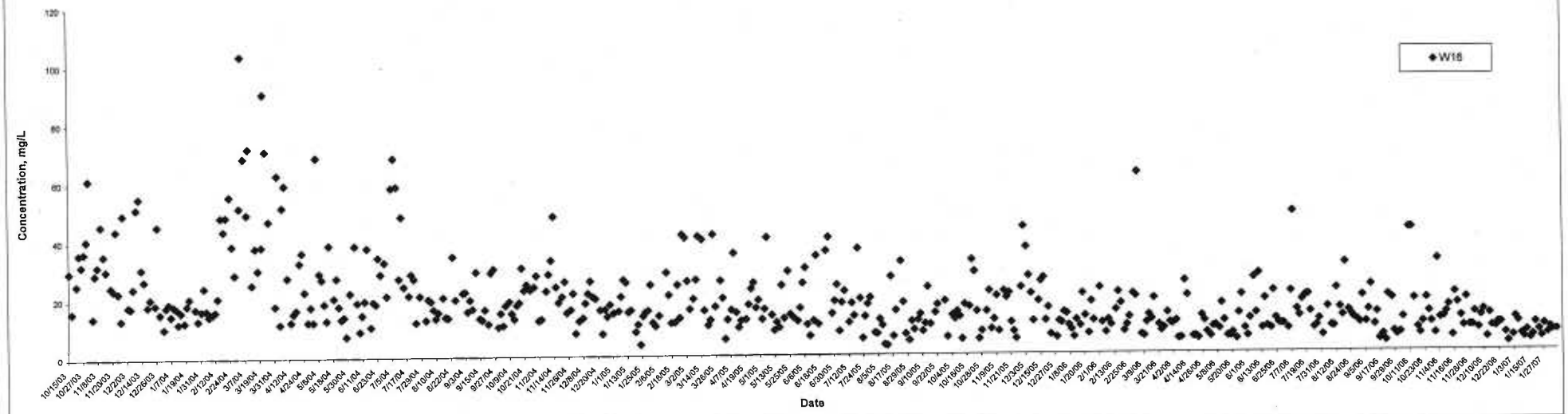
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Turbidity at Mid-Ebb Tide

### W15




### W16

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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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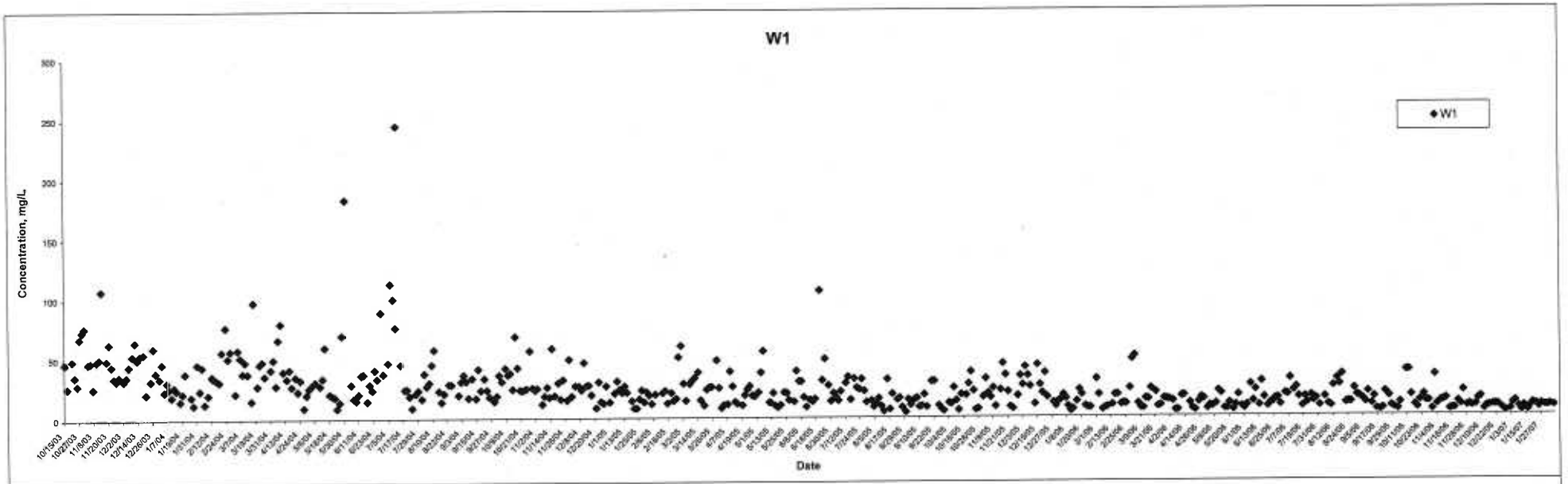
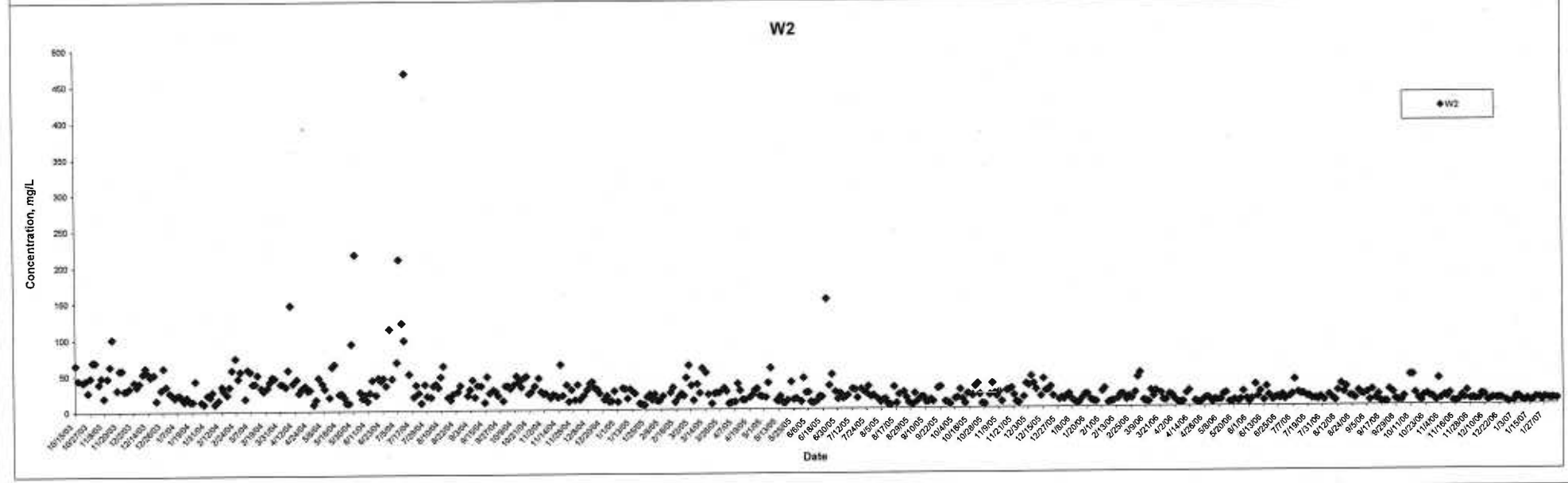
| SCALE | N.T.S. | DATE | Jul-07 |
| CHECK | PTPM | DRAWN | LLMC |
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Turbidity at Mid-Flood Tide

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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| SCALE | N.T.S. | DATE | Jul-07 |
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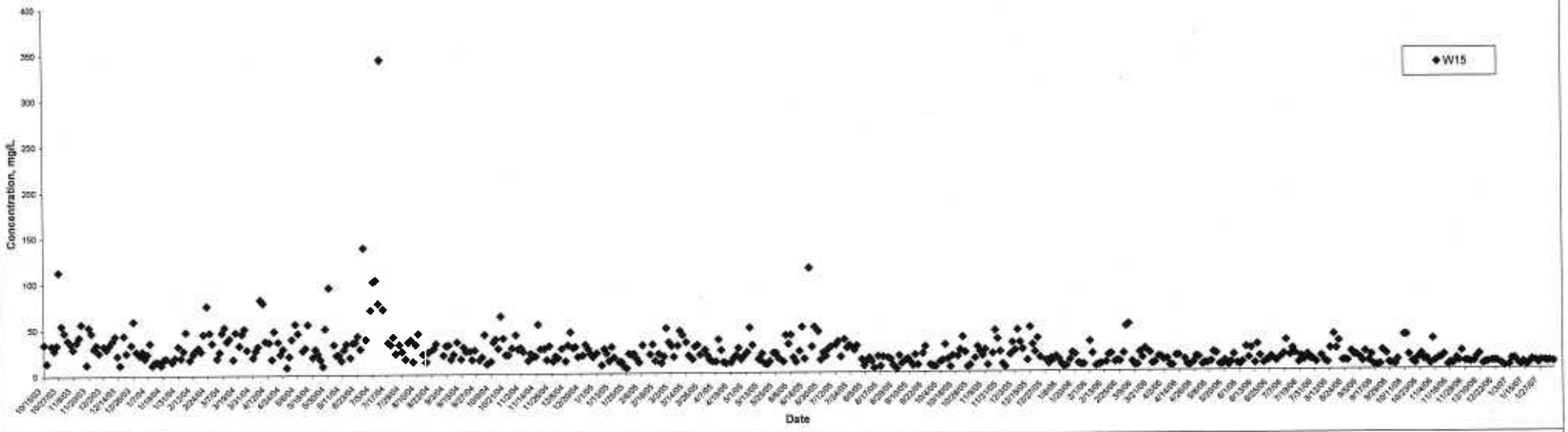
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Turbidity at Mid-Flood Tide

### W15

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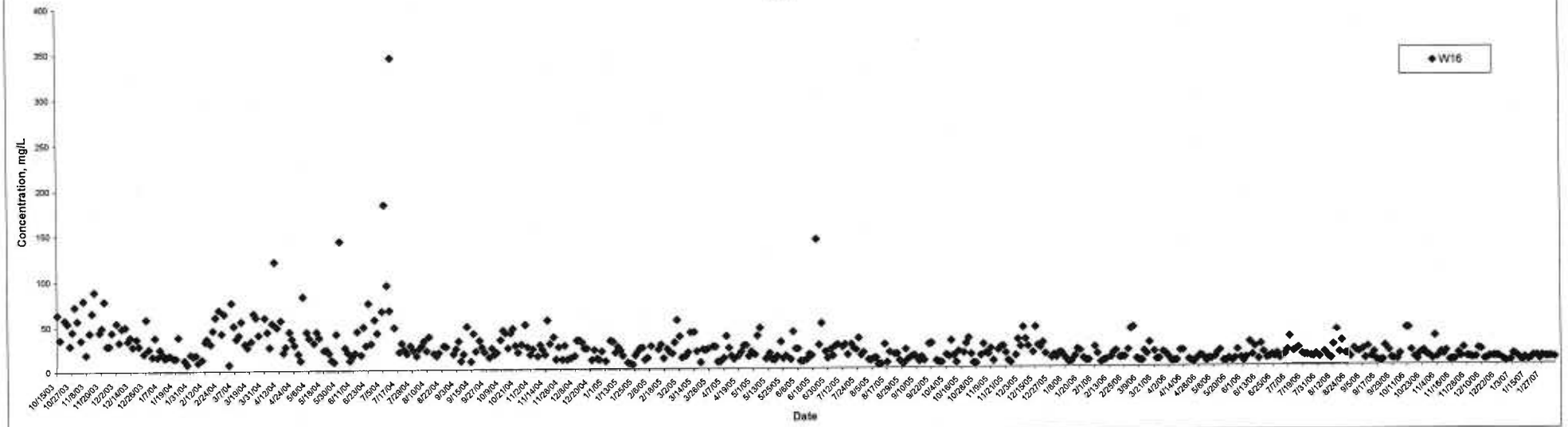


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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Coastal Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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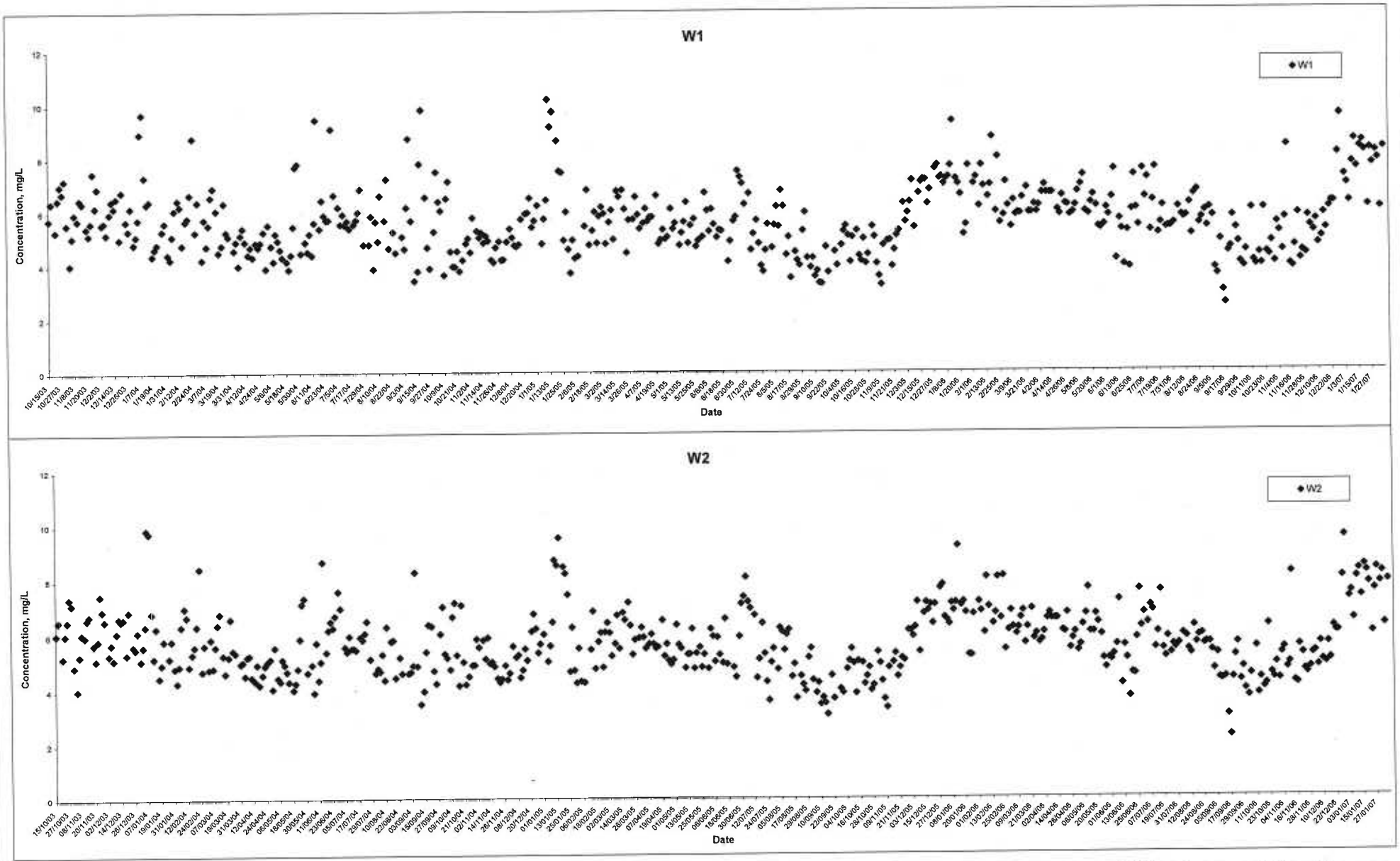
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Dissolved Oxygen at Mid-Ebb Tide




ENSR | AECOM

Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| SCALE | N.T.S. | DATE | Jul-07 |
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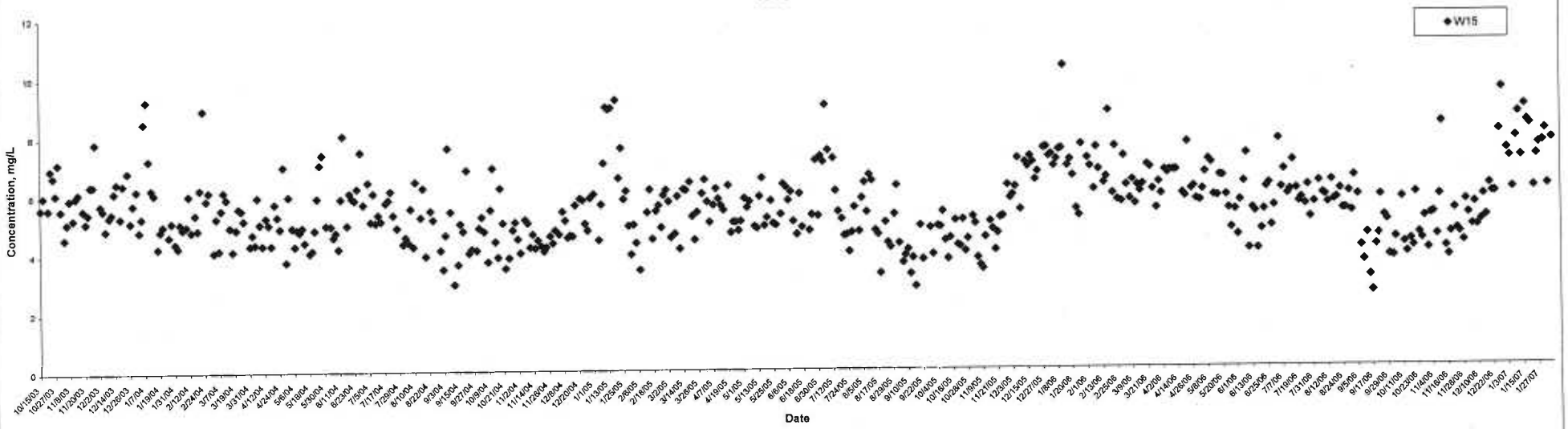
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Dissolved Oxygen at Mid-Ebb Tide

### W15

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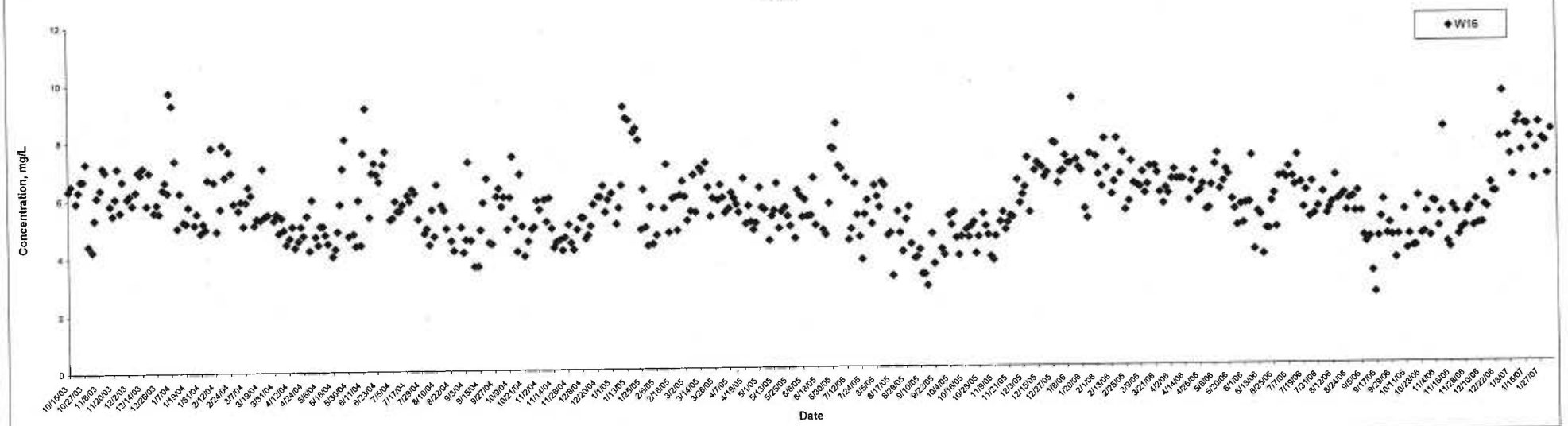


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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| SCALE | N.T.S. | DATE | Jul-07 |
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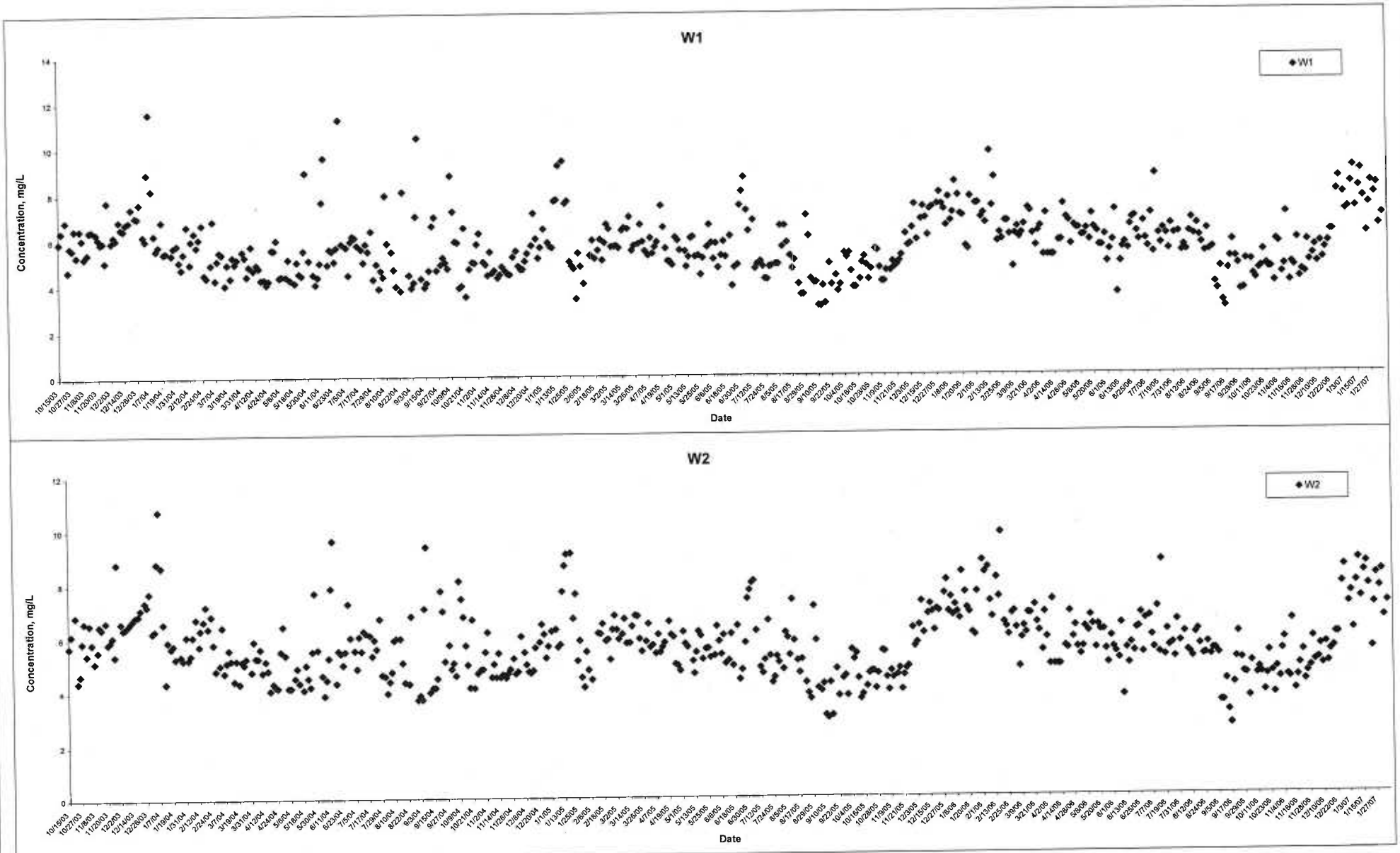
| JOB NO. | 60016782 | APPENDIX G | Rev - |

## Dissolved Oxygen at Mid-Flood Tide

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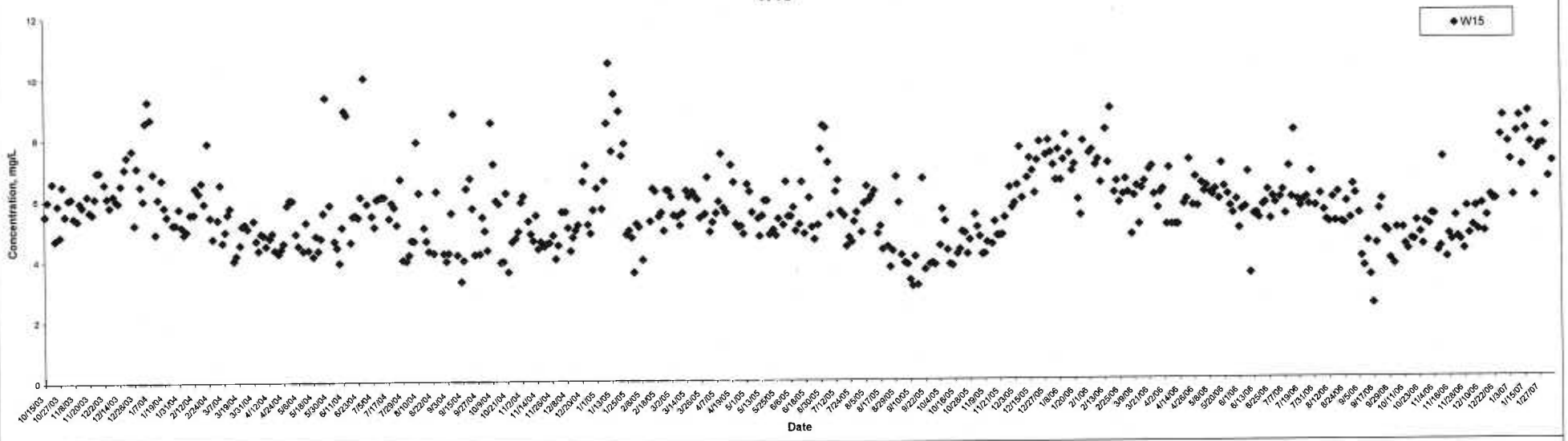
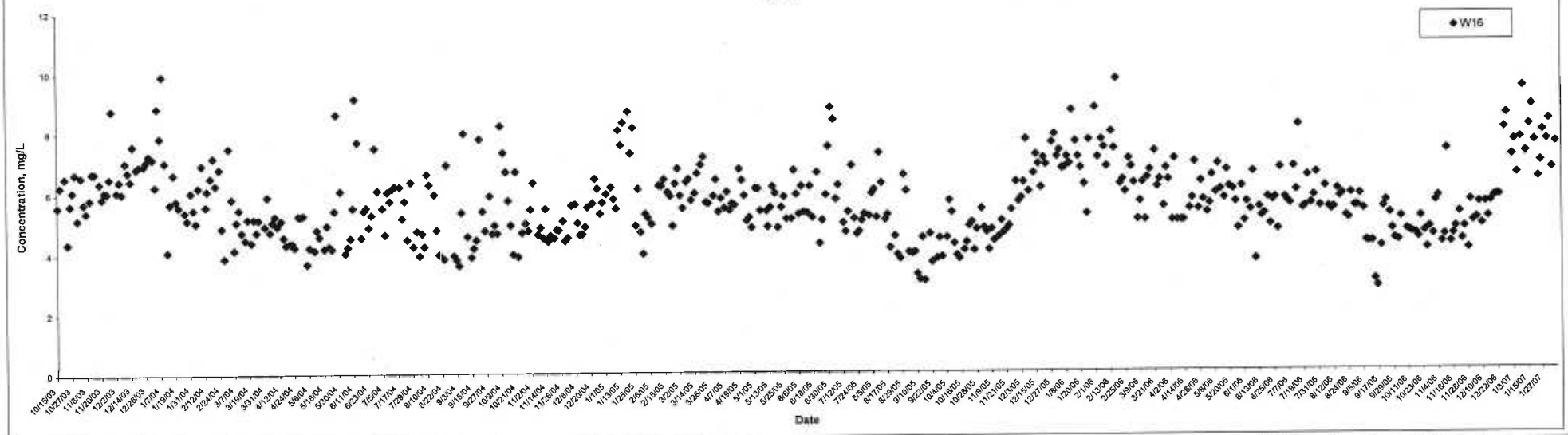
| ENSR \| AECOM | Contract No.: HY/2002/24<br>Deep Bay Link Northern Section<br>**Graphical Presentation of Water Quality Monitoring Results (From EM&A programme of HK-SWC)** | SCALE: N.T.S. / DATE: Jul-07<br>CHECK: PTPM / DRAWN: LLMC<br>JOB NO.: 60016782 / APPENDIX: G / Rev: - | |

## Dissolved Oxygen at Mid-Flood Tide

### W15




### W16

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Contract No.: HY/2002/24

Deep Bay Link Northern Section

**Graphical Presentation of Water Quality Monitoring Results (From EM&A programme of HK-SWC)**

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| JOB NO. | 60016782 | APPENDIX G | Rev - |

# APPENDIX H
# SUMMARY OF ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHDULE

## Appendix H — Summary of Environmental Mitigation Implementation Schedule

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| Air Quality | | |
| Site clearance and demolition of existing structures | • The working area for the uprooting of trees, shrubs or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures shall be sprayed with water or a dust suppression chemical immediately | √ |
| | • All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures debris, rubbish and other items arising from site clearance) that may dislodge dust particles shall be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition | √ |
| Site boundary and entrance | • Vehicle washing facilities including a high pressure jet shall be provided at every vehicle exit point; | √ |
| | • The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point shall be paved with concrete, bituminous materials or hardcores; | √ |
| | • Where a site boundary adjoins a road, streets or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length except for a site entrance or exit; | N/A |
| Access road | • Every main haul road (i.e. any course inside a construction site having a vehicle passing rate higher than 4 in any 30 minutes) shall be sealed and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet; | √ |
| | • The portion of any road leading only to a construction site that is within 30m of discernible or designated vehicle entrance or exit shall be kept clear of dusty materials; | √ |
| Use of vehicle | • Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels; | √ |
| | • Where a vehicle leaving a 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; | √ |
| | • Vehicle speed within the worksite shall be limited to 10 kph, except for properly formed and maintained access roads; | √ |
| Concrete production | • The concrete batching plant shall be located away from any air sensitive receiver as far as practicable; | N/A |
| | • If the total silo capacity of the concrete batching plant exceed 50 tonne, the project proponent is required to obtain a Specified Process licence to ensure that any potential dust emission would be properly controlled | N/A |
| | • Cement delivered in bulk shall be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line such that, in the event of the silo approaching an overfilling condition, an audible alarm is triggered and the material filling stops within one minute; | N/A |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| | • Silo used for the storage of cement shall not be overfilled; | N/A |
| | • The loading, unloading, transfer, handling or storage of any cement shall be carried out in a totally enclosed system or facility, and any vent or exhaust shall be fitted with an effective fabric filter or equivalent air pollution control system or equipment; | N/A |
| | • Cement collected by fabric filters or other pollution control system or equipment shall be disposed of in a totally enclosed containers; | N/A |
| Excavation and earth moving | • The working area of any excavation or earth moving operation shall be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; | √ |
| | • Exposed earth shall be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies; | √ |
| Stockpiling of dusty materials | • If a stockpile of dusty materials is more than 1.2 m high and lies within 50 m from any site boundary that adjoins a road, street, or other area accessible to the public, it shall be properly treated and sealed with latex, vinyl, bitumen or other suitable surface stabilizer; | √ |
| | • All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; | √ |
| Noise | | |
| Good site practice | • The Contractor should site noisy equipment and activities as far from sensitive receivers as practical. Also, temporary site offices (and other similar structures) should be located, as far as is possible, such that sensitive receivers are screened by these structures form the line of sight of the construction areas | √ |
| | • Intermittent noisy activities should be scheduled to minimise exposure of nearby NSRs to high levels of construction noise. For example, noisy activities could be scheduled at times coinciding with periods when the schools are likely to be unoccupied. Prolonged operation of noisy equipment close to the schools should be avoided | √ |
| | • Idle equipment should be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary | √ |
| | • Construction activities should be planned so that parallel operation of several sets of equipment close to a given receiver is avoided | √ |
| | • Where possible, the numbers of concurrently operating items of plant should be reduced through sensitive programming | √ |
| | • Construction plant should be properly maintained and operated. Construction equipment often has silencing measures built in or added on, e.g. compressor panels, and mufflers. Silencing measures should be properly maintained and utilized | √ |
| Water Quality | | |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| Local Stream Courses, Pipeworks and drains | • Local stream courses should be realigned or diverted in the sections where the proposed road alignment intersects with the local stream courses to ensure that there would be no discontinuity of flows downstream from the construction sites | √ |
| | • Box culverts and diversion channels should be constructed to divert the stream flows downstream | √ |
| | • Supporting columns and piers for the elevated sections of the DBL should be located away from existing stream courses as far as possible | √ |
| | • The design of diverted sections of the stream courses should minimise loss of flow section and avoid generating unstable flow conditions | √ |
| | • The construction period for re-alignment or diversion of stream courses should be shortened as far as possible through a better coordination with the other DBL construction activities | √ |
| | • A construction site drainage layout and management plan should be developed by the Contractor to detail the procedures for control of construction site runoff. The plan should be submitted to the ET prior to the commencement of the DBL construction works to ensure a better site management and control of surface runoff on site | √ |
| | • The existing pipes, which would be affected by the DBL project due to the increased runoff from DBL, should be upsized to increase the pipe capacity | √ |
| | • A discharge license from EPD for discharge of effluent should be obtained | √ |
| Excavation and Filling | • In areas where extensive excavation and filling are carried out, temporary earth bunds should be built. Sand bags may be used to confine the runoff or wastewater generated from the construction activities | √ |
| | • Excavation works should be minimised in rainy season | √ |
| | • Open stockpiles of construction materials and dusty materials should be covered with tarpaulin during rainstorms. These materials should not be placed near the stream courses. This avoids the release of materials into the stream water | √ |
| | • The carrying out of trench and hole digging should be in short sections. Trenches and holes should be immediately back-filled after the completion of a section of works to minimise the inflow of rainwater during rainstorms | √ |
| | • To prevent runoff from washing across exposed soil surface, intercepting channels should be provided. It is recommended to pave haul roads with concrete and protect temporary access roads using crushed stone or gravel. The exposed slope surfaces should be line or hydroseeded. | √ |
| Construction of Foundation and Road Sections | • The waste water generated from bored pile foundation construction and related activities should be collected and recycled | √ |
| | • Bentonite slurries used in bore-piling works or diaphragm wall construction should be reconditioned and reused whenever practicable | √ |
| | • Adequate surface channels should be constructed along the site boundaries to avoid release of surface and storm runoffs out of the sites | √ |
| | • The channel system to collect the runoffs in the construction sites should be well designed prior to the commencement of the site formation works | √ |

| Types of Impacts | Mitigation Measures | Status |
|---|---|---|
| | • Provisions of drains at the lowest points of the sites could effectively collect the runoff. Silt and sand traps, which remove large soil particles in the runoffs, should be provided in the channels. Regular maintenance and cleaning of the channels would ensure that the channel system is in good condition and is not obstructed by sediments | √ |
| | • Wastewater generated from the vehicle wheel washing facilities should be recycled wherever practicable. Excess wastewater should be transferred to suitable treatment systems for removal of suspended solids. | √ |
| | • Wastewater generated from washing of concrete lorry mixers should be pre-treated by discharging into a sedimentation pit, which provides a quiescent environment for the concrete particles to settle and consolidate. The upper layer water in the sedimentation pit with low concentration of concrete particles should be further treated to the standards acceptable for final discharge. The concrete wastes deposited on the bottom of the pit should be removed regularly. | √ |
| | • Covers should be provided to the newly constructed manholes to prevent any kinds of wastewater from entering into the drainage systems during the construction phase. | √ |
| | • Pipes connected to the manholes should be temporarily sealed to avoid debris and construction materials get into the drainage systems | √ |
| | • A wastewater treatment system comprising of chemical coagulation, sedimentation and pH control processes should be used to treat the site runoffs and the wastewater generated from various construction activities | √ |
| | • Chemical toilets should be provided on site for collection and temporary storage of sewage. Alternatively, sewage storage tank should be provided. The collected sewage should be tinkered away by a licensed waste collector for off-site disposal. | √ |
| *Chemical Waste* | *Storage and Handling of Oil, Other Petroleum Products and Chemicals*<br>• All fuel tanks and chemical storage areas shall be provided with locks and be sited on sealed areas. The 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. The Contractors shall prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals. | √ |
| *Waste* | Details are provided in the Waste Management Plan. | |
| *Landscape and Visual* | ▪ Temporary hydroseeding to reclamation if lapse time between completion of the reclamation and subsequent development is one year or more. | N/A |

Note:

| | |
|---|---|
| √ | Compliance of mitigation measure |
| × | Non-compliance of mitigation measures |
| N/A | Not applicable |

# APPENDIX I
# STATUS OF ENVIRONMENTAL LICENSES AND PERMITS

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| **Environmental Permit** | | | |
| EP-163/2000 | 02 Apr 03 | 20 May 03 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a duel 2-lane to a dual 3-lane. |
| EP-163/2003/A | 21 May 03 | 31 Aug 03 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/B | 1 Sep 04 | 7 Dec 04 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/C | 8 Dec 04 | 10 May 05 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/D | 11 May 05 | 8 Sep 05 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/E | 9 Sep 05 | 1 Mar 06 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/F | 2 Mar 06 | 26 Oct 06 | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| EP-163/2003/G | 27 Oct 06 | N/A | • Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking, interchange between at Lam Tei, Ha Tsuen and widening of the Yuen Long Highway between Lam Tei and Tan Kwai Tsuen from a dual 2-lane to a dual 3-lane. |
| **Construction Noise Permit** | | | |
| GW-TW0264-03 | 25 Aug 03 | 24 Jan 04 | • Holiday Daytime and any day evening time. |
| GW-TW0266-03 | 25 Aug 03 | 24 Jan 04 | • Holiday Daytime and any day evening time. |
| GW-TW0267-03 | 25 Aug 03 | 24 Jan 04 | • Holiday Daytime and any day evening time. |
| GW-TW0281-03 | 01 Sep 03 | 31 Oct 03 | • Any day evening time. |
| GW-TW0321-03 | 4 Oct 03 | 31 Jan 04 | • Holiday Daytime and any day evening time. |
| GW-TW0387-03 | 23 Nov 03 | 22 May 04 | • Holiday Daytime and any day evening time. |
| GW-TW0020-04 | 12 Feb 04 | 11 Aug 04 | • Holiday Daytime and any day evening time. |
| GW-TW0021-04 | 12 Feb 04 | 11 Aug 04 | • Holiday Daytime and any day evening time. |
| GW-TW0022-04 | 12 Feb 04 | 11 Aug 04 | • Holiday Daytime and any day evening time. |
| GW-TW0036-04 | 16 Feb 04 | 15 Aug 04 | • Holiday Daytime and any day evening time. |
| GW-TW0037-04 | 16 Feb 04 | 15 Aug 04 | • Holiday Daytime and any day evening time. |
| GW-TW0086-04 | 31 Mar 04 | 30 Sep 04 | • Holiday Daytime and any day evening time. |
| GW-TW0107-04 | 19 Apr 04 | 06 May 04 | • Holiday Daytime and any day evening time. |
| GW-TW0113-04 | 17 Apr 04 | 16 Oct 04 | • Holiday Daytime and any day evening time. |
| GW-TW0126-04 | 07 May 04 | 07 Jun 04 | • Any day between 2300-0700 hrs. |
| GW-TW0144-04 | 24 May 04 | 23 Oct 04 | • Holiday Daytime and any day evening time. |
| GW-TW0169-04 | 11 Jun 04 | 10 Dec 04 | • Holiday Daytime and any day evening time. |

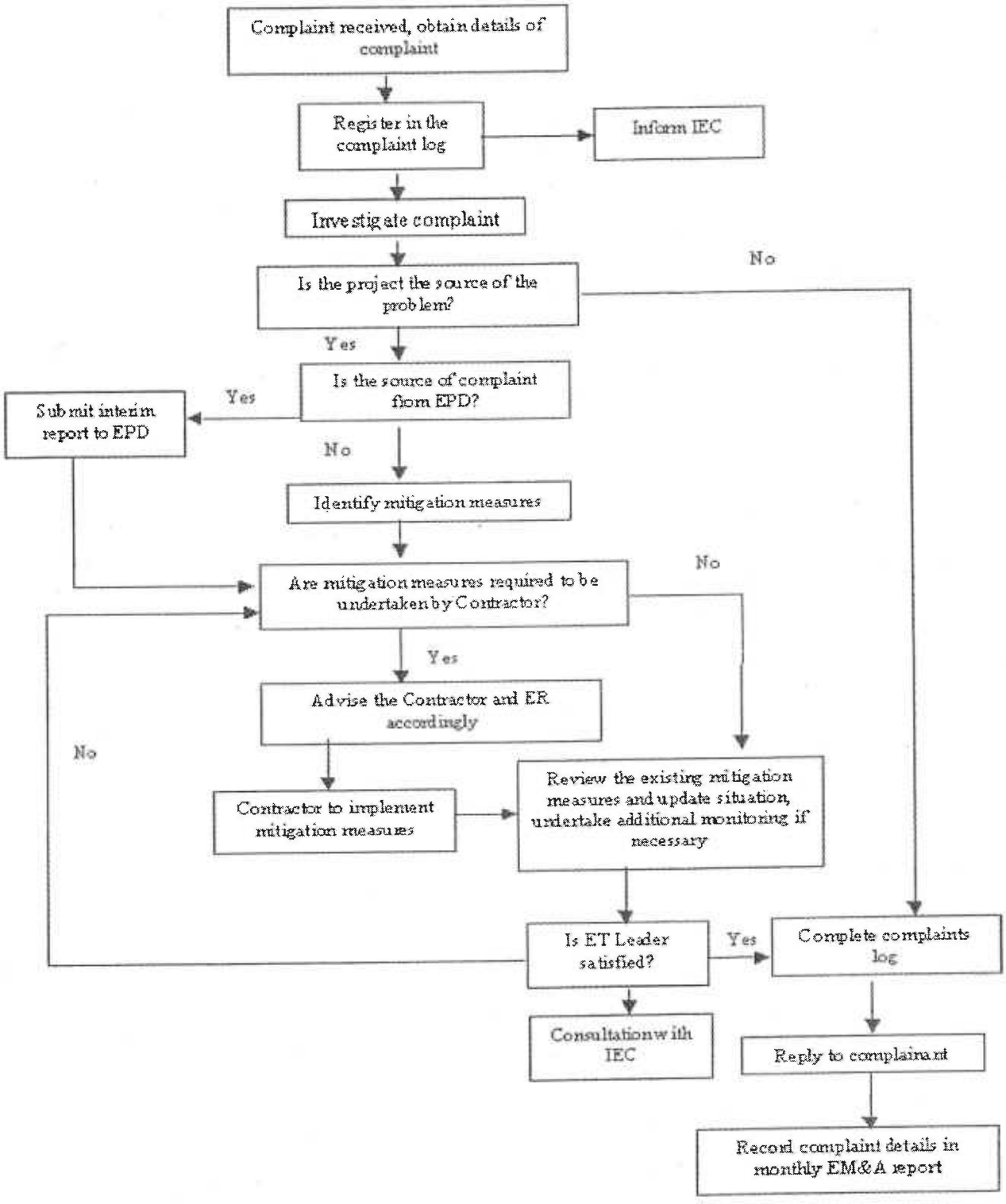
| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| GW-TW0198-04 | 29 Jun 04 | 28 Dec 04 | • Holiday Daytime and any day evening time. |
| GW-TW0215-05 | 16 Jul 04 | 16 Aug 04 | • Only three nights within the validity period between 1900-2300 hrs on any day not being a general holiday. |
| GW-TW0226-04 | 06 Aug 04 | 06 Sep 04 | • Any one day including general holiday between 2300-0700 hours on next day. |
| GW-RW0370-04 | 16 Aug 04 | 15 Feb 05 | • Holiday Daytime and any day evening time. |
| GW-RW0391-04 | 19 Aug 04 | 18 Feb 05 | • Holiday Daytime and any day evening time. |
| GW-RW0408-04 | 27 Aug 04 | 30 Nov 04 | • Only two nights within the validity period between 1900-2300 hrs on any day not being a general holiday. |
| GW-RN8001-04 | 19 Aug 04 | 18 Feb 05 | • Holiday Daytime and any day evening time. |
| GW-RN8024-04 | 24 Oct 04 | 23 Apr 05 | • Holiday Daytime and any day evening time. |
| GW-RN8025-04 | 19 Oct 04 | 18 Apr 05 | • Holiday Daytime and any day evening time. |
| GW-RW0493-04 | 15 Oct 04 | 12 Nov 04 | • Only ten nights within the validity period between 0100-0500 on any day not being a general holiday. |
| GW-RW0531-04 | 19 Oct 04 | 18 Apr 05 | • Holiday Daytime and any day evening time. |
| GW-RW0629-04 | 13 Nov 04 | 12 Jan 05 | • Ten nights within the validity period between 0100-0500 hrs on any day not being a general holiday and not immediately following a general holiday. |
| GW-RW0661-04 | 22 Nov 04 | 21 May 05 | • Holiday daytime and any day evening time. |
| GW-RN8049-04 | 6 Dec 04 | 5 Jun 05 | • Holiday daytime and any day evening time. |
| GW-RN8051-04 | 21 Dec 04 | 20 Jun 05 | • Holiday daytime and any day evening time |
| GW-RN8057-04 | 1 Jan 05 | 30 Jun 05 | • Holiday daytime and any day evening time |
| GW-RW0730-04 | 13 Dec 04 | 12 Jun 05 | • Holiday Daytime and any day evening time. |
| GW-RW0731-04 | 13 Dec 04 | 12 Jun 05 | • Holiday Daytime and any day evening time. |
| GW-RW0732-04 | 13 Dec 04 | 12 Jun 05 | • Holiday Daytime and any day evening time. |
| GW-RW0820-04 | 13 Jan 05 | 12 Feb 05 | • Seven nights within the validity period between 0100-0500 hrs. |
| GW-RW0053-05 | 31 Jan 05 | 30 Jul 05 | • General holiday including Sundays between 0000-2400 hrs;<br>• Any day not being a general holiday between 0000-0700 and 1900-2400 hrs. |
| GW-RW0095-05 | 17 Feb 05 | 16 Mar 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RW0096-05 | 17 Feb 05 | 16 Mar 05 | • Seven nights within the validity period between 0100- 0500 hrs. |
| GW-RN8005-05 | 19 Feb 05 | 18 Aug 05 | • Holiday Daytime and any day evening time. |
| GW-RW0117-05 | 28 Feb 05 | 31 Mar 05 | • Seven nights within the validity period between 0100- 0500 hrs. |
| GW-RW0135-05 | 17 Mar 05 | 16 Apr 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RW0136-05 | 14 Mar 05 | 13 May 05 | • General holiday including Sundays between 0000-0600 hrs;<br>• Any day not being a general holiday between 0000-0600 hrs. |
| GW-RW0191-05 | 30 Mar 05 | 29 May 05 | • Only eighteen days not being a general holiday between 1900-2100 hrs within the validity period. |
| GW-RN8014-05 | 28 Mar 05 | 27 Sep 05 | • Holiday daytime and any day evening time. |
| GW-RN8017-05 | 6 Apr 05 | 5 Oct 05 | • Holiday daytime and any day evening time. |
| GW-RN8018-05 | 6 Apr 05 | 5 Oct 05 | • Holiday daytime and any day evening time. |
| GW-RW0212-05 | 8 Apr 05 | 7 May 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW0213-05 | 17 Apr 05 | 16 Jun 05 | • Any day within the validity period between 0000-0600 hrs |
| GW-RW0239-05 | 18 Apr 05 | 17 Jun 05 | • Only 7 nights including general holiday between 0100- 0500 hrs within the validity period. |
| GW-RN8023-05 | 27 Apr 05 | 26 Jun 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8024-05 | 27 Apr 05 | 26 Jun 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8025-05 | 28 Apr 05 | 27 Jun 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RW0288-05 | 8 May 05 | 7 Jun 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW0289-05 | 14 May 05 | 13 Nov 05 | • General holiday including Sundays between 0000-0600 hrs;<br>• Any day not being a general holiday between 0000-0600 hrs. |
| GW-RN8029-05 | 18 May 05 | 17 Nov 05 | • General holiday including Sundays between 0700-2300 hrs; |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| | | | • Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8030-05 | 18 May 05 | 17 Nov 05 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0321-05 | 18 May 05 | 17 Aug 05 | • Any day between 0100-0500 hrs. |
| GW-RW0325-05 | 30 May 05 | 29 Jul 05 | • Only eighteen days not being a general holiday between 1900-2100 hrs within the validity period. |
| GW-RW0343-05 | 8 Jun 05 | 7 Jul 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW0349-05 | 31 May 05 | 30 Nov 05 | • Any day within the validity period between 1900-0700 hrs on next day. |
| GW-RW0369-05 | 13 Jun 05 | 12 Dec 05 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0370-05 | 13 Jun 05 | 12 Dec 05 | • General holiday including Sundays between 0700-2300 hrs.<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0375-05 | 17 Jun 05 | 16 Aug 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8043-05 | 27 Jun 05 | 26 Aug 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8044-05 | 27 Jun 05 | 26 Aug 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8045-05 | 27 Jun 05 | 26 Aug 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RW0444-05 | 8 Jul 05 | 7 Aug 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW0477-05 | 30 Jul 05 | 29 Sep 05 | • Any day not being a general holiday between 1900-2100 hrs. |
| GW-RW0478-05 | 30 Jul 05 | 30 Jan 06 | • General holiday including Sundays between 0700-0700 hrs on next day;<br>• Any day not being a general holiday between 1900-0700 hrs on the next day. |
| GW-RW0497-05 | 17 Aug 05 | 16 Oct 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RW0498-05 | 18 Aug 05 | 17 Nov 05 | • Any day between 0100 and 0500 hrs. |
| GW-RW0508-05 | 8 Aug 05 | 7 Sep 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RN8056-05 | 19 Aug 05 | 18 Feb 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0548-05 | 24 Aug 05 | 23 Feb 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8057-05 | 27 Aug 05 | 25 Sep 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8058-05 | 27 Aug 05 | 25 Sep 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8059-05 | 27 Aug 05 | 25 Sep 05 | • Any day within the validity period between 0000-0600 hrs. |
| GW-RN8063-05 | 31 Aug 05 | 27 Feb 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hours. |
| GW-RW0570-05 | 8 Sep 05 | 7 Oct 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW0571-05 | 5 Sep 05 | 4 Mar 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0586-05 | 12 Sep 05 | 11 Mar 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs |
| GW-RW0587-05 | 12 Sep 05 | 11 Mar 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8067-05 | 21 Sep 05 | 20 Mar 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| GW-RW0612-05 | 30 Sep 05 | 29 Nov 05 | • Any day not being a general holiday between 1900-2100 hrs. |
| GW-RW0637-05 | 8 Oct 05 | 7 Nov 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RN8070-05 | 6 Oct 05 | 5 Apr 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8071-05 | 6 Oct 05 | 5 Apr 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0681-05 | 27 Oct 05 | 26 Dec 05 | • Any day within the validity period between 0100-0500 hrs. |
| GW-RW0697-05 | 8 Nov 05 | 7 Dec 05 | • Any day within the validity period between 2300-0700 hrs on next day. |
| GW-RW8087-05 | 18 Nov 05 | 17 May 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0751-05 | 30 Nov 05 | 29 Jan 06 | • Any day not being a general holiday between 1900-2100 hrs. |
| GW-RN8094-05 | 30 Nov 05 | 29 May 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8095-05 | 30 Nov 05 | 29 May 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RN8098-05 | 30 Nov 05 | 29 May 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0769-05 | 1 Dec 05 | 31 May 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0775-05 | 3 Dec 05 | 2 Jun 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0776-05 | 13 Dec 05 | 12 Jun 06 | • General holiday including Sundays between 0700-2300 hrs;<br>• Any day not being a general holiday between 1900-2300 hrs. |
| GW-RW0798-05 | 15 Dec 05 | 31 Dec 05 | • Any day within the validity period between 0100-0500 hrs. |
| GW-RW0848-05 | 3 Jan 06 | 26 Feb 06 | • Any day between 0100-0500 hrs. |
| GW-RN8006-06 | 19 Feb 06 | 18 Aug 06 | • Between 0700-2300 hrs on a general holiday;<br>• Any day between 1900hrs-2300 hrs not being a general holiday. |
| GW-RW0075-06 | 24 Feb 06 | 23 Aug 06 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RN8009-06 | 1 Mar 06 | 31 Aug 06 | • Between 0700-2300 hrs on a general holiday;<br>• Any day between 1900-2300 hrs not being a general holiday. |
| GW-RW0108-06 | 12 Mar 06 | 11 Sep 06 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW8017-06 | 21 Mar 06 | 20 Sep 06 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW0222-06 | 18 Apr 06 | 17 Jun 06 | • Any day not being a holiday between 0100-0500 hrs |
| GW-RW0292-06 | 19 May 06 | 25 Jul 06 | • Any day not being a general holiday between 0100-0500 hr. |
| GW-RN8040-06 | 29 May 06 | 28 Nov 06 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW0304-06 | 4 Jun 06 | 30 Nov 06 | • Between 0700-2300 hrs on a general holiday;<br>• Any day between 1900-2300 hrs not being a general holiday. |

| Permit No. | Valid Period | | Section |
|---|---|---|---|
| | From | To | |
| GW-RW0329-06 | 13 Jun 06 | 12 Dec 06 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW0460-06 | 24 Aug 06 | 23 Feb 07 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RN8065-06 | 19 Aug 06 | 18 Feb 07 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day, not being a general holiday (including Sundays) 1900-2300 hrs |
| GW-RW0473-06 | 30 Aug 06 | 29 Nov 06 | • Any day not being a general holiday between 0100-0500 hrs. |
| GW-RW8068-06 | 1 Sep 06 | 28 Feb 07 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW0505-06 | 12 Sep 06 | 11 Mar 07 | • General holidays (including Sundays) 0700-2300 hrs;<br>• Any day not being a general holiday (including Sundays) 1900-2300 hrs. |
| GW-RW0692-06 | 5 Dec 06 | 8 Jan 07 | • Any day not being a general holiday between 0100-0500 hrs. |
| GW-RW0756-06 | 11 Jan 07 | 28 Feb 07 | • Any day not being a general holiday between 0100-0500 hrs. |
| GW-RW0170-07 | 18 Apr 07 | 31 May 07 | • General holidays (including Sundays), 0000-0700 hrs and 1900-2400 hrs on any day not being a general holiday. |
| **Notification of Construction Work under APCO** | | | |
| TW20030866-001 | - | - | - |
| TW20041025-001 | - | - | - |
| 001016124 | 23 Nov 06 | 30 Jun 07 | - |
| **Effluent Discharge License** | | | |
| 6T1002/1 | 8 Nov 03 | 30 Nov 08 | Discharge of commercial trade effluent. |
| 1T316/1 | 25 Nov 03 | 30 Nov 08 | Discharge of industrial / trade effluent |
| **Chemical Waste Registration** | | | |
| WPN5296-442-G2 040-84 | 11 Sep 03 | N/A | Spent mineral oil and its contaminants |
| **Construction Waste Disposal Account** | | | |
| 5000439 | 20 Jan 06 | 31 Dec 07 | - |

**APPENDIX J**
**COMPLAINT FLOW DIAGRAM AND COMPLAINT LOG**




| | | | | | |
|---|---|---|---|---|---|
| ENSR \| AECOM | Contract HY/2002/24<br>Deep Bay Link - Northern Section<br>**Environmental Complaint Handling Procedure** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | PTPM | DRAWN | YSL |
| | | JOB NO. | 60016782 | APPENDIX No. J | Rev. - |

## Appendix J – Environmental Complaints Log

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 001 | Ling To Tsz | 11 Nov 03 | Local resident via EPD | Air | Mud trail was left on nearby public road. It was likely caused by non-project related traffic | No | |
| 002 | Tsing Chuen Wai | 11 Dec 03 | Local resident via EPD | Noise | Night-time construction noise nuisance was complained. Although the Contractor obtained valid CNP, no activity was carried out on the day of complaint | No | |
| 003 | Tsing Chuen Wai | 6 Jan 04 | Local resident via EPD | Air | Mud trail was left on Ng Lau Road. Wheel wash bay appeared muddy and vehicle was not completely free of dust prior to leaving the site | Yes | Measures below were undertaken:<br>1. All dusty materials were removed.<br>2. Deposit in wheel washing facilities was removed. |
| 004 | Tsing Chuen Wai | 6 Jan 04 | Local resident | Air | Construction dust nuisance was complained. However, dust problem was mainly due to poor regional air quality | No | |
| 005 | Tsing Chuen Wai | 7 Jan 04 | Local resident via HyD | Noise | Construction noise due to rock breaking was complained near Yonking Garden. Rock breaking was carried out during non-restricted hours and no limit level exceedance was recorded. | Yes | Since there was no violation, no particular mitigation measure was applicable. |
| 006 | Tsing Chuen Wai | 13 Jan 04 | Local resident via HyD | Noise & Water | Noise nuisance and possible muddy water discharge due to stockpile of soil at Yonking Garden. Rock breaking was carried out during non-restricted hours and no limit level exceedance was recorded, while the stockpile of soil was not part of Project's works. | Yes (for Noise only) | Since there was no violation, no particular mitigation measure was applicable. |
| 007 | Ngau Hom Shek | 4 Feb 04 | Local resident via Media | Water | Wastewater was discharged to nearby streams at Ngau Hom Shek | Yes | Measures below were undertaken:<br>1. Bundings were erected.<br>2. Wastewater was recycled. |
| 008 | Tsing Chuen Wai | 24 Mar 04 | DSD | Water | Slurry material was discharged | Yes | Measures below was undertaken:<br>1. Silt deposit was cleared from the channel. |
| 009 | Yick Yuen | 30 Mar 04 | Local resident via EPD | Air | Construction dust nuisance was observed on Yick Yuen Road. However, the majority of Project's traffic did not use the site exit at Yick Yuen Road. The problem was likely due to non-Project related traffic | No | |
| 010 | Ngau Hom Shek | 14 May 04 | Yuen Long District Office | Water | Wastewater was discharged to nearby streams at Ngau Hom Shek. The problem was due to heavy rainfall and no sufficient measures could be provided on site for the silty runoff | Yes | Measures below were undertaken:<br>1. Exposed slope were covered, final slope surfaces were shotcreted.<br>2. Capacity of detention pond was increased. |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 011 | Tsing Chuen Wai | 8 Jun 04 | Local resident | Waste/ Storage | Spoil was disposed of adjacent to Yonking Garden. However, the location of the spoil was outside the site boundary and the disposal was not carried out under this Project's works. | No | |
| 012 | Lok On Pai | 17 Jun 04 | Local resident via EPD | EP Condition 3.11(c) | Some construction materials, which belonged to the Contractor, were improperly stored at Lok On Pai without permission | Yes | Measures below was undertaken:<br>1. The storage was removed on next day. |
| 013 | Yick Yuen & Tsing Chuen Wai | 29 Jul 04 | Local resident via EPD | Waste/ Storage | Unauthorized land filling was complained. However, the fill materials were sourced from other sites and the activity was not conducted by the Contractor | No | |
| 014 | Po Ka Leng at Hung Shiu Kiu | 12 Aug 04 | Local resident via EPD | Air & Water | Construction dust and muddy water were complained | Yes | Measures below were undertaken:<br>1. Dust mitigation measures were conducted.<br>2. Wastewater was treated before discharge. |
| 015 | Tin Sam Tsuen | 8 Sep 04 | Local resident | Water | Alleged crops damage was induced by washing of muddy runoff. However, this runoff was confirmed from the nearby land filling site under rainy weather | No | |
| 016 | Lok On Pai | 30 Oct 04 | Local resident via EPD | EP Condition 3.11(a) | Segment loading and unloading was undertaken outside operation hours. However, according to the site diary, there was no such activities during the complaint | No | |
| 017 | Tsing Chuen Wai | 22 Dec 04 | EPD | Noise | Construction noise nuisance was observed after midnight. However, the Contractor obtained valid CNP and conducted construction activity according to the CNP specification and no night-time noise exceedance was recorded. | Yes | Since there was no violation, no particular mitigation measure was applicable. |
| 018 | Tsing Chuen Wai | 30 Dec 04 | EPD | Noise & Air | Noise nuisance and malodor nuisance was induced from burning unknown materials after midnight. However, no construction activity was undertaken after midnight. | No | |
| 019 | Tsing Chuen Wai | 25 Jan 05 | Local resident via HyD | Air | Mud trail was observed on Ng Lau Road. However, mud trail was observed originating from another entrance (not associated with this Project) on Ng Lau Road. | No | |
| 020 | Yick Yuen | 22 Feb 05 | Local resident via EPD | Air | Construction dust nuisance was complained. However, the majority of Project's traffic did not use the site exit at Yick Yuen Road. The problem was likely due to non-Project related traffic | No | |

| Log Ref. | Location | Received Date | Complainant | Nature of Complaint | Information of Complaint | Project Related | Remarks |
|---|---|---|---|---|---|---|---|
| 021 | Lok On Pai | 31 Mar 05 | Local resident via EPD | EP Condition 3.11(a) | Segment loading was operated outside allowable period and dust nuisance was also observed by the complainant. Noise nuisance might have been originating from two tractors for segment transportation which arrived on-site near 0830, with their engines kept on, while no fugitive dust was observed mitigation measures were properly implemented | Yes | Measures below was undertaken:<br>1. All plant and equipment were switched off before the allowable working hours |
| 022 | Yick Yuen | 9 Apr 05 | Local resident via EPD | Air | Construction dust nuisance was complained. A joint-site visit was carried out with EPD. Mitigation measures were properly conducted and no fugitive dust was observed | No | |
| 023 | Tsing Chuen Wai | 20 Apr 05 | Local resident via EPD | Noise | Noise nuisance caused by heavy vehicle movement near the site entrance at Ng Lau Road.during restricted hours. However, the Contractor did not have project related heavy vehicle movement at Ng Lau Road. | No | |
| 024 | Yick Yuen | 14 Sep 05 | Local resident via EPD | Water | Muddy surface runoff was generated. However, this runoff might be caused by seepage of underground water due to high water table level on the day of complaint | No | |
| 025 | San Sang San Tsuen | 15 May 06 | Local resident via EPD | Air | Construction dust emission was observed. However, no evidence proved the incidence was related to Project activities | Yes | Measures below was undertaken<br>1. Frequency of water spraying was increased. |
| 026 | Ng Lau Road near Caltex petrol station | 14 Sep. 06 | Local resident via EPD | Air | Muddy road surface was complained. However, it is believed that the mud trails were created by local villager | No | |
| 027 | Yick Yuen | 08 Nov. 06 | Local resident via EPD | Air | Construction dust nuisance was complained. However, no evidence proved the incidence was related to Project activities | No | |
| 028 | Yick Yuen | 30 Nov. 06 | Local resident via EPD | Air | Construction dust nuisance was complained. No construction activity or construction plant movement was observed at the complaint location. Fugitive dust might be generated under dry and windy condition or when there was non-project related vehicle movement in the vicinity. | No | Measures below was undertaken<br>1. Frequency of water spraying was increased. |

**APPENDIX K**
**YELLOW FORMS LOG**

## Appendix K – Yellow Forms Log

| Log Ref. | Received Date | Nature of Complaint | Information of Yellow Form | Project Related | Remarks |
|---|---|---|---|---|---|
| 001 | 8 Jun 2004 | Water | Muddy surface runoff was observed on site. | Yes | Mitigation Measures below were undertaken:<br>1. The Contractor immediately halted the muddy surface runoff. |
| 002 | 8 Jun 2004 | Air | Construction dust was not sufficiently suppressed. | Yes | Mitigation Measures below were undertaken:<br>1. The Contractor subsequently enhanced watering program of dry haul road. |
| 003 | 8 Sep 2004 | Water | Effluent discharged out of site may not meet the requirements stipulated in the requirements stipulated in the Effluent Discharge License. | Yes | Mitigation Measures below were undertaken:<br>1. The Contractor subsequently well managed the package wastewater system; the wastewater treatment system had been installed on site during EPD's visit. |
| 004 | 7 Feb 2005 | Noise | Noise nuisance generated from segment transportation during night time. | Yes | Mitigation Measures below were undertaken:<br>1. The Contractor strictly followed conditions stipulated in GW-RW0095-05. |
| 005 | 11 Jul 2005 | Water | Muddy water was discharged from Site | Yes | Mitigation Measures below were undertaken:<br>1. The Contractor subsequent enhanced bunding to prevent muddy surface overflow from entering the stream. |

**SECTION 3**

**Deep Bay Link**

**Final EM&A Summary Report for Operation Phase**

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CH2MHILL

Our Ref.: HYDDBLWCEM00/2/11349

Date: 4 January 2010

By Fax (2761 4864) & Post

Highways Department
Major Works Project Management Office
6th Floor, Ho Man Tin Government Offices,
88 Chung Hau Street, Homantin, Kwoloon

Attention: Mr. K.M. Bok / Mr. William Chiang

Dear Sirs,

**Re: Contract No. HY/2007/04**
**Hong Kong – Deep Bay Link (Operational Phase)**
**Final EM&A Summary Report**

Reference is made to ET's e-mail correspondences enclosed with a copy of the Final EM&A Summary Report for Deep Bay Link Operational Phase Monitoring. We are pleased to inform that we have no further comment on the captioned Report.

We are pleased to inform you that the captioned Report, which had been certified by the Environmental Team Leader, is verified by IEC in compliance with Condition 1.9 of the Environmental Permit No.EP-162/2003/B and Condition 1.7 of the Environmental Permit No. EP-290/2007 of the Project.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned or our Ms. Vivian Chan if you have any queries.

Yours sincerely,

K.S. Lee
Independent Environmental Checker

| | | | |
|---|---|---|---|
| c.c. | Mr. Y T Tang | ENSR (ET Leader) | By Fax: 2891 0305 |
| | Mr. Eric Chan | Arup (HY2002/21) | By Fax: 2268 3955 |

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**TABLE OF CONTENTS**

**List of Tables**



**List of Figures**



**List of Appendices**

## EXECUTIVE SUMMARY

This is the Final Environmental Monitoring and Audit (EM&A) Summary Report prepared by Maunsell Consultants Asia Ltd., the designated Environmental Team (ET), for the operational phase of the Project "Deep Bay Link". Operation of Deep Bay Link commenced on 1 July 2007 and the operational phase EM&A programme started on 1 October 2007. This report presents the summary of EM&A works conducted between 1 October 2007 and 31 October 2009.

Monitoring on road surface runoff from carriageway, operational noise, amphibian, water level, water quality, avifauna, pelagic fauna, benthos and flora were carried out in the reporting period. Environmental mitigation measures and environmental complaint handling procedures were implemented.

### Environmental Monitoring Works

Noise
The first operation noise monitoring was completed in October 2008. Supplementary operation noise monitoring for E1A was completed on 19 May 2009. Another supplementary operation noise monitoring was carried out for OP3, OP4 and OP7A in September 2009 and October 2009.

Water Quality
Due to the safety concern on the installation of equipment onto the bridge deck or on parapet by government departments, an alternative proposal on the monitoring method had been prepared and had been approved by EPD. A procedural guide was also prepared. The guide was vetted by the IEC and the Engineer and was reviewed by EPD.

Twelve road surface runoff monitoring were carried out between October 2007 and January 2008. Results of all monitoring parameters complied with the reference criteria except for nitrite and nitrate concentration.

The high nitrite and nitrate concentration was mainly attributable to a relatively high nitrate content since the nitrite concentration was about 0.01 mg/L in all monitoring results. In fact, the nitrate concentration in the reference sample taken from the water tanker was around 0.63 – 1.65 mg/L and already above the reference criterion. The water used for surface runoff monitoring was tap water from the Water Supplies Department (WSD). According to the "Drinking Water Quality for the Period April 2006 – March 2007" issued by WSD, the range of nitrate concentration in the water supply is <2.5 to 9.9 mg/L with an average of 3.6 mg/L. Nevertheless, the nitrate concentration of this level, i.e. 0.63 – 1.65 mg/L, is still within WSD requirements for potable use. No action is required.

Elevated nitrate levels were recorded on 27 October 2007, 8 and 15 December 2007, and 12 January 2008. No action level was triggered.

Ecology
After the handover of Pond 15 complex to ET on 1 November 2007, weekly site inspections and maintenance work during early establishment period at Pond 15 complex were carried out from November 2007 to October 2008.

Ecological monitoring carried out during operational phase EM&A programme at Pond 15 included:

| | |
|---|---|
| Water level & water quality | 8 Times |
| Flora | 4 Times |
| Avifauna | 4 Times |
| Pelagic fauna | 5 Times |
| Benthic | 8 Times |
| Amphibian | 2 Times |

### Environmental Complaints and Prosecution

No complaint, summons or prosecution related to environmental issues was received or made against the Project in the reporting period.

# 1. INTRODUCTION

## Background

1.1 Maunsell Consultants Asia Ltd. (MCAL), which was integrated into AECOM Asia Company Limited as of 1 May 2009, (hereinafter called the "ET") was appointed by Highways Department (hereinafter called the "Client") to undertake Environmental Monitoring and Audit for "Deep Bay Link" (hereinafter called the "Project") during operational phase. Under the requirements of Section 6 of Environmental Permit EP-163/2003/G, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the Environmental Permit and the EM&A Manual, environmental monitoring of operational noise, water quality and ecology are required for the Project.

1.2 Operation of Deep Bay Link commenced on 1 July 2007 and the operational phase EM&A programme commenced on 1 October 2007. This report summarises the environmental monitoring and audit works for the Project between 1 October 2007 and 31 October 2009.

## Project Organization

1.3 The structure of the environmental management team is shown in Figure 1.1. Contacts of key environmental staff of the Project are shown in Appendix A.

1.4 A layout plan of the Project is provided in Figure 1.2.

## Summary of the EM&A Requirements

1.5 The EM&A programme requires environmental monitoring for operational noise, water quality and ecology. The EM&A requirements for each item are described in subsequent sections, including:

- Monitoring parameters;
- Environmental quality performance limits (Action and Limit levels);
- Environmental mitigation measures, as recommended in the project EIA final report; and
- Environmental requirements specified in EM&A manual and in the contract documents.

1.6 Status of Environmental License, advice on the implementation status of environmental protection and pollution control/mitigation measures are summarised in Section 5 of the Report.

## 2. OPERATIONAL NOISE MONITORING

### Monitoring Requirements

2.1 Noise monitoring is required to monitor the operational noise level at the nearby noise sensitive receivers (NSR) during peak traffic hour.

2.2 The measured noise level will be compared to the predicted traffic noise levels in the EIA under full provision of the mitigation measures.

### Monitoring Parameters, Frequency and Duration

2.3 The traffic noise level should be measured twice within the first year of the road opening. Measurements should be made in terms of the A-weighted $L_{10}$ over three 30-mins periods during the peak traffic hour. Other parameters $L_{90}$ and $L_{eq}$ would be included for reference purpose.

### Monitoring Locations

2.4 Noise measurements were conducted at ten monitoring locations according to the approved Traffic Noise Monitoring Plan (rev. 2). The locations are shown in Figure 2.1 Table 2.1 describes these monitoring stations.

**Table 2.1 Noise Monitoring Locations (Sensitive Receivers)**

| Monitoring Station | Location |
|---|---|
| OP1 | 2/F, Village house north to Tsing Chuen Wai |
| OP2 | G/F, Village House near Tsing Chuen Wai |
| OP3 | 11/F, Block 1, Botania Villa |
| OP4 | G/F, Village House at Ngau Hom Shek |
| OP5A | G/F, Village House at San Sang San Tsuen |
| OP6 | G/F, Poultry Farm with residential house |
| OP7A | 19/F, Block 1, The Sherwood |
| E1 | 2/F, Home of Elderly near To Yuen Wai |
| E1A | 2/F, Village House at To Yuen Wai |
| E2A | 1/F, Village House near Tan Kwai Tsuen |

### Measurement Time

2.5 All the measurements were conducted during the AM and PM peak traffic hours of the respective highways. The monitoring dates and time are summarized in Table 2.2.

**Table 2.2 Noise Monitoring Dates and Time**

| Monitoring Date | Monitoring Station | Monitoring Period |
|---|---|---|
| 29 September 2008 | OP6 | 09:00 – 10:30 |
| | OP6 | 14:00 – 15:30 |
| | OP5A | 09:00 – 10:30 |
| | OP5A | 14:00 – 15:30 |
| | OP2 | 09:00 – 10:30 |
| | OP2 | 14:00 – 15:30 |
| 30 September 2008 | OP1 | 09:00 – 10:30 |
| | OP1 | 14:00 – 15:30 |
| 8 October 2008 | E1 | 08:00 – 09:30 |
| | E1 | 17:00 – 18:30 |
| | E2A | 08:00 – 09:30 |
| | E2A | 17:00 – 18:30 |
| 19 May 2009 | E1A | 08:00 – 09:30 |
| | E1A | 17:00 – 18:30 |
| 23 September 2009 | OP3 | 09:00 – 10:30 |
| | OP3 | 14:00 – 15:30 |
| 25 September 2009 | OP4 | 09:00 – 10:30 |
| | OP4 | 13:30 – 15:00 |
| 28 September 2009 | OP7A | 09:00 – 10:30 |
| 7 October 2009 | OP7A | 14:00 – 15:30 |

**Noise Measurement Methodology**

2.6 The noise measurements were conducted to obtain two sets of A-weighted $L_{10\ (1\ hour)}$ sound pressure level during the AM and PM peak traffic hours over 3 half hours periods at each designated sensitive receiver.

2.7 The noise measurement point was at a point 1m from the exterior of the sensitive receiver building facades and was at a position at least 1.2m above ground of the sensitive receiver level.

2.8 Noise measurements were made in accordance with Section III of the "Calculation of Road Traffic Noise (CRTN), 1998"[4].

2.9 All monitoring were carried out at 1m from the façade of the building, except for OP4 (Village House at Ngau Hom Shek) which was carried out free-field. Additional 3dB(A) was applied to all free-field measurement data.

2.10 Statistical results such as $L_{max}$, $L_{min}$, $L_{eq}$ and $L_{90}$ were also obtained for reference purpose.

2.11 Observations were recorded when intrusive noise was unavoidable.

2.12 The wind speed was frequently checked with a portable wind meter. Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

**Traffic Survey**

2.13 Traffic survey was conducted concurrently with the noise measurement for the sections of Deep Bay Link (DBL) and Yuen Long Highways between Lam Tei and Tan Kwai Tsuen (YLH) near the representative sensitive receivers.

2.14 Background information, including weather conditions and noise sources other than traffic along DBL and YLH, was recorded for each sensitive receiver. The traffic survey included monitoring of traffic flow, percentage of heavy and light vehicles and average traffic speed.

**MEASUREMENT RESULTS AND OBSERVATIONS**

2.15 Noise data was continuously recorded by sound level meter at an interval of 1 second. Other sources included community noise, road joint noise, dog barking, sirens from emergency vehicles and etc. These activities were recorded during the monitoring events and these extraneous noises were not taken into calculation of the traffic noise level.

**Traffic Noise Level Monitoring Results**

2.16 Random check of wind speed at the monitoring station showed that it was below 5 m/s.

2.17 The summaries of traffic noise levels and traffic flow recorded are provided in Table 2.3 and Table 2.4.

**Table 2.3 Traffic Noise Measurement Results**

| Monitoring Date | Weather Condition | Monitoring Station | Monitoring Period | Noise Level, $L_{10,\ 1\text{-hour}}$ dB(A) |
|---|---|---|---|---|
| 29 September 2008 | Sunny | OP6 | 09:00 – 10:30 | 53.1 |
| | | OP6 | 14:00 – 15:30 | 51.5 |
| | | OP5A | 09:00 – 10:30 | 62.7 |
| | | OP5A | 14:00 – 15:30 | 61.4 |
| | | OP2 | 09:00 – 10:30 | 52.2 |
| | | OP2 | 14:00 – 15:30 | 49.2 |
| 30 September 2008 | Sunny | OP1 | 09:00 – 10:30 | 58.7 |
| | | OP1 | 14:00 – 15:30 | 59.6 |
| 8 October 2008 | Fine | E1 | 08:00 – 09:30 | 63.4 |
| | | E1 | 17:00 – 18:30 | 62.9 |
| | | E2A | 08:00 – 09:30 | 59.7 |
| | | E2A | 17:00 – 18:30 | 60.5 |
| 19 May 2009 | Fine | E1A | 08:00 – 09:30 | 68.7 |
| | | E1A | 17:00 – 18:30 | 68.8 |
| 23 September 2009 | Sunny | OP3 | 09:00 – 10:30 | 59.2 |
| | | OP3 | 14:00 – 15:30 | 58.1 |
| 25 September 2009 | Sunny | OP4 | 09:00 – 10:30 | 58.2* |
| | | OP4 | 13:30 – 15:00 | 57.4* |
| 28 September 2009 | Cloudy | OP7A | 09:00 – 10:30 | 63.0 |
| 7 October 2009 | Fine | OP7A | 14:00 – 15:30 | 63.0 |

*+3 dB(A) Façade Correction included

**Table 2.4 Traffic Flow**

| Monitoring Location | Monitoring Period | Measured Value | | | | EIA prediction | |
|---|---|---|---|---|---|---|---|
| | | LV | HV | Total Flow | Percentage of HV | Traffic Flow | Percentage of HV |
| OP1 (DBL) | AM | 267 | 213 | 480 | 44.4% | 4,300 | 71.3% |
| | PM | 294 | 267 | 561 | 47.6% | | |
| OP2 (DBL) | AM | 411 | 405 | 816 | 49.6% | 5,700 | 76.5% |
| | PM | 321 | 237 | 558 | 42.5% | | |
| OP3 (DBL) | AM | 458 | 512 | 970 | 52.8% | 5,800 | 75.0% |
| | PM | 514 | 474 | 988 | 48.0% | | |
| OP4 (DBL) | AM | 422 | 362 | 784 | 46.2% | 7,600 | 66.0% |
| | PM | 516 | 380 | 896 | 42.4% | | |
| OP5A (DBL) | AM | 411 | 405 | 816 | 49.6% | 5,700 | 76.5% |
| | PM | 321 | 237 | 558 | 42.5% | | |
| OP6 (DBL) | AM | 411 | 405 | 816 | 49.6% | 5,700 | 76.5% |
| | PM | 321 | 237 | 558 | 42.5% | | |
| OP7A (DBL) | AM | 572 | 518 | 1090 | 47.5% | 5,800 | 75% |
| | PM | 490 | 428 | 918 | 46.6% | | |
| CPR | AM | 738 | 790 | 1528 | 51.7% | 2,700 | 5.0% |
| | PM | 666 | 826 | 1492 | 55.4% | | |
| E1 (YLH) | AM | 2574 | 2919 | 5493 | 53.1% | 7,200 | 42.5% |
| | PM | 2010 | 2736 | 4746 | 57.6% | | |
| E1A (YLH) | AM | 2232 | 3078 | 5310 | 58.0% | 7,200 | 42.5% |
| | PM | 2444 | 2692 | 5136 | 52.4% | | |
| E2A (YLH) | AM | 3183 | 1800 | 4983 | 36.1% | 7,200 | 42.5% |
| | PM | 1647 | 2538 | 4185 | 60.6% | | |

Notes: HV represents Heavy Vehicle
LV represents Light Vehicle

2.18 Low traffic flow in DBL was noted during the course of measurement.

2.19 The traffic speeds along HK-DBL were estimated concurrently with the noise measurement. Table 2.5 provides a summary of averaged traffic speed monitoring results and EIA prediction.

**Table 2.5 Traffic Speed Measurement**

| Monitoring Date | Monitoring Period | Road | Measured Speed (km/hr) | EIA Predicted Speed (km/hr) |
|---|---|---|---|---|
| 29 September 08 | AM Peak | DBL (OP2, OP5A & OP6) | 98.3 | 100.0 |
| | PM Peak | DBL (OP2, OP5A & OP6) | 94.3 | 100.0 |
| 30 September 08 | AM Peak | DBL (OP1) | 83.2 | 100.0 |
| | PM Peak | DBL (OP1) | 86.1 | 100.0 |
| 8 October 08 | AM Peak | YLH (E1) | 81.4 | 80.0 |
| | PM Peak | YLH (E1) | 79.3 | 80.0 |
| | AM Peak | YLH (E2A) | 75.7 | 80.0 |
| | PM Peak | YLH (E2A) | 85.9 | 80.0 |
| 19 May 09 | AM Peak | YLH (E1A) | 77.4 | 80.0 |
| | PM Peak | YLH (E1A) | 78.9 | 80.0 |
| 23 September 09 | AM Peak | DBL (OP3) | 84.0 | 100.0 |
| | PM Peak | DBL (OP3) | 84.3 | 100.0 |
| 25 September 09 | AM Peak | DBL (OP4) | 92.9 | 100.0 |
| | PM Peak | DBL (OP4) | 100.5 | 100.0 |
| 28 September 09 | AM Peak | DBL (OP7A) | 83.2 | 100.0 |
| 7 October 09 | PM Peak | DBL (OP7A) | 86.1 | 100.0 |
| 28 September 09 | AM Peak | CPR (OP7A) | 54.0 | 70.0 |
| 7 October 09 | PM Peak | CPR (OP7A) | 57.1 | 70.0 |

**Predicted Noise Levels under the Traffic Flow Condition in 2021**

2.20 The predicted noise level under the traffic flow condition in 2021 was in accordance with Section III of the "Calculation of Road Traffic Noise (CRTN), 1988" [4] for adjustment to the measured traffic noise level by adding a correction factor and for comparison with prediction from the CRTN.

2.21 The predicted noise levels at the sensitive receivers are estimated based on the equation from CRTN.

2.22 Detailed traffic conditions in year 2021 are summarized in the Table 2.6.

**Table 2.6 EIA Predicted 2021 Peak Hour Traffic Data**

| Noise Monitoring Location | Traffic Flow (Nr/hr) | % of HV | Traffic Speed (km/hr) |
|---|---|---|---|
| OP1 | 4,300 | 71.3% | 100 |
| OP2 | 5,700 | 76.5% | 100 |
| OP3 | 5,800 | 75.0% | 100 |
| OP4 | 7,600 | 66.0% | 100 |
| OP5A | 5,700 | 76.5% | 100 |
| OP6 | 5,700 | 76.5% | 100 |
| OP7A | 5,800 | 75.0% | 100 |
| E1 | 7,200 | 42.5% | 80 |
| E1A | 7,200 | 42.5% | 80 |
| E2A | 7,200 | 42.5% | 80 |
| CPR | 2,700 | 5.0% | 70 |

2.23 The correction factors for each monitoring period were evaluated and summarized in Table 2.7.

**Table 2.7 Correction Factor for Different Monitoring Period**

| Monitoring Station | Monitoring Period | Correction Factor dB(A) |
|---|---|---|
| OP1 | AM Peak | 12.1 |
| | PM Peak | 11.0 |
| OP2 | AM Peak | 10.0 |
| | PM Peak | 12.3 |
| OP3 | AM Peak | 9.9 |
| | PM Peak | 10.1 |
| OP4 | AM Peak | 11.5 |
| | PM Peak | 10.6 |
| OP5A | AM Peak | 10.0 |
| | PM Peak | 12.3 |
| OP6 | AM Peak | 10.0 |
| | PM Peak | 12.3 |
| OP7A | AM Peak | * |
| | PM Peak | * |
| E1 | AM Peak | 0.4 |
| | PM Peak | 0.9 |
| E1A | AM Peak | 0.4 |
| | PM Peak | 0.9 |
| E2A | AM Peak | 2.4 |
| | PM Peak | 0.8 |

*Calculation of correction factor for OP7A will be presented in Sections 4.8 – 4.9 and Table 4.3.

2.24 Due to the close proximity of monitoring station OP7A to the Castle Peak Road and the low traffic flow of Deep Bay Link during the monitoring, contribution from Castle Peak Road should be taken into account when calculating the correction factor. The predicted noise level for 2009 would be calculated by back-calculation from the predicted noise level for year 2021 using the measured traffic information. The difference between the predicted 2009 noise level and the predicted 2021 noise level as stated in the

EIA report will be the normalized value. Detailed calculation is shown in Section 2.25 and Table 2.8.

2.25 For OP7A and Castle Peak Road,

$$* \text{ Correction Factor} = 10\text{Log}\left(\frac{Q'}{Q}\right) + 33\text{Log}\left(\frac{V' + 40 + 500/V'}{V + 40 + 500/V}\right) + 10\text{Log}\left(\frac{1 + 5p'/V'}{1 + 5p/V}\right)$$

Where Q' is measured traffic flow during the traffic noise monitoring event in 2009,
V' is measured traffic speed during the traffic noise monitoring event in 2009,
p' is measured percentage heavy vehicle during the traffic noise monitoring event in 2009,
Q is predicted traffic flow for 2021,
V is predicted traffic speed for 2021,
p is predicted percentage heavy vehicle for 2021.

**Table 2.8 Correction Factor for OP7A**

| Monitoring Period | [1)] Predicted NL (CPR) | [2)] Correction Factor (CPR) | [3)] Predicted NL (DBL) | [4)] Correction Factor (DBL) | [5)] Predicted NL in 2021 (as in EIA) | Predicted NL in 2009 | Correction factor for 2021 |
|---|---|---|---|---|---|---|---|
| AM | 57.4 | 2.0 | 67.1 | -9.8 | 69.0 | 61.5 | 7.5 |
| PM | 57.4 | 2.3 | 67.1 | -10.4 | 69.0 | 61.5 | 7.5 |

1) & 3) Obtained from Supplementary Document of Technical Note No. 30 – DBL13M1 Noise Barrier Review Report, Annex 1
2) & 4) Obtained from back-calculation from (5) the predicted noise level for year 2021, using the measured traffic information.

2.26 Under the designed traffic condition in Year 2021, the projected noise levels as received at the sensitive receivers are estimated and shown in Table 2.9.

**Table 2.9 Projected and EIA Predicted Noise Level**

| Monitoring Station | | Noise Level, $L_{10\ (1\ hour)}$ dB(A) | | |
|---|---|---|---|---|
| | | Correction Factor* | Projected Noise Level | EIA Predicted Noise Level |
| OP1 | **AM Peak** | 12.1 | 70.8 | 66.0 |
| | **PM Peak** | 11.0 | 70.6 | 66.0 |
| OP2 | **AM Peak** | 10.0 | 62.2 | 67.0 |
| | **PM Peak** | 12.3 | 61.5 | 67.0 |
| OP3 | **AM Peak** | 9.9 | 69.1 | 69.0 |
| | **PM Peak** | 10.1 | 68.2 | 69.0 |
| OP4 | **AM Peak** | 11.5 | 69.7 | 67.0 |
| | **PM Peak** | 10.6 | 68.0 | 67.0 |
| OP5A | **AM Peak** | 10.0 | 72.7 | N/A |
| | **PM Peak** | 12.3 | 73.7 | N/A |
| OP6 | **AM Peak** | 10.0 | 63.1 | 66.0 |
| | **PM Peak** | 12.3 | 63.8 | 66.0 |
| OP7A | **AM Peak** | 7.5 | 70.6 | 69.0 |
| | **PM Peak** | 7.5 | 70.5 | 69.0 |
| E1 | **AM Peak** | 0.4 | 63.8 | 76.0 |
| | **PM Peak** | 0.9 | 63.8 | 76.0 |
| E1A | **AM Peak** | 0.4 | 69.1 | 69.0 |
| | **PM Peak** | 0.9 | 69.7 | 69.0 |
| E2A | **AM Peak** | 2.4 | 62.1 | 69.0 |
| | **PM Peak** | 0.8 | 61.3 | 69.0 |

* Corrected by traffic flow, speed and percentage of heavy vehicles.

2.27 Comparison of the projected noise level was made against the EIA prediction for year 2021. The projected noise level for the year 2021 at stations OP1, OP3, OP4, OP7A and E1A are higher than the predicted 2021 noise level in the EIA.

2.28 For monitoring stations OP1, OP3, OP4 and OP7A, the traffic flow in DBL was low during the course of measurement. Background noise may cause a rather significant contribution to the measured noise levels, and hence affect the projected values.

2.29 For the operational noise monitoring at OP1 and OP7A, the projected noise levels were marginally exceeded the traffic noise standard of 70dB(A). However for OP3, OP4 and E1A, while the projected noise levels exceeded the EIA prediction, they were within the traffic noise standard of 70dB(A).

## 3. WATER QUALITY

### Monitoring Requirements

3.1 The monitoring is to determine the characteristics of bridge runoff in particular the first flush from the Deep Bay Link bridge during rain-storm events and to review the frequency of road cleaning.

3.2 The original method on road surface runoff monitoring stated in the EM&A Manual involves installation of equipments onto the bridge deck or the parapets on both sides of the expressway to collect runoff during rainstorm events. After reviewing by relevant government departments, including the Hong Kong Police Force and Fire Services Department, the installation of equipment was considered causing disturbance to other road users including the fire services and police vehicles during emergency operation and considered relatively unsafe for the ET staff working on the expressway.

3.3 An alternative proposal on the monitoring method using a water tanker to simulate an artificial rainfall by spraying water onto the catchment area of the monitoring gully during bridge closure at night was prepared. The alternative proposal was approved by EPD. A procedural guide was also prepared. The guide was vetted by the IEC and the Engineer and was reviewed by EPD.

3.4 The proposed criteria, action level and actions required as stipulated in the EM&A Manual are included in Appendix B.

### Monitoring Parameters, Frequency and Duration

3.5 The monitoring should include in total 12 sampling / rainstorm events (12 sets of data). A total of 6 sets of sampling data should be collected during the first 3 months after the opening of the Deep Bay Link (1st monitoring period). The other 6 sets of sampling data should be collected in month 4 to month 6 after opening of the Deep Bay Link (2nd monitoring period). The minimum interval between two sampling events shall not be less than 4 days.

3.6 The commencement of the road surface runoff monitoring programme was postponed to October 2007 since the appointment of the contract was 1 September 2007 and the requirement in obtaining consent and relevant permits and licenses from relevant government departments for working on the expressway. Six monitoring events for the first monitoring period were carried out between October and November 2007, while four monitoring events and two monitoring events for the second monitoring period were carried out in December 2007 and January 2008 respectively. All monitoring works were carried out under fine weather condition.

3.7 All samples were cooled to 4°C without being frozen and delivered to a HOKLAS laboratory within 24 hours for analysis for the following pollutants in highway runoff:

- Total suspended solids
- Total organic carbon
- Chemical oxygen demand
- Nitrate
- Nitrite
- Total Kjeldahl Nitrogen
- Total phosphorus
- Copper
- Lead
- Zinc

### Monitoring Locations

3.8 Water samples were collected from six different road gullies, three on each side of the carriageways.

3.9 The exact monitoring locations were recorded in terms of nearby lighting pole / highways chainage. The exact monitoring locations are shown in Figure 3.1.

**Results and Observations**

3.10 A total of twelve monitoring of road surface runoff from carriageway monitoring were carried out during the operational phase of the Project.

3.11 Graphical presentations of all monitoring results in the reporting period are provided in Appendix C.

3.12 In the reporting period, results of all monitoring parameters complied with the reference criteria except nitrite and nitrate concentration in the 1st and 4th composite samples on 27 October 2007, the 1st and 2nd composite samples on 8 December 2007, the 1st composite samples on 15 December 2007 and the 1st composite sample on 12 January 2008.

3.13 Throughout the reporting period, a generally high nitrite and nitrate concentration was recorded and it was mainly attributable to relatively high nitrate content since the nitrite concentration was generally below 0.01 mg/L in all monitoring results. In fact, the nitrate concentration in the reference sample taken from the water tanker was around 0.63 – 1.65 mg/L and most were already above the reference criterion. The water used for surface runoff monitoring was tap water from the Water Supplies Department (WSD). According to the "Drinking Water Quality for the Period April 2006 – March 2007" issued by WSD, the range of nitrate concentration in the water supply is <2.5 to 9.9 mg/L with an average of 3.6 mg/L. Nevertheless, the nitrate concentration of this level, i.e. 0.63 – 1.65 mg/L, is still within WSD requirements for potable use.

3.14 There was no adverse observation / condition, which would contribute to high level of pollutants, identified on the bridge deck during the monitoring. On the other hand, the accumulated water inside the gully may increase the pollutant levels in the first or even the second sample. Currently, water sample was collected at the mid-level of the gully once runoff is observed discharged from the gully to the downpipe. The existing pollutant inside the gully may also be a factor of elevating pollutant level. Nevertheless, in the reporting period, the total nitrogen level, i.e. sum of nitrite, nitrate and TKN level, in the discharge (max 8.58 mg/L) complied with the discharge standard of 50/100 mg/L in Deep Bay Water and the associated environmental impact was considered minimal.

3.15 Since no action level was triggered, no further action was required.

## 4. ECOLOGY

### Monitoring Requirements

4.1 As required under Clause 3.3 of the Environmental Permit, the approved Habitat Creation and Management Plan (HCMP) and Section 7.2 of the EM&A Manual, 1 year maintenance / establishment programme at the Wetland Compensation Area (Pond 15) include the removal of colonizing *Mikania* and *Urochloa*, replanting bamboos and aquatic vegetation and 2 years monitoring of habitat conditions at Pond 15 during operational phase were required. The trigger and action level of avifauna monitoring was included in Appendix B.

### Monitoring Parameters, Frequency and Duration

4.2 Maintenance for the Pond 15 complex is required to be carried out for 1 year (12 months) after the completion of construction of the pond. Maintenance works at Pond 15 include the removal of colonizing *Mikania micrantha* and *Urochloa mutica*, replanting bamboos and aquatic vegetation (at the end of 12-month) and the removal of refuse.

4.3 Ecological monitoring is also required to be carried out for 2 years after the completion of construction of the pond. Monitoring of water level and water quality (Dissolved Oxygen and 5-day Biological Oxygen Demand) should be carried out quarterly. Monitoring of flora, pelagic fauna and benthic species are required to be carried out twice a year (covering both dry and wet seasons), while monitoring of avifauna and amphibian are required to be carried out 4 times a year (covering all 4 seasons) and once a year (between April and May) respectively. The trigger and action levels set by the EM&A Manual for Deep Bay Link Pond 15 Complex (Section 7.3 in HY/2002/23) are provided in Appendix B.

4.4 The construction of Pond 15 complex completed in October 2007 and was handed over to MCAL, now known as AECOM, on 1 November 2007. The maintenance work and monitoring programme commenced on 1 November 2007 .The 1-year maintenance programme during the early establishment period of Pond 15 complex was completed in October 2008, and was handed over to Agriculture, Fisheries and Conservation Department (AFCD) in November 2008.

### Hydrology

Monitoring Locations

4.5 The Pond 15 Complex comprises of four ponds, including Pond 15X, 15ABD, 15Y and 15C1. Water level at the centres of each pond was monitored.

4.6 For water quality, all water samples were collected at mid-depth at all ponds.

Monitoring Equipment

4.7 Equipment used for monitoring water level included the metal measuring stakes that were pre-installed into each of the ponds during the construction of ponds.

4.8 Equipment used for water quality monitoring included a water sampler, a Dissolved Oxygen Measuring Meter (model number YSI-85), pre-treated containers, as well as a cooler box with ice cubes to keep the samples at $4^{o}C$ without being frozen.

Monitoring Methodology

4.9 Readings of water level at each pond were observed and recorded onsite.

4.10 Parameters used for water quality monitoring included Dissolved Oxygen (DO) and 5-day Biological Oxygen Demand ($BOD_5$). While Pond 15ABD is much bigger than the other ponds and is partially divided by the bamboo planting site in the middle, two water samples were collected from Pond 15ABD,

and one sample was collected at each of the Pond 15X, 15Y and 15C1.

4.11 For DO monitoring, water samples were collected and measured by a Dissolved Oxygen Measuring Meter on site. For $BOD_5$, the collected samples were kept separately in sealed containers and placed in a cooler, kept away from sunlight and submitted to an accredited laboratory for analysis within 24 hours.

Results and Discussions

4.12 Monitoring on water level and water quality was carried out every 3 months since the commencement of the operational phase EM&A programme. A total of 8 monitoring were carried out in the reporting period.

*Water Level*

4.13 The detailed monitoring results are presented in Appendix D. The summary of water levels recorded during the monitoring surveys are presented as follows:

**Table 4.1 Water Levels at Pond 15X, 15ABD, 15Y and 15C1**

| Pond | Range of Water Level (m) |
|---|---|
| 15X | 1.15 - 1.20 |
| 15ABD | 1.10 – 1.30 |
| 15Y | 1.10 – 1.20 |
| 15C1 | 1.10 – 1.20 |

4.14 As set in the HCMP, water levels should be maintained between 1m to 1.5m at all four ponds. The water levels recorded at all ponds ranged from 1.1m to 1.3m, which was within the required level.

*Water Quality*

4.15 The detailed monitoring results are presented in Appendix D. The following table presents the summary of water quality at Pond 15 Complex during the monitoring surveys:

**Table 4.2 Water Quality at Pond 15X, 15ABD, 15Y and 15C1**

| Location | DO (%) | | DO (mg/L) | | $BOD_5$ (mg/L) | |
|---|---|---|---|---|---|---|
| | Average | Range | Average | Range | Average | Range |
| 15X | 70.5 | 31.8 – 129.4 | 6.16 | 2.83 – 11.95 | 10.38 | <2 – 36 |
| 15ABD (1) | 68.7 | 42.3 – 116.2 | 5.76 | 3.21 – 10.56 | 6.00 | <2 – 15 |
| 15ABD (2) | 63.7 | 46.2 – 97.4 | 5.32 | 3.49 – 8.87 | 8.38 | <2 – 29 |
| 15Y | 59.1 | 41.3 – 85.9 | 4.90 | 3.13 – 6.66 | 3.38 | <2 – 6 |
| 15C1 | 62.7 | 27.1 – 89.8 | 5.22 | 2.11 – 7.93 | 3.38 | <2 – 7 |

4.16 The highest DO level was recorded at Pond 15X and the lowest at Pond 15C1.

4.17 It is noted that the DO level decreased across the monitoring period. This may be due to overgrown of vegetation (*Ipomoea aquatic* and *Ludwigia* sp.) in the ponds.

4.18 For $BOD_5$ concentration, there was a decreasing trend at all ponds across the monitoring period.

**Fauna**

*Avifauna*

Monitoring Location

4.19 The monitoring of avifauna was conducted at a fixed sampling point pre-established at each of the four ponds (Figure 4.1)

Monitoring Equipment

4.20 A pair of 10x42 binoculars, a camera and a stopwatch were required during the monitoring.

Monitoring Methodology

4.21 Bird monitoring surveys were carried out at dawn on two consecutive days. Upon arrival at each fixed sampling point, monitoring was commenced after a 5-minutes settling period. Within the subsequent 10-minutes, any bird species observed or heard within and outside the pond were recorded.

Results and Observations

4.22 The monitoring of avifauna was carried out once every 3 months since the commencement of the operational phase EM&A programme. A total of 8 monitoring were carried out in the reporting period.

4.23 A detailed survey results and the list of birds recorded in the surveys are shown in Appendix D. Table 4.3 summarizes the species richness and abundance recorded at Pond 15 Complex during the avifauna surveys in the reporting period:

**Table 4.3 Summary of Abundance and Richness of Bird Species at Pond 15 Complex over the 2-Consecutive-Days Survey in each reporting month**

| | Averaged no. of Species Recorded | Averaged no. of Birds Recorded |
|---|---|---|
| Dec-07 | 7.5 | 24.5 |
| Mar-08 | 14 | 38 |
| Jun-08 | 10 | 51.5 |
| Sep-08 | 11 | 24.5 |
| Dec-08 | 12.5 | 30.5 |
| Mar-09 | 15 | 68.5 |
| Jun-09 | 14.5 | 48 |
| Sep-09 | 15 | 48 |

4.24 Table 4.4 presents the species abundance and richness recorded at each pond in the reporting period:

**Table 4.4 Comparsion of Abundance and Richness of Bird Species Recorded at Pond 15X, 15ABD, 15Y and 15C1**

| | | **15X** | **15ABD** | **15Y** | **15C1** |
|---|---|---|---|---|---|
| **Total No. of Bird Individuals** | Average | 17.4 | 28.3 | 18.1 | 19.6 |
| | Range | 4 – 31 | 17 – 50 | 2 – 29 | 4 – 34 |
| **Total No. of Bird Species** | Average | 7.0 | 9.1 | 8.5 | 7.9 |
| | Range | 3 – 10 | 7 – 12 | 1 – 13 | 3 – 14 |

4.25 The HCMP suggested to statistically compare the recorded species richness and population density, with the baseline quantitative data obtained from the EIA study. However, the only bird data recorded closest to Pond 15 Complex during EIA was collected from 'Transect 3' at Ling To Monastery Road. While the survey location, methodology and timescale during the EIA study and this monitoring survey are different (EIA: transect survey [between 100m and 1km] over 45 minutes at Ling To Monastery Road;

this monitoring survey: point-count for 10 minutes at Pond 15 Complex), fair and meaningful conclusion cannot be drawn from the suggested statistical comparison and therefore no statistical analysis will be included in this report.

4.26 The greatest species richness and the highest number of bird individuals were recorded at Pond 15ABD.

4.27 A summary of the bird species recorded in Pond 15 Complex in the reporting period is listed in Table 4.5:

**Table 4.5 List of Bird Species Recorded at Pond 15X, 15ABD, 15Y and 15C1 in the reporting period**

| Common Name | Scientific Name | Total No. of Birds Recorded in Pond 15 Complex |
|---|---|---|
| Common Magpie | *Pica pica* | 1 |
| Barn Swallow | *Hirundo rustica* | 72 |
| Black-collared Starling | *Sturnus nigricollis* | 10 |
| Black-crowned Night Heron* | *Nycticorax nycticorax* | 2 |
| Black Kite | *Milvus migrans* | 1 |
| Cattle Egret* | *Bubulcus ibis* | 9 |
| Chinese Bulbul | *Pycnonotus sinensis* | 35 |
| Chinese Pond Heron* | *Ardeola bacchus* | 8 |
| Common Buzzard | *Buteo buteo* | 1 |
| Common Kingfisher** | *Alcedo atthis* | 6 |
| Common Koel | *Eudynamys scolopacea* | 4 |
| Common Moorhen* | *Gallinula chloropus* | 1 |
| Common Myna | *Acridotheres tristis* | 1 |
| Common Stonechat | *Saxicola torquata* | 1 |
| Common Tailorbird | *Orthotomus sutorius* | 11 |
| Crested Bulbul | *Pycnonotus jocosus* | 9 |
| Crested Myna | *Acridotheres cristatellus* | 41 |
| Crested Serpent Eagle | *Spilornis cheela* | 2 |
| Daurian Redstart | *Phoenicurus auroreus* | 1 |
| Dusky Warbler | *Phylloscopus fuscatus* | 3 |
| Eurasian Tree Sparrow | *Passer montanus* | 166 |
| Fork-tailed Sunbird | *Aethopyga christinae* | 1 |
| Great Egret* | *Egretta alba* | 1 |
| Great Tit | *Parus major* | 2 |
| Greater Coucal | *Centropus sinensis* | 1 |
| Japanese White-eye | *Zosterops japonicus* | 12 |
| Little Egret* | *Egretta garzetta* | 4 |
| Long-tailed Shrike | *Lanius schach* | 9 |
| Masked Laughingthrush | *Garrulax perspicillatus* | 57 |
| Olive-backed Pipit | *Anthus hodgsoni* | 6 |
| Oriental Magpie Robin | *Copsychus saularis* | 31 |
| Plain Prinia | *Prinia inornata* | 5 |
| Red-whiskered Bulbul | *Pycnonotus jocosus* | 37 |
| Richard's Pipit | *Anthus richardi* | 2 |
| Scaly-breasted Munia | *Lonchura punctulata* | 10 |
| Spotted Dove | *Streptopelia chinensis* | 24 |
| White Wagtail** | *Motacilla alba* | 31 |
| Yellow-bellied Prinia | *Prinia flaviventris* | 38 |
| Yellow-browed Warbler | *Phylloscopus inornatus* | 6 |
| Zitting Cisticola | *Cisticola juncidis* | 1 |
| **Total number of species recorded** | | **40** |

***** wetland-dependant birds
** often found near wetland area

4.28 Six recorded species (Black-crowned Night Heron *Nycticorax nycticorax,* Common Moorhen *Gallinula chloropus,* Great Egret *Egretta alba,* Little Egret *Egretta garzetta*, Cattle Egret *Bubulcus ibis* and Chinese Pond Heron *Ardeola bacchus*) are considered as wetland-dependant birds. Species that are often found near wetland area (Common Kingfisher *Alcedo atthis* and White Wagtail *Motacilla alba*) were also recorded. This is an indication that the wetland compensation area was attractive to the nearby wetland-dependant species

4.29 The main objective of the proposed wetland compensation area is to provide feeding opportunities for wildlife (mainly ardeids). As stated in the HCMP, Little Egret (*Egretta garzetta*) and Chinese Pond Heron (*Ardeola bacchus*) were selected as the target species for the compensation wetland, as they were both recorded in small numbers near Pond 15 Complex during the EIA study. As both target species were recorded during the monitoring surveys, this indicates that the Pond 15 Complex was utilized by the target wetland species.

4.30 The relationships of avifauna to water levels and vegetation cover/species could not be determined during the monitoring surveys. The limited data were not conclusive enough to suggest any relationship between avifauna and water levels or vegetation cover/species.

4.31 According to the trigger and action levels (Appendix B**)**, no specific trigger levels for ardeid's use were recommended due to the low level of use expected, and that immediate action is not appropriate for the long term process of wetland creation and management. As ardeids were recorded in the surveys, no immediate adaptive measure to the management plan was required.

*Benthos*

Monitoring Locations

4.32 Benthos sampling was conducted at five random locations around each pond, as presented in Figure 4.2.

Monitoring Equipment

4.33 A 50mm (diameter) core sampler to a depth of 100mm, sealable bags, a cooler, a 500µm sieve, sealable containers/bottles, alcohol, a stereo-microscope, an oven and an electronic balance were required for the monitoring survey.

Monitoring Methodology

4.34 Five replicates of benthos samples were collected by core sampler at each pond. Collected contents were bagged and stored in coolers for subsequent sorting. To obtain the benthos specimen, the collected contents were rinsed through a 500 µm sieve. Species that were over 500 µm in size were left in the sieve and preserved in alcohol. A stereo-microscope was used to identify the sorted specimen, which were then dried in an oven at 80$^{o}$C. The total dry weight/biomass for each taxa group was then weighed by an electronic balance.

Results and Observations

4.35 Monitoring survey for benthos was conducted twice a year since the commencement of the operational phase EM&A programme. A total of 4 benthos surveys were carried out in the reporting period. Detailed list of results for benthos monitoring is provided in Appendix D. Table 4.6 and 4.7 summarizes the species richness and dry biomass of benthos recorded at each of the ponds in the reporting months:

**Table 4.6 Number of Benthos Families Recorded**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 |
|---|---|---|---|---|
| 15X | 5 | 5 | 7 | 6 |
| 15ABD | 5 | 4 | 5 | 4 |
| 15Y | 6 | 5 | 6 | 4 |
| 15C1 | 5 | 4 | 6 | 5 |
| **Pond 15 Complex** | **8** | **5** | **9** | **6** |

**Table 4.7 Total Benthos Biomass Recorded (in grams)**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | **Total** |
|---|---|---|---|---|---|
| 15X | 10.1 | 45.66 | 38.95 | 34.56 | **129.27** |
| 15ABD | 5.49 | 24.67 | 21.3 | 29.93 | **81.39** |
| 15Y | 6.39 | 42.65 | 26.48 | 29.56 | **105.08** |
| 15C1 | 6.22 | 9.94 | 13.96 | 14.09 | **44.21** |
| **Pond 15 Complex** | **28.2** | **122.92** | **100.69** | **108.14** | **359.95** |

4.36 Table 4.8 presents the number of benthos individuals recorded at Pond 15 Complex:

**Table 4.8 Number of Each Benthos Families Recorded at Pond 15 Complex**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | **Total** |
|---|---|---|---|---|---|
| *Ampullariidae* | 5 | 4 | 4 | 14 | **27** |
| *Ancylidae* | 0 | 0 | 2 | 0 | **2** |
| *Thiaridae* | 102 | 185 | 212 | 17 | **516** |
| *Viviparidae* | 34 | 148 | 114 | 110 | **406** |
| *Oligochaeta spp.* | 60 | 110 | 107 | 6 | **283** |
| *Orbiniidae* | 28 | 65 | 31 | 0 | **124** |
| *Corbiculidae* | 0 | 0 | 2 | 7 | **9** |
| *Chironomidae (larvae)* | 2 | 0 | 27 | 2 | **31** |
| *Physidae* | 2 | 0 | 0 | 0 | **2** |
| *Planorbidae* | 1 | 0 | 0 | 0 | **1** |

4.37 Table 4.9 presents the dry biomass of benthos recorded at Pond 15 Complex:

**Table 4.9 Dry Biomass of Each Benthos Families Recorded at Pond 15 Complex (in grams)**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | **Total** |
|---|---|---|---|---|---|
| *Ampullariidae* | 7.76 | 13.29 | 10.99 | 46.81 | **78.84** |
| *Ancylidae* | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| *Thiaridae* | 10.00 | 25.13 | 31.21 | 3.24 | **69.58** |
| *Viviparidae* | 0.44 | 84.45 | 54.99 | 48.57 | **188.45** |
| *Oligochaeta spp.* | 9.95 | 0.01 | 0.00 | 1.00 | **10.96** |
| *Orbiniidae* | 0.00 | 0.06 | 0.03 | 0.00 | **0.09** |
| *Corbiculidae* | 0.00 | 0.00 | 3.42 | 8.52 | **11.95** |
| *Chironomidae (larvae)* | 0.01 | 0.00 | 0.04 | 0.00 | **0.05** |
| *Physidae* | 0.00 | 0.00 | 0.00 | 0.00 | **0.00** |
| *Planorbidae* | 0.03 | 0.00 | 0.00 | 0.00 | **0.03** |

4.38 A total of 10 families were recorded at Pond 15 Complex. In terms of abundance, *Thiaridae* was the dominant family in Pond 15 Complex during the monitoring surveys, followed by *Viviparidae*. Pond 15X recorded the highest biomass of benthos, followed by Pond 15Y, Pond 15ABD and PondC1.

*Pelagic Fauna*

Monitoring Locations

4.39 Pelagic fauna sampling was conducted at three random locations at each pond.

Monitoring Equipment

4.40 A 1.5m diameter fishing throw-net of 100mm mesh size, a bucket and a scale balance were required during the monitoring survey.

Monitoring Methodology

4.41 Pelagic fauna monitoring was undertaken by deploying a fishing throw-net to collect three replicated samples at each pond by random sampling. After each catch, each of the caught contents was counted, identified to the lowest taxonomic level on-site, weighed (biomass in terms of wet weight) and released back to the pond.

Results and Discussions

4.42 Monitoring survey for pelagic fauna was conducted twice a year since the commencement of the operational phase EM&A programme. A total of 4 pelagic fauna surveys were carried out in the reporting period. Detailed list of results of pelagic fauna monitoring is presented in Appendix D. Table 4.10 summarizes the results of pelagic fauna monitoring recorded at Pond 15 Complex in the reporting period:

**Table 4.10 Number of Pelagic Species caught at Pond 15 Complex**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | **Total** |
|---|---|---|---|---|---|
| Nile Tilapia (*Oreochromis niloticus*) | 11 | 5 | 1 | 1 | **18** |
| Goldfish (*Carassius auratus*) | 1 | 0 | 0 | 0 | **1** |
| *Macrobrachium sp.* | 0 | 4 | 0 | 0 | **4** |

4.43 A total of three species was recorded during the monitoring surveys at Pond 15 Complex in the reporting period.

4.44 The wet weight of the individuals caught are summarized in Table 4.11.

**Table 4.11 Wet Weight of Pelagic Species caught at Pond 15 Complex (in kg)**

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | **Total** |
|---|---|---|---|---|---|
| Nile Tilapia (*Oreochromis niloticus*) | 1.62 | 0.6 | 0.1 | 0.2 | **2.52** |
| Goldfish (*Carassius auratus*) | 0.01 | 0 | 0 | 0 | **0.01** |
| *Macrobrachium sp.* | 0 | 0.028 | 0 | 0 | **0.028** |

4.45 In terms of abundance and biomass, Nile Tilapia (Oreochromis niloticus) was the dominant species in Pond 15 Complex.

*Amphibian*

Monitoring Locations

4.46 Amphibian monitoring was conducted along the path around each of the four ponds.

4.47 Amphibian monitoring was conducted on 18 May 2009, starting from 7:30 pm, along the path around each of the four ponds.

Monitoring Equipment

4.48 A torch and a vocal recorder were required during the survey.

Monitoring Methodology

4.49 Amphibian monitoring was conducted by walking around the ponds at night and recording encountered amphibians by active searching with torch and vocal identification. Species and categorical abundance of amphibians encountered were recorded.

Results and Observations

4.50 Amphibian monitoring was conducted once a year since the commencement of the operational phase EM&A programme. A total of 2 amphibian monitoring were carried out in the reporting period.

4.51 One individual of Brown Tree Frog *Polypedates megacephalus* was seen on the path of Pond 15ABD on 18 May 2009 and one individual of Asian Common Toad (*Bufo melanostictus*) was seen on the slope of Pond 15Y on 6 May 2008. During the surveys, vocal calls from Asian Common Toad *Bufo melanostictus,* Gunther's Frog *Rana guentheri*, Paddy Frog *Rana limnocharis* and Brown Tree Frog *Polypedates megacephalus* and Ornate Pigmy Frog *Microhyla ornate* were also heard. All the recorded species are considered to be widely distributed in Hong Kong and are not protected species.

**Vegetation**

Monitoring Locations

4.52 The monitoring of floral communities was conducted on a fixed belt transect on the bank of each of the ponds. Each transect began on dry bank and ended in open water.

Monitoring Equipment

4.53 Equipment required for flora monitoring included a retractable metallic measuring tape (for measuring plant height) and a flexible plastic measuring tape (over 4m in length for marking $1m^2$ quadrats).

Monitoring Methodology

4.54 Flora monitoring was conducted at a fixed belt transect on the bank of each of the ponds, and each transect was divided up into $1m^2$ quadrats. Within each quadrat, percentage cover of each species and its height were recorded. Representative photos of each quadrat surveyed were taken.

Results and Discussions

4.55 Flora monitoring was carried out twice a year since the commencement of the operational phase EM&A programme. A total of 4 flora monitoring were carried out in the reporting period. Detailed results on species richness and percentage cover are presented in Appendix D. A summary of floral species richness at each of the 4 ponds are presented in Table 4.12

**Table 4.12 Floral Species Richness at each of the 4 Ponds**

| | 15X | 15ABD | 15Y | 15C1 |
|---|---|---|---|---|
| 11-Dec-07 | 8 | 8 | 7 | 4 |
| 19-Jun-08 | 3 | 8 | 7 | 8 |
| 15-Dec-08 | 2 | 8 | 6 | 5 |
| 17-Jun-09 | 1 | 2 | 8 | 5 |

4.56 A total of 29 species were recorded in the monitoring surveys. As shown in Table 4.13, the percentage coverage of Pond 15 Complex by vegetation had increased compared with the initial establishment.

**Table 4.13 Percentage of Floral Species Coverage**

| | 15X | 15ABD | 15Y | 15C1 | Pond 15 Complex (Average of the 4 ponds) |
|---|---|---|---|---|---|
| 11-Dec-07 | 95.5 | 85.01 | 70 | 88.33 | 84.71 |
| 19-Jun-08 | 95 | 72 | 87 | 91.25 | 86.3125 |
| 15-Dec-08 | 86 | 70 | 46.5 | 75 | 69.4 |
| 17-Jun-09 | 100 | 100 | 97 | 98 | 98.8 |

4.57 Vegetation trimming was carried out in Pond 15 Complex regularly during the 1-year early establishment period of Pond 15 complex. The average height of vegetation in the transects could vary largely before and after the maintenance work.

**Invasive Floral Species**

4.58 The monitoring of invasive floral species within all pond areas and the bamboo planting sites was carried out during the weekly site visits. The climber, Mile-a-minute Weed (*Mikania micrantha*), was the species most frequently found on the body of bamboo plants. Any climbers found on the bamboo were removed immediately as much as possible during the visits.

4.59 Removal / trimming of invasive species were also carried out regularly during the 1-year early establishment period of Pond 15 complex.

4.60 However, as the ponds were handed over to Agriculture, Fisheries and Conservation Department (AFCD) in November 2008, subsequent invasive species removal / trimming was to be programmed by AFCD.

## 5. LICENCING AND IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

### Status of Environmental Licensing and Permitting

5.1 All permits/licences/notifications obtained as of the reporting period are summarised in Table 5.1

**Table 5.1 Summary of Environmental Notification, Licensing and Permit Status**

| Permit No. | Valid Period | | Description | Status |
|---|---|---|---|---|
| | From | To | | |
| **Environmental Permit** | | | | |
| EP-163/2003/G | 27 Oct. 06 | - | 1. Construction and operation of a dual three-lane carriageway (Deep Bay Link) with bridge structures linking the Shenzhen Western Corridor at Ngau Hom Shek with the Yuen Long Highway at Lam Tei;<br>2. Construction and operation of an interchange between Deep Bay Link and Yuen Long Highway at Lam Tei. | Valid |

### Implementation Status of Environmental Mitigation Measures

5.2 The mitigation measures were implemented properly in the reporting period.

*Environmental Mitigation Implementation Schedule (EMIS)*

5.3 According to the Environmental Permit, the mitigation measures detailed in the permits are required to be implemented. The updated implementation status of environmental mitigation measures (EMIS) is given in Appendix E.

### Summary of Exceedances of Environmental Quality Performance Limit

5.4 No action / limit level exceedance was recorded in the reporting period.

### Implementation Status of Environmental Complaint Handling Procedures

5.5 Appendix F presents the environmental complaint flow diagram of the Project.

5.6 No complaint, summon or prosecution related to environmental issues was received or made against the Project in the reporting period.

## 6. COMPARISON OF EM&A DATA WITH EIA PREDICTION

### Operational Noise Monitoring

6.1 The projected noise levels for year 2021 at all stations are lower than the respective predicted 2021 noise levels in the EIA except stations OP1, OP3, OP4, OP7A and E1A.

6.2 For the operational noise monitoring at OP3, OP4 and E1A, while the projected noise levels exceeded the EIA prediction, they were within the traffic noise standard of 70dB(A). However, for OP1 and OP7A, the projected noise levels were marginally exceeded the traffic noise standard of 70dB(A). This could be attributed to the low traffic flow in DBL during the course of measurement. Background noise may cause a rather significant contribution to the measured noise levels, and hence affect the projected values.

### Water Quality

6.3 The results of all water quality monitoring parameters complied with the reference criteria except nitrite and nitrate concentration in the 1st and 4th composite samples on 27 October 2007, the 1st and 2nd composite samples on 8 December 2007, the 1st composite samples on 15 December 2007 and the 1st composite sample on 12 January 2008.

6.4 Throughout the reporting period, a generally high nitrite and nitrate concentration was recorded and it was mainly attributable to relatively high nitrate content since the nitrite concentration was generally below 0.01 mg/L in all monitoring results. In fact, the nitrate concentration in the reference sample taken from the water tanker was around 0.63 – 1.65 mg/L and most were already above the reference criterion. The water used for surface runoff monitoring was tap water from the Water Supplies Department (WSD). According to the "Drinking Water Quality for the Period April 2006 – March 2007" issued by WSD, the range of nitrate concentration in the water supply is <2.5 to 9.9 mg/L with an average of 3.6 mg/L. Nevertheless, the nitrate concentration of this level, i.e. 0.63 – 1.65 mg/L, is still within WSD requirements for potable use.

6.5 There was no adverse observation / condition, which would contribute to high level of pollutants, identified on the bridge deck during the monitoring. On the other hand, the accumulated water inside the gully may increase the pollutant levels in the first or even the second sample. Currently, water sample was collected at the mid-level of the gully once runoff is observed discharged from the gully to the downpipe. The existing pollutant inside the gully may also be a factor of elevating pollutant level. Nevertheless, in the reporting period, the total nitrogen level, i.e. sum of nitrite, nitrate and TKN level, in the discharge (max 8.58 mg/L) complied with the discharge standard of 50/100 mg/L in Deep Bay Water and the associated environmental impact was considered minimal.

### Ecology

6.6 Both avifauna target species (Little Egret and Chinese Pond Heron), mentioned in the Habitat Creation and Management Plan (HCMP) and the EM&A Manual, together with other wetland-dependent species were recorded during the operational phase monitoring surveys. This indicates that Pond 15 Complex was utilized by the targeted wetland species. In addition, the recorded bird species richness and abundance had been increasing in the surveys in 2009 when compared with the same seasons in previous years. The ecological function of Pond 15 Complex has been establishing.

### Review of Environmental Monitoring Methodology and EM&A Programme

6.7 The environmental monitoring methodologies and procedures were regularly reviewed by the ET. No modification to the monitoring methodology was made during the operation period.

6.8 The EM&A programme, the effectiveness and efficiency of the mitigation measures were successful during the operation period.

**Environmental Acceptability of the Project**

6.9 Although the projected operational noise levels for year 2021 at OP1 and OP7A marginally exceeded the traffic noise standard of 70dB(A), which could be attributed to the low traffic flow at Deep Bay Link during the course of the measurement, no other monitoring exceedance, and complaint, summon or prosecution related to environmental issues was recorded, received or made against the Project in the reporting period. This indicates that the EIA recommended mitigation measures were effectively implemented and demonstrates the operation of Deep Bay Link in general was environmentally acceptable.

## 7. CONCLUSIONS AND RECOMMENDATIONS

**Conclusion**

7.1 Operation phase environmental monitoring was performed by the Environmental Team, in accordance with the EM&A Manual, between 1 October 2007 and 31 October 2009. All monitoring results in the reporting period were checked and reviewed.

7.2 All the operational noise monitoring was completed in October 2009. The projected noise levels for year 2021 at all stations are lower than the respective predicted 2021 noise levels in the EIA, except stations OP1, OP3, OP4, OP7A and E1A. While the projected noise levels at OP3, OP4 and E1A exceeded the EIA prediction, they were within the traffic noise standard of 70dB(A). However, for OP1 and OP7A, the projected noise levels were marginally exceeded the traffic noise standard of 70dB(A). This could be attributed to the low traffic flow in DBL during the course of measurement. Background noise may cause significant contribution to the measured noise levels, and hence affect the projected values.

7.3 All road surface runoff monitoring were completed in January 2008, no action level was triggered.

7.4 Water level, water quality, avifauna, pelagic fauna, benthos, amphibian and flora monitoring at Pond 15 Complex were carried out in the reporting period. The monitoring results show that Pond 15 Complex was utilized by the target wetland species and the ecological function of the Pond has been establishing.

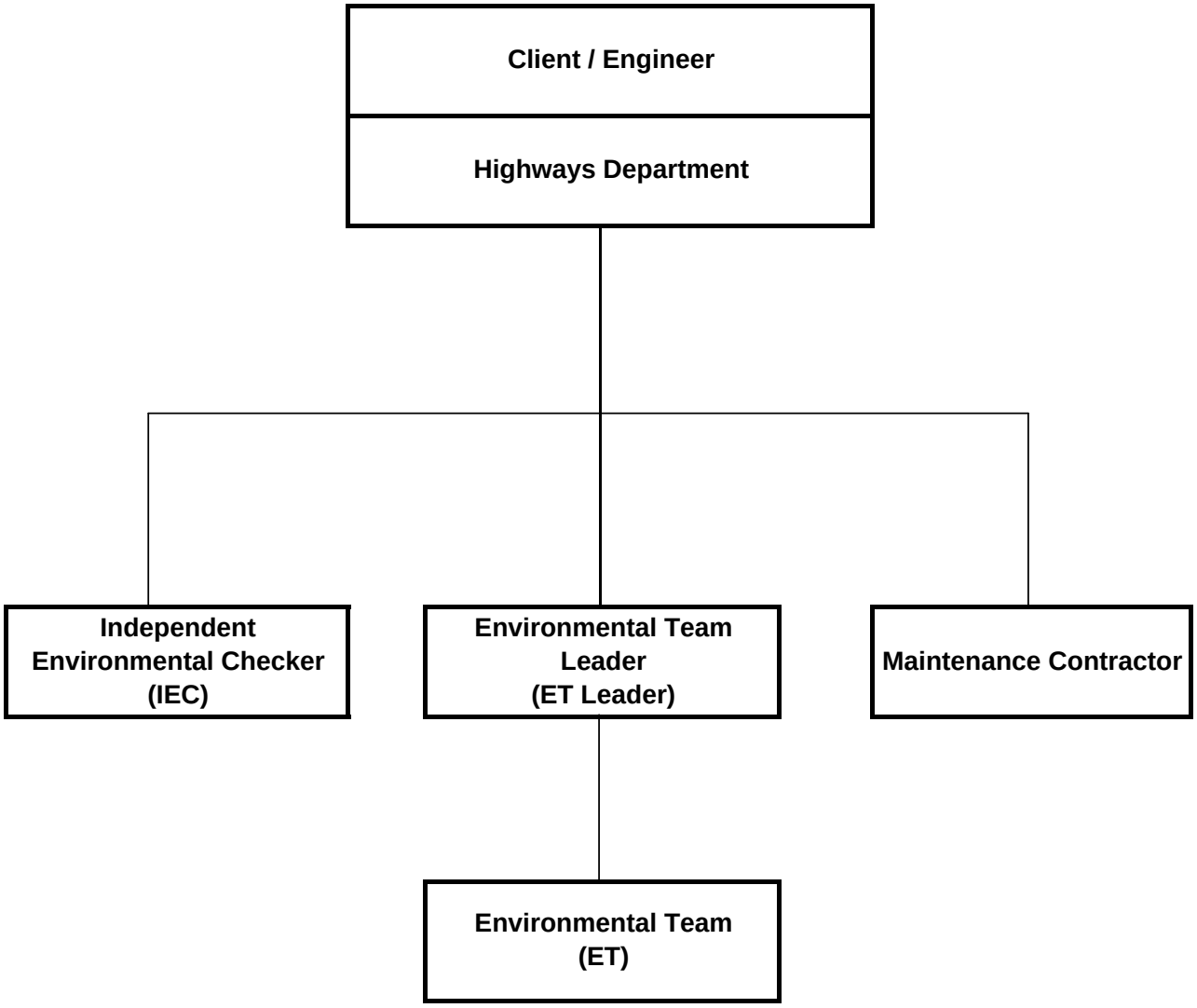
7.5 Maintenance of Pond 15 complex was carried out in the 1-year early establishment period starting from 1 November 2007. The maintenance programme was completed on 31 October 2008 and the ponds were handed over to AFCD in November 2008.

7.6 No complaint, notification of summons or prosecution related to environmental issues was made against the Project in the reporting period.

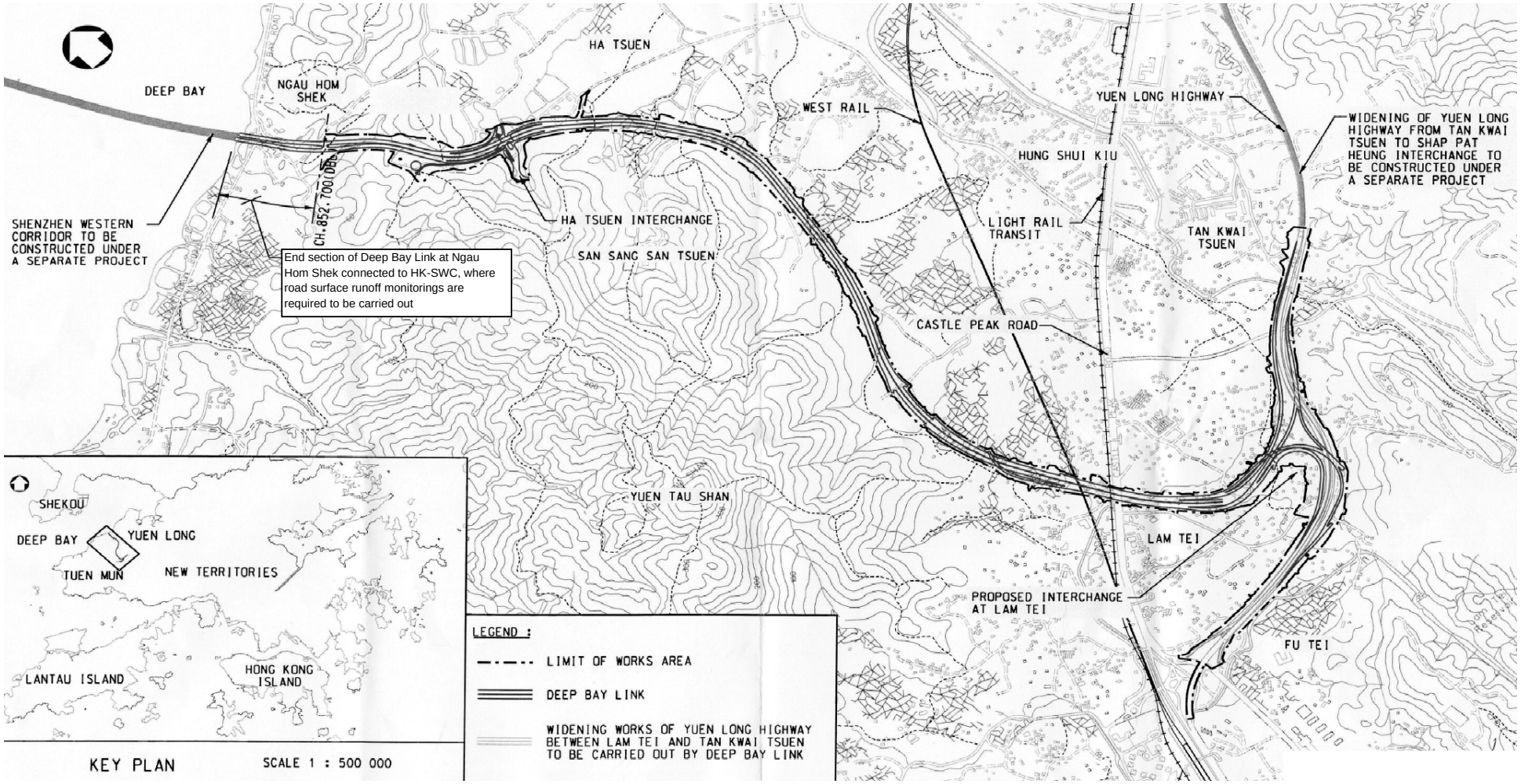
7.7 No significant impact to the adjacent environment was noted during the operation of the Project, which concurs with the findings in the EIA Report.

7.8 Assessment and analysis of the monitoring results of the Project had demonstrated the environmental acceptability of the Project. This concluded that the EIA recommended mitigation measures were effectively implemented. There was no particular recommendation advised for improvement in the EM&A programme in the reporting period.

## FIGURES




| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | 2007 |
| | Environmental Team for Deep Bay Link (Operational Phase) | CHECK | CWHY | DRAWN | FLWY |
| | **Project Organization** | JOB NO. | 60027337 | **FIGURE** 1.1 | **Rev** - |



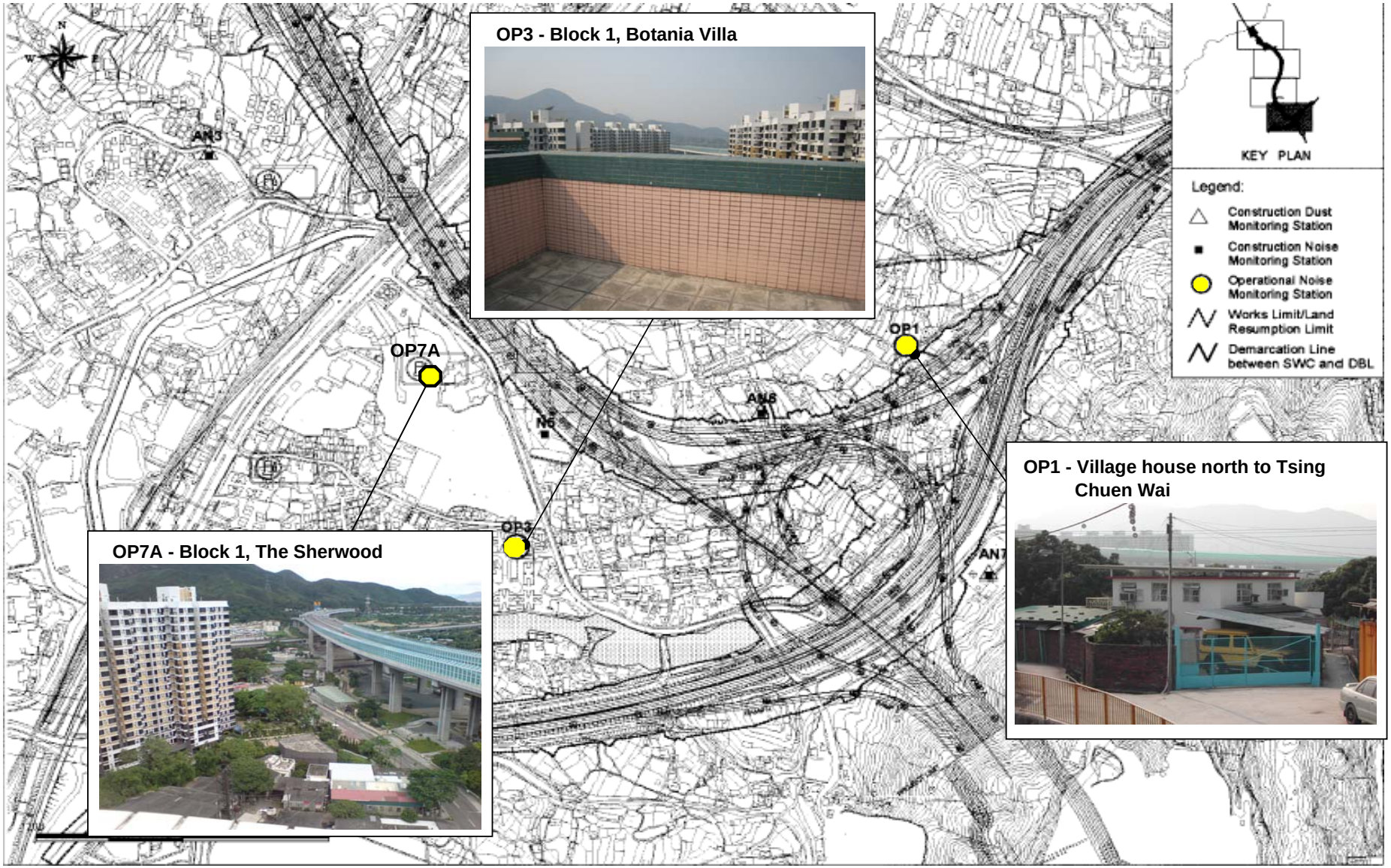

AECOM

Contract No. HY/2007/13

Environmental Team for Deep Bay Link

**Site Layout**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | CWHY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE 1.2 | Rev - |



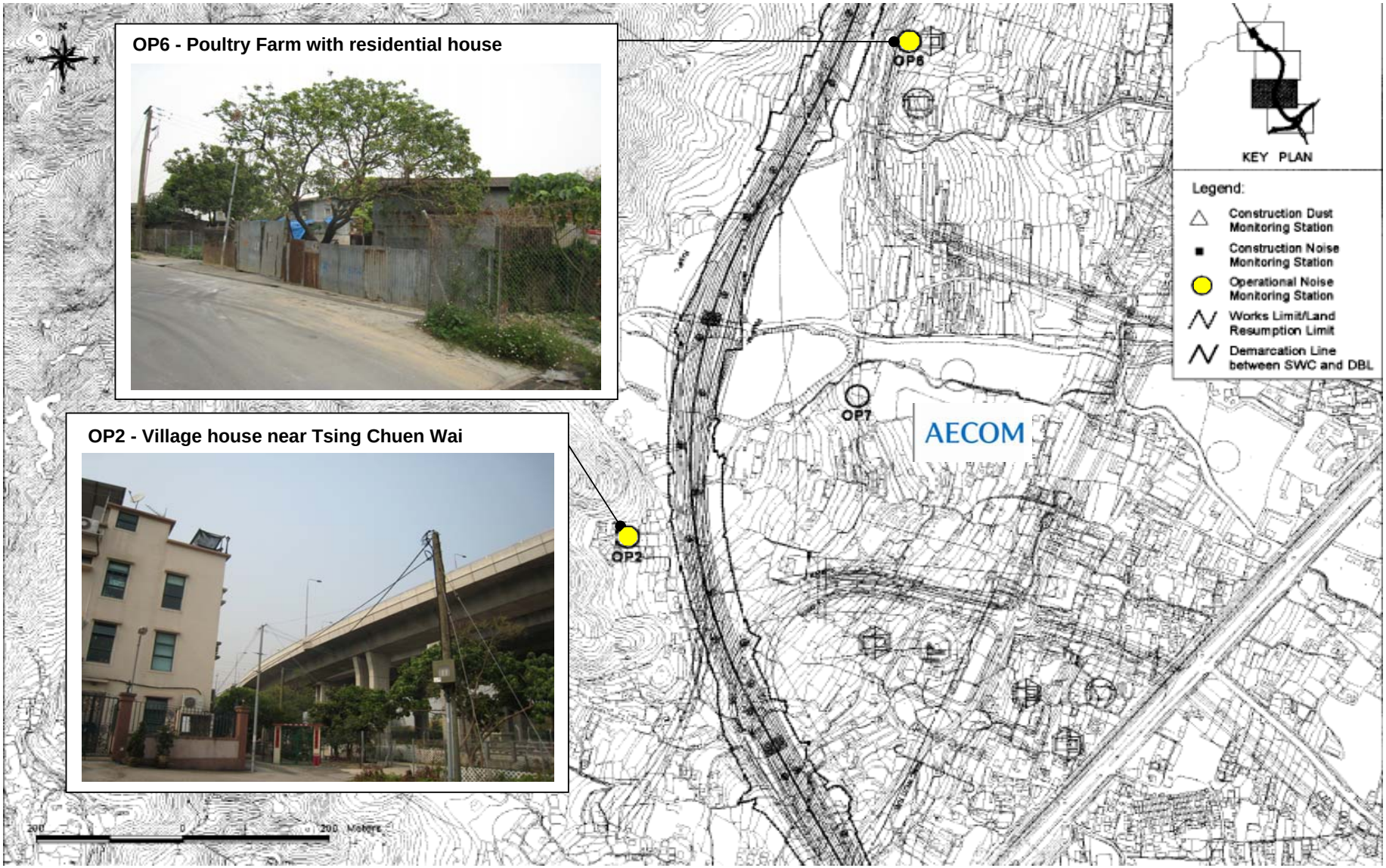

AECOM

Contract No. HY/2007/13

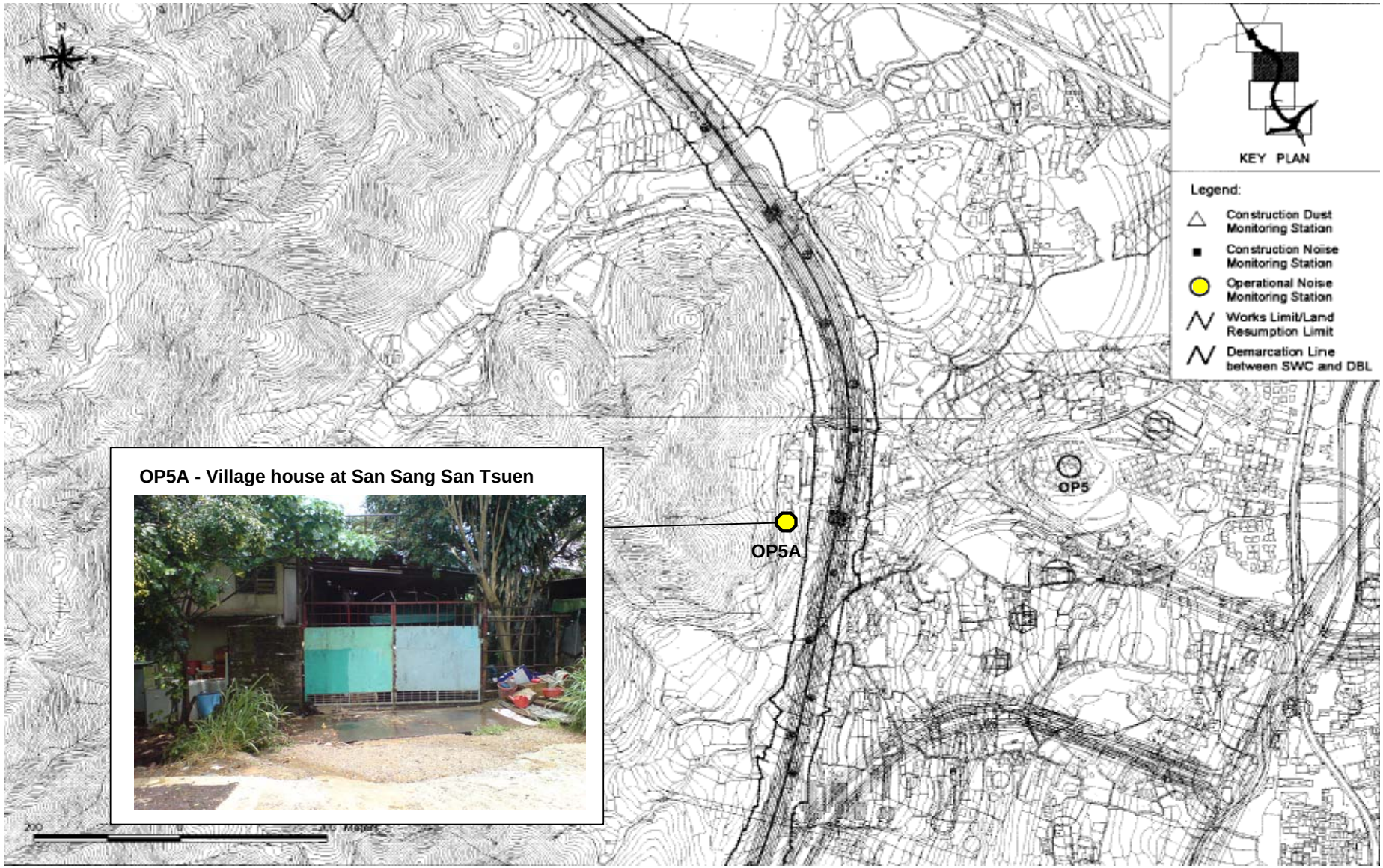
Environmental Team for Deep Bay Link (Operational Phase)

**Operational Phase Noise Monitoring Location (Sheet 1 of 6)**

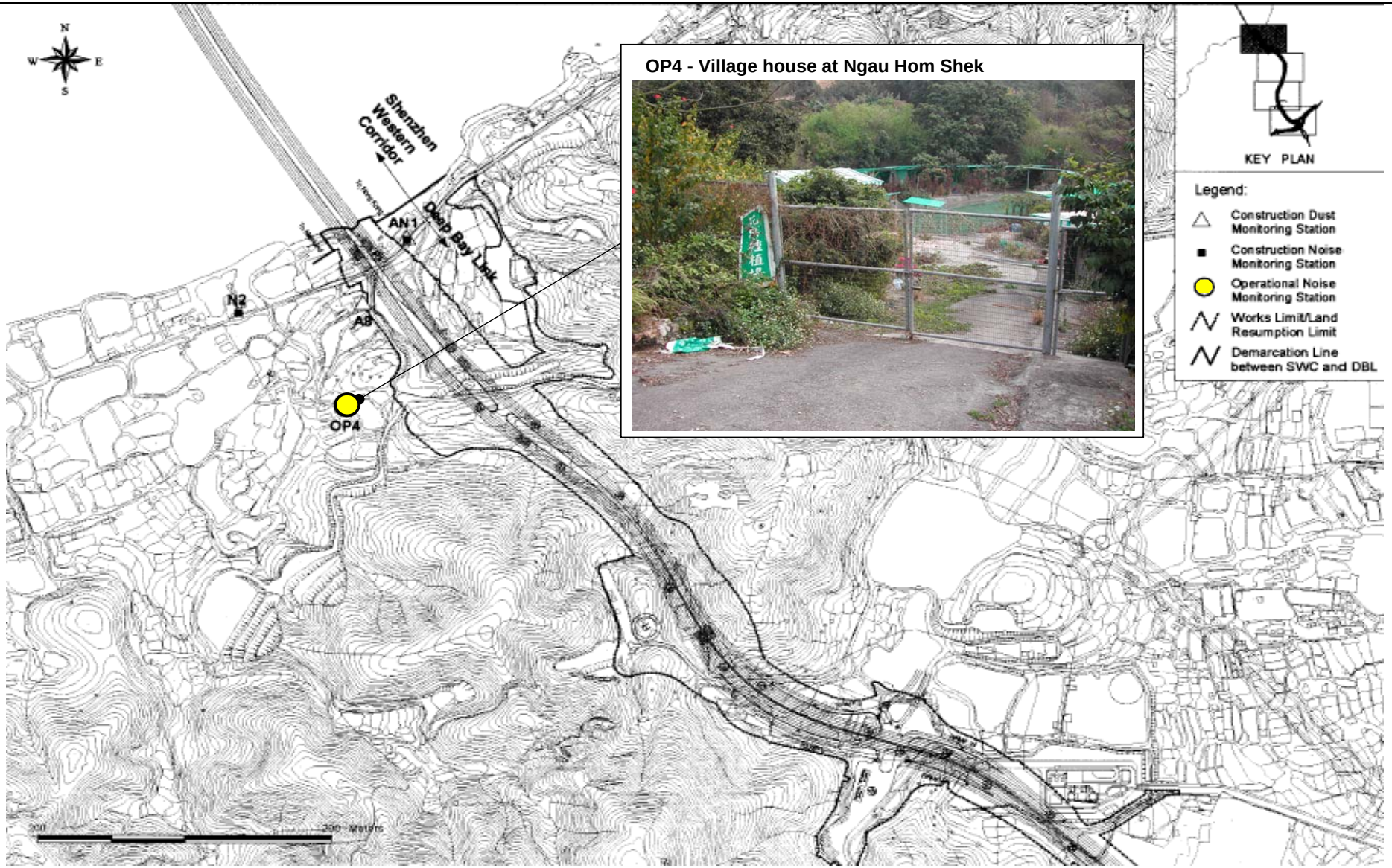
| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | Oct-08 |
| CHECK | FLWY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE NO. 2.1 | Rev 0 |




| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13<br>Environmental Team for Deep Bay Link (Operational Phase)<br>**Operational Phase Noise Monitoring Location (Sheet 2 of 6)** | SCALE | N.T.S. | DATE | Oct-08 |
| | | CHECK | FLWY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | FIGURE NO. 2.1 | Rev 0 |




| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13<br>Environmental Team for Deep Bay Link (Operational Phase)<br>**Operational Phase Noise Monitoring Location (Sheet 3 of 6)** | SCALE | N.T.S. | DATE | Oct-08 |
| | | CHECK | FLWY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | FIGURE NO. 2.1 | Rev 0 |



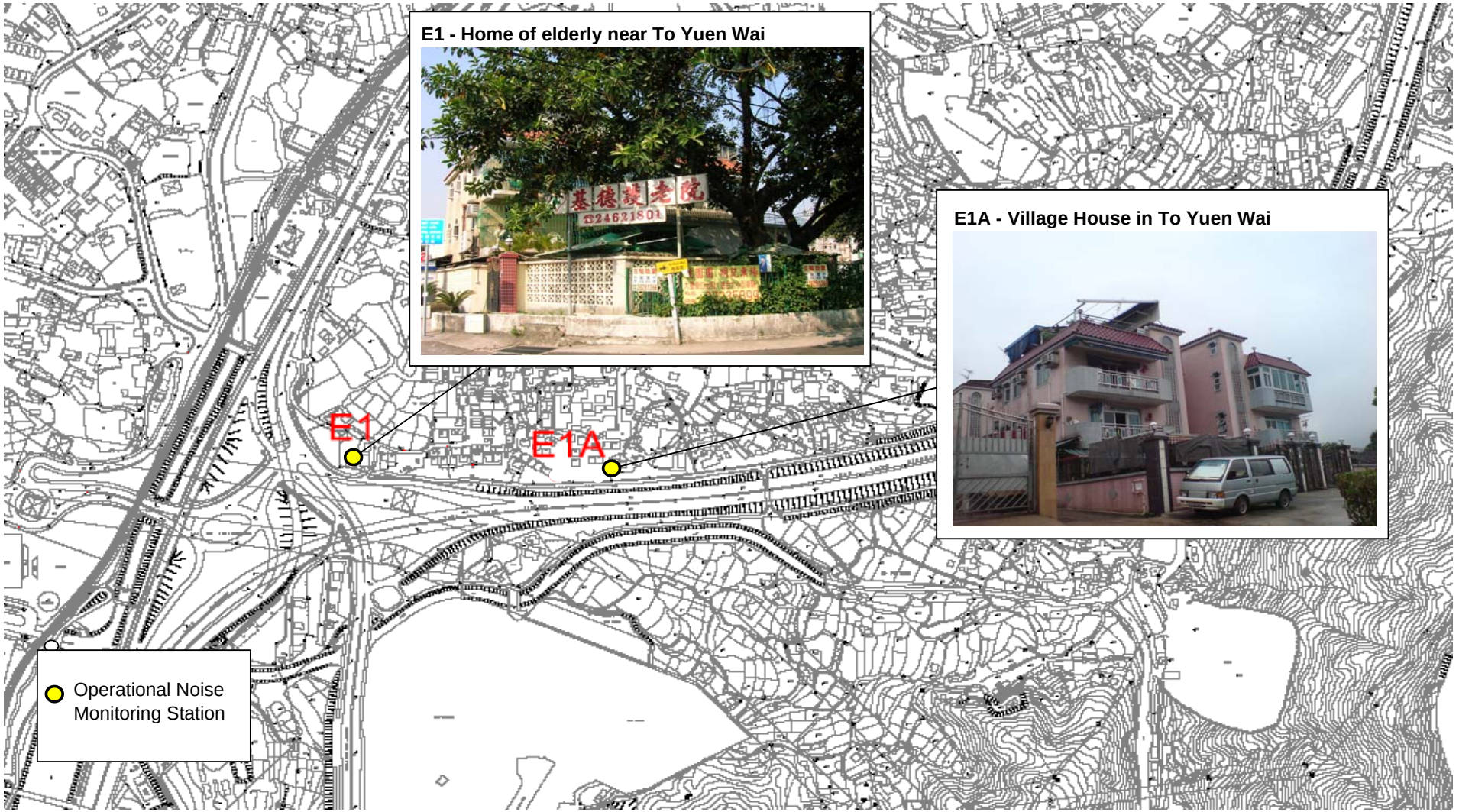

AECOM

Contract No. HY/2007/13

Environmental Team for Deep Bay Link (Operational Phase)

**Operational Phase Noise Monitoring Location (Sheet 4 of 6)**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | Oct-08 |
| CHECK | FLWY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE NO. | 2.1 |
| | | Rev | 0 |




AECOM

Contract No. HY/2007/13

Environmental Team for Deep Bay Link (Operational Phase)

**Operational Phase Noise Monitoring Location (Sheet 5 of 6)**

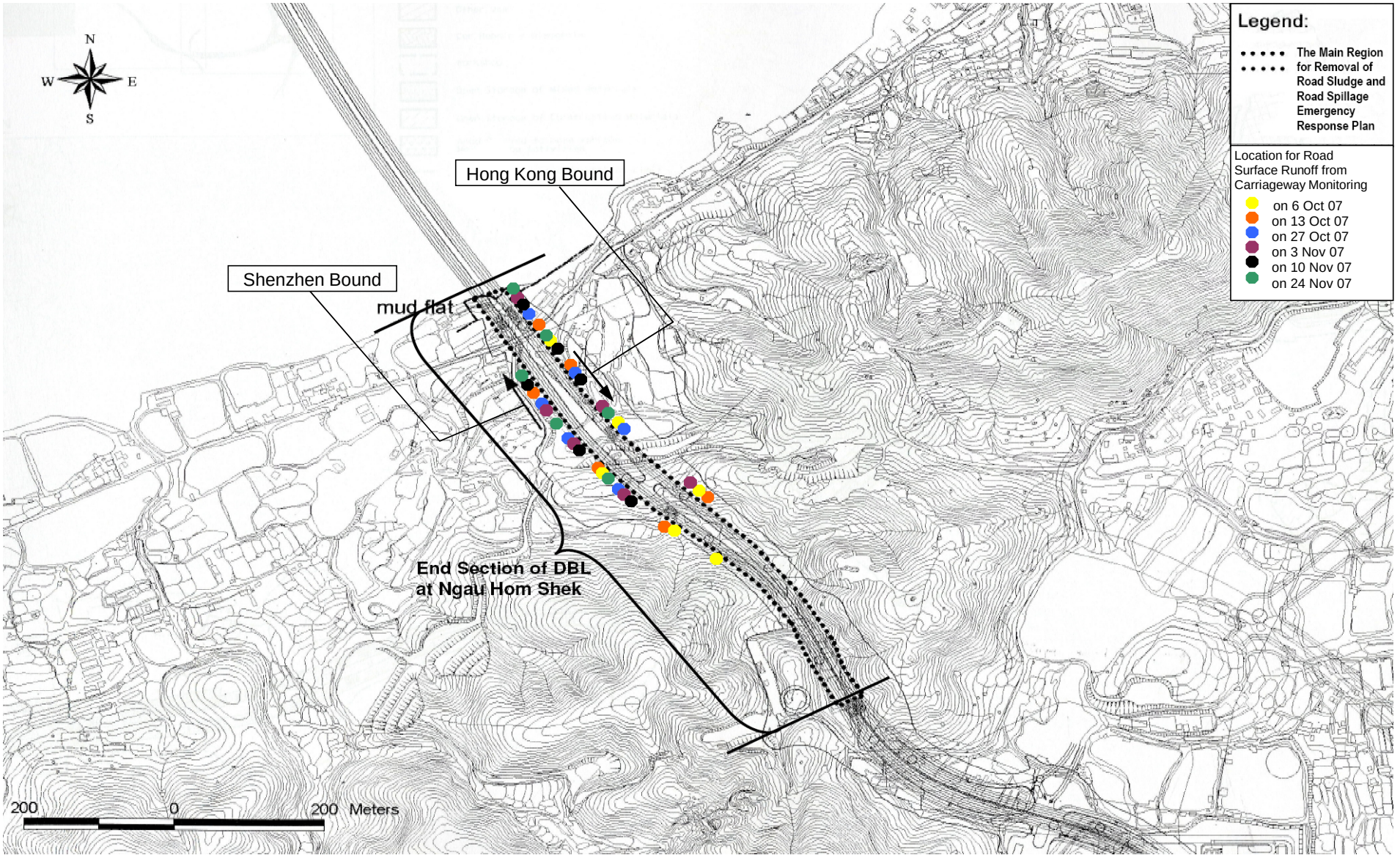
| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | Oct-08 |
| CHECK | FLWY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE NO. 2.1 | Rev 0 |

**E2A - Village house at Tan Kwai Tsuen**

NSR93
(E2A)

Operational Noise Monitoring Station

| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | Oct-08 |
| | Environmental Team for Deep Bay Link (Operational Phase) | CHECK | FLWY | DRAWN | FLWY |
| | **Operational Phase Noise Monitoring Location (Sheet 6 of 6)** | JOB NO. | 60027337 | FIGURE NO. 2.1 | Rev 0 |



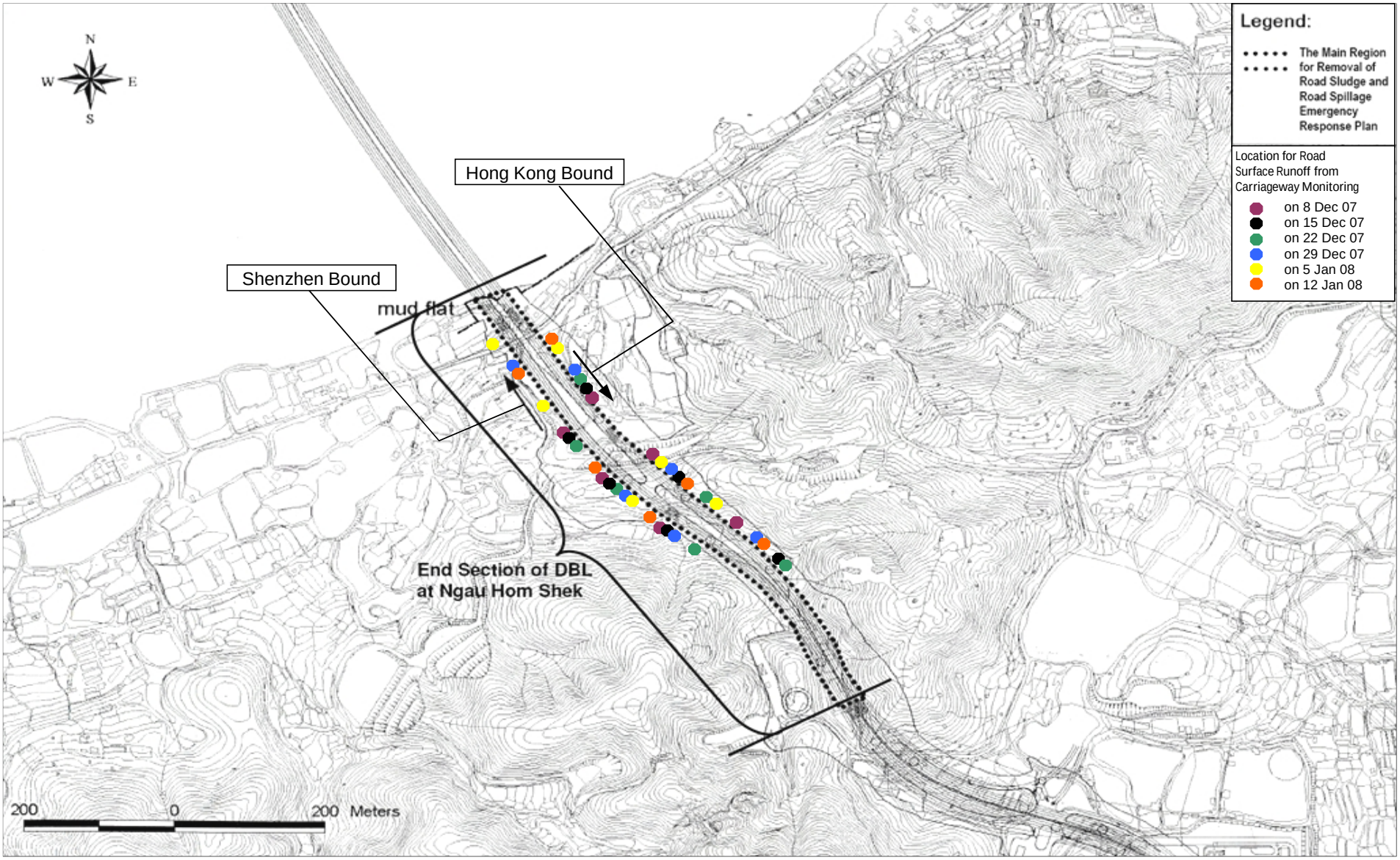

AECOM

Contract No. HY/2007/13

Environmental Team for Deep Bay Link

**Road Surface Runoff from Carriageway Monitoring Locations**

| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2007 |
| CHECK | EWNY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE | 3.1a |
| | | Rev | - |



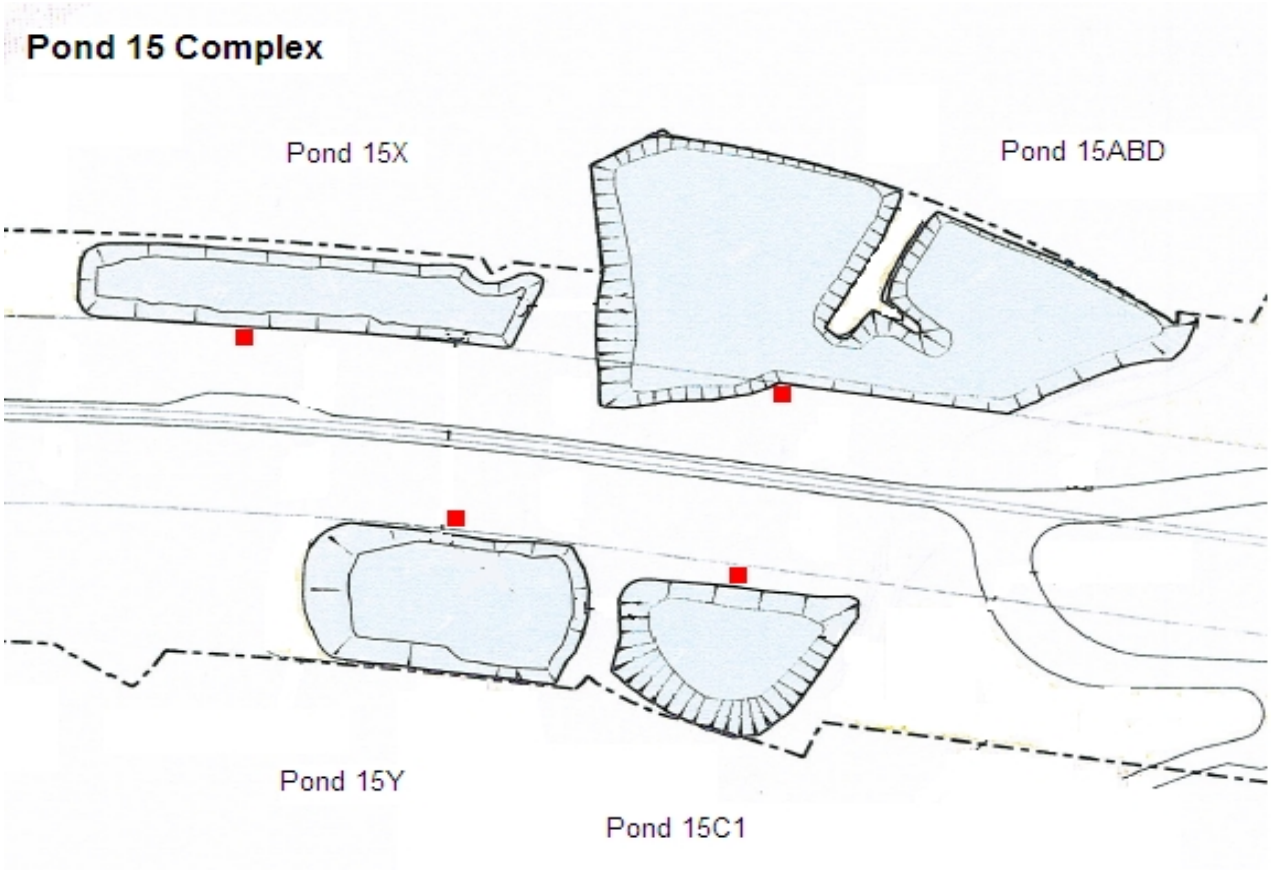

AECOM

Contract No. HY/2007/13

Environmental Team for Deep Bay Link

**Road Surface Runoff from Carriageway Monitoring Locations**

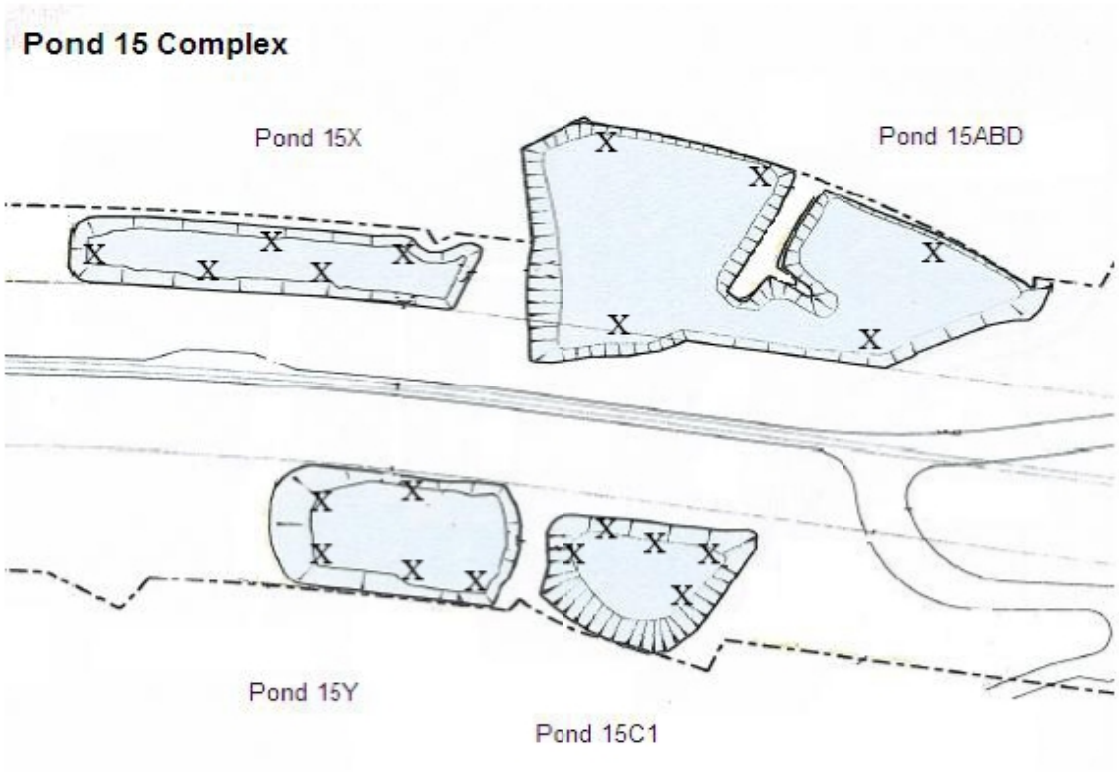
| | | | |
|---|---|---|---|
| SCALE | N.T.S. | DATE | 2008 |
| CHECK | CWHY | DRAWN | FLWY |
| JOB NO. | 60027337 | FIGURE | 3.1b |
| | | Rev | - |




**Legend**

| |
|---|
| ■ Locations of fixed sampling points for birds monitoring |

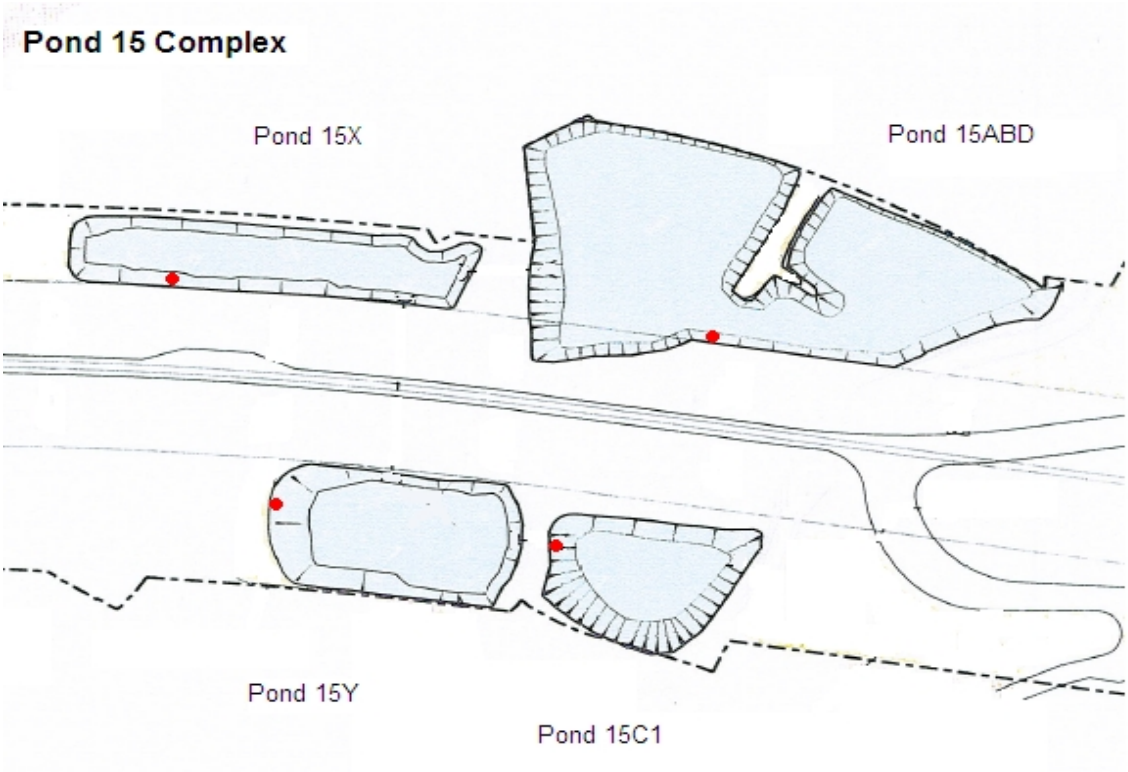
| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | Jun-08 |
| | Environmental Team for Deep Bay Link | CHECK | EYWY | DRAWN | KCYJ |
| | **Locations of Fixed Sampling Points for Bird Monitoring** | JOB NO. | 60027337 | DRAWING No. Fig 4.1 | Rev - |




**Legend**

| |
|---|
| ✕ Location of benthos sampling points |

| | | | | | | |
|---|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | Jun-08 | |
| | Environmental Team for Deep Bay Link | CHECK | EYWY | DRAWN | KCYJ | |
| | **Locations of Sampling Points for Benthos Monitoring** | JOB NO. | 60027337 | **DRAWING No.** Fig 4.2 | | **Rev** - |




**Legend**

- Location of fixed flora transect

| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | Jun-08 |
| | Environmental Team for Deep Bay Link | CHECK | EYWY | DRAWN | KCYJ |
| | **Locations of Fixed Flora Transect** | JOB NO. | 60027337 | DRAWING No. Fig 4.3 | Rev - |

# APPENDIX A
# CONTACTS OF KEY ENVIRONMENTAL PERSONNEL

## Contacts of Key Environmental Staff

| | Name | Telephone | Fax |
|---|---|---|---|
| **EPD** | | | |
| Environmental Protection Officer | Ms. M. Y. Choi | 2411 9622 | 2611 9149 |
| **Highways Department (Major Works)** | | | |
| Senior Engineer | Mr. Robert Chan | 2762 3610 | 2761 4864 |
| Engineer | Mr. Stephen Chan | 2762 3674 | 2761 4864 |
| **Highways Department (New Territories Region)** | | | |
| Engineer | Mr. Kevin C K Yu | 2762 3526 | 2714 5228 |
| Engineer | Mr. Gary T W Mok | 2482 0230 | 2714 5228 |
| **IEC** | | | |
| **CH2M HILL Hong Kong Limited** | | | |
| Independent Environmental Checker | Mr. K S Lee | 2507 2203 | 2507 2293 |
| Assistant to IEC | Ms. Vivian Chan | 2507 2203 | 2507 2293 |
| **ET** | | | |
| **Maunsell Consultants Asia Ltd.** | | | |
| Environmental Team Leader | Mr. Y T Tang | 2893 1551 | 2891 0305 |
| Senior Environmental Consultant | Ms. Edith Ng | 2893 1551 | 2891 0305 |
| **Maintenance Contractor** | | | |
| **Chiu Hing Construction & Transportation Co. Ltd.** | | | |
| Site Agent | Mr. K L Liu | 2771 9197 | 2782 1075 |

# APPENDIX B
# ACTION / LIMIT LEVEL AND EVENT ACTION PLANS

**Appendix B – Action and Limit Levels and Event Action Plans**

**Proposed Criteria to be Used for Determination of Cleaning Frequency, Action Level and Action**

| Parameter | Reference Criteria for Determination of Cleaning Frequency | Action Level | Action |
|---|---|---|---|
| Total suspended solids (mg/L) | 81 | 3 consecutive monitoring with the same parameter (1 or more than 1 parameter) exceeded the criteria | Increase 1 cleaning event per week |
| Total organic carbon (mg/L) | 25 | | |
| Chemical oxygen demand (mg/L) | 90 | | |
| Nitrite and nitrate (mg/L) | 0.72 | | |
| Total Kjeldahl Nitrogen (mg/L) | 6.4 | | |
| Total phoshorus (mg/L) | 0.95 | | |
| Copper (mg/L) | 0.174 | | |
| Lead (mg/L) | 0.31 | | |
| Zinc (mg/L) | 0.94 | | |

**Trigger and Action Levels for Ecological Monitoring at Deep Bay Link Pond 15 Complex (as stated in Section 7.3 in the EM&A Manual)**

Monitoring will reveal the level of ardeid use. This proposed wetland is expected to support a small number of Little Egret and Chinese Pond Heron associated with the affected wetland areas. No specific trigger levels for ardeid use are recommended because of the low level of use expected and because immediate action is not appropriate for the long term process of wetland creation and management. If no ardeids are recorded or other unexpected findings made, possible causes should be considered and appropriate changes to the management made.

**APPENDIX C**
**ROAD SURFACE RUNOFF FROM CARRIAGEWAY MONITORING RESULTS**

## APPENDIX C: Road Surface Runoff from Carriageway Monitoring Results

Date and Time of Sampling: 06/10/2007 01:30 - 04:01 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 14 | 7 | 4 | < 2 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.37 | 1.58 | 1.61 | 1.62 | 1.65 |
| Total Kjeldahl Nitrogen (mg/L) | 1.1 | 0.5 | 0.6 | 0.5 | 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 8 | 6 | 4 | 4 | < 1 |
| Chemical Oxygen Demand (mg/L) | 34 | 18 | 14 | 12 | < 2 |
| Copper (mg/L) | 0.010 | 0.004 | 0.006 | 0.002 | < 0.001 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.07 | 0.06 | 0.05 | 0.05 | 0.03 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 1.36 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.57 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.60 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.61 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.64 mg/L |

Date and Time of Sampling: 13/10/2007 01:07 - 03:51 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 8 | 6 | 4 | 4 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.85 | 1.78 | 1.64 | 1.62 | 1.48 |
| Total Kjeldahl Nitrogen (mg/L) | 1.2 | 1.1 | 0.8 | 0.8 | 0.2 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 13 | 12 | 7 | 6 | < 1 |
| Chemical Oxygen Demand (mg/L) | 43 | 36 | 21 | 21 | < 2 |
| Copper (mg/L) | 0.007 | 0.005 | 0.003 | 0.003 | 0.001 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.10 | 0.07 | 0.05 | 0.05 | 0.03 |
| Remarks | Nitrite: 0.01 mg/L<br>Nitrate: 1.84 mg/L | Nitrite: 0.01 mg/L<br>Nitrate: 1.77 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.63 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.61 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.47 mg/L |

Date and Time of Sampling: 27/10/2007 01:00 - 03:55 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 12 | 16 | 11 | 13 | < 2 |
| Nitrite & Nitrate (mg/L) | 2.48 | 2.16 | 2.02 | 2.48 | 1.61 |
| Total Kjeldahl Nitrogen (mg/L) | 1.2 | 1.2 | 0.7 | 1.3 | 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 13 | 12 | 7 | 6 | < 1 |
| Chemical Oxygen Demand (mg/L) | 43 | 36 | 21 | 21 | < 2 |
| Copper (mg/L) | 0.050 | 0.062 | 0.053 | 0.044 | 0.075 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.17 | 0.12 | 0.13 | 0.10 | 0.05 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 2.47 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 2.15 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 2.01 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 2.47 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.60 mg/L |

Remark: For calculation of the parameter, nitrate and nitrite, the measured value, if below detection limit would be considered as detection limit level.

## APPENDIX C: Road Surface Runoff from Carriageway Monitoring Results

Date and Time of Sampling: 03/11/2007 01:00 - 03:17 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 9 | 6 | < 2 | < 2 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.30 | 1.48 | 1.51 | 1.52 | 1.47 |
| Total Kjeldahl Nitrogen (mg/L) | 0.8 | 0.4 | 0.2 | < 0.1 | < 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 5 | 2 | 1 | 2 | < 1 |
| Chemical Oxygen Demand (mg/L) | 17 | 8 | 5 | 4 | < 2 |
| Copper (mg/L) | 0.004 | 0.002 | 0.002 | 0.001 | < 0.001 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.05 | 0.05 | 0.04 | 0.03 | 0.04 |
| Remarks | Nitrite: 0.01 mg/L<br>Nitrate: 1.29 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.47 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.50 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.51 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.46 mg/L |

Date and Time of Sampling: 10/11/2007 01:00 - 04:06 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 18 | 7 | 4 | 2 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.34 | 1.38 | 1.34 | 1.34 | 1.33 |
| Total Kjeldahl Nitrogen (mg/L) | 0.8 | 0.6 | 0.5 | 0.3 | 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 7 | 4 | 3 | 2 | < 1 |
| Chemical Oxygen Demand (mg/L) | 26 | 16 | 14 | 10 | 5 |
| Copper (mg/L) | 0.025 | 0.021 | 0.018 | 0.017 | 0.032 |
| Lead (mg/L) | 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.08 | 0.05 | 0.04 | 0.03 | 0.03 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 1.33 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.37 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.33 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.33 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.32 mg/L |

Date and Time of Sampling: 24/11/2007 01:00 - 02:15 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 26 | 6 | 7 | 5 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.84 | 1.77 | 1.71 | 1.61 | 1.47 |
| Total Kjeldahl Nitrogen (mg/L) | 4.2 | 2.8 | 3.0 | 1.9 | 1.7 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 8 | 8 | 7 | 5 | < 1 |
| Chemical Oxygen Demand (mg/L) | 44 | 27 | 23 | 16 | < 2 |
| Copper (mg/L) | 0.009 | 0.005 | 0.005 | 0.004 | < 0.001 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.11 | 0.08 | 0.07 | 0.05 | 0.03 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 1.83 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.76 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.70 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.60 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.46 mg/L |

Remark: For calculation of the parameter, nitrate and nitrite, the measured value, if below detection limit would be considered as detection limit level.

## APPENDIX C: Road Surface Runoff from Carriageway Monitoring Results

Date and Time of Sampling: 08/12/2007 01:00 - 03:00 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 15 | 10 | 5 | 5 | < 2 |
| Nitrite & Nitrate (mg/L) | 2.48 | 1.78 | 1.49 | 1.36 | 0.97 |
| Total Kjeldahl Nitrogen (mg/L) | 6.1 | 6.2 | 2.8 | 1.4 | 0.2 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 21 | 17 | 14 | 11 | < 1 |
| Chemical Oxygen Demand (mg/L) | 62 | 51 | 35 | 27 | < 2 |
| Copper (mg/L) | 0.022 | 0.015 | 0.010 | 0.008 | 0.002 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.18 | 0.15 | 0.12 | 0.11 | 0.06 |
| Remarks | Nitrite: 0.02 mg/L<br>Nitrate: 2.46 mg/L | Nitrite: 0.02 mg/L<br>Nitrate: 1.76 mg/L | Nitrite: 0.01 mg/L<br>Nitrate: 1.48 mg/L | Nitrite: 0.01 mg/L<br>Nitrate: 1.35 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.96 mg/L |

Date and Time of Sampling: 15/12/2007 01:00 - 02:30 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 26 | 9 | 4 | 3 | 2 |
| Nitrite & Nitrate (mg/L) | 1.62 | 1.26 | 1.13 | 1.00 | 0.72 |
| Total Kjeldahl Nitrogen (mg/L) | 1.9 | 1.1 | 1.0 | 0.7 | < 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 13 | 10 | 8 | 7 | < 1 |
| Chemical Oxygen Demand (mg/L) | 36 | 28 | 24 | 20 | 2 |
| Copper (mg/L) | 0.017 | 0.009 | 0.006 | 0.006 | 0.003 |
| Lead (mg/L) | 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.14 | 0.08 | 0.07 | 0.06 | 0.09 |
| Remarks | Nitrite: 0.01 mg/L<br>Nitrate: 1.61 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.25 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.12 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.99 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.71 mg/L |

Date and Time of Sampling: 22/12/2007 01:00 - 02:30 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 6 | 3 | 2 | 4 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.09 | 0.88 | 0.81 | 0.79 | 0.63 |
| Total Kjeldahl Nitrogen (mg/L) | 0.9 | 0.8 | 0.7 | 0.6 | 0.3 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 8 | 6 | 5 | 4 | < 1 |
| Chemical Oxygen Demand (mg/L) | 21 | 11 | 11 | 14 | 2 |
| Copper (mg/L) | 0.006 | 0.004 | 0.004 | 0.003 | 0.002 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.07 | 0.04 | 0.04 | 0.03 | 0.03 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 1.08 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.87 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.80 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.78 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.62 mg/L |

Remark: For calculation of the parameter, nitrate and nitrite, the measured value, if below detection limit would be considered as detection limit level.

## APPENDIX C: Road Surface Runoff from Carriageway Monitoring Results

Date and Time of Sampling: 29/12/2007 01:00 - 02:30 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 6 | 3 | 2 | < 2 | < 2 |
| Nitrite & Nitrate (mg/L) | 0.80 | 0.75 | 0.75 | 0.73 | 0.67 |
| Total Kjeldahl Nitrogen (mg/L) | 0.7 | 0.7 | 0.4 | 0.5 | 0.2 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 4 | 3 | 3 | 2 | < 1 |
| Chemical Oxygen Demand (mg/L) | 11 | 9 | 9 | 8 | 3 |
| Copper (mg/L) | 0.006 | 0.004 | 0.004 | 0.003 | 0.002 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.06 | 0.05 | 0.04 | 0.03 | 0.02 |
| Remarks | Nitrite: < 0.01 mg/L<br>Nitrate: 0.79 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.74 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.74 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.72 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 0.66 mg/L |

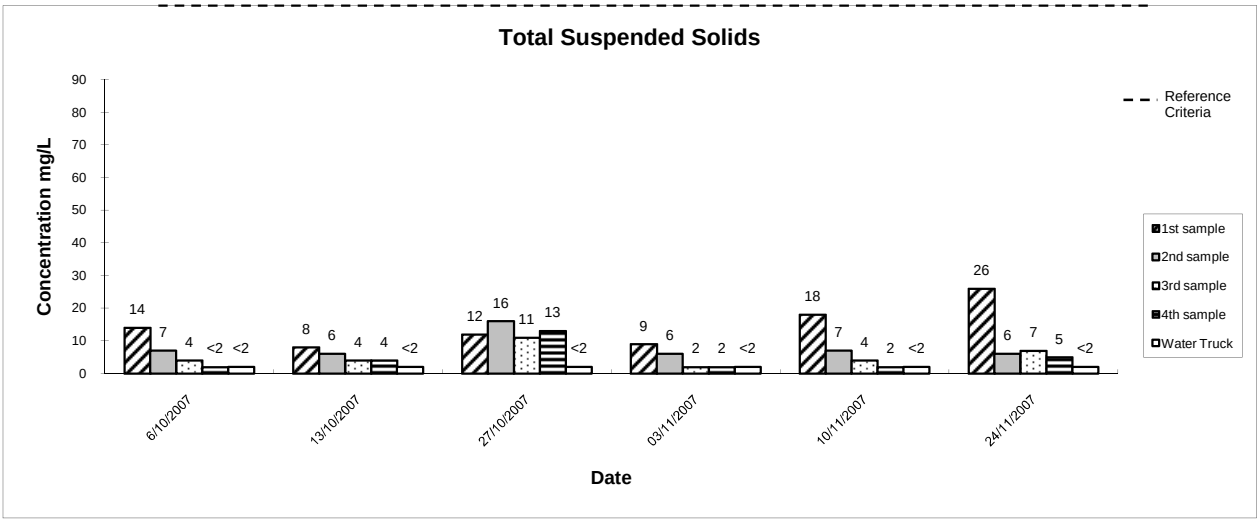
Date and Time of Sampling: 05/01/2008 01:00 - 03:10 Weather Condition: Fine

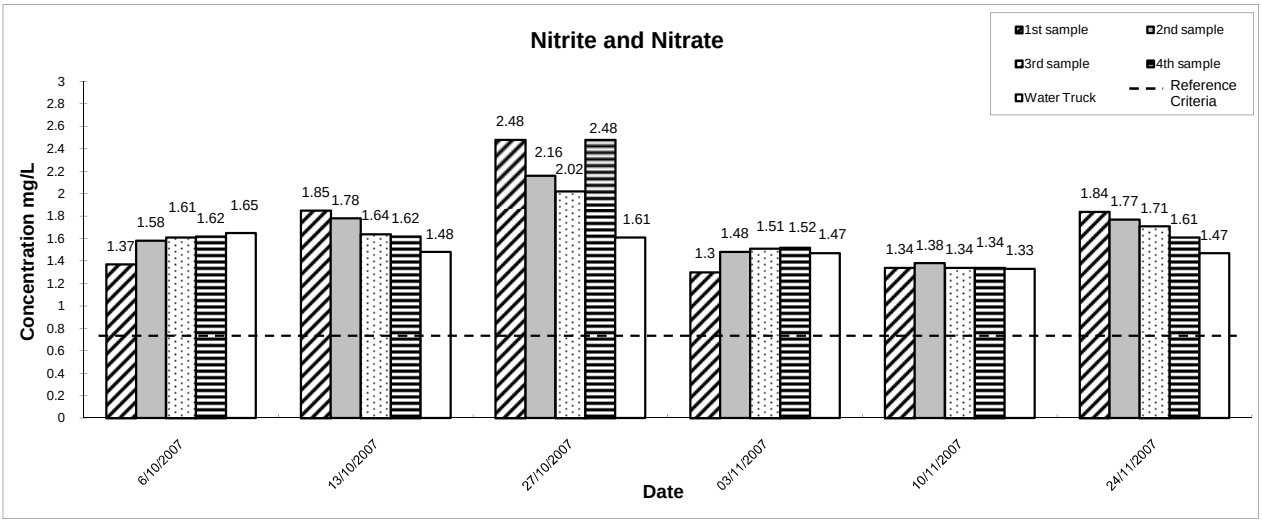
| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 25 | 18 | 9 | 7 | < 2 |
| Nitrite & Nitrate (mg/L) | 1.89 | 1.65 | 1.55 | 1.49 | 1.26 |
| Total Kjeldahl Nitrogen (mg/L) | 1.6 | 1.3 | 0.8 | 0.7 | < 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 10 | 7 | 6 | 5 | < 1 |
| Chemical Oxygen Demand (mg/L) | 21 | 26 | 22 | 13 | < 2 |
| Copper (mg/L) | 0.011 | 0.007 | 0.006 | 0.004 | 0.002 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.11 | 0.08 | 0.07 | 0.06 | 0.02 |
| Remarks | Nitrite: 0.01 mg/L<br>Nitrate: 1.88 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.64 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.54 mg/L | Nitrite: 0.01 mg/L<br>Nitrate: 1.48 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.25 mg/L |

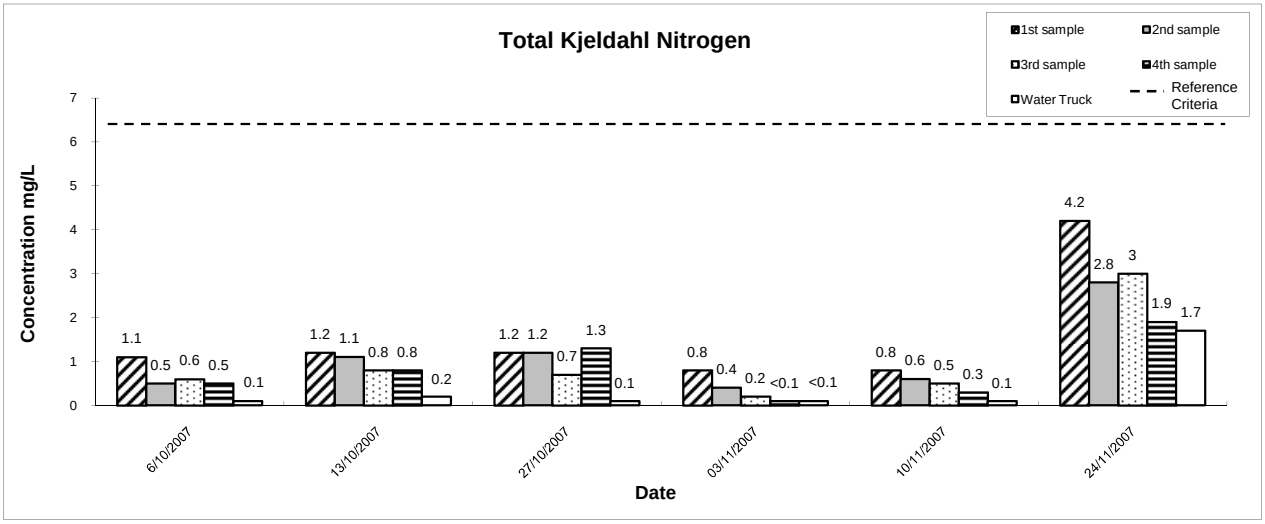
Date and Time of Sampling: 12/01/2008 01:00 - 03:45 Weather Condition: Fine

| Parameter \ Composite | 1st | 2nd | 3rd | 4th | Water Truck (Reference) |
|---|---|---|---|---|---|
| Suspended Solids (mg/L) | 20 | 12 | 9 | 4 | < 2 |
| Nitrite & Nitrate (mg/L) | 2.34 | 1.97 | 1.88 | 1.78 | 1.49 |
| Total Kjeldahl Nitrogen (mg/L) | 1.2 | 1.2 | 0.8 | 0.7 | < 0.1 |
| Total Phosphorus (mg/L) | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Organic Carbon (mg/L) | 8 | 8 | 6 | 5 | < 1 |
| Chemical Oxygen Demand (mg/L) | 58 | 33 | 30 | 9 | 9 |
| Copper (mg/L) | 0.011 | 0.009 | 0.006 | 0.004 | 0.001 |
| Lead (mg/L) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc (mg/L) | 0.10 | 0.08 | 0.06 | 0.05 | 0.02 |
| Remarks | Nitrite: 0.01 mg/L<br>Nitrate: 2.33 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.96 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.87 mg/L | Nitrite: 0.01 mg/L<br>Nitrate: 1.77 mg/L | Nitrite: < 0.01 mg/L<br>Nitrate: 1.48 mg/L |

Remark: For calculation of the parameter, nitrate and nitrite, the measured value, if below detection limit would be considered as detection limit level.

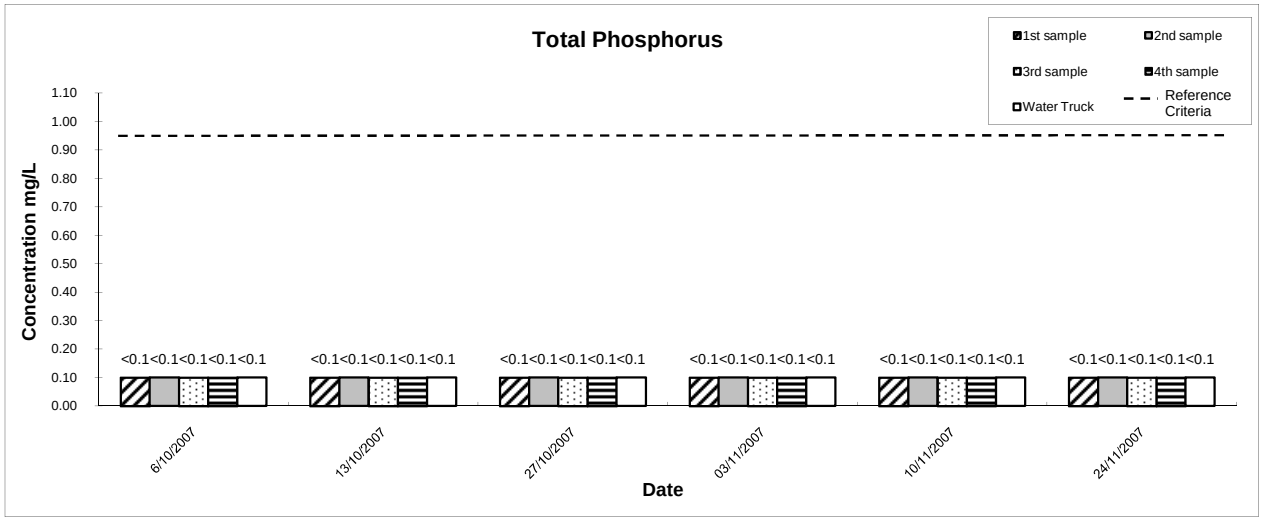


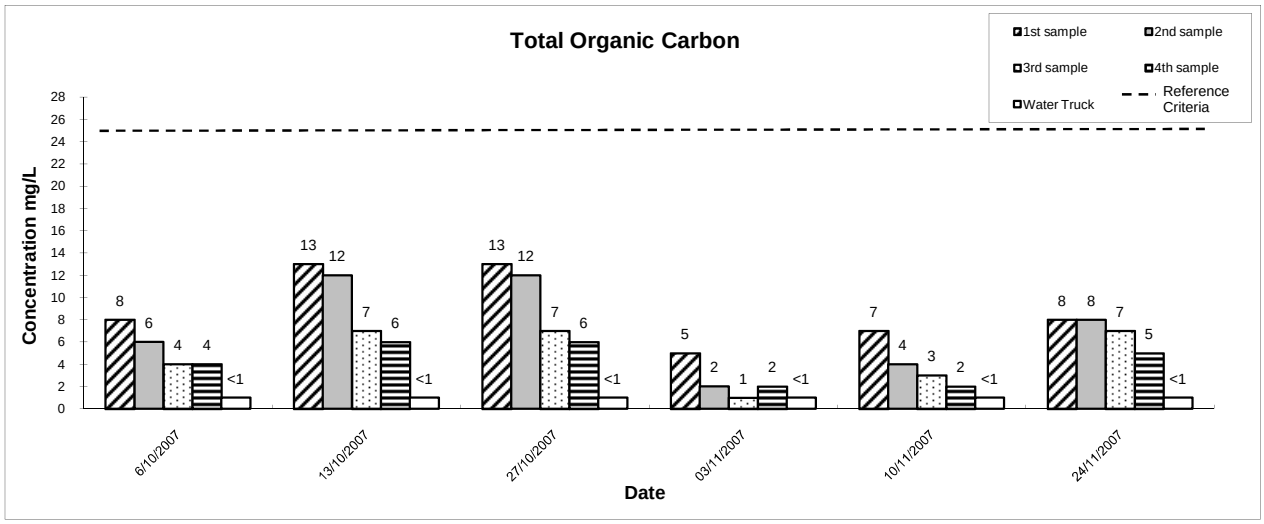



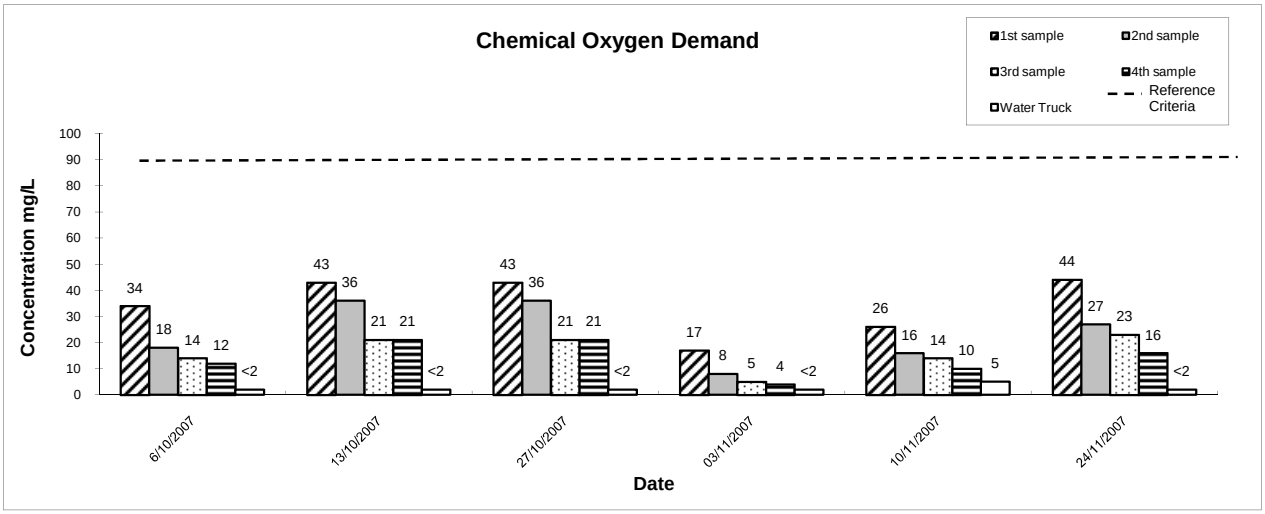




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.
Data presented in the graphs are raw data from the laboratory.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | EWNY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |

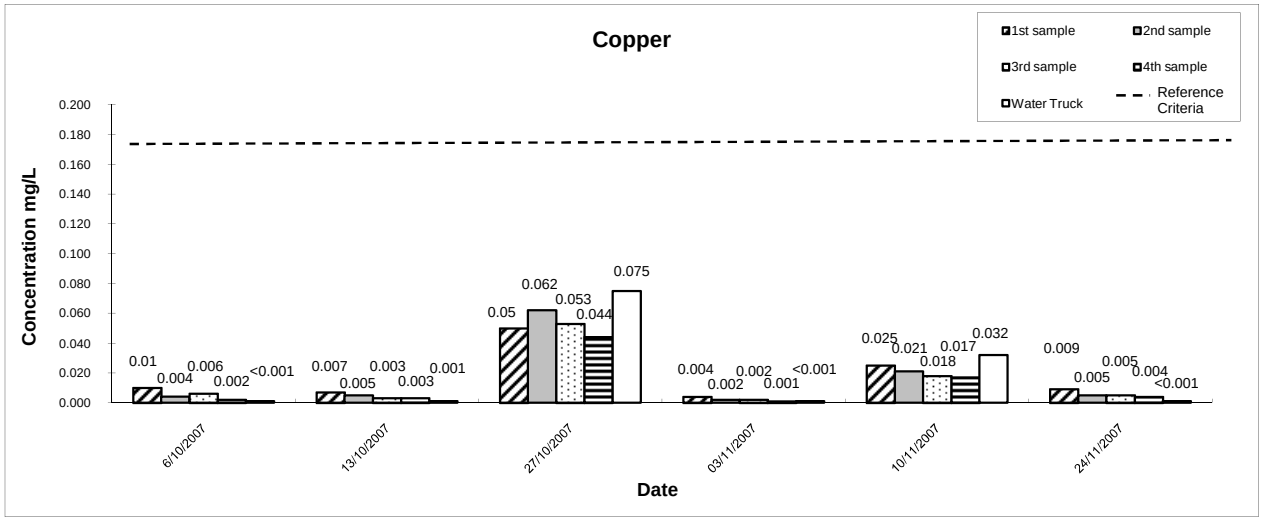


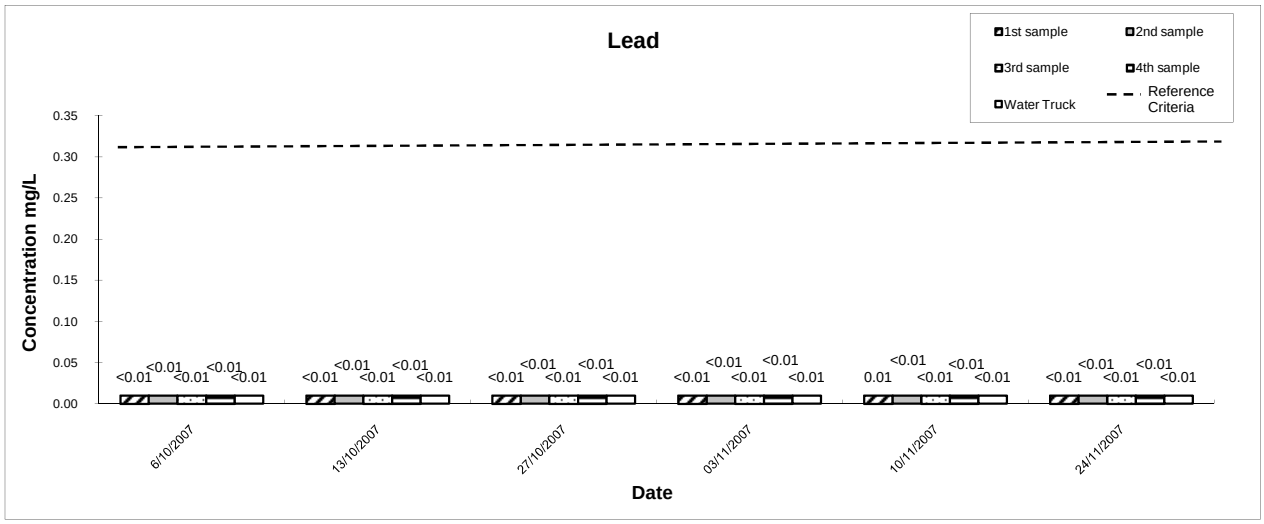



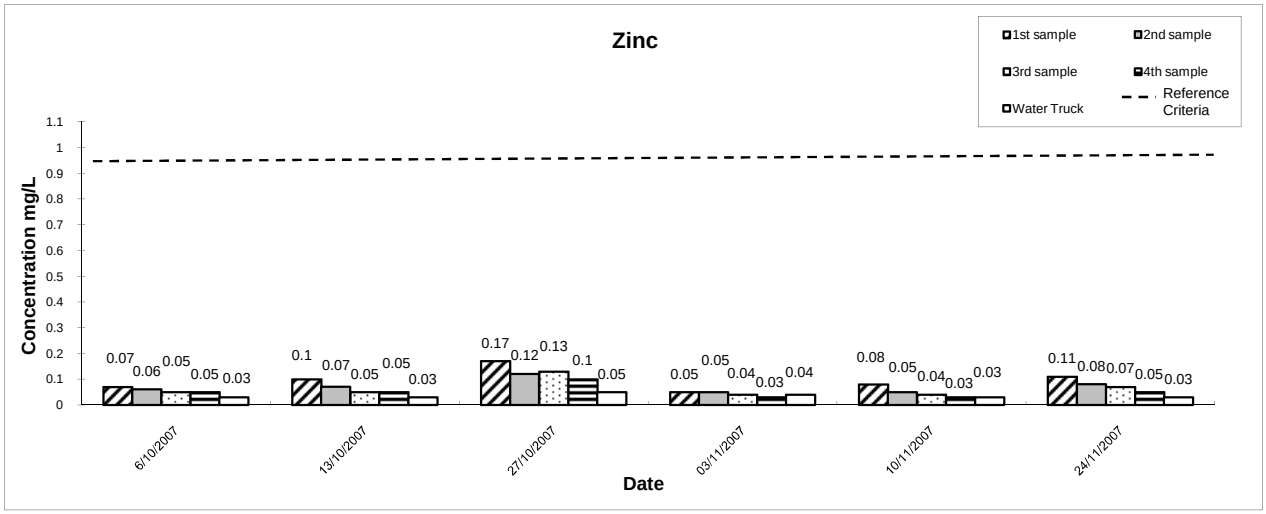




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.
Data presented in the graphs are raw data from the laboratory.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | EWNY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |

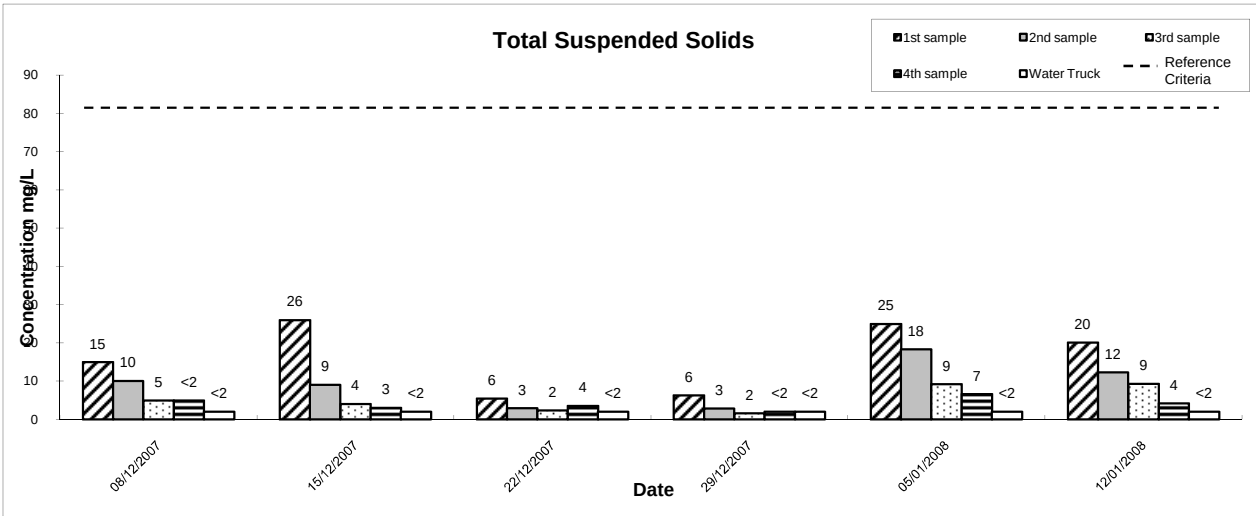


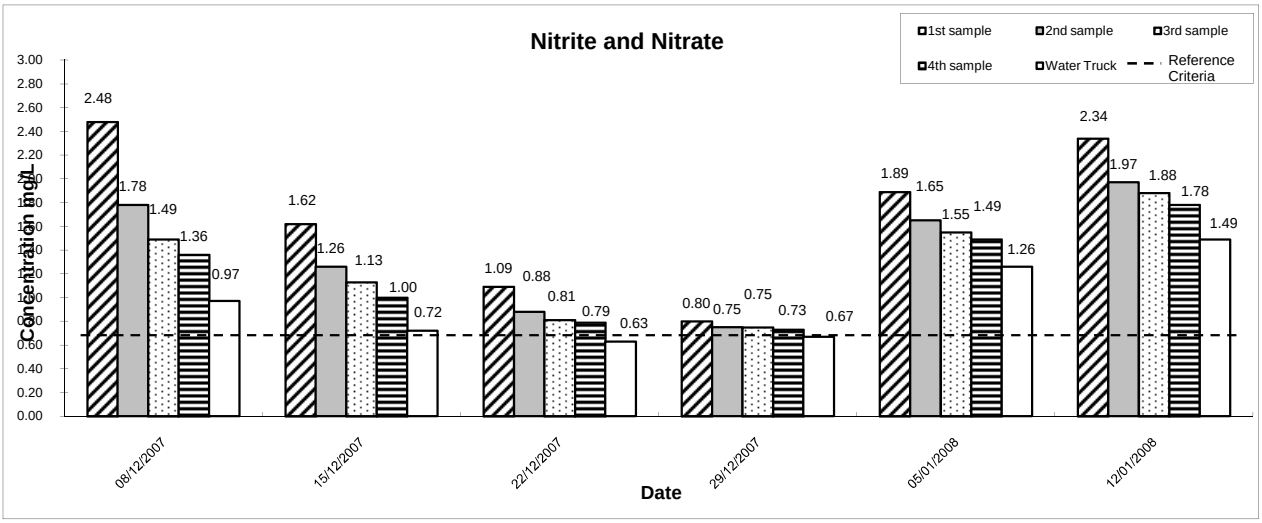



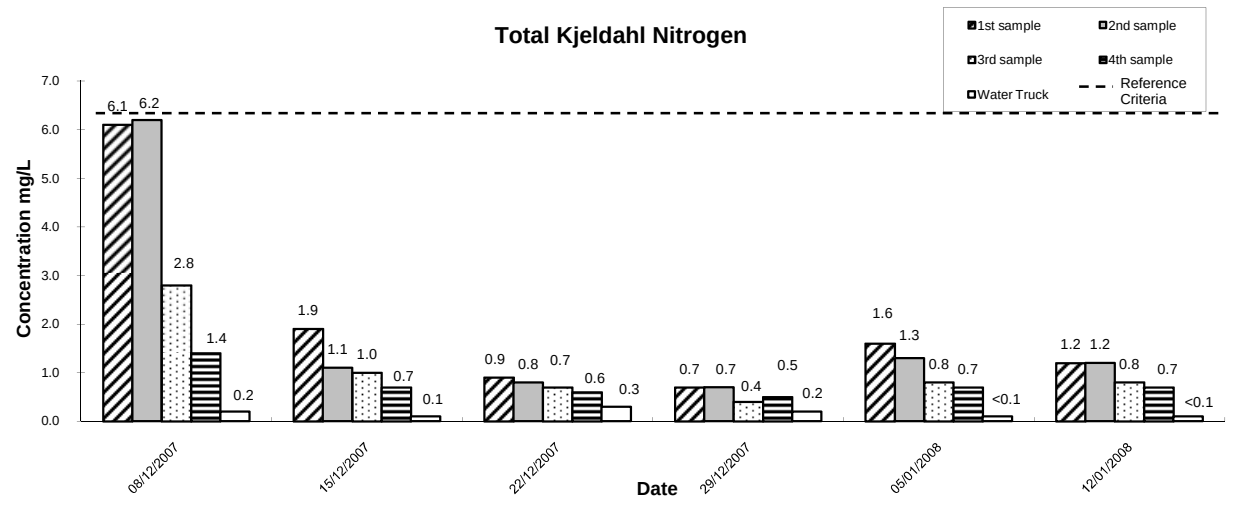




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.
Data presented in the graphs are raw data from the laboratory.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2007 |
| | | CHECK | EWNY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |

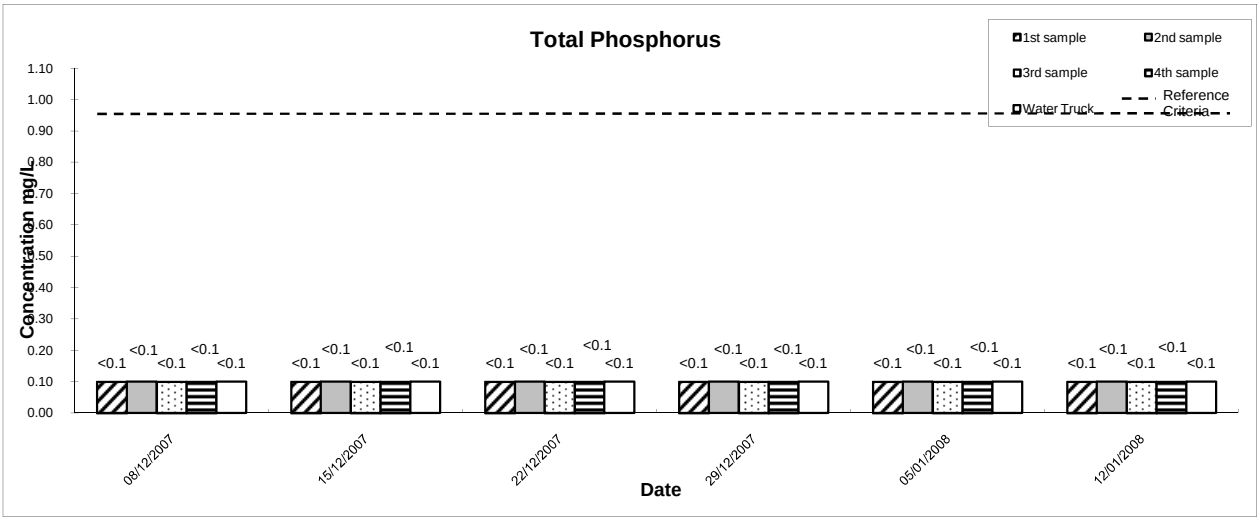


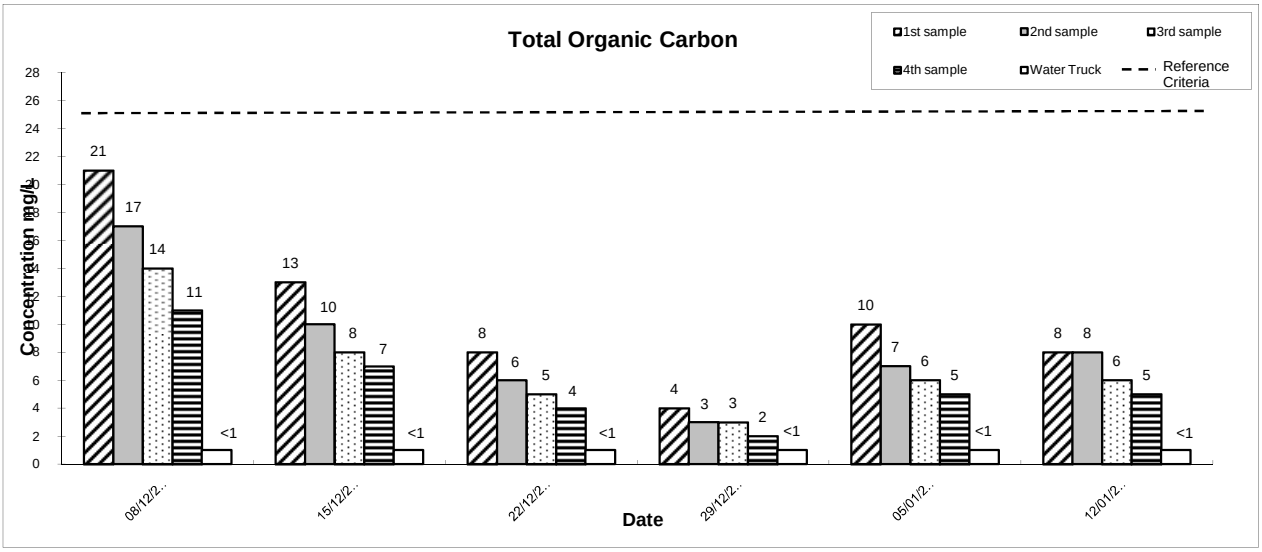



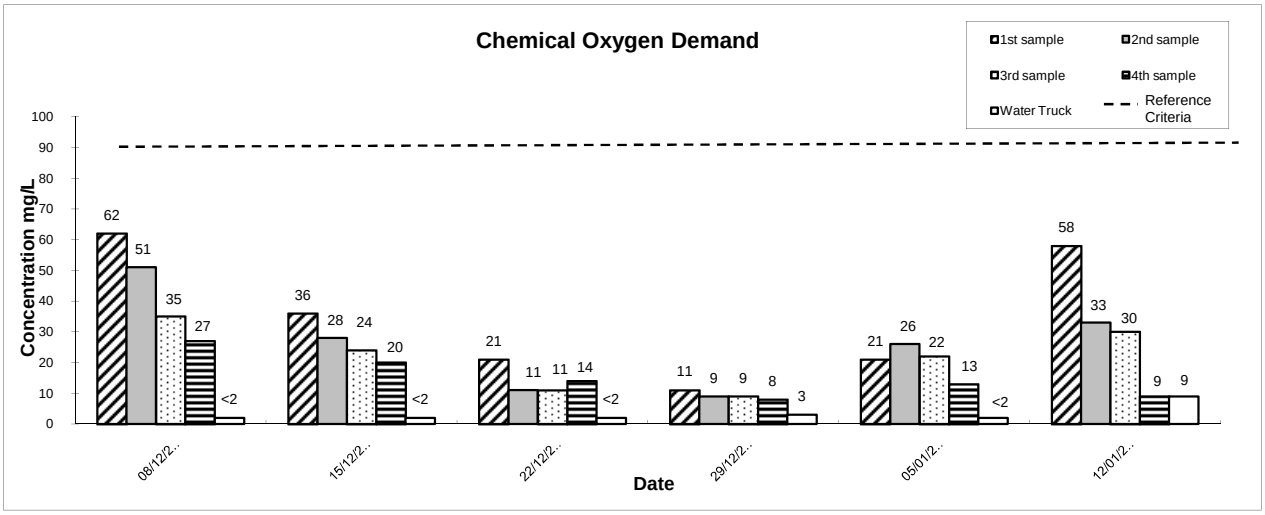




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2008 |
| | | CHECK | FLWY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |

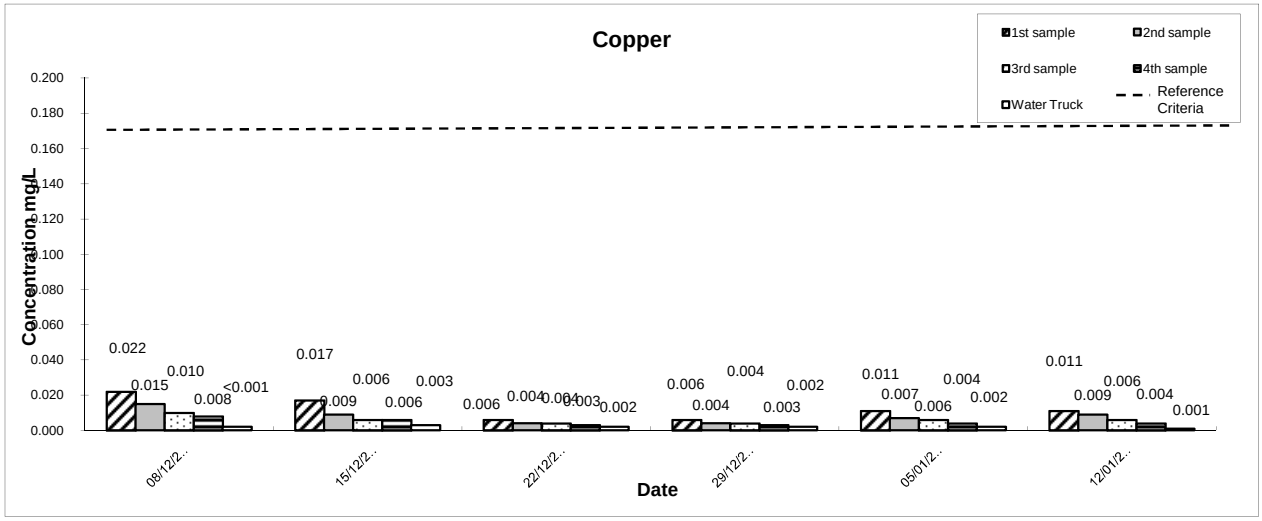


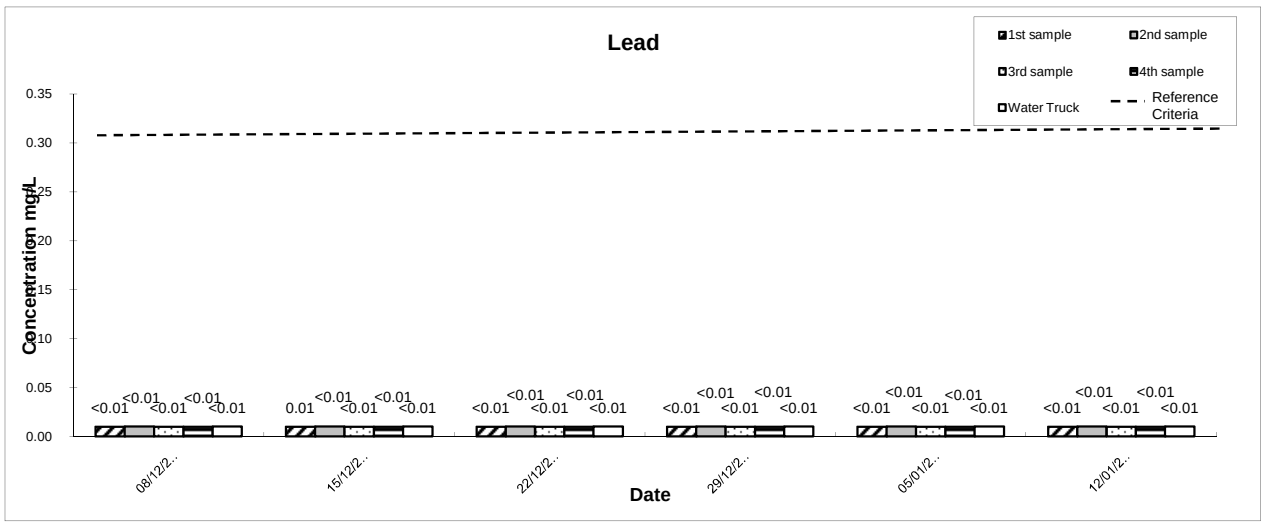



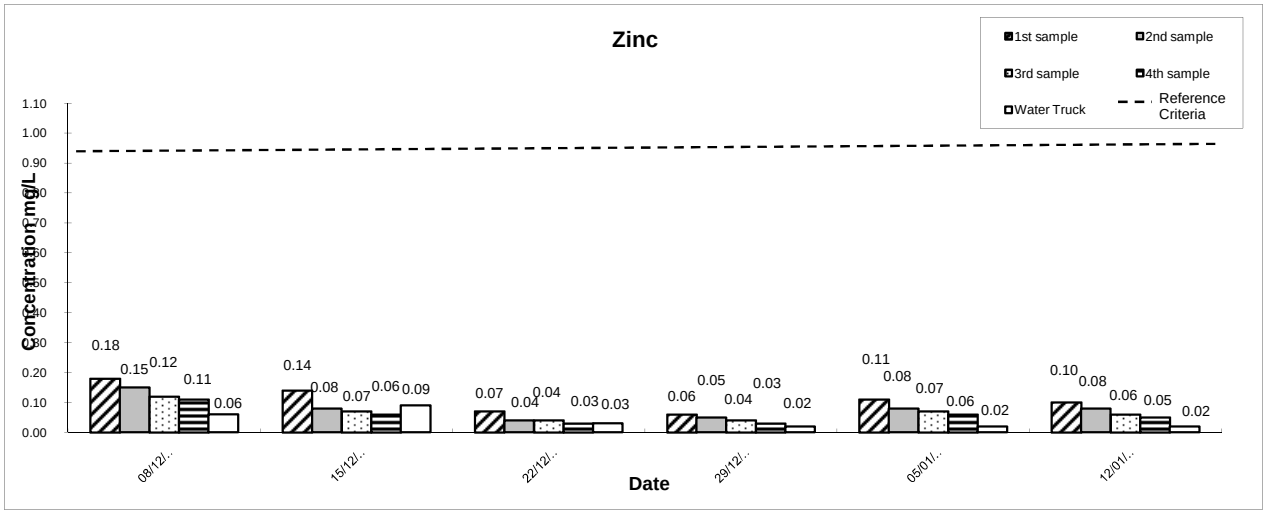




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2008 |
| | | CHECK | FLWY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase)<br>**Graphical Presentation of Road Surface Runoff from Carriageway Results** | SCALE | N.T.S. | DATE | 2008 |
| | | CHECK | FLWY | DRAWN | FLWY |
| | | JOB NO. | 60027337 | APPENDIX C | Rev - |

# APPENDIX D
# ECOLOGY MONITORING RESULTS

Appendix D

**Hydrology Data Recorded at Pond 15 Complex**

Water levels at Pond 15 Complex

Water level (metre)

| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 1.15 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 15ABD | 1.15 | 1.1 | 1.15 | 1.1 | 1.15 | 1.15 | 1.3 | 1.1 |
| 15Y | 1.15 | 1.1 | 1.15 | 1.2 | 1.1 | 1.2 | 1.2 | 1.1 |
| 15C1 | 1.15 | 1.1 | 1.2 | 1.1 | 1.1 | 1.2 | 1.2 | 1.2 |

Water quality at Pond 15 Complex

Dissolved Oxygen Saturation (%)

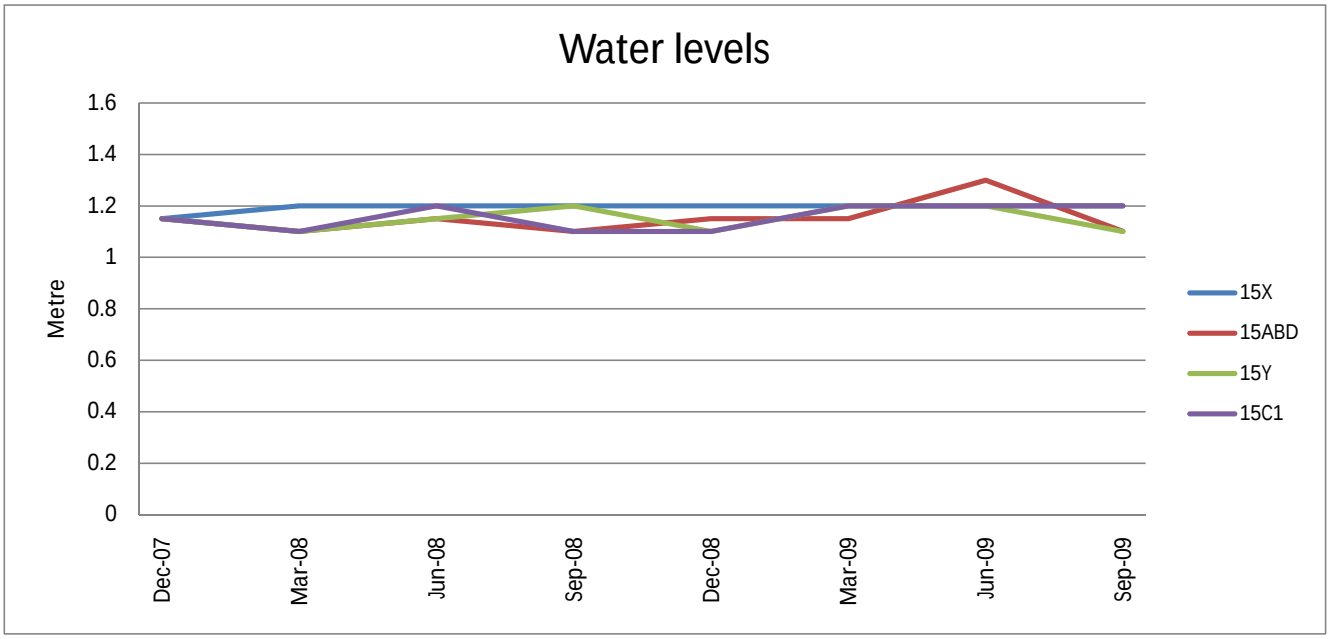
| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 109.2 | 129.4 | 64.1 | 40.3 | 89.4 | 31.8 | 43.6 | 56.5 |
| 15ABD (1) | 73.8 | 116.2 | 69.5 | 42.3 | 76.1 | 58.2 | 57.5 | 58 |
| 15ABD (2) | 74.1 | 97.4 | 56.7 | 46.2 | 70.5 | 54.3 | 55.3 | 55.3 |
| 15Y | 72.5 | 70 | 85.9 | 41.3 | 49.1 | 56.3 | 46.4 | 51.2 |
| 15C1 | 71.2 | 87.1 | 89.8 | 60.4 | 61.4 | 52.2 | 27.1 | 52 |

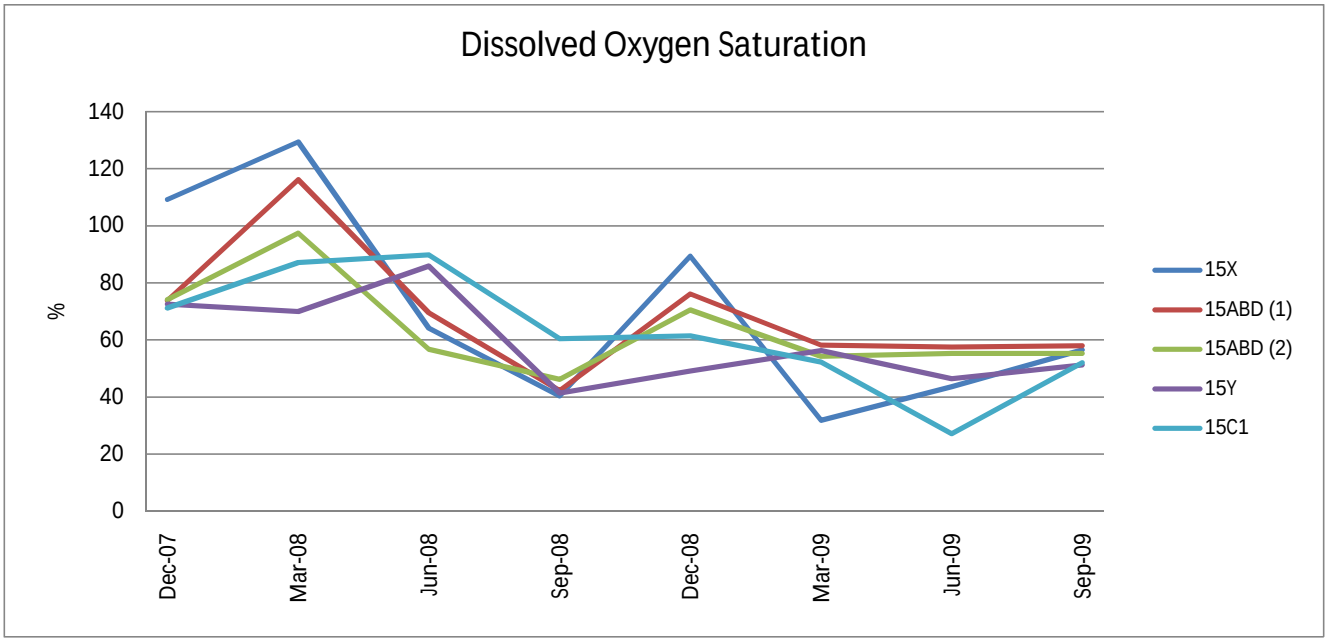
Dissolved Oxygen Concentration (mg/L)

| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 10.73 | 11.95 | 4.97 | 3.09 | 8.78 | 2.83 | 3.36 | 3.54 |
| 15ABD (1) | 6.31 | 10.56 | 5.26 | 3.21 | 7.4 | 5.13 | 4.39 | 3.81 |
| 15ABD (2) | 6.48 | 8.87 | 4.35 | 3.5 | 6.86 | 4.81 | 4.2 | 3.49 |
| 15Y | 6.48 | 6.36 | 6.66 | 3.18 | 4.75 | 4.97 | 3.65 | 3.13 |
| 15C1 | 6.18 | 7.93 | 7.05 | 4.6 | 5.97 | 4.66 | 2.11 | 3.22 |

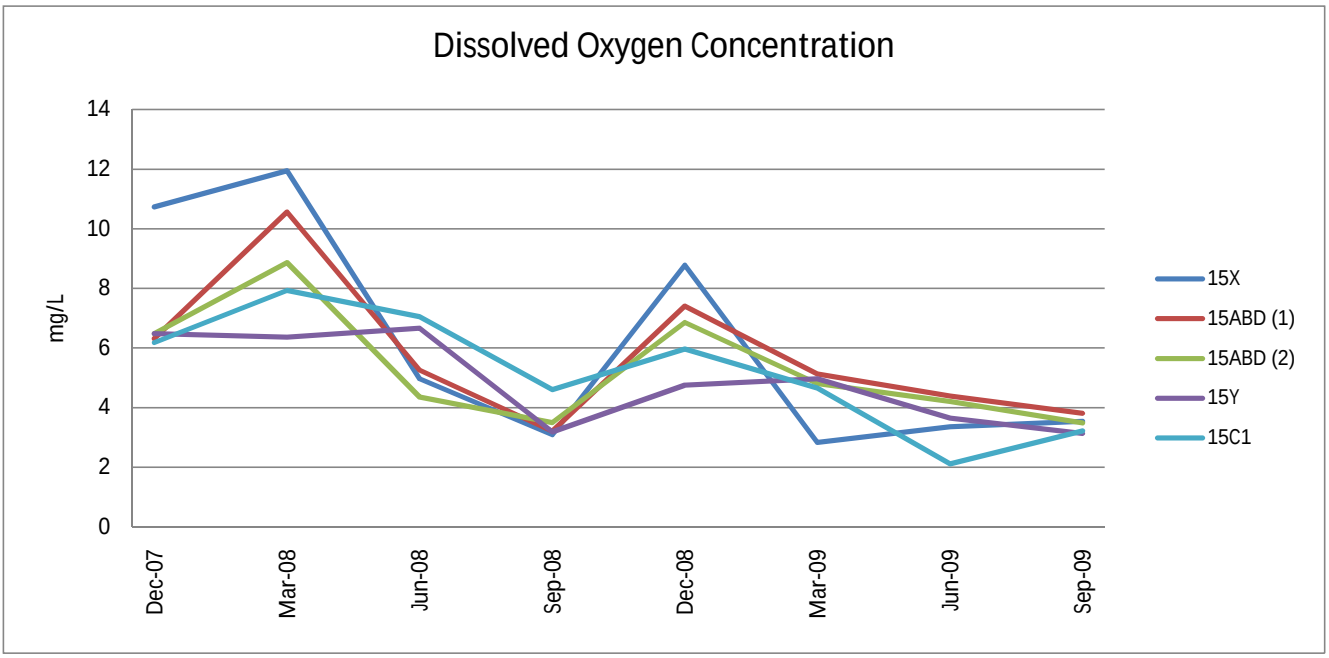
5-day Biological Oxygen Demand (mg/L)

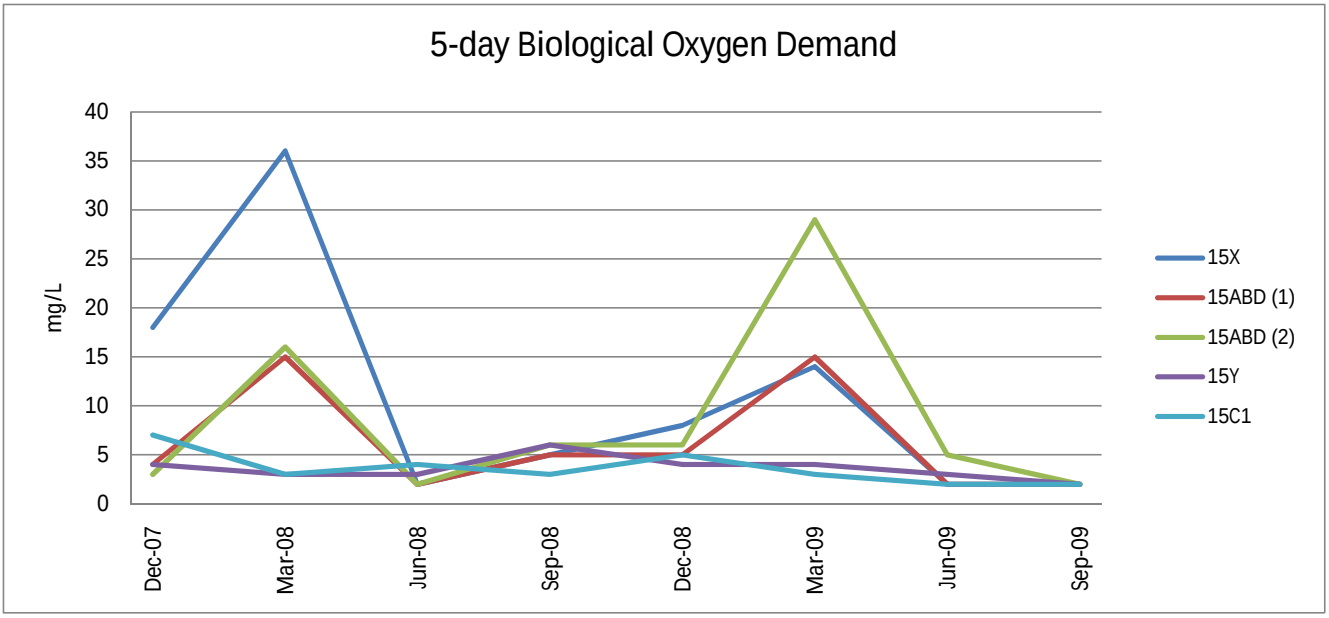
| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 18 | 36 | 2 | 5 | 8 | 14 | <2 | <2 |
| 15ABD (1) | 4 | 15 | 2 | 5 | 5 | 15 | <2 | 2 |
| 15ABD (2) | 3 | 16 | 2 | 6 | 6 | 29 | 5 | <2 |
| 15Y | 4 | 3 | 3 | 6 | 4 | 4 | 3 | <2 |
| 15C1 | 7 | 3 | 4 | 3 | 5 | 3 | <2 | 2 |




| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Hydrology Data at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |




** Remarks: Results below the lowest detection limit are shown as the value of detection limit in the above graphs.

| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Hydrology Data at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

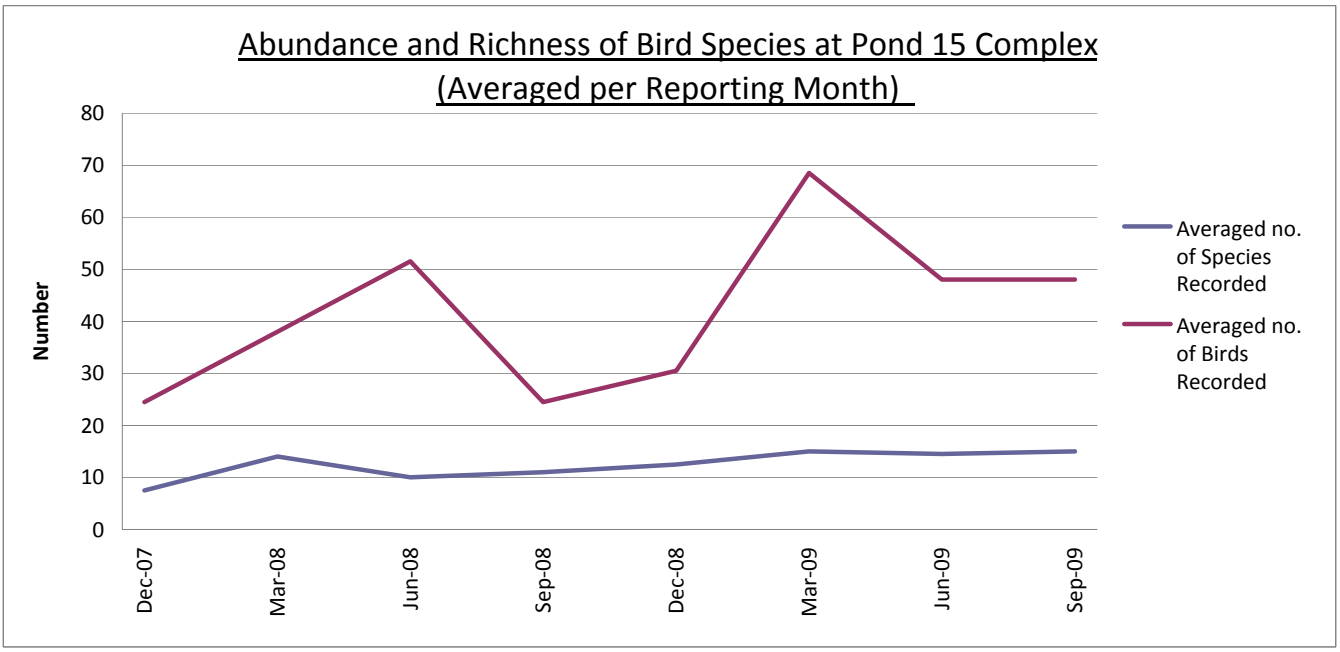
Appendix D
Avifauna Data Recorded at Pond 15 Complex

Abundance and Richness of Bird Species at Pond 15 Complex

| | Total no. of Species Recorded | Total no. of Birds Recorded |
|---|---|---|
| 10-Dec-07 | 10 | 23 |
| 11-Dec-07 | 5 | 26 |
| 11-Mar-08 | 12 | 29 |
| 12-Mar-08 | 16 | 47 |
| 19-Jun-08 | 12 | 63 |
| 20-Jun-08 | 8 | 40 |
| 11-Sep-08 | 10 | 22 |
| 12-Sep-08 | 12 | 27 |
| 15-Dec-08 | 14 | 29 |
| 16-Dec-08 | 11 | 32 |
| 17-Mar-09 | 14 | 63 |
| 18-Mar-09 | 16 | 74 |
| 17-Jun-09 | 16 | 50 |
| 18-Jun-09 | 13 | 46 |
| 21-Sep-09 | 17 | 49 |
| 22-Sep-09 | 13 | 47 |

Abundance and Richness of Bird Species at Pond 15 Complex
(Averaged per Reporting Month)

| | Averaged no. of Species Recorded | Averaged no. of Birds Recorded |
|---|---|---|
| Dec-07 | 7.5 | 24.5 |
| Mar-08 | 14 | 38 |
| Jun-08 | 10 | 51.5 |
| Sep-08 | 11 | 24.5 |
| Dec-08 | 12.5 | 30.5 |
| Mar-09 | 15 | 68.5 |
| Jun-09 | 14.5 | 48 |
| Sep-09 | 15 | 48 |

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| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Abundance and Richness of Bird Species at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

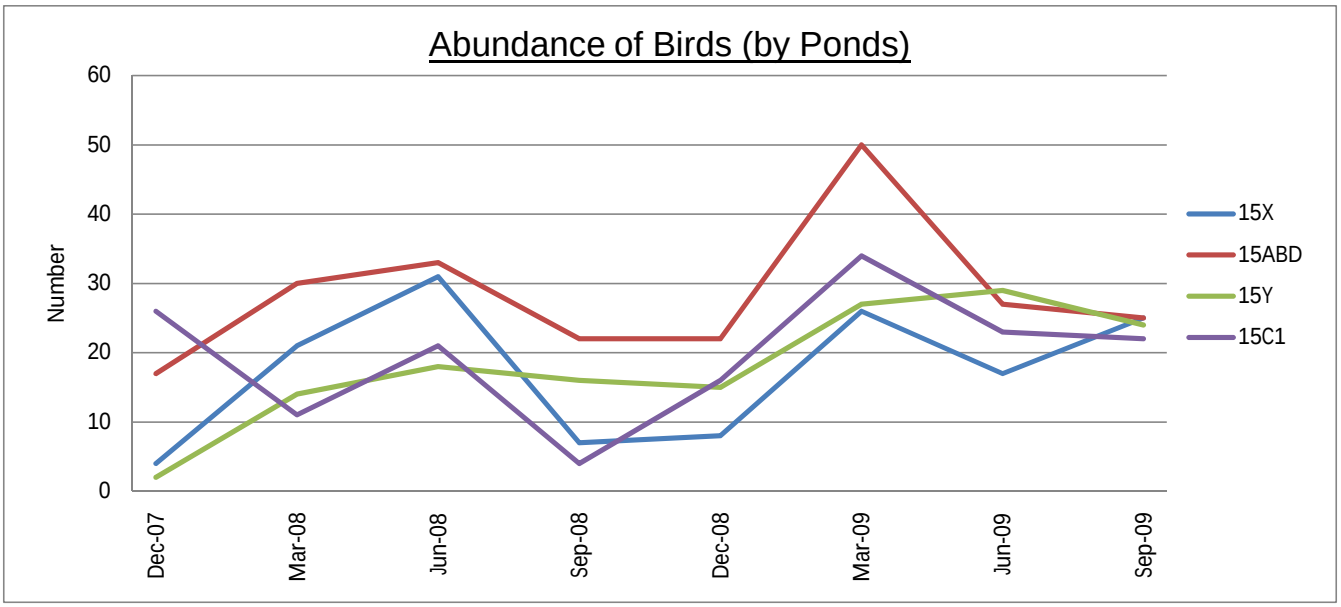
Appendix D
Avifauna Data Recorded at Pond 15 Complex

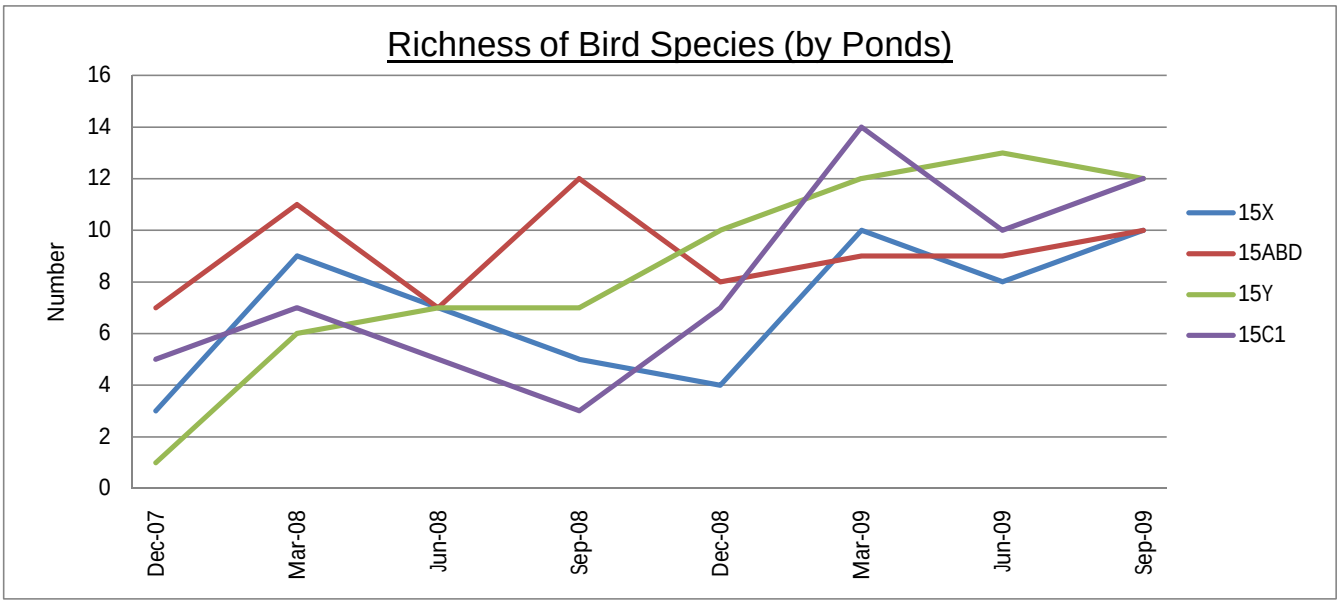
Abundance of Birds Recorded (by ponds)

| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 4 | 21 | 31 | 7 | 8 | 26 | 17 | 25 |
| 15ABD | 17 | 30 | 33 | 22 | 22 | 50 | 27 | 25 |
| 15Y | 2 | 14 | 18 | 16 | 15 | 27 | 29 | 24 |
| 15C1 | 26 | 11 | 21 | 4 | 16 | 34 | 23 | 22 |

Richness of Bird Species Recorded (by ponds)

| | Dec-07 | Mar-08 | Jun-08 | Sep-08 | Dec-08 | Mar-09 | Jun-09 | Sep-09 |
|---|---|---|---|---|---|---|---|---|
| 15X | 3 | 9 | 7 | 5 | 4 | 10 | 8 | 10 |
| 15ABD | 7 | 11 | 7 | 12 | 8 | 9 | 9 | 10 |
| 15Y | 1 | 6 | 7 | 7 | 10 | 12 | 13 | 12 |
| 15C1 | 5 | 7 | 5 | 3 | 7 | 14 | 10 | 12 |




| | | | | | |
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| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Abundance and Richness of Bird Species at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

**Appendix D**

**Benthos Data Recorded at Pond 15 Complex**

Number of Benthos Families recorded

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 |
|---|---|---|---|---|
| 15X | 5 | 5 | 7 | 6 |
| 15ABD | 5 | 4 | 5 | 4 |
| 15Y | 6 | 5 | 6 | 4 |
| 15C1 | 5 | 4 | 6 | 5 |
| Pond 15 Complex | 8 | 5 | 9 | 6 |

Total Benthos Biomass recorded (g)

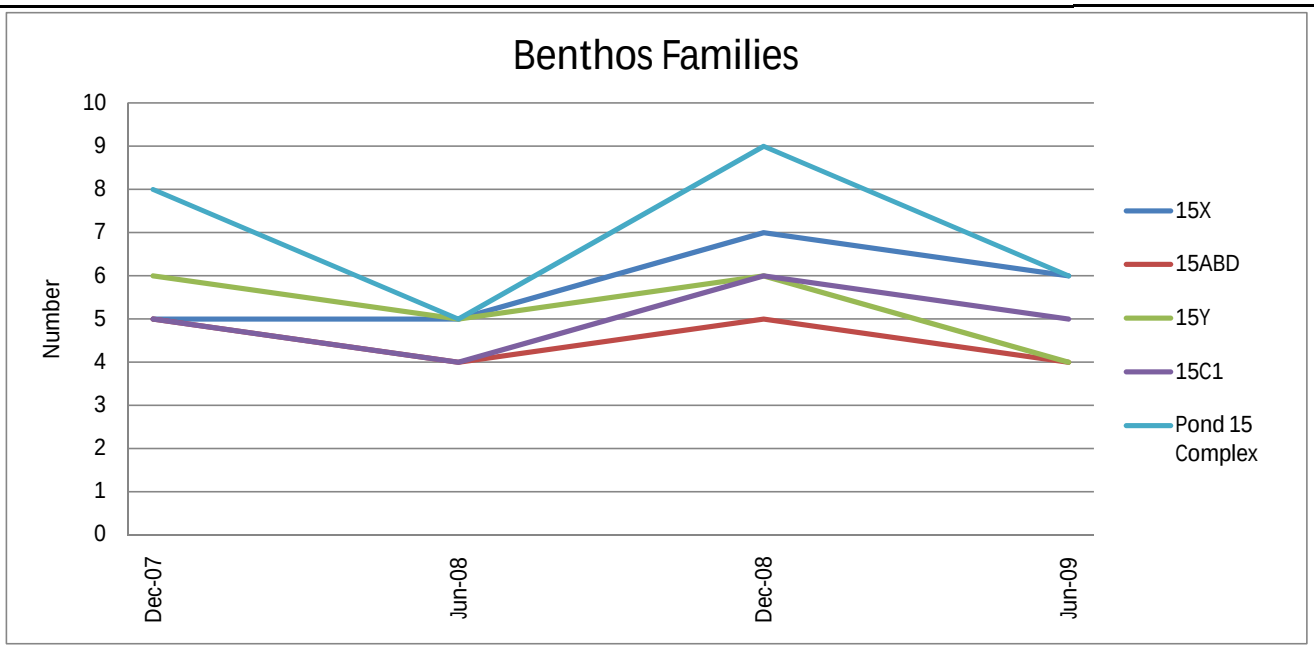
| | Dec-07 | Jun-08 | Dec-08 | Jun-09 |
|---|---|---|---|---|
| 15X | 10.1 | 45.66 | 38.95 | 34.56 |
| 15ABD | 5.49 | 24.67 | 21.3 | 29.93 |
| 15Y | 6.39 | 42.65 | 26.48 | 29.56 |
| 15C1 | 6.22 | 9.94 | 13.96 | 14.09 |
| Pond 15 Complex | 28.2 | 122.92 | 100.69 | 108.14 |

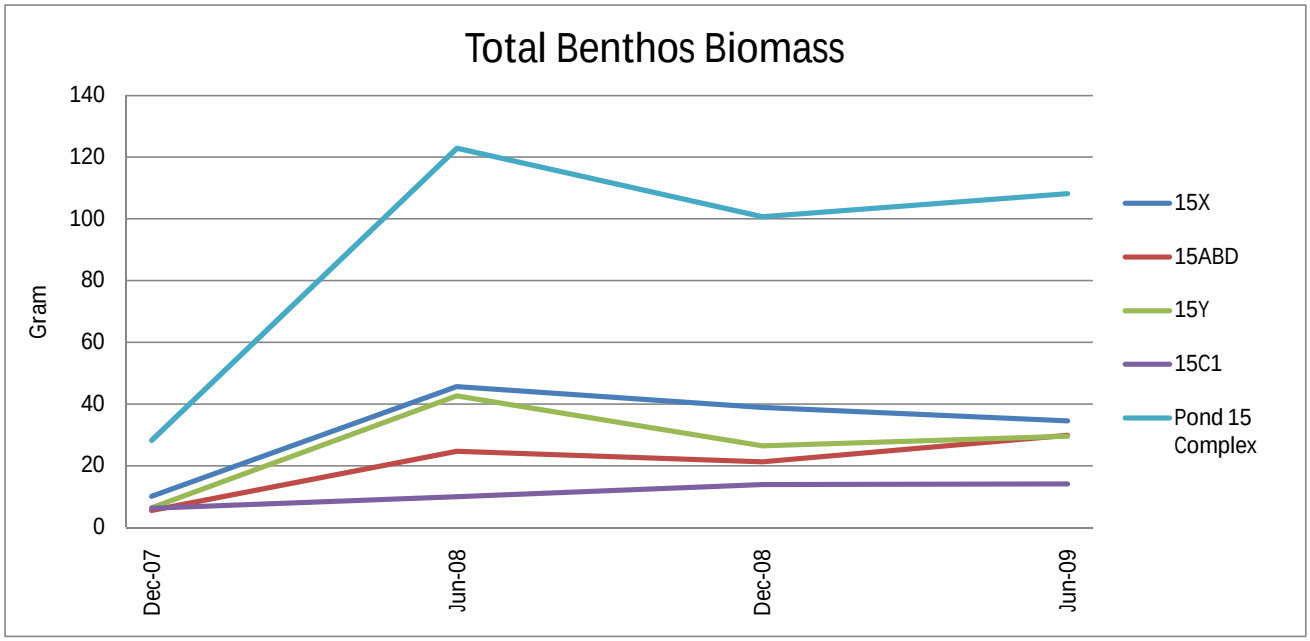
Number of Benthos Individuals recorded

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| *Ampullariidae* | 5 | 4 | 4 | 14 | 27 |
| *Ancylidae* | 0 | 0 | 2 | 0 | 2 |
| *Thiaridae* | 102 | 185 | 212 | 17 | 516 |
| *Viviparidae* | 34 | 148 | 114 | 110 | 406 |
| *Oligochaeta spp.* | 60 | 110 | 107 | 6 | 283 |
| *Orbiniidae* | 28 | 65 | 31 | 0 | 124 |
| *Corbiculidae* | 0 | 0 | 2 | 7 | 9 |
| *Chironomidae (larvae)* | 2 | 0 | 27 | 2 | 31 |
| *Physidae* | 2 | 0 | 0 | 0 | 2 |
| *Planorbidae* | 1 | 0 | 0 | 0 | 1 |

Dry Mass of Benthos Species (g)

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| *Ampullariidae* | 7.76 | 13.29 | 10.99 | 46.81 | 78.84 |
| *Ancylidae* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Thiaridae* | 10.00 | 25.13 | 31.21 | 3.24 | 69.58 |
| *Viviparidae* | 0.44 | 84.45 | 54.99 | 48.57 | 188.45 |
| *Oligochaeta spp.* | 9.95 | 0.01 | 0.00 | 1.00 | 10.96 |
| *Orbiniidae* | 0.00 | 0.06 | 0.03 | 0.00 | 0.09 |
| *Corbiculidae* | 0.00 | 0.00 | 3.42 | 8.52 | 11.95 |
| *Chironomidae (larvae)* | 0.01 | 0.00 | 0.04 | 0.00 | 0.05 |
| *Physidae* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| *Planorbidae* | 0.03 | 0.00 | 0.00 | 0.00 | 0.03 |

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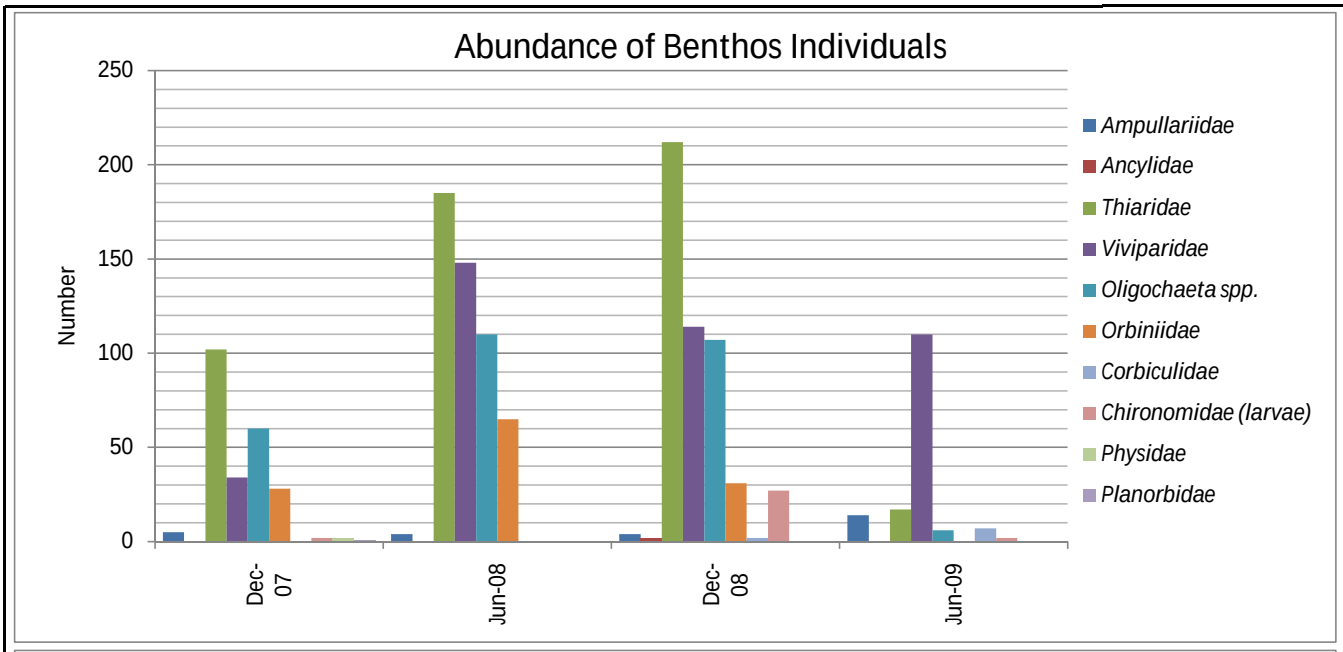
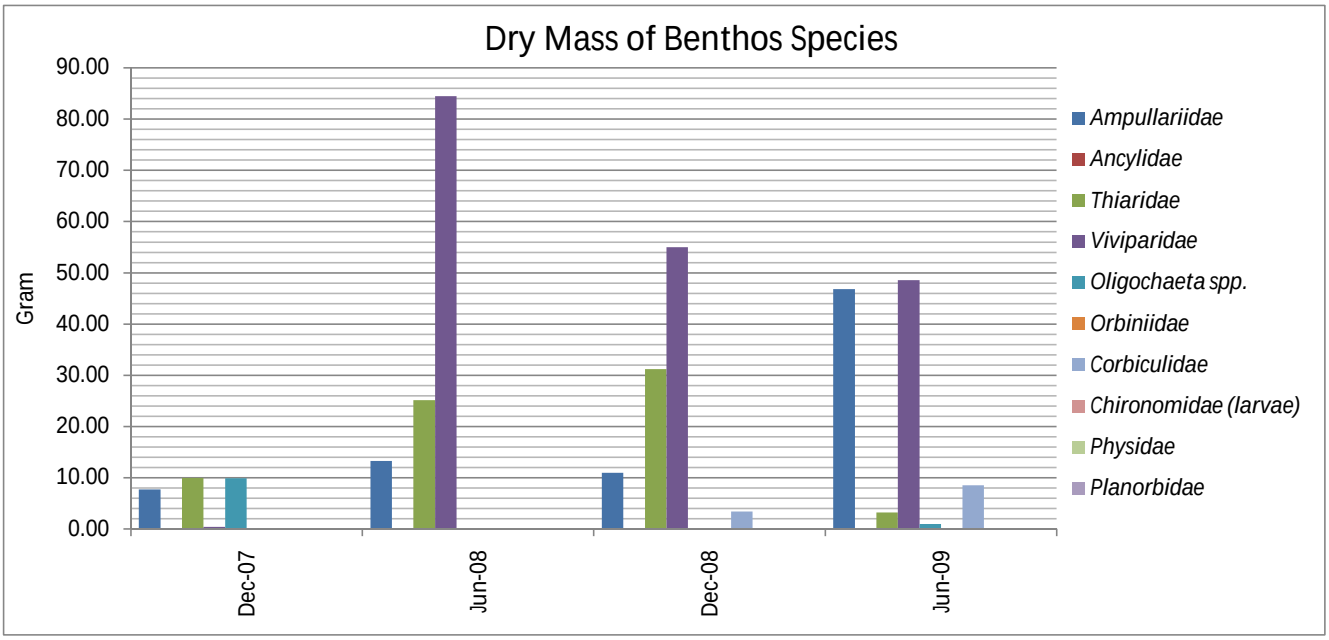
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Benthos Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

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|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Benthos Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX | D |
| | | | | Rev | - |

**Appendix D**

**Pelagic Fauna Data Recorded at Pond 15 Complex**

Number of Pelagic Individuals caught

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| 15X | 5 | 0 | 0 | 0 | 5 |
| 15ABD | 2 | 0 | 1 | 2 | 5 |
| 15Y | 2 | 8 | 0 | 0 | 10 |
| 15C1 | 3 | 1 | 0 | 0 | 4 |
| Pond 15 Complex | 12 | 9 | 1 | 2 | 24 |

Number of Pelagic Species caught

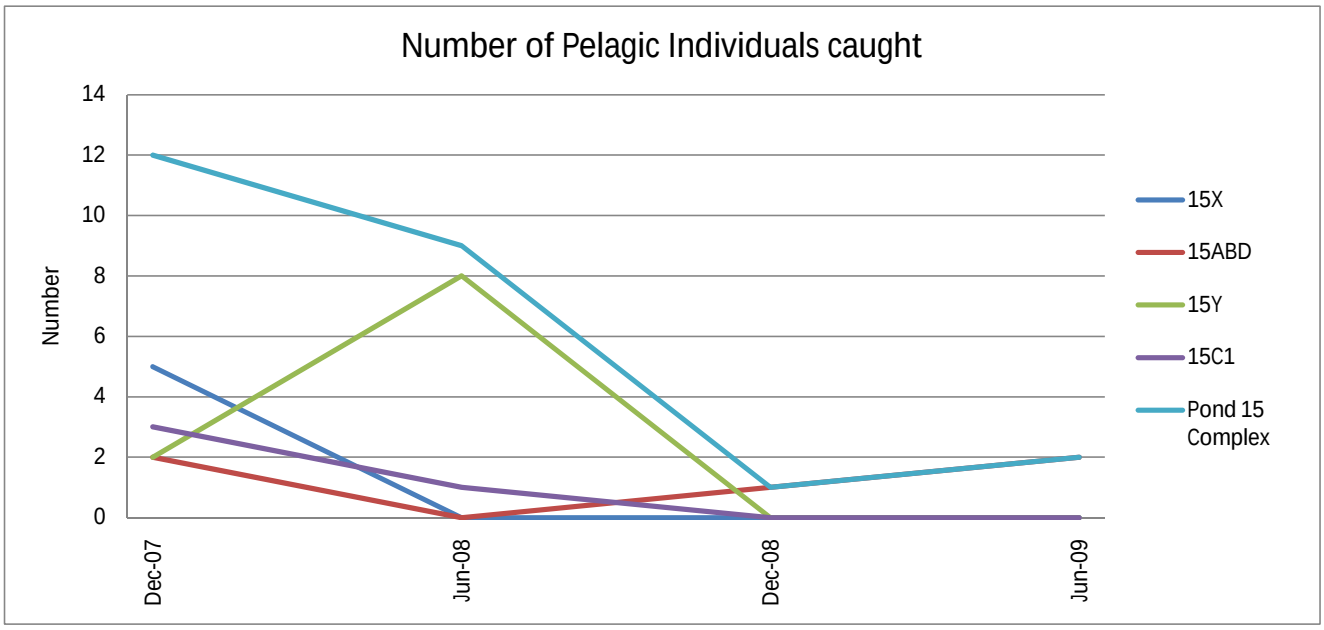
| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| 15X | 1 | 0 | 0 | 0 | 1 |
| 15ABD | 1 | 0 | 1 | 1 | 3 |
| 15Y | 1 | 2 | 0 | 0 | 3 |
| 15C1 | 2 | 1 | 0 | 0 | 3 |
| Pond 15 Complex | 2 | 2 | 1 | 1 | 6 |

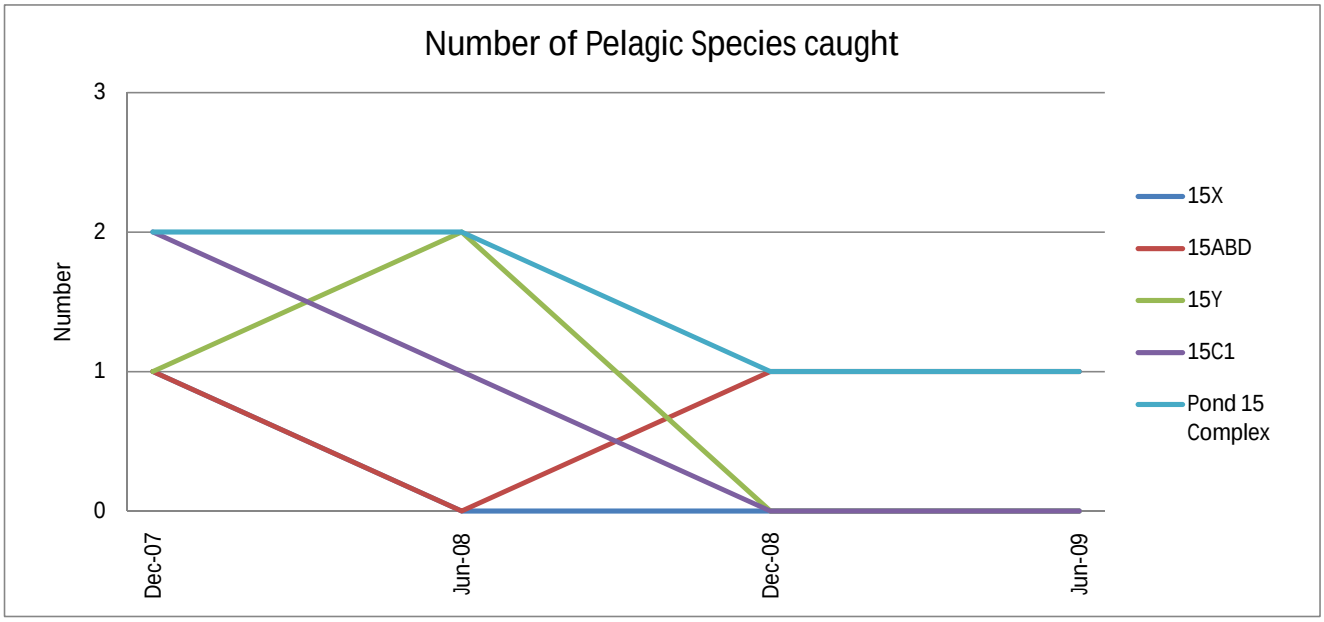
Pelagic Species recorded and their Abundance

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| Nile Tilapia (*Oreochromis niloticus*) | 11 | 5 | 1 | 1 | 18 |
| Goldfish (*Carassius auratus*) | 1 | 0 | 0 | 0 | 1 |
| *Macrobrachium sp.* | 0 | 4 | 0 | 0 | 4 |

Wet Weight of the Pelagic Species caught (kg)

| | Dec-07 | Jun-08 | Dec-08 | Jun-09 | Total |
|---|---|---|---|---|---|
| Nile Tilapia (*Oreochromis niloticus*) | 1.62 | 0.6 | 0.1 | 0.2 | 2.52 |
| Goldfish (*Carassius auratus*) | 0.01 | 0 | 0 | 0 | 0.01 |
| *Macrobrachium sp.* | 0 | 0.028 | 0 | 0 | 0.028 |

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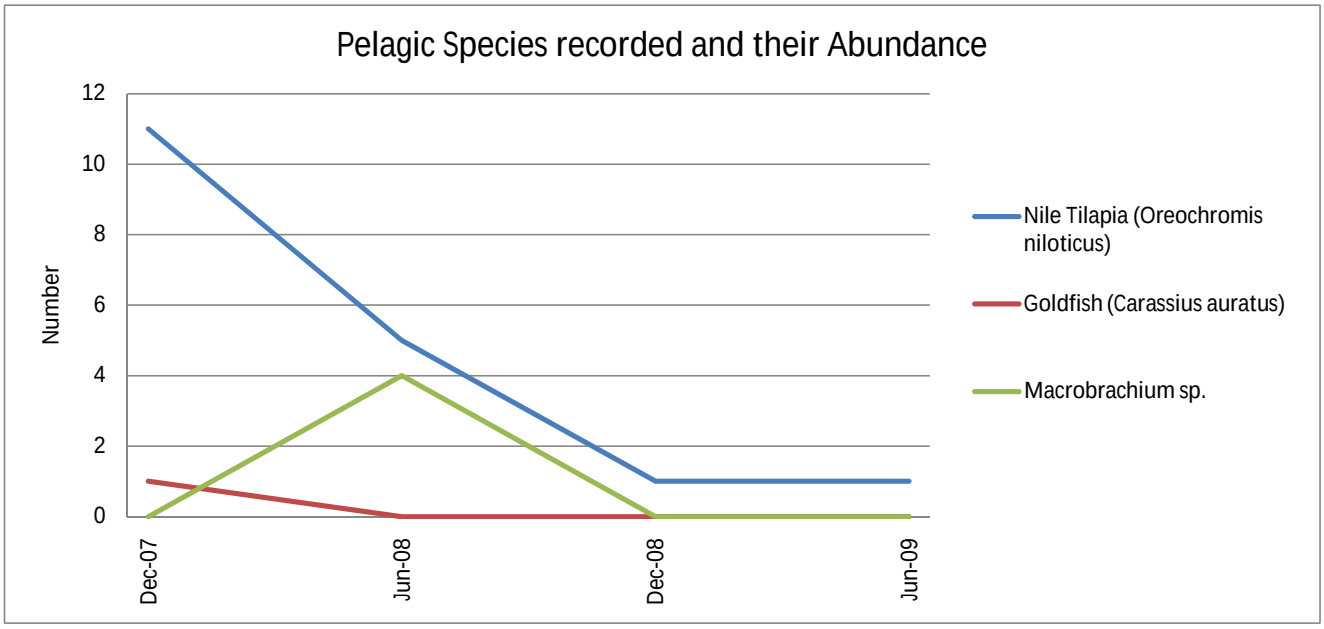
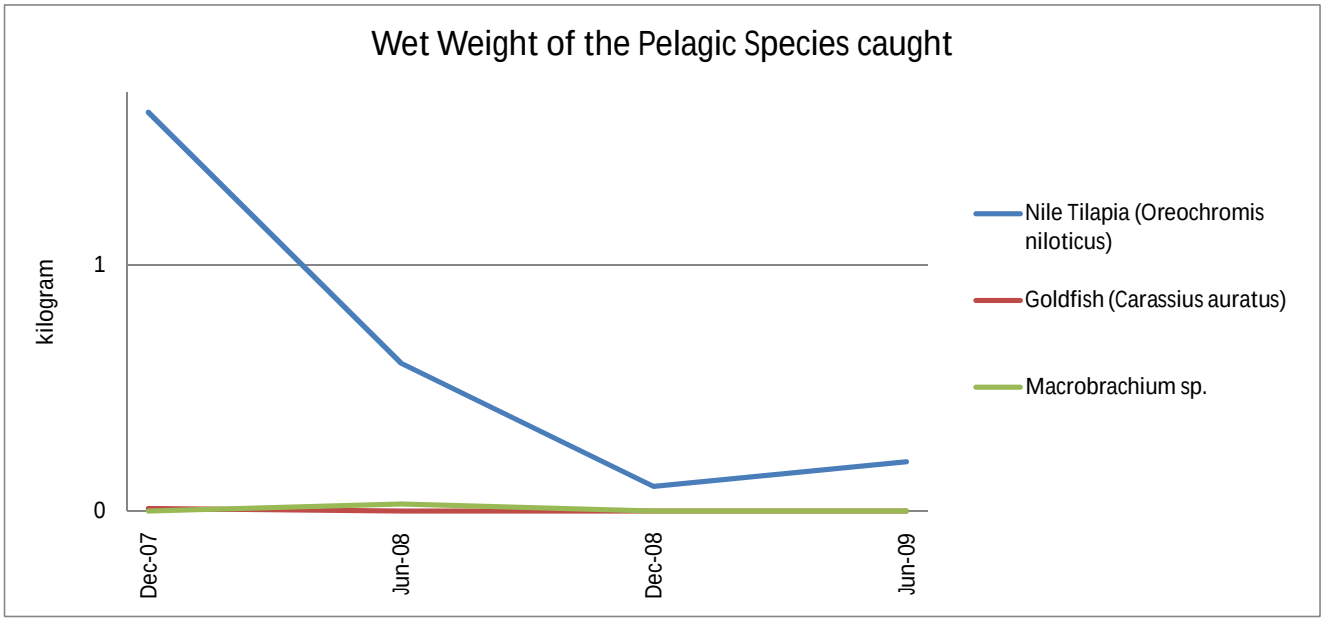
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Pelagic Fauna Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |




| | | | | | |
|---|---|---|---|---|---|
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Pelagic Fauna Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

**Appendix D**

**Flora Data Recorded at Pond 15 Complex**

Percentage Cover in Whole Transect (%) on 11-Dec-2007

| | 15X | 15ABD | 15Y | 15C1 |
|---|---|---|---|---|
| *Alternanthera nodiflora* | 5 | 0 | 0 | 0 |
| *Alternanthera philoxeroides* | 10 | 0 | 0 | 0 |
| *Amaranthus viridis* | 5 | 0 | 0 | 5 |
| *Bidens alba* | 17.5 | 30 | 0 | 44.66 |
| *Cyperus sp.* | 0 | 1.67 | 0 | 0 |
| *Cyperus zollingeri* | 0 | 13.33 | 0 | 0 |
| *Digitaria sp.* | 0 | 3.33 | 0 | 0 |
| *Eclipta prostrata* | 0 | 0 | 3.33 | 0 |
| *Eleusine indica* | 0.5 | 21.67 | 1.67 | 0 |
| Hydroseed | 45 | 0 | 3.33 | 0 |
| *Ipomoea aquatica* | 0 | 0 | 5 | 0 |
| *Ipomoea triloba* | 2.5 | 0 | 0 | 0 |
| *Lophatherum gracile* | 0 | 0 | 26.66 | 0 |
| *Ludwigia octovalvis* | 0 | 6.67 | 0 | 0 |
| *Mikania micrantha* | 0 | 1.67 | 0 | 0 |
| *Panicum sp.* | 0 | 0 | 28.33 | 38.33 |
| *Poaceae sp.* | 10 | 6.67 | 1.67 | 0 |
| *Taraxacum mongolicum* | 0 | 0 | 0 | 0.33 |
| Bare ground | 4.5 | 14.99 | 30 | 11.67 |

Percentage Cover in Whole Transect (%) on 19-Jun-2008

| | 15X | 15ABD | 15Y | 15C1 |
|---|---|---|---|---|
| *Ageratum conyzoides* | 0 | 2 | 0 | 0 |
| *Alternanthera nodiflora* | 0 | 2 | 0 | 5 |
| *Amaranthus viridis* | 0 | 0 | 0 | 22.5 |
| *Bidens alba* | 82.5 | 8 | 41 | 11.25 |
| *Cynodon dactylon* | 0 | 0 | 0 | 3.75 |
| *Cyperus sp.* | 0 | 0 | 5 | 0 |
| *Digitaria* sp. | 0 | 0 | 0 | 3.75 |
| *Eleusine indica* | 0 | 0 | 0 | 18.75 |
| *Ipomoea aquatica* | 0 | 5 | 4 | 0 |
| *Ipomoea triloba* | 7.5 | 0 | 0 | 0 |
| *Ludwigia perennis* | 0 | 2 | 0 | 0 |
| *Mikania micrantha* | 0 | 33 | 1 | 0 |
| *Mimosa pudica* | 0 | 17 | 4 | 0 |
| *Panicum* sp. | 0 | 0 | 0 | 5 |
| *Paspalum* sp. | 5 | 0 | 0 | 0 |
| *Poaceae sp.* | 0 | 3 | 0 | 0 |
| *Sonchus oleraceus* | 0 | 0 | 1 | 0 |
| *Urochloa mutica* | 0 | 0 | 31 | 21.25 |
| Bare ground | 5 | 28 | *13* | 8.75 |

**Appendix D**

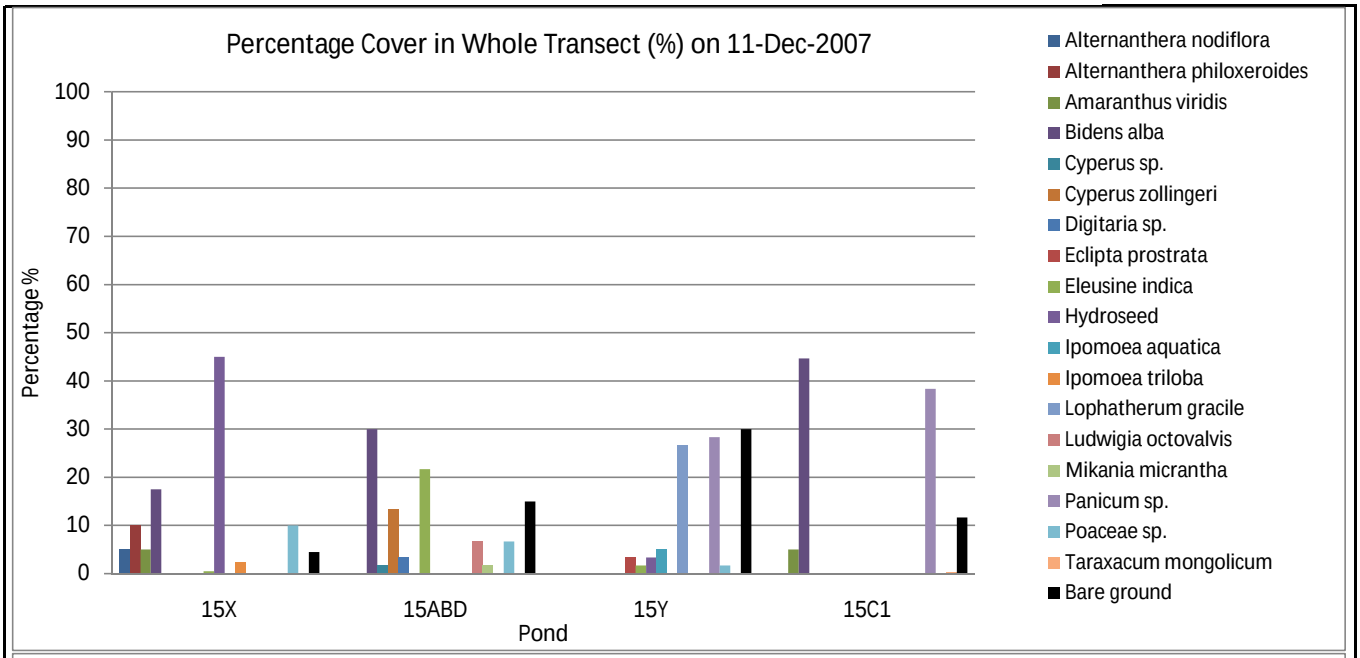
**Flora Data Recorded at Pond 15 Complex**

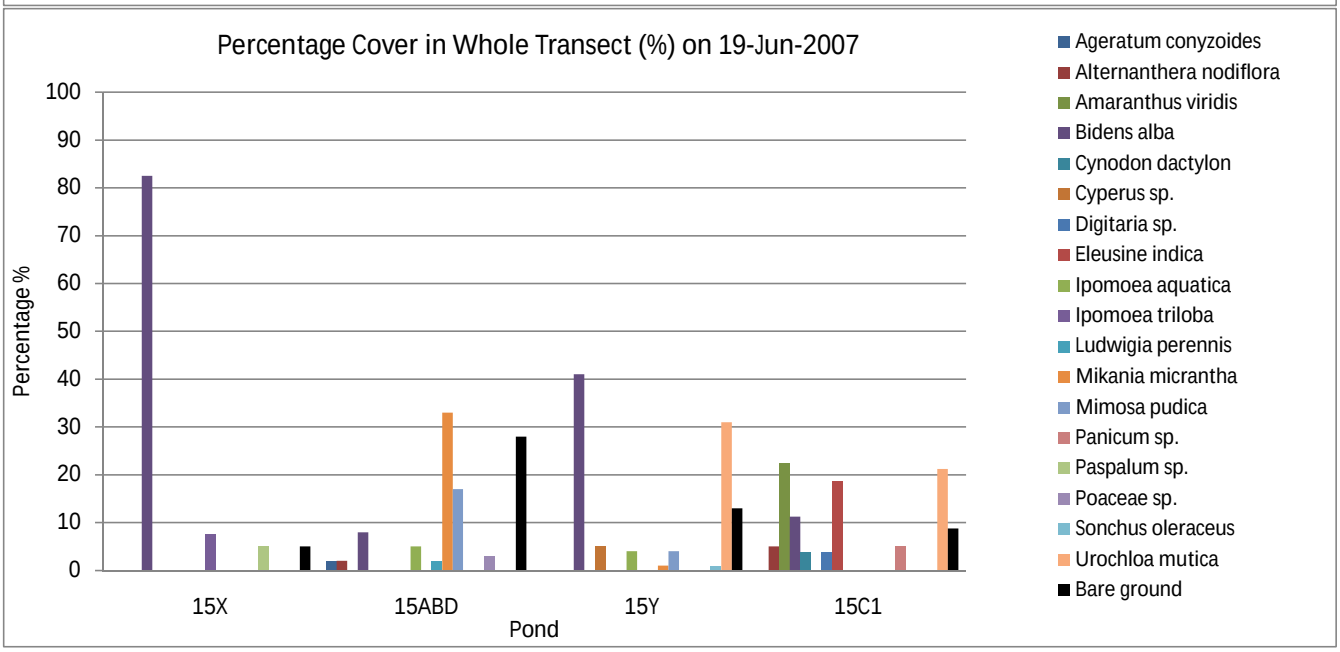
Percentage Cover in Whole Transect (%) on 15-Dec-2008

| | 15X | 15ABD | 15Y | 15C1 |
|---|---|---|---|---|
| *Bidens alba* | 1 | 35 | 8.5 | 0 |
| *Ipomoea triloba* | 0 | 7.5 | 0.25 | 0 |
| *Pueraria* sp. | 0 | 2.5 | 0 | 0 |
| *Mimosa pudica* | 0 | 0 | 0 | 13.3 |
| *Mikania micrantha* | 85 | 2.5 | 2.25 | 26.7 |
| *Ageratum conyzoides* | 0 | 2.5 | 0.25 | 0 |
| *Ludwigia octovalvis* | 0 | 2.5 | 0 | 0 |
| *Sonchus* sp. | 0 | 2.5 | 0 | 0 |
| *Urochloa mutica* | 0 | 0 | 35 | 26.7 |
| *Cynodon dactylon* | 0 | 0 | 0.25 | 0 |
| *Panicum* sp. | 0 | 15 | 0 | 6.7 |
| *Leucaena leucocephala* | 0 | 0 | 0 | 1.6 |
| Bare ground | 14 | 30 | 53.5 | 25 |

Percentage Cover in Whole Transect (%) on 17-Jun-2009

| | 15X | 15ABD | 15Y | 15C1 |
|---|---|---|---|---|
| *Bidens alba* | 100 | 20 | 7 | 30 |
| *Pennisetum alopecurodies* | 0 | 0 | 3 | 0 |
| *Mimosa pudica* | 0 | 0 | 19 | 10 |
| *Mikania micrantha* | 0 | 80 | 5 | 28 |
| *Ageratum conyzoides* | 0 | 0 | 2 | 15 |
| *Paspalum paspaloides* | 0 | 0 | 6 | 0 |
| *Urochloa mutica* | 0 | 0 | 35 | 15 |
| *Panicum* sp. | 0 | 0 | 20 | 0 |
| Bare ground | 0 | 0 | 3 | 2 |

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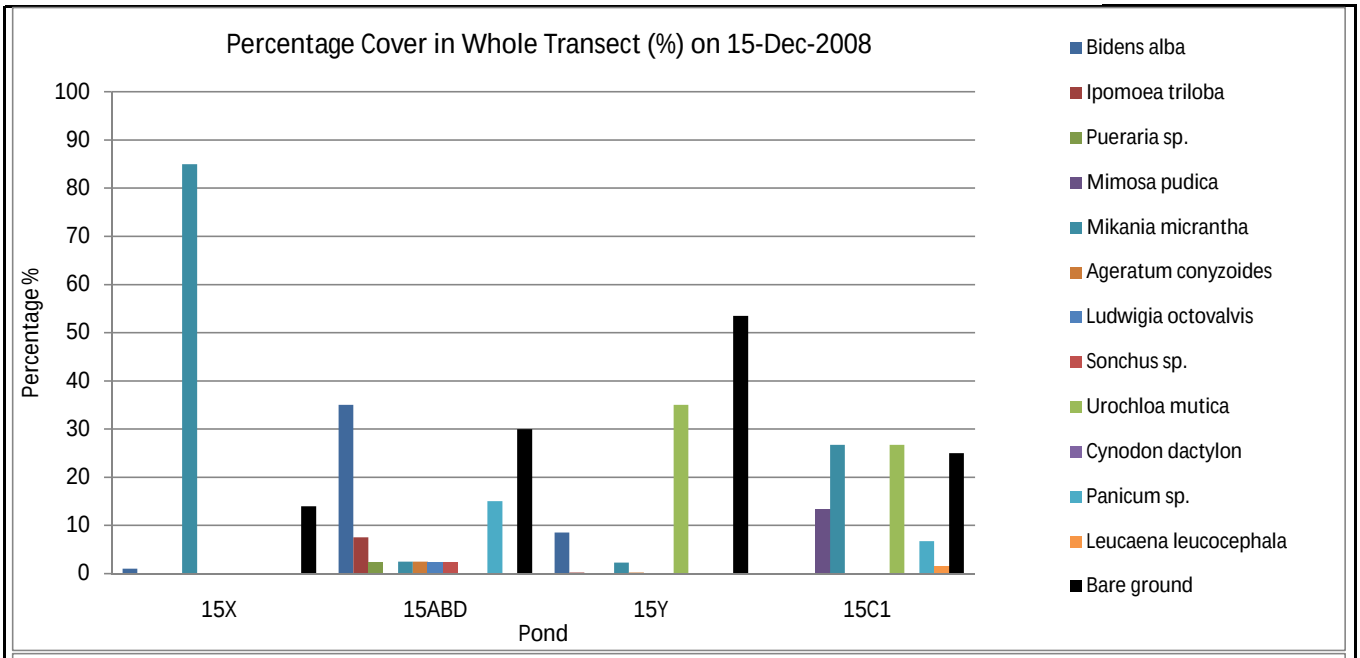
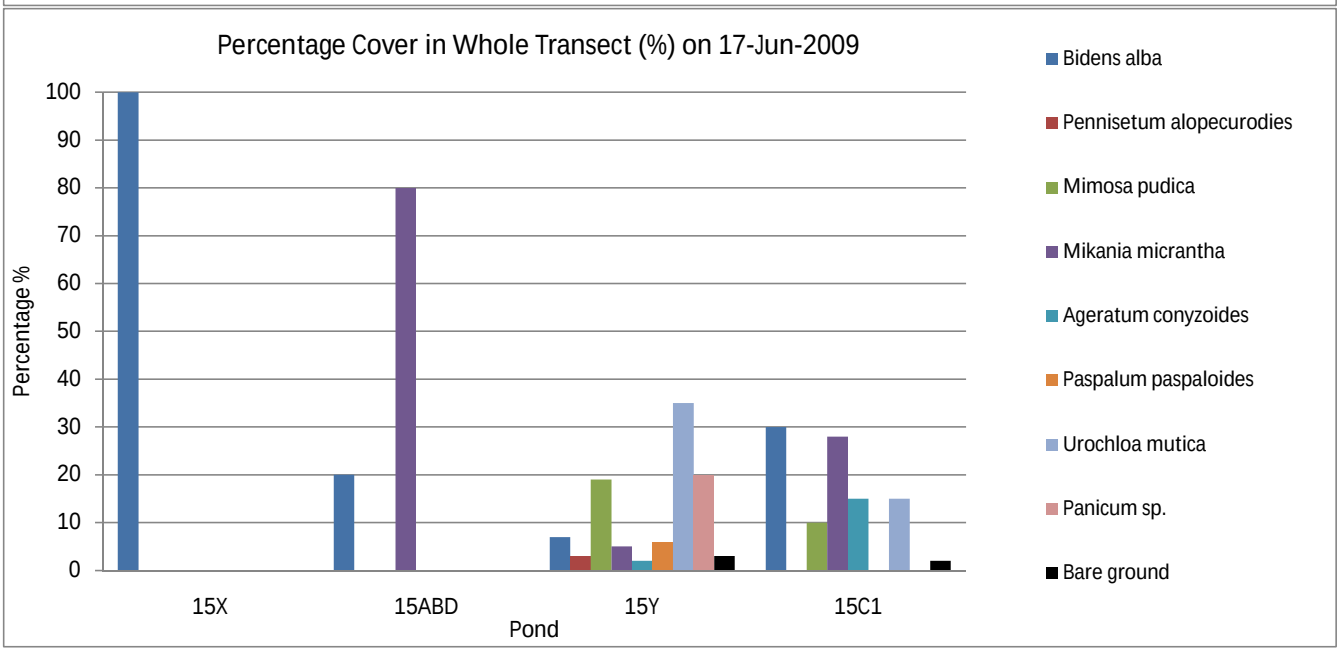
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Flora Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

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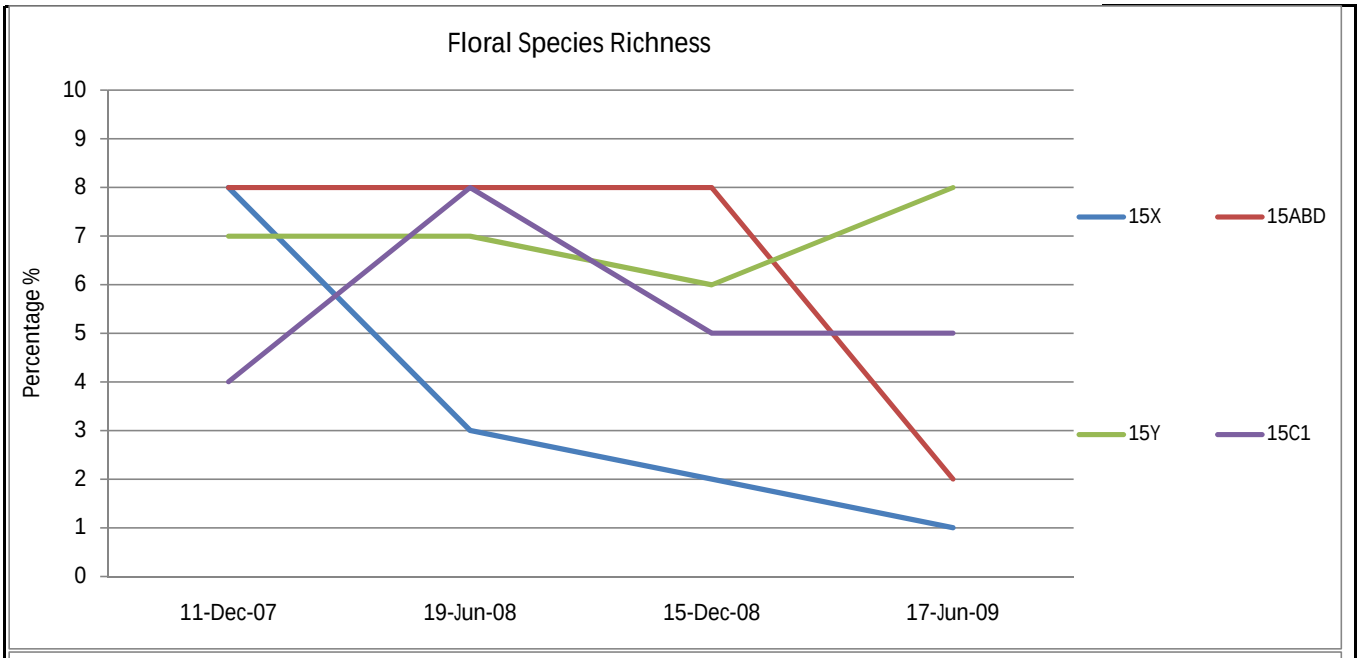
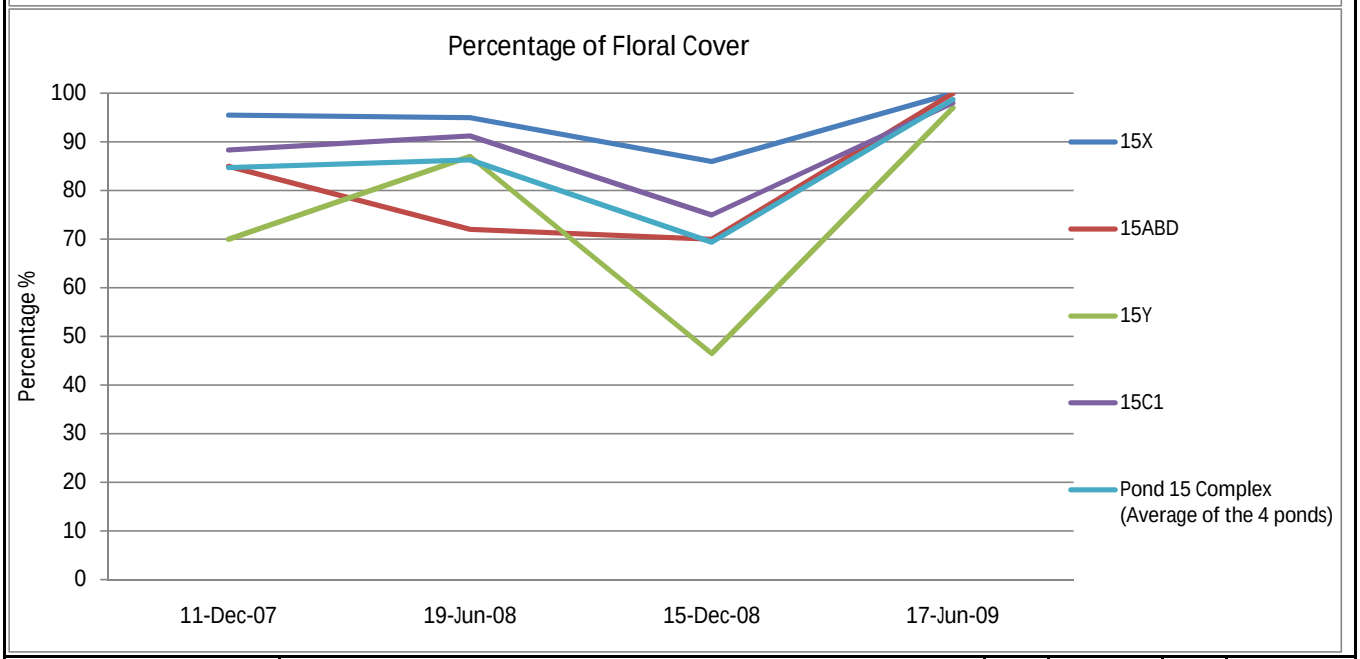
| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Flora Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

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| AECOM | HY/2007/13<br>Environmental Team for Deep Bay Link<br>(Operational Phase) | SCALE | N.T.S. | DATE | Dec-09 |
| | **Graphical Presentation** | CHECK | ENFL | DRAWN | RWHW |
| | **Flora Data Recorded at Pond 15 Complex** | JOB NO. | 60027337 | APPENDIX D | Rev - |

# APPENDIX E
# SUMMARY OF ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE

## Appendix E — Summary of Environmental Mitigation Implementation Schedule

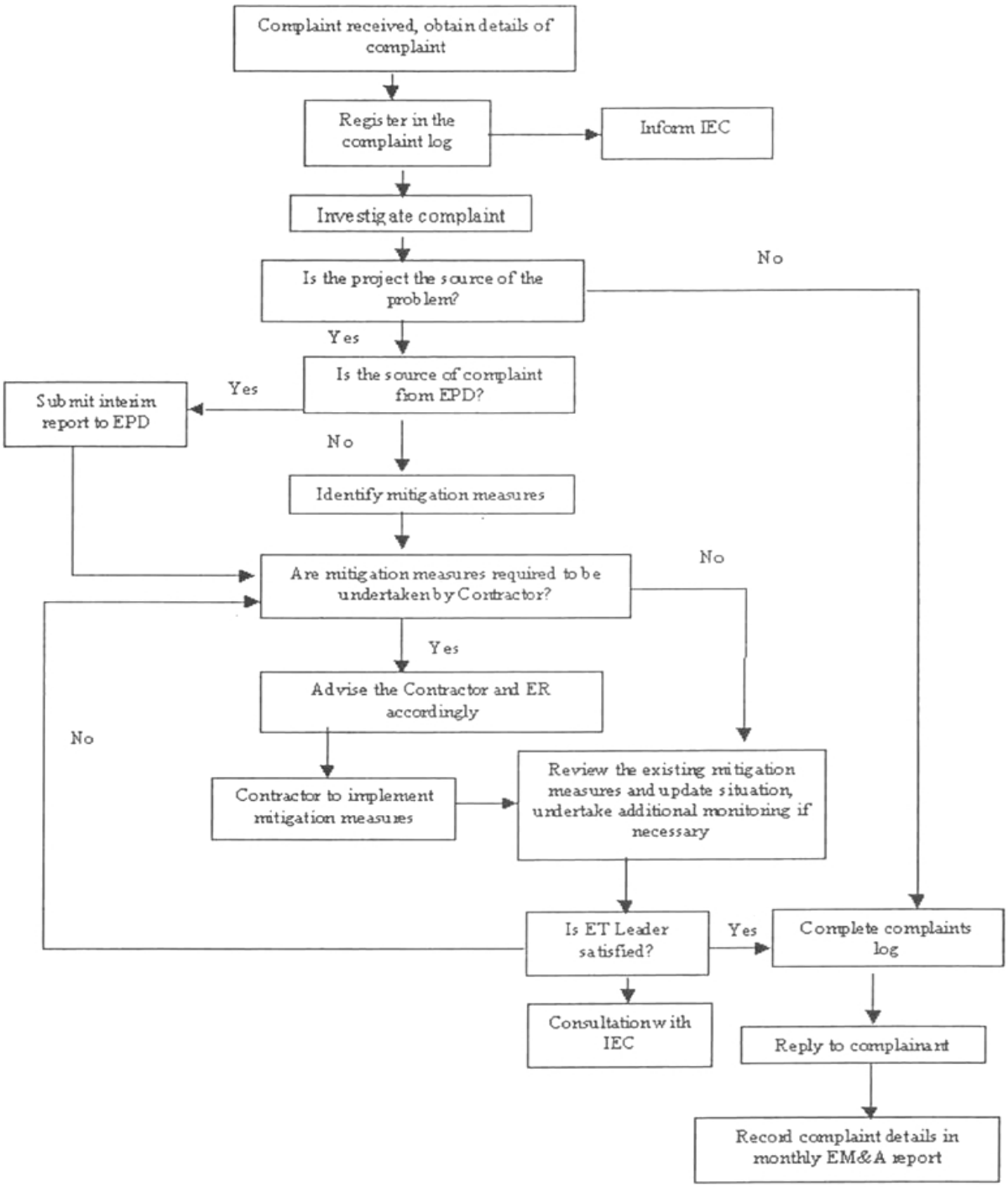
| EP / EM&A Manual Reference Section | Types of Impacts | Mitigation Measures | Status |
|---|---|---|---|
| *Noise* | | | |
| EP (EP-163/2003/G) S.3.9, 5.3 & 6.3 & EM&A Manual S.3.4 | | • Properly maintain the noise barriers during operation of the Project. | √ |
| | | • Carry out operational noise monitoring. | N/A |
| *Water Quality* | | | |
| EP (EP-163/2003/G) S.5.2 & 6.2 & EM&A Manual S.4.2.6, 4.3.14 – 4.3.15, 4.4.5 – 4.4.7, 4.5.7 and 4.6.13 – 4.6.17 | Road runoff | • Carry out bridge runoff monitoring at Ngau Hom Shek section to confirm the effectiveness of the cleaning frequency to remove vehicle-generated pollutants from the bridge. | √ |
| | | • The carriageway of the section at Ngau Hom Shek should be cleaned twice a week, during low traffic flow condition, by vacuum air sweeper(s) or suction truck(s) to remove grits and pollutants. The cleaning path of the vacuum air sweeper should mainly cover the region about 1 to 2m from the road kerb. Each of the cleaning events should not be separated by more than four days. The removed grits and pollutants should be transported for off site disposal. | √ |
| | | • Standard HyD road gullies with silt traps should be installed in the road drainage systems to remove the residual grit, particulate matter and pollutants in road runoff. | √ |
| | | • Regular cleaning of rubbish and sediment from the drainage system for maintaining the normal operation of the system. | √ |
| | | • Oil and grease interceptors would be incorporated as part of the drainage system in areas where vehicles may be parked. | √ |
| EP (EP-163/2003/G) S.5.1 & EM&A Manual 4.8.1 | Accidental Spillage of Chemicals During Accidents | • An emergency plan should be prepared. | √ |
| | | • To minimize water quality and ecological impacts in case of an vehicle accident on the end section of DBL at Ngau Hom Shek: | |
| | | - identify the type of chemicals and justify if immediate evacuation of the area is required. | N/A |
| | | - evacuate the area as necessary. | N/A |
| | | - stop the flow of spill from the source of the pollution. | N/A |
| | | - confine the spill to a limited area and prevent the spill from entering the road drainage system of end section of DBL at Ngau Hom Shek. | N/A |
| | | - Avoid spraying water or chemicals unless it is absolutely necessary. AFCD, EPD and / or GL should be consulted as needed. | N/A |
| | | - Remove the spilled chemical by using suitable equipment and materials. | N/A |
| | | - Dispose of the collected spill once the spill has been removed from the road surface. | N/A |
| | | - Any flushing water for cleaning spilled chemical on end section of DBL at Ngau Hom Shek should be retrieved by vacuum suction or equivalent means to suitable container for proper disposal. | N/A |

| EP / EM&A Manual Reference Section | Types of Impacts | Mitigation Measures | Status |
|---|---|---|---|
| *Ecology* | | | |
| EP (EP-163/2003/G) S.5.5 & EM&A Manual S.7.2.6 | | • Carry out quarterly water level and water quality monitoring at Pond 15. | √ |
| | | • Carry out flora monitoring during wet season and dry season. | √ |
| | | • Carry out birds monitoring during wet season, autumn migration period, dry season and spring migration period. | √ |
| | | • Carry out Benthos and Pelagic fauna (fish and invertebrates) monitoring during wet season and dry season. | √ |
| | | • Carry out amphibians monitoring between April to May. | √ |
| *Landscape and Visual* | | | |
| EP (EP-163/2003/G) S.5.4 & EM&A Manual S.9.2.1 | | • Tree and shrub planting should be implemented at the road leading from the SWC to reduce the visual impact to the Deep Bay Road users. | √ |
| | | • Climbing plants should be used to soften the appearance of viaduct columns. | √ |
| | | • Woodland tree and shrub planting should be undertaken at the cut slope so as to compensate for vegetation lost during construction. Any affected slope areas should be hydroseeded and planted with woodland species, avoid shotcreting. | √ |
| | | • Native shrub planting should be undertaken to screen the alignment and blend it into the landscape. | √ |
| | | • A wide buffer planting zone comprising berm and tree planting should be provided to screen the alignment from the future residents at HSKNDA. | √ |
| | | • Planting should be implemented at the interchanges to reduce the visual impact to the future residents at the adjacent HSKNDA. | √ |
| | | • Planting should be incorporated where possible to screen the road in low level views from adjacent areas, and to tone down the extent of hard paving and reduce the amount of glare, especially in elevated views from the high rise tower blocks. | √ |
| | | • More ornamental tree and shrub planting should be undertaken at interchanges, to create a more colourful and decorative environment. | √ |
| | | • Minimized glare is implemented from the lighting of the road to all receivers. | √ |

Note:

| | |
|---|---|
| √ | Compliance of mitigation measure |
| × | Non-compliance of mitigation measures |
| • | Non-compliance but rectified by the contractor |
| N/A | Not applicable |

# APPENDIX F
# ENVIRONMENTAL COMPLAINT HANDLING PROCEDURE




| | | | | | |
|---|---|---|---|---|---|
| AECOM | Contract No. HY/2007/13 | SCALE | N.T.S. | DATE | 2007 |
| | Environmental Team for Deep Bay Link (Operational Phase) | CHECK | CWHY | DRAWN | FLWY |
| | **Environmental Complaint Handling Procedure** | JOB NO. | 60027337 | APPENDIX F | Rev - |