Proposed Comprehensive Development at Wo Shang Wai, Yuen Long

Biannual EM&A Report on Ecology for Nov 2012 to Apr 2013 (Rev. A)

May 2013

Report No.: 266567/57/A

Mott MacDonald

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Pursuant to Condition 4.6 of Environmental Permit No. EP-311/2008/D, this Biannual EM&A Report on ecological aspects for November 2012 to April 2013 has been reviewed, certified by the Environmental Team Leader (ETL) and verified by the Independent Environmental Checker (IEC).

Certified by:

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

Date 6 June 2013

Verified by:

David Yeung
Independent Environmental Checker (IEC)
ENVIRON Hong Kong Limited

Date 10 June 2013

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1. Introduction

1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site at Wo Shang Wai in Yuen Long. An Environmental Impact Assessment (EIA) was then carried out and approved under the EIA Ordinance (EIAO), and the Environmental Permit (EP-311/2008) for construction of the comprehensive development in Wo Shang Wai was first granted by EPD on 9 September 2008 and has been subsequently varied, with the current version (EP-311/2008/D) issued by EPD on 20 March 2013.

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. The site formation construction works of the Wetland Restoration Area (hereafter WRA) were completed on 15 November 2010, while the 30-month establishment period of the WRA was concluded in October 2012 – this indicated that planting works as scheduled in the approved Wetland Restoration and Creation Scheme (WRCS; Nov 2009) was complete, except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which a Variation to Environmental Permit (EP-311/2008/C) to defer planting at the location was approved. This factor remains applicable in the current valid EP (EP-311/2008/D) which also includes specific mitigation measures to minimise certain identified noise impacts during the operation phase of the Project.

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 6th Biannual EM&A report and it summarises the findings on EM&A results of ecological aspects during the period from 1 November 2012 to 30 April 2013. This report documents surveys and management activities conducted in the Survey Area and WRA between 1 November 2012 to 30 April 2013, which is based on ecological surveys and advices on management which were undertaken by the appointed ecological consultant (Green Power/Ecological Resource Centre) during the reporting period.

1.2 Survey Area

Surveys were conducted within 500m of the Project area. The WRA was surveyed since early September 2010. The survey area and transect are 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

Descriptions	Locations	Frequencies
Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during Mar and Sep to Nov, and twice per month during Apr to Aug
Herpetofauna	Within the Project Area and Assessment Area of 500m	Daytime: Once per month during Apr to Nov Night-time: Once per month during Mar to Aug
Water quality of Wetland Restoration Area (WRA)	WRA	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 and frequency outlined in the EM&A Manual (Table 7-1). Since September 2010, monitoring included the newly formed cells to monitor faunal usage of this area. 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 throughout the period. A total of 62 bird species were recorded in the Survey Area (excluding the WRA) in November 2012 to April 2013, 32 of which were species of conservation importance and/or wetland-dependence. A summary of survey data is provided in **Appendix B**.

A total of 52 species were recorded in the WRA in the survey periods, 30 of which were species of conservation importance and/or wetland-dependent species. Of all three target species (i.e. Little Egret (*Egtretta garzetta*), Eastern Cattle Egret (*Bubulcus coromandus*) and Chinese Pond Heron (*Ardeola bacchus*)), two were recorded in the WRA (Little Egret and Chinese Pond Heron). The WRA has attracted a number of species of conservation interest, including one uncommon Black-browed Reed Warbler, *Acrocephalus bistrigiceps,* and one local concern wetland dependence species, Black-crowned Night Heron, *Nycticorax nycticorax*; indicating that the WRA was effective in providing habitat suitable for species of interest. Outside routine surveys, one near-threatened Collared Crow, *Corvys torquatus*, was recorded in the WRA.

The fishponds to the north of the WRA are at a greater distance from the residential portion and any disturbance impact(s) from the construction works would have first affected the WRA. Further, 34 bird species of conservation importance and/or wetland-dependence, were observed using the site, including some bird species which are highly sensitive to disturbance and two bird target species (i.e. Little Egret and Chinese Pond Heron). Thus, the WRA is considered to be effective both in acting as a buffer against potential disturbance impacts from the construction site and in providing suitable wetland habitats at the fringe of the Deep Bay system.

2.3 Monitoring of Herpetofauna

Monitoring was undertaken following the survey methodology in the EM&A Manual. Day-time herpetofauna surveys were conducted once per month in November 2012 and April 2013. Further, notable herpetofauna observations during other surveys were also recorded.

No herpetofauna species were recorded in the survey area (excluding WRA) nor the WRA in the survey period. A summary of survey data is provided in **Appendix C**.

2.4 Monitoring of Dragonflies and Butterflies

Monitoring of dragonflies and butterflies was conducted once per month in November 2012 and March 2013 and twice-monthly in April 2013. Further, notable dragonfly and butterfly observations during other surveys were recorded.

A total of four dragonfly species and three butterfly species were recorded using the ponds in the survey area (excluding WRA) in the survey period. At the WRA, a higher diversity of dragonfly species (seven species) and six butterfly species were 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 Ryukyu Mouse, *Mus caroli*, was recorded in the Study Area (excluding WRA) in the survey period, Ryukyu Mouse is regarded as of 'local concern' by Fellowes *et al*. (2002). No mammal was recorded in the WRA during regular survey. A Small Asian Mongoose, *Herpestes javanicus,* and Japanese Pipistrelle, *Pipistrellus abramus,* were recorded outside survey within the WRA. A summary of the survey findings is provided in **Appendix C**.

2.6 Monitoring of Water Quality

Monthly water quality monitoring continued during the reporting period. Monitoring parameters followed that in the EM&A Manual. During the reporting period, pH of some Cells reached the Action Level. No measures are proposed at the moment, but the condition will be monitored. Monitoring data are presented in **Appendix D**.

2.7 Monitoring of Soil Quality

No soil sample was collected for laboratory analysis during the reporting period.

3. Ecological issues

3.1 Vegetation Management

Vegetation management activities undertaken at the site primarily involved watering of plants, tree pruning, weeding and grass cutting. Some supplemental planting was undertaken at end of August 2012.

Removal of exotic vegetation was undertaken during the reporting period which included *Ipomoes* sp., *Mikania* sp., *Mimosa* sp., *Pennisetum* sp. and *Typha* sp.

3.2 Wildlife Management

Removal of Golden Apple Snails was undertaken on an “as-seen” basis.

All fire ant nests were treated with an approved pesticide and covered with overturn baskets for a week. All treated fire ant nests were inactive within one week of treatment.

4. Conclusions

4.1 Summary of Findings

Ecological monitoring between 1 November 2012 and 30 April 2013 was carried out following the survey methodology and frequency outlined in the EM&A Manual.

Summary of survey findings are listed as follows (**Table 4.1**):

Table 4.1: Summary of Ecological Monitoring in WRA and Survey Area

Number of Species	Survey Area (excluding WRA)	WRA
Birds (total)	62	52
Birds (of conservation importance and/or wetland-dependence)	32	30
Amphibians	0	0
Reptiles	0	0
Mammals	1	2
Dragonflies	4	7
Butterflies	3	6

A total of 52 bird species, two mammal species, seven dragonfly species and six butterfly species were recorded in the WRA, including 30 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 indicate that the WRA is attracting the three target species to varying degrees. During the reporting period, the site was particularly attractive to Little Egret, which was recorded on a near-weekly basis, with monthly means ranging from 0.8 to 2.2 birds per survey. Chinese Pond Heron was recorded in four out of the six months under review (November 2012 to April 2013), with monthly means ranging from 0.4 to 2.4 birds per survey. Eastern Cattle Egret was least attracted to the site; no Eastern Cattle Egret was recorded under the review period (November 2012 and April 2013).

With the completion of planting as scheduled in the approved HCMP in August 2012, establishment work at the WRA is considered complete (except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which a previous Variation to Environmental Permit (EP-311/2008/C) to defer planting at the location was approved by EPD and remains applicable in the current valid EP (EP-311/2008/D)), and the 30-month establishment period concluded in October 2012. A review of the performance of the WRA in terms of target species attraction over the 30-month establishment period is provided in Section 4.2 below.

It should be noted that the high planting density was intended to ensure a rapid establishment of the site prior to occupation intake, and not intended to be maintained as a long-term tree density at the WRA. It is a standard arboricultural practice to apply appropriate horticultural/arboricultural maintenance methods in the subsequent five or six years after initial planting to remove less desired specimens to facilitate the successful growth of those which are of higher landscape and/or ecological value. Further, some fine-tuning of planting locations and tree/shrub mix is required in order to fulfill the design intent of the habitat structure at WRA after reviewing the site configuration following site formation. Vegetation management

hereafter should largely consist of maintenance of planted trees and shrubs for the creation of suitable habitats for target species and long-term habitat structure of the site.

4.2 WRA Performance for the Target Species

The provision, maintenance and operation of a WRA are a requirement under the Environmental Permit for compensation for predicted ecological impacts to species of conservation importance. Three bird target species were identified during the EIA process; these are Little Egret, Eastern Cattle Egret and Chinese Pond Heron. Target levels of these species are the annual mean number recorded during the Baseline Ecological Monitoring (i.e. a mean of 5.5 Little Egret, 1.3 Eastern Cattle Egret and 1.3 Chinese Pond Heron over a 12-month period). Thus, the ecological impact of the project to the species concerned is considered to have been fully compensated for when the target level for each of the three species is achieved.

The 30-month establishment period of the WRA was concluded in October 2012 – this indicated that planting works as scheduled in the approved Wetland Restoration and Creation Scheme (WRCS; Nov 2009) was complete, except as described in Section 4.1 above.

Of all three target species, two were recorded using the site including Chinese Pond Heron and Little Egret during the reporting period (November 2012 – April 2013). Among all target species, Little Egret was recorded most regularly (recorded in all six months of the reporting period), followed by Chinese Pond Heron (recorded in four out of the six months) and no Eastern Cattle Egret was recorded during the reporting period. **Table 4.2** below presents the target level achievement of the three target bird species during and after the establishment period.

Table 4.2: Annual Mean of the Three Bird Target Species Recorded at the WRA between May 2010 and Apr 2013

Common Name	Scientific name	Conservation Status (2)	May10-Apr11	May11-Apr12	May12-Apr13
Little Egret	*Egretta garzetta*	PRC, (RC)	1.6	1.0	0.9
Eastern Cattle Egret	*Bubulcus coromandus*	(LC)	0.0	1.2	0.0
Chinese Pond Heron	*Ardeola bacchus*	PRC, (RC)	0.2	**2.7**	**1.3**

Note:

(1) Values **in bold** indicate that the Target Level was achieved.

(2) Conservation Status follows that of Fellowes *et. al.* (2002). See **Appendix B** (**Table B3**).

Based on **Table 4.2** above, the annual mean target level for Chinese Pond Heron was achieved between May 2012 and April 2013. Target levels for Little Egret and Eastern Cattle Egret were not achieved between May 2012 and April 2013. As the WRA was still under establishment phase during part of this annual period, the survey findings are considered acceptable. However, should this situation continue a review of the management of the WRA and adaptive management steps will be required.

A total of 102 bird species have been recorded within the WRA since completion of site formation. Of the 102 species, 69 were species of conservation importance and/or wetland dependence - indicating that the WRA provides suitable habitat for these species despite the construction work within the residential portion of the Project Site. A list of the bird species recorded at the WRA since completion of site formation is provided in **Appendix B** (**Table B4**).

The site continuously attracts bird species of conservation importance, indicating that the WRA not only provides a buffer for potential disturbance during construction phase, it is also a valuable habitat for wetland dependent species and species of conservation importance.

5. References

5.1 List of References

Chan, S. K.F., K.S. Cheung, C.Y. Ho, F.N Lam & W.S. Tam, 2005. *A Field Guide to the Amphibians of Hong Kong*. Cosmos Books Ltd., Hong Kong.

Fellowes *et al*., 2002. Wild Animals to Watch: Terrestrial and Freshwater Fauna of Conservation Concern in Hong Kong.

Karsen, S., M.W.N. Lau & A. Bogadek, 1998. *Hong Kong Amphibians and Reptiles*. Provisional Urban Council, Hong Kong.

IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on **07 October 2011**

Lo, P. Y. F. and W.L. Hui, 2004. *Hong Kong Butterflies*. Hong Kong, Cosmos Books Ltd.

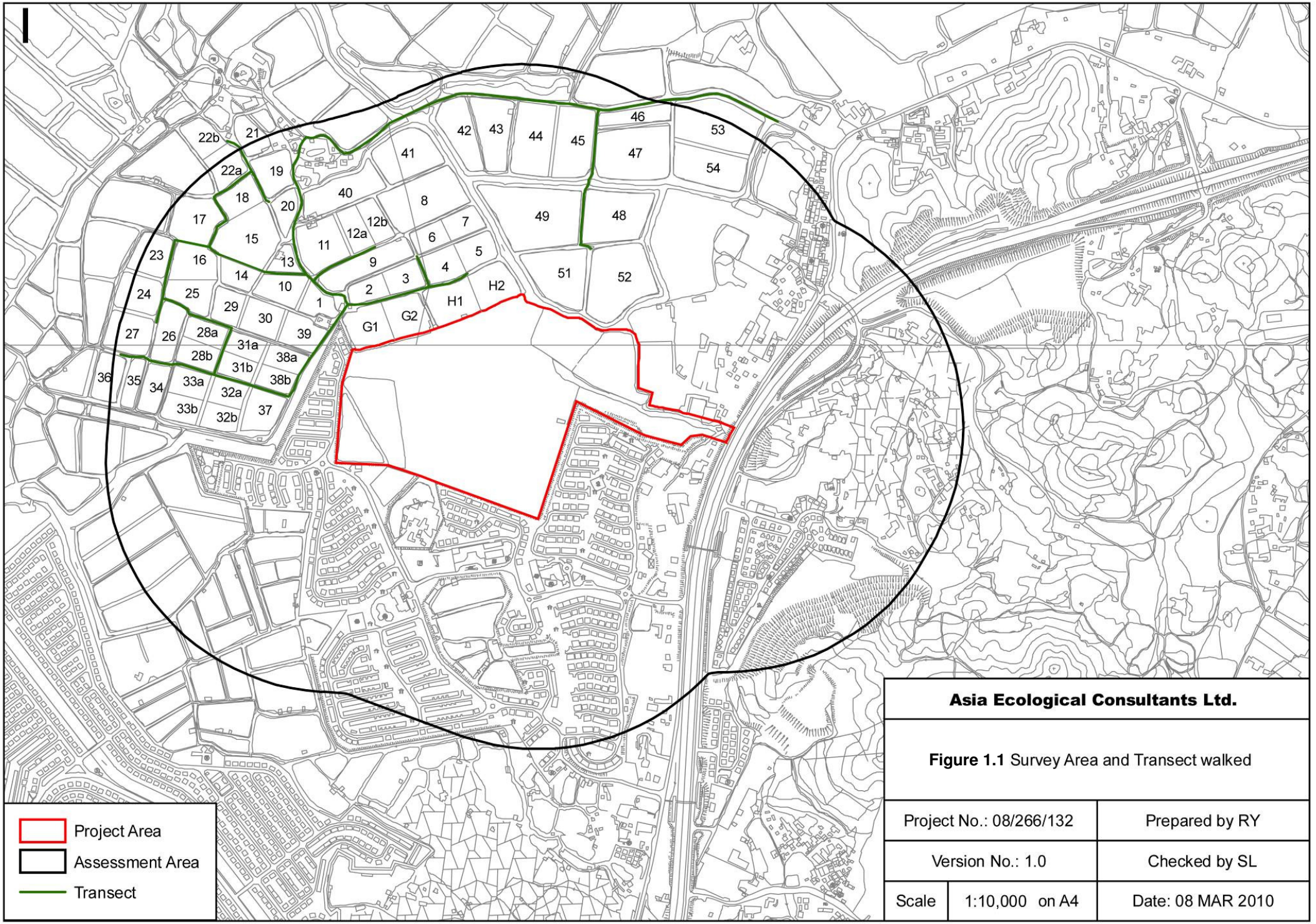
Mott, 2008. *WSW Environmental Monitoring and Audit Manual (March 2008)*.

Mott, 2008. *WSW Environmental Impact Assessment Report Volumes 1 to 3 (March 2008)*

Shek, C. T. 2006. *A Field Guide to the Terrestrial Mammals of Hong Kong*. Friends of the Country Parks Cosmos Books Ltd., Hong Kong.

Tam, T. W., K.K. Leung, B.S.P. Kwan, K.K.Y. Wu, S.S.H. Tang, I.W.Y. So, J.C.Y. Cheng, E.F.M. Yuen, Y.M. Tsang, and W.L. Hui, 2011. *The Dragonflies of Hong Kong (1st edition).* Agriculture, Fisheries and Conservation Department. Friends of Country Parks and Cosmos Books Ltd., Hong Kong .

Young, J.J. & Yiu, V., 2002. *Butterfly Watching In Hong Kong*. Wan Li Book Co. Ltd., Hong Kong.


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

Nov 2012	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																											✓			
Water Quality																												✓		
Inspection Visits		✓							✓				✓										✓				✓			

Dec 2012	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																															
Water Quality																			✓												
Inspection Visits							✓							✓					✓		✓						✓				

Jan 2013	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																															
Water Quality																				✓											
Inspection Visits				✓							✓							✓							✓				✓		

Feb 2013	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																												
Water Quality																									✓			
Inspection Visits								✓							✓							✓			✓	✓		

Mar 2013	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												✓																			
Water Quality																				✓											
Inspection Visits	✓								✓							✓							✓			✓					

Apr 2013	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		✓														✓														✓
Water Quality																										✓				
Inspection Visits		✓										✓							✓							✓				

Note:

1. Light grey cells indicate public holidays, Saturdays or Sundays.
2. Dark cells indicate that no survey was required during the relevant month.

Appendix B. Summary of Bird Surveys

Table B1. Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) within the Survey Area (excluding the WRA)

Common Name[4]	*Scientific Name*[4]	Conservation Status[2]	Nov	Dec	Jan	Feb	Mar	Apr
			Mean[3]	Mean[3]	Mean[3]	Mean[3]	Mean[3]	Mean[3]
Little Grebe	*Tachybaptus ruficollis*	LC, (1)	16.2	20.8	17.8	11.4	10.0	6.4
Great Cormorant	*Phalacrocorax carbo*	PRC, (1)	6.2	4.4	5.6	8.4	2.0	0.0
Black-crowned Night Heron	*Nycticorax nycticorax*	(LC), (1)	0.2	0.0	0.0	0.0	0.0	0.4
Chinese Pond Heron	*Ardeola bacchus*	PRC, (RC), (1)	3.8	3.6	3.6	6.0	2.0	2.4
Little Egret	*Egretta garzetta*	PRC, (RC), (1)	6.6	8.6	18.2	8.2	15.4	15.2
Intermediate Egret	*Egretta intermedia*	RC, (1)	1.6	0.6	0.0	0.0	0.0	0.2
Great Egret	*Egretta alba*	PRC, (RC), (1)	2.2	2.4	4.6	1.8	2.8	6.4
Grey Heron	*Ardea cinerea*	PRC, (1)	1.8	6.0	4.2	6.2	2.4	0.2
Black-faced Spoonbill	*Platalea minor*	PGC, EN, (1)	0.0	0.6	0.0	0.8	0.6	0.0
Northern Pintail	*Anas acuta*	RC, (1)	0.2	0.0	0.0	0.0	0.0	0.0
Northern Shoveler	*Anas clypeata*	RC, (1)	0.0	0.6	0.2	0.0	0.0	0.0
Tufted Duck	*Aythya fuligula*	LC, (1)	1.2	12.4	35.0	19.2	10.4	1.2
Osprey	*Pandion haliaetus*	RC, (1)	0.0	0.0	0.0	0.0	0.0	0.2
Black Kite	*Milvus migrans*	(RC)	0.0	0.6	0.0	0.2	1.0	0.0
White-breasted Waterhen	*Amaurornis phoenicurus*	(1)	1.0	0.4	1.8	0.6	0.4	1.0
Common Moorhen	*Gallinula chloropus*	(1)	0.0	0.0	0.0	2.6	0.8	0.4
Eurasian Coot	*Fulica atra*	(1)	0.2	0.0	0.0	0.0	0.0	0.0
Pied Avocet	*Recurvirostra avosetta*	RC, (1)	0.0	9.0	1.2	0.0	0.0	0.0
Little Ringed Plover	*Charadrius dubius*	LC, (1)	0.0	2.4	2.8	1.2	1.8	0.0
Common Redshank	*Tringa totanus*	RC, (1)	0.0	1.2	0.0	0.0	0.0	0.0
Green Sandpiper	*Tringa ochropus*	(1)	0.2	2.6	4.6	0.4	0.0	0.6
Common Sandpiper	*Actitis hypoleucos*	(1)	1.4	6.2	6.2	2.0	2.0	1.4
Whiskered Tern	*Chlidonias hybrida*	LC, (1)	0.0	0.0	0.0	0.0	0.0	2.8
Pied Kingfisher	*Ceryle rudis*	LC, (1)	0.0	0.0	0.0	0.0	0.2	0.0
White-throated Kingfisher	*Halcyon smyrnensis*	LC, (1)	0.0	0.6	0.0	0.8	0.8	0.2
Common Kingfisher	*Alcedo atthis*	(1)	3.0	1.8	1.4	1.4	2.0	1.2

Common Name[4]	*Scientific Name*[4]	Conservation Status[2]	Nov Mean[3]	Dec Mean[3]	Jan Mean[3]	Feb Mean[3]	Mar Mean[3]	Apr Mean[3]
Eastern Yellow Wagtail	*Motacilla tschutschensis*	(1)	0.2	1.8	3.8	5.6	6.6	2.6
Grey Wagtail	*Motacilla cinerea*	(1)	1.6	0.2	0.2	0.0	0.0	0.0
White Wagtail	*Motacilla alba*	(1)	4.2	11.8	8.0	5.8	4.4	1.6
Zitting Cisticola	*Cisticola juncidis*	LC, (1)	0.0	0.0	0.0	0.4	0.0	0.0
Red-billed Starling	*Spodiopsar sericeus*	(1)	0.0	1.0	0.0	0.4	0.0	1.2
Collared Crow	*Corvus torquatus*	LC, NT	0.0	1.0	0.0	0.0	0.0	0.0
	No. of Species Recorded		**18**	**24**	**17**	**20**	**18**	**19**

(1) Indicates wetland-dependent or wetland-associated species.
(2) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010). See Table B3.
(3) Refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA)
(4) Follows HK bird list (dated 2013-3-25)

Table B2. Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) in the WRA

Common Name[4]	*Scientific Name*[4]	Conservation Status[2]	Nov Mean[3]	Dec Mean[3]	Jan Mean[3]	Feb Mean[3]	Mar Mean[3]	Apr Mean[3]	Record outside survey
Little Grebe	*Tachybaptus ruficollis*	LC, (1)	1.0	1.0	1.2	0.4	0.6	0.4	✔
Great Cormorant	*Phalacrocorax carbo*	PRC, (1)	0.8	3.2	0.8	1.0	0.0	0.0	-
Yellow Bittern	*Ixobrychus sinensis*	LC, (1)	-	-	-	-	-	-	✔
Black-crowned Night Heron	*Nycticorax nycticorax*	LC, (1)	0.0	0.0	0.0	0.2	0.0	0.0	✔
Chinese Pond Heron	*Ardeola bacchus*	PRC, (RC), (1)	1.6	2.2	2.4	0.4	0.0	0.0	✔
Little Egret	*Egretta garzetta*	PRC, (RC), (1)	0.8	2.0	2.2	1.4	0.6	1.2	✔
Intermediate Egret	*Egretta intermedia*	RC, (1)	0.2	0.0	0.0	0.0	0.0	0.0	✔
Great Egret	*Egretta alba*	PRC, (RC), (1)	1.4	0.6	1.0	0.8	0.2	0.6	✔
Grey Heron	*Ardea cinerea*	PRC, (1)	0.8	1.4	0.8	1.4	0.0	0.0	✔
Northern Shoveler	*Anas clypeata*	RC, (1)	-	-	-	-	-	-	✔
Tufted Duck	*Aythya fuligula*	LC, (1)	-	-	-	-	-	-	✔
Black Kite	*Milvus migrans*	RC	0.0	0.2	0.0	0.0	0.6	0.0	-
Peregrine Falcon	*Falco peregrinus*	LC	-	-	-	-	-	-	✔
White -breasted Waterhen	*Amaurornis phoenicurus*	(1)	0.2	0.0	0.2	0.0	0.4	0.2	✔
Greater Painted Snipe	*Rostratula benghalensis*	(1)	0.2	0.0	0.0	0.0	0.0	0.0	-
Pied Avocet	*Recurvirostra avosetta*	RC, (1)	0.0	0.2	0.0	0.0	0.0	0.0	-
Little Ringed Plover	*Charadrius dubius*	LC, (1)	0.0	0.0	0.4	1.0	0.2	0.0	✔

Common Name[4]	*Scientific Name*[4]	Conservation Status[2]	Nov	Dec	Jan	Feb	Mar	Apr	Record outside survey
			Mean[3]	Mean[3]	Mean[3]	Mean[3]	Mean[3]	Mean[3]	
Common Greenshank	*Tringa nebularia*	LC, (1)	-	-	-	-	-	-	✔
Green Sandpiper	*Tringa ochropus*	(1)	0.0	0.0	0.0	0.0	0.0	0.2	-
Wood Sandpiper	*Tringa glareola*	LC, (1)	-	-	-	-	-	-	✔
Common Sandpiper	*Actitis hypoleucos*	(1)	0.2	0.0	0.0	0.0	0.0	0.2	✔
Common Snipe	*Gallinago gallinago*	(1)	-	-	-	-	-	-	✔
Pied Kingfisher	*Ceryle rudis*	(LC), (1)	-	-	-	-	-	-	✔
Common Kingfisher	*Alcedo atthis*	(1)	0.2	0.2	0.5	0.4	0.2	0.2	✔
Eastern Yellow Wagtail	*Motacilla tschutschensis*	(1)	0.2	0.2	1.4	2.8	2.2	2.2	✔
Grey Wagtail	*Motacilla cinerea*	(1)	0.6	0.0	0.0	0.0	0.0		-
White Wagtail	*Motacilla alba*	(1)	2.6	1.0	1.0	3.0	4.8	2.0	✔
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	(1)	0.2	0.0	0.0	0.0	0.0	0.0	-
Zitting cistocola	*Cisticola juncidis*	LC, (1)	0.0	0.2	0.0	0.0	0.0	0.0	✔
Collared Crow	*Corvus torquatus*	LC, (1)	-	-	-	-	-	-	✔
No. of Species Recorded			**15**	**12**	**11**	**11**	**9**	**9**	**-**

(1) Indicates wetland-dependent or wetland-associated species.
(2) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010). See Table B3.
(3) Refers to the mean number of individuals recorded in each survey in the WRA
(4) Follows HK bird list (dated 2013-3-25)

Table B3. Conservation Status Categories of Bird Species

Code	Category	Brief Description	Source
GC	Global Concern	Habitat loss/damage in Hong Kong would pose significant threat to global survival	Fellowes *et al.* (2002)
RC	Regional Concern	Habitat loss/damage in Hong Kong would pose significant threat to regional survival.	
LC	Local Concern	Habitat loss/damage in Hong Kong would pose significant threat to local survival.	
PGC	Potential Global Concern	Large, secure population in Hong Kong is of global significance.	
PRC	Potential Regional Concern	Large, secure population in Hong Kong is of regional significance.	
CR	Critically Endangered	Best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.	BirdLife International (2010)
EN	Endangered	Best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.	
VU	Vulnerable	Best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.	
NT	Near Threatened	Does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.	

Table B4. Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean Between September 2010 and April 2013

Common name	Scientific name	Conservation Status[2]	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13
Little Grebe	*Tachybaptus ruficollis*	LC, (1)					0.5						1	3.8	0.8	0.5	0.5		0.6		1.4	1.6	0.8	1	1.3	0.2		0.2	1	1	1.2	0.4	0.6	0.4
Great Cormorant	*Phalacrocorax carbo*	PRC, (1)					0.8									0.3	0.3	0.4	1.2	0.7	0.2								0.8	3.2	0.8	1	0	0
Grey Heron	*Ardea cinerea*	PRC, (1)			1	1.6	2	2	0.4							1	2.5	1.8	0.8	2.3	0.8				0.3			0.4	0.8	1.4	0.8	1.4	0	0
Purple Heron	*Ardea purpurea*	RC, (1)														0.3	0.3																	
Great Egret	*Ardea alba*	PRC, (1)				0.4	14	2	0.2	0.5	0.3	0.5	0.3		1.5	1.8	0.8	1.2	0.6	0.7	0.6	0.6	1	0.3		0.4	0.5	1.5	1.4	0.6	1	0.8	0.2	0.6
Intermediate Egret	*Egretta intermedia*	RC, (1)					1.7	0.8	0.2						1.5	1.5	1.5	1	0.6	0.7	0.6	0.6					0.3	0.9	0.2	0	0	0	0	0
Little Egret	*Egretta garzetta*	PRC, (1)				1.8	8	2	0.4	0.5	0.8	0.3	0.3	1	1	0.5	1.5	1.6	1.4	2	1.6					0.8	0.3	1.2	0.8	2	2.2	1.4	0.6	1.2
Eastern Cattle Egret	*Bubulcus coromandus*	(LC), (1)										0.3	11.8		1.3	0.3			0.4					0.3		0.2								
Chinese Pond Heron	*Ardeola bacchus*	PRC, (1)			1	0.2				0.3	0.3	0.3	1.5	4.2	7.8	4.5	5.3	2.4	0.3	2.3	2.6	1.4	0.8	1	0.8	2	1.8	2.2	1.6	2.2	2.4	0.4	0	0
Yellow Bittern	*Ixobrychus sinensis*	(LC), (1)														0.3	0.3																	^
Black-crowned Night Heron	*Nycticorax nycticorax*	LC, (1)																											^			0.2		
Eurasian Spoonbill^	*Platalea leucorodia*	LC, (1)																																
Black-faced Spoonbill	*Platalea minor*	PGC, EN, (1)					0.3	10.3											0.4															
Mandarin Duck	*Aix galericulata*	(1)														0.3																		
Eurasian Wigeon	*Anas penelope*	RC, (1)				1.6	2.5																											
Eurasian Teal	*Anas crecca*	RC, (1)					1																											
Northern Pintail	*Anas acuta*	RC, (1)				0.2	7																											
Northern Shoveler	*Anas clypeata*	RC, (1)																													^			
Tufted Duck	*Aythya fuligula*	LC, (1)																													^			
Garganey^	*Anas querquedula*	(1)																																
Western Osprey	*Pandion haliaetus*	RC, (1)				0.2																												
Black Kite	*Milvus migrans*	(RC) 0.8					0.8	0.3	0.2		0.3				0.3				0.2			0.2	0.5					0.4	0	0.2	0	0	0.6	0
Eastern Buzzard	*Buteo japonicus*	-							0.2																									
Common Kestrel	*Falco tinnunculus*	-			1	0.4	1	0.3	0.4																									
Eurasian Hobby^	*Falco subbuteo*	(LC), (1)																																
Peregrine Falcon	*Falco peregrinus*	-																												^				
Imperial Eagle	*Aquila heliaca*	-																													^			
Japanese Quail	*Coturnix japonica*	LC, (1)																																
White-breasted Waterhen	*Amaurornis phoenicurus*	(1)									0.5	0.8	1.3	2.6	1.3	1.5	0.3				0.4			0.5	1	0.5			0.2	0	0.2	0	0.4	0.2
Common Moorhen	*Gallinula chloropus*	(1)																							0.2									
Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	LC, (1)															0.3																	
Greater Painted-snipe	*Rostratula benghalensis*	LC, (1)								0.5																			0.2	0	0	0	0	0
Black-winged Stilt	*Himantopus himantopus*	RC, (1)	8													1																		
Pied Avocet	*Recurvirostra avosetta*	RC, (1)				0.2															0.2								0	0.2	0	0	0	0
Oriental Pratincole	*Glareola maldivarum*	LC, (1)								2.5																								
Little Ringed Plover	*Charadrius dubius*	LC, (1)	3		24.5	7.4	3.8	9	6.8	10.5	5.5	0.5		0.2						1	0.6								0	0	0.4	1	0.2	0
Kentish Plover^	*Charadrius alexandrinus*	RC, (1)																																
Spotted Redshank^	*Tringa erythropus*	RC, (1)																																

Common name	Scientific name	Conservation Status[2]	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13
Common Redshank^	*Tringa totanus*	RC, (1)																															
Marsh Sandpiper^	*Tringa stagnatilis*	RC, (1)																															
Common Greenshank	*Tringa nebularia*	RC, (1)			0.5												0.3	0.8	0.2									^	^	^		^	
Green Sandpiper	*Tringa ochropus*	(1)			1	0.4	0.5	0.5	0.4				0.3							0.2		0.2	0.4			0.2			0	0	0	0	0	0.2
Wood Sandpiper	*Tringa glareola*	LC, (1)						0.5	1.2											0.8	0.3					0.6				^		^	^	
Common Sandpiper	*Actitis hypoleucos*	(1)	1		0.5	1		0.5	0.6	1	0.3			0.2								0.4	0.2					0.9	0.2	0	0	0	0	0.2
Eurasian Woodcock^	*Scolopax rusticola*	(1)																															
Pintail/Swinhoe's Snipe*	*Gallinago stenura/G. megala*	LC*,(1)			0.5											0.3																	
Common Snipe	*Gallinago gallinago*	(1)						0.3	0.2																					^			^
Red-necked Stint	*Calidris ruficollis*	LC, (1)	3																														
Temminck's Stint	*Calidris temminckii*	LC, (1)			0.5			2.5	0.4	1.3																							
Long-toed Stint	*Calidris subminuta*	LC, (1)																		0.3													
Whiskered Tern	*Chlidonias hybrida*	(1)																					1.3										
Domestic Pigeon	*Columba livia*	-												v																			
Oriental Turtle Dove	*Streptopelia orientalis*	-													0.2																		
Red Turtle Dove^	*Streptopelia tranquebarica*	-																															
Spotted Dove	*Spilopelia chinensis*	-																v		v	v		v			v		0.6	0.4	1.2	0.4		0.2	0.2
Savanna Nightjar^	*Caprimulgus affinis*	-																													^		
Pacific Swift	*Apus pacificus*	(LC)								0.3																							
House Swift	*Apus nipalensis*	-	10						0.2											v	v									0.4	^			
Pied Kingfisher	*Ceryle rudis*	(LC), (1)				0.2	0.3	0.5	0.2			0.3									0.2				0.5								^
Common Kingfisher	*Alcedo atthis*	(1)				0.4	0.5	0.3		0.3	0.5	1	0.3	1	0.8	0.5	0.8	1	0.4		0.8					0.6		0.4	0.2	0.2	0.5	0.4	0.2	0.2
White-throated Kingfisher	*Halcyon smyrnensis*	(LC)															0.3								0.3								
Barn Swallow	*Hirundo rustica*	-	25					1.5												v	v		v		v	v	3.0		0.2	1		0.2	9.2	23
Red-rumped Swallow	*Hirundo daurica*	-																											1.2	1.2				
Eastern Yellow Wagtail	*Motacilla tschutschensis*	(1)			14.5	10.2	15	23.5	8.2	11.8	1.8			0.2	0.8	1.5	2	1.2	0.6		4	1							0.2	0.2	1.4	2.8	2.2	2.2
Grey Wagtail	*Motacilla cinerea*	(1)				0.2		0.3	0.2						0.3														0.6	0	0	0	0	
White Wagtail	*Motacilla alba*	(1)	3			1.8												v	v	v	v	v				v	1.8	3.2	2.6	1	1	3	4.8	2
Richard's Pipit	*Anthus richardi*	(1)			1.5	0.8	0.5	1	1	1.8	0.5					0.3		v		v	v	v							0.2	0.4	1.2	0.4	0.4	
Olive-backed Pipit	*Anthus hodgsoni*	-			0.5													v														0.6	1.2	1.4
Red-throated Pipit	*Anthus cervinus*	LC		2	2.5	1.2	0.5	0.5	0.2													0.4					0.7						
Buff-bellied Pipit	*Anthus rubescens*	LC		1	1.5																												
Red-whiskered Bulbul	*Pycnonotus jocosus*	-																															0.2
Chinese Bulbul	*Pycnonotus sinensis*	-																			v		v		v					0.2	2	0.2	0.2	3.2
Long-tailed Shrike	*Lanius schach*	-																	v	v					v	v			0.2		0.4			0.2
Oriental Magpie Robin	*Copsychus saularis*	-																		v										0.2				
Daurian Redstart	*Phoenicurus auroreus*	-																													0.2			
Stejneger's Stonechat	*Saxicola stejnegeri*	-		3	0.5	1	1	0.8	0.2	0.3						1		v	v		v								0.4	0.4	0.8			0.6

Common name	Scientific name	Conservation Status[2]	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13
Masked Laughingthrush	*Garrulax perspicillatus*	-																							v							0.6	1.2
Lanceolated Warbler	*Locustella lanceolata*	(1)														0.3																		
Pallas's Grasshopper Warbler	*Locustella certhiola*	LC, (1)														0.3																		
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	(1)														0.3												0.2	0	0	0	0	0
Zitting Cisticola	*Cisticola juncidis*	LC							0.2	1.5	2.5	2.5	1	0.4		0.3	0.8	1.8	0.2	0.3	0.6					0.2				0.2			^	
Yellow-bellied Prinia	*Prinia flaviventris*	-																	v		v		v		v	v	0.8	0.4		0.8	0.6	0.8	1.4	4.6
Plain Prinia	*Prinia inornata*	-																			v		v		v	v			1.2	0.4	^	1.4	0.2	0.2
Dusky Warbler	*Phylloscopus fuscatus*	-														0.5		v															
Yellow-browed warbler	*Phylloscopus inornatus*	-																										1.4	0.8	0.6				
Chinese Penduline-Tit	*Remiz consobrinus*	RC, (1)																			1.2	0.2												
Little Bunting	*Emberiza pusilla*	-			0.5																													
Black-faced Bunting	*Emberiza spodocephala*	-								0.5																								
Chinese Grosbeak	*Eophona migratoria*	LC														0.3																		
Scaly-breasted Munia	*Lonchura punctulata*	-	20				2.5		15	7.5													v		v	v	1.5					1	2.2	1
Eurasian Tree Sparrow	*Passer montanus*	-																			v		v		v									
Red-billed Starling	*Spodiopsar sericeus*	GC													0.3		0.8	1.6	6.6	39	17.4													
White-cheeked Starling	*Spodiopsar cineraceus*	PRC												6.6																				
Black-collared Starling	*Gracupica nigricollis*	-																v	v	v	v					v					0.8	0.4	0.2	0.2
White-shouldered Starling	*Sturnia sinensis*	(LC)									0.3		0.5	2.4																				
Common Myna	*Acridotheres tristis*	(1)																		v														
Crested Myna	*Acridotheres cristatellus*	–	3															v					v			v		^	0.6					
Black-naped Oriole	*Oriolus chinensis*	LC													1																			
Black Drongo	*Dicrurus macrocercus*	-																							v	v								
Eurasian Magpie	*Pica pica*	-																			v					v	0.3							
Large-billed Crow	*Corvus macrorhynchos*	-				0.4			0.2																									
Collared Crow	*Corvus torquatus*	LC, NT				0.2	0.3			0.5		0.3		0.8	0.8	0.8	0.5							0.8										^
No. of species recorded:	**102**																																	

Conservation Status follows that of Fellowes et. al. (2002)
(1) Indicates the bird species is wetland dependent.
(2) Conservation status follows that of Fellowes et al. (2002) and BirdLife International listing (2010). See Table B3.
* Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.
^ Indicates the species is recorded outside regular surveys.
v Indicates species recorded during surveys

Appendix C. Summary of Herpetofauna Monitoring, Mammals and Insects Surveys

Table C1. Summary of herpetofauna monitoring within the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status	Nov	Apr
Amphibian			**Mean**	**Mean**
(No records in the reporting period)				
Reptile			**Mean**	**Mean**
(No records in the reporting period)				

Table C2. Summary of herpetofauna monitoring conducted in the WRA

Common Name	Scientific Name	Conservation Status[1]	Nov	Apr
Amphibian			**Mean**	**Mean**
(No records in the reporting period)				
Reptile			**Mean**	**Mean**
(No records in the reporting period)				

Table C3. Summary of mammal monitoring within the Study Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status[1]	Nov	Dec	Jan	Feb	Mar	Apr
			Max[2]	**Max[2]**	**Max[2]**	**Max[2]**	**Max[2]**	**Max[2]**
Ryukyu mouse	*Mus caroli*	LC	1	-	-	-	-	-
		No. of Species Recorded	**1**	**0**	**0**	**0**	**0**	**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.

Table C4. Summary of mammal monitoring conducted in the WRA between 1 November 2012 and 30 April 2013

Common Name	Scientific Name	Conservation Status[1]	Nov	Dec	Jan	Feb	Mar	Apr	Records Outside Survey
			Max[2]	Max[2]	Max[2]	Max[2]	Max[2]	Max[2]	
Japanese Pipistrelle	*Pipistrellus abramus*	LC	-	-	-	-	-	-	✔
Small Asian Mongoose	*Herpestes javanicus*	-	-	-	-	-	-	-	✔
No. of Species Recorded			**0**	**0**	**0**	**0**	**0**	**0**	**2**

(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.

Table C5. Summary of dragonfly and butterfly monitoring within the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status[1]	Nov	Mar	Apr
Odonate			Mean[2]	Mean[2]	Mean[2]
Wandering Glider	*Pantala flavescens*	-	0.0	1.0	0.0
Common Bluetail	*Ischnura senegalensis*	-	0.0	0.0	3.7
Common Flangetail	*Ictionogomphus pertinax*	-	0.0	0.0	0.3
Variegated Flutterer	*Rhyothemis variegata arria*	-	0.0	0.0	1.3
		No. of Species Recorded	**0**	**1**	**3**
Butterfly			Mean[2]	Mean[2]	Mean[2]
Indian Cabbage White	*Pieris canidia*	-	0.0	2.0	0.3
Pale Grass Blue	*Pseudozizeeria maha*	-	0.0	0.0	0.7
Red-base Jezebel	*Delias pasithoe*	-	0.0	0.0	0.3
		No. of Species Recorded	**0**	**1**	**3**

(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.

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

Common Name	*Scientific Name*	Conservation Status[1]	Nov	Mar	Apr
Odonate			**Mean[2]**	**Mean[2]**	**Mean[2]**
Wandering Glider	*Pantala flavescens*	-	0.0	23.0	0.0
Saddlebag Glider	*Tramea virginia*	-	0.0	0.0	0.3
Asian Amberwing	*Brachythemis contaminata*	-	0.0	0.0	1.3
Common Bluetail	*Ischnura senegalensis*	-	0.0	3.0	26.0
Common Flangetail	*Ictinogomphus pertinax*	-	0.0	0.0	0.3
Green Skimmer	*Orthetrum sabina*	-	0.0	0.0	2.7
Variegated Flutterer	*Rhyothemis variegata arria*	-	0.0	0.0	8.0
		No. of Species Recorded	**0**	**2**	**6**
Butterfly			**Mean[2]**	**Mean[2]**	**Mean[2]**
Long-tailed Blue	*Lampides boeticus*	-	0.0	1.0	0.3
Pale Grass Blue	*Pseudozizeeria maha*	-	0.0	0.0	1.0
Indian Cabbage White	*Pieris canidia*	-	0.0	1.0	0.0
Lemon Emigrant	*Catopsilia pomona*	-	0.0	0.0	0.3
Mottled Emigrant	*Catopsilia pyranthe*	-	0.0	0.0	0.3
Red-base Jezebel	*Delias pasithoe*	-	0.0	0.0	3.7
		No. of Species Recorded	**0**	**2**	**5**

(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.

Appendix D. Summary of Water Quality Monitoring

Table D1. Water quality at WRA

November 2012

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	18.5	7.40	0.72	14.4	8.20
2	18.4	7.40	0.73	15.7	7.40
3	18.3	7.51	0.71	20.1	7.30
4	19.1	7.53	0.83	9.8	7.70

December 2012

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	16.2	7.82	0.58	14.0	8.14
2	16.8	**8.13**	0.43	9.6	7.92
3	17.0	**8.19**	0.74	22.3	7.78
4	17.8	**8.14**	0.82	22.2	7.28

January 2013

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	18.2	**8.44**	0.76	22.4	8.62
2	18.5	**8.37**	0.93	14.8	9.28
3	18.2	7.98	0.81	7.5	8.37
4	18.8	**8.32**	0.9	11.9	8.78

February 2013

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	21.6	7.93	0.92	10.6	8.41
2	21.5	7.95	0.92	12.4	7.73
3	20.7	**8.01**	0.93	7.8	7.92
4	22.0	**8.14**	0.84	6.6	8.54

March 2013

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	26.9	7.80	0.8	41.4	8.10
2	26.0	7.91	1.11	17.6	6.22
3	26.6	**8.01**	1.04	17.1	6.50
4	26.7	**8.02**	1.07	1.07	8.00

April 2013

Cell No.	Temp. (℃)	pH	Salinity (ppt)	Turbidity (mg/L)	DO (mg/L)
1	25.0	7.90	0.86	40.6	5.4
2	25.5	8.00	1.01	12.4	5.3
3	25.7	**8.10**	1.01	9.7	4.9
4	25.3	**8.10**	0.96	35.1	5.5

Notes:

Values **in Bold** indicate Action Level exceedance.

Values **Underlined and in Bold** indicate Limit Level exceedance.