

# Expansion of Hong Kong International Airport into a Three-Runway System

Egretty Survey Plan

April 2016

Airport Authority Hong Kong



# Expansion of Hong Kong International Airport into a Three-Runway System

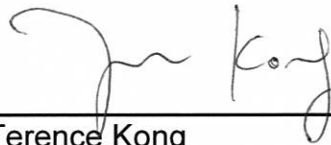
Egretry Survey Plan

April 2016

Airport Authority Hong Kong

**This Egret Survey Plan has been reviewed and certified by  
the Environmental Team Leader (ETL) in accordance with  
Condition 2.14 of Environmental Permit No. EP-489/2014.**

**Certified by:**



---

Terence Kong  
Environmental Team Leader (ETL)  
Mott MacDonald Hong Kong Limited

**Date**

21 April 2016

Our Ref : 60440482/C/JCHL160421

By Email

Airport Authority Hong Kong  
HKIA Tower, 1 Sky Plaza Road  
Hong Kong International Airport  
Lantau, Hong Kong

Attn: Mr. Lawrence TSUI, Senior Manager

21 April 2016

Dear Sir,

**Contract No. 3102**  
**3RS Independent Environmental Checker Consultancy Services**

**Egretry Survey Plan**

Reference is made to the Environmental Team's submission of Egretry Survey Plan under Condition 2.14 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 21 April 2016.

We would like to inform you that we have no adverse comment on the captioned submission. Therefore we write to verify the captioned submission in accordance with the requirement stipulated in Condition 1.9 of EP-489/2014.

Should you have any query, please feel free to contact our Isabella Yeung at 3922 9348 or the undersigned at 3922 9376.

Yours faithfully,  
AECOM Asia Co. Ltd.



Jackel Law  
Independent Environmental Checker

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# 1 Introduction

## 1.1 Background

The Government of the Hong Kong Special Administrative Region (HKSAR) approved in principle the adoption of the Three-Runway System (3RS) as the future development option for Hong Kong International Airport (HKIA) for planning purposes on 20 March 2012, and also approved the recommendation of Airport Authority Hong Kong (AAHK) to proceed with the statutory environmental impact assessment (EIA). An EIA study brief (ESB-250/2012) for the 3RS project (henceforth referred to as the 'project') was issued by the Environmental Protection Department (EPD) on 10 August 2012. The EIA report has been prepared according to the EIA study brief requirements, which identified 12 key environmental assessment aspects to be addressed as part of the EIA study.

On 7 November 2014, the EIA report for the project (EIA Register No.: AEIAR-185/2014) was approved and an Environmental Permit (EP) (Permit No.: EP-489/2014) was issued for the project. Pursuant to Condition 2.14 of the EP, AAHK shall submit an Egretry Survey Plan (ESP) 1 month before the commencement of construction works at areas with potential to disturb the Sha Chau Egretry.

Mott MacDonald Hong Kong Limited (MMHK) was appointed by AAHK to provide environmental consultancy services which cover the preparation of the ESP.

## 1.2 Project Description

The project will be located on a new land formation immediately north of HKIA in North Lantau, covering a permanent footprint of approximately 650 ha. As described in the approved EIA report, the project primarily comprises:

- New third runway with associated taxiways, aprons and aircraft stands;
- New passenger concourse building;
- Expansion of the existing Terminal 2 (T2) building; and
- Related airside and landside works, and associated ancillary and supporting facilities.

The existing airport island is currently supplied with aviation fuel via submarine aviation fuel pipelines that originate from the permanent aviation fuel facility (PAFF) at Tuen Mun. These pipelines route via the aviation fuel receiving facility (AFRF) at Sha Chau before connecting to the existing aviation fuel tank farm (AFTF) on the airport island. The total length of existing pipelines between Sha Chau and the airport island is approximately 6 km, of which 3 km is located below seabed within Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP).

The AFRF at Sha Chau was used as the delivery route for aviation fuel to HKIA from airport opening until 2010, when PAFF came into operation. The AFRF and its twin berths are currently maintained as a backup facility in case of any emergency incidents at PAFF, with these berths ensuring an alternative supply of aviation fuel to HKIA. The PAFF supplies fuel via submarine pipelines to the AFRF and on to the AFTF on the airport island.

The planned land formation for the airport expansion will cover part of the existing alignment of the submarine pipelines, and therefore these pipelines will need to be diverted prior to commencement of land formation.

To ensure full and proper operation of the aviation fuel supply system in preparation for the implementation of the 3RS, diversion of the existing submarine fuel pipelines from HKIA island to Sha Chau is required and this will be undertaken using Horizontal Directional Drilling (HDD) method as described in the approved EIA report.

The HDD works will engineer the approximately 1 m diameter parallel drill holes through the deep rock stratum between HKIA and Sha Chau in order to facilitate the required diversion of the submarine fuel pipelines. Drill heads are planned to emerge (daylight) on the rocky shoreline above the high water mark on the northeastern part of Sheung Sha Chau Island and once the pipelines are installed they will be connected to the existing (AFRF) by pipelines. The originally proposed HDD daylighting location was immediately opposite the AFRF so as to minimise associated pipe connection works. However given the presence of the egretry in close proximity to that location, the proposed daylighting location was shifted further northwards to safeguard a buffer between anticipated works and the egretry as presented in the approved EIA report. **Figure 1** presents a location plan of the planned aviation fuel pipeline diversion works. As shown with the latest works programme presented in Attachment II of the Submission of Construction Works Schedule and Location Plans (October 2015), the HDD works is currently planned to commence in the second quarter of 2016.

Ardeid's breeding activities are seasonal, and in Hong Kong mostly occurring from the beginning of April through to the end of July. Construction in close proximity to an egretry may result in some human disturbance and noise that could affect the egretry, particularly if the construction works coincide with the ardeid's active breeding season. In this case the most likely outcome of such human disturbance would be the shifting of ardeids' nesting locations within Sheung Sha Chau Island away from the disturbance. The potential for abandonment of the whole egretry is low, however, as there are many suitable habitats available for the ardeids on Sheung Sha Chau Island and the scale of the planned construction works is small, affecting only a relatively small area.

Disturbance from the HDD and related construction activities as planned on Sheung Sha Chau have potential impacts in the ardeids' peak breeding season (April to July) and works activities may affect ardeid's normal breeding activities during both the daytime and the night-time. The impact was assessed as moderate in the EIA if the proposed construction activities are carried out in the ardeid's peak breeding season and in the absence of suitable mitigation measures. Mitigations committed to in the EIA were for the construction works at Sheung Sha Chau Island to be scheduled outside the ardeids' breeding season with no night-time construction work allowed in all seasons. Other mitigation measures including construction phase monitoring would also be in place to minimize potential impacts on the egretry. These mitigations are also effective therefore in regard to the potential impacts to nocturnal species, i.e. the Black-crowned Night Heron.

### 1.3 Objectives of the Egretry Survey

In Hong Kong, the status and location of egretry can change from time to time even in the absence of human disturbance. Therefore, a pre-construction survey was recommended in the approved EIA Report and particularly in Section 9.2 of the Environmental Monitoring and Audit (EM&A) Manual to update the latest boundary of the Sha Chau egretry during the breeding season before commencement of the HDD drilling works. The survey updates the boundary of the egretry with a view to confirming the daylighting location. Subject to the pre-construction survey findings, the daylighting location/ works area may need to be adjusted to avoid egretry location in case the boundary shifts towards the currently identified daylighting location.

In accordance with Clause 2.14 of the EP, the permit holder shall consult the Director of Agriculture, Fisheries and Conservation and submit an Egretry Survey Plan no later than 1 month before the commencement of construction works at areas with potential to disturb the Sha Chau Egret. The ESP shall include at least the following information/ specifications:

- i. the pre-construction survey to be carried out at least once per month in the breeding season between April and July, prior to the commencement of HDD works at areas with potential to disturb the Sha Chau egretry to update the latest boundary of the Egret with a view to confirming the daylighting location. The daylighting point shall be kept to the minimum in size and be situated as far away from the latest egretry boundary as practicable; and
- ii. the survey works shall be conducted by qualified ecologist with at least three years' experience on Egret monitoring.

This ESP reports the result of the pre-construction surveys, which were conducted between April and July 2015 and updates the boundary of the Egret based on the results.



## 2 Baseline Information

According to the approved EIA Report, the concerned egretry is located at the eastern part of Sheung Sha Chau Island, as shown in **Figure 2**. The Sha Chau egretry is monitored by the Hong Kong Bird Watching Society (HKBWS) as part of the Egretty Counts Programme, a field monitoring programme commissioned by the AFCD. The egretry counts performed between May and June 2011 revealed that Sha Chau supported 56 nests of Little Egret, which was the highest count among all surveyed colonies that year (Anon, 2012a). Two nests of Great Egret and six nests of Black-crowned Night Heron were also recorded (Anon, 2012a). The number of nests on Sheung Sha Chau Island increased in the summer of 2012. The monitoring of the egretry conducted between April and July 2012 identified that the number of nests of Little Egrets increased from 56 to 69, which was the highest number among all colonies of the same species in Hong Kong. The number of Black-crowned Night Heron nests also showed an increasing trend from six in 2011 to 22 in 2012 while that of Great Egret remained unchanged (Anon, 2012b). The egretry monitoring programme continued in 2013; the results showed that the number of Little Egret nests dropped from 69 to 40, Great Egret nests increased by one, whilst Black-crowned Night Heron increased from 22 to 40. In 2013, Sha Chau egretry was the second largest egretry in Hong Kong (Anon, 2013).

During the egretry survey conducted in 2013 for the 3RS EIA study, a maximum of 97 ardeid nests comprising 61 Little Egret, 5 Great Egret, 28 Black-crowned Night Heron and 3 Pacific Reef Heron nests were observed and it was found that the most active breeding activities happened between April and May. The AFCD field counts programme continued in 2014 and the numbers of nests of Little Egret, Great Egret and Black-crowned Night Heron in Sha Chau egretry all declined in 2014, with 35 nests of Little Egret, 2 nests of Great Egret and 15 nests of Black-crowned Night Heron present (Anon, 2014).

## 3 Specifications of the Egretry Survey

### 3.1 Survey Method

In accordance with the EM&A Manual, the egret survey was conducted once per month between April and July 2015. All the surveys were conducted in early morning (around 7:30 am to 9:30 am) to meet the most active period of the ardeids. Each survey lasted for more than one hour. The survey programme is given in **Table 3.1** below.

Table 3.1: Survey Programme

April 2015	May 2015	June 2015	July 2015
1 <sup>st</sup> April (Wed)	5 <sup>th</sup> May (Tue)	3 <sup>rd</sup> June (Wed)	7 <sup>th</sup> July (Tue)

The survey was conducted at a survey location with open and unobstructed view over the egret at the lighthouse just in close proximity to the egret, as shown in **Figure 2**. During the survey, the egret was scanned by the surveyors using binoculars. All active nests were identified and recorded. Aside from bird nests, any activities related to breeding behaviour, such as nest sitting and chick feeding, were also recorded as a field note in the datasheet. The field scan was repeated at 30 minute intervals to inspect the whole egret area and its proximity. The number of ardeids/ nests of the egret were determined as the maximum number of ardeids/nests counted during the survey.

The survey was followed up with a close up observation during which the surveyors used a boat to inspect the areas that cannot be fully observable at the survey location. The surveyors did not land on the egret area in order to minimise any disturbance to the ardeids. An audit by the project's Independent Environmental Checker (IEC) was conducted on 1<sup>st</sup> April 2015, which confirmed that the surveys were being conducted according to the planned methodology.

### 3.2 Information Collected

During the survey, the species composition and abundance of the ardeids community was recorded. The number of nests and number of ardeids were counted in each of the field surveys. In the event that nests were not directly seen due to thick vegetation, any breeding activities, such as nest sitting and chick feeding, were recorded and considered as the presence of nest. The number of ardeids and the number of nests were counted each month. The data sheet used for recording field survey findings is provided in **Appendix A**. Based on the locations of the nests, the boundary of the egret was depicted on a map. The boundary has covered all the active nests locations recorded in the survey.

### 3.3 Surveyors

As required under the EP, the survey was conducted by qualified ecologists with at least three years' experience on egret monitoring. The CVs of the surveyors is given in **Appendix B** with their experience on egret monitoring highlighted.

## 4 Survey Results

### 4.1 Survey Results

The pre-construction egretty survey was conducted between April and July 2015 according to the schedule shown in **Table 3.1**. The survey findings revealed that the breeding species community involved is same to that identified in previous years which mainly comprises of Little Egret, Great Egret and Black-crowned Night Heron. The peak count of birds and nests in the surveyed months are presented in **Table 4.1**.

Table 4.1: Peak Count of Birds and Nests during the Survey Months

	Little Egret		Great Egret		Black-crowned Night Heron		Pacific Reef Heron	
	Birds	Nests	Birds	Nests	Birds	Nests	Birds	Nests
April	128	40	7	1	55	33	5	0
May	48	28	15	7	23	6	1	0
June	80	9	11	2	23	0	9	1*
July	102	6	6	0	14	0	1	0

\* - The record of one Pacific Reef Heron nest is based on observation of three juveniles in June.

Amongst the three main breeding species, the Black-crowned Night Heron tends to breed slightly earlier than the other two breeding species and during this survey, it was noted that some Black-crowned Night Heron juveniles were already able to leave their nests, whilst Little Egrets and Great Egrets were just nesting or incubating. As this egretty survey has shown that the egretty boundary has shifted further away from the proposed HDD daylighting location (see **Section 4.2** below), there is no particular concern of direct impact on the egretty, however the potential effect to the egrets and herons will need to be monitored during the construction phase. As described in the EM&A Manual, ecological monitoring shall be undertaken monthly at the HDD daylighting location on Sheung Sha Chau Island during the HDD construction works period from August to March.

**Table 4.2** below summarises the nest numbers of ardeids on Sha Chau egretty between 2011 and 2015, which shows the figures in 2015 are comparable to previous years with slight increase of total nest number when compared to the 2014 figures.

Table 4.2: Nest Numbers of Different Ardeid Species on Sha Chau Egretty between 2011 and 2015

Ardeids	2011*	2012*	2013*	3RS EIA Egretty Survey in 2013	2014*	3RS Pre-construction Survey in 2015
Little Egret	56	69	40	61	35	40
Great Egret	2	2	3	5	2	7
Black-crowned Night Heron	6	22	40	28	15	33
Pacific Reef Heron	0	0	0	3	0	1
<b>Total No. of Nests</b>	<b>64</b>	<b>93</b>	<b>83</b>	<b>97</b>	<b>52</b>	<b>81</b>

\* - Data source: Anon (2012a, 2012b, 2013 and 2014).

In addition to the three major species, other ardeids including Cattle Egret, Swinhoe's Egret and Pacific Reef Heron were also recorded during the course of the field surveys. A single Cattle Egret was recorded in April and a single Swinhoe's Egret was recorded in May, whilst Pacific Reef Heron was regularly seen throughout the survey period. A maximum number of 9 Pacific Reef Herons were recorded in June including at least three juveniles as presented in **Table 4.1**. Pacific Reef Heron usually breeds on ground, cliff ledges, but it was found breeding in Sha Chau Egretry in 2013. Its nest is difficult to observe as it was not built on trees. Observation of fledglings in June strongly suggests successful breeding in this year but the actual number of nests could not be confirmed.

## 4.2 Egretry Boundary

The egretry boundary is defined as the boundary which covers all ardeid nests. Based on the survey findings, the boundary is depicted in **Figure 3**, whilst a comparison of the boundary between 2013 and 2015 is provided in **Figure 2**. Compared to the boundary observed in 2013 EIA study, the latest boundary is of similar size but has shifted further southwest of the boundary identified in the EIA. It is of particular note that active nests were observed immediately opposite to the AFRF in 2013 but in 2015 the nearest nest is at least 50m to the west of AFRF. Based on the survey findings, the egretry boundary in 2015 has shifted further away from the planned daylighting location as proposed in the EIA report.

## 4.3 HDD Daylighting Location

The target daylighting location is provided in **Figure 3** and it has been situated as far away from the egretry boundary as practicable and within the recommended area of the EIA. It should be noted that the exact daylighting location may change subject to detailed design and construction as built. The size of the daylighting location has now been kept to a minimal as per the EP Condition 2.14 requirement and has been designed not to exceed 10m x 10m as recommended in the EIA Report. The updated egretry survey has identified that the boundary of the egretry tends to move southwest and further away from the proposed daylighting point. Hence, the daylighting location and mooring of flat top barge will not encroach into the Sha Chau Egretry in accordance with EP Condition 2.30.

## 5 Conclusion

This Egretry Survey Plan, which was prepared in accordance with EP Condition 2.14 and the requirements described in Section 9.2 of the EM&A Manual, has reported the findings of the pre-construction egretry survey conducted in April, May, June and July 2015. The survey results show that nest numbers in 2015 are comparable to previous years with a slight increase in total nest numbers compared to 2014. The survey has identified that the egretry boundary has shifted further south and west of the boundary identified in the EIA.

The EIA report has made the commitment that the final daylighting location for HDD may be subject to further adjustment to avoid direct encroachment on the egretry. The updated egretry survey has identified that the boundary of the egretry has in fact moved further away from the proposed daylighting point and therefore direct encroachment on the egretry to the breeding ardeids due to the daylighting for HDD and mooring of flat top barge can be avoided. However, indirect disturbance to the breeding ardeids will need to be minimised and monitored in accordance with the EM&A Manual. Mitigation measures to be undertaken to minimise indirect impacts on the breeding ardeids include confining artificial lighting within the site, covering/camouflaging the containment pit at the daylighting location, no felling of trees at Sha Chau, no construction works at night-time as well as between April and July, with reference to EP Condition 2.30. Ecological monitoring shall be undertaken on a monthly basis at the HDD daylighting location on Sheung Sha Chau Island during the HDD construction works period from August to March.

## 6 Reference

Anon. (2012a). Summer 2011 Report: Egretty Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site. Report by The Hong Kong Bird Watching Society to the Agriculture, Fisheries and Conservation Department of HKSAR Government.

Anon. (2012b). Summer 2012 Report: Egretty Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site. Report by The Hong Kong Bird Watching Society to the Agriculture, Fisheries and Conservation Department of HKSAR Government.

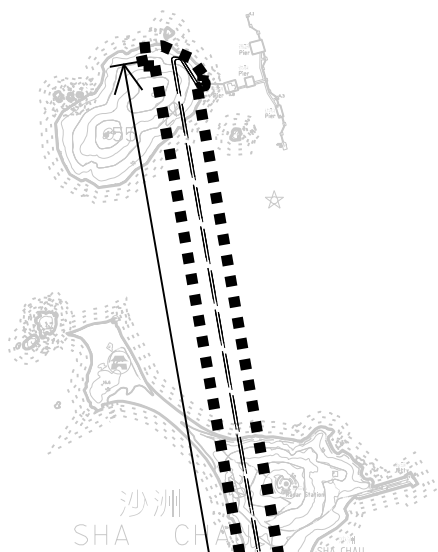
Anon. (2013). Summer 2013 Report: Egretty Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site. Report by The Hong Kong Bird Watching Society to the Agriculture, Fisheries and Conservation Department, Hong Kong Special Administrative Region Government.

Anon. (2014). Summer 2014 Report: Egretty Counts in Hong Kong with particular reference to the Mai Po Inner Deep Bay Ramsar Site. Report by The Hong Kong Bird Watching Society to the Agriculture, Fisheries and Conservation Department, Hong Kong Special Administrative Region Government.

PAK CHAU



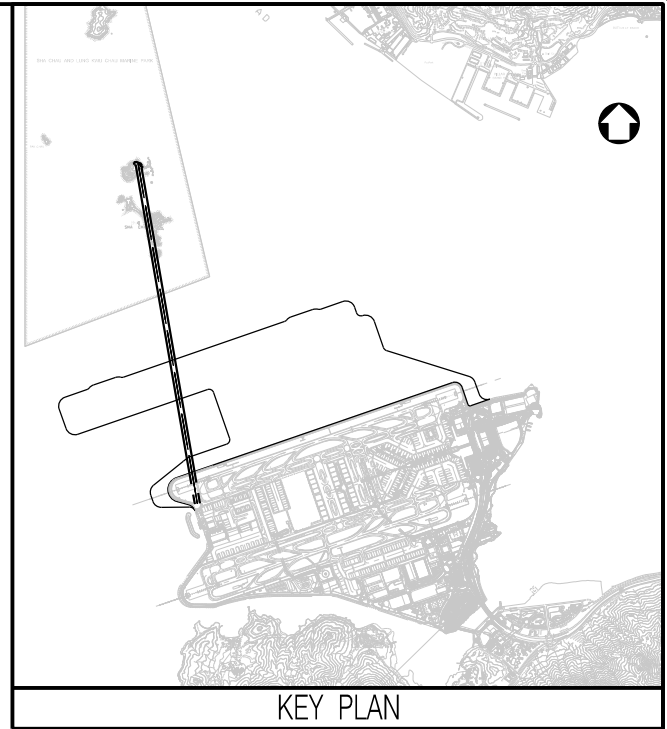
PORITION OF THE FUEL PIPE ABOVE GROUND



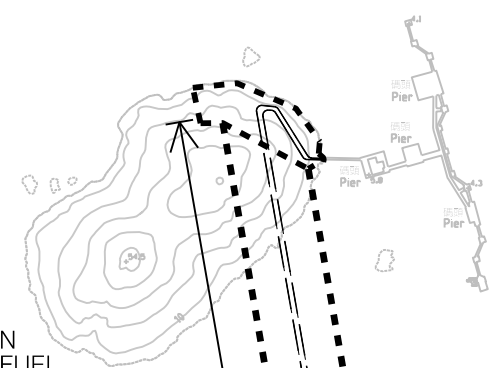
沙洲  
SHA CHAU

SHA CHAU AND  
LUNG KWU CHAU  
MARINE PARK

CONSTRUCTION OF  
AVIATION FUEL  
PIPELINES BY HORIZONTAL  
DIRECTIONAL DRILLING  
METHOD



KEY PLAN



CONSTRUCTION  
OF AVIATION FUEL  
PIPELINES BY HORIZONTAL  
DIRECTIONAL DRILLING METHOD

ZOOMED IN WORKS AREA AT SHA CHAU

SCALE 1:7500

NOTES

1. EXACT DAYLIGHT LOCATION OF FUEL PIPELINES AT SHA CHAU SUBJECT TO CONFIRMATION DURING CONSTRUCTION STAGE
2. FOR CONTINGENCY SHOULD ENGINEERING DIFFICULTIES BE ENCOUNTERED DURING PIPELINES INSTALLATION, STAND-BY BARGES NEAR SHEUNG SHA CHAU ISLAND WOULD BE NECESSITATED.

LEGEND

- ■ ■ ■ WORKS LOCATION
- — — UNDERGROUND FUEL PIPELINES
- — — EXPOSED FUEL PIPELINES ABOVE GROUND



HONG KONG  
INTERNATIONAL  
AIRPORT

				Title DIVERSION OF SHA CHAU FUEL PIPELINES	Design Designer	Date 22.07.14	Hong Kong International Airport	
					Checked Checker	22.07.14	Drawing No. <b>FIGURE 1</b>	
Rev.	Date	Description	Checked	Approved Approver	22.07.14	Scale 1 : 15000 (A3)	Rev. A	
A	22.07.14	FIRST ISSUE						



**Legend**

- Approximate Boundary of Sha Chau Egretry in 2013
- Approximate Boundary of Sha Chau Egretry in 2015
- Stationed Survey Location



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Rev.	Date	Description	Checked
A	06 July 15	FIRST ISSUE	GC
B	23 July 15	SECOND ISSUE	GC






Boundary of Sha Chau Egretry  
in 2013 and 2015

Consultant's Signatures for Approval		Date
Design		
Checkers		
Design Supervisor		
Authorised Representative		

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3
<b>Figure 2</b>	Rev. B



**Legend**

-  **Approximate Boundary of Sha Chau Egretty in 2015**
-  **Daylighting Location (specified as blue zone) suggested in EIA stage**
-  **Target Daylighting Location (subject to the results of topographic survey, tree survey and boulder survey)**



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Boundary of Sha Chau Egretty in 2015

Consultant's Signatures for Approval		Date
Design		
Checkers		
Design Supervisor		
Authorised Representative		

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM	
Drawing No.	Scale at A3
Figure 3	Rev. B



# Appendices

Appendix A. Egretty Monitoring of Sha Chau Egretty – Data Sheet \_\_\_\_\_ 11  
Appendix B. CVs of the Nominated Surveyors \_\_\_\_\_ 12

# Appendix A. Egrettry Monitoring of Sha Chau Egrettry – Data Sheet

**EGRETRY MONITORING OF SHA CHAU EGRETRY  
DATA SHEET**

Date: \_\_\_\_\_  
Weather: Sunny / Cloudy / Rainy / Overcast  
Temperature: \_\_\_\_\_°C  
Surveyor: \_\_\_\_\_

**NUMBER OF BIRDS**

Time	Little Egret	Great Egret	Black-crowned Night Heron	Other ( _____ )

**NUMBER OF ACTIVE NESTS**

Time	Little Egret	Great Egret	Black-crowned Night Heron	Other ( _____ )

Field Note:

## Appendix B. CVs of the Nominated Surveyors

**Environmental Team Services for  
Expansion of Hong Kong International Airport  
into a Three-Runway System**

**Curriculum Vitae**

**Gary CHOW**

**Position:** Ecologist

**Name:** Gary CHOW

**Education/  
Qualifications:** MSc (Sustainable Tourism) The Chinese University of Hong Kong, 2009  
BSc (Hons) (Environmental Science) The University of Hong Kong, 1999

**Key Experience:**

Mr Chow has over 14 years of experience in ecological research, especially in ornithological study. Resourceful in local ecology and experienced on planning and undertaking ecological field survey. Possess technical skills in undertaking environmental impact assessment (EIA), Independent Environmental Checker (IEC) service and due diligence. Relevant experience on ecological impact assessments includes South Island Line (East) EIA; Tai Shue Wan Development at Ocean Park EIA Study; and Liantang/Heung Yuen Wai Boundary Control Point and Associated Works EIA.

Over twelve years of contribution to the Waterbird Monitoring Programme in Mai Po and Inner Deep Bay Ramsar Site. Six years service in Biodiversity, and Wetland and Fauna Conservation Divisions in Agriculture, Fisheries and Conservation Department (AFCD), conducting comprehensive baseline survey on local bird fauna and co-ordinating nature conservation and wildlife research projects. Specialises in ornithological research but also possess broad knowledge on biodiversity of Hong Kong.

Selected experience on egret monitoring including egret colony study for the South Island Line (East) EIA study in 2009, egret investigation for Tai Shue Wan Development at Ocean Park EIA in 2013, egret survey for Expansion of Hong Kong International Airport into a Three-Runway System EIA Study in 2013, egret survey for the Proposed Expansion of Sha Tau Kok Sewage Treatment Works in 2014.

**Selected Project Experience:**

**Ecological Survey and Assessment for Yuen Long Bypass Floodway – Project Manager.** It is an ecological research project for providing ecological evaluation and advice for a drainage channel Yuen Long Bypass Floodway which involves a two years on-site ecological monitoring. Gary is project manager of the project responsible for leading the research and field survey works and provides adaptive advice to the drainage management party. He is responsible for liaison with government department, local NGOs and stakeholder to formulate a most feasible ecological enhancement plan for the drainage channel.

**Tai Shue Wan Development at Ocean Park EIA Study – Project Manager** for the EIA study responsible for coordinating EIA investigation work, liaison with EPD and other key government department, providing advice to the project team for adjustment of project design in

responding to EIA requirement. The EIA report was successfully submitted and approved by EPD.

**Expansion of Hong Kong International Airport into a Three-Runway System Environmental Impact Assessment – Environmental Specialist** responsible for coordinating baseline terrestrial ecological surveys and impact assessment related to avifauna directly and indirectly affected by the project.

**Ecological Survey for the Proposed Expansion of Sha Tau Kok Sewage Treatment Works – Project Management** responsible for arranging ecological field survey for the proposed works area. The scope of the field cover terrestrial fauna and flora, intertidal and sub-tidal coastal habitat, and specialized

**Environmental Team Services for  
Expansion of Hong Kong International Airport  
into a Three-Runway System**

**Curriculum Vitae**

**Gary CHOW**

survey on particular fauna such as egret, horseshoe crab and seagrass.

**Liantang/Heung Yuen Wai Boundary Control Point and Associated Works EIA** – Conducting ecological field surveys, providing fauna species evaluation and proposing mitigation measures for the Project. The Study covered wide range of rural area in the Northeast New Territories where a suite of fauna species of conservation concern was recorded but the ecological impact was sufficiently mitigated with the proposed measures, including a wetland and woodland compensation plan.

**Agreement No. LD01/2012 Eco-hydraulics Study on Green Channels – Stage 1** – The project involves the preparation of inventory of existing engineered and green channels/rivers of DSD, to conduct desktop study to assess and ranking the eco-hydraulics performance of the existing green channels in Hong Kong and to provide guidelines on green channels design with a balance of proper enhancement on the ecological value of the channels with due consideration of the hydraulic resistance.

**South Island Line (East) EIA** - Conducted ecological baseline survey and ecological impact assessment of the proposed railway and associated structures construction during the constructional and operational phases. Carried out supplementary egret survey to study the ecology of the potentially affected egret colony. Recommended mitigation measures to avoid, minimize and compensation for loss of ardeid night roost.

**Construction of Cycle Tracks and the Associated Supporting Facilities at Nam Sang Wai, Yuen Long** – Environmental Consultant for conducting impact assessment for the habitat having high ecological value, including the Mai Po and Inner Deep Bay Ramsar Site. The cycle track was situated in protected zone where impact prediction and proper mitigation needed special attention. Several site-specific mitigation measures were recommended to reduce, avoid and

compensate the potential impact to the ecological sensitive area.

**Planning and Engineering Study for Kwu Tung South Feasibility Study** – The objective of the study is to examine and identify sites within the Potential Development Area in Kwu Tung South for low-rise and low-density private housing development. Environmental Team Co-ordinator responsible for co-ordinating environmental works for the study, which included compiling all the environment study results into a Preliminary Environmental Review (PER).

**Construction of a Secondary Boundary Fence and New Sections of the Primary Boundary Fence and Boundary Patrol Road EIA** – The project comprises the construction of a Secondary Boundary Fence along the southern edge of the existing Boundary Patrol Road (approximately 21.7km) from west (Pak Hok Chau) to east (Sha Tau Kok). Environmental consultant conducting baseline ecological surveys in the Frontier Closed Area to assess the potential impacts that may arise from construction and demolition of the boundary fences along ecological sensitive locations.

**Umbulan Bulk Water Supply Project, East Java, Indonesia (2012)** – Ecologist conducting due diligent identifying key ecological impact associated with the water supply project in particular to the wetland ecosystem and aquatic fauna through both review of literature and on-site ecological survey. Scope of further ecological assessment was recommended for fulfilling the IFC standard.

**Employment History:**

2008- Present	Senior Environmental Consultant – Mott Macdonald Hong Kong Ltd
2002-2008	Supervisor – Agricultural Fishery and Conservation Department
2000-2002	Ecologist and Education Officer – Tai Po Kau Interactive Nature Center
1999-2000	Research Assistant – World Wide Fund for Nature

**Environmental Team Services for  
Expansion of Hong Kong International Airport  
into a Three-Runway System**

**Curriculum Vitae**

**Heidi YU**

**Position:** Ecologist

**Name:** Heidi YU

**Education/  
Qualifications:** MSc Environmental Science, The Hong Kong University of Science and Technology, 2007  
BSc (Hons) Applied Chemistry (Environmental Concentration), Hong Kong Baptist University, 2006

**Key Experience:**

Ms Yu has six years of experience in environmental study and is specialized in ecological research. She has carried out ecological impact assessment and field surveys for high profiled EIA projects including avifauna and intertidal field survey for the Expansion of Hong Kong International Airport into a Three-Runway System and terrestrial ecological field for MTR South Island Line (East). She is experienced in liaison with government department for co-ordination of EIA and PER works, which include infrastructures project such as Organic Waste Treatment Facilities Phase 2 and land use planning such as Kwu Tung South Feasibility Study. Other than EIA, she is also knowledgeable in ecological study and provides technical advice for ecological habitat management, which is shown in her co-ordination works for Yuen Long Bypass Floodway project.

Selected experience on egret monitoring including egret and night roost investigation for Tai Shue Wan Development at Ocean Park EIA in 2013, egret survey for Expansion of Hong Kong International Airport into a Three-Runway System EIA Study in 2013 and egret night roost study for the South Island Line (East) EIA in 2008-2009.

**Selected Project Experience:**

**Tai Shue Wan Development at Ocean Park – (2013-2014)** – Ocean Park Corporation – an EIA study for development of a new waterpark at Tai Shue Wan where it was a roosting and breeding site for egrets. Conducted egret survey, baseline monitoring of ardeid roosting site, investigation of alternative roosting sites in the territory and ecological impact assessment.

**Ecological Survey and Assessment for Yuen Long Bypass Floodway – (2013-present)** – Drainage Services Department – project coordinator for monthly bird monitoring and other ecological surveys for Stage 2 Study, managing ecological assessment and proposing ecological improvement measures for Stage 1 Study.

**Planning and Engineering Study for Kwu Tung South – (2013-present)** – Civil Engineering and Development Department and Planning Department – Responsible for ecological and environmental baseline review, providing assistance in project coordination and conducting monthly ecological surveys including avifauna (transect and flight-line surveys), herpetofauna, dragonfly, butterfly and mammal surveys.

**Expansion of Hong Kong International Airport into a Three-Runway System – (2012-2013)** – Airport Authority Hong Kong – Conducted survey of ardeid nests at Sha Chau Egret and avifauna survey at Chek Lap Kok and Sha Chau island; also carried out terrestrial field surveys and coordinated intertidal surveys at Chek Lap Kok and Lantau Island.

**Development of Organic Waste Treatment Facilities Phase 2 Feasibility Study – (2012-2013)** – Environmental Protection Department – EIA for the development of OWTF at Sha Ling; Conducted ecological field surveys including inspection of Man Kam To Road Egret, and ecological impact assessment; Acted as EIA Coordinator to liaise with sub-consultants and government officers, coordinate inputs for EIA submissions and respond public comments.

**Review, Design and Tender Documentation for Drainage Improvement Works at Tsung Yuen, Kwu Tung North – (2011-2012)** – Drainage Services Department – Conducted ecological field survey including investigation of Ho Sheung Heung Egret and impact



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Curriculum Vitae**

**Heidi YU**

assessment for the Environmental Review of the project.

**Liantang/Heung Yuen Wai Boundary Control Point and Associated Works – (2010-2011)** – Civil Engineering and Development Department – The project is to establish a new Boundary Crossing Point in the eastern part of the Hong Kong-Shenzhen boundary, also a connecting road from the boundary to Fanling Highway. Assisted in ecological impact assessment and conducted ecological baseline surveys (including investigation of Ping Che Egretty), tree surveys and literature review on ecological resources in the study area.

**South Island Line (East) EIA (2008-2009)** – Mass Transit Railway (MTR) Corporation – The new line comprises approximately 7km of railway alignment and from Ap Lei Chau island to the existing Admiralty station, including a railway bridge across Aberdeen Channel. Conducted terrestrial and intertidal ecological baseline surveys for the construction and operation of the proposed railway and associated structures, noticeably ardeid night roost survey at Wong Chuk Hang Nullah and follow-up investigation at other parts of Hong Kong.

**Cycle Tracks Connecting Northwest New Territories with Northeast New Territories (Extension), Major Sections – (2008-2009)** – Civil Engineering and Development Department – This project aims to link existing tracks to over 100km long continuous cycle track network that enhances recreational facilities, provides socio-economic benefit and capitalizes on Hong Kong's landscape asset. Conducted ecological field surveys for the designated project at Nam Sang Wai Section which included survey of ardeid nests at Tung Shing Lane Egretty and monthly baseline survey of waterbirds at Kam Tin River and Shan Pui River.

**Construction of a Secondary Boundary Fence and New Sections of the Primary Boundary Fence and Boundary Patrol Road EIA – (2008-2009)** – Architectural Services Department – The project alignment is about 21.7km in length generally running from west of Mai Po to east of Sha Tau Kok. Part of its route situates within the Wetland Conservation Area (WCA) at Mai Po, the

home for a diversity of waterbird species. Conducted literature review on ecology and baseline ecological surveys in the Frontier Closed Area; Conducted water quality assessment including literature review and impact assessment on water quality of rivers, streams and marine water in the assessment area.

**West Kowloon Cultural District Development – (2011-2013)** – West Kowloon Cultural District Authority – Conducted ecological surveys and assisted for EIA Study on ecology as well as fishery, waste management implications and land contamination.

**Deep Cement Mixing (DCM) Trial Works – (2011-2012)** – Airport Authority Hong Kong – The project aimed to investigate the effectiveness of the proposed DCM as a ground treatment method for land formation over the existing capped contaminated mud pits and to assess the potential environmental impacts of the DCM trial. Responsible for reviewing deep cement mixing (DCM) practices in Japan and other countries and the associated environmental impact assessment; assisting in the provision of a comprehensive environmental monitoring and sampling programme for DCM trial works; coordination and analysis of testing results for water and sediment samples to ascertain the potential environmental impacts during the first DCM installation works in Hong Kong.

**Voluntary Work**

**Waterbird Monitoring at the Mai Po Inner Deep Bay Ramsar Site – (2011)** – Hong Kong Bird Watching Society – conducted monthly waterbird monitoring in Mai Po and Inner Deep Bay Ramsar Site, a project commissioned by AFCD to facilitate the management of the Ramsar Site.

**Employment History:**

2013 - Present	Environmental Consultant – Mott MacDonald HK Ltd
2008 - 2013	Assistant Environmental Consultant – Mott MacDonald HK Ltd.
2007	Project Assistant – The Hong Kong University of Science and Technology