



## Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Biannual EM&A Report on Ecology for Nov 2010 – Apr 2011 (Rev. B)

Jun 2011  
Report No.: 266567/21/B



Pursuant to Condition 4.6 of Environmental Permit No. EP-311/2008/B,

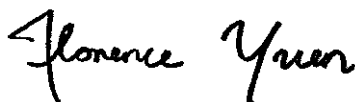
this Biannual EM&A Report on ecological aspects for Nov 2010 to

Apr 2011 has been reviewed, certified by Environmental Team

Leader (ETL) and verified by the Independent Environmental Checker

(IEC)

Certified by:



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Florence Yuen  
Environmental Team Leader (ETL)  
Mott MacDonald Hong Kong Ltd.

Date

13 June 2011

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David Yeung  
Independent Environmental Checker (IEC)  
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13 Jun 2011

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# 1. Introduction

## 1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site in Yuen Long at Wo Shang Wai. An Environmental Impact Assessment (EIA) was carried out under the EIA Ordinance (EIAO) since then and the Environmental Permit (EP-311/2008B) for construction of the comprehensive development in Wo Shang Wai was granted by EPD on 29 July 2010. The Project involves the residential development and associated infrastructure and wetland restoration area and linear landscape area. The construction works under the Environmental Permit commenced on 12 May 2010.

Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by the Contractor, Heng Shung Construction Co. Ltd., to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long.

According to the EP Condition 4.6, the EM&A results on ecological aspects during the construction phase should be reported to the EIA Subcommittee of the ACE, EPD and AFCD on a biannual basis. This is the 2<sup>nd</sup> Biannual EM&A report and it summarises the findings on EM&A results of ecological aspects during the period from 1 November 2010 to 30 April 2011.

## 1.2 Survey Area

Surveys were conducted within 500 m of the Project area. The Wetland Restoration Area (hereafter WRA) was surveyed since early September 2010. The survey transect is provided in **Figure 1.1**.

## 1.3 EM&A Requirements on Ecological impact

The EM&A programme requires environmental monitoring of ecology as specified in the approved EM&A Manual. A summary of ecological impact EM&A requirements is presented in **Table 1.1**:

Table 1.1: Summary of ecological Impact EM&A Requirements

Descriptions	Locations	Frequencies
Birds	Within the Project Area and Assessment Area of 500m	Weekly
Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during Mar and Sep to November, and twice per month during Apr to Aug
Herpetofauna	Within the Project Area and Assessment Area of 500m	Once per month during Apr to Nov
Water quality of WRA	Wetland Restoration Area	After filling of WRA with water, monthly for in situ water quality and every size months (end of wet season and end of dry season) for laboratory testing
Site Inspections	Within the Project Area and Assessment Area of 500m	Weekly

## 2. Ecological Monitoring

### 2.1 Introduction

In accordance with the EM&A requirements, monitoring of birds, dragonflies and butterflies, and herpetofauna was carried out during the reporting period. In addition, monitoring of mammals was also conducted concurrently with other surveys and the results were reported although it is not required by the EM&A manual. The dates of surveys are summarised in **Appendix A**.

### 2.2 Monitoring of Birds

Monitoring was undertaken following the survey methodology in the EM&A Manual. In addition, low intensity monitoring of the WRA was undertaken (on a monthly basis) to monitor faunal usage of the newly formed cells since September 2010; monitoring intensity will follow that outlined in the EM&A Manual at the completion of the WRA. All bird species of conservation importance and/or wetland dependent were identified and enumerated. Flying birds were not recorded unless they were foraging and/or associated with the habitat (such as swifts). Further, notable bird observations during other surveys were also recorded.

Bird surveys were conducted on a weekly basis. A total of 54<sup>1</sup> bird species of conservation importance and/or wetland-dependence were recorded within 500 m of the Project area in the survey period. This number includes all bird of prey species recorded and any locally uncommon or rare species. A summary of survey data is provided in **Appendix B**.

A total of 48<sup>1</sup> bird species were recorded in the Wetland Restoration Area (WRA) in the study period. Of these 48 species, 37 species were bird species of conservation importance and/or wetland-dependence. Bird species of conservation importance recorded so far included four species of ardeids (two of which are target species Little Egret *Egretta garzetta* and Chinese Pond Heron *Ardeola bacchus*), four species of bird of prey and other species of conservation importance, including the endangered Black-faced Spoonbill *Platalea minor*; up to 41 birds were recorded in February 2011. A summary of survey data is provided in **Appendix B**.

Approximately 6 pairs of Little Ringed Plovers were recorded breeding in the WRA at Cells 1 to 3 (of which 3-5 pairs were recorded at Cell 2 and 3) in April 2011.

The species composition and abundance of the avifauna recorded within the Study Area were typical of fish pond areas between November and April (i.e. dry season). Further, the WRA has attracted a number of species of conservation interest; indicating that the WRA was effective in providing habitat suitable for species of interest and acting as a buffer between the site and the fishpond areas.

### 2.3 Monitoring of Herpetofauna

Monitoring was undertaken following the survey methodology in the EM&A Manual. Day-time herpetofauna surveys were conducted monthly in November 2010, while night-time herpetofauna surveys were conducted twice per month between March and April 2011. Further, notable herpetofauna observations during other surveys were also recorded.

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<sup>1</sup> Includes one species pair, Swinhoe's/Pintail Snipe, not distinguishable in the field.

Three amphibian species and a single reptile species were recorded in the survey area, while one of these amphibian species was recorded in the WRA in April 2011. No species of conservation interest was recorded. A summary of survey data is provided in **Appendix C**.

No herpetofauna were recorded in the WRA in the surveys conducted in November 2010 and March 2011.

## **2.4 Monitoring of Dragonflies and Butterflies**

Monitoring of dragonflies and butterflies was conducted monthly in November 2010 and March 2011 and twice-monthly in April 2011. Further, notable dragonfly and butterfly observations during other surveys were recorded.

A total of seven dragonfly species and nine butterfly species were recorded using the ponds within 500 m of the Project in the survey period. While nine dragonfly species and five butterfly species were recorded in the WRA. No species of conservation interest was recorded. A summary of the survey findings is provided in **Appendix C**.

## **2.5 Monitoring of Mammals**

Monitoring of mammals was conducted concurrently with other surveys. One unidentified rat was recorded in the Study Area in the survey period while one unidentified shrew was recorded in the WRA. A summary of the survey findings is provided in **Appendix C**.

## 3. Ecological issues

### 3.1 Ecological Issues/Management Activities

Site formation works at the WRA was completed in mid-November 2010. In accordance with the Habitat Creation Management Plan, a 1-m high chain-link fence is erected between the WRA and the adjacent fishponds, while the noise barrier is re-located to the southern bund between the residential portion of the Site and the WRA. Site access is controlled via a padlocked gate at the fence.

Site access to the WRA was restricted to authorized persons only; a memorandum was issued to all site staff on 23<sup>rd</sup> December 2010.

Soft landscape contractor was appointed in April 2011. Since appointment, the contractor, Yee Sun Gardens Limited, commenced ground preparation work at the WRA, which comprised largely of weeding and general site maintenance such as removal of rubbish.

No ecological issues were identified.

### 3.2 Implications to the WRA Design

There were no additional implications to the WRA design from the survey findings.



## 4. Conclusions

### 4.1 Summary of findings

Ecological monitoring between 1 November 2010 and 30 April 2011 was carried out following the survey methodology and frequency outlined in the EM&A Manual.

A total of 54 bird species, 3 amphibian species, 1 reptile species, 7 dragonfly species and 9 butterfly species were recorded in the ponds within 500 m of the Project area in the survey period. Survey findings indicate that the ponds within the Survey Area supported numbers and diversity of wetland-dependent birds and other species of conservation importance typical of fish pond areas.

48 bird species, 1 amphibian species, 9 dragonfly species and 5 butterfly species were recorded in the WRA, including 37 bird species of conservation importance and/or wetland-dependence, while all dragonfly species are wetland-dependent. These findings indicate that the WRA is supporting wetland-dependent birds and other species of conservation importance.

Survey findings support that the WRA was effective in providing habitat for some species of conservation interest known to occur in the fringes of the Deep Bay Area and in acting as a buffer between the residential portion of the site in the north and the fishpond areas in the south.

## 5. References

### 5.1 List of references

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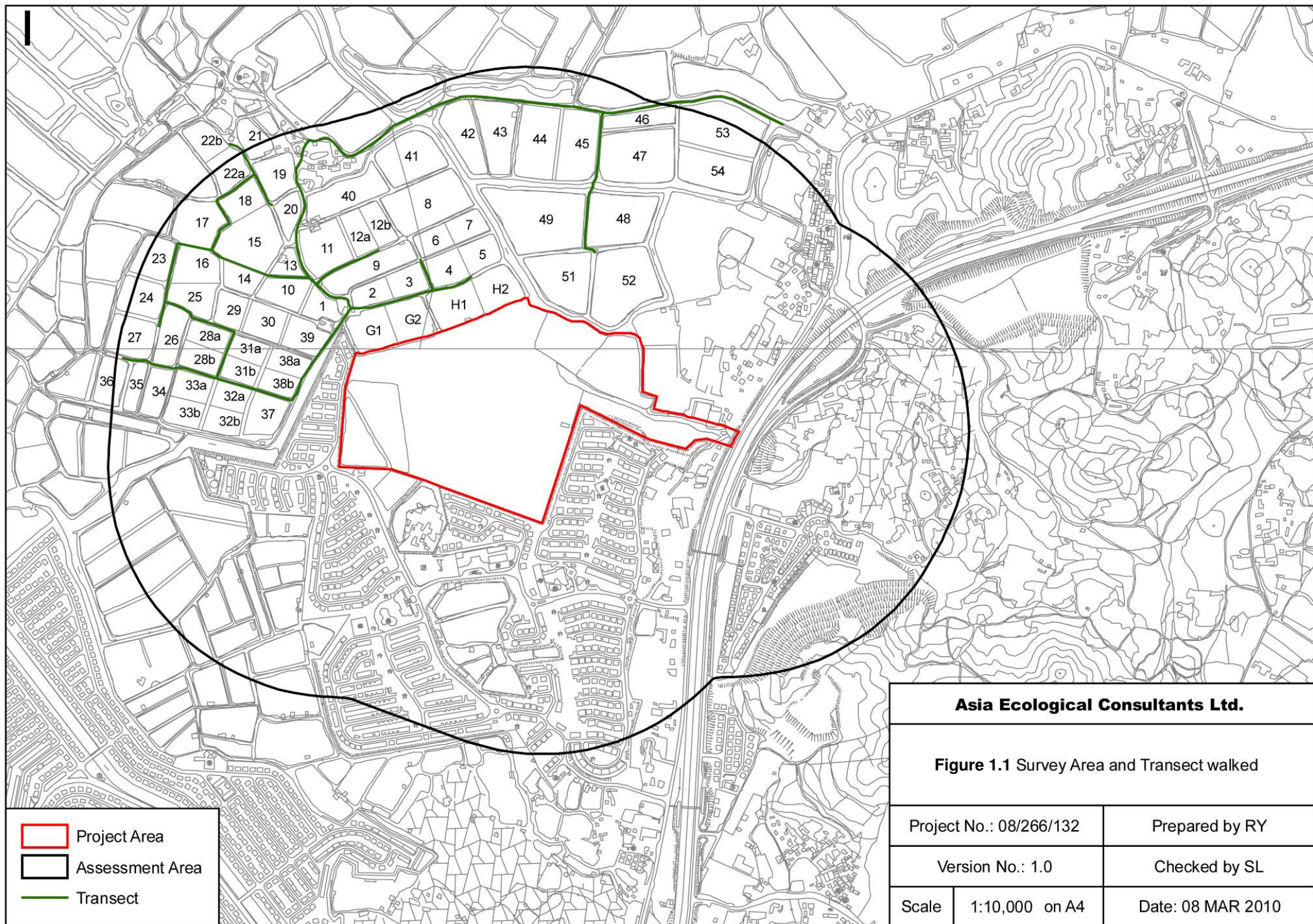
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- Project Area
- Assessment Area
- Transect

**Asia Ecological Consultants Ltd.**

**Figure 1.1 Survey Area and Transect walked**

Project No.: 08/266/132

Prepared by RY

Version No.: 1.0

Checked by SL

Scale 1:10,000 on A4

Date: 08 MAR 2010



## Appendix A. Schedule of Ecological Monitoring

November 2010	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Mammals		✓										✓								✓					✓					
Birds		✓										✓								✓			✓		✓					
Herpetofauna																							✓							
Dragonflies & butterflies																							✓							
Inspection Visits		✓								✓		✓								✓			✓		✓					

December 2010	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals	✓							✓							✓								✓							✓	
Birds	✓							✓							✓								✓							✓	
Herpetofauna																															
Dragonflies & butterflies																															
Inspection Visits	✓							✓							✓								✓							✓	

January 2011	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals					✓					✓							✓									✓					
Birds					✓					✓							✓									✓					
Herpetofauna																															
Dragonflies & butterflies																															
Inspection Visits					✓					✓							✓									✓					

February 2011	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Mammals		✓					✓									✓									✓			
Birds		✓					✓									✓									✓			
Herpetofauna																												
Dragonflies & butterflies																												
Inspection Visits		✓					✓									✓									✓			



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March 2011	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals	✓							✓				✓			✓		✓					✓							✓		✓
Birds	✓											✓					✓					✓									✓
Herpetofauna															✓														✓		
Dragonflies & butterflies								✓																							
Inspection Visits	✓											✓					✓					✓									✓

April 2011	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Mammals				✓		✓								✓	✓			✓		✓	✓					✓				
Birds				✓											✓					✓						✓				
Herpetofauna						✓												✓												
Dragonflies & butterflies														✓						✓										
Inspection Visits				✓											✓					✓						✓				

Note:

\* Light grey cells indicated public holidays or Sundays.

## Appendix B. Summary of bird surveys

Table B1. Summary of bird monitoring within the Survey Area

Species Name	Scientific Name	Conservation Status <sup>(2)</sup>	Mean <sup>(3)</sup>					
			Nov	Dec	Jan	Feb	Mar	Apr
Little Grebe	<i>Tachybaptus ruficollis</i>	LC, (1)	43.3	30.6	18.0	24.3	13.0	4.0
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC, (1)	10.0	15.4	12.5	24.3	11.0	0.0
Grey Heron	<i>Ardea cinerea</i>	PRC, (1)	18.0	15.4	9.3	11.0	3.6	0.0
Great Egret	<i>Egretta alba</i>	PRC, (1)	10.0	8.2	11.3	5.8	19.0	3.8
Intermediate Egret	<i>Egretta intermedia</i>	RC, (1)	1.3	0.4	1.5	0.3	0.8	0.8
Little Egret	<i>Egretta garzetta</i>	PRC, (1)	41.3	23.6	75.0	103.5	55.2	24.3
Cattle Egret	<i>Bubulcus ibis</i>	(LC)	0.0	0.6	0.0	0.5	0.6	2.5
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC, (1)	36.3	15.2	22.3	14.5	13.2	21.8
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	(LC), (1)	0.3	0.0	0.0	0.0	0.0	0.3
Black-faced Spoonbill	<i>Platalea minor</i>	PGC, EN, (1)	5.3	1.4	13.3	5.0	5.0	2.8
Northern Shoveler	<i>Anas clypeata</i>	RC, (1)	1.5	0.2	0.0	0.0	0.0	0.0
Tufted Duck	<i>Aythya fuligula</i>	LC, (1)	0.0	0.0	0.0	5.3	0.2	0.0
Osprey	<i>Pandion haliaetus</i>	RC	0.0	0.6	0.3	0.3	0.0	0.0
Black Kite	<i>Milvus migrans</i>	(RC)	0.0	0.6	0.0	0.3	0.2	0.0
Besra	<i>Accipiter virgatus</i>	-	0.3	0.0	0.0	0.0	0.0	0.0
Common Buzzard	<i>Buteo buteo</i>	-	0.3	0.0	0.3	0.3	0.0	0.0
Common Kestrel	<i>Falco tinnunculus</i>	-	0.0	0.0	0.0	0.3	0.0	0.0
Japanese Quail	<i>Coturnix japonica</i>	LC, (1)	0.0	0.0	0.0	0.0	0.0	0.3
Eastern Water Rail	<i>Rallus aquaticus</i>	LC, (1)	0.0	0.4	0.3	0.3	0.4	0.0
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	(1)	2.5	0.8	2.5	0.8	1.2	2.0
Common Moorhen	<i>Gallinula chloropus</i>	(1)	19.0	16.6	18.3	21.3	15.2	3.3
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	LC, (1)	0.3	0.0	0.0	0.0	0.0	0.0
Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC, (1)	0.3	0.0	0.0	0.0	0.0	0.0
Black-winged Stilt	<i>Himantopus himantopus</i>	RC, (1)	5.8	2.0	0.3	0.0	0.0	0.0
Pied Avocet	<i>Recurvirostra avosetta</i>	RC, (1)	0.0	1.2	0.0	0.0	0.0	0.0
Little Ringed Plover	<i>Charadrius dubius</i>	LC, (1)	9.8	17.4	9.0	5.3	3.2	3.5



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Species Name	Scientific Name	Conservation Status <sup>(2)</sup>	Mean <sup>(3)</sup>					
			Nov	Dec	Jan	Feb	Mar	Apr
Kentish Plover	<i>Charadrius alexandrinus</i>	RC, (1)	0.3	0.0	0.0	0.0	0.0	0.0
Spotted Redshank	<i>Tringa erythropus</i>	RC, (1)	0.3	0.2	0.0	0.0	0.0	0.0
Common Redshank	<i>Tringa totanus</i>	RC, (1)	0.3	0.0	0.0	0.0	0.0	0.0
Marsh Sandpiper	<i>Tringa stagnatilis</i>	RC, (1)	2.5	0.0	0.0	0.0	0.0	0.0
Common Greenshank	<i>Tringa nebularia</i>	RC, (1)	3.5	3.0	3.3	1.3	1.0	0.5
Green Sandpiper	<i>Tringa ochropus</i>	(1)	7.3	7.2	4.0	4.8	2.4	2.0
Wood Sandpiper	<i>Tringa glareola</i>	LC, (1)	8.3	8.4	3.3	4.0	3.0	3.0
Common Sandpiper	<i>Actitis hypoleucos</i>	(1)	20.5	14.8	9.8	5.3	8.4	9.8
Pintail/Swinhoe's Snipe*	<i>Gallinago stenura/G. megala</i>	LC, (1)	0.0	0.6	0.3	0.0	0.0	0.0
Common Snipe	<i>Gallinago gallinago</i>	(1)	1.0	0.2	0.3	0.3	0.0	0.0
Temminck's Stint	<i>Calidris temminckii</i>	LC, (1)	3.3	3.6	3.8	4.5	0.4	0.0
Black-headed Gull	<i>Larus ridibundus</i>	PRC, (1)	0.0	0.0	0.3	0.0	0.2	0.0
Pied Kingfisher	<i>Ceryle rudis</i>	(LC), (1)	0.3	0.2	0.0	0.5	0.4	0.3
Common Kingfisher	<i>Alcedo atthis</i>	(1)	7.8	6.0	3.0	2.5	2.2	0.5
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	(LC)	2.0	1.0	0.3	0.0	0.4	0.0
Yellow Wagtail	<i>Motacilla flava</i>	(1)	23.5	25.8	14.8	18.0	9.6	39.3
Grey Wagtail	<i>Motacilla cinerea</i>	(1)	0.5	0.6	0.0	0.0	0.8	0.8
Red-throated Pipit	<i>Anthus cervinus</i>	LC	1.3	2.8	0.3	2.5	1.2	1.3
Buff-bellied Pipit	<i>Anthus rubescens</i>	LC	0.0	1.0	0.0	0.3	0.0	0.0
Bluethroat	<i>Luscinia svecica</i>	LC	0.0	0.0	0.0	0.3	0.0	0.0
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	(1)	0.8	0.0	0.0	0.0	0.0	0.0
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	(1)	0.3	0.0	0.0	0.0	0.0	0.0
Zitting Cisticola	<i>Cisticola juncidis</i>	LC	2.8	3.2	0.8	0.8	1.2	1.5
Red-billed Starling	<i>Sturnus sericeus</i>	GC	46.8	153.2	277.5	163.5	19.0	0.0
White-cheeked Starling	<i>Sturnus cineraceus</i>	PRC	2.8	5.0	5.8	10.7	1.2	0.0
White-shouldered Starling	<i>Sturnus sinensis</i>	(LC)	0.0	0.0	0.0	0.0	0.0	2.0
Collared Crow	<i>Corvus torquatus</i>	LC, NT	1.5	1.8	1.3	0.8	1.6	1.0
<b>No. of Species Recorded</b>			<b>40</b>	<b>39*</b>	<b>33*</b>	<b>34</b>	<b>31</b>	<b>24</b>

(1) indicates wetland-dependant or wetland-associated species.

(2) Conservation status follows that of Fellowes et al. (2002) and BirdLife International listing (2010).

(3) refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA)

\* Includes one species pair, Swinhoe's/Pintail Snipe, not distinguishable in the field. Swinhoe's Snipe is listed as Local Concern in Fellowes et al. (2002)

**Table B2. Summary of bird monitoring in the WRA**

Common Name	Scientific Name	Conservation Status <sup>(2)</sup>	Mean <sup>(3)</sup>						Records Outside Survey
			Nov	Dec	Jan	Feb	Mar	Apr	
Little Grebe	<i>Tachybaptus ruficollis</i>	LC, (1)	0.0	0.0	0.5	0.0	0.0	0.0	
Great Cormorant	<i>Phalacrocorax carbo</i>	PRC, (1)	0.0	0.0	0.8	0.0	0.0	0.0	
Grey Heron	<i>Ardea cinerea</i>	PRC, (1)	1.0	1.6	2.0	2.0	0.4	0.0	
Great Egret	<i>Egretta alba</i>	PRC, (1)	0.0	0.4	14.0	2.0	0.2	0.5	
Intermediate Egret	<i>Egretta intermedia</i>	RC, (1)	0.0	0.0	1.7	0.8	0.2	0.0	
Little Egret	<i>Egretta garzetta</i>	PRC, (1)	0.0	1.8	8.0	2.0	0.4	0.5	
Chinese Pond Heron	<i>Ardeola bacchus</i>	PRC, (1)	1.0	0.2	0.0	0.0	0.0	0.3	
Black-faced Spoonbill	<i>Platalea minor</i>	PGC, EN, (1)	0.0	0.0	0.3	10.3	0.0	0.0	
Eurasian Wigeon	<i>Anas penelope</i>	RC, (1)	0.0	1.6	2.5	0.0	0.0	0.0	
Common Teal	<i>Anas crecca</i>	RC, (1)	0.0	0.0	1.0	0.0	0.0	0.0	
Northern Pintail	<i>Anas acuta</i>	RC, (1)	0.0	0.2	7.0	0.0	0.0	0.0	
Osprey	<i>Pandion haliaetus</i>	RC, (1)	0.0	0.2	0.0	0.0	0.0	0.0	
Black Kite	<i>Milvus migrans</i>	(RC)	0.0	0.0	0.8	0.3	0.2	0.0	
Common Buzzard	<i>Buteo buteo</i>	-	0.0	0.0	0.0	0.0	0.2	0.0	
Common Kestrel	<i>Falco tinnunculus</i>	-	1.0	0.4	1.0	0.3	0.4	0.0	
Japanese Quail	<i>Coturnix japonica</i>	LC, (1)	0.0	0.0	0.0	0.0	0.0	0.0	✓
Greater Painted-snipe	<i>Rostratula benghalensis</i>	LC, (1)	0.0	0.0	0.0	0.0	0.0	0.5	
Pied Avocet	<i>Recurvirostra avosetta</i>	RC, (1)	0.0	0.2	0.0	0.0	0.0	0.0	
Oriental Pratincole	<i>Glareola maldivarum</i>	LC, (1)	0.0	0.0	0.0	0.0	0.0	2.5	
Little Ringed Plover	<i>Charadrius dubius</i>	LC, (1)	24.5	7.4	3.8	9.0	6.8	10.5	
Common Greenshank	<i>Tringa nebularia</i>	RC, (1)	0.5	0.0	0.0	0.0	0.0	0.0	✓
Green Sandpiper	<i>Tringa ochropus</i>	(1)	1.0	0.4	0.5	0.5	0.4	0.0	✓
Wood Sandpiper	<i>Tringa glareola</i>	LC, (1)	0.0	0.0	0.0	0.5	1.2	0.0	✓
Common Sandpiper	<i>Actitis hypoleucos</i>	(1)	0.5	1.0	0.0	0.5	0.6	1.0	
Pintail/Swinhoe's Snipe*	<i>Gallinago stenura/G. megala</i>	LC, (1)	0.5	0.0	0.0	0.0	0.0	0.0	✓
Common Snipe	<i>Gallinago gallinago</i>	(1)	0.0	0.0	0.0	0.3	0.2	0.0	
Temminck's Stint	<i>Calidris temminckii</i>	LC, (1)	0.5	0.0	0.0	2.5	0.4	1.3	
Long-toed Stint	<i>Calidris subminuta</i>	LC, (1)	0.0	0.0	0.0	0.0	0.0	0.0	✓
Pacific Swift	<i>Apus pacificus</i>	(LC)	0.0	0.0	0.0	0.0	0.0	0.3	
Little Swift	<i>Apus affinis</i>	-	0.0	0.0	0.0	0.0	0.2	0.0	

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Common Name	Scientific Name	Conservation Status <sup>(2)</sup>	Mean <sup>(3)</sup>						Records Outside Survey
			Nov	Dec	Jan	Feb	Mar	Apr	
Pied Kingfisher	<i>Ceryle rudis</i>	(LC), (1)	0.0	0.2	0.3	0.5	0.2	0.0	
Common Kingfisher	<i>Alcedo atthis</i>	(1)	0.0	0.4	0.5	0.3	0.0	0.3	
Barn Swallow	<i>Hirundo rustica</i>	-	0.0	0.0	0.0	1.5	0.0	0.0	
Yellow Wagtail	<i>Motacilla flava</i>	(1)	14.5	10.2	15.0	23.5	8.2	11.8	
Grey Wagtail	<i>Motacilla cinerea</i>	(1)	0.0	0.2	0.0	0.3	0.2	0.0	
White Wagtail	<i>Motacilla alba</i>	(1)	0.0	1.8	0.0	0.0	0.0	0.0	
Richard's Pipit	<i>Anthus richardi</i>	-	1.5	0.8	0.5	1.0	1.0	1.8	
Olive-backed Pipit	<i>Anthus hodgsoni</i>	-	0.5	0.0	0.0	0.0	0.0	0.0	
Red-throated Pipit	<i>Anthus cervinus</i>	LC	2.5	1.2	0.5	0.5	0.2	0.0	
Buff-bellied Pipit	<i>Anthus rubescens</i>	LC	1.5	0.0	0.0	0.0	0.0	0.0	
Common Stonechat	<i>Saxicola torquata</i>	-	0.5	1.0	1.0	0.8	0.2	0.3	
Zitting Cisticola	<i>Cisticola juncidis</i>	LC	0.0	0.0	0.0	0.0	0.2	1.5	
Little Bunting	<i>Emberiza pusilla</i>	-	0.5	0.0	0.0	0.0	0.0	0.0	
Black-faced Bunting	<i>Emberiza spodocephala</i>	-	0.0	0.0	0.0	0.0	0.0	0.5	
Scaly-breasted Munia	<i>Lonchura punctulata</i>	-	0.0	0.0	0.0	2.5	0.0	15.0	
Large-billed Crow	<i>Corvus macrorhynchos</i>	-	0.0	0.4	0.0	0.0	0.2	0.0	
Collared Crow	<i>Corvus torquatus</i>	LC, NT	0.0	0.2	0.3	0.0	0.0	0.5	
No. of Species Recorded			17*	20	20	22	21	16	7*

(1) indicates wetland-dependant or wetland-associated species.

(2) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010).

(3) refers to the mean number of individuals recorded in each survey in the WRA

(4) Black-faced Spoonbill is listed as endangered in the IUCN Red List.

\* Includes one species pair, Swinhoe's/Pintail Snipe, not distinguishable in the field. Swinhoe's Snipe is listed as Local Concern in Fellowes *et al.* (2002)

## Appendix C. Summary of herpetofauna monitoring, mammals and insects surveys

Table C1. Summary of herpetofauna monitoring within the Survey Area

Common Name	Scientific Name	Conservation Status <sup>(1)</sup>	Mean <sup>(2)</sup>		
Amphibian			Nov	Mar	Apr
Asian Common Toad	<i>Bufo melanostictus</i>	-	0.0	0.0	0.5
Paddy Frog	<i>Fejervarya limnocharis</i>	-	0.0	0.0	0.5
Günther's Frog	<i>Rana guentheri</i>	-	0.0	0.0	0.5
No. of Species Recorded			0	0	3
Reptile			Nov	Mar	Apr
Bowring's Gecko	<i>Hemidactylus bowringii</i>	-	0.0	0.0	2.0
No. of Species Recorded			0	0	1

(1) Conservation status follows that of Fellowes *et al.* (2002), Chan *et al.* (2005) and Karsen *et al.* (1998).

(2) refers to the number of individuals recorded in each month in the survey area (excluding the WRA)

Table C2. Summary of herpetofauna monitoring conducted in the WRA

Common Name	Scientific Name	Conservation Status <sup>(1)</sup>	Mean <sup>(2)</sup>		
Amphibian			Nov	Mar	Apr
Günther's Frog	<i>Rana guentheri</i>	-	0.0	0.0	0.5
No. of Species Recorded			0	0	1
Reptile			Nov	Mar	Apr
(No record)					

(1) Conservation status follows that of Fellowes *et al.* (2002), Chan *et al.* (2005) and Karsen *et al.* (1998).

(2) refers to the number of individuals recorded in each month in the WRA

Table C3. Summary of mammal monitoring within the Study Area

Common Name	Scientific Name	Conservation Status <sup>(1)</sup>	Max <sup>(2)</sup>					
			Nov	Dec	Jan	Feb	Mar	Apr
Rat sp.	-	-	0.0	0.0	0.0	0.0	1.0	0.0
No. of Species Recorded			0	0	0	0	1	0

(1) Conservation status follows that of Fellowes et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month in the survey area (excluding WRA).

Table C4. Summary of mammal monitoring conducted in the WRA

Common Name	Scientific Name	Conservation Status <sup>(1)</sup>	Max <sup>(2)</sup>					
			Nov	Dec	Jan	Feb	Mar	Apr
Shrew sp.	-	Uncommon	0.0	0.0	0.0	0.0	1.0	0.0
No. of Species Recorded			0	0	0	0	1	0

(1) Conservation status follows that of Fellowes et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month in the WRA.

Table C5. Summary of dragonfly and butterfly monitoring within the Survey Area

Common Name		Scientific Name	Conservation Status <sup>(1)</sup>	Mean <sup>(2)</sup>		
Odonate				Nov	Mar	Apr
Asian Amberwing	<i>Brachythemis contaminata</i>	-	0.0	0.0	1.0	
Common Bluetail	<i>Aschnura senegalensis</i>	-	1.0	0.0	0.0	
Crimson Darter	<i>Crocothemis servilia</i>	-	1.0	0.0	0.0	
Green Skimmer	<i>Orthetrum sabina</i>	-	4.0	0.0	1.0	
Lesser Blue Skimmer	<i>Orthetrum triangulare</i>	-	0.0	0.0	1.0	
Wandering Glider	<i>Pantala flavescens</i>	-	6.0	0.0	0.5	
Saddlebag Glider	<i>Tramea virginia</i>	-	3.0	0.0	0.0	
No. of Species Recorded			5	0	4	
Butterfly			Nov	Mar	Apr	
Unidentified Swift	<i>Pelopidas</i> sp.	-	1.0	0.0	0.0	
Common Mormon	<i>Papilio polytes</i>	-	0.0	0.0	0.5	
Red-base Jezebel	<i>Delias pasithoe</i>	-	1.0	0.0	0.0	
Indian Cabbage White	<i>Pieris canidia</i>	-	17.0	0.0	10.0	
Common Grass Yellow	<i>Eurema hecabe</i>	-	6.0	0.0	0.0	
Unidentified Cerulean	<i>Jamides</i> sp.	-	2.0	0.0	0.0	
Pale Grass Blue	<i>Zizeeria maha</i>	-	7.0	0.0	0.0	
Common Tiger	<i>Danaus genutia</i>	-	1.0	0.0	0.0	
Blue-spotted Crow	<i>Euploea midamus</i>		1.0	0.0	0.0	
No. of Species Recorded			8	0	2	

(1) Conservation status follows that of Fellowes *et al.* (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) refers to the mean number of individuals recorded in each month in the survey area (excluding the WRA)

Table C6. Summary of dragonfly and butterfly monitoring conducted in the WRA

Table 66: Summary of dragonfly and damselfly monitoring conducted in the WPA					
Common Name	Scientific Name	Conservation Status <sup>(1)</sup>	Mean <sup>(2)</sup>		
Odonate			Nov	Mar	Apr
Common Bluetail	<i>Ischnura senegalensis</i>	-	8.0	100.0	591.0
Pale-spotted Emperor	<i>Anax guttatus</i>	-	1.0	0.0	0.0
Lesser Emperor	<i>Anax parthenope</i>	-	1.0	0.0	0.0
Regal Pond Cruiser	<i>Epopthemia elegans</i>	-	0.0	0.0	0.5
Crimson Darter	<i>Crocothemis servilia</i>	-	3.0	0.0	0.5
Blue Percher	<i>Diplacodes trivialis</i>	-	2.0	0.0	0.0
Common Red Skimmer	<i>Orthetrum pruinosum</i>	-	1.0	0.0	0.0
Green Skimmer	<i>Orthetrum sabina</i>	-	30.0	0.0	5.0
Wandering Glider	<i>Pantala flavescens</i>	-	25.0	0.0	0.5
No. of Species Recorded			8	1	5
Butterfly			Nov	Mar	Apr
Common Straight Swift	<i>Parnara guttatus</i>	-	1.0	0.0	0.0
Common Bluebottle	<i>Graphium sarpedon</i>	-	0.0	0.0	0.5
Lemon Emigrant	<i>Catopsilia pomona</i>	-	1.0	0.0	0.0
Common Grass Yellow	<i>Eurema hecabe</i>	-	4.0	0.0	0.0
Blue-spotted Crow	<i>Euploea midamus</i>	-	2.0	0.0	0.0
No. of Species Recorded			4	0	1

(1) Conservation status follows that of Fellowes *et al.* (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) refers to the mean number of individuals recorded in each month in the WRA