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AGREEMENT NO. CE 65/2013 (EP) POST-CONSTRUCTION ECOLOGICAL MONITORING OF RIVER IMPROVEMENT WORKS IN UPPER LAM TSUEN RIVER SHE SHAN RIVER AND UPPER TAI PO RIVER – INVESTIGATION

ANNUAL MONITORING REPORT (NO.2)

Prepared By:

ALLIED ENVIRONMENTAL CONSULTANTS LTD.

For:

Drainage Services Department

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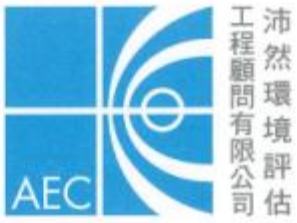

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Agreement No. CE65/2013(EP)
Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation

2015 Annual Report
Upper Lam Tsuen River

January 2016

Prepared by: Mike pang January 8, 2016

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Ecology Team: China-Hong Kong Ecology Consultants

Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation
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1 Introduction

1.1 Agreement No. CE65/2013(EP) Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation required a post-construction ecological monitoring programme when the project completed. An annual report is required to be prepared for 2015 by using the collected data from surveys of January to December conducted by Agreement No. CE65/2013(EP) Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation. This report aims to summaries and present findings of the post construction ecological monitoring carried out during 2015.

1.2 The scope of the ecological monitoring was detailed in EM & A Manual of the project. In brief, the survey aimed to collect data on abiotic factors such as water quality, substratum characteristics, water flow as well as flora and fauna.

1.3 China Hong Kong Ecology Consultants Ltd. was committed by Allied Environmental Consultants Ltd (AEC) to undertake the ecological monitoring tasks for the project from December 2014

1.4 This is the number 2 annual report for the project summarising monitoring results collected from January to December of 2015. It contains the following subsections:

- Summary of major points
- Monitoring Methods
- Monitoring Results
- Summary and Comments

2 Summary of Major Points

- Field ecological monitoring was undertaken since July 2008;
- Presentation of species abundance and species richness for fauna and flora using graphs;
- Aquatic and riparian vegetation re-established quickly after completion of drainage works;
- Adult Hong Kong Newt were commonly found during monitoring survey and its abundance was higher than before;
- Fish's abundance and species richness recovered after completion of construction in late 2013 and returned to original level in baseline monitoring. Low number of fish was usually recorded during wet season throughout 2015 due to seasonality. *;*
- Odonata number increased after completion of construction and that record was higher than baseline level. Number of odonata fluctuated along different season, especially high abundance of odonata was recorded during wet season ;
- Number of bird species was recorded with no significant change from baseline to post-construction monitoring. Bird's abundance recovered after completion of construction in later 2013. Compared to baseline monitoring, more individuals of bird were recorded in post-construction monitoring.

- The species diversity of aquatic marco-invertebrate was low during construction period and recovered after construction completed. Species diversity kept in a stable level throughout 2015 ; and
- Measured water quality and physical characteristics showed no apparent change, overall water quality is defined as clean and retain in an acceptable level to fauna and flora in Lam Tsuen River.

3 Monitoring Methodology

3.1 Riparian Vegetation

Riparian vegetation, including aquatic and emergent, was sampled using line transects along the affected river channel and riparian habitat. Species, relative abundance and average heights were recorded. Vegetation surveys were conducted at four selected belt transects with two located at the lower portion (T3 and T4) of the river channel and another two at the upper section (T1 and T2) of the river respectively (**Figure 1**). The belt transects was run across the river channel in order to collect quantitative data of the vegetation, e.g., species inventory, height, percentage cover. Qualitative data of plants was collected by recording plant species, relative abundance along line transect. Nomenclature and protection status of the species followed those documented in Lai *et al.* (2004) and Hong Kong Herbarium (2015).

3.2 Avifauna

Avifauna survey was conducted during post construction monitoring period. Special attention was given to the river channel and corridor area which birds used as feeding and foraging habitat. Avifauna surveys were undertaken in the early morning plus species recorded in the rest of the day when conducting other taxonomic groups (benthic, fish, insect) monitoring. Numerical abundance was recorded at fixed count points within a radius of 30-50m according to landscape feature and visual penetration extent. The duration of the point count of birds was standardized for 10 minutes at each location in order to collect comparable data. Transect count along accessible section of river channel were used in order to collect qualitative data. Binoculars and digital camera were the main items of equipment used. Nomenclature and protection status of the species follows the AFCD website (www.hkbiodiversity.net) and Carey *et al.* (2001).

The point count was conducted at four locations with two located at the lower portion of the river channel (T3&T4) and the other two located at the upper section of the river (T1&T2). The point count and survey transect locations for the bird survey and sampling sites for surveys of other faunal groups and flora were presented in **Figure 1.**

3.3 Adult Odonata Survey

Adult Odonata survey was conducted along transects (**Figure 1**). Binoculars, digital camera and hand net were utilized to aid identification. Numerical abundance, species identity and other notable behavior were recorded. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net), Wilson *et al.* (2004) and Tam *et al.* (2011). Adult Odonata survey was conducted along line transects in parallel with river channel within the works area where access was permitted.

3.4 Aquatic Macro-invertebrates

Macro-invertebrates in the river channel were surveyed. Sampling was conducted at five sampling locations including two sites located at the lower portion (T3 and T4) of the river channel and another two sites at the upper section (T1 and T2) of the river, as well as the reference site. Those sampling sites covered major type of river habitats, e.g. river pool and riffle (**Figure 1**) Five replicates were taken at each sampling point and pool together for further sample sorting and identification. Kick sampling and hand netting were the survey methodologies for river organisms. Dissection microscope and digital camera were used to aid identification and enumeration. Numerical abundance and species identity were recorded. Nomenclature and protection status of the species has followed those documented in the AFCD website (www.hkbiodiversity.net) and other literatures such as Dudgeon (1994).

3.5 Fish and Newt

Fish community and *Paramesotriton hongkongensis* at the specified river channel was monitored by live trapping, hand netting and direct observation methods.

Sampling was conducted at five sampling locations including two sites located at the lower portion (T3 and T4) of the river channel and another two sites at the upper section (T1 and T2) of the river, as well as reference site. Those sampling sites covered major type of river habitats, e.g. river pool and riffle (**Figure 1).** The number of the observed fish and newt was estimated and recorded. Nomenclature and protection status of the species followed those documented in the AFCD website (www.hkbiodiversity.net) and Lee *et al.* (2004).

3.6 Abiotic Data Collection

3.6.1 Water Quality Monitoring

Dissolved oxygen level, pH value, conductivity, salinity, BOD and nutrient level (nitrate and ammonium) were measured and analyzed by conventional methods in situ or in laboratory. The instruments for measuring dissolved oxygen level, pH value, conductivity, salinity were model: DO-5510, AZ8685, AZ8361 and AZ8374 respectively. All the instruments were calculated every monitoring month according to the operation manuals in order to obtain the precise result. BOD test took 5 days to complete within darkness incubator with stable temperature at 20^{o}C and was performed using model: DO-5510 for measuring dissolved oxygen. Nutrient levels including nitrate and ammonia were performed in laboratory by applying the In-house method SOP056 (FIA) and SOP057 (FIA) respectively.

3.6.2 Sediment Characteristics

Sediment/substrate characteristics were recorded of sediment cover in percentage e.g. mud, sand, rock, boulder and cemented bottom in the river bed at sampling sites.

3.6.3 Water Flow

Water flow rates in river channel were measured by recording the time taken for a floating object (e.g. floating ball) to cover a measured distance. The

sampling locations for surveys were presented in **Figure 1.**

4 Monitoring Results

4.1 Vegetation

Vegetation has generally covered the gabion wall/retaining wall along the Upper Lam Tsuen River and part of the river bed. Over 60 flora species were recorded within the survey transects along the river course in 2015. Most were wetland species with a few floating aquatic species such as *Lemna minor*, *Pistia stratiotes*and and submerged plants such as *Hydrilla verticillata*. More dense vegetation coverage was observed during dry season when there was no flooding (Photos 1-4). The recorded floras were generally in good health and the height of the dominated riparian grass and herb species were in a range from 0.1m to over 3m as observed along survey transect. Dominant flora species were shown in the **Table 4.1** marked with relative abundance sign "+++". Results of vegetation survey and belt transect survey were presented in **Table 4.1** and **Table 4.2**. **Figure 1** shows the transect line for the flora surveys.

Photo 1. General view of Lam Tsuen River (Middle section) in March.

Photo 2. General view of Lam Tsuen River (Middle section) in June.

Photo 3. General view of Lam Tsuen River (Middle section) in September.

Photo 4. General view of Lam Tsuen River (Middle section) in December.

4.2 Fauna

4.2.1 Avifauna

Avifauna surveys were undertaken from July 2008 to December 2015 along survey transects and at four selected point count locations. Transect and Point Count locations were shown on **Figure 1**. Result of bird survey was presented in the **Table 4.3.** **Figure 4.1** and **Figure 4.2** showed the abundance of bird and number bird species recorded at Lam Tsuen River from baseline monitoring to post-construction monitoring respectively. During construction period, number of bird was relatively low due to the disturbance raised from construction. Following the completion of construction in late 2013, bird's abundance raised back to the previous level recorded in baseline monitoring with little increment. A sharp peak of bird's abundance was recorded in January 2010, that peak was created by a large group of very common bird *Pycnonotus sinensis* and it was not related to construction work. For the number of bird species at Lam Tsuen Rvier, there is no significant change in average from baseline monitoring to current monitoring. Natural fluctuation could be seen from the record. In total, 46 species of birds were recorded from the bird surveys throughout the year. All the birds are under protection of Wild Animals Protection Ordinance (Cap. 170). Some birds of conservation importance recorded at Lam Tsuen River in 2015 were listed in the **Table 4.2.1** below. Photos 5-12 are showing some birds species which were recorded in Lam Tsuen River during 2015.

Table 4.2.1 Birds recorded with conservation interest

Common Name	Scientific name	Chinese Name	Protection status	Recorded month within 2015
Black Kite	*Milvus lineatus*	麻鷹	Cap.586, RC	1,2,3,4
Chinese Pond Heron	*Ardeola bacchus*	池鷺	RC	Every month
Common Buzzard	*Buteo buteo*	普通鵟	Cap. 586	5,11
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	VU	1,2,3,4,5,6,11
Little Egret	*Egretta garzetta*	小白鷺	RC	Every month
Great Egret	*Ardea alba*	大白鷺	RC	3,4,6,7,8
Night Heron	*Nycticorax nycticorax*	夜鷺	LC	8,9,10

Key: RC – Regional Concern; LC – Local Concern by Fellowes et al. (2002)

Cap.586 – Endangered Species of Animals and Plants Ordinance (Cap. 586)

VU - Vulnerable in China Red Data Book Status

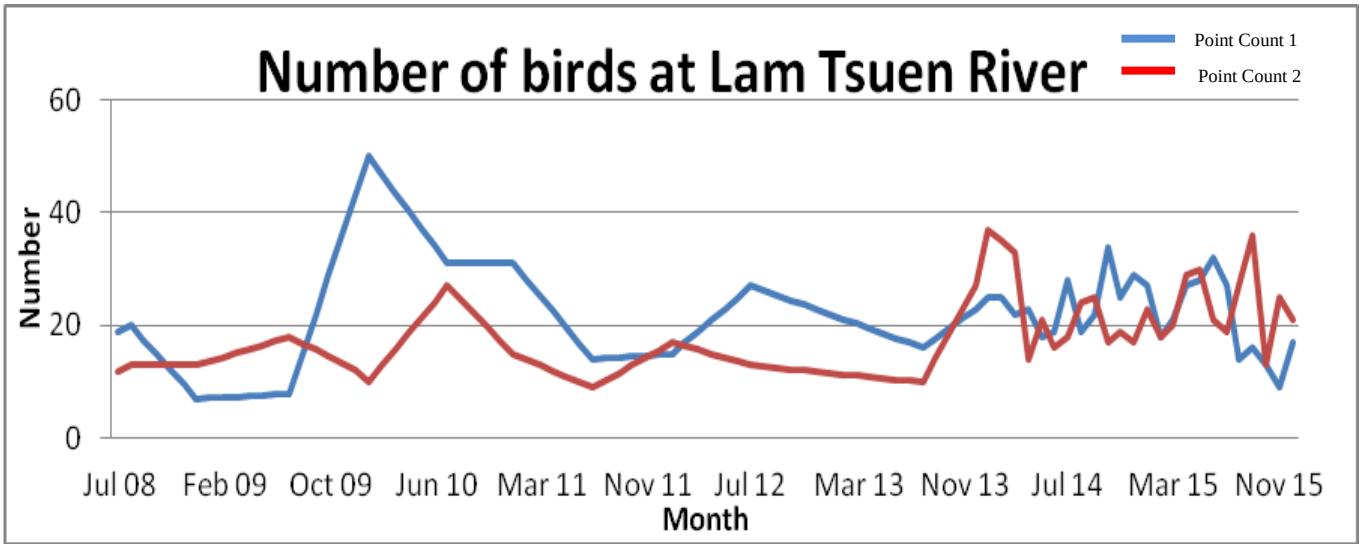

Figure 4.1. Avifauna abundance.

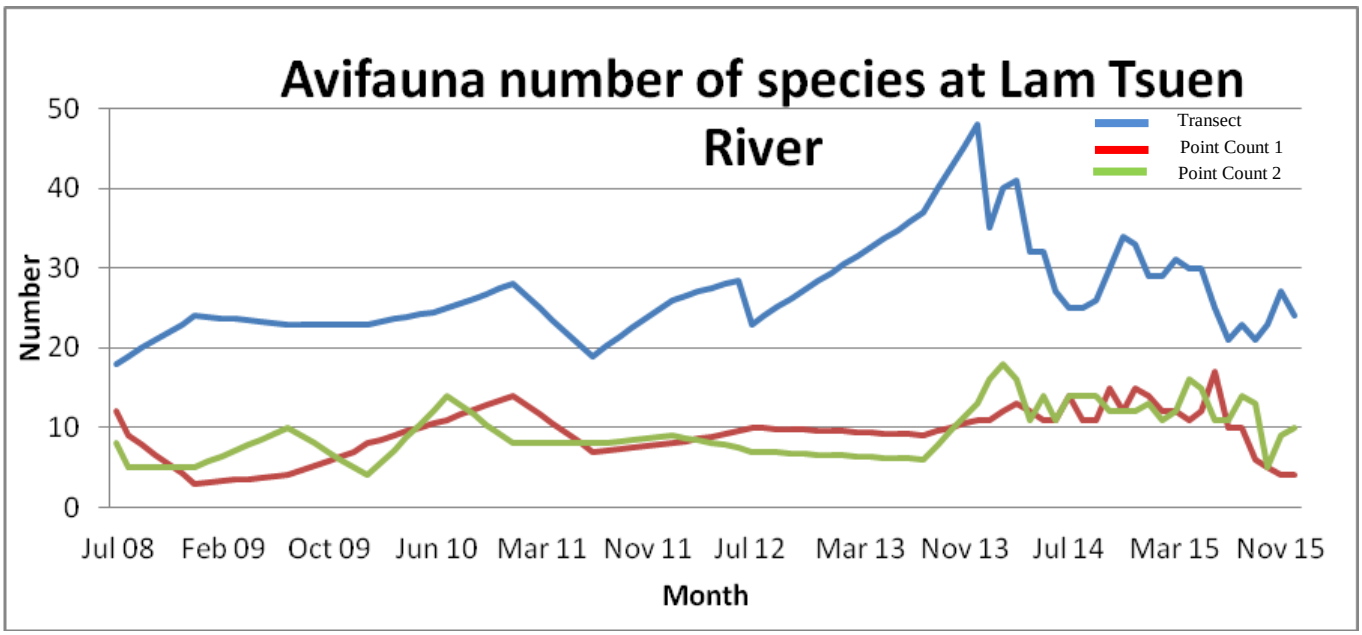

Figure 4.2. Species richness of Avifauna

Photo 5. Avifauna - *Motacilla alba*

Photo 6. Avifauna - *Milvus lineatus*

Photo 7. Avifauna - *Ardea alba*

Photo 8. Avifauna - *Motacilla cinerea*

	
Photo 9. Avifauna - *Centropus sinensis*	Photo 10. Avifauna - *Egretta garzetta*
	
Photo 11. Avifauna - *Lanius schach*	Photo 12. Avifauna - *Acridotheres cristatellus*

4.2.2 Adult Odonata Survey

Records of odonata along the Upper Lam Tsuen River from July2008 to December of 2015 are presented in **Table 4.4**. A graph of odonate species richness is shown in **Figures 4.3**, it indicates that species number of odonate was fluctuating along with different season and more species were recorded after completion of construction in late 2013. Better water quality and increased colonization of vegetation were the main reason of increment in odonata species. The maximum number of odonata species was recorded during wet season and a big contrast that significant low number of species was recorded during dry season. It is assumed that most species of odonata in Hong Kong have a peak emergence in spring and continue to emerge with decreasing number until late autumn (Wilson *et al.*, 2004 & Tam *et al.*, 2011). In total, 19 species of donate were recorded throughout the year. The Sampling location was shown in **Figure 1**. Photographs of some of the recorded dragonfly and damselfly species are presented below.

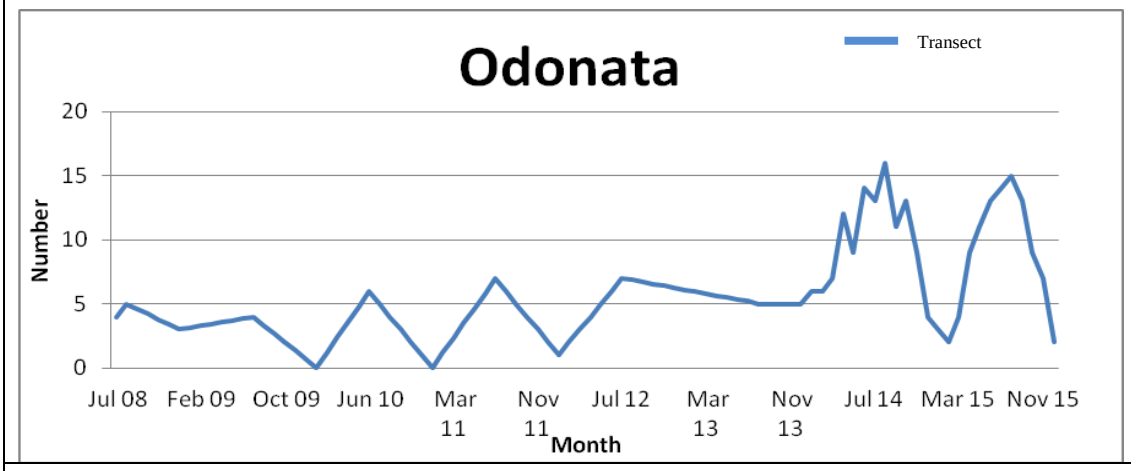

Figure 4.3 Species richness of Odonata.

Photo 13. Odonata - *Rhinocypha perforata perforata*

Photo 14. Odonata - *Neurobasis chinensis*

Photo 15. Odonata - *Trithemis aurora*

Photo 16. Odonata - *Copera marginipes*

	
Photo 17. Odonata - *Orthetrum chrysis*	Photo 18. Odonata - *Neurothemis fulvia*
	
Photo 19. Odonata - *Ictinogomphus pertinax*	Photo 20. Odonata - *Ceriagrion auranticum ryukyuanum*

4.2.3 Aquatic Macro-invertebrates

Aquatic-net and kick sampling were performed at the Upper Lam Tseun River. 17 species were found during the ecology surveys undertaken since baseline monitoring. The river benthic fauna collected was mainly comprised of insects, mollusks and crustaceans. During construction period, species numbers dropped significantly due to disturbance raised from construction. Following the completion of construction, species numbers returned to original level recorded at baseline monitoring and kept stable until late 2015, shown as **Figure 4.4**. Details of recorded of river benthic fauna refers to **Table 4.5.** Sampling location was shown on **Figure 1**.

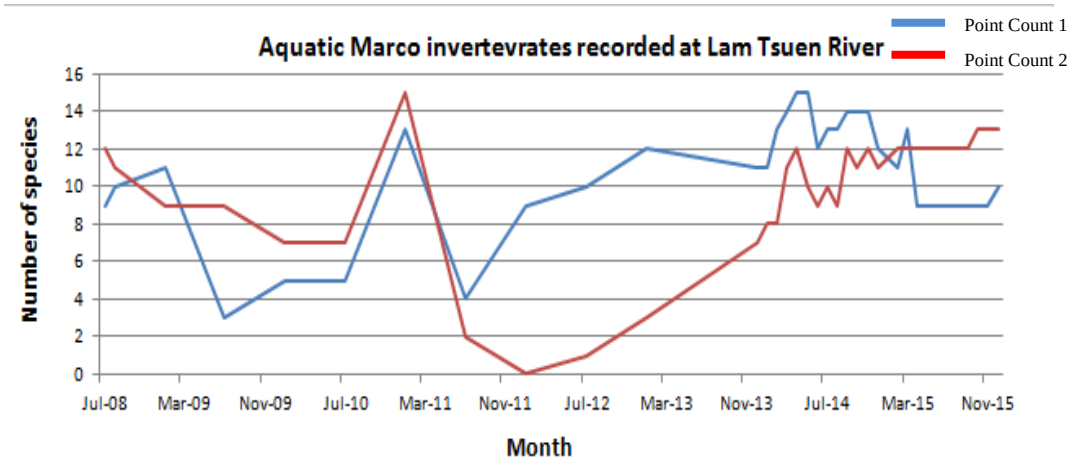

Figure 4.4. Species richness of aquatic macroinvertebrate.

4.2.4 Hong Kong Newt

Surveys of Hong Kong Newt were conducted at Upper Lam Tsuen River from January to December of 2015. Adult Hong Kong Newt was recorded in every survey throughout the year. They were likely roosting in the habitat covered with dense vegetation. Riparian vegetation grown along the channel especially along water margin could provide shelter and breeding habitat for Hong Kong Newt (Photos 21-24). Their estimated abundance was higher than previous stages during baseline and impact monitoring as Lam Tsuen River has become more mature and stable for Hong Kong Newt to colonize. **Figure 4.5** showed the abundance of Hong Kong Newt recorded in Lam Tsuen River from 2008 to 2015. Hong Kong Newt is listed in Wild Animals Protection Ordinance (Cap. 170) and classified as "Near Threatened" under IUCN Red List Status and as "Potential Global Concern" by Fellowes *et al.* (2002). Record of Hong Kong Newts can be referred to **Table 4.6**.

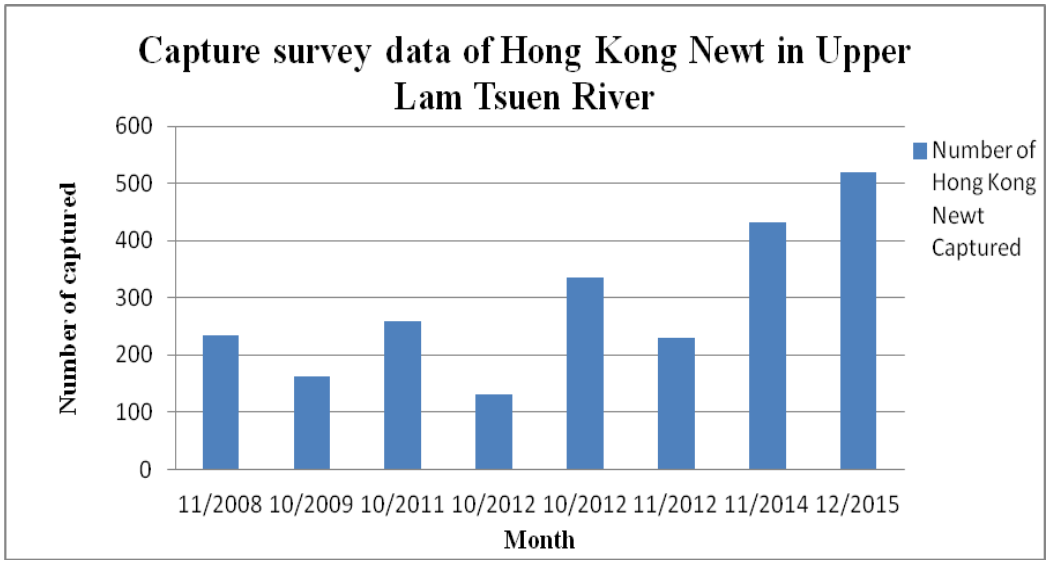

Figure 4.5 Capture survey data of Hong Kong Newt in Upper Lam Tsuen River 2008-2015

	
Photo 21. Hong Kong Newt preferred river habitat.	Photo 22. Hong Kong Newt captured by hand net.
	
Photo 23. Hong Kong Newt roosting under rock.	Photo 24. Dead Hong Kong Newt.

4.2.5 River Fish Fauna

Fish surveys were performed at Upper Lam Tsuen River during field monitoring since July 2008 (Photos 25). In total, 18 species of freshwater fish, including species recorded from reference site, were recorded throughout 2015. Details of recorded of fish fauna refers to **Table 4.6.** *Oreochromis niloticus* (Photo 26) and *Rhinogobius spp* (Photo 27) were the dominated species in the river. *Acrossocheilus parallens* is a rare freshwater fish species in Hong Kong and it was observed at a few locations along the surveyed river with pool (Photo 28). The trend of the number of fish species are shown in **Figure 4.6**. The data showed that number of fish species was comparatively low during construction period and increased after the completion of construction. The average number of fish species recorded in post-construction monitoring was similar to the baseline level.. Fish abundance in the 2x2 meter recording areas was significantly low during construction period due to disturbance raised from construction. After completion of construction in late 2013, fish abundance increased sharply and returned to the original level in baseline monitoring. Natural fluctuation was recorded throughout 2015. It is assumed that low abundance of fish was caused by heavy rainfall and floods which dispersed fish in the river during wet season. (**Figure 4.7)**. Sampling location was shown on **Figure 1**.

Point Count 1

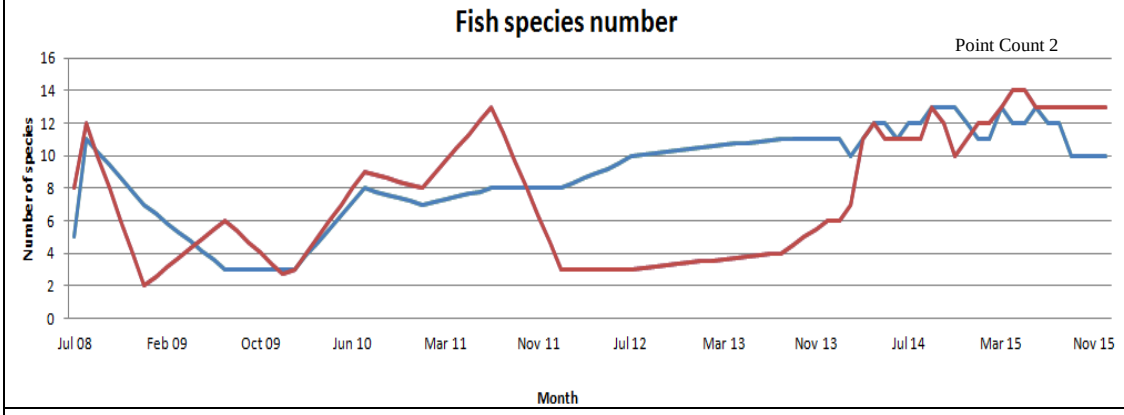

Figure 4.6. Species richness of fish.

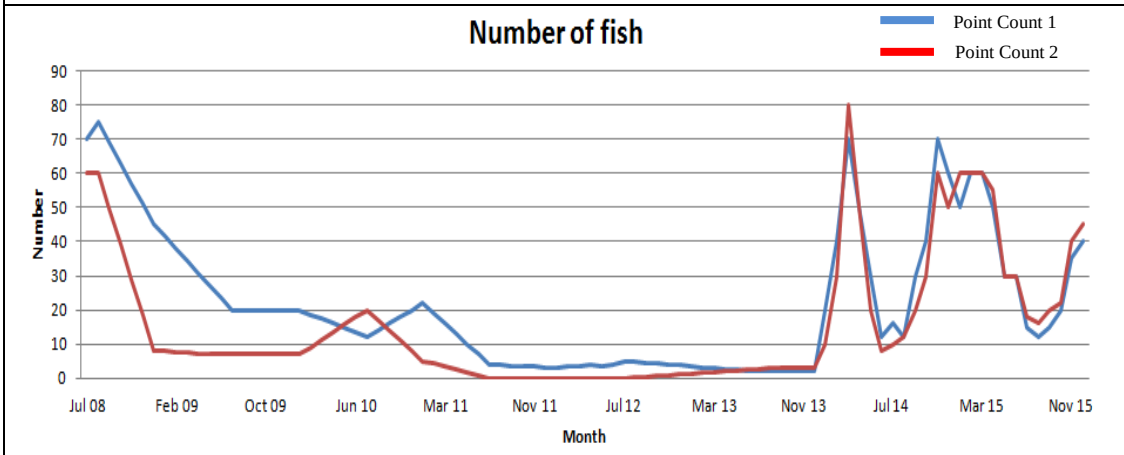

Figure 4.7 Fish Abundance.

Photo 25. Fish sampling in upper Lam Tsuen River.

Photo 26. Fish - *Oreochromis niloticus*

	
Photo 27. Fish - *Rhinogobius* sp.	Photo 28. Fish - *Acrossocheilus parallens*
	
Photo 29. Fish - *Xiphophorus hellerii*	Photo 30. Fish - *Cyprinus carpio var. viridiviolaceus*

4.3 Abiotic Data

Data on water quality and major river hydrological feature (water flow and substratum) of the river were collected and are presented in the **Table 4.7.**

All the parameters measured in 2015 were kept in stable within satisfied level of the river condition. There was no significant fluctuation on any parameter observed except only slightly difference on dissolved oxygen and conductivity were recorded throughout the year.

The river substratum was comprised of over 75% stones or rocks in most of the river sections with moderate water flow (up to 0.2m/second at pool and 0.6m/second at riffle).

5 Summary and Commentary

5.1 Data presented and analyzed in this report were derived from ecology surveys conducted since July 2008. The post-construction ecological monitoring will be continued and it is expected that long term monitoring will reveal even more information on ecological recovery and habitat improvement.

5.3 Aquatic and riparian vegetation re-established quickly after the completion of the drainage works as demonstrated by the photographs in this report. Aquatic and marsh plants growing on the riverbed and along the water margins provide breeding and feeding habitat for a variety of aquatic life including insects, shrimps, fish and the Hong Kong Newt.

5.4 The adult Hong Kong Newt was record in every survey throughout the 2015. They were usually found in the habitat covered with dense vegetation. Their abundance was higher than original level in baseline monitoring and kept increasing following the river became more stable and mature.

5.5 Fish's abundance and species number recovered after completion of construction work since late 2013. The number of fish species was recorded in a stable level during 2015. Natural fluctuation was observed in fish's abundance during post-construction monitoring.Significant low abundance of fish was usually recorded during wet season, it was assumed that fishes were dispersed by heavy rain and floods. *Acrossocheilus parallens* a rare freshwater fish species in Hong Kong, was found in some locations with pool.

5.6 Abundance of the aquatic marco-invertebrates was low during construction period. After completion of construction, abundance recovered and remained in at a stable level during post-construction monitoring.

5.7 Species composition of avifauna at Lam Tsuen River was observed with no significant change from baseline motoring to post-construction monitoring. The average abundance of avifauna recorded in post-construction monitoring was slightly higher than that record in baseline and impact monitoring. Natural fluctuation in abundance and species richness were observed during post-construction monitoring.

5.8 Odonata had the lowest number during construction period. Following the completion of construction in late 2013, more species were recorded in post-construction monitoring. Better water quality and increased colonization of vegetation were the main reason of increment in odonata species. In addition, odonata number also showed natural fluctuation that significant low number was recorded during dry season.

5.9 Measured water quality and physical characteristics showed no apparent change. The water quality of the surveyed river was not polluted although low concentration of nutrients will discharge to the river from the nearby agriculture lands and resident houses.

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FIGURES

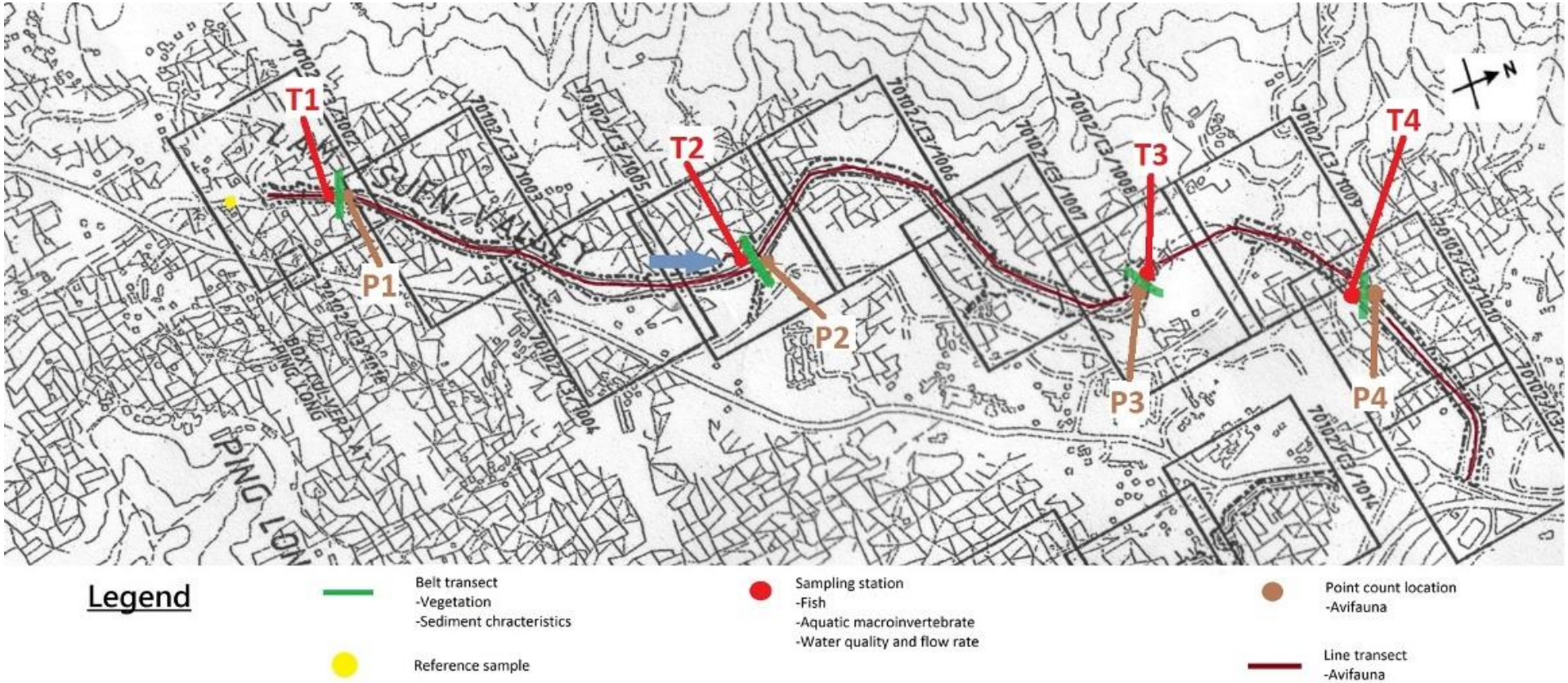

Figure1. Sampling Location of Ecological Survey and Monitoring at Upper Lam Tsuen River, Tai Po.

TABLE

Table 4.1. Flora species recorded along the Lam Tsuen River including riparian habitat.

			Baseline monitoring	Impact monitoring						Impact monitoring				Post Construction monitoring			Post Construction monitoring								Post Construction monitoring								Post Construction monitoring				Post Construction monitoring			
Family	Species name	Species name in Chinese	Jul to Aug 08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Aug-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Riparian Plant																																									
Acanthaceae	*Ruellia coerulea*	蘭花草											+	+	+	+	+	+	+	+	+	+	+	+	+																
Acanthaceae	*Dicliptera chinensis*	狗肝菜																																	+	+	+					
Amaranthaceae	*Celosia argentea*	青葙	+	+	+	+	+	+	+	+			++	++	+	+	+	+	+	++	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Amaranthaceae	*Amaranthus viridis*	野莧		+	+	+	+	+	+	+	+	+	++	++	++	++	++	++	++	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Amaranthaceae	*Alternanthera philoxeroides*	空心蓮子草			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Amaranthaceae	*Alternanthera sessilis*	蓮子草																							+	+	+	+	+	+												
Anacardiaceae	*Rhus hypoleuca*	白背漆																								+	+	+	+													
Annonaceae	*Uvaria macrophylla*	紫玉盤															+	+	+	+	+	+	+	+	+																
Apiaceae	*Oenanthe javanica*	水芹															++	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Apiaceae	*Centella asiatica*	崩大碗															+	+	+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+
Araceae	*Alocasia odora*	海芋	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Araceae	*Colocasia esculenta*	芋	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Araceae	*Pistia stratiotes*	大薸		+		+	+	+							+	+				+	+	+	+	+	+		+	+	+											
Arecaceae	*Rhapis excelsa*	棕竹			+	+	+									+	+	+	+	+	+	+	+	+	+																
Asteraceae	*Bidens alba*	白花鬼針草	+	+	+	+	+	+	+	+	+	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Asteraceae	*Mikania micrantha*	薇甘菊	++	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	++	++	++	+++	++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Asteraceae	*Ageratum conyzoides*	勝紅薊		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Emilia sonchifolia*	一點紅		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Wedelia chinensis*	蜈蚣菊		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Erechtites hieracifolia*	革命菜		+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+																
Asteraceae	*Conyza canadensis*	小蓬草							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Youngia japonica*	黃鵌菜															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Eclipta prostrata*	鱧腸															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Spilanthes paniculata*	金鈕扣															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Wedelia trilobata*	三裂葉蜈蚣菊																																							
Asteraceae	*Sonchus arvensis*	苣賣菜																																							
Athyriaceae	*Callipteris esculenta*	菜蕨																	+	+	+	+	+	+	+	+	+	+													
Blechnaceae	*Blechnum orientale*	烏毛蕨											+	+	+	+	+	+	+	+	+	+	+	+	+																
Brassicaceae	*Cardamine flexuosa*	碎米薺		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Brassicaceae	*Nasturtium officinale*	西洋菜		+	+	+	+	+		+			+	+++	+++	+++	+	+	+	+	+	++	++	++	++	+	++	++	++	+	+	+	+	+	+	+	+	+	+	+	++
Brassicaceae	*Rorippa indica*	塘葛菜								+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Brassicaceae	*Capsella bursa-pastoris*	薺菜															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Buddlejaceae	*Buddleja asiatica*	白背楓															+	+	+	+	+	+	+	+																	
Caesalpiniaceae	*Cassia alata*	翅莢決明	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Caryophyllaceae	*Drymaria cordata*	荷蓮豆															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Caryophyllaceae	*Myosoton aquaticum*	鵝腸菜															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Commelinaceae	*Commelina diffusa*	節節草	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	+++	+++	+++	+++	++	++	++	++	++	++	++	++	++	++	++	++
Convolvulaceae	*Ipomoea cairica*	五爪金龍		+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Convolvulaceae	*Pharbitis nil*	牽牛				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+																
Convolvulaceae	*Ipomoea aquatica*	蕹菜											+	+	+	+	+	+	+	+	+	+	+	+	+																
Cucurbitaceae	*Solena amplexicaulis*	茅瓜															+	+	+	+	+	+	+	+	+																
Cuscutaceae	*Cuscuta australis*	南方菟絲子																							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cyperaceae	*Cyperus flabelliformis*	風車草														+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cyperaceae	*Cyperus sp.*	莎草														+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Euphorbiaceae	*Macaranga tanarius*	血桐	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Euphorbiaceae	*Bischofia javanica*	秋楓															+	+	+	+	+	+	+						+	+	+	+	+	+	+	+	+	+	+	+	+
Fabaceae	*Pueraria lobata*	野葛	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fabaceae	*Crotalaria pallida*	猪屎豆								+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+																
Fabaceae	*Sesbania cannabina*	田菁										+	+	+	+	+	+	+	+	+	+	+	+	+	+																
Fabaceae	*Dalbergia benthamii*	兩廣黃檀																																							
Fabaceae	*Pueraria lobata var.thomsonii*	粉葛																							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lauraceae	*Machilus breviflora*	短序潤楠																																							
Lauraceae	*Machilus pauhoi*	刨花潤楠																																							
Magnoliaceae	*Michelia alba*	白蘭	+	+	+	+	+	+							+	+	+	+	+	+	+	+	+	+																	
Malvaceae	*Hibiscus rosa-sinensia*	大紅花															+	+	+	+	+	+	+	+																	
Mimosaceae	*Acacia confusa*	台灣相思	+	+	+	+	+	+							+	+	+	+	+	+	+	+	+	+																	
Mimosaceae	*Leucaena leucocephala*	銀合歡		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Mimosaceae	*Mimosa pudica*	含羞草								+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+																
Mimosaceae	*Calliandra haematocephala*	紅絨球										+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Moraceae	*Ficus hispida*	對葉榕	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 4.1. Flora species recorded along the Lam Tsuen River including riparian habitat.

			Baseline monitoring	Impact monitoring						Impact monitoring				Post Construction monitoring			Post Construction monitoring								Post Construction monitoring								Post Construction monitoring				Post Construction monitoring			
Family	Species name	Species name in Chinese	Jul to Aug 08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Aug-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Moraceae	*Ficus variegata*	青果榕																								+	+	+	+	+	+	+	+	+	+	+	+
Moraceae	*Ficus subpisocarpa*	筆管榕																																			
Moraceae	*Ficus microcarpa*	細葉榕																																			
Musaceae	*Musa paradisiaca*	大蕉	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Myrtaceae	*Cleistocalyx nervosum*	水翁															+	+	+	+	+	+	+	+	+												
Nyctaginaceae	*Bougainvillea spectabilis*	勒杜鵑	+	+	+	+	+	+								+	+	+	+	+	+	+	+	+	+												
Oleaceae	*Ligustrum sinense*	山指甲																								+	+	+	+	+	+	+	+	+	+	+	+
Onagraceae	*Ludwigia erecta*	美洲水丁香											++	++	+	+	+	+	+	++	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+
Oxalidaceae	*Oxalis corniculata*	酢漿草											+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Plantaginaceae	*Plantago major*	車前草															+	+	+	+	+	+	+	+	+												
Poaceae	*Panicum repens*	枯骨草	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+												
Poaceae	*Pennisetum purpureum*	象草	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	+	+	+	+	+	+	+	+
Poaceae	*Pennisetum alopecuroides*	狼尾草																														+	+	+	+	+	+
Poaceae	*Rhynchelytrum repens*	紅毛草	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+												
Poaceae	*Microstegium ciliatum*	剛秀竹	++	++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Brachiaria mutica*	巴拉草	++	+	++	++	++	++	+	++	++	++	++	++	++	++	++	++	++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Poaceae	*Miscanthus floridulus*	五節芒		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Arundinella nepalensis*	石珍芒		+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Panicum maximum*	大黍		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+												
Poaceae	*Coix lacryma-jobi*	薏苡				+	+	+						+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Arundo donax*	蘆竹															+	+	+	+	+	+	+	+	+												
Poaceae	*Chloris virgata*	虎尾草															+	+	+	+	+	+	+	+	+												
Poaceae	*Setaria palmifolia*	棕葉狗尾草																																			
Polygonaceae	*Rumex trisetifer*	假菠菜		+	+	+	+	+		+					+	+	++	++	++	++	++	++	++	++	++	+	++	++	++	++	++	++	++	++	+	+	+
Polygonaceae	*Polygonum chinense*	火炭母															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Polygonaceae	*Polygonum hydropiper*	水蓼															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Polygonaceae	*Polygonum glabrum*	光蓼																														+	+	+	+	+	+
Polygonaceae	*Polygonum perfoliatum*	杠板歸															+	+	+	+	+	+	+	+	+												
Polygonaceae	*Polygonum lapathifolium*	大馬蓼															+	+	+	+	+	+	+	+	+												
Portulacaceae	*Portulaca oleracea*	馬齒莧							+	+	+									+	+	+	+	+	+												
Ranunculaceae	*Ranunculus sceleratus*	石龍芮														+	++	+	+			+	+			+	+	+	+	+	+	+	+	+	+	+	+
Rubiaceae	*Adina pilulifera*	水團花															+	+	+	+	+	+	+	+	+												
Sapindaceae	*Dimocarpus longan*	龍眼		+	+	+	+	+							+	+	+	+	+	+	+	+	+	+	+												
Scrophulariaceae	*Scoparia dulcis*	野甘草															+	+	+	+	+	+	+	+	+												
Scrophulariaceae	*Lindernia anagallis*	長蕊母草															+	+	+	+	+	+	+	+	+												
Solanaceae	*Solanum nigrum*	龍葵				+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+												
Solanaceae	*Lycopersicon esculentum*	番茄											+	+	+	+	+																				
Solanaceae	*Solanum torvum*	水茄															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sterculiaceae	*Sterculia lanceolata*	假蘋婆															+	+	+	+	+	+	+	+	+												
Sterculiaceae	*Byttneria aspera*	刺果藤															+	+	+	+	+	+	+	+	+												
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Thelypteridaceae	*Macrothelypteris torresiana*	普通針毛蕨															+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tiliaceae	*Microcos nervosa*	布渣葉																																			
Ulmaceae	*Celtis sinensis*	朴樹	+	+	+	+	+	+							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ulmaceae	*Trema orientalis*	異色山黃麻																+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ulmaceae	*Trema tomentosa*	山黃麻										+	+	+	+	+	+	+	+	+	+	+	+	+	+												
Urticaceae	*Pilea microphylla*	透明草			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Verbenaceae	*Duranta erecta*	假連翹																								+	+	+	+	+	+	+	+	+	+	+	+
Urticaceae	*Boehmeria nivea*	苧麻			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Verbenaceae	*Lantana camara*	馬纓丹	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Vitaceae	*Cayratia corniculata*	角花烏蘞莓	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Floating Plant																																					
Lemnaceae	*Lemna minor*	浮萍		+											+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Submerged Plant																																					
Hydrocharitaceae	*Hydrilla verticillata*	黑藻														+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
No. of species			22	38	40	44	44	42	34	40	37	39	47	49	56	62	91	92	93	94	94	94	94	94	96	63	64	64	66	64	64	63	63	63	65	65	65

Note:

+, occurred; ++, common; +++, Species abundant/dominant in the the study area

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Baseline monitoring								Impact monitoring				Impact monitoring				Impact monitoring								Impact monitoring								Impact monitoring			
		Stream	Jul-08				Aug-08				Jan-09				Jan-09				Jul-09								Jan-10								Jul-10			
		Transect	P1		P4		P1		P4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹	0.4	40			0.4	40			0.4	30	0.5	5	1.5	5	1	15																						
Fabaceae	*Pueraria lobata*	野葛	0.5	30			0.5	30							0.2	5			0.5	50			0.5	20					0.5	5			0.5	2			0.5	5		
Poaceae	*Pennisetum purpureum*	象草	3	20			3	20																									2	5						
Araceae	*Alocasia odora*	海芋	1	10			1	10			0.5	2					0.3	<1															1	5					1	10		
Caesalpiniaceae	*Cassia alata*	翅荚決明			1.2	10			1.2	10																														
Magnoliaceae	*Michelia alba*	白蘭			6	10			6	10																														
Poaceae	*Brachiaria mutica*	巴拉草			1.2	70			1.2	70	1.5	30							0.5	20			1.2	5	1	40	0.8	40	0.9	50	1	15			0.8	20	0.9	30	1	60	1.5	30
Moraceae	*Ficus hispida*	對葉榕									1.5	5							1.5	5	4	5									4	5	0.5	30					4	5		
Asteraceae	*Mikania micrantha*	薇甘菊									0.4	20					0.5	1	0.5	5	0.3	15	0.5	30					0.5	30	0.3	25					0.5	20	0.3	5		
Musaceae	*Musa paradisiaca*	大蕉													3	5							1.5	5									0.5	2						
Ulmaceae	*Celtis sinensis*	朴樹			6	10			6	10							4	10							6	50														
Araceae	*Pistia stratiotes L.*	大漂																											0.05	5			2							
Urticaceae	*Boehmeria nivea*	苧麻																													0.3	5								
Asteraceae	*Bidens alba*	白花鬼針草											0.5	5													0.4	50			0.3	5			0.4	20			0.5	10
Poaceae	*Coix lacryma-jobi*	薏苡																													1.5	2								
Solanaceae	*Solanum nigrum*	龍葵																																						
Cyperaceae	*Cyperus flabelliformis*	風車草																															1	30						
Poaceae	*Miscanthus floridulus*	五節芒																					1.2	2																
Euphorbiaceae	*Macaranga tanarius*	血桐											3	5																										
Asteraceae	*Wedelia chinensis*	蟛蜞菊															0.2	10																						
Commelinaceae	*Commelina diffusa*	節節草															0.2	<1																					0.5	20
Asteraceae	*Erechtites hieracifolia*	革命菜															0.5	<1																						
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																						
Convolvulaceae	*Pharbitis nil*	牽牛																																					0.5	10
Verbenaceae	*Lantana camara*	馬纓丹																																						
Mimosaceae	*Leucaena leucocephala*	銀合歡																																						
Brassicaceae	*Nasturtium officinale*	西洋菜																																						
Onagraceae	*Ludwigia erecta*	美洲水丁香																																						
Poaceae	*Pennisetum alopecuroides*	狼尾草																																						
Amaranthaceae	*Celosia argentea*	青箱																																						
Bare Gound												13		85		85		64		20		80		38		10		50		10		43		24		60		45		20		30

P1 – Point count location 1; P4 – Point count location 4

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Impact monitoring								Impact monitoring								Impact monitoring								Impact monitoring								Impact monitoring							
		Stream	Jan-11								Jul-11								Jan-12								Jul-12								Aug-13							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹							0.8	5																											0.5	5						
Fabaceae	*Pueraria lobata*	野葛									0.3	10							0.3	10							0.3	5							0.3	15	0.3	5			0.3	10
Poaceae	*Pennisetum purpureum*	象草			1.2	10							1.2	2	2.5	10					2.5	5	2.5	5					2	5												
Araceae	*Alocasia odora*	海芋							0.5	3																																	
Caesalpiniaceae	*Cassia alata*	翅荚決明																																									
Magnoliaceae	*Michelia alba*	白蘭																																									
Poaceae	*Brachiaria mutica*	巴拉草	0.8	5			1	30	1	15	0.8	10	1	5					0.8	10	1	2	1.5	60			0.8	10	1	5	1.5	20			0.8	5	0.8	5	1	10	1	15
Moraceae	*Ficus hispida*	對葉榕					4	5																																		
Asteraceae	*Mikania micrantha*	薇甘菊	0.4	10	0.5	5	0.3	5	0.4	8	0.4	5	0.5	3			0.4	2	0.4	5	0.5	3			0.4	2	0.4	5	0.5	3	0.5	15	0.4	1	0.5	25	0.5	10	0.5	10	0.4	3
Musaceae	*Musa paradisiaca*	大蕉																																								
Ulmaceae	*Celtis sinensis*	朴樹																																								
Araceae	*Pistia stratiotes L.*	大漂																																								
Urticaceae	*Boehmeria nivea*	苧麻													1.5	10																							0.8	2		
Asteraceae	*Bidens alba*	白花鬼針草	0.4	10	0.4	20	0.5	5			0.4	2	0.4	5	0.5	2	0.5	10	0.4	2	0.4	5	0.5	2	0.5	10	0.4	5	0.4	5	0.5	5	0.5	2	0.4	5	0.4	20	0.5	10	0.5	2
Poaceae	*Coix lacryma-jobi*	薏苡																																								
Solanaceae	*Solanum nigrum*	龍葵													2	3																											
Cyperaceae	*Cyperus flabelliformis*	風車草							1	5																																	
Poaceae	*Miscanthus floridulus*	五節芒																																								
Euphorbiaceae	*Macaranga tanarius*	血桐																																								
Asteraceae	*Wedelia chinensis*	蜈蚣菊							0.5	5																																	
Commelinaceae	*Commelina diffusa*	節節草					0.4	10							0.4	10					0.3	3	0.4	5							0.4	2	0.3	5								
Asteraceae	*Erechtites hieracifolia*	革命菜																																								
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨							0.5	5																																	
Convolvulaceae	*Pharbitis nil*	牽牛																																								
Verbenaceae	*Lantana camara*	馬纓丹													0.5	2																											
Mimosaceae	*Leucaena leucocephala*	銀合歡																																							1.2	5
Brassicaceae	*Nasturtium officinale*	西洋菜																																								
Onagraceae	*Ludwigia erecta*	美洲水丁香																																								
Poaceae	*Pennisetum alopecuroides*	狼尾草																																								
Amaranthaceae	*Celosia argentea*	青箱																																								
Bare Gound				75		65		45		54		73		85		65		88		73		82		28		88		75		82		58		92		50		55		68		70

P1 – Point count location 1; P4 – Point count location 4

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Impact monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Stream	Dec-13								Jan-14								Feb-14								Mar-14								Apr-14							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹																															0.3	2						
Fabaceae	*Pueraria lobata*	野葛							0.3	10							0.3	10						0.3	10						0.3	10					0.3	5	0.3	5
Poaceae	*Pennisetum purpureum*	象草							1.5	5							1.5	5						1.5	5						1.5	5								
Araceae	*Alocasia odora*	海芋																																						
Caesalpiniaceae	*Cassia alata*	翅荚決明																																						
Magnoliaceae	*Michelia alba*	白蘭																																						
Poaceae	*Brachiaria mutica*	巴拉草	0.8	10	0.8	10					0.8	10	0.8	10					0.8	10	0.8	10					1	13	1	13					0.5	5	0.6	10			0.6	10
Moraceae	*Ficus hispida*	對葉榕																																						
Asteraceae	*Mikania micrantha*	薇甘菊	0.5	10	0.5	5	0.5	10	0.4	10	0.5	10	0.5	5	0.5	10	0.4	10	0.5	10	0.5	5	0.5	10	0.4	10	0.5	10	0.5	5	0.5	10	0.4	10			0.3	5	0.3	15	0.3	5
Musaceae	*Musa paradisiaca*	大蕉																																						
Ulmaceae	*Celtis sinensis*	朴樹																																						
Araceae	*Pistia stratiotes L.*	大漂																																						
Urticaceae	*Boehmeria nivea*	苧麻																																						
Asteraceae	*Bidens alba*	白花鬼針草	0.4	5			0.5	10			0.4	5			0.5	10			0.4	5			0.5	10			0.4	5			0.5	10			0.5	20	0.5	10	0.7	15	0.6	10
Poaceae	*Coix lacryma-jobi*	薏苡																																						
Solanaceae	*Solanum nigrum*	龍葵																																						
Cyperaceae	*Cyperus flabelliformis*	風車草																																						
Poaceae	*Miscanthus floridulus*	五節芒																																						
Euphorbiaceae	*Macaranga tanarius*	血桐																																						
Asteraceae	*Wedelia chinensis*	蟛蜞菊																																						
Commelinaceae	*Commelina diffusa*	節節草					0.3	5							0.3	5							0.3	5							0.3	5			0.2	10			0.3	3		
Asteraceae	*Erechtites hieracifolia*	革命菜																																						
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																						
Convolvulaceae	*Pharbitis nil*	牽牛																																						
Verbenaceae	*Lantana camara*	馬纓丹																																						
Mimosaceae	*Leucaena leucocephala*	銀合歡																																						
Brassicaceae	*Nasturtium officinale*	西洋菜																																			0.2	5	0.2	50	0.2	5
Onagraceae	*Ludwigia erecta*	美洲水丁香																																						
Poaceae	*Pennisetum alopecuroides*	狼尾草																																						
Amaranthaceae	*Celosia argentea*	青箱					1	2							1	2							1	2							1	2										
Bare Gound				75		85		73		75		75		85		73		75		75		85		73		75		72		82		73		75		63		70		12		65

P1 – Point count location 1; P4 – Point count location 4

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Stream	May-14								Jun-14								Jul-14								Aug-14								Sep-14							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹	0.3	2							0.3	2							0.5	4							0.7	5							0.7	5						
Fabaceae	*Pueraria lobata*	野葛					0.3	5	0.3	5					0.3	5	0.3	5					0.3	5	0.3	5					0.3	5	0.3	5					0.3	5	0.3	5
Poaceae	*Pennisetum purpureum*	象草																																								
Araceae	*Alocasia odora*	海芋																																								
Caesalpiniaceae	*Cassia alata*	翅荚決明																																								
Magnoliaceae	*Michelia alba*	白蘭																																								
Poaceae	*Brachiaria mutica*	巴拉草	0.5	5	0.6	6			0.6	6	0.5	5	0.6	8			0.6	6	0.6	10	0.8	10			0.8	6	0.6	10	0.8	12			0.8	8	0.6	10	0.8	12			0.8	8
Moraceae	*Ficus hispida*	對葉榕																																								
Asteraceae	*Mikania micrantha*	薇甘菊			0.3	5	0.3	15	0.3	5			0.3	6	0.3	15	0.3	8			0.3	6	0.3	15	0.3	8			0.3	6	0.3	15	0.3	8			0.3	8	0.3	15	0.3	10
Musaceae	*Musa paradisiaca*	大蕉																																								
Ulmaceae	*Celtis sinensis*	朴樹																																								
Araceae	*Pistia stratiotes L.*	大漂																																								
Urticaceae	*Boehmeria nivea*	苧麻																																								
Asteraceae	*Bidens alba*	白花鬼針草	0.5	20	0.5	10	0.7	15	0.6	10	0.5	20	0.5	10	0.7	15	0.6	10	0.5	20	0.5	12	0.7	18	0.6	10	0.5	20	0.6	12	0.7	15	0.6	10	0.5	20	0.6	12	0.7	15	0.6	10
Poaceae	*Coix lacryma-jobi*	薏苡																																								
Solanaceae	*Solanum nigrum*	龍葵																																								
Cyperaceae	*Cyperus flabelliformis*	風車草																																								
Poaceae	*Miscanthus floridulus*	五節芒																																								
Euphorbiaceae	*Macaranga tanarius*	血桐																																								
Asteraceae	*Wedelia chinensis*	蟛蜞菊																																								
Commelinaceae	*Commelina diffusa*	節節草	0.2	8			0.3	3			0.2	8			0.3	3			0.2	8			0.3	3			0.3	10			0.3	5			0.3	10			0.3	5		
Asteraceae	*Erechtites hieracifolia*	革命菜																																								
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																								
Convolvulaceae	*Pharbitis nil*	牽牛																																								
Verbenaceae	*Lantana camara*	馬纓丹																																								
Mimosaceae	*Leucaena leucocephala*	銀合歡																																								
Brassicaceae	*Nasturtium officinale*	西洋菜			0.2	2	0.2	2	0.2	1			0.2	2	0.2	2	0.2	1			0.3	1	0.3	1	0.3	1			0.3	1	0.3	1	0.3	2	0.3	1			0.3	1	0.3	1
Onagraceae	*Ludwigia erecta*	美洲水丁香																																								
Poaceae	*Pennisetum alopecuroides*	狼尾草																																								
Amaranthaceae	*Celosia argentea*	青箱																																								
Bare Gound				65		77		60		73		65		74		60		70		58		71		58		70		55		69		59		68		55		67		58		66

P1 – Point count location 1; P4 – Point count location 4

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Stream	Oct-14								Nov-14								Dec-14								Jan-15								Feb-15								Mar-15							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height (m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height (m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹																																															
Fabaceae	*Pueraria lobata*	野葛							0.6	10							0.6	10							0.6	10							0.6	10							0.6	10							0.6	10
Poaceae	*Pennisetum purpureum*	象草																											3	15					3	15							3	15					
Araceae	*Alocasia odora*	海芋							1.8	1							1.8	1							1.8	1							1.8	1							1.8	1							1.8	1
Caesalpiniaceae	*Cassia alata*	翅荚決明																																															
Magnoliaceae	*Michelia alba*	白蘭																																															
Poaceae	*Brachiaria mutica*	巴拉草	1	10	1.5	15	1.3	30	1	5	1	10	1.5	15	1.3	30	1	5	1	10	1.5	15	1.3	30	1	5	1	20	1	20	1.3	20	1	10	1	20	1	20	1.3	20	1	10	1	20	1.2	20	1.4	20	1	10
Moraceae	*Ficus hispida*	對葉榕																																															
Asteraceae	*Mikania micrantha*	薇甘菊	0.3	15	0.3	15	0.3	15	0.3	15	0.3	18	0.3	18	0.3	18	0.3	18	0.3	18	0.3	18	0.3	18	0.3	18	0.4	10	0.4	15	0.3	5	0.3	20	0.4	10	0.4	15	0.3	5	0.3	20	0.4	10	0.4	15	0.3	5	0.3	20
Musaceae	*Musa paradisiaca*	大蕉																																															
Ulmaceae	*Celtis sinensis*	朴樹																																															
Araceae	*Pistia stratiotes L.*	大漂																																															
Urticaceae	*Boehmeria nivea*	苧麻																																															
Asteraceae	*Bidens alba*	白花鬼針草	0.5	5	0.8	12	0.7	10			0.5	5	0.8	12	0.7	10			0.5	5	0.8	12	0.7	10			1	10	0.4	15	1	15			1	10	0.7	15	1	15			1	10	0.7	15	1	15		
Poaceae	*Coix lacryma-jobi*	薏苡	2	5							2	5							2	5																														
Solanaceae	*Solanum nigrum*	龍葵																																															
Cyperaceae	*Cyperus flabelliformis*	風車草																																															
Poaceae	*Miscanthus floridulus*	五節芒																																															
Euphorbiaceae	*Macaranga tanarius*	血桐																																															
Asteraceae	*Wedelia chinensis*	蟛蜞菊																																															
Commelinaceae	*Commelina diffusa*	節節草	0.3	10	0.8	20			0.3	20	0.3	12	0.8	22			0.3	20	0.3	12	0.8	22			0.3	20	0.4	10	0.4	20			0.3	20	0.5	10	0.5	20			0.3	20	0.5	10	0.4	20			0.3	20
Asteraceae	*Erechtites hieracifolia*	革命菜																																															
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																															
Convolvulaceae	*Pharbitis nil*	牽牛																																															
Verbenaceae	*Lantana camara*	馬纓丹																																															
Mimosaceae	*Leucaena leucocephala*	銀合歡																																															
Brassicaceae	*Nasturtium officinale*	西洋菜					0.3	2	0.1	1					0.3	2	0.1	1					0.3	2	0.1	1					0.3	10	0.1	15					0.3	10	0.2	15					0.3	10	0.2	15
Onagraceae	*Ludwigia erecta*	美洲水丁香	2	30	2	15	2	10	1.8	5	2	25	2	13	2	10	1.8	5	2	25	2	13	2	10	1.8	5	2	30	2	10	2	5	1.8	5	2	30	2	10	2	5	2	5	2	30	2	10	2	5	2	5
Poaceae	*Pennisetum alopecuroides*	狼尾草																																															
Amaranthaceae	*Celosia argentea*	青箱					1.5	15							1.5	15							1.5	15																										
Bare Gound				25		23		18		43		25		20		15		40		25		20		15		40		20		20		30		19		20		20		30		19		20		20		30		19

P1 – Point count location 1; P4 – Point count location 4

Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Stream	Apr-15								May-15								Jun-15								Jul-15								Aug-15							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹																																									
Fabaceae	*Pueraria lobata*	野葛							0.6	10							0.3	5							0.3	5	0.5	10					0.4	5	0.5	10					0.4	5
Poaceae	*Pennisetum purpureum*	象草					3	15							2	15							2	15																		
Araceae	*Alocasia odora*	海芋							1.8	1							0.8	1							0.8	1																
Caesalpiniaceae	*Cassia alata*	翅荚決明																																								
Magnoliaceae	*Michelia alba*	白蘭																																								
Poaceae	*Brachiaria mutica*	巴拉草	1.1	20	1.2	20	1.4	20	1	10	0.9	15	1	18	0.8	20	1	10	0.9	15	1	18	0.8	20	1	10	0.9	30	1.5	30	0.5	70	1	15	1	30	1.5	30	0.8	70	1	15
Moraceae	*Ficus hispida*	對葉榕																																								
Asteraceae	*Mikania micrantha*	薇甘菊	0.4	10	0.4	15	0.3	5	0.3	20	0.3	5	0.4	10	0.3	5	0.3	10	0.3	5	0.4	10	0.3	5	0.3	10	0.3	5	0.2	5	0.3	5	0.4	5	0.3	5	0.2	5	0.3	5	0.4	5
Musaceae	*Musa paradisiaca*	大蕉																																								
Ulmaceae	*Celtis sinensis*	朴樹																																								
Araceae	*Pistia stratiotes L.*	大漂																																								
Urticaceae	*Boehmeria nivea*	苧麻																																								
Asteraceae	*Bidens alba*	白花鬼針草	1	10	0.7	15	1	15			0.8	5	0.7	10	0.8	15			0.8	5	0.7	10	0.8	15							0.3	5							0.4	5		
Poaceae	*Coix lacryma-jobi*	薏苡																																								
Solanaceae	*Solanum nigrum*	龍葵																																								
Cyperaceae	*Cyperus flabelliformis*	風車草																																								
Poaceae	*Miscanthus floridulus*	五節芒																																								
Euphorbiaceae	*Macaranga tanarius*	血桐																																								
Asteraceae	*Wedelia chinensis*	蟛蜞菊																									0.3	20	0.2	10					0.4	20	0.2	10				
Commelinaceae	*Commelina diffusa*	節節草	0.5	10	0.4	20			0.3	20	0.5	5	0.4	10			0.3	10	0.5	5	0.4	10			0.3	10	0.3	20	0.2	20	0.2	5	0.4	20	0.3	20	0.2	20	0.2	5	0.4	20
Asteraceae	*Erechtites hieracifolia*	革命菜																																								
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																								
Convolvulaceae	*Pharbitis nil*	牽牛																																								
Verbenaceae	*Lantana camara*	馬纓丹																																								
Mimosaceae	*Leucaena leucocephala*	銀合歡																																								
Brassicaceae	*Nasturtium officinale*	西洋菜					0.3	10	0.2	15																																		
Onagraceae	*Ludwigia erecta*	美洲水丁香	2	30	2	10	2	5	2	5	1.2	10	1.1	5	1.4	5	1.3	5	1.2	10	1.1	5	1.4	5	1.3	5																
Poaceae	*Pennisetum alopecuroides*	狼尾草																													0.5	5	2	5					0.8	5	2	5
Amaranthaceae	*Celosia argentea*	青箱																																								
Bare Gound				20		20		30		19		60		47		40		59		60		47		40		59		15		35		13		55		15		35		13		55

P1 – Point count location 1; P4 – Point count location 4

(Contiuous) Table 4.2. Flora species recorded from belt transect survey at the Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

			Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Stream	Sep-15								Oct-15								Nov-15								Dec-15							
		Transect	T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Poaceae	*Microstegium ciliatum*	剛秀竹																																
Fabaceae	*Pueraria lobata*	野葛	0.5	10					0.4	5	0.5	10					0.4	5	0.5	10					0.4	5	0.5	10					0.4	5
Poaceae	*Pennisetum purpureum*	象草																																
Araceae	*Alocasia odora*	海芋																																
Caesalpiniaceae	*Cassia alata*	翅莢決明																																
Magnoliaceae	*Michelia alba*	白蘭																																
Poaceae	*Brachiaria mutica*	巴拉草	1.1	30	1.5	35	1	70	1.2	15	0.7	5	1.5	30	1	60	1.2	15	0.7	5	1.5	35	1	60	1.2	20	0.8	5	1.5	35	1.2	60	1.2	20
Moraceae	*Ficus hispida*	對葉榕																																
Asteraceae	*Mikania micrantha*	薇甘菊	0.3	5	0.2	5	0.3	5	0.4	5	0.3	5	0.2	5	0.3	5	0.4	5	0.3	5	0.2	5	0.3	5	0.4	5	0.3	5	0.2	5	0.3	5	0.4	5
Musaceae	*Musa paradisiaca*	大蕉																																
Ulmaceae	*Celtis sinensis*	朴樹																																
Araceae	*Pistia stratiotes L.*	大漂																																
Urticaceae	*Boehmeria nivea*	苧麻																																
Asteraceae	*Bidens alba*	白花鬼針草					0.4	5							0.4	10							0.4	10							0.4	10		
Poaceae	*Coix lacryma-jobi*	薏苡									1	5							1	5							1	5						
Solanaceae	*Solanum nigrum*	龍葵																																
Cyperaceae	*Cyperus flabelliformis*	風車草					0.6	2																										
Poaceae	*Miscanthus floridulus*	五節芒									1	10							1	10							1	10						
Euphorbiaceae	*Macaranga tanarius*	血桐																																
Asteraceae	*Wedelia chinensis*	蟛蜞菊	0.4	20	0.2	10					0.4	5							0.4	5							0.4	5						
Commelinaceae	*Commelina diffusa*	節節草	0.3	20	0.2	20	0.2	5	0.4	20	0.3	10	0.2	20	0.2	5	0.4	20	0.3	10	0.2	20	0.2	5	0.4	25	0.3	10	0.2	20	0.2	5	0.4	25
Asteraceae	*Erechtites hieracifolia*	革命菜																																
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨																																
Convolvulaceae	*Pharbitis nil*	牽牛																																
Verbenaceae	*Lantana camara*	馬纓丹																																
Mimosaceae	*Leucaena leucocephala*	銀合歡																																
Brassicaceae	*Nasturtium officinale*	西洋菜																															0.2	10
Onagraceae	*Ludwigia erecta*	美洲水丁香																																
Poaceae	*Pennisetum alopecuroides*	狼尾草					0.8	5	2	5					1.5	10	2	5					1.5	10	2	5					1.5	10	2	5
Amaranthaceae	*Celosia argentea*	青葙													0.4	5							0.4	5							0.4	5		
Acanthaceae	*Dicliptera chinensis*	狗肝菜									0.3	20							0.3	20							0.3	20						
Bare Gound				15		30		13		55		30		45		20		55		30		40		20		45		30		40		20		35

P1 – Point count location 1; P4 – Point count location 4

Table 4.3 Avifauna recorded along survey transects and at four selected point count locations of Lam Tsuen River.

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

					Baseline monitoring						Impact monitoring					Impact monitoring					Impact monitoring				
Common Name	**Species name**	**Chinese name**	**Status**	**Commonness**	Jul-08			Aug-08			Jan-09					Jul-09					Jan-10				
					Abundance			Abundance			Abundance					Abundance					Abundance				
					C	P1	P4	C	P1	P4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C	+	**1**	**1**									+			2	3					
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																					
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C				+			+										+				
Black-faced bunting	*Emberiza spodocephala*	灰頭鶇	WV&PM	C																					
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	+++	**2**	**1**	++	**2**		+		1			+			2	1	+			2	
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																					
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																					
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C																					
Chinese Bulbul	*Pycnonotus sinensis*	白頭鶇	R	C	++	**2**	**3**	+++	**4**	**5**	++	2		2	2	++	1	2	1	3	+++	20	2		
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	+			++	**3**	**1**	+			1		+			1	1	+	1	2	1	1
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C												+				1	+				1
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	++	**1**		+													+			2	
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C							+										+			3	
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	+	**1**	**1**	+	**1**		+		1	1		+				1	+	1		1	
Crested bulbul	*Pycnonotus jocosus*	紅耳鶇	R	C	+++	**2**	**3**	++	**3**	**4**	++	3		3	4	+++	3	2	2	1	+++				
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U																					
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	++	**2**		++	**2**		+		2			++		2	3	2	++	2	3	5	1
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U																					
Daurian redstart	*Phoenicurus auroreus*	北紅尾鴝	WV	C																					
Domestic pigeon	*Columba sp.*	鴿	R	C	+			+	**3**	**2**	++					++		4			+	2		4	
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C																					
Eurasian tree sparrow	*Passer montanus*	麻鵲	R	C	++	**2**		+			+					++	3		1	2	+	4			3
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C							+					+			1						
Great Tit	*Parus major(commixtus)*	大山雀	R	C																					
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C																					
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C	+																				
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C																					
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	+			+			++	1			4	++		2		3	++	15			
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C																					
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C																					
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C																					
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C				+			+			2		+			1	1	+	1	1	2	
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C																					
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C	++	**3**																			
Magpie	*Pica pica*	喜鵲	R	C				+			+					+			1						
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	++	**1**	**1**	+	**1**	**1**	+		1	1	1	+	1			1	+	1	1	2	2
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U																					
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C																					
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C																					
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																					
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C	+	**1**					++										+			2	
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U																					
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅嘴藍鵲	R	C																					
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C																					
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C												+		1							
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C				+			+			1		+	1	1			+		1		
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C																					
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C																					
Siberian Stonechat	*Saxicola maurus*	黑喉石鵲	WV	C							+														
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鶇	R	U																					
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	+	**1**	**1**	+	**1**		+++			3	1	++	2		1	3	++	3	4	4	2
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C												+		2			+			3	
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳭	R	C																					
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C				+			+	1		1	1	+	1		1		+	1	2	2	1
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+			+			+				1	+				1	+				1
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C												+			1		+			1	
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																					
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鵐鶯	R	C	+		**1**	+			+				1	+				1	+	+	1	3	1
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U							+			1	1						+	1		2	
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C																					
Number of birds						19	12		20	13		6	5	14	12		9	14	13	17		50	14	28	10
No. of species					18	12	8	19	9	5	24	3	4	8	5	23	5	7	9	11	23	9	6	10	5

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

+, occurred; ++, common; +++, abundant/dominant species in the the study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

All bird species are under protection of Wild Animals Protection Ordinance (Cap. 170)

Endangered Species of Animals and Plants Ordinance (Cap. 586)

RC : Regional concern Fellowes *et al* (2002)

LC : Local Concern Fellowes *et al* (2002)

PRC: Potential Regional onver Fellowes *et al* (2002)

CR: Rare in China Red Data Book Status

VU: Vulnerable in China Red Data Book Status

Table 4.3 Avifauna recorded along survey transects and at four selected point count locations of Lam Tsuen River.

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

Common Name	Species name	Chinese name	Status	Commonness	Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring				
					Jul-10					Jan-11					Jul-11					Jan-12					Jul-12				
					Abundance					Abundance					Abundance					Abundance					Abundance				
					C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C																				+++	3	4	3	2
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																								
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C	+					+										+								
Black-faced bunting	*Emberiza spodocephala*	灰頭鶇	WV&PM	C																								
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	+			2	1	+	2		1			+			1		+	1			2	++			3	
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																								
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																								
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C						+																		
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	+++	4	3	5	2	+	5		2	2	3	+		1	3	1	+	2		2	1	++	2	1	4	2
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	+	2	1	1	2	+	1					+			1	1	+			1		+		1	1	
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C	+		1	1	2	+	1										+									
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	+					+											+				4	+				
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C	+					+	2		1								+					+				
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	+			1	1	+	2		1		1	+	1		2	1	+				1	+	1	1	1	
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++	2	2	3	2	+	3		2	1	2	+	3	1	3	1	+	1		1	2	+++	5	2	4	2
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U						+					4														
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	++	3	4	2	3	+	3		2	1		+		1	2		+		2			++			5	2
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U						+																				
Daurian redstart	*Phoenicurus aurореus*	北紅尾鴝	WV	C																										
Domestic pigeon	*Columba sp.*	鴿	R	C	+	3	2																							
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C																										
Eurasian tree sparrow	*Passer montanus*	麻鵲	R	C	++	6	4	3	5	+						+			3	2	+					+++	4	5	3	2
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+				1	+						+					++	6			3	+				
Great Tit	*Parus major(commixtus)*	大山雀	R	C																										
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C																										
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C																										
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C						+	2		1	1							+		1	2	1					
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	++	6			4	+	4		2	1		+	5	2	3		+	1	1	2	1	+++	4		3	
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C																										
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C																										
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C												+	1									+				
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C	+	2	1	2	1	+	1		1		1	+			2	1						+			1	1
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C																										
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C																										
Magpie	*Pica pica*	喜鵲	R	C	+					+						+					+		1							
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	+	2	1	1	2	+	1		1		1	+	2	1	2	1	+	2	3	1	2	++	3	2	3	2
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U																										
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C																										
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C																										
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																										
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C	+					+											+	1	1			+				
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U																										
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅咀藍鵲	R	C																										
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C																										
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C																										
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C	+			1		+						+					+					+	1			
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C																										
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C																	+									
Siberian Stonechat	*Saxicola maurus*	黑喉石鵲	WV	C																										
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	U												+	1		1		+					+			1	
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	++	1	2	2	1	+	3		2		1	+	1	2	1	1	+			12		++	2	1	3	
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C						+						+					++					+				
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳾	R	C																										
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	+	1		1	1	+	1		1		2	+					+	1				++	1	2		
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+			1	2	+	1					+					+					+				
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C	+																									
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																										
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鷦鶯	R	C	+			1	1	+	1		1	1	2	+			1		+					+	1		1	
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U						+																				
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C																										
Number of birds						31	21	24	27		30	14	8	13		14	8	24	9		15	9	21	17		27	19	36	13
No. of species					25	10	10	12	13	28	13	9	7	7	19	7	6	12	8	26	8	6	7	9	23	10	9	13	7

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

+, occurred; ++, common; +++, abundant/dominant species in the the study area

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VU: Vulnerable in China Red Data Book Status

Table 4.3 Avifauna recorded along survey transects and at four selected point count locations of Lam Tsuen River.

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

Common Name	Species name	Chinese name	Status	Commonness	Impact monitoring					Impact monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
					Aug-13					Dec-13					Jan-14					Feb-14					Mar-14					Apr-14				
					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance				
					C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C	+															+					+					+				1
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																														
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C																+					+									
Black-faced bunting	*Emberiza spodocephala*	灰頭鶇	WV&PM	C																														
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	++	1			2	++		2	3	2	++		2	2	1	++		2		3	++	1		4	2	++		2	1	
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																														
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																														
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C																					+									
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	++	2	1		1	++	3	3	2	1	+	1		2	3	+	3	1	2	2	+	2	2	4	3	+	2		3	1
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	+			1	1	++	2	3	2	1	++	1	2	4	3	++		1	2	2	++	2	3	3	1	++	3	2	2	
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C	+					+					+			1		+				1	+			1		+				
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	+					+					+					+	1				+	1		1		+	2		1	
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C	+					+		2	2		+		1	2		+		2	2		+		2	2	1	+		2	1	
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	+	1			1	+	1	1		1	++	2	1	3	2	++	1	1	2	1	++	1	2	1	2	++	1	1		1
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++	4	2	2	3	+++	5	4	5	3	+++	6	5	4	5	+++	4	3	3	4	+++	3	2	6	5	+++	2	3	4	2
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U	+																													
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	++	1	3	3		++	1	2	3	2	++		3	2	3	++		2	4	2	++			6	3	++		1	3	2
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U						+															+									
Daurian redstart	*Phoenicurus auroreus*	北紅尾鴝	WV	C						+					+		1	1		+		1		1	+		1	1						
Domestic pigeon	*Columba sp.*	鴿	R	C	+					+					+					+					+									
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C						+					+	1				+	1		1		+		1	1		+			1	
Eurasian tree sparrow	*Passer montanus*	麻鵐	R	C	++			2		++					+					+					+					+	2			
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+					+					+			1	1	+		1	1		+		1	1	1	+		1		1
Great Tit	*Parus major(commixtus)*	大山雀	R	C						+					+					+	1			2	+	1				+				
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C						+					+		2			+			2		+		2	2		+		1	2	
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C	+					+					+					+					+					+				
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C						++	1	3	3	2	++	2	2	4	1	++	2	1	2	2	++	2	1	2	1	+		1		
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	+++	4		3	2	+++	6	4	6	3	+++	4	3	3	5	+++	5		4		++	4		5	3	++	2		3	
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C						+										+.					+.					+				
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C																														
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C																					+.									
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C	+	1	1			+	1	2	1	2	+	1	2	3	2	+	2	2	3	3	++	1	3	4	2	++	3	2	2	1
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C																														
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C											+					+			2	1	+		2	2						
Magpie	*Pica pica*	喜鵲	R	C	+					+					+					+					+			1		+				
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	++	1	1	1		++	1	1	1	2	++	2	1	3	1	++	1	2	1	2	++	1	1	2	2	++	1		2	1
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U						+																								
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C						+					+					+			3	2	+		2	4	2	+		2		
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C																														
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																														
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C						++		3	2	3	++	2	1		2	+			1		+		1	2		+			2	
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U																														
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅咀藍鵲	R	C																+					+									
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C						+					+		1		1	+			1		+									
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C																														
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C	+					+					+					+					+					+			1	
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C						+					+					+					+					+				
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C						+										+														
Siberian Stonechat	*Saxicola maurus*	黑喉石鴴	WV	C						+					+		1			+					+			1						
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	U																														
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	++	1	2	2		++	1	3	1	2	++	3	2	3	4	++	3	4	3	2	++	2	3	4	3	++	3	2	2	1
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C	+					+					++					++					++					++			4	
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳽	R	C						+																								
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	+					++	1	2	2	3	++		2	1	2	++	1	2	3	2	++	1	2	2	1	++	1	2	1	2
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+					+					+					+					+			2		+				1
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C											+					+										+				
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																														
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鷦鶯	R	C	+					+		1	1		+		1	2	1	+			1	2	+		1	2	1	+	1	1	1	
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U																														
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C																														
Number of birds						16	10	14	10		23	36	34	27		25	33	41	37		25	25	42	35		22	32	66	33		23	23	36	14
No. of species					37	9	6	7	6	48	11	15	14	13	35	11	18	17	16	40	12	14	19	18	41	13	18	26	16		12	14	18	11

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

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(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

Common Name	Species name	Chinese name	Status	Commonness	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
					May-14					Jun-14					Jul-14					Aug-14					Sep-14					Oct-14					Nov-14				
					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance				
					C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C	++	2	1	4	2	+		1	2	1	+			2															+				
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																																	
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C																+									+					+				
Black-faced bunting	*Emberiza spodocephala*	灰頭鶲	WV&PM	C																																	
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	++	1	2	2	1	++	2		3	2	++	2	3	2	1	++	1		3		++		2	2	1	++	2		3		++		2	2	
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																																	
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																																	
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C																																	
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	+		1	2		+	2		2		+	1				+	2		1		+	2	2	1		+	3		2	1	+	2			1
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	++	1		2	1	++	2	1	1		++	4	2	3	2	++	2	1	2	2	++	3	2	3	1	++	4	1	1	2	++	3		2	1
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C	+					+					+					+					+					+			1	1	+				1
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	+	1		1	1	+			1		+	1				+		1			+					+									
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C	+			1		+					+					+					+					+					+				
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	++	1		1	1	++	1	1	1	1	++	2		1		++	1	2	1	1	++	1	1	2	2	++	1	1		1	+		1		
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++	3	2	3	3	+++	2	3	4	2	+++	4	3	6	3	+++	3		4	2	+++	2	2	3	2	+++	3	3	4	2	+++		2	2	3
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U																																	
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	+		2	1		++		3	5	2	++	1	2	5		++		2	3		++		4	3	2	++	1		2	3	++	3		4	
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U																																	
Daurian redstart	*Phoenicurus auroreus*	北紅尾鴝	WV	C																										+		1			+		1	1	
Domestic pigeon	*Columba sp.*	鴿	R	C																					+					+					+				
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C	+			1	1	+			1		+		1	1		+			1	1	+			1		+		1	1		+			1	
Eurasian tree sparrow	*Passer montanus*	麻鵲	R	C	+					+				2	+	2		3	1	+		1	2	2	+		1			+		3		1	+	2	2		
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+	1		1	1	+			1	1	+	1		1	1	+			1	1	+		1	1	1	+		1	1		+	1		1	
Great Tit	*Parus major(commixtus)*	大山雀	R	C	+			2																														
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C	+					+																									+				
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C																															+				
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C	+										+		1	1		+			1	1	+	2	1	3	1	+	1	2	2	1	+	1	1	1	2
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	++	4	3	5	2	++	2	2	3		++	5	2		2	++	3		4	3	++	2				++	3				++	2		3	
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C	+					+										+					+					+									
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C	+					+																													
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C																																	
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C	++	1	2	3	2	++	1	1	2	1	++	1	2	3	1	++	2	3	4	2	++	1	2	4	2	++	2	1	3	1	++	3	2	4	2
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C																																	
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C																																	
Magpie	*Pica pica*	喜鵲	R	C																					+					+			1		+				
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	++	1	1	1		++	1	2		1	++		1	3	1	++	1	2	2	1	++	2	1	2	1	++	1	2	2		++	1	1	2	1
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U																																	
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C	+		2	4	2	+	2		3		+			2	1	+		3	2	3	+		2	4	2	+		2			+	3		3	
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C																																	
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																															+				
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C	+																																	
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U	+					+																													
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅嘴藍鵲	R	C											+																				+				
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C																																			
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C																																			
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C	+					+					+			1	1	+			1		+		1	1		+	1		1		+				1
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C	+																				+										+				
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C																																			
Siberian Stonechat	*Saxicola maurus*	黑喉石鵲	WV	C																															+		1		
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	U																																			
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	++	2	3	5	2	++	3	1	3	2	++	2	3	5	1	++	1	2	4	2	++	3	2	4	3	++	4	2	3	2	++	3	3	5	3
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C	++					++					+					+			2		+			5		++	5		8		++		4	5	
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳾	R	C																																			
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	+					+					++	1	2	3	1	++	2	1	2	2	++	3	2	3	4	++	2	1	2	1	++	1	2	1	2
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+			1	1	+		1			+			1	1	+		1	1		+		1	2	1	+			1	1	+			1	1
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C	+																									+					+				
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																																			
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鵐鶯	R	C	+			1	1	+	1			1	+	1	2	1	1	+	1	2	2	1	+	1	1	2	2	+	1		1		+		1	1	1
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U																																			
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C																																			
Number of birds						18	19	41	21		19	16	32	16		28	24	44	18		19	21	43	24		22	28	46	25		34	21	39	17		25	23	39	19
No. of species						11	10	19	14		11	10	14	11		14	12	18	14		11	12	20	14		11	17	18	14		15	13	18	12		12	13	17	12

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

+, occurred; ++, common; +++, abundant/dominant species in the the study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

All bird species are under protection of Wild Animals Protection Ordinance (Cap. 170)

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CR: Rare in China Red Data Book Status

VU: Vulnerable in China Red Data Book Status

Table 4.3 Avifauna recorded along survey transects and at four selected point count locations of Lam Tsuen River.

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

Common Name	Species name	Chinese name	Status	Commonness	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
					Dec-14					Jan-15					Feb-15					Mar-15					Apr-15					May-15				
					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance				
					C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C																++	3	2	4	2	++	4	3	3	2	++	4	4	5	3
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																									+				
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C	+					+					+					+					+			1					
Black-faced bunting	*Emberiza spodocephala*	灰頭鶇	WV&PM	C	+																				+			1					
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	++	2		3	2	++	2		2		++			3	2	++	2		2		+		2		2	++			3	2
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																													
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																													
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C																									+			1	
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	++	2	2	3		++	2		3	1	+	1		1		++	2		2		++	2		2		++	2	2	2	
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	+	2	1	3		+	2	2		1	+	2	1	2		+	2	1	2	1	+				1	+				1
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C	+		1			+		1			+					+		1			+	1				+	1			
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	+										+	1				+			1	1	+			1	1	+			1	1
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C	+					+					+					+					+								
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	++		1		1	++	1		1		+	1		1	1	+	1		2	1	+	2		1		+	2		2	
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++		4	3	2	+++	3	2	3		+++	2	2	4		+++	2	4			+++	4	3	5	2	+++	5	2	5	2
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U																													
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	++	2	3	5		++		3	4	2	++		4	3		++		2	3	2	+++	3	4	2	3	+++	3	4	2	3
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U																													
Daurian redstart	*Phoenicurus aurореus*	北紅尾鴝	WV	C	++		1	1	1	+	1				+		1																
Domestic pigeon	*Columba sp.*	鴿	R	C	+					+					+																		
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C	+	1	1			+		1			+			1	1	+					+		1			+		1	1	
Eurasian tree sparrow	*Passer montanus*	麻鵐	R	C	++	3		2		+++		3	2	1	++		2		1	++	2			1	++	2	2	1	3	++	2	2	1	3
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+		1		1	+					+			1	1	+		1	1		+		1	1		+			1	
Great Tit	*Parus major(commixtus)*	大山雀	R	C						+															+	2				+	2			
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C	+					+					+																			
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C																													
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C	+	1		2	1	+	1	1	1		++	1	2	2	2	++	1		1	2	+		1	1	2	++		1	1	2
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	++	3	4	5		++	3		3		++	3		4		++			4	3	++			3	3	++		3	1	3
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C																													
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C																+					+			1	1	+			1	1
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C																													
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C	++	2	1	3	1	++	1	2	3	2	+	1	1	3	2	+	1	2	3	2	+		2	1		+		2	1	
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C																+		1			+		1						
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C											+	1		2		+			2										
Magpie	*Pica pica*	喜鵲	R	C	+																												
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	++	1	1	2	2	++	1	1	2	2	++	1	1	2	1	++	1	1	2		++	2		1	2	++	1	1	1	2
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U																													
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C	++			2	2	++	2				+			3		++					++		2			++		2		
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C																													
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																													
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C	+					+			1																				
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U																+													
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅嘴藍鵲	R	C																													
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C																													
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C																													
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C	+	1		1		+		1		1	+					+					+		1							
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C	+					++					++					+					+					+				
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C																+													
Siberian Stonechat	*Saxicola maurus*	黑喉石鵙	WV	C	++		1		1	++		1	1		+		1			++		1	1										
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	U																													
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	+++	2	3	3	2	+++	2	3	5	2	++	3	2	4	3	++	2	3	2	2	++	4	2	3	2	++	3	3	3	2
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C	+++	5		7		++	5		8		+										+			2		+				
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳾	R	C																+					+		1			+		1		
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	++	1	1	2	1	++	1	2	3	2	+	1	1	2		++	2	1	2	2	+	1	2	1	2	++	1	1	1	2
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+			1		+					+			1	1	+			1		+			1		+	1			
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C																													
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																													
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鷦鶯	R	C	+	1		1												+		1	1	1	+		1	1	1	+		1	1	1
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U																													
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C	+																												
Number of birds						29	26	49	17		27	23	42	14		18	18	39	15		21	21	36	20		28	29	32	27		28	30	35	28
No. of species						15	15	18	12	29	14	13	15	9	29	12	11	17	10	31	12	13	18	12	31	12	16	18	14	30	12	15	20	15

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

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Table 4.3 Avifauna recorded along survey transects and at four selected point count locations of Lam Tsuen River.

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

Common Name	Species name	Chinese name	Status	Commonness	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
					Jun-15					Jul-15					Aug-15					Sep-15					Oct-15					Nov-15					Dec-15				
					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance					Abundance				
					C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4	C	T1	T2	T3	T4
Barn Swallow	*Hirundo rustica*	家燕	PM	C	++	3	3	2	3	++			3	3	++	3	2	4		++		3	2		++			5		++			5								
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C						+			1																										
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C																																			
Black-faced bunting	*Emberiza spodocephala*	灰頭鶇	WV&PM	C																																			
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	++	2		1	2	++	2	2		2	++	4	3	3		++		3	3		++		2	3		++		2	3		++	5	3		
Black-winged Cuckoo-shrike	*Coracina melaschistos*	暗灰鵙鶲	PM	C																																			
Brown Shrike	*Lanius cristatus*	紅尾伯勞	PM	C																					+														
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV,Cap.586	C																										+									
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	++		1	3	2	++		2	1	2	++	3		2	2	++	2	2	4	3	++			3	3	++			3	3	++			2	3
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	+	1				+	1				+				1	+				1	+				2	+				2	+		1		
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C	+	1									+			1		+			1		+				2	+				2	+				1
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C	+			1	1																										+	1			
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV&PM	C																																			
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	+	1		2		++	2		2		++	1	2	2		++		1		1	++	2			2	++	2			2	++		2	1	
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++	5	3	5	4	+++	8	3	3	5	+++	7	5	5	5	+++	3	6	5	20	+++	3	5	5	10	+++	3	5	5	10	+++	8	5	5	12
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U																																			
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	++	2	3	2	2	++	3	2	3	3	++		2	4		++		2		3	++			3		++			3		++			2	
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU, LC	U																																			
Daurian redstart	*Phoenicurus auroreus*	北紅尾鴝	WV	C																															+				
Domestic pigeon	*Columba sp.*	鴿	R	C																																			
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C	+		1	1		+		1	1		+	1	1			+			1		+					+					+				
Eurasian tree sparrow	*Passer montanus*	麻鵐	R	C	++	3	2	2	2	++	3		2	3	++	3	2	2	3	++	4	4	2	2	++				7	++				7	++		3		5
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+	1									+				2											+									
Great Tit	*Parus major(commixtus)*	大山雀	R	C	+	2									+																								
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM&WV	C																																			
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C																																			
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C	++		1	1	1	+			1		+	1	1			+	1				+		1			+		1		1	+		1		1
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	++	3	3	2	3	++	3	3	2	5	++	4	2	3	2	++	3	3	2	4	++				4	++		3		4	++			4	4
Jungle Crow	*Corvus macrorhynchus*	大嘴烏鴉	R	C																																			
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	C	+																																		
Lesser Coucal	*Centropus bengalensis*	小鴉鵑	R, VU	C																																			
Little Egret	*Egretta garzetta*	小白鷺	R, RC	C	+	1	1	1		+	1	1	1		+		1		1	+		1		1	+	1			1	+	1			1	+			1	1
Great Egret	*Ardea alba*	大白鷺	R,WV, RC	C	+	1				+		1																											
Little Swift	*Apus affinis*	小白腰雨燕	R,SpM	C											+			4		+		3			++	5				++		5			++				
Magpie	*Pica pica*	喜鵲	R	C																																			
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	++	2			2	++	2	1	1	2	++		2	2		++		2	2		++			2	2	++		2		1	+		1		2
Mandarin Duck	*Aix galericulata*	鴛鴦	WV	U																																			
Masked Laughing Thrush	*Garrulax perspicillatus*	黑臉噪鶥	R	C	++	2				++				3	++				4	++		3							+					4	+				2
Night Heron	*Nycticorax nycticorax*	夜鷺	R&WV, LC	C											+				1	+				1	+				2										
Northern Shoveler	*Anas clypeata*	琵嘴鴨	WV	C																																			
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C																										+					+				
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	U																																			
Red-billed Blue Magpie	*Urocissa erythrorhyncha*	紅咀藍鵲	R	C																																			
Red-flanked Bluetail	*Tarsiger cyanurus*	紅脇藍尾鴝	PM&WV	C																																			
Rufous Turtle Dove	*Streptopelia orientalis*	山斑鳩	R	C																																			
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C											+		1	1		+		1								+					+				
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C	+																																		
Scarlet Minivet	*Pericrocotus flammeus*	赤紅山椒鳥	R	C						++			12																										
Siberian Stonechat	*Saxicola maurus*	黑喉石鵖	WV	C																					+		1			+		1	1		+		1	1	
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	U											+		1													+			3						
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	++	1	2	2	2	++	2	2	2	4	++	1	2	2	4	++	3	2	2		++	2	4	4	3	++	3	3	3	1	++	3	3		2
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C																					++					++		3	3						
Velvet-fronted Nuthatch	*Sitta frontalis*	絨額鳾	R	C																																			
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	++			2	2	++			2		+++				8	+				2	+				2	+				2	++		1		2
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+	1				+				1											+				1										
White-throated Kingfisher	*Halcyon smyrnensis*	白胸翡翠	R, LC	C																																			
White-rumped Munia	*Lonchura striata*	白腰文鳥	R	C																										+			1		+			1	
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鵐鶯	R	C	+		1	1	1	+		1	1		+			1		+			1		+					+					+				
Yellow Wagtail	*Motacilla flava*	黃鶺鴒	WV&PM	U																																			
Zitting cisticola	*Cisticola juncidis*	棕扇尾鶯	WV&PM	C																																			
Number of birds						32	21	25	27		27	19	38	34		14	27	36	26		16	36	25	38		13	13	25	41		9	25	30	40		17	21	17	35
No. of species					25	17	11	15	13	21	10	11	16	11	23	10	14	14	11	21	6	13	11	10	23	5	5	7	13	27	4	9	10	13	24	4	10	8	11

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv–Summer Visitor ; C – transect survey;

P1 – Point count location 1; P4 – Point count location 4

+, occurred; ++, common; +++, abundant/dominant species in the the study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

All bird species are under protection of Wild Animals Protection Ordinance (Cap. 170)

Endangered Species of Animals and Plants Ordinance (Cap. 586)

RC : Regional concern Fellowes *et al* (2002)

LC : Local Concern Fellowes *et al* (2002)

PRC: Potential Regional onver Fellowes *et al* (2002)

CR: Rare in China Red Data Book Status

VU: Vulnerable in China Red Data Book Status

Table 4.4. Odonate species recorded at the Upper Lam Tsuen River

					Baseline monitoring		Impact monitoring								Impact monitoring		Post construction monitoring						
Species name	Common name	Chinese name	Status	Commonness	Jul-08	Aug-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Aug-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14
Acisoma panorpoides panorpoides	Asian Pintail	錐腹蜻	NP	VC																		+	
Brachythemis contaminata	Asian Amberwing	黃翅蜻	NP	VC										+	+								
Ceriagrion auranticum ryukyuanum	Orange-tailed Sprite	琉球橘黃蟌	NP	VC																+	+	+	+
Coeliccia cyanomelas	Blue Forest Damsel	黃紋長腹蟌	NP	VC																+			
Copera marginipes	Yellow Featherlegs	黃狹扇蟌	NP	VC	+							+		+						+		+	+
Crocothemis servilia servilia	Crimson Darter	红蜻	NP	VC	+	+	+	+		++									+	+	+	+	+
Euphaea decorata	Black-banded Gossamerwing	方帶幽蟌	NP	VC																+		+	
Ictinogomphus pertinax	Common Flangetail	霸王葉春蜓	NP	C																			+
Ischnura senegalensis	Common Blue Jewel	褐斑異痣蟌	NP	VC																+	+	+	
Mnais lacteola	Indochinese Copperwing	煙翅綠色蟌	P, LC	C																+			
Nannophya pygmaea	Scarlet Dwarf	侏紅小蜻	P, LC	C																+			
Neurobasis chinensis	Chinese Greenwing	華艷色蟌	NP	VC						+		+	+	+	+	+			+	+	+	+	+
Neurothemis fulvia	Russet Percher	網脈蜻	NP	VC																			+
Neurothemis tullia tullia	Pied Percher	截斑脈蜻	NP	C																			
Orthetrum chrysis	Red-faced Skimmer	華麗灰蜻	NP	VC	+	+	+	+		+		+		++	++	+							
Orthetrum glaucum	Common blue skimmer	黑尾灰蜻	NP	VC			+					+		+	+								
Orthetrum luzonicum	Marsh Skimmer	呂宋灰蜻	NP	VC																			
Orthetrum pruinosum neglectum	Common Red Skimmer	赤褐灰蜻	NP	VC								+									+	+	+
Orthetrum sabina sabina	Green Skimmer	狹腹灰蜻	NP	VC						+													
Pantala flavescens	Wandering Glider	黃蜻	NP	VC	+	+		+				++					+				+		
Paracercion calamorum duyeri	Dusky Lilysquatter	葦尾蟌	P, LC	C																+			
Prodasineura autumnalis	Black Threadtail	烏齒原蟌	NP	VC																+	+	+	+
Pseudagrion rubriceps rubriceps	Orange-faced Sprite	丹頂斑蟌	NP	UC		+															+	+	+
Rhinocypha perforata perforata	Common Blue Jewel	三斑鼻蟌	NP	VC		+				+										+			+
Rhyothemis variegata arria	Variegated Flutterer	斑麗翅蜻	NP	C																		+	+
Trithemis aurora	Crimson Dropwing	曉褐蜻	NP	VC										++	+	+	+	+	+		+	+	+
Trithemis festiva	Indigo Dropwing	慶褐蜻	NP	VC				+		+		+		+								+	+
Zygonyx iris insignis	Emerald Cascader	彩虹蜻	P,PGC	VC																		+	
No. of species					4	5	3	4	0	6	0	7	1	7	5	3	2	1	3	12	9	14	13

Note: NP – Not protected in Hong Kong; P-Protection in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common

“+” – Species exists in the study area

“++” – Species common in the study area

“+++” – Species abundant/dominant in study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

LC- Local Concern - Fellowes *et al* (2002)

PGC - Potential Global Concern - Fellowes *et al* (2002)

Table 4.4. Odonate species recorded at the Upper Lam Tsuen River

					Post construction monitoring							Post construction monitoring							Post construction monitoring		
Species name	Common name	Chinese name	Status	Commonness	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Acisoma panorpoides panorpoides	Asian Pintail	錐腹蜻	NP	VC												+					
Brachythemis contaminata	Asian Amberwing	黃翅蜻	NP	VC																	
Ceriagrion auranticum ryukyuanum	Orange-tailed Sprite	琉球橘黃蟌	NP	VC	+	+	+	+		+			+	+	+	+	+	+			
Coeliccia cyanomelas	Blue Forest Damsel	黃紋長腹蟌	NP	VC																	
Copera marginipes	Yellow Featherlegs	黃狹扇蟌	NP	VC	+	+	+						+	+	+	+	+	+			
Crocothemis servilia servilia	Crimson Darter	紅蜻	NP	VC	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Euphaea decorata	Black-banded Gossamerwing	方帶幽蟌	NP	VC													+				
Ictinogomphus pertinax	Common Flangetail	霸王葉春蜓	NP	C										+	+	+	+	+	+		
Ischnura senegalensis	Common Blue Jewel	褐斑異痣蟌	NP	VC																	
Mnais lacteola	Indochinese Copperwing	煙翅綠色蟌	P, LC	C																	
Nannophya pygmaea	Scarlet Dwarf	侏紅小蜻	P, LC	C																	
Neurobasis chinensis	Chinese Greenwing	華艷色蟌	NP	VC	+	+	+	+	+			+	+	+	+	+	+	+	+	+	
Neurothemis fulvia	Russet Percher	網脈蜻	NP	VC	+	+	+						+		+	+	+	+			
Neurothemis tullia tullia	Pied Percher	截斑脈蜻	NP	C	+																
Orthetrum chrysis	Red-faced Skimmer	華麗灰蜻	NP	VC													+	+	+	+	
Orthetrum glaucum	Common blue skimmer	黑尾灰蜻	NP	VC	+								+								
Orthetrum luzonicum	Marsh Skimmer	呂宋灰蜻	NP	VC												+	+	+	+		
Orthetrum pruinosum neglectum	Common Red Skimmer	赤褐灰蜻	NP	VC	+	+	+							+	+	+	+				
Orthetrum sabina sabina	Green Skimmer	狹腹灰蜻	NP	VC	+															+	
Pantala flavescens	Wandering Glider	黃蜻	NP	VC			+	+	+			+	+	+	+	+	+	+	+	+	+
Paracercion calamorum duyeri	Dusky Lilysquatter	葦尾蟌	P, LC	C																	
Prodasineura autumnalis	Black Threadtail	烏齒原蟌	NP	VC	+	+	+						+	+	+	+	+	+			
Pseudagrion rubriceps rubriceps	Orange-faced Sprite	丹頂斑蟌	NP	UC	+	+	+	+						+	+						
Rhinocypha perforata perforata	Common Blue Jewel	三斑鼻蟌	NP	VC	+	+	+	+							+	+	+	+	+		
Rhyothemis variegata arria	Variegated Flutterer	斑翼翅蜻	NP	C	+	+	+	+													
Trithemis aurora	Crimson Dropwing	曉褐蜻	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Trithemis festiva	Indigo Dropwing	慶褐蜻	NP	VC	+	+	+	+						+	+	+	+	+	+	+	+
Zygonyx iris insignis	Emerald Cascader	彩虹蜻	P,PGC	VC																	
No. of species					15	11	13	9	4	3	2	4	9	11	13	14	15	13	9	7	2

Note: NP – Not protected in Hong Kong; P-Protection in Hong Kong

"VC" – Very Common; "UC" – Uncommon; "C" - Common

"+" – Species exists in the study area

"++" – Species common in the study area

"+++" – Species abundant/dominant in study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

LC- Local Concern - Fellowes *et al* (2002)

PGC - Potential Global Concern - Fellowes *et al* (2002)

Table 4.5 Aquatic Macro invertebrates recorded at Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Baseline monitoring				Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring				
				Jul-08		Aug-08		Jan-09					Jul-09					Jan-10					Jul-10					Jan-11				
		Sampling point		Upper stream	Lower stream	Upper stream	Lower stream	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness																												
Molluscs																															
Biomphalaria sp.	--	NP	VC		+	+	+					+					+					+					+				
Brotia hainanensis	--	NP	VC	+++	++	++	++	+	+	+	+	+	+		+	+	+	++	++			+	++	++			+	++	+	+	+	+
Melanoides tuberculata	瘤擬黑螺	NP	VC		+		+											+					+					+			+	+
Pomacea canaliculata	蘋果螺	NP	VC		+		+	+	+			+	+	+			+	+	+				+	+				+			+	+
Radix plicatulus	羅白螺	NP	VC		+	+	+	+	+			+	+	+			+					+	+				+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC		+		+	+	+			+	+	+			+	+	+			+	+	+			+	+	+	+	+	+
Insects																																
Baetis sp.	--	NP	VC	+	+	+	+	+	+		+	+	+			+	+	+		+	+	+	+				+	+	+	+	+	+
Caenis sp.	--	NP	VC						+	+		+	+				+	+					+					+					
Chironomus sp.	蠓幼虫	NP	VC	+	+	+	+	+	+	+		+	+		+		+	+		+	+	+	+		+	+	+	+	+	+	+	+
Electrogenas sp.	--	NP	VC																									+	+	+	+	+
Hydropsyche sp.	--	NP	VC																									+	+	+	+	+
Indobaetis sp.	--	NP	VC	+	+	+	+	+	+				+					+					+					+	+	+	+	+
Mnais sp.	--	NP	VC					+	+			+																+	+	+	+	+
Orthetrum sp.	--	NP	VC	+	+										+		+	+		+		+	+		+		+	+	+	+	+	+
Crustaceans																																
Caridina cantanensis	廣東米蝦	NP	VC	+	+	+	+	+	+				+					+	+				+	+				+	+			+
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC	+		+																										
Macrobrachium hainanense	海南沼蝦	NP	VC	+	+	+	+	+	+				+					+	+				+	+				+	+			+
Somanniathelphusa zanklon	束腰蟹	NP	VC	+		+																										
No. of species				9	12	10	11	10	11	3	2	9	10	3	3	2	9	12	5	3	2	7	12	5	4	2	7	15	13	11	13	15

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
“VC” – Very Common; “UC” – Uncommon; “C” - Common; "R" - Rare
+, occurred; ++, common; +++, abundant/dominant Species in the the study area
Reference point was the sampling location outside the works area.

Table 4.5 Aquatic Macro invertebrates recorded at Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
				Jul-11					Jan-12					Jul-12					Aug-13					Dec-13					Jan-14					Feb-14					Mar-14				
		Sampling point		Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness																																								
Molluscs																																											
Biomphalaria sp.	--	NP	VC									+		+	+				+	+	+			+					+	+				+	+				+	+	+		+
Brotia hainanensis	--	NP	VC	+					+	+				++					++	+	+			++	+	+			++	+	+	+		++	+	+	+		++	+	+	+	+
Melanoides tuberculata	瘤擬黑螺	NP	VC	+	+				+	+	+	+		+	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pomacea canaliculata	蘋果螺	NP	VC	+	+				+	+	+			+	+	+	+		+	+	+	+	+			+	+	+			+	+	+	+			+	+	+	+	+	+
Radix plicatulus	羅白螺	NP	VC	+					+	+		+		+	+	+			+	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+					+	+				+	+	+			+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+
Insects																																											
Baetis sp.	--	NP	VC	+					+					+					+					+					+			+		+			+	+			+	
Caenis sp.	--	NP	VC	+					+																																		
Chironomus sp.	蠓幼虫	NP	VC	+					+	+	+			+	+	+			+	+	+			+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+
Electrogenas sp.	--	NP	VC	+					+					+					+					+					+					+	+	+			+	+	+		
Hydropsyche sp.	--	NP	VC	+					+					+					+					+	+				+	+				+	+				+				
Indobaetis sp.	--	NP	VC	+					+										+					+					+			+		+			+	+	+	+	+	
Mnais sp.	--	NP	VC	+					+	+	+			+	+	+	+		+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Orthetrum sp.	--	NP	VC	+					+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Crustaceans																																											
Caridina cantanensis	廣東米蝦	NP	VC	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	+	+	++	++	++	++	+	++	++	++	++
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC	+					+					+	+	+	+		+	+	+	+		+	+				+	+				+	+				+	+			
Macrobrachium hainanense	海南沼蝦	NP	VC	+	+			+	+					+					+	+				+					+					+	+	+			+	+	+	+	+
Somanniathelphusa zanklon	束腰蟹	NP	VC						+																																		
No. of species				16	4	1	1	2	17	9	6	5	0	15	10	8	5	1	16	12	11	7	3	15	11	9	8	7	15	11	9	10	8	16	13	13	11	8	16	14	14	12	11

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common; "R" - Rare
+, occurred; ++, common; +++, abundant/dominant Species in the the study area
Reference point was the sampling location outside the works area.

Table 4.5 Aquatic Macro invertebrates recorded at Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Post construction monitoring					Post construction monitoring					Post construction monitoring				
				Apr-14					May-14					Jun-14				
		Sampling point		Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness															
Molluscs																		
Biomphalaria sp.	--	NP	VC	+	+			+	+	+				+	+			
Brotia hainanensis	--	NP	VC	++	+	+	+	+	++	+	+	+	+	++	+	+	+	+
Melanoides tuberculata	瘤擬黑螺	NP	VC	+	+	+	+	+	+	+	+	+	+				+	+
Pomacea canaliculata	蘋果螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Radix plicatulus	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+	+		+	+	+	+	+	+	+	+	+			+
Insects																		
Baetis sp.	--	NP	VC	+		+					+					+		
Caenis sp.	--	NP	VC	+														
Chironomus sp.	蠓幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Electrogenas sp.	--	NP	VC	+	+				+	+				+	+			
Hydropsyche sp.	--	NP	VC	+	+	+				+						+	+	
Indobaetis sp.	--	NP	VC	+	+	+		+	+	+			+	+	+		+	
Mnais sp.	--	NP	VC	+	+	+	+	+	+	+		+				+		
Orthetrum sp.	--	NP	VC	+	+	+	+	+	+	+	+	+		+	+	+	+	+
Crustaceans																		
Caridina cantanensis	廣東米蝦	NP	VC	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC	+	+	+				+					+	+		
Macrobrachium hainanense	海南沼蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Somanniathelphusa zanklon	束腰蟹	NP	VC															
No. of species				17	15	16	13	12	13	15	10	10	10	11	12	11	10	9

	Post construction monitoring					Post construction monitoring					Post construction monitoring				
	Jul-14					Aug-14					Sep-14				
	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name															
Molluscs															
Biomphalaria sp.	+	+		+	+	+	+		+	+	+	+	+	+	+
Brotia hainanensis	++	+	+	+	+	++	+	+	+		++	+	+	+	
Melanoides tuberculata				+	+			+	+	+			+		
Pomacea canaliculata	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Radix plicatulus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	+	+	+		+	+	+	+	+	+	+	+	+	+	+
Insects															
Baetis sp.	+		+			+	+	+	+		+	+	+	+	+
Caenis sp.												+			
Chironomus sp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Electrogenas sp.	+	+				+	+	+			+	+	+		
Hydropsyche sp.	+		+	+		+		+	+		+		+	+	+
Indobaetis sp.	+	+	+	+		+	+	+	+		+	+	+	+	+
Mnais sp.			+	+			+	+	+			+	+	+	+
Orthetrum sp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Crustaceans															
Caridina cantanensis	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++
Cryptopotamon anacoluthon			+	+				+	+				+	+	
Macrobrachium hainanense	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Somanniathelphusa zanklon															
No. of species	13	11	13	13	10	13	13	15	15	9	13	14	16	14	12

	Post construction monitoring					Post construction monitoring					Post construction monitoring				
	Oct-14					Nov-14					Dec-14				
	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name															
Molluscs															
Biomphalaria sp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Brotia hainanensis	++	+	+	+		++	++	+	+	+	++	++	+	+	+
Melanoides tuberculata			+	+	+			+	+	+				+	
Pomacea canaliculata	+	+	+	+	+	+	+	+	+	+	+	+		+	+
Radix plicatulus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Insects															
Baetis sp.	+	+	+	+	+	+	+	+	+	+	+	+			+
Caenis sp.															
Chironomus sp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Electrogenas sp.	+	+	+			+	+	+	+		+	+	+	+	
Hydropsyche sp.	+		+	+		+		+			+		+		
Indobaetis sp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Mnais sp.		+	+	+	+		+	+	+				+	+	
Orthetrum sp.	+	+	+	+	+	+	+	+		+	+	+	+		+
Crustaceans															
Caridina cantanensis	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++
Cryptopotamon anacoluthon		+	+	+			+		+					+	
Macrobrachium hainanense	+	+	+	+		+	+	+	+	+	+	+	+	+	+
Somanniathelphusa zanklon															
No. of species	13	14	16	15	11	13	14	15	14	12	13	12	12	13	11

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common; "R" - Rare
+, occurred; ++, common; +++, abundant/dominant Species in the the study area

Reference point was the sampling location outside the works area.

Table 4.5 Aquatic Macro invertebrates recorded at Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Post construction monitoring					Post construction monitoring					Post construction monitoring									Post construction monitoring					Post construction monitoring					Post construction monitoring				
				Jan-15					Feb-15					Mar-15					Apr-15					May-15					Jun-15					Jul-15				
		Sampling point		Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness																																		
Molluscs																																					
Biomphalaria sp.	--	NP	VC	+	+	+	+	+		+		+			+		+	+				+	+				+					+					+
Brotia hainanensis	--	NP	VC	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	++	+	++
Melanoides tuberculata	瘤擬黑螺	NP	VC				+	+				+	+				+	+				+	+				+	+				+	+				+	+
Pomacea canaliculata	蘋果螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	++	++	++	++	++	++
Radix plicatulus	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Insects																																					
Baetis sp.	--	NP	VC	+	+		+	+	+	+		+	+	+	+	+	+	+	+		+	+	+	+	+			+	+	+				+	+		+	+
Caenis sp.	--	NP	VC																																			
Chironomus sp.	蠓幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Electrogenas sp.	--	NP	VC	+	+				+	+	+			+	+	+			+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	
Hydropsyche sp.	--	NP	VC	+		+			+		+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+		
Indobaetis sp.	--	NP	VC	+	+		+	+	+	+			+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+		+	+	+	+	+
Mnais sp.	--	NP	VC			+	+				+						+					+				+					+						+	
Orthetrum sp.	--	NP	VC	+		+		+					+			+	+	+				+	+	+			+	+				+	+				+	+	+
Crustaceans																																					
Caridina cantanensis	廣東米蝦	NP	VC	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC				+				+	+				+						+					+					+					+	
Macrobrachium hainanense	海南沼蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+
Somanniathelphusa zanklon	束腰蟹	NP	VC																																			
No. of species				13	11	11	13	12	11	12	12	11	11	11	13	13	12	12	11	9	12	15	12	11	9	11	13	12	11	9	11	13	12	11	9	11	13	12

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common; "R" - Rare
+, occurred; ++, common; +++, abundant/dominant Species in the the study area
Reference point was the sampling location outside the works area.

Table 4.5 Aquatic Macro invertebrates recorded at Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
				Aug-15					Sep-15					Oct-15					Nov-15					Dec-15				
		Sampling point		Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness																									
Molluscs																												
Biomphalaria sp.	--	NP	VC					+					+					+					+					+
Brotia hainanensis	--	NP	VC	++	++	++	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Melanoides tuberculata	瘤擬黑螺	NP	VC				+	+				+	+				+	+				+	+				+	+
Pomacea canaliculata	蘋果螺	NP	VC	++	++	++	++	++	++	++	++	++	+++	++	++	++	++	+++	++	++	++	++	+++	++	++	++	++	++	+++
Radix plicatulus	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Insects																												
Baetis sp.	--	NP	VC	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+
Caenis sp.	--	NP	VC																					+	+	+	+	+
Chironomus sp.	蠓幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Electrogenas sp.	--	NP	VC	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		
Hydropsyche sp.	--	NP	VC	+	+	+			+	+	+			+	+	+			+	+	+			+	+	+	+		+
Indobaetis sp.	--	NP	VC	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+				+		
Mnais sp.	--	NP	VC				+					+					+					+		+	+	+	+	+	+
Orthetrum sp.	--	NP	VC			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+	+
Crustaceans																												
Caridina cantanensis	廣東米蝦	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC				+					+					+	+				+	+				+	+
Macrobrachium hainanense	海南沼蝦	NP	VC	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+			+	+	+
Somanniathelphusa zanklon	束腰蟹	NP	VC																									
No. of species				12	9	11	13	12	11	9	11	13	12	11	9	11	13	13	11	9	11	13	13	12	10	11	13	13

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common; "R" - Rare
+, occurred; ++, common; +++, abundant/dominant Species in the the study area
Reference point was the sampling location outside the works area.

Table 4.6 Fish species and amphibians at Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Baseline monitoring				Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring					Impact monitoring				
				Jul-08		Aug-08		Jan-09					Jul-09					Jan-10					Jul-10					Jan-11					Jul-11					Jan-12					Jul-12				
			Sampling point	Upper stream	Lower stream	Upper stream	Lower stream	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species	Chinese name	Status	Commonnes																																												
Fish																																															
Acrossocheilus parallens	側條光唇魚	P, PGC	R		+		+				+					+								+	+	+	+			+	+						+	+			+	+	+		
Channa maculate	斑鱧	NP	C				+																																								
Cirrhina molitorella	鯪魚	NP	C																					+						+																
Clarias fuscus	胡子鯰	NP	C																					+																			+		+		
Cyprinus carpio var. viridiviolaceus	鏡鯉	NP	C																						+																					
Gambusia affinis	食蚊魚	NP	VC			+	+	+			+	++	+		+	+		+						+		+	++	++	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis	擬平鰍	NP	C																																											
Misgurnus anguillicaudatus	泥鰍	NP	C	+		+																		+			+			+	+						+					+					
Oreochromis niloticus	尼羅口孵非鯽	NP	C		+		+										+								+	+	++				+	+	+				+	+	+	+	+	+	+	+	+	+	+
Parazacco spilurus	異鱲	V and NP	C	+		+																	+	+				+	+				+					+	+				+	+	+			
Poecilia reticulate	孔雀花魚將	NP	VC			+	+							+											+	+					+					+					+					
Pseudogastromyzon myersi	麥氏擬腹吸鰍	NP	C		+	+	+	++	++	++	+		++	++	+	+	+	++	++				++	+++	+	+		++	+				++	+				+					+				
Pterocryptis cochinchinensis	黃鮡	NP	C																																											
Puntius semifasciolatus	七星魚	NP	C	++	+	++	+	+	+		++					+	++						+	+	+	+	+	+				+	+				+	+	+			+	+	+			
Rhinogobius spp.	鰕虎魚	NP	C/UN/R		+	+	+	+	+		+			+					+					+	+	+	+	+	+				+	+				+	+				+	+	+	+	
Schistura fasciolata	橫紋南鰍	NP	C		+	+	+	+	+	+	+		+	+				+	+				+	+	+			+	+				+	+				+	+	+						
Xiphophorus hellerii	劍尾魚	NP	C	+	+	+	+		+	+		++	+			++	+	+	+	++	+		+	+	++	++		+			+	+				+	+	+	+	+	+	+	+	+	+	+
Xiphophorus variatus	雞色劍尾魚	NP	C			+	+	+	+		+					+									+	+				+					+	+				+	+				
Zacco platypus	寬鰭鱲	NP	C	+	++	+	++	+++	+++	+++	+++		++				++	++		++	++	+	++	+	++	++	++	+	+	+	+	+	+	++	++			+	+				+	+	+		
2x2m fish counting		No. of fish		70	60	75	60	38	45	40	40	8	38	20	5	15	7	38	20	5	15	7	32	12	6	10	20	30	22	10	7	5	10	4	2	0	0	6	3	1	0	0	8	5	2	0	0
No. of species				5	8	11	12	7	7	4	8	2	5	3	3	5	6	5	3	2	2	2	9	8	10	13	9	9	7	4	4	8	10	8	9	5	3	12	8	6	4	3	14	10	10	4	3
Amphibian																																															
Paramesotriton hongkongensis	香港瘰螈	P (Cap 170, NT, PGC)	R	+		+	+	+	+			+	+				+	+	+		+	+	+					+			+	+						+		+	+				+		
Fejervarya limnocharis	澤蛙	NP	VC																																											
No. of species				1	0	1	1	1	1	0	0	1	1	0	0	0	1	1	1	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	1	0

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common; "R" - Rare

+, occurred; ++, common; +++, abundant/dominant Species in the the study area

-V – Listed as vulnerable in China Fish Red Data Book

-Reference point was the sampling location outside the works area used to compare the with the data within works area.

"Cap 170" - List in Wild Animials Protcetion Ordinance (Cap.170)

"NT" - Near Treatened in IUCN Red List Status

"PGC"-Potential Golal Concern by Fellowes *et al* (2002)

Table 4.6 Fish species and amphibians at Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Impact monitoring					Impact monitoring					Post construction monitoring				
				Aug-13					Dec-13					Jan-14				
			Sampling point	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species	Chinese name	Status	Commonnes															
Fish																		
Acrossocheilus parallens	側條光唇魚	P, PGC	R	+	+	+			+	+	+	+		+	+	+	+	
Channa maculate	斑鱧	NP	C															
Cirrhina molitorella	鯪魚	NP	C															
Clarias fuscus	胡子鯰	NP	C	+					+		+			+		+		
Cyprinus carpio var. viridiviolaceus	錦鯉	NP	C								+					+		
Gambusia affinis	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis	擬平鰍	NP	C															
Misgurnus anguillicaudatus	泥鰍	NP	C	+					+					+				
Oreochromis niloticus	尼羅口孵非鯽	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Parazacco spilurus	異鱲	V and NP	C	+	+	+	+		+	+	+	+		+	+	+	+	
Poecilia reticulate	孔雀花魚將	NP	VC	+	+	+										+	+	
Pseudogastromyzon myersi	麥氏擬腹吸鰍	NP	C	+					+					+				
Pterocryptis cochinchinensis	黃鯰	NP	C						+					+			+	
Puntius semifasciolatus	七星魚	NP	C	+	+	+			+	+	+	+	+	+	+	+	+	+
Rhinogobius spp.	鰕虎魚	NP	C/UN/R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Schistura fasciolata	橫紋南鰍	NP	C	+	+	+			+	+	+			+	+	+		
Xiphophorus hellerii	劍尾魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xiphophorus variatus	雜色劍尾魚	NP	C	+	+	+			+		+			+		+	+	
Zacco platypus	寬鰭鱲	NP	C	+	+	+	+		+	+	++	++	++	+	+	++	++	++
2x2m fish counting		No. of fish		5	2	3	2	3	5	2	3	2	3	6	20	60	20	10
No. of species				14	11	11	6	4	14	9	12	8	6	14	10	13	11	6
Amphibian																		
Paramesotriton hongkongensis	香港瘰螈	P (Cap 170, NT, PGC)	R	+		+	+		+	+	+	+	+	+	+	+	+	+
Fejervarya limnocharis	澤蛙	NP	VC															
No. of species				1	0	1	1	0	1	1	1	1	1	1	1	1	1	1

	Post construction monitoring					Post construction monitoring					Post construction monitoring				
	Feb-14					Mar-14					Apr-14				
	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species															
Fish															
Acrossocheilus parallens	+	+	++	+++	+	+	++	++	+++	++		++	++	+++	++
Channa maculate															
Cirrhina molitorella													+		
Clarias fuscus	+		+			+			+	+				+	+
Cyprinus carpio var. viridiviolaceus			+					+					+		
Gambusia affinis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis						+	+	+	+		+	+	+	+	
Misgurnus anguillicaudatus	+		+			+		+	+	+	+	+	+	+	+
Oreochromis niloticus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Parazacco spilurus	+	+	+	+		+	+	+	+	+	+	+	+	+	+
Poecilia reticulate			+	+				+	+	+			+	+	+
Pseudogastromyzon myersi	+	+	+			+	+	+				+	+		
Pterocryptis cochinchinensis	+			+		+			+		+			+	
Puntius semifasciolatus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Rhinogobius spp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Schistura fasciolata	+	+	+			+	+	+			+	+	+		
Xiphophorus hellerii	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xiphophorus variatus	+		+	+		+		+	+				+	+	+
Zacco platypus	+	+	++	+++	++	+	+	++	+++	++	+	+	++	+++	++
2x2m fish counting	16	40	70	40	30	60	70	80	90	80	40	50	60	60	50
No. of species	14	10	15	11	7	15	11	16	14	11	11	12	16	14	12
Amphibian															
Paramesotriton hongkongensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fejervarya limnocharis															
No. of species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
	May-14					Jun-14					Jul-14					Aug-14				
	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species																				
Fish																				
Acrossocheilus parallens		+	+	+	+		+	+	+	+		+	++	++	+		++	++	++	+
Channa maculate																				
Cirrhina molitorella																				
Clarias fuscus					+					+					+					+
Cyprinus carpio var. viridiviolaceus																				
Gambusia affinis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis	+	+	+	+		+	+	+			+	+	+			+	+	+		
Misgurnus anguillicaudatus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Oreochromis niloticus	+	+	+	+	+			+	+	+		+	+	+	+		+	+	+	+
Parazacco spilurus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poecilia reticulate			+	+	+			+		+			+		+			+	+	+
Pseudogastromyzon myersi	+	+				+	+				+	+				+	+	+		
Pterocryptis cochinchinensis	+					+					+			+		+			+	
Puntius semifasciolatus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	+
Rhinogobius spp.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Schistura fasciolata	+	+	+			+	+	+	+		+	+	+	+		+	+	+	+	
Xiphophorus hellerii	+	+	+	+	+		+	+	+	+		+	+	+	+		+	++	++	+
Xiphophorus variatus			+	+				+	+				+	+					+	
Zacco platypus	+	+	++	++	++	+	+	+	+	+	+	+	+	+	+	+	++	++	+	+
2x2m fish counting	20	30	30	20	20	6	12	10	6	8	8	16	15	5	10	10	12	18	10	12
No. of species	13	13	13	12	11	10	12	13	11	11	11	12	13	12	11	10	12	13	13	11
Amphibian																				
Paramesotriton hongkongensis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fejervarya limnocharis																				
No. of species	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: NP – Not protected in Hong Kong

"VC" – Very Common; "UC" – Uncommon; "C" - Common; "R" - Rare

+, occurred; ++, common; +++, abundant/dominant Species in the the study area

-V – Listed as vulnerable in China Fish Red Data Book

-Reference point was the sampling location outside the works area used to compare the with the data within works area.

"Cap 170" - List in Wild Animials Protcetion Ordinance (Cap.170)

"NT" - Near Treatened in IUCN Red List Status

"PGC"-Potential Golal Concern by Fellowes *et al* (2002)

Table 4.6 Fish species and amphibians at Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
				Sep-14					Oct-14					Nov-14					Dec-14					Jan-15					Feb-15					Mar-15					Apr-15				
			Sampling point	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species	Chinese name	Status	Commonnes																																								
Fish																																											
Acrossocheilus parallens	側條光唇魚	P, PGC	R		++	++	++	+		++	++	++	+		++	++	++	++		++	++	++	++		++	++	++	++		++	++	++	++		++	++	++	++		++	++	++	++
Channa maculate	斑鱧	NP	C																																								
Cirrhina molitorella	鯪魚	NP	C																																									
Clarias fuscus	胡子鯰	NP	C					+					+					+					+				+					+					+					+				+
Cyprinus carpio var. viridiviolaceus	鏡鯉	NP	C																																								
Gambusia affinis	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis	擬平鰍	NP	C	+	+	+	+		+	+	+	+		+	+	+			+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	
Misgurnus anguillicaudatus	泥鰍	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+		+	+	+	+	+
Oreochromis niloticus	尼羅口孵非鯽	NP	C		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+
Parazacco spilurus	異鱲	V and NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	+	+	+	+	+	+	+
Poecilia reticulate	孔雀花魚將	NP	VC			+	+	+			+	+	+			+	+				+	+						+								+	+					+	+		
Pseudogastromyzon myersi	麥氏擬腹吸鰍	NP	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	
Pterocryptis cochinchinensis	黃鯰	NP	C	+	+	+	+		+	+	+	+		+	+	+			+	+	+			+			+		+	+	+	+		+	+	+	+		+	+	+	+	
Puntius semifasciolatus	七星魚	NP	C	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+
Rhinogobius spp.	鰕虎魚	NP	C/UN/R	+	+	+	+	+	+	+	+	+	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	++
Schistura fasciolata	橫紋南鰍	NP	C	+	+	+	+	+	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+			+	+	+	+		+	+	+	+		+	+	+	+	
Xiphophorus hellerii	劍尾魚	NP	C		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+
Xiphophorus variatus	雜色劍尾魚	NP	C				+	+			+	+					+	+				+					+					+					+					+	+
Zacco platypus	寬鱗鱲	NP	C	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	+
2x2m fish counting		No. of fish		20	30	30	20	20	30	40	40	30	30	50	70	70	60	60	60	60	60	50	50	50	50	60	60	60	40	50	60	60	60	40	50	60	60	60	40	40	50	55	50	40
No. of species				11	13	14	15	13	11	13	14	15	12	11	13	14	13	11	11	13	14	14	11	10	11	12	13	10	10	11	12	14	10	10	13	13	14	11	13	12	14	15	11
Amphibian																																												
Paramesotriton hongkongensis	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fejervarya limnocharis	澤蛙	NP	VC																																								
No. of species				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: NP – Not protected in Hong Kong

“VC” – Very Common; “UC” – Uncommon; “C” - Common; "R" - Rare

+, occurred; ++, common; +++, abundant/dominant Species in the the study area

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"PGC"-Potential Golal Concern by Fellowes *et al* (2002)

Table 4.6 Fish species and amphibians at Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

				Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring				
				May-15					Jun-15					Jul-15					Aug-15					Sep-15					Oct-15					Nov-15					Dec-15				
			Sampling point	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4	Reference	T1	T2	T3	T4
Species	Chinese name	Status	Commonnes																																								
Fish																																											
Acrossocheilus parallens	側條光唇魚	P, PGC	R		+	+	++	++		+	+	++	++		+	+	+	+		+	+	+	+			+	+	+			+	+	+			+	+	+	++	
Channa maculate	斑鱧	NP	C					+					+					+					+					+					+					+				+
Cirrhina molitorella	鯪魚	NP	C																																								
Clarias fuscus	胡子鯰	NP	C					+					+					+					+					+					+					+				+
Cyprinus carpio var. viridiviolaceus	錦鯉	NP	C			+						+					+					+					+					+					+				
Gambusia affinis	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Liniparhomaloptera disparis	擬平鰍	NP	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	
Misgurnus anguillicaudatus	泥鰍	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Oreochromis niloticus	尼羅口孵非鯽	NP	C	+	+	+	+	+	+	+	++	+	+	+	++	++	++	++	+	++	++	++	++	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++
Parazacco spilurus	異鱲	V and NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+		+	+
Poecilia reticulate	孔雀花魚將	NP	VC			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+	+	
Pseudogastromyzon myersi	麥氏擬腹吸鰍	NP	C	+	+				+	+				+	+				+	+				+	+				+	+				+	+				+	+			
Pterocryptis cochinchinensis	黃鯰	NP	C	+					+					+					+					+					+					+					+				
Puntius semifasciolatus	七星魚	NP	C	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+
Rhinogobius spp.	鰕虎魚	NP	C/UN/R	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++
Schistura fasciolata	橫紋南鰍	NP	C	+	+	+			+	+	+			+	++	++			+	++	++			+	++	++			+	++	++			+	++	++			+	++	++		
Xiphophorus hellerii	劍尾魚	NP	C	+	+	++	+	+	+	++	+	+	+	+	+	++	+	+	+	+	++	+	+	+	+	++	+	+	+	+	++	+	+	+	+	++	+	+	+	+	++	+	+
Xiphophorus variatus	雜色劍尾魚	NP	C			+	+			+	+					+	+				+	+				+	+				+	+				+	+				+	+	
Zacco platypus	宽鰭鱲	NP	C	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+
2x2m fish counting		No. of fish		20	30	30	20	20	20	30	30	20	20	12	15	18	8	7	15	12	16	10	10	18	15	20	15	15	25	20	22	18	20	40	35	40	35	40	55	40	45	45	40
No. of species				13	12	14	12	13	12	13	13	13	12	12	12	13	13	12	12	12	13	13	12	12	10	13	13	12	12	10	13	13	12	12	10	13	13	12	12	10	13	12	12
Amphibian																																												
Paramesotriton hongkongensis	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Fejervarya limnocharis	澤蛙	NP	VC																																								
No. of species				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

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“VC” – Very Common; “UC” – Uncommon; “C” - Common; "R" - Rare

+, occurred; ++, common; +++, abundant/dominant Species in the the study area

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Table 4.7 Abotic data for Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

	Baseline monitoring	Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring			
Parameter / date	8-Aug	Jan-09				Jul-09				Jan-10				Jul-10				Jan-11				Jul-11			
Replicate		T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	9.2	9.8	9.9	9.4	9.1	6.4	6.4	6.5	6.8	9.7	9.5	9.5	9.3	8.3	8.5	8.5	8.7	9.6	9.5	9.5	9.1	9.5	9.6	9.4	9.3
pH	7.49	7.24	7.36	7.53	7.44	7.1	7.25	7	7.05	7.9	8.1	8.1	8.2	7.4	7.5	7.3	7.4	7.1	7.2	7.2	7.1	7.3	7.1	7.1	7.1
Nitrate (mg N/L)	0.36	0.79	1.1	1.2	1.2	0.31	0.48	0.48	0.59	0.56	1.11	1.13	1.33	0.1	0.2	0.2	0.3	0.1	0.2	0.4	0.5	0.1	0.2	0.3	0.45
Ammonia (mg/L)	<0.01	PO4-P (µg P/L): <100				0.02	0.02	0.02	0.03	0.01	0.16	0.17	0.07	0.2	0.4	0.2	0.2	0.05	0.07	0.07	0.1	0.06	0.05	0.08	0.1
Salinity (ppt)	<0.1	<0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conductivity (µS/cm)	60	80	100	120	120	45	51	52	63	62	96	98	114	84	100	460	54	90	87	93	120	93	90	90	100
BOD (mg/L)	<2	<2	<2	<2	3	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.1-0.3	0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2			
Water flow at riffle (m/s)	0.4-0.7	0.2-0.5				0.2-0.5				0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6			
Sand (%)	15	15	10	10	10	10	10	10	15	8	8	8	15	8	8	8	15	8	8	8	15	8	8	8	15
Stone (%)	80	80	88	88	88	88	88	88	70	90	90	90	70	90	90	90	70	90	90	90	70	90	90	90	70
Mud (%)	5	5	2	2	2	2	2	2	5	2	2	2	5	2	2	2	5	2	2	2	5	2	2	2	5

Table 4.7 Abotic data for Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

	Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Post construction monitoring			
Parameter / date	Jan-12				Jul-12				Aug-13				Dec-13				Jan-14			
Replicate	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	9.4	9.2	9.4	9.2	8.2	8	7.8	7.3	8.9	8.5	8.7	8.8	9.3	8.6	8.8	8.7	9.1	9.0	8.6	8.5
pH	7.2	6.9	6.8	6.7	6.8	7.1	7.3	7.6	6.5	6.8	6.8	7.1	6.2	6.9	7.1	7.1	6.2	6.9	7.1	7.1
Nitrate (mg N/L)	0.2	0.3	0.5	0.6	0.13	0.67	0.62	0.82	0.74	0.72	0.83	0.79	0.48	0.57	0.77	0.89	0.9	0.8	1.3	1.26
Ammonia (mg/L)	0.04	0.05	0.06	0.2	0.01	0.02	0.04	0.03	0.02	0.03	0.03	0.04	<0.01	<0.01	<0.01	<0.01	0.04	0.1	0.12	0.15
Salinity (ppt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conductivity (µS/cm)	92	84	96	110	41	38	73	86	67	77	74	75	62	64	90	110	72	78	88	108
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2			
Water flow at riffle (m/s)	0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6			
Sand (%)	10	15	10	10	10	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5
Stone (%)	80	70	80	70	60	60	60	60	75	75	75	75	90	85	85	85	90	85	85	85
Mud (%)	10	15	10	20	30	30	30	30	15	15	15	15	5	10	10	10	5	10	10	10

Table 4.7 Abotic data for Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
Parameter / date	Feb-14				Mar-14				Apr-14				May-14				Jun-14				Jul-14				Aug-14			
Replicate	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	7.8	8.7	9.8	9.8	7.5	7.8	8.2	8.1	7.7	7.6	7.8	8.0	8.2	7.8	8.1	8.2	7.6	7.8	7.4	7.2	7.6	7.2	7.6	7.5	7.6	7.4	7.3	7.6
pH	8.2	8.5	8	7.8	8.3	8.2	7.6	7.2	7.6	7.8	8.2	7.8	7.7	7.8	7.9	8.2	7.6	7.8	7.8	8.1	7.6	7.7	7.8	8	7.8	7.5	7.6	7.8
Nitrate (mg N/L)	1.3	1.8	1.6	2.1	1.2	1.4	1.1	1.3	1.5	1.5	1.3	1.2	0.9	0.7	0.6	0.7	0.8	0.8	0.9	0.9	0.8	1.1	1.1	0.8	1.2	1.1	0.9	1.1
Ammonia (mg/L)	0.05	0.04	0.1	0.12	0.06	0.04	0.04	0.1	0.1	0.1	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Salinity (ppt)	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.02	0.03	0.03	0.01	0.02	0.03	0.03	0	0	0	0	0	0	0	0
Conductivity (µS/cm)	78	87	118	119	120	123	125	123	96	114	120	122	82	80	72	66	39	58	69	70	43	85	72	75	75	78	82	86
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.01-0.2				0.01-0.2				0.01-0.2				0.01-0.2				0.03-0.2				0.03-0.2				0.03-0.2			
Water flow at riffle (m/s)	0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.6			
Sand (%)	5	5	5	5	5	5	5	5	5	5	5	10	5	5	5	10	5	5	5	10	5	5	5	10	5	5	8	10
Stone (%)	90	85	85	85	90	85	85	80	90	85	85	75	90	85	85	75	93	90	90	75	93	90	90	75	93	90	90	75
Mud (%)	5	10	10	10	5	10	10	15	5	10	10	15	5	10	10	15	2	5	5	15	2	5	5	15	2	5	2	15

Table 4.7 Abotic data for Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
Parameter / date	Sep-14				Oct-14				Nov-14				Dec-14				Jan-15				Mar-15				Apr-15			
Replicate	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	8.7	8.7	8.4	8.6	7.2	7.3	8.1	7.6	7.3	7.3	8.2	7.8	7.2	8.1	8.2	8.2	8.9	9.2	9.3	9.2	9.2	9.1	9	9.3	8.2	8.1	8.1	8.3
pH	8.4	8.1	8.4	8.0	8.4	8.2	8.1	8.0	8.1	8.3	8.1	8.3	8.5	8.4	8.2	8.2	7.9	8.2	8.3	7.9	7.9	8.2	8.1	7.8	8.2	8.0	8.0	8.1
Nitrate (mg N/L)	1.2	1.3	1.2	1.2	0.9	1	0.9	1	1	1	0.9	0.9	0.9	1	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Ammonia (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Salinity (ppt)	0	0	0	0	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.02
Conductivity (µS/cm)	73	77	74	72	47	50	80	88	52	56	82	84	112	92	86	67	156	153	152	163	45	89	92	94	45	89	92	94
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2			
Water flow at riffle (m/s)	0.2-0.6				0.2-0.6				0.2-0.6				0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5			
Sand (%)	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10
Stone (%)	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75
Mud (%)	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15

Table 4.7 Abotic data for Upper Lam Tsuen River

(T1- located at upper river channel sampling site to T4 - located at lower river Channel sampling site)

	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
Parameter / date	May-15				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15			
Replicate	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	8.3	8.1	8.1	8.2	8.0	8.2	8.3	8.2	8.3	8.2	8.0	8.3	8.4	8.3	8.3	8.3	8.3	8.2	8.2	8.2	8.1.	8.2	8.2	8.2	7.9	8.0	8.0	8.1	8.0	8.1	7.9	8.1
pH	7.9	8.0	7.9	8.1	7.8	7.9	7.9	8.1	7.7	7.8	7.8	7.8	7.7	7.7	7.6	7.7	7.5	7.7	7.6	7.6	7.5	7.6	7.7	7.6	7.6	7.5	7.6	7.7	7.7	7.5	7.6	7.6
Nitrate (mg N/L)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9
Ammonia (mg/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Salinity (ppt)	0.01	0.01	0.01	0.01	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0	0.0	0.0	0.0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Conductivity (µS/cm)	35	45	50	43	35	45	50	43	42	32	35	55	36	42	46	38	33.0	39.0	42.0	43.0	36.0	38.0	44.0	46.0	34.0	32.0	37.0	40.0	36.0	33.0	42.0	62.0
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2				0.03-0.2			
Water flow at riffle (m/s)	0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5				0.2-0.5			
Sand (%)	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10	5	5	8	10
Stone (%)	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75	93	90	90	75
Mud (%)	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15	2	5	2	15

Agreement No. CE65/2013(EP)
Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation

2015 Annual Report
She Shan River

January 2016

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	Ecology Team: China Hong Kong Ecology Consultants	

Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation

2015 Annual Report
She Shan River

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TABLE

1 Introduction

1.1 Agreement No. CE65/2013(EP) Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation required a post-construction ecological monitoring programme when the project completed. An annual report is required to be prepared for 2015 by using the data collected from surveys of January to December conducted by Agreement No. CE65/2013(EP) Post-Construction Ecological Monitoring of River Improvement Work in Upper Lam Tsuen River, She Shan River and Upper Tai Po River – Investigation. This report aims to summaries and present findings of the post construction ecological monitoring carried out during 2015.

1.2 The scope of the ecological monitoring was detailed in EM & A Manual of the project. In brief, the survey aimed to collect data on abiotic factors such as water quality, substratum characteristics, water flow as well as flora and fauna.

1.3 China Hong Kong Ecology Consultants Ltd. was committed by Allied Environmental Consultants Ltd (AEC) to undertake the ecological monitoring tasks for the project from December 2014.

1.4 This is the number 2 annual report for the project summarising monitoring results collected from January to December of 2015. It contains the following subsections:

- Summary of major points
- Monitoring Methods
- Monitoring Results
- Summary and Comments

2 Summary of Major Points

- Field ecological monitoring were undertaken during January to December 2015;
- Presentation of species abundance and species richness for fauna and flora using graphs;
- Fauna and flora along the drainage project sections is in a process of re-establishing or restoration;
- Hong Kong Newt was recorded at middle section of the river;
- The species richness and abundance of marco-invertebrate , odonata and avifauna were in natural fluctuation;
- A significant low number of fish was observed during wet season as large amount of fishes were affected by heavy rain or flooding; and
- The measured water quality was generally acceptable.

3 Monitoring Methodology

3.1 Riparian Vegetation

Riparian vegetation, including aquatic and emergent, was sampled using line transects along the affected river channel and riparian habitat. Species, relative abundance and average heights were recorded. Vegetation survey was conducted at three selected belt transects located at the upper (T1), middle

(T2) and lower portion (T3) of the river channel respectively (**Figure 1**). The belt transects was run across the river channel in order to collect quantitative data of vegetation, e.g., species inventory, height, percentage cover. Qualitative data of plants was collected by recording plant species along line transect, e.g., species inventory, relative abundance. Nomenclature and protection status of the species has followed those documented in the Lai *et al.* (2004) and Hong Kong Herbarium (2015).

3.2 Avifauna

Avifauna survey was conducted during the post construction monitoring period. Special attention was given to those stream channel area which birds used as feeding and foraging habitat. Avifauna surveys were undertaken in the early morning plus species recorded in the rest of the day when conducting other taxonomic groups (benthic, fish, insect) monitoring. Numerical abundance was recorded at fixed count points within a radius of 30 to 50m according to landscape feature and visual penetration extent. The duration of the point count of birds was standardized for 10 minutes at each location in order to collect comparable data. Transect count along accessible section of river channel were used in order to collect qualitative data. Binoculars and digital camera were the main items of equipment used. Nomenclature and protection status of the species has followed in the AFCD website (www.hkbiodiversity.net) and Carey *et al.* (2001).

The point count was conducted at three locations located at the lower (T3), middle (T2) and upper (T1) portion of the river channel respectively. The point count and survey transect locations for the bird survey and sampling sites for surveys of other faunal groups and flora were presented in **Figure 1.**

3.3 Adult Odonata Survey

Adult Odonata survey was conducted along transects (**Figure 1)**. Binoculars, digital camera and hand net were utilized to aid identification. Numerical abundance, species identity and other notable behavior were recorded. Nomenclature and protection status of the species has followed those documented in the AFCD website (www.hkbiodiversity.net), Wilson *et al.* (2004) and Tam *et al.* (2011). Adult Odonata survey was conducted along line transects in parallel with river channel within the works area where access was permitted.

3.4 Aquatic Macro-invertebrates

Macro-invertebrates in the riverbed were surveyed. Four sampling sites were selected to collect necessary macro-invertebrate fauna for ecological monitoring information, which covered upper (T1), middle (T2) and lower (T3) sections of the river respectively, as well as reference site (**Figure 1**). Five replicates were taken at each sampling point and pool together for further sample process. Kick sampling and hand netting were the survey methodologies for stream organisms. Dissection microscope and digital camera were used to aid identification and enumeration. Numerical abundance, species identity was recorded. Nomenclature and protection status of the species has followed those documented in the AFCD website (www.hkbiodiversity.net), and other literatures such as Dudgeon (1994).

3.5 Fish Population and Hong Kong Newt

Fish community at the specified river channel was monitored by live trapping, hand netting and direct observation methods. Hong Kong newt was surveyed by direct observation and hand netting as well.

Sampling was conducted at four proposed sampling locations at upper (T1), middle (T2), lower (T3) sections and reference site respectively. Those sampling sites covered major type of stream habitats, e.g. river pool and riffle (**Figure 1**). The number of the observed fish was estimated and recorded. Nomenclature and protection status of the species has followed those documented in the AFCD website (www.hkbiodiversity.net) and Lee *et al.* (2004).

3.6 Abiotic Data Collection

3.6.1 Water Quality Monitoring

Dissolved oxygen level, pH value, conductivity, salinity, BOD and nutrient level (nitrate and ammonium) were sampled and analyzed by conventional methods in situ or in laboratory. The instruments for measuring dissolved oxygen level, pH value, conductivity, salinity were model: DO-5510, AZ8685, AZ8361 and AZ8374 respectively. All the instruments were calculated every monitoring month according to the operation manuals in order to obtain the precise result. BOD test took 5 days to complete within darkness incubator with stable temperature at 20^{o}C and was performed using model: DO-5510 for measuring dissolved oxygen. Nutrient levels including nitrate and ammonia were performed in laboratory by applying the In-house method SOP056 (FIA) and SOP057 (FIA) respectively.

3.6.2 Sediment Characteristics

Sediment/substrate characteristics were recorded of sediment cover in percentage e.g. mud, sand, rock, boulder and cemented bottom in the stream bed at sampling sites.

3.6.3 Water Flow

Water flow rates in river channel were measured by recording the time taken for a floating object (e.g. floating ball) in a measured distance. The sampling locations for surveys were presented in **Figure 1.**

4 Monitoring Results

4.1 Vegetation

Over 60 flora species was recorded within the survey transects along the river course within 2015. Most of the recorded floras were comprised of marsh species with few floating aquatic species such as *Lemna mino* and submerged plant such as *Hydrilla verticillata*. The height of the dominated riparian grass and herb species were in a range from 0.2m to 2m as observed along survey transect. Dominant flora species were shown in the **Table 4.1** marked with relative abundance sign "+++". Vegetation has generally covered the riparian habitat in upper sections and part of the riverbed. Aquatic plants *Brachiaria*

mutica and *Commelina diffusa* were the most abundant plants found at most section of the river channel all of the years. An aquatic plant, which is also a vegetable, *Nasturtium officinale* was recorded especially high in abundance during dry season when there was no flooding occurred. The composition of vegetation species had not changed greatly throughout the year, but relatively low vegetation coverage was recoded during wet season when flooding event was frequently occurred or sometimes in dry season after vegetation clearance work at lower to middle section (Photos 1-4). Results of vegetation survey and belt transect survey were presented in **Table 4.1** and **Table 4.2**. **Figure 1** shows the transect line for the flora surveys.

Photo 1. General view of She Shan River (Middle section) in March.

Photo 2. General view of She Shan River (Middle section) in June.

Photo 3. General view of She Shan River (Middle section) in September.

Photo 4. General view of She Shan River (Middle section) in December.

4.2 Fauna

4.2.1 Avifauna

An avifauna surveys were undertaken from January to December 2015 along survey transect and at three selected point count locations. Transect and Point Count locations were shown on **Figure 1**. Result of bird survey was presented in the **Table 4.3**. The summarised results showed that there was no obvious change on species richness of avifauna at She Shan River and the number of avifauna was presenting a natural fluctuation, shown as **Figure 4.1** and **Figure 4.2.** In total, 43 species of birds were recorded during the bird surveys within project area throughout the year. 9 species of total recorded were wetland dependent species including *Ardea alba, Alcedo atthis, Actitis hypoleucos, Motacilla cinerea, Tringa ochropus, Egretta garzetta, Motacilla alba, Ardeola bacchus* and *Amaurornis phoenicurus,* they were commonly found forging in the river channel. The most common terrestrial birds recorded included – *Pycnonotus jocosus*, *Sturnus nigricolli*s, *Copsychus saularis,* and *Streptopelia chinensis*. Birds with conservation interest recoded during 2015 were listed in the table below. Photos 5-12 are showing some birds recorded at She Shan River during 2015.

Common Name	Scientific name	Chinese Name	Protection status	Recorded month within 2015
Ashy Drongo	*Dicrurus leucophaeus*	灰卷尾	LC	12
Black Kite	*Milvus lineatus*	麻鷹	Cap.586, RC	1,2,3,4
Chinese Pond Heron	*Ardeola bacchus*	池鷺	RC	Every month
Common Emerald Dove	*Chalcophaps indica*	綠翅金鳩	VU	8
Common Buzzard	*Buteo buteo*	普通鵟	Cap. 586	1,2,12
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	CR, Cap.586	1,2,4,10
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	VU,LC, Cap.586	3,5,8,9,10,11

Great Coucal	*Centropus sinensis*	褐翅鴉鵑	VU	1,2,3,4,5,8
Little Egret	*Egretta garzetta*	小白鷺	RC	Every month
Great Egret	*Ardea alba*	大白鷺	RC	1,2,9
Grey Heron	*Ardea cinerea*	蒼鷺	PRC	4,11

Key:

RC – Regional Concern; LC – Local Concern; PRC – Potential Regional concern by Fellowes et al. (2002)

Cap.586 – Endangered Species of Animals and Plants Ordinance (Cap. 586)

VU - Vulnerable in China Red Data Book Status

CR - Rare in China Red Data Book Status

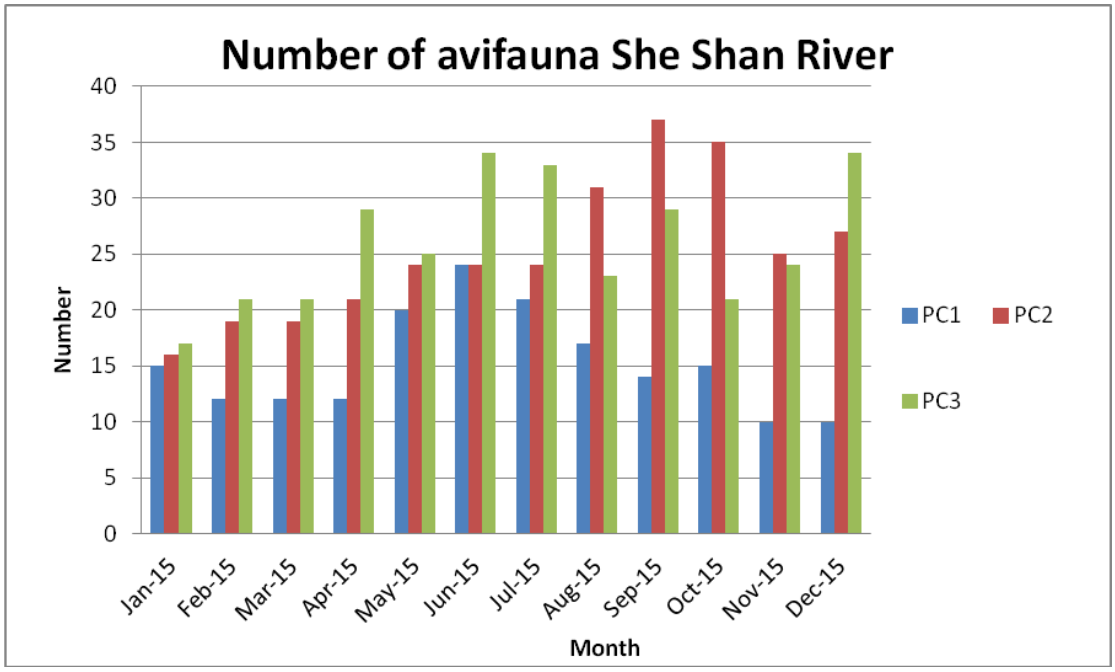

Figure 4.1. Avifauna abundance.

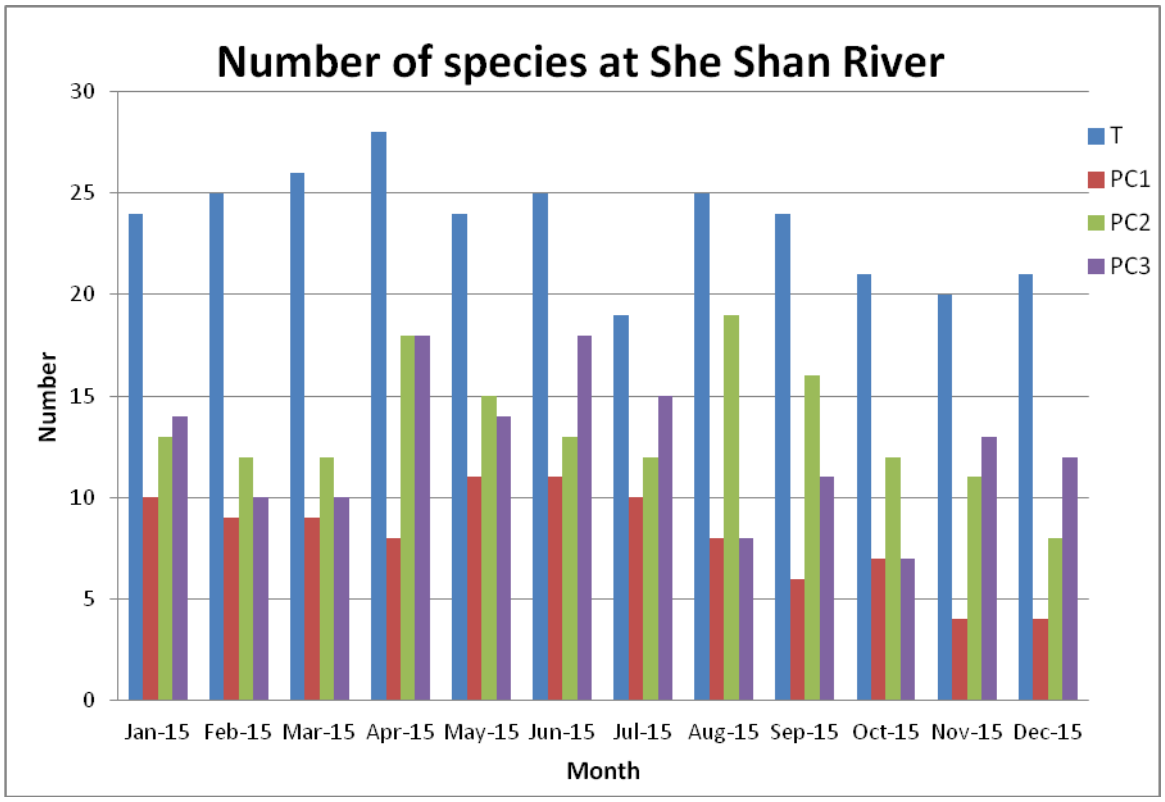

Figure 4.2. Species richness of avifauna.

Photo 5. Avifauna - *Spilornis cheela*

Photo 6. Avifauna - *Motacilla alba*

	
Photo 7. Avifauna - *Egretta garzetta*	Photo 8. Avifuana - *Motacilla cinerea*
	
Photo 9. Avifauna - *Ardeola bacchus*	Photo 10. Avifauna - *Accipiter trivirgatus*
	
Photo 11. Avifauna - *Cacomantis merulinus*	Photo 12. Avifauna - *Eurystomus orientalis*

4.2.2 Adult Odonata Survey

Odonata surveys were performed from January to December 2015 and a list of recorded odonata species in She Shan River is shown in **Table 4.4**. A graph of odonata species richness is shown in **Figures 4.3**, it indicates that species number of odonata fluctuated among different seasons. The maximum number of odonata species was recorded during wet season and a big contrast showing species number of odonata in dry season was significantly low. It is assumed that most species of odonata in Hong Kong have a peak emergence in spring and continue to emerge with decreasing number until late autumn (Wilson *et al.*, 2004 & Tam *et al.*, 2011). Thus, the low species diversity during dry season was mainly related to seasonality. In total, 16 species of odonata were recorded in 2015 and the pattern of species richness was similar to those results collected in previous years that number of species was fluctuating along with different seasons. Sampling location was shown on **Figure 1**. Some of the recorded dragonfly and damselfly species are presented in Photos (13-22).

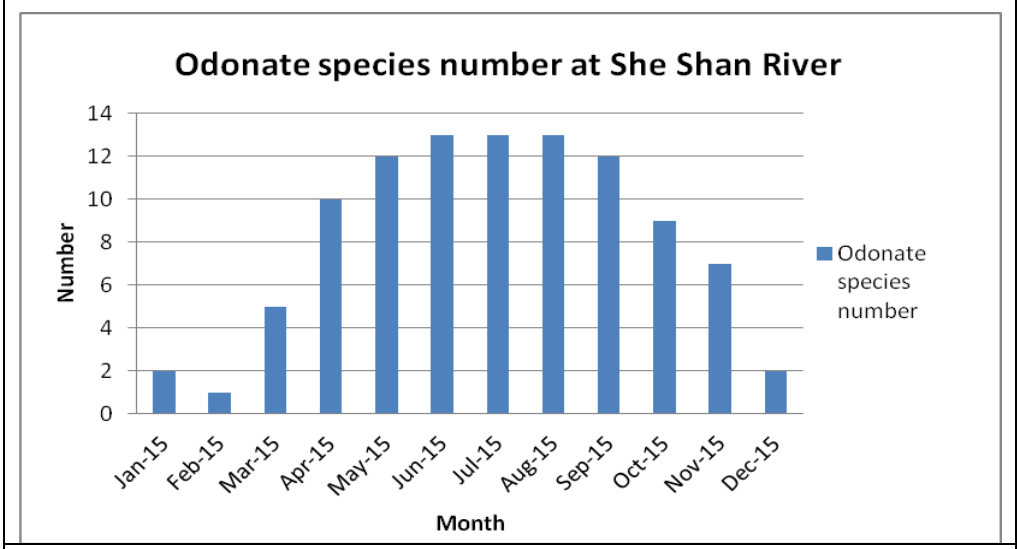

Figure 4.3 Species richness of Odonata.

Photo 13. Odonata - *Ceriagrion auranticum ryukyuanum*

Photo 14. Odonata - *Neurothemis fulvia*

	
Photo 15. Odonata - *Orthetrum pruinosum neglectum*	Photo 16. Odonata - *Crocothemis servilia servilia*
	
Photo 17. Odonata - *Nannophya pygmaea*	Photo 18. Odonata - *Copera marginipes*
	
Photo 19. Odonata - *Ictinogomphus pertinax*	Photo 20. Odonata - *Rhyothemis variegata arria*

	
Photo 21. Odonata - *Rhinocypha perforata perforata*	Photo 22. Odonata - *Trithemis festiva*

4.2.3 Aquatic Macro-invertebrates

The river benthic fauna collected was mainly comprised of insects, mollusks and crustaceans. Over 20 species were recorded during ecology surveys undertaken from January to December 2015. The species richness was observed with no significant change, shown as **Figure 4.3**. Details of recorded benthic fauna refer to **Table 4.5**. Sampling location was shown on **Figure 1**.

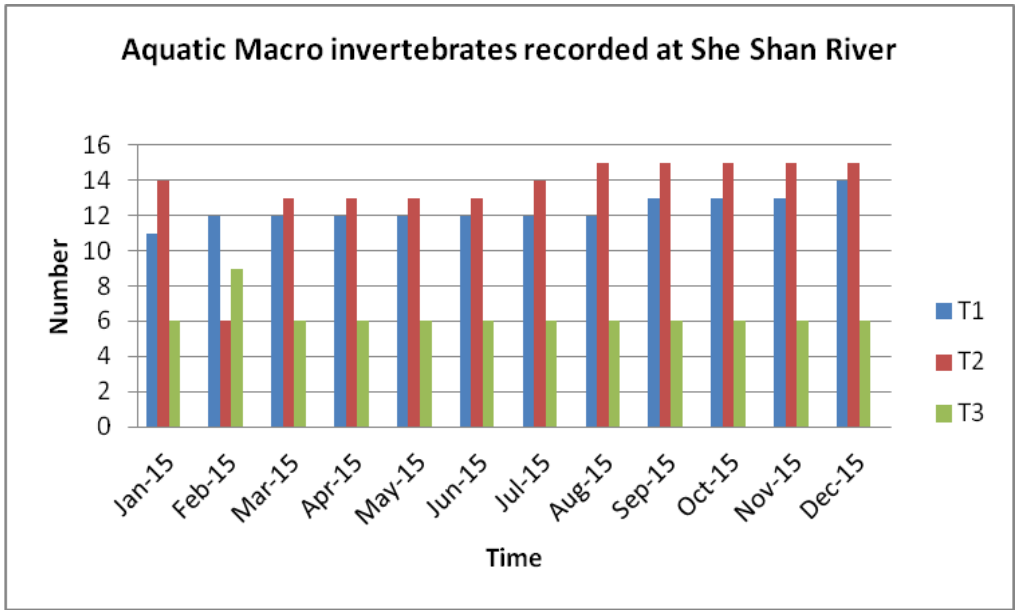

Figure 4.3 Species richness of aquatic macroinvertebrate.

4.2.4 Hong Kong Newt

Survey of Hong Kong Newt was conducted at She Shan River from January to December of 2015. Adult Hong Kong Newt was only recorded at middle section in She Shan River, where covered with dense vegetation. Hong Kong Newt was absent from July to November, assuming that they were back to terrestrial habitats during their breeding period in wet season (Dudgeon, 2003).

Photos 23-24 are showing the potential habitat for Hong Kong Newt and Hong Kong Newt captured by hand net respectively. Record of Hong Kong Newts can be referred to **Table 4.6.**

Photo 23. Hong Kong Newt preferred habitat.

Photo 24. Hong Kong Newt.

4.2.5 Fish Fauna

Fish surveys were performed at She Shan River from January to December 2015 and total 13 species of freshwater fish were recorded. *Zacco platypus* and *Oreochromis niloticus* were the dominant fish species in the river channel (Photos 25-28). There was no apparent change on the species number and composition at She Shan River within 2015, shown as **Figure 4.4**. The abundance of fish was fluctuating along with different season, lower abundance of fish was observed during wet season as frequent flooding has washed proportion of fish out of the river, shown as **Figure 4.5**. Details of recorded of fish fauna refers to **Table 4.6.** Sampling location was shown on **Figure 1**.

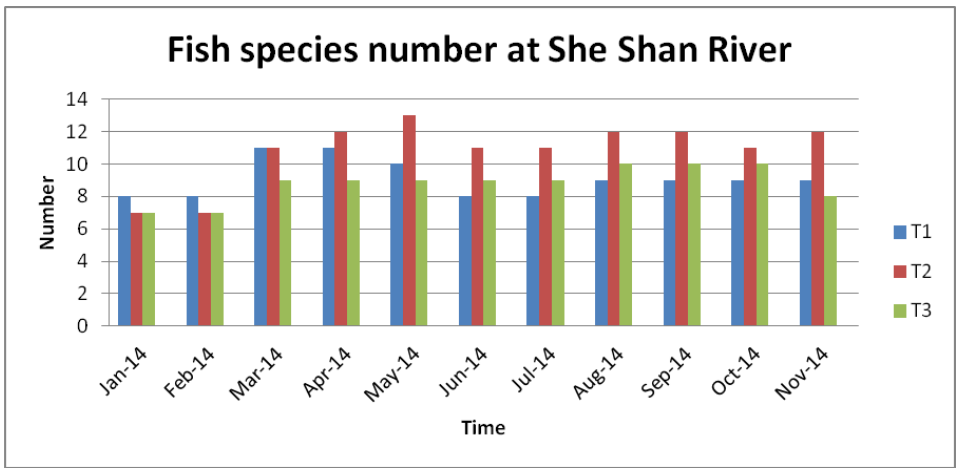

Figure 4.4 Species richness of fish.

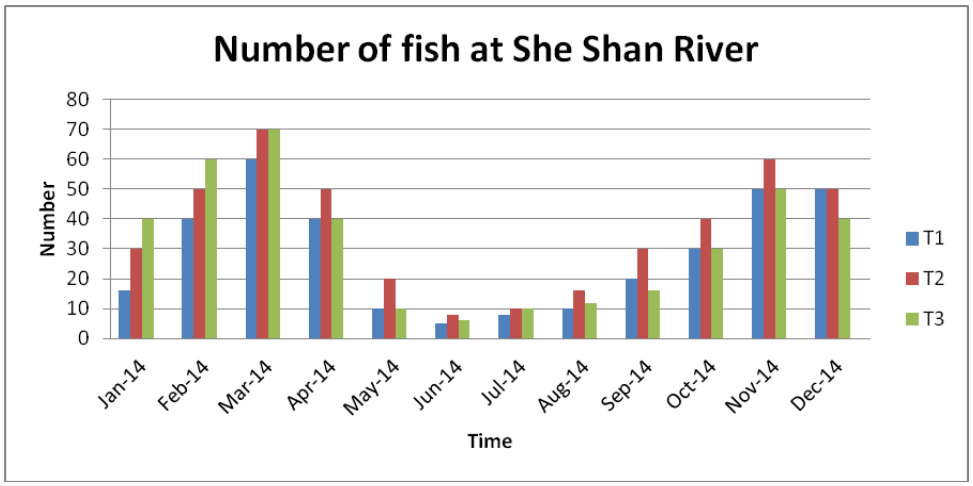

Figure 4.5 Fish Abundance..

Photo 25. Fish sampling in She Shan River.

Photo 26. Fish - *Parazacco spilurus*

Photo 27. Fish - *Zacco platypus*

Photo 28. Fish - *Channa maculata*

4.3 Abiotic Data

Data on water quality and major stream hydrological feature (water flow and substratum) of the stream were collected and are presented in the **Table 4.7.**

All the parameters measured in 2015 were kept in stable within satisfied level of the river condition. There was no significant fluctuation on any parameter observed except only slightly difference on dissolved oxygen and conductivity

were recorded throughout the year. Results of water test are presented in the **Table 4.7.**

The river substratum was comprised of over 20-80% stones or rocks in large proportion of the river sections with slow water flow (up to 0.2m/second at pool and 0.5m/second at riffle).

5 Summary and Commentary

5.1 Data presented and analyzed in this report were derived from ecology surveys conducted during 2015. The post-construction ecological monitoring will be continued and it is expected that long term monitoring will reveal even more information on ecological recovery and habitat improvement.

5.2 Aquatic and riparian vegetation re-established quickly after the completion of the drainage works as demonstrated by the photographs in this report. Aquatic and marsh plants growing on the riverbed and along the water margins provide breeding and feeding habitat for a variety of aquatic life including insects, shrimps, fish and the Hong Kong Newt.

5.3 The adult Hong Kong Newt was mainly recorded at middle section of the river during dry season.

5.4 The species richness of fish was recorded in a stable level during 2015. However, the fish abundance was observed significant low during wet season, it was believed that fishes were affected by heavy rain and floods. *Zacco platypus* and *Oreochromis niloticus* were the dominant species in the river channel.

5.5 Abundance of the aquatic marco-invertebrates and avifauna were stable with no apparent seasonal change.

5.6 The species richness of odonata fluctuates sharply along with different season, maximum species number was recorded during wet season due to seasonality.

5.7 Measured water quality parameters and physical characteristics showed only minor monthly fluctuation.

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FIGURE

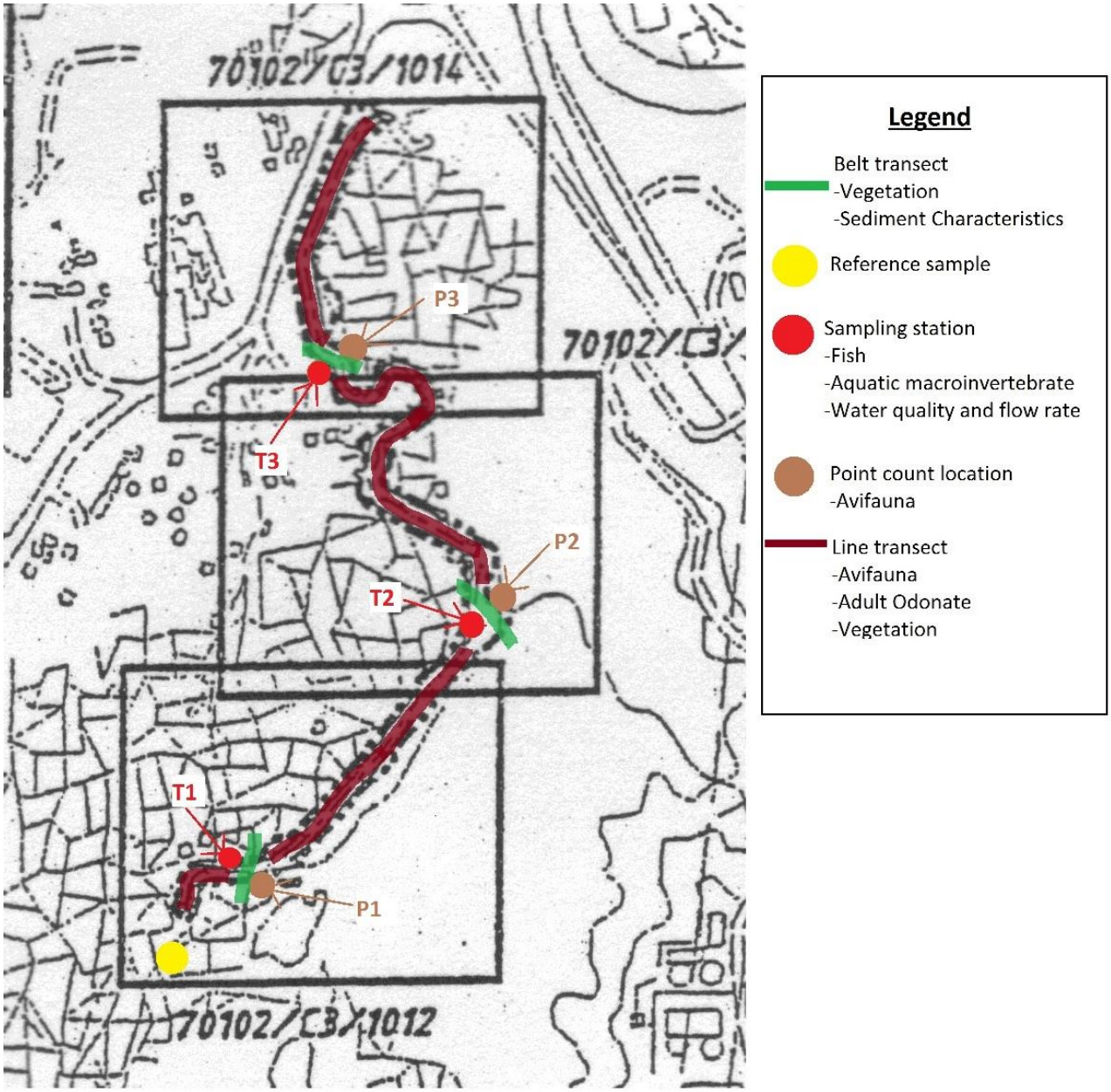

Figure 1. Sampling Location of Ecological Survey and Monitoring at She Shan River, Tai Po.

TABLE

Table 4.1. Flora species recorded along the She Shan River including riparian habitat.

			Post Construction Monitoring											
Family	Species name	Species name in Chinese	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Riparian Plant														
Acanthaceae	*Dicliptera chinensis*	狗肝菜												
Acoraceae	*Acorus gramineus*	金錢蒲												
Amaranthaceae	Alternanthera philoxeroides	空心蓮子草												
Amaranthaceae	*Celosia argentea L.*	青葙												
Apiaceae	*Oenanthe javanica*	水芹												
Aquifoliaceae	*Ilex rotunda*	鐵冬青												
Araceae	*Alocasia odora*	海芋	+	+	+	+	+	+	+	+	+	+	+	+
Araceae	*Colocasia esculenta*	芋	+	+	+	+	+	+	+	+	+	+	+	+
Araceae	*Syngonium podophyllum*	合果芋												
Araceae	*Pistia stratiotes*	大漂	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Bidens alba*	白花鬼針草	+	++	++	++	++	++	++	++	++	++	++	++
Asteraceae	*Synedrella nodiflora*	金腰箭					+	+	+	+	+	+	+	+
Asteraceae	*Mikania micrantha*	薇甘菊	++	++	++	++	++	++	++	++	++	++	++	++
Asteraceae	*Erigeron karvinskianus*	加勒比飛蓬					+	+	+	+	+	+	+	+
Asteraceae	*Eclipta prostrata*	鱧腸	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Gynura divaricata*	白子菜		+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Ageratum conyzoides*	勝紅薊	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*Emilia sonchifolia*	一點紅	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*E rechtites hieraciifolius*	梁子菜					+	+	+	+	+	+	+	+
Asteraceae	*Y oungia japonica*	黃鵪菜	+	+	+	+	+	+	+	+	+	+	+	+
Asteraceae	*S pilanthes paniculata*	金鈕扣	+	+	+	+	+	+	+	+	+	+	+	+
Athyriaceae	*Callipteris esculenta*	菜蕨	+	+	+	+	++	++	+	+	+	+	+	+
Begoniaceae	*Begonia cucullata var.hookeri*	四季秋海棠												
Blechnaceae	*Blechnum orientale*	烏毛蕨												
Brassicaceae	*Nasturtium officinale*	西洋菜	+	++	++	++	+	+	+	+	+	+	+	++
Brassicaceae	*R orippa indica*	塘葛菜	+	+	+	+	+	+	+	+	+	+	+	+
Brassicaceae	*C apsella bursa-pastoris*	齊菜												
Caesalpiniaceae	*Bauhinia championii*	缺葉藤	+	+	+	+	+	+	+	+	+	+	+	+
Caryophyllaceae	*Drymaria diandra*	荷蓮豆	+	+	+	+	+	+	+	+	+	+	+	+
Caryophyllaceae	*Myosoton aquaticum*	鵝腸菜	+	+	+	+	+	+	+	+	+	+	+	+
Chenopodiaceae	*Chenopodium ficifolium*	小藜				+	+	+	+	+	+	+	+	+
Commelinaceae	*Commelina diffusa*	節節草	+++	+++	+++	+++	+++	+++	++	++	++	++	++	++
Convolvulaceae	*Pharbitis nil*	牽牛												
Convolvulaceae	*Ipomoea cairica*	五爪金龍	+	+	+	+	+	+	+	+	+	+	+	+
Convolvulaceae	*Ipomoea aquatica*	蕹菜										+	+	+
Cucurbitaceae	*Solena amplexicaulis*	茅瓜												
Cuscutaceae	*Cuscuta australis*	南方菟絲子	+	+	+	+	+	+	+	+	+	+	+	+
Cyperaceae	*Cyperus sp.*	莎草	+	+	+	+	+	+	+	+	+	+	+	+
Cyperaceae	*Cyperus involucratus*	風車草	+	+	+	+	+	+	+	+	+	+	+	+
Euphorbiaceae	*Macaranga tanarius*	血桐	+	+	+	+	+	+	+	+	+	+	+	+
Euphorbiaceae	*Aporusa dioica*	銀柴												
Fabaceae	*Pueraria lobata*	野葛	+	+	+	+	++	++	++	++	++	++	++	++
Fabaceae	*Sesbania cannabina*	田菁												
Lauraceae	*Cinnamomum burmannii*	陰香												
Lygodiaceae	*Lygodium japonicum*	海金沙												
Magnoliaceae	*Michelia alba*	白蘭												
Malvaceae	*Hibiscus rosa-sinensia*	大紅花	+	+	+	+	+	+	+	+	+	+	+	+
Mimosaceae	*Mimosa pudica*	含羞草												
Mimosaceae	*Leucaena leucocephala*	銀合歡		+	+	+	+	+	+	+	+	+	+	+

Table 4.1. Flora species recorded along the She Shan River including riparian habitat.

			Post Construction Monitoring											
Family	Species name	Species name in Chinese	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Mimosaceae	*Calliandra haematocephala*	紅絨球	+	+	+	+	+	+	+	+	+	+	+	+
Moraceae	*Broussonetia papyrifera*	構樹												
Moraceae	*Ficus hispida*	對葉榕	+	+	+	+	+	+	+	+	+	+	+	+
Moraceae	*Ficus pumila*	薜荔												
Moraceae	*Ficus variolosa*	變葉榕												
Moraceae	*Ficus variegata*	青果榕	+	+	+	+	+	+	+	+	+	+	+	+
Musaceae	*Musa paradisiaca*	大蕉					+	+	+	+	+	+	+	+
Myrsinaceae	*Maesa perlarius*	鯉魚胆												
Myrtaceae	*Cleistocalyx operculatus*	水翁		+	+	+	+	+	+	+	+	+	+	+
Onagraceae	*Ludwigia hyssopidolia*	草龍				+	+	+	+	+	+	+	+	+
Onagraceae	*Ludwigia erecta*	美洲水丁香	+	+	+	+	+	+	+	+	+	+	+	+
Oxalidaceae	*Averrhoa carambola*	楊桃												
Oxalidaceae	*Oxalis corniculata*	酢醬草				+	+	+	+	+	+	+	+	+
Plantaginaceae	*Plantago major*	車前草												
Poaceae	*Panicum maximum*	大黍	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Panicum repens*	枯骨草	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Brachiaria mutica*	巴拉草	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Poaceae	*Pennisetum purpureum*	象草	++	++	++	++	+	+	+	+	+	+	+	+
Poaceae	*Coix lacryma-jobi*	薏苡	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Microstegium ciliatum*	剛秀竹	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Miscanthus floridulus*	五節芒	+	+	+	+	+	+	+	+	+	+	+	+
Poaceae	*Pennisetum alopecuroides*	狼尾草					+	+	+	+	+	+	+	+
Poaceae	*Digitaria radicosa*	紅尾翎	+	+	+	+	+	+	+	+	+	+	+	+
Polygonaceae	*Polygonum hydropiper*	水蓼	+	+	+	+	+	+	+	+	+	+	+	+
Polygonaceae	*Polygonum glabrum*	光蠶							+	+	+	+	+	+
Polygonaceae	*Polygonum chinense*	火炭母				+	+	+	+	+	+	+	+	+
Polygonaceae	*Rumex trisetifer*	假菠菜	+	+	+	+	+	+	+	+	+	+	+	+
Polygonaceae	*Polygonum lapathifolium*	大馬蓼					+	+	+	+	+	+	+	+
Rubiaceae	*Hedyotis hedyotidea*	牛白藤												
Sapindaceae	*Dimocarpus longan*	龍眼												
Solanaceae	*Solanum torvum*	水茄	+	+	+	+	+	+	+	+	+	+	+	+
Solanaceae	*Solanum americanum*	少花龍葵												
Thelypteridaceae	*Cyclosorus parasiticus*	華南毛蕨	+	+	+	+	+	+	+	+	+	+	+	+
Ulmaceae	*Celtis sinensis*	朴樹		+	+	+	+	+	+	+	+	+	+	+
Ulmaceae	*Celtis timorensis*	樟葉朴												
Ulmaceae	*Trema orientalis*	異色山黃麻												
Ulmaceae	*Trema tomentosa*	山黃麻												
Urticaceae	*Boehmeria nivea*	苧麻												
Urticaceae	*Pilea microphylla*	透明草							+	+	+	+	+	+
Urticaceae	*Pouzolzia zeylanica*	霧水葛												
Verbenaceae	*Vitex quinata*	山牡荊												
Polygonaceae	*Polygonum perfoliatum*	杠板歸	+	+	+	+	+	+	+	+	+	+	+	+
Verbenaceae	*Lantana camara*	馬纓丹	+	+	+	+	+	+	+	+	+	+	+	+
Floating Plant														
Araceae	*Pistia stratiotes*	大薸										+	+	+
Lemnaceae	*Lemna minor*	浮萍												
Submerged Plant														
Hydrocharitaceae	*Hydrilla verticillata*	黑藻				+	+	+	+	+	+	+	+	+
No. of Species			42	46	46	51	57	57	59	59	59	61	61	61

Note:

"+" – Species exists in the study area

"++" – Species common in the study area

"+++" – Species abundant/dominant in study area

Table 4.2. Flora species recorded from belt transect survey at the She Shan River

(T1- Upper stream section,T2 - middle stream section and T3 - Lower stream section)

			Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring					
		Stream	Jan-15						Feb-15						Mar-15						Apr-15						May-15						Jun-15					
		Transect	T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Commelinaceae	*Commelina diffusa*	節節草	0.5	10	0.8	70	0.3	40	0.6	10	1	70	0.4	40	0.6	10	1	70	0.5	40	0.6	10	1	70	0.5	40	0.3	5	0.7	50	0.5	25	0.3	5	0.7	50	0.5	25
Poaceae	*Panicum repens*	枯骨草																																				
Asteraceae	*Mikania micrantha*	薇甘菊	0.4	10	0.5	15			0.4	10	0.5	15			0.4	10	0.5	15			0.4	10	0.5	15			0.3	5	0.5	10			0.3	5	0.5	10		
Brassicaceae	*Nasturtium officinale*	西洋菜																																				
Moraceae	*Ficus microcarpa*	細葉榕																																				
Moraceae	*Ficus hispida*	對葉榕																																				
Poaceae	*Microstegium ciliatum*	剛秀竹																																				
Fabaceae	*Pueraria lobata*	野葛																																				
Araceae	*Colocasia esculenta*	芋																																				
Urticaceae	*Boehmeria nivea*	苧麻																																				
Asteraceae	*Bidens alba*	白花鬼針草																																				
Poaceae	*Pennisetum purpureum*	象草																																				
Poaceae	*Coix lacryma-jobi*	薏苡																																				
Amaranthaceae	*Alternanthera philoxeroides*	空心蓮子草																																				
Poaceae	*Panicum maximum*	大黍																																				
Moraceae	*Broussonetia papyrifera*	構樹																																				
Polygonaceae	*Polygonum chinense*	火炭母																																				
Onagraceae	*Ludwigia hyssopidolia*	草龍																																				
Cyperaceae	*Cyperus sp.*	莎草																																				
Poaceae	*Miscanthus floridulus*	五節芒																																				
Poaceae	*Brachiaria mutica*	巴拉草	1.5	80	1	5	1	25	1.5	80	1.3	5	1.3	25	1.5	80	1.3	5	1.3	25	1.5	80	1.4	5	1.4	25	1.5	40	1.2	5	1.2	15	1.5	45	1.2	10	1.2	20
Blechnaceae	*Blechnum orientale*	烏毛蕨																																				
Poaceae	*Pennisetum alopecuroides*	狼尾草																																				
Araceae	*Alocasia macrorrhizos*	海芋																																				
Lemnaceae	*L emna minor*	浮萍																																				
Polygonaceae	*Polygonum hydropiper*	水蓼																																				
Cyperaceae	*Cyperus involucratus*	風車草			1.5	5					1.5	5					1.5	5					1.5	5					1.4	5					1.4	5		
Onagraceae	*Ludwigia erecta*	美洲水丁香					2	10					2	10					2	10					2	10					1.6	5					1.6	5
Convolvulaceae	*Ipomoea cairica*	五爪金龍																																				
Bare Gound				0		5		25		0		5		25		0		5		25		0		5		25		50		30		55		45		25		50

P1 – Point count location 1; P3 – Point count location 3

Table 4.2. Flora species recorded from belt transect survey at the She Sha

(T1- Upper stream section,T2 - middle stream section and T3 - Lower st

			Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring					
		Stream	Jul-15						Aug-15						Sep-15						Oct-15						Nov-15						Dec-15					
		Transect	T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3		T1		T2		T3	
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%
Commelinaceae	*Commelina diffusa*	節節草			0.3	25					0.3	15					0.3	17					0.3	17	0.2	10			0.3	17	0.2	10			0.3	10	0.2	5
Poaceae	*Panicum repens*	枯骨草																																				
Asteraceae	*Mikania micrantha*	薇甘菊	0.4	10	0.4	10			0.5	10	0.4	5			0.5	10	0.4	5			0.5	10	0.4	20			0.5	10	0.4	20			0.5	10	0.5	10		
Brassicaceae	*Nasturtium officinale*	西洋菜																																				
Moraceae	*Ficus microcarpa*	細葉榕																																				
Moraceae	*Ficus hispida*	對葉榕																																				
Poaceae	*Microstegium ciliatum*	剛秀竹																																				
Fabaceae	*Pueraria lobata*	野葛																																				
Araceae	*Colocasia esculenta*	芋																																				
Urticaceae	*Boehmeria nivea*	苧麻																																				
Asteraceae	*Bidens alba*	白花鬼針草	0.9	15			0.3	2	0.9	15			0.5	2	0.9	15			0.5	2	0.9	30					0.9	30					1	30				
Poaceae	*Pennisetum purpureum*	象草																																				
Poaceae	*Coix lacryma-jobi*	薏苡	1	2					1	2					1	2					1	2					1	2					1	2				
Amaranthaceae	*Alternanthera philoxeroides*	空心蓮子草																																				
Poaceae	*Panicum maximum*	大黍																																				
Moraceae	*Broussonetia papyrifera*	構樹																																				
Polygonaceae	*Polygonum chinense*	火炭母																																				
Onagraceae	*Ludwigia hyssopidolia*	草龍																																				
Cyperaceae	*Cyperus sp.*	莎草																																				
Poaceae	*Miscanthus floridulus*	五節芒																																				
Poaceae	*Brachiaria mutica*	巴拉草	0.8	60	1	50	0.8	10	0.9	60	1	35	0.9	10	0.9	60	1	38	0.9	10	0.3	30	1	15	0.9	1	0.3	30	1	15	0.9	1	0.3	30	1	5	1	1
Blechnaceae	*Blechnum orientale*	烏毛蕨																																				
Poaceae	*Pennisetum alopecuroides*	狼尾草																																				
Araceae	*Alocasia macrorrhizos*	海芋																																				
Lemnaceae	*L emna minor*	浮萍																																				
Polygonaceae	*Polygonum hydropiper*	水蓼																																				
Cyperaceae	*Cyperus involucratus*	風車草			1.2	5					1.2	5					1.2	5					1.2	5	0.4	2			1.2	5	0.4	2			1.2	5	0.4	2
Onagraceae	*Ludwigia erecta*	美洲水丁香					1.5	50					1.5	50					1.5	50					0.3	15					0.3	15					0.3	5
Convolvulaceae	*Ipomoea cairica*	五爪金龍			0.3	5					0.3	5					0.3	5					0.3	5					0.3	5					0.3	5		
Bare Gound				13		10		38		13		40		38		13		35		38		28		43		72		28		43		72		28		70		87

P1 – Point count location 1; P3 – Point count location 3

Table 4.3 Avifauna recorded along survey transects and at three selected point count locations at She Shan River.

(T1- Upper stream section, T2 - middle stream section and T3 - Lower stream section)

Common Name	Species name	Chinese name	Status	Commonness	Post Construction Monitoring																																															
					Jan-15				Feb-15				Mar-15				Apr-15				May-15				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15			
					Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance				Abundance			
					C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3	C	T1	T2	T3
Ashy Drongo	*Dicrurus leucophaeus*	灰卷尾	SWV, LC	U																																													+		1	
Barn Swallow	*Hirundo rustica*	家燕	PM	C									+	1	2		++		2	2	++	2		2	++	2		2	++		2	2	++	4			++			4												
Black Drongo	*Dicrurus macrocercus*	黑卷尾	Sv	C																					+			2																					++			7
Black Kite	*Milvus lineatus*	麻鷹	R, RC, Cap.586	C	+				+				+		1		+		1																																	
Black-necked Starling	*Sturnus nigricollis*	黑領椋鳥	R	C	+		2	2	+				++		2	2	++		2	2	++	2	2	2	++	1		2	++	2		2	++		3		++		2	2	++		3		+			1	+			
Black-throated Laughingthrush	*Garrulax chinensis*	黑喉噪鶥	R	C													+		1		+		2		+			2					+		1		+		1		+		1									
Buzzard (Common Buzzard)	*Buteo buteo*	普通鵟	WV, Cap 586	U	+				+																																								+			1
Chinese Bulbul	*Pycnonotus sinensis*	白頭鵯	R	C	+	1		3	+	1		2	++	2		3	++	1		2	++	2		2	++	3	1	2	++	2	2	2	++		2	2	+		3		++	3	3		++		3	2	++		3	2
Chinese Pond Heron	*Ardeola bacchus*	池鷺	R,RC	C	++	1	2	2	++	1	1		+	1	1		+	1			+	1			+	1			+			1	+	1			+			1	+		1		+			1	+			1
Common Emerald Dove	*Chalcophaps indica*	綠翅金鳩	R,VU	U																													+		1																	
Common Kingfisher	*Alcedo atthis*	普通翠鳥	R	C																					+	1																							+		1	
Common Koel	*Eudynamys scolopacea*	噪鵑	R	C									+		1		+		1		+		1		+		1	1																								
Common Sandpiper	*Actitis hypoleucos*	磯鷸	WV& PM	C																									+			1	+		1																	
Common Tailorbird	*Orthotomus sutorius*	長尾縫葉鶯	R	C	++	2	1	1	+	1	1		+	1	1		+	1		1	+	1		1	+		1	1	+	2	2		++	2	2		++	1	2		++				++		1	1	+			
Crested bulbul	*Pycnonotus jocosus*	紅耳鵯	R	C	+++	3	2	4	+++	2	2	4	+++	3	1	4	+++	3	2	3	+++	4	3	3	+++	5	4	4	+++	5	5	7	+++	3	3	8	+++	5	9	5	+++	5	5	7	+++	7	3	4	+++	7	6	7
Crested Goshawk	*Accipiter trivirgatus*	鳳頭鷹	R, CR, Cap.586	U	+				+								+			1																					+											
Crested Myna	*Acridotheres cristatellus*	八哥	R	C	+			3	+			2	++		2	3	++		1	3	++		2	3	++	3	2	3	++	2	2	1	++			3	++			2	+		3		+		3					
Crested Serpent Eagle	*Spilornis cheela*	蛇鵰	R, VU,	U									+								+												+		1		+		1		+				+		1					
Domestic pigeon	*Columba sp.*	鴿	R	C	++				++																																											
Dusky Warbler	*Phylloscopus fuscatus*	褐柳鶯	WV	C	++	1	2	1	++		1		+		1		+		1		+		1		+		1		+	1	1		+	1	1		+	1	1		+	1	1		+	1	1		+		1	1
Eurasian tree sparrow	*Passer montanus*	麻鵲	R	C	+++	2	4	3	+++		3	2	++	2		2	++	2	2	2	++	3	2	2	++	2	3	3	++	3	3	3	++		2	4	++		3	3	+++		6	3	++		3	4	++		6	5
Fork-tailed Sunbird	*Aethopyga christinae*	叉尾太陽鳥	R	C													+			2													+		2		+		1													
Great Coucal	*Centropus sinensis*	褐翅鴉鵑	R,VU	C	+		1		+		1		+		1		+		1		+		1										+		1																	
Great Egret	*Ardea alba*	大白鷺	R,RC	C	+				+																												+	1														
Great Tit	*Parus major(commixtus)*	大山雀	R	C																																																
Green Sandpiper	*Tringa ochropus*	白腰草鷸	PM& WV	C																																	+		1		+			1	+			1	+			1
Grey Heron	*Ardea cinerea*	蒼鷺	WV,PRC	C													+			1																									+			1				
Grey Wagtail	*Motacilla cinerea*	灰鶺鴒	WV	C	+		1	2	+	1	2	1	+		1	1	+		1	1	+		1	1	+		1		+			1	+			1	+			1	+	1			+	1			+	1		1
Japanese White Eye	*Zosterops japonica(simplex)*	暗綠繡眼鳥	R	C	+			4	+			3	+			4	+			3	+		2	3	+		3	3	+		3	3	+	3	3		+	3	3										++		5	3
Large Hawk Cuckoo	*Cuculus sparverioides*	鷹鵑	SV	U									+				+				+				+																											
Little Egret	*Egretta garzetta*	小白鷺	R,RC	C	+	1	2	1	+	2	1	1	+	1	1	2	+		1	1	+	1		1	+	1		1	+			1	+			1					+			1	+			1	+	1		
Magpie Robin	*Copsychus saularis*	鵲鴝	R	C	+	1	1	2	+	1		1	++	1	2	1	+	1	2	1	+	2	2	1	+	1	2	2	+	2		2	+		1	2	+		2	2	+	1	2		+	1	2	1	+		2	
Night Heron	*Nycticorax nycticorax*	夜鷺	R,LC	C																																																
Olive Backed Pipit	*Anthus hodgsoni*	樹鷚	WV	C																																																
Oriental Dollarbird	*Eurystomus orientalis*	三寶鳥	PM	U																													+		1		+		3													
Plaintive Cuckoo	*Cacomantis merulinus*	八聲杜鵑	SV	C									+				+																																			
Plain Prinia	*Prinia inornata*	純色鷦鶯	R	C																																													++			
Rufous-backed Shrike	*Lanius schach*	棕背伯勞	R	C	+				+		1		+		1		+			1	+			1	+			1	+	1			+	1			+			1	+	1		1	+			1	+			
Rufous-capped Babbler	*Stachyridopsis ruficeps*	紅頭穗鶥	R	C	+				+				+				+				+				+				+		1		+		1		+		1													
Scarlet Minivet	*Pericrocotus speciosus*	赤紅山椒鳥	R	C					+				+																																							
Sooty-headed Bulbul	*Pycnonotus aurigaster*	白喉紅臀鵯	R	C																					+			1																								
Spotted Dove	*Streptopelia chinensis*	珠頸斑鳩	R	C	+	2	3	4	++	2	3	3	++	3	3	1	++	3	1	2	++	2	2	2	++	2	2	2	++	3	3	4	++	2	3	2	++	3	3	4	++	3	5	5	++		2	5	++		3	4
Spotted Munia	*Lonchura punctulata*	斑文鳥	R	C	+		5		+																												+			3	+		4		++		5					
Stejneger's Stonechat	*Saxicola stejnegeri*	黑喉石䳭	PM,WV	C																																									+				+			
White Wagtail	*Motacilla alba*	白鶺鴒	WV	C	++	1	2	2	++	1	2	2	+		1	2	+		1	1	+		1	1	+		1	1	+		1	1	+		1		+			1	+			3	+		1	1	+	1		1
White-breasted Waterhen	*Amaurornis phoenicurus*	白胸苦惡鳥	R	C	+				+		1		+		1		+		1		+		1		+		1														+		1									
Yellow Bellid Prinia	*Prinia flaviventris*	黃腹鷦鶯	R	C									+	1	1		+		1		+		1		+		1	1	+		1	1	+		1		+		1		+				+				+			
Number of birds						15	16	17		12	19	21		12	19	21		12	21	29		20	24	25		24	24	34		21	24	33		17	31	23		14	37	29		15	35	21		10	25	24		10	27	34
No. of species					24	10	13	14	25	9	12	10	26	9	12	10	28	8	18	18	24	11	15	14	25	11	13	18	19	10	12	15	25	8	19	8	24	6	16	11	21	7	12	7	20	4	11	13	21	4	8	12

Note: R – Resident; WV – Winter visitor; PM – Passage migrant; C – Common; U – Uncommon

SpM – Spring migrant; Sv - Summer visitor; SWV–Scarce winter visitor; C – transect count; P1 – Point count location 1; P3 – Point count location 3

+, occurred; ++, common; +++, abundant/dominant species in the the study area

Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)

All bird species are under protection of Wild Animals Protection Ordinance (Cap. 170)

Endangered Species of Animals and Plants Ordinance (Cap. 586)

RC : Regional concern Fellowes *et al* (2002)

LC : Local Concern Fellowes *et al* (2002)

PRC: Potential Regional concern Fellowes *et al* (2002)

CR: Rare in China Red Data Book Status

VU: Vulnerable in China Red Data Book Status

Table 4.4. Odonate species recorded at the She Shan River

					Post Construction Monitoring											
Species	Common name	Chinese name	Status	Commo--nness	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Agriocnemis pygmnalis	Wandering Midget	黃尾小蟌	NP	VC												
Brachythemis contaminata	Asian Amberwing	黃翅蜻	NP	VC												
Ceriagrion auranticum ryukyuanum	Orange-tailed Sprite	琉球橘黃蟌	NP	VC			+	+	+	+	+	+	+			
Copera ciliata	Black-knees Featherlegs	白狹扇蟌	NP	VC												
Copera marginipes	Yellow Featherlegs	黃狹扇蟌	NP	VC			+	+	+	+	+	+	+			
Crocothemis servilia servilia	Crimson Darter	红蜻	NP	VC	+		+	+	+	+	+	+	+	+	+	
Diplacodes trivialis	Blue Percher	紋藍小蜻	NP	VC												
Ictinogomphus pertinax	Common Flangetail	霸王葉春蜓	NP	C					+	+	+	+	+	+		
Ischnura senegalensis	Common Bluetail	褐斑異痣蟌	NP	VC												
Nannophya pygmaea	Scarlet Dwarf	侏紅小蜻	NP	C												
Neurobasis chinensis chinensis	Chinese Greenwing	華艷色蟌	NP	VC			+	+	+			+	+	+	+	
Neurothemis fulvia	Russet Percher	網脈蜻	NP	VC			+	+	+	+	+	+	+			
Orthetrum chrysis	Red-faced Skimmer	華麗灰蜻	NP	VC								+	+	+	+	
Orthetrum glaucum	Common blue skimmer	黑尾灰蜻	NP	VC												
Orthetrum luzonicum	Marsh Skimmer	呂宋灰蜻	NP	VC						+	+					
Orthetrum pruinosum neglectum	Common Red Skimmer	赤褐灰蜻	NP	VC				+	+	+	+					
Orthetrum Sabina sabina	Green Skimmer	狹腹灰蜻	NP	C										+	+	
Pantala flavescens	Wandering Glider	黃蜻	NP	VC					+	+	+	+	+	+	+	+
Prodasineura autumnalis	Black Threadtail	烏齒原蟌	NP	VC				+	+	+	+	+				
Pseudagrion pruinosum fraseri	Ferruginous-faced Sprit	赤斑蟌	NP	C												
Pseudagrion rubriceps rubriceps	Orange-faced Sprite	丹頂斑蟌	NP	UC												
Rhinocypha perforata perforata	Common Blue Jewel	三斑鼻蟌	NP	VC				+	+	+	+	+	+	+		
Rhyothemis variegata arria	Variegated Flutterer	斑麗翅蜻	NP	C						+	+	+	+			
Trithemis aurora	Crimson Dropwing	曉褐蜻	NP	VC	+	+		+	+	+	+	+	+	+	+	
Trithemis festiva	Indigo Dropwing	慶褐蜻	NP	VC				+	+	+	+	+	+	+	+	+
Zygonyx iris insignis	Emerald Cascader	彩虹蜻	P,PG	VC												
No of Species					2	1	5	10	12	13	13	13	12	9	7	2

Note: NP – Not protected in Hong Kong ; P - Protected in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common
"+" – Species exists in the study area
"++" – Species common in the study area
"+++" – Species abundance in the study area
Commonness and status were decided accroding to AFCD biodiversity website (www.hkbiodiversity.net)
LC- Local Concern - Fellowes *et al* (2002)
PGC - Potential Global Concern - Fellowes *et al* (2002)

Table 4.5 Aquatic Macro invertebrates recorded at She Shan Rive

(T1- Upper stream section, T2 - middle stream section, T3 - Lower stream section)

				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
Species	Chinese name	Sampling location		Jan-15				Feb-15				Mar-15				Apr-15				May-15				Jun-15			
		Status	Common-ness	Reference	T1	T2	T3	Reference	T1	T2	T3	Referer	T1	T2	T3	Referenc	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Mollusks																											
Anodonta woodiana	背角無齒蚌	NP	VC																								
Biomphalaria sp.	--	NP	VC		+	+				+		+	+	+		+	+	+		+	+	+		+	+	+	
Brotia hainanensis	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Corbicula fluminea	河蜆	NP	VC							+				+				+				+				+	
Melanoides tuberculata	瘤擬黑螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pomacea canaliculata	蘋果螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++
Radix plicatulus	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	++	+	+	+	++	+	+	+	+	++	+	+	+	++
Insects																											
Baetis sp.		NP	VC			+				+				+				+				+				+	
Caenis sp.	--	NP	VC																								
Chironomus sp.	幙幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Euphaea sp.		NP	VC			+							+	+		+	+	+			+	+			+	+	
Indobaetis sp.	--	NP	VC	+	+	+			+	+		+	+	+						+	+	+		+	+	+	
Odonate larvae		NP	VC														+										
Orthetrum spp.	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+					+	+	+	+	+	+	+	+
Pseudagrion spp.	--	NP	UC	+	+	+			+	+			+	+			+	+			+	+			+	+	
Pseudocloeon sp.	--	NP	VC	+		+										+	+	+	+								
Serratella sp.		NP	VC		+	+			+				+				+	+			+				+		
Crustaceans																											
Caridina cantanensis	廣東米蝦	NP	VC																								
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC																								
No of Species				10	11	14	6	7	10	12	6	9	12	13	6	9	12	13	6	9	12	13	6	9	12	13	6

Note: NP – Not protected in HK P - protected species in Hong Kong
"VC" – Very Common; "UC" – Uncommon; "C" - Common
"+" – Species exists in the study area
"++" – Species common in the study area
"+++" – Species abundance in the study area
- Reference point was the sampling location outside the works area used to compare the with the data within works area.

Table 4.5 Aquatic Macro invertebrates recorded at She Shan Rive

(T1- Upper stream section, T2 - middle stream section, T3 - Lower stream section)

Species	Chinese name	Sampling location		Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15			
		Status	Common-ness	Reference	T1	T2	T3	Referenc	T1	T2	T3	Reference	T1	T2	T3	Referen	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Mollusks																											
Anodonta woodiana	背角無齒蚌	NP	VC																								
Biomphalaria sp.	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Brotia hainanensis	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Corbicula fluminea	河蜆	NP	VC			+				+				+				+				+				+	
Melanoides tuberculata	瘤擬黑螺	NP	VC	+	+	+	+	+	+	+	+	+	+	++	+	+	+	++	+	+	+	++	+	+	+	++	+
Pomacea canaliculata	蘋果螺	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	+	++	++	+	+	++	++	+	+	++	++	+
Radix plicatulus	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sinotaia quadrata	田螺	NP	VC	+	+	+	++	+	+	+	++	+	+	+	++	+	+	++	++	+	+	++	++	+	+	++	++
Insects																											
Baetis sp.		NP	VC			+				+				+				+				+				+	
Caenis sp.	--	NP	VC																								
Chironomus sp.	幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Euphaea sp.		NP	VC		+	+			+	+			+	+			+	+			+	+			+	+	
Indobaetis sp.	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Odonate larvae		NP	VC							+			+	+			+	+			+	+			+	+	
Orthetrum spp.	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pseudagrion spp.	--	NP	UC		+	+			+	+			+	+			+	+			+	+			+	+	
Pseudocloeon sp.	--	NP	VC																								
Serratella sp.		NP	VC		+				+				+				+				+				+		
Crustaceans																											
Caridina cantanensis	廣東米蝦	NP	VC			+				+				+				+				+			+	+	
Cryptopotamon anacoluthon	鰓刺溪蟹	NP	VC											+				+				+				+	
No of Species				9	12	14	6	9	12	15	6	9	13	15	6	9	13	15	6	9	13	15	6	9	14	15	6

Note: NP – Not protected in HK P - protected species in Hong Kong

"VC" – Very Common; "UC" – Uncommon; "C" - Common

"+" – Species exists in the study area

"++" – Species common in the study area

"+++" – Species abundance in the study area

- Reference point was the sampling location outside the works area used to compare the with the data within works area.

Table 4.6 Fish species and Hong Kong Newt recorded at She Shan River
(T1- Upper stream section, T2 - middle stream section and T3 - Lower stream section)

				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
				Jan-15				Feb-15				Mar-15				Apr-15				May-15			
Species		Status	Commonness	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Channa maculata	斑鱧	NP	C		+				+				+				+				+	+	
Clarias gariepinus	革胡子鯰	NP	VC			+				+				+	+			+	+			+	+
Gambusia affinis	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Misgurnus anguillicaudatus	泥鰍	NP	C		+	+			+	+		+	+	+		+	+	+		+	+	+	
Oreochromis niloticus	尼羅口孵非鯽	NP	C	+	+	+	+	+	+	+	+	+	+	++	+	+	+	++	+	+	+	++	++
Parazacco spilurus	異鱲	NP, V	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Poecilia reticulata	孔雀花魚將	NP	VC				+			+	+			+	+			+	+			+	+
Pterocryptis cochinchinensis	越南隱鰭鯰	NP	C			+				+				+				+				+	
Puntius semifasciolatus	七星魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Rhinogobius spp.	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xiphophorus hellerii	劍尾魚	NP	C	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xiphophorus variatus	雜色劍尾魚	NP	C			+				+			+	+			+	+				+	+
Zacco platypus	寬鰭鱲	NP	C	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	+	++	+
		2x2m fish number		50	40	40	50	40	30	40	40	40	40	50	50	30	35	55	45	20	10	20	10
No of Species				7	8	11	8	7	9	12	8	8	10	12	9	8	10	12	9	8	9	13	10
Amphibian																							
Paramesotriton hongkongensis	香港瘰螈	P, Cap 170, NT, PGC	R			+				+				+				+				+	

Note: NP – Not protected in Hong Kong

"VC" – Very Common; "UC" – Uncommon; "C" - Common

"+" – Species exists in the study area

"++" – Species common in the study area

"+++" – Species abundance in the study area

- Reference point was the sampling location outside the works area used to compare the with the data within works area.

"Cap 170" - List in Wild Animials Protcetion Ordinance (Cap.170)

"NT" - Near Treatened in IUCN Red List Status

"PGC"-Potential Golal Concern by Fellowes *et al* (2002)

'V" - Vulerable - in China Red Data Book

Table 4.6 Fish species and Hong Kong Newt recorded at She Shan River
(T1- Upper stream section, T2 - middle stream section and T3 - Lower stream section)

				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15			
Species		Status	Commonness	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Referenc	T1	T2	T3
Channa maculata	斑鱧	NP	C			+				+				+				+				+				+				+	
Clarias gariepinus	革胡子鯰	NP	VC			+	+			+	+			+	+			+	+			+	+			+	+			+	+
Gambusia affinis	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Misgurnus anguillicaudatus	泥鰍	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Oreochromis niloticus	尼羅口孵非鯽	NP	C	+	+	++	++	+	+	++	++	+	++	++		+	++	++		+	++	++		+	++	++		+	++	++	
Parazacco spilurus	異鱲	NP, V	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+		+	+	+	
Poecilia reticulata	孔雀花魚將	NP	VC			+	+			+	+			+	+			+	+			+	+			+	+			+	+
Pterocryptis cochinchinensis	越南隱鰭鯰	NP	C			+				+				+				+				+				+				+	
Puntius semifasciolatus	七星魚	NP	C	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Rhinogobius spp.	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Xiphophorus hellerii	劍尾魚	NP	C	+	+	+	+	+	+	+	+	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
Xiphophorus variatus	雜色劍尾魚	NP	C			+	+			+	+			+	+			+	+			+	+			+	+			+	+
Zacco platypus	寬鰭鱲	NP	C	+	+	++	+	+	+	++	+	+	+	++	+	+	+	++	+	+	++	++	+	+	++	++	+	+	++	++	+
		2x2m fish number		20	10	20	10	15	8	15	8	20	10	20	10	20	12	23	12	35	35	25	20	45	45	35	30	55	50	40	35
No of Species				8	8	13	10	8	8	13	10	8	8	13	7	8	8	13	6	8	8	13	6	8	8	13	6	8	8	13	6
Amphibian																															
Paramesotriton hongkongensis	香港瘰螈	P, Cap 170, NT, PGC	R			+																								+	

Note: NP – Not protected in Hong Kong

"VC" – Very Common; "UC" – Uncommon; "C" - Common

"+" – Species exists in the study area

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"+++" – Species abundance in the study area

- Reference point was the sampling location outside the works area used to compare

"Cap 170" - List in Wild Animials Protcetion Ordinance (Cap.170)

"NT" - Near Treatened in IUCN Red List Status

"PGC"-Potential Golal Concern by Fellowes *et al* (2002)

'V" - Vulerable - in China Red Data Book

Table 4.7 Abotic data for the Upper She Shan River (T1- Upper stream section, T2 - middle stream section and T3 - Lower stream section)

	Baseline monitoring	Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring		
Stream	Aug-08	Jan-15			Feb-15			Mar-15			Apr-15			May-15		
Replicate		T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
DO (mg/L)	8.9	8.6	8.6	8.7	8.5	8.6	8.4	8.6	8.5	8.4	8.3	8.4	8.1	8.3	8.1	8.2
pH	7.29	9.0	8.8	8.8	9.1	8.9	8.7	8.6	8.5	8.5	8.6	8.5	8.5	8.1	8.2	8.1
Nitrate (mg N/L)	0.5	0.4	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5
Ammonia (mg N/L)	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Salinity (ppt)	<0.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02
Conductivity (µS/cm)	90	156	162	147	152	153	155	142	138	137	142	138	137	36	39	45
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.1-0.3	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2
Water flow at riffle (m/s)	0.4-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5
Sand (%)	55	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Stone (%)	25	80	80	30	80	80	30	80	80	30	80	80	30	80	80	30
Mud (%)	30	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2
Concrete (%)	0	10	10	63	10	10	63	10	10	63	10	10	63	10	10	63

Table 4.7 Abotic data for the Upper Sh
Upper stream section, T2 - middle strea
stream section)

	Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring		
Stream	Jun-15			Jul-15			Aug-15			Sep-15			Oct-15			Nov-15			Dec-15		
Replicate	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
DO (mg/L)	8.3	8.1	8.2	8.2	8.0	8.2	8.1	8.0	8.1	8	8.1	8.2	8.1	7.9	8	7.9	7.8	7.9	8	7.8	8
pH	7.8	7.7	7.8	7.8	7.7	7.9	7.6	7.7	7.6	7.7	7.7	7.5	7.5	7.5	7.6	7.6	7.5	7.5	7.6	7.6	7.5
Nitrate (mg N/L)	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5
Ammonia (mg N/L)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Salinity (ppt)	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Conductivity (µS/cm)	36	39	45	39	45	28	32	38	46	29	31	32	33	32	39	30	29	36	32	29	42
BOD (mg/L)	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2	0.1-0.2
Water flow at riffle (m/s)	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5	0.2-0.5
Sand (%)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Stone (%)	80	80	30	80	80	30	80	80	30	80	80	30	80	80	30	80	80	30	80	80	30
Mud (%)	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2	5	5	2
Concrete (%)	10	10	63	10	10	63	10	10	63	10	10	63	10	10	63	10	10	63	10	10	63