Highways Department

Contract No. HY/2007/13

Environmental Team for Deep Bay Link (Operational Phase)

Monthly EM&A Report No. 8 (for the month of September 2008)

10/2008

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Our Ref.: HYDDBLWCEM00/2/11142

Date: 22 October 2008

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

By Fax (2761 4864) & Post

Attention: Mr. Robert Chan / Mr. Stephen Chan

Dear Sirs,

Re: Contract No. HY/2007/13
Deep Bay Link (Operational Phase)
Monthly EM&A Report for Operational Phase – September 2008

Reference is made to ET's e-mail correspondences and the subsequent revised pages of the Operational Phase Monthly EM&A Report (September 2008) for the captioned Project. 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-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. Damien Ku if you have any queries.

Yours sincerely,

K.S. Lee
Independent Environmental Checker

c.c.	Mr. Y T Tang	MCAL (ETL)	By Fax: 2891 0305
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EXECUTIVE SUMMARY

This is the eighth monthly Environmental Monitoring and Audit (EM&A) 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 results of EM&A works conducted between 1 and 30 September 2008.

Monitoring on operational (traffic) noise, water level, water quality and avifauna and maintenance at Pond 15 were carried out in the reporting month. Monitoring of road surface runoff from carriageway was not carried out in the reporting month. Environmental mitigation measures and environmental complaint handling procedures were implemented.

Environmental Monitoring Works

Noise
Operational noise monitoring was carried out on 29 and 30 September 2008 and was scheduled to be completed in early October 2008.

Water Quality
All road surface runoff from carriageway monitoring had been completed in January 2008. No such monitoring was carried out in the reporting month.

Ecology
Weekly site inspections during early establishment period and maintenance work at Pond 15 complex were carried out in the reporting month. Water level had been filled up to the required level.

Water level, water quality and avifauna monitoring at Pond 15 were carried out in the reporting month.

Environmental Licensing and Permitting
Permit granted to the Project includes the Environmental Permit for the Project (EP-163/2003/G).

Reporting Change

There was no reporting change in this month.

Environmental Complaints and Prosecution

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

Future Key Issues

Key issues to be considered in the coming month include:

- Maintain sufficient cleaning works for the carriageway by vacuum air sweeper(s) to remove grits and pollutants;
- Properly maintain the noise barriers during operation of the Project;
- Implementation of the Emergency Response Plan for Spillage of Chemicals; and
- Maintenance of Pond 15 Complex during the 12-month establishment period.

1. INTRODUCTION

Background

1.1 Maunsell Consultants Asia Ltd. (MCAL) (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. The monthly monitoring and audit report for previous month, i.e. for April 2008, was not required to submit since there was no monitoring works carried out in April 2008. This report summarises the environmental monitoring and audit works for the Project between 1 and 30 September 2008.

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 mitigation measures, as recommended in the project EIA final report;
- 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 sensitive receivers 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 monitoring was required to be carried out at 10 NSRs, while 7 of them were under the requirements as stipulated in the EM&A Manual and the other 3 of them were specified in the Yuen Long Highways Widening EM&A Manual.

Results and Observations

2.5 The operational noise monitoring was carried out on 29 and 30 September 2008 and was scheduled to be completed on 8 October 2008.

2.6 The operational noise monitoring report will be submitted in early November 2008 and the monitoring result will be presented in the monthly EM&A report for October 2008.

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 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.

3.3 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

3.4 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.

3.5 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

3.6 The road surface runoff from carriageway monitoring period was completed in January 2008.

Monitoring Locations

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

3.8 The exact monitoring locations were recorded in terms of nearby lighting pole / highways chainage.

Results and Observations

3.9 The 12 road surface runoff from carriageway monitoring had been completed. In the reporting month, no monitoring of road surface runoff from carriageway monitoring was carried out.

4. ECOLOGY

Monitoring Requirements

4.1 As required under Clause 3.3 of the Environmental Permit, the approved Habitat Creation and Management Plan and Section 7.2 of the EM&A Manual, 1 year maintenance / establishment programme at the Wetland Compensation Area (Pond 15) and 2 years monitoring of habitat conditions at Pond 15 during operational phase were required.

Monitoring Parameters, Frequency and Duration

4.2 Maintenance for the Pond 15 complex was 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* and *Urochloa*, replanting bamboos and aquatic vegetation (at the end of 12-month) and the removal of refuse.

4.3 Ecological monitoring was 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.

4.4 The construction of Pond 15 complex completed in October 2007 and was handed over to MCAL on 1 November 2007. The maintenance work and monitoring programme commenced on 1 November 2007 and continued in the reporting month.

Hydrology

Monitoring Locations

4.5 The Pond 15 Complex comprises of four ponds, including Pond 15X, 15ABD, 15Y and 15C1. Water level at the centre 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

Water level

4.12 The water levels were recorded during the monitoring survey on 12 September 2008, and are presented as follows:

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

Pond	Water Level (m)
15X	1.2
15ABD (1)	1.0
15ABD (2)	1.2
15Y	1.2
15C1	1.1

4.13 As set in the HCMP, water levels should be maintained between 1 m to 1.5 m at all four ponds. The water levels recorded at all ponds ranged from 1 m to 1.2 m, which is within the required level.

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

Location	DO (%)	DO (mg/l)	BOD_5 (mg/L)
15X	40.3	3.09	5
15ABD (1)	42.3	3.21	5
15ABD (2)	46.2	3.50	6
15Y	41.3	3.18	6
15C1	60.4	4.60	3

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

4.15 The BOD_5 concentration was the highest in Pond 15ABD(2) and 15Y, and the lowest concentration was recorded at Pond 15C1.

Fauna

Avifauna

Monitoring Location

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

Monitoring Equipment

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

Monitoring Methodology

4.18 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

4.19 The monitoring of avifauna was conducted on 11 and 12 September 2008. A detailed list of birds recorded is shown in Appendix C. The following table summarises the species richness and abundance

recorded at Pond 15 Complex during the two-consecutive-days survey in September 2008:

Table 4.3 Summary of Abundance and Richness of Bird Species at Pond 15 Complex

Species		Abundance	
		11/09/2008	12/09/2008
Common Name	**Scientific Name**	**Abundance**	
White Wagtail	*Motacilla alba*	3	0
Eurasian Tree Sparrow	*Passer montanus*	1	2
Crested Myna	*Acridotheres cristatellus*	0	6
Chinese Bulbul	*Pycnonotus sinensis*	0	2
Crested Bulbul	*Pycnonotus jocosus*	2	2
Masked Laughingthrush	*Garrulax perspicillatus*	4	1
Oriental Magpie Robin	*Copsychus saularis*	1	3
Spotted Dove	*Streptopelia chinensis*	5	5
Long-tailed Shrike	*Lanius schach*	0	1
Great Egret	*Egretta alba*	0	1
Chinese Pond Heron	*Ardeola bacchus*	0	1
Common Kingfisher	*Alcedo atthis*	2	0
Yellow-bellied Prinia	*Prinia flaviventris*	2	2
Plain Prinia	*Prinia inornata*	1	0
Black Kite*	*Milvus migrans*	1	0
Japanese White-eye	*Zosterops japonicus*	0	1

Note: * At flight high above the Deep Bay Link

4.20 Table 4.4 presents the species abundance and richness recorded at each pond in September 2008:

Table 4.4 Abundance and Richness of Bird Species Recorded at Pond 15X, 15ABD, 15Y and 15C1 over the 2-Consecutive-Days Survey

	15X	15ABD	15Y	15C1
Total No. of Bird Individuals	**7**	**22**	**16**	**4**
Total No. of Bird Species	**5**	**12**	**7**	**3**

4.21 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.

4.22 A total of 16 species of 49 individuals were recorded during the 2 consecutive monitoring days at Pond 15 Complex. The most common species recorded was Spotted Dove *Streptopelia chinensis* (ten individuals), followed by Crested Myna *Acridotheres cristatellus* (six individuals).

4.23 Over the 2 consecutive monitoring days, Pond 15ABD recorded the highest species richness (12 species), followed by Pond 15Y (seven species), 15X (five species) and 15C1 (3 species). For species abundance, Pond 15ABD recorded the highest number of individuals (22 individuals), followed by Pond 15Y (16 individuals), 15X (seven individuals) and 15C1 (four individuals).

4.24 Two recorded species (Great Egret *Egretta alb*a and Chinese Pond Heron *Ardeola bacchus*) are considered as wetland-dependant birds. Species that are often found near wetland area, including White Wagtail (*Motacilla alba*) and Common Kingfisher (*Alcedo atthis*), were also recorded. These are indications that the wetland compensation area is attractive to the nearby wetland-dependant species.

4.25 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. During the survey, one individual of Chinese Pond Heron was recorded near the Pond 15 Complex. This is an indication that the Pond 15 Complex was utilized by the target wetland species.

4.26 The relationships of avifauna to water levels and vegetation cover/species could not be determined during this monitoring survey, as only two individuals of Yellow-bellied Prinia (*Prinia flaviventris*) were recorded standing among *Bidens alba* at Pond 15ABD, and one individual of Plain Prinia (*Prinia inornata*) was recorded among *Urochloa mutica*. The limited data collected is not conclusive enough to suggest any relationship between avifauna and water levels / vegetation cover/species.

4.27 According to the trigger and action levels (Appendix B**)**, no specific trigger levels for ardeid's use are 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 few ardeids were recorded in recent surveys, no immediate adaptive measure to the management plan was required.

Invasive Floral Species

4.28 The monitoring of invasive floral species within all pond areas and the bamboo planting sites was carried out during the weekly site visits. Invasive species including *Mikania micrantha* are found to have rapid growth during wet season due to the plentiful of rainfall.

4.29 The upcoming invasive species removal / trimming is tentatively scheduled for October 2008.

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; 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 had been implemented properly in the reporting month.

Environmental Mitigation Implementation Schedule (EMIS)

5.3 According to the Environmental Permit, the mitigation measures detailed in the permits are required to be implemented. An updated summary of the EMIS is presented in Appendix D.

Summary of Exceedances of Environmental Quality Performance Limit

5.4 No exccedance was recorded in the reporting month.

5.5 The Event and Action Plans for water quality are presented in Appendix B.

Implementation Status of Environmental Complaint Handling Procedures

5.6 Appendix E presents the environmental complaint flow diagram of the Project.

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

6. FUTURE KEY ISSUES

Key Issues for the Coming Month

6.1 Key issues to be considered in the coming month include:

- Maintain sufficient cleaning works for the carriageway by vacuum air sweeper(s) to remove grits and pollutants;
- Properly maintain the noise barriers during operation of the Project;
- Implementation of the Emergency Response Plan for Spillage of Chemicals; and
- Maintenance of Pond 15 Complex during the 12-month establishment period.

Environmental Monitoring Programme for the Next Month

6.2 Tentative environmental monitoring and audit schedule for the next reporting month is shown in Appendix F.

7. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

7.1 Environmental impact monitoring was performed between 1 and 30 September 2008. All monitoring results in the reporting period were checked and reviewed.

7.2 Monitoring on operational noise was carried out on 29 and 30 September 2008 and was scheduled to be completed in early October 2008.

7.3 The second monitoring period of the road surface runoff monitoring programme completed on 12 January 2008. No such monitoring was carried out in the reporting month.

7.4 Water level, water quality and avifauna monitoring at Pond 15 were carried out in the reporting month. As few ardeids were recorded in the surveys in the reporting month, no immediate adaptive measure to the management plan was required.

7.5 Maintenance of Pond 15 was carried out in the reporting month.

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

Recommendations

7.7 The following recommendations were made:

Water Impact

- Maintain sufficient cleaning works for the carriageway by vacuum air sweeper(s) to remove grits and pollutants;
- Implementation of the Emergency Response Plan for Spillage of Chemicals.

Noise

- Properly maintain the noise barriers during operation of the Project.

Ecology

- Maintenance of Pond 15 Complex during the 12-month establishment period.