

Issue No. : Issue 1
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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**

FINAL MONITORING REPORT

Prepared By:

ALLIED ENVIRONMENTAL CONSULTANTS LTD.

For:

Drainage Services Department

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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**

**Final Report
Upper Lam Tsuen River**

March 2018

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Final Report

Upper Lam Tsuen River

Table of Contents	Page
1 Introduction	3
2 Summary of Major Points	3
3 Monitoring Methodology	4
4 Monitoring Results	7
5 Summary and Commentary	14
6 References	15

FIGURES

Figure 1. Sampling location of ecological survey and monitoring at Upper Lam Tsuen River, Tai Po.

Figure 4.1. Avifauna abundance.

Figure 4.2. Species richness of Avifauna.

Figure 4.3. Species richness of Odonata.

Figure 4.4. Species richness of aquatic macroinvertebrate.

Figure 4.5. Capture survey data of Hong Kong Newt in Upper Lam Tsuen River 2008-2017.

Figure 4.6. Species richness of fish.

Figure 4.7. Fish Abundance.

TABLES

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

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

Table 4.2.1 Birds recorded with conservation interest

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

Table 4.4 Odonata species recorded at the Upper Lam Tsuen River

Table 4.5 Aquatic Macro invertebrates recorded at Upper Lam Tsuen River.

Table 4.6 Fish species and Hong Kong Newt recorded at Upper Lam Tsuen River.

Table 4.7 Abiotic data for Upper Lam Tsuen River.

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. A final report is required to be prepared by using the collected data from surveys from January 2014 to December 2017 under 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 January 2014 to December 2017.
- 1.2 The scope of the ecological monitoring was detailed in EM & A Manual of the project. In the 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 January 2014.
- 1.4 This is the final report for the project summarising monitoring results collected from January 2014 to December of 2017. 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;
- The species abundance and species richness of fauna and flora are presented by graphs;
- Aquatic and riparian vegetation re-established quickly after completion of drainage works;
- Adult Hong Kong Newt were commonly found during monitoring survey;
- 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 from January 2014 to December 2017 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 from January 2014 to December 2017 ; and

- Measured water quality and physical characteristics showed no apparent change, overall water quality is not polluted 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°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. A total of 112 flora species were recorded along the survey transects from January 2014 to December 2017. Most of vegetation were wetland species with a few floating aquatic species such as *Lemna minor* and submerged plants such as *Hydrilla verticillata*. Higher vegetation coverage was observed during dry season when there was no flooding. The recorded floras were generally in good health and the height of the dominated riparian grass and herb species were in a range from 0.2m to over 2.0 m 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.

4.2 Fauna

4.2.1 Avifauna

Avifauna surveys were undertaken from July 2008 to December 2017 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 River, there is no significant change in average from baseline monitoring to post-construction monitoring. Natural fluctuation of bird’s abundance and diversity were observed from the record. In total, 52 species of birds were recorded from the bird surveys from January 2014 to December 2017. All the birds are under protection of Wild Animals Protection Ordinance (Cap. 170). Some birds of conservation importance recorded at Lam Tsuen River were listed in the **Table 4.2.1** below.

Table 4.2.1 Birds recorded with conservation interest

Common Name	Scientific name	Chinese Name	Protection status
Black Kite	<i>Milvus lineatus</i>	麻鷹	Cap.586, RC
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	RC
Common Buzzard	<i>Buteo buteo</i>	普通鵟	Cap.586
Crested Goshawk	<i>Accipiter trivirgatus</i>	鳳頭鷹	CR, Cap.586
Grey Heron	<i>Ardea cinerea</i>	蒼鷺	PRC
Great Egret	<i>Ardea alba</i>	大白鷺	RC
Great Coucal	<i>Centropus sinensis</i>	褐翅鴉鵂	VU
Little Egret	<i>Egretta garzetta</i>	小白鷺	RC
Night Heron	<i>Nycticorax nycticorax</i>	夜鷺	LC
<p>Key:</p> <p>RC – Regional Concern; LC – Local Concern by Fellowes et al. (2002)</p> <p>Cap.586 – Endangered Species of Animals and Plants Ordinance (Cap. 586)</p> <p>VU - Vulnerable in China Red Data Book Status</p> <p>CR - Rare in China Red Data Book Status</p> <p>PRC - Potential Regional onver Fellowes et al (2002)</p>			

4.2.2 Adult Odonata Survey

Records of odonata along the Upper Lam Tsuen River from July 2008 to December of 2017 are presented in **Table 4.4**. A graph of odonata species richness is shown in **Figures 4.3**, it indicates that species number of odonata 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, 20 species of donate were recorded from January 2014 to December 2017. The Sampling location was shown in **Figure 1**.

4.2.3 Aquatic Macro-invertebrates

Aquatic-net and kick sampling were performed at the Upper Lam Tseun River. 18 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 2017, shown as **Figure 4.4**. Details of recorded of river benthic fauna refers to **Table 4.5**. Sampling location was shown on **Figure 1**.

4.2.4 Hong Kong Newt

Surveys of Hong Kong Newt were conducted at Upper Lam Tsuen River from January 2014 to December of 2017. Adult Hong Kong Newt was recorded in every survey throughout the entire survey period. **Figure 4.5** showed the abundance of Hong Kong Newt recorded in Lam Tsuen River from 2008 to 2017. 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. Following the river became more mature, numbers of Hong Kong Newt kept increasing since construction work completed. 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**.

4.2.5 River Fish Fauna

Fish surveys were performed at Upper Lam Tsuen River during field monitoring since July 2008. In total, 19 species of freshwater fish, including species recorded from reference site, were recorded from January 2014 to December 2017. Details of recorded of fish fauna refers to **Table 4.6**. *Oreochromis niloticus* and *Rhinogobius spp.* 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. 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 every survey. 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**.

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 from January 2014 to December 2017 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 from January 2014 to December 2017.

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 0.5m/second at riffle).

5 Summary and Commentary

- 5.1 Aquatic and riparian vegetation was re-established quickly after the completion of the drainage works. 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.
- 5.2 The adult Hong Kong Newt was recorded in every survey from January 2014 to December 2017. 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.
- 5.3 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 from January 2014 to December 2017. 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.
- 5.4 Abundance of the aquatic macro-invertebrates was low during construction period. After completion of construction, abundance recovered and remained in at a stable level during post-construction monitoring.
- 5.5 Species composition of avifauna at Lam Tsuen River was observed with no significant change from baseline monitoring to post-construction monitoring. The average abundance of avifauna recorded in post-construction monitoring was slightly higher than that recorded in baseline and impact monitoring. Natural fluctuation in abundance and species richness were observed during post-construction monitoring.
- 5.6 Lowest number of odonata was recorded 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.
- 5.7 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.
- 5.8 Upper Lam Tsuen River is one of the best ecological friendly designed river channels in Hong Kong. The population of the protected species, Hong Kong Newt, is fully restored after completion of river improvement works; As new river bed was expanded in dimension in some locations, generally laid and retained with natural stones, with more aquatic vegetation established, the Newt population is even more large than that recorded before river works. The Upper Lam Tsuen River provided one of the best show cases or demonstration for DSD's river improvement projects in terms of achieving both flood release and biodiversity conservation. As the Hong Kong Newt is considered conservation flagship species for Hong Kong rivers; It is recommended DSD to

commit a long-term ecological monitoring program on Newt and fish population of ULT river. This can be performed by consultant or other party.

- 5.9 To prevent using herbicide for control vegetation on river bed; prohibit using pesticide in the rivers. (This was observed when local farmers growing Watercress (*Nasturtium officinale*) in river channel and herbicide and pesticide was applied). Those chemicals will affect aquatic life and river biodiversity

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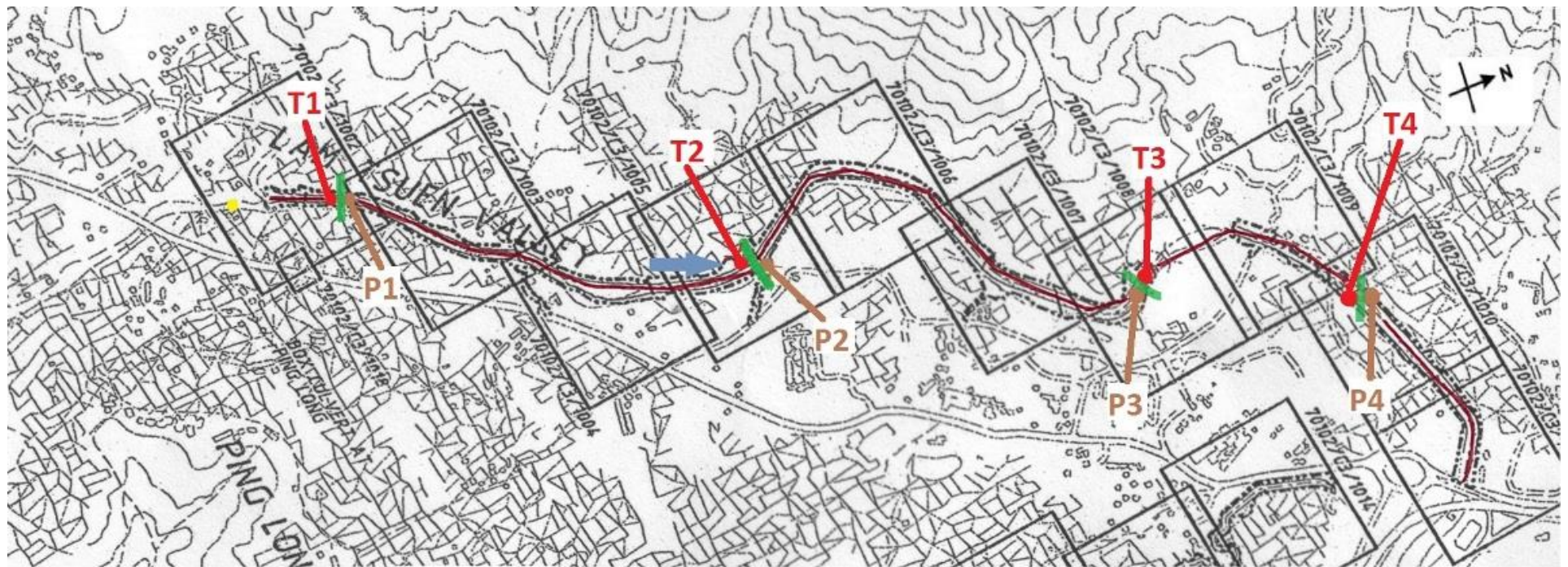
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FIGURES



Legend

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> — Belt transect -Vegetation -Sediment characteristics | <ul style="list-style-type: none"> ● Sampling station -Fish -Aquatic macroinvertebrate -Water quality and flow rate | <ul style="list-style-type: none"> ● Point count location -Avifauna |
| <ul style="list-style-type: none"> ● Reference sample | | <ul style="list-style-type: none"> — Line transect -Avifauna -Adult Odonate -Vegetation |

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

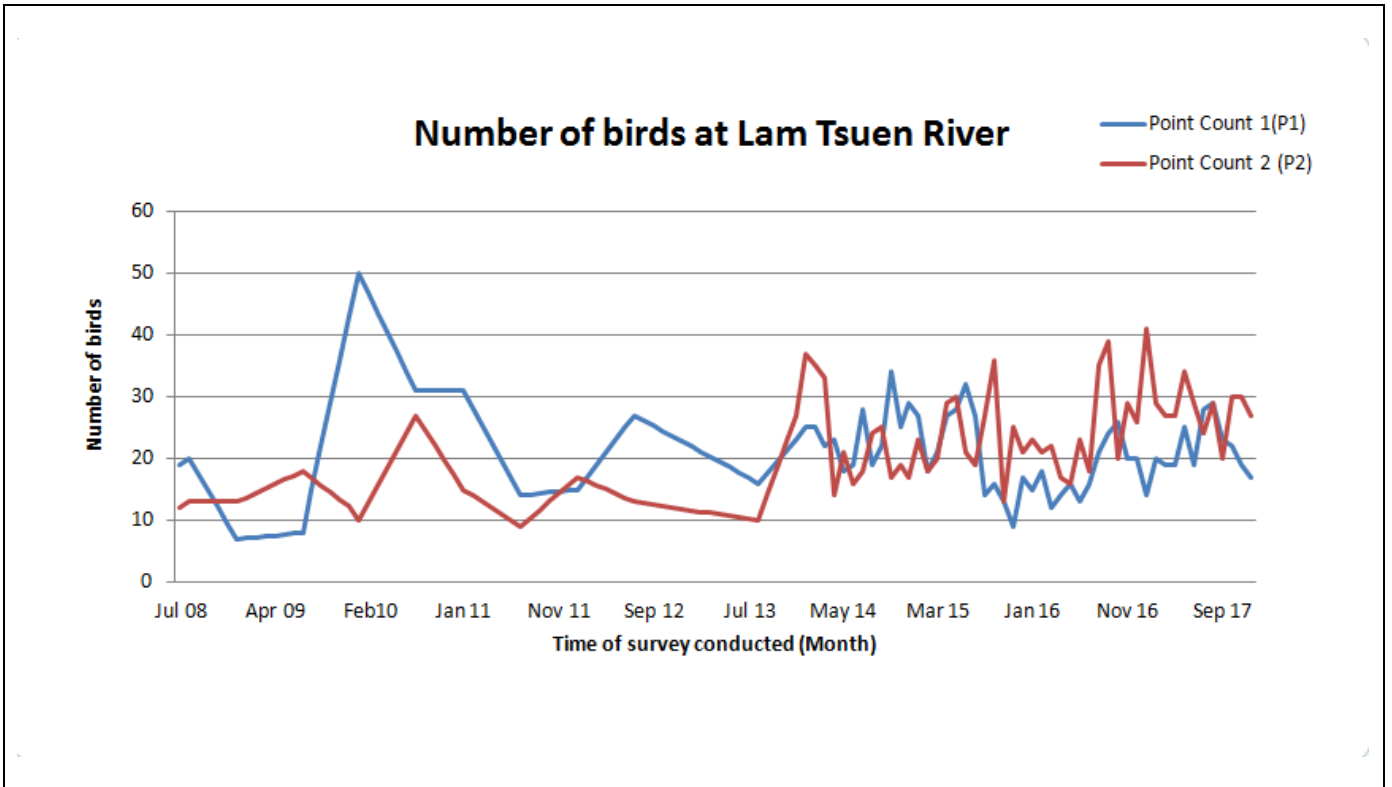


Figure 4.1. Avifauna abundance.

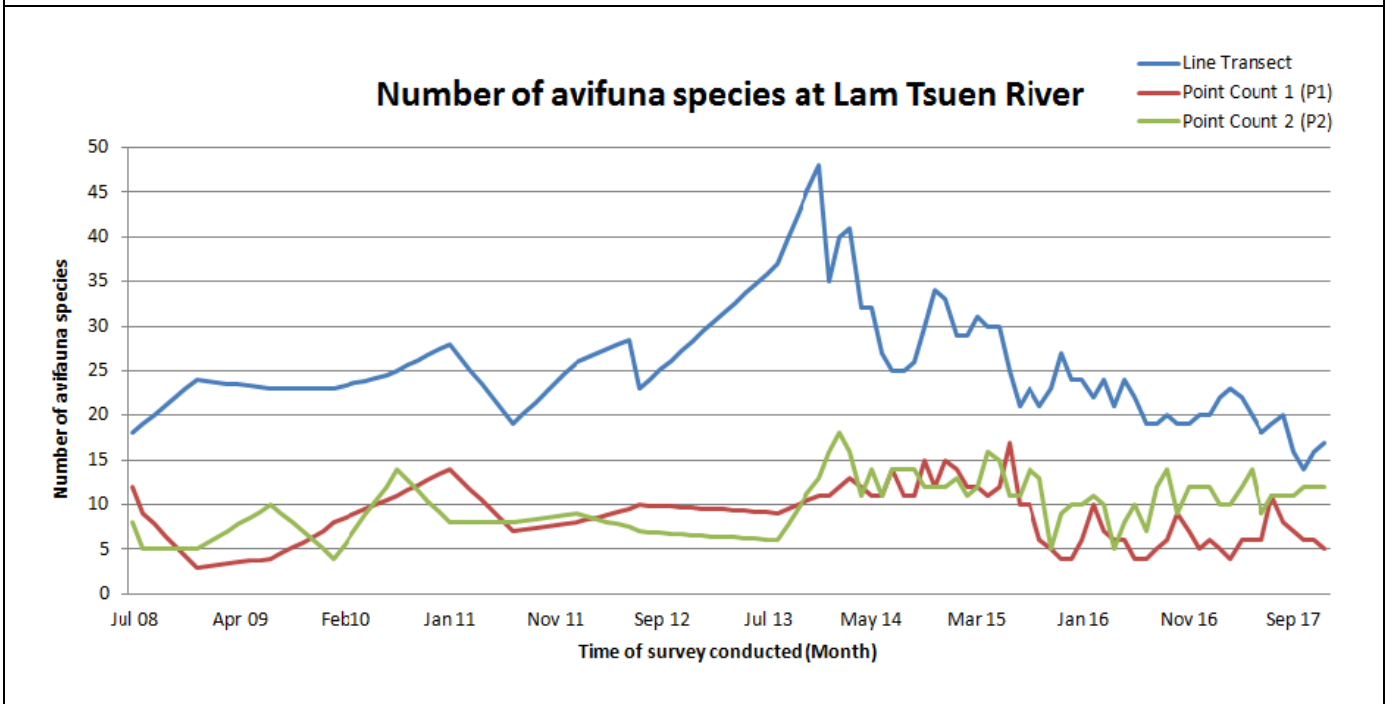


Figure 4.2. Species richness of Avifauna

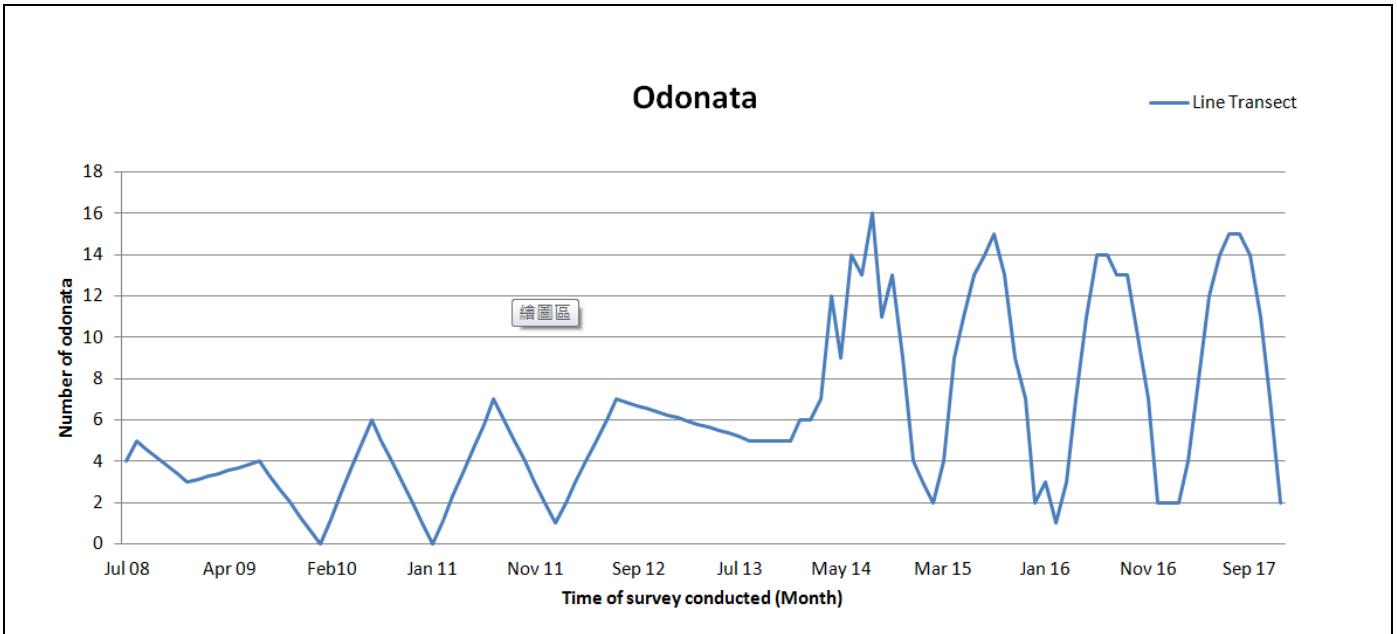


Figure 4.3. Species richness of Odonata.

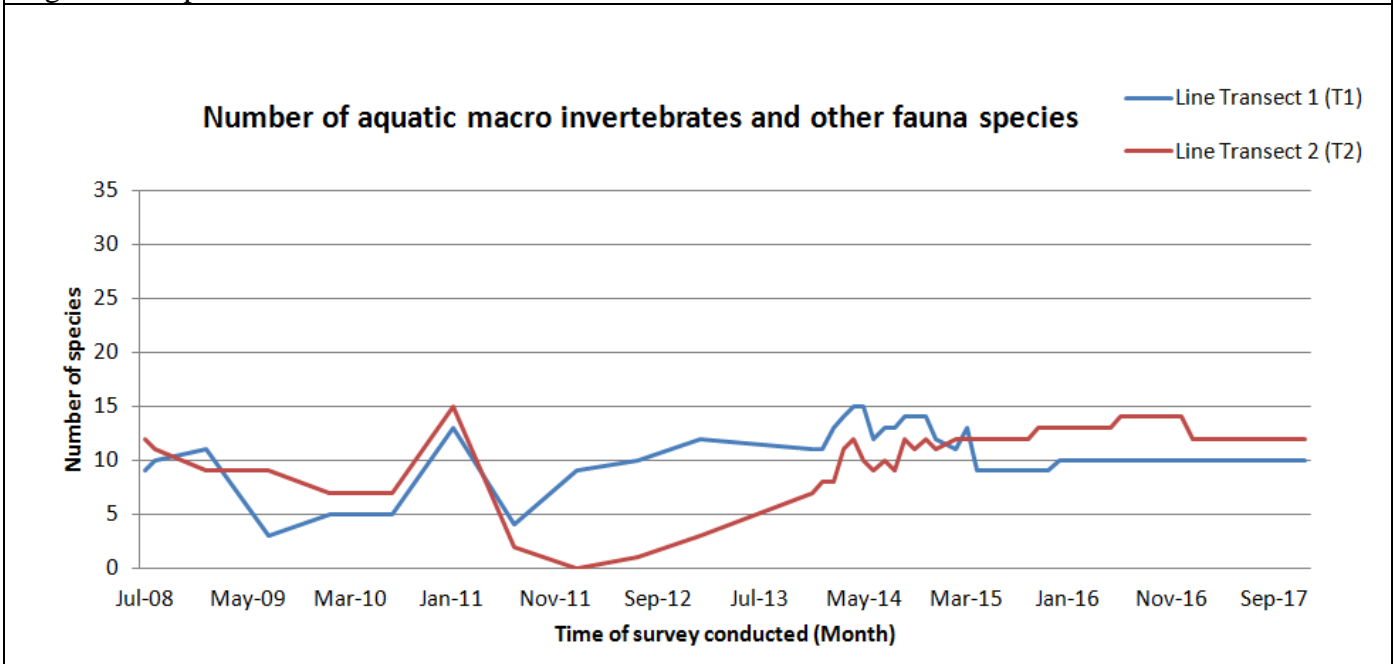


Figure 4.4. Species richness of aquatic macroinvertebrate.

Capture survey data of Hong Kong Newt in Upper Lam Tsuen River

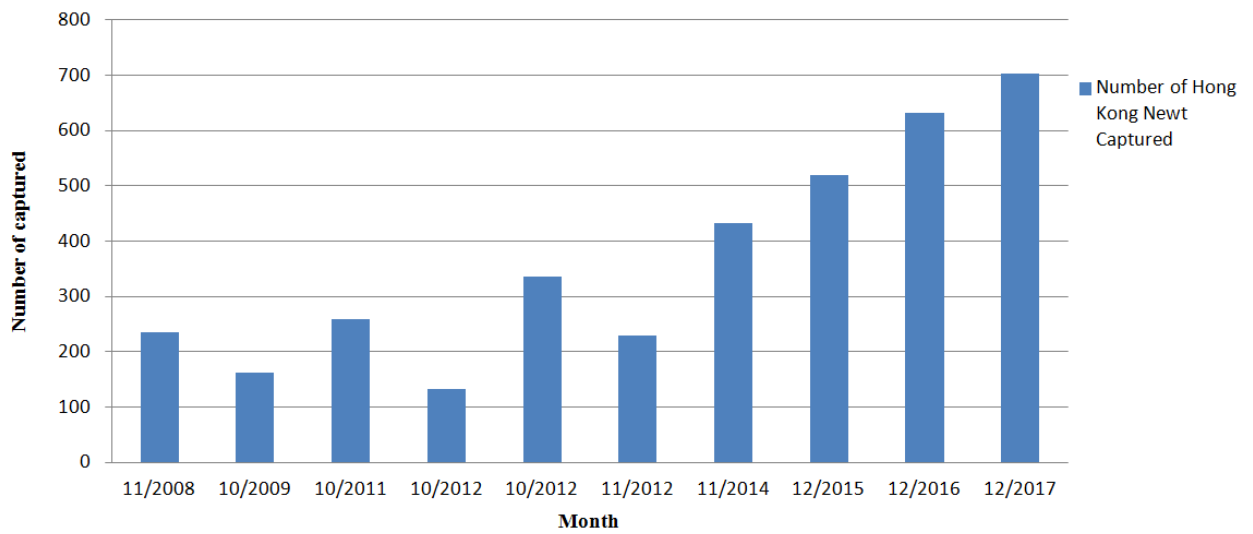


Figure 4.5. Capture survey data of Hong Kong Newt in Upper Lam Tsuen River 2008-2017.

Number of fish species

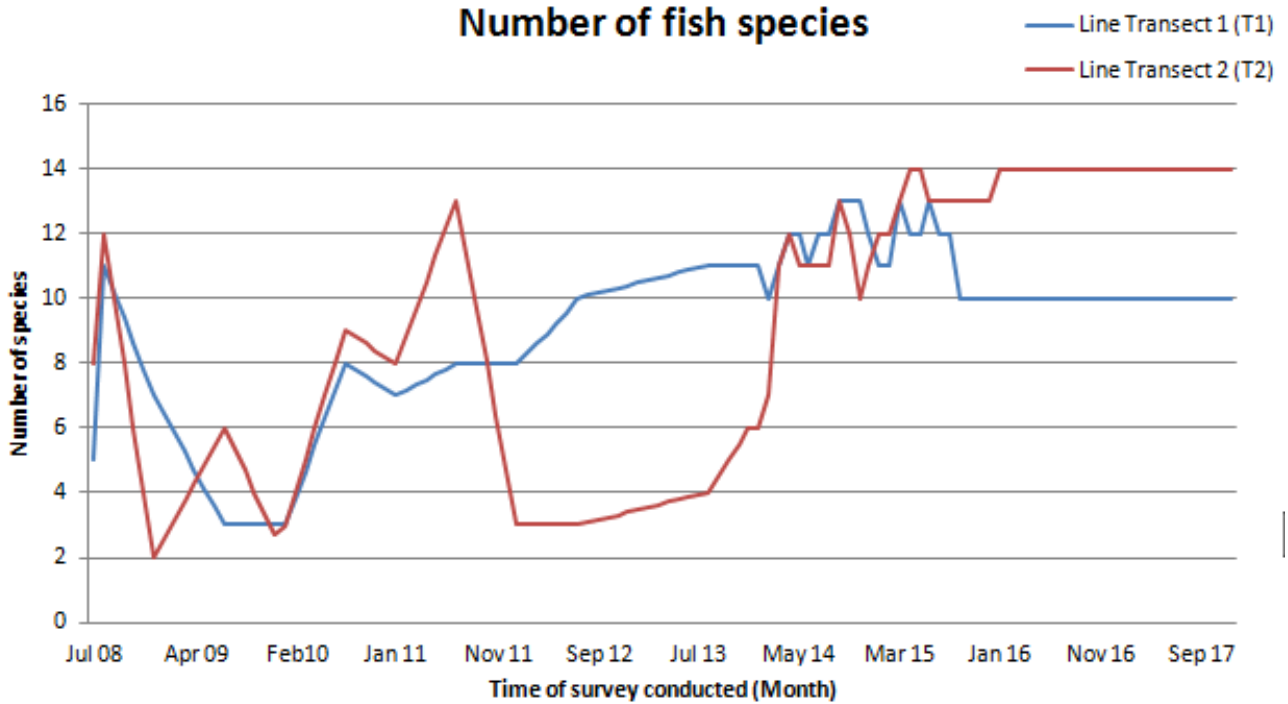


Figure 4.6. Species richness of fish.

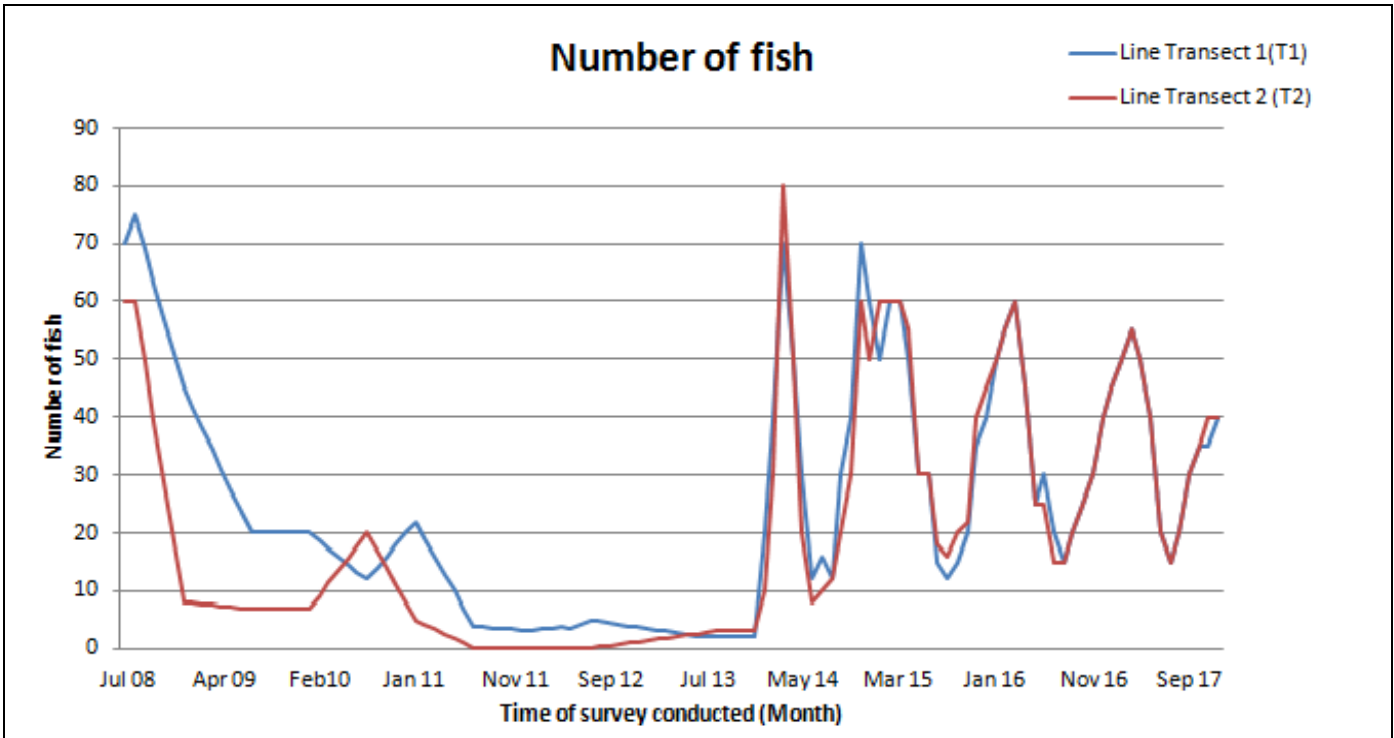


Figure 4.7 Fish Abundance.

TABLE

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)

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

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)

Stream	Transect	Impact monitoring		Impact monitoring		Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring																								
		Jul-10		Jul-10		Jan-11				Jul-11				Jan-12				Jul-12																								
		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)	%														
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹											0.8	5																												
Fabaceae	<i>Pueraria lobata</i>	野葛		0.5	5									0.3	10																											
Poaceae	<i>Pennisetum purpureum</i>	象草								1.2	10				1.2	2	2.5	10			2.5	5	2.5	5				2	5													
Araceae	<i>Alocasia odora</i>	海芋			1	10							0.5	3																												
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																								
Magnoliaceae	<i>Michelia alba</i>	白蘭																																								
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.8	20	0.9	30	1	60	1.5	30	0.8	5			1	30	1	15	0.8	10	1	5			0.8	10	1	5	1.5	20												
Moraceae	<i>Ficus hispida</i>	對葉榕			4	5							4	5																												
Asteraceae	<i>Mikania micrantha</i>	微甘菊		0.5	20	0.3	5			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	5	0.5	3	0.5	15	0.4	1					
Musaceae	<i>Musa paradisiaca</i>	大蕉																																								
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																								
Araceae	<i>Pistia stratiotes L.</i>	大漂																																								
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																								
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.4	20			0.5	10	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		
Poaceae	<i>Coix lacryma-jobi</i>	慈苣																																								
Solanaceae	<i>Solanum nigrum</i>	酸漿																																								
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草											1	5																												
Poaceae	<i>Miscanthus floridulus</i>	五節芒																																								
Euphorbiaceae	<i>Macaranga tamaris</i>	血桐																																								
Asteraceae	<i>Wedelia chinensis</i>	膨脹菊																																								
Commelinaceae	<i>Commelina diffusa</i>	雞眼草			0.5	20							0.4	10																												
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																								
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																								
Convolvulaceae	<i>Pharbitis nil</i>	牽牛				0.5	10																																			
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																								
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																								
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																								
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																								
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草																																								
Amaranthaceae	<i>Celosia argentea</i>	青葙																																								
Bare Gound				60		45		20		30		75		65		45		54		73		85		65		88		73		82		28		88		75		82		58		92

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)

Stream	Transect	Impact monitoring								Impact monitoring								Post construction monitoring								Post construction monitoring															
		Aug-13								Dec-13								Jan-14								Feb-14								Mar-14							
		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)	%											
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹			0.5	5																																			
Fabaceae	<i>Pueraria lobata</i>	野葛	0.3	15	0.3	5																																			
Poaceae	<i>Pennisetum purpureum</i>	象草													1.5	5																									
Araceae	<i>Alocasia odora</i>	海芋																																							
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																							
Magnoliaceae	<i>Michelia alba</i>	白蘭																																							
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.8	5	0.8	5	1	10	1	15	0.8	10	0.8	10																											
Moraceae	<i>Ficus hispida</i>	對葉榕																																							
Asteraceae	<i>Mikania micrantha</i>	微甘菊	0.5	25	0.5	10	0.5	10	0.4	3	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									
Musaceae	<i>Musa paradisiaca</i>	大蕉																																							
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																							
Araceae	<i>Pistia stratiotes L.</i>	大漂																																							
Urticaceae	<i>Boehmeria nivea</i>	苧麻					0.8	2																																	
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.4	5	0.4	20	0.5	10	0.5	2	0.4	5			0.5	10			0.4	5			0.5	10			0.4	5			0.5	10									
Poaceae	<i>Coix lacryma-jobi</i>	慈苣																																							
Solanaceae	<i>Solanum nigrum</i>	酸漿																																							
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																							
Poaceae	<i>Miscanthus floridulus</i>	五節芒																																							
Euphorbiaceae	<i>Macaranga tamaris</i>	血桐																																							
Asteraceae	<i>Wedelia chinensis</i>	膨脹菊																																							
Commelinaceae	<i>Commelina diffusa</i>	錦蔴草													0.3	5																									
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																							
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																							
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																							
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																							
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡					1.2	5																																	
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																							
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																							
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草																																							
Amaranthaceae	<i>Celosia argentea</i>	青葙																																							
Bare Gound				50		55		68		70		75		85		73		75		75		85		73		75		75		85		73		75							

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)

Stream	Transect	Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
		Apr-14				May-14				Jun-14				Jul-14				Aug-14				Sep-14																			
		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												
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)	%			
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹	0.3	2																																					
Fabaceae	<i>Pueraria lobata</i>	野葛					0.3	5	0.3	5																															
Poaceae	<i>Pennisetum purpureum</i>	象草																																							
Araceae	<i>Alocasia odora</i>	海芋																																							
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																							
Magnoliaceae	<i>Michelia alba</i>	白蘭																																							
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.5	5	0.6	10			0.6	10	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			
Moraceae	<i>Ficus hispida</i>	對葉榕																																							
Asteraceae	<i>Mikania micrantha</i>	微甘菊			0.3	5	0.3	15	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			
Musaceae	<i>Musa paradisiaca</i>	大蕉																																							
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																							
Araceae	<i>Pistia stratiotes L.</i>	大漂																																							
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																							
Asteraceae	<i>Bidens alba</i>	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	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			
Poaceae	<i>Coix lacryma-jobi</i>	慈苣																																							
Solanaceae	<i>Solanum nigrum</i>	酸漿																																							
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																							
Poaceae	<i>Miscanthus floridulus</i>	五節芒																																							
Euphorbiaceae	<i>Macaranga amarus</i>	血桐																																							
Asteraceae	<i>Wedelia chinensis</i>	膨脹菊																																							
Commelinaceae	<i>Commelina diffusa</i>	鵝節草	0.2	10			0.3	3			0.2	8			0.3	3			0.2	8			0.3	3			0.3	10			0.3	5			0.3	10					
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																							
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																							
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																							
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																							
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																							
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜			0.2	5	0.2	50	0.2	5			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							
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																							
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草																																							
Amaranthaceae	<i>Celosia argentea</i>	青葙																																							
Bare Gound				63		70		12		65		65		77		60		73		65		74		60		70		58		71		58		70		55		69			

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)

Stream	Transect	Post construction monitoring																										
		Oct-14				Nov-14				Dec-14				Jan-15				Feb-15				Mar-15						
		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)	%		
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹																										
Fabaceae	<i>Pueraria lobata</i>	野葛				0.6	10																					
Poaceae	<i>Pennisetum purpureum</i>	象草																										
Araceae	<i>Alocasia odora</i>	海芋				1.8	1																					
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																										
Magnoliaceae	<i>Michelia alba</i>	白蘭																										
Poaceae	<i>Brachiaria mutica</i>	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	10
Moraceae	<i>Ficus hispida</i>	對葉榕																										
Asteraceae	<i>Mikania micrantha</i>	微甘菊	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	0.3	18
Musaceae	<i>Musa paradisiaca</i>	大蕉																										
Ulmaceae	<i>Celtis sinensis</i>	朴樹																										
Araceae	<i>Pistia stratiotes L.</i>	大漂																										
Urticaceae	<i>Boehmeria nivea</i>	苧麻																										
Asteraceae	<i>Bidens alba</i>	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
Poaceae	<i>Coix lacryma-jobi</i>	慈苣	2	5					2	5									2	5								
Solanaceae	<i>Solanum nigrum</i>	酸漿																										
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																										
Poaceae	<i>Miscanthus floridulus</i>	五節芒																										
Euphorbiaceae	<i>Macaranga tamaris</i>	血桐																										
Asteraceae	<i>Wedelia chinensis</i>	膨脹菊																										
Commelinaceae	<i>Commelina diffusa</i>	番薯草	0.3	10	0.8	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
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																										
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																										
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																										
Verbenaceae	<i>Lantana camara</i>	馬纓丹																										
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																										
Brassicaceae	<i>Nasturtium officinale</i>	西洋蔥				0.3	2	0.1	1			0.3	2	0.1	1			0.3	2	0.1	1			0.3	10	0.1	15	
Onagraceae	<i>Ludwigia erecta</i>	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
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草																										
Amaranthaceae	<i>Celosia argentea</i>	青葙				1.5	15					1.5	15							1.5	15							
Bare Ground			25		23		18		43		25		20		15		40		25		20		15		40		20	

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)

Stream	Transect	Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								
		Apr-15								May-15								Jun-15								Jul-15								Aug-15								
		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		
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	<i>Microstegium ciliatum</i>	剛秀竹																																								
Fabaceae	<i>Pueraria lobata</i>	野葛					0.6	10																																		
Poaceae	<i>Pennisetum purpureum</i>	象草				3	15																																			
Araceae	<i>Alocasia odora</i>	海芋					1.8	1																																		
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																								
Magnoliaceae	<i>Michelia alba</i>	白蘭																																								
Poaceae	<i>Brachiaria mutica</i>	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	<i>Ficus hispida</i>	對葉榕																																								
Asteraceae	<i>Mikania micrantha</i>	微甘菊	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	<i>Musa paradisiaca</i>	大蕉																																								
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																								
Araceae	<i>Pistia stratiotes L.</i>	大漂																																								
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																								
Asteraceae	<i>Bidens alba</i>	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																		
Poaceae	<i>Coix lacryma-jobi</i>	慈苣																																								
Solanaceae	<i>Solanum nigrum</i>	酸漿																																								
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																								
Poaceae	<i>Miscanthus floridulus</i>	五節芒																																								
Euphorbiaceae	<i>Macaranga tamaris</i>	血桐																																								
Asteraceae	<i>Wedelia chinensis</i>	錦繡菊																																								
Commelinaceae	<i>Commelina diffusa</i>	番薯草	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	20	0.2	5	0.4	20	0.3	20	0.2	20	0.2	5	0.4	20	0.3	20		
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																								
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																								
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																								
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																								
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																								
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜				0.3	10	0.2	15																																	
Onagraceae	<i>Ludwigia erecta</i>	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	<i>Pennisetum alopecuroides</i>	狼尾草																																								
Amaranthaceae	<i>Celosia argentea</i>	青葙																																								
Bare Gound			20	20	30	19	60	47	40	59	60	47	40	59	60	47	40	59	15	35	13	55	15	35	13	55	15	35	13	55	15	35	13	55	15	35	13	55	15	35		

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

(Continous) 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	<i>Microstegium ciliatum</i>	剛秀竹																																		
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	10					0.4	5	0.5	10					0.4	5	0.5	10										0.4	5					
Poaceae	<i>Pennisetum purpureum</i>	象草																																		
Araceae	<i>Alocasia odora</i>	海芋																																		
Caesalpiniaceae	<i>Cassia alata</i>	翅莢決明																																		
Magnoliaceae	<i>Michelia alba</i>	白蘭																																		
Poaceae	<i>Brachiaria mutica</i>	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	<i>Ficus hispida</i>	對葉榕																																		
Asteraceae	<i>Mikania micrantha</i>	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	<i>Musa paradisiaca</i>	大蕉																																		
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																		
Araceae	<i>Pistia stratiotes L.</i>	大漂																																		
Urticaceae	<i>Boehmeria nivea</i>	芋麻																																		
Asteraceae	<i>Bidens alba</i>	白花鬼針草				0.4	5								0.4	10															0.4	10				
Poaceae	<i>Coix lacryma-jobi</i>	薏苡									1	5																								
Solanaceae	<i>Solanum nigrum</i>	龍葵																																		
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草				0.6	2																													
Poaceae	<i>Miscanthus floridulus</i>	五節芒									1	10																								
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																		
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	20	0.2	10					0.4	5																								
Commelinaceae	<i>Commelina diffusa</i>	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	<i>Erechtites hieracifolia</i>	革命菜																																		
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																		
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																		
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																		
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																		
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																	0.2	10
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																		
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				0.8	5	2	5																											
Amaranthaceae	<i>Celosia argentea</i>	青葙																																		
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜									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

(Continous) 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								
		Jan-16								Feb-16								Mar-16								Apr-16								
Stream																																		
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)	%		
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹																																
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	10					0.4	5	0.5	10					0.4	5	0.5	10					0.4	5	0.5	8			0.4	5		
Poaceae	<i>Pennisetum purpureum</i>	象草																																
Araceae	<i>Alocasia odora</i>	海芋																																
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																
Magnoliaceae	<i>Michelia alba</i>	白蘭																																
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.3	5	0.3	20	0.3	30	0.3	10	0.3	5	0.3	20	0.3	30	0.3	10	0.4	10	0.4	25	0.4	35	0.4	15	0.4	8	0.4	25	0.4	35	0.4	10
Moraceae	<i>Ficus hispida</i>	對葉榕																																
Asteraceae	<i>Mikania micrantha</i>	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	<i>Musa paradisiaca</i>	大蕉																																
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																
Araceae	<i>Pistia stratiotes L.</i>	大漂																																
Urticaceae	<i>Boehmeria nivea</i>	芋麻																																
Asteraceae	<i>Bidens alba</i>	白花鬼針草				0.4	10							0.4	10							0.4	10					0.4	10					
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1	5						1	5							1	5							1	5							
Solanaceae	<i>Solanum nigrum</i>	龍葵																																
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1	10						1	10							1	10							1	8							
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5						0.4	5							0.4	5							0.4	5							
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	10	0.2	20	0.2	5	0.4	25	0.3	10	0.2	20	0.2	5	0.4	25	0.3	10	0.2	20	0.2	5	0.4	25	0.3	8	0.2	20	0.2	5	0.4	20
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜					0.2	10							0.2	10								0.2	5							0.2	5	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10	2	5					1.5	10	2	5					1.5	10					1.5	10					
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.4	5							0.4	5													0.4	5					
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	20						0.3	20							0.3	20							0.3	15							
Bare Gound			30		55		50		45	30		55		50		45	25	50		45		45		38		50		45				55		

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

(Continous) 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										
		Stream	May-16									
		Transect	T1		T2		T3		T4			
Family	Species	Chinese name	Height(m)	%	Height(m)	%	Height(m)	%	Height(m)	%		
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹										
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	5					0.4	5		
Poaceae	<i>Pennisetum purpureum</i>	象草										
Araceae	<i>Alocasia odora</i>	海芋										
Caesalpiniaceae	<i>Cassia alata</i>	翅莢決明										
Magnoliaceae	<i>Michelia alba</i>	白蘭										
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.4	7	0.4	20	0.4	25	0.4	5		
Moraceae	<i>Ficus hispida</i>	對葉榕										
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.3	5	0.2	5	0.3	5	0.4	5		
Musaceae	<i>Musa paradisiaca</i>	大蕉										
Ulmaceae	<i>Celtis sinensis</i>	朴樹										
Araceae	<i>Pistia stratiotes L.</i>	大漂										
Urticaceae	<i>Boehmeria nivea</i>	苧麻										
Asteraceae	<i>Bidens alba</i>	白花鬼針草					0.4	5				
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1	5								
Solanaceae	<i>Solanum nigrum</i>	龍葵										
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草										
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1	7								
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐										
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5								
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	7	0.2	15	0.2	5	0.4	15		
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜										
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨										
Convolvulaceae	<i>Pharbitis nil</i>	牽牛										
Verbenaceae	<i>Lantana camara</i>	馬纓丹										
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡										
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜							0.2	5		
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香										
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草					1.5	10				
Amaranthaceae	<i>Celosia argentea</i>	青葙					0.4	5				
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5								
Bare Gound				54		60		60		65		

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

(Continous) 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								
		Jun-16				Jul-16				Aug-16				Sep-16																				
Stream	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)	%						
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹																																
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	5					0.4	5	0.5	5					0.4	5	0.5	5						0.4	5							
Poaceae	<i>Pennisetum purpureum</i>	象草																																
Araceae	<i>Alocasia odora</i>	海芋																			0.3	5	0.2	5	0.3	5	0.3	5						
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																																
Magnoliaceae	<i>Michelia alba</i>	白蘭																																
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.4	7	0.4	20	0.4	25	0.4	5	0.4	7	0.4	15	0.4	20	0.4	5	0.4	7	0.4	15	0.4	20	0.4	5	0.5	10	0.5	20	0.5	25	0.5	5
Moraceae	<i>Ficus hispida</i>	對葉榕																																
Asteraceae	<i>Mikania micrantha</i>	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	0.3	5	0.3	10	0.4	5
Musaceae	<i>Musa paradisiaca</i>	大蕉																																
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																
Araceae	<i>Pistia stratiotes L.</i>	大漂																																
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																
Asteraceae	<i>Bidens alba</i>	白花鬼針草				0.4	5						0.4	5						0.4	5					0.3	5	0.4	5					
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1	5						1	5							1	5															
Solanaceae	<i>Solanum nigrum</i>	龍葵																																
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1	7						1	7							1	7															
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5						0.4	5							0.4	5															
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	7	0.2	15	0.2	5	0.4	15	0.3	7	0.2	10	0.2	5	0.4	10	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.2	15	0.2	10	0.4	15
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜					0.2	5						0.2	5					0.2	5													
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10						1.5	10						1.5	10						1.5	10						
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.4	5						0.4	5						0.4	5						0.4	5						
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5						0.3	5							0.3	5							0.3	5							
Bare Gound				54		60		60		65		54		70		65		70		51		65		60		65		43		50		45		60

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

(Continous) 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								
		Oct-16								Nov-16								Dec-16								Jan-17								
Stream																																		
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)	%		
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹																																
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	5					0.4	5	0.5	5					0.4	5	0.5	5					0.4	5	0.5	5			0.4	5		
Poaceae	<i>Pennisetum purpureum</i>	象草																																
Araceae	<i>Alocasia odora</i>	海芋	0.3	5	0.2	5	0.3	5	0.3	5	0.4	5	0.2	5	0.3	5	0.4	5	0.4	5	0.2	5	0.3	5	0.4	5	0.4	5	0.2	5	0.3	5	0.4	5
Caesalpiniaceae	<i>Cassia alata</i>	翅莢決明																																
Magnoliaceae	<i>Michelia alba</i>	白蘭																																
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.5	10	0.5	20	0.5	25	0.5	5	0.5	10	0.5	20	0.5	25	0.5	5	0.5	10	0.5	20	0.5	25	0.5	5	0.5	10	0.5	20	0.5	25	0.5	5
Moraceae	<i>Ficus hispida</i>	對葉榕																																
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.4	5	0.4	5	0.4	10	0.4	5	0.4	5	0.4	10	0.4	5	0.4	5	0.4	5	0.4	5	0.4	10	0.4	5	0.4	5	0.4	5	0.4	10	0.4	5
Musaceae	<i>Musa paradisiaca</i>	大蕉																																
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																
Araceae	<i>Pistia stratiotes L.</i>	大漂																																
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																
Asteraceae	<i>Bidens alba</i>	白花鬼針草			0.5	5	0.4	5					0.5	5	0.4	5					0.5	5	0.4	5					0.5	5	0.4	5		
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1	5							1.1	5							1.1	5							1.1	5						
Solanaceae	<i>Solanum nigrum</i>	龍葵																																
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1	7							1.1	7							1.1	7							1.1	7						
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5							0.4	5							0.4	5							0.4	5						
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.2	15	0.2	10	0.4	15
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10							1.5	10							1.5	10						1.5	10				
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.4	5							0.4	5							0.4	5					0.4	5					
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5							0.3	5							0.3	5							0.3	5						
Bare Gound				43		50		45		65		43		50		45		65		43		50		45		65		43		50		45		65

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

(Continous) 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)

Family	Species	Chinese name	Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring								
			Feb-17				Mar-17				Apr-17				May-17																				
			T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4																	
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	<i>Microstegium ciliatum</i>	剛秀竹																																	
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	5				0.4	5	0.5	5					0.4	5	0.5	5					0.4	5	0.5	5		0.4	5					
Poaceae	<i>Pennisetum purpureum</i>	象草																																	
Araceae	<i>Alocasia odora</i>	海芋	0.4	5	0.2	5	0.3	5	0.4	5	0.4	5	0.2	10	0.3	10	0.4	5	0.4	5	0.2	10	0.3	10	0.4	5	0.4	5	0.2	10	0.3	10	0.4	5	
Caesalpiniaceae	<i>Cassia alata</i>	翅莢決明																																	
Magnoliaceae	<i>Michelia alba</i>	白蘭																																	
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.5	10	0.5	20	0.6	25	0.5	5	0.6	10	0.6	25	0.6	25	0.6	10	0.5	10	0.7	35	0.7	35	0.5	10	0.6	10	0.8	35	0.7	35	0.7	10	
Moraceae	<i>Ficus hispida</i>	對葉榕																																	
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.4	5	0.5	5	0.5	10	0.5	5	0.4	5	0.5	5	0.5	10	0.5	5	0.4	5	0.5	5	0.5	10	0.5	5	0.4	5	0.6	5	0.6	10	0.6	5	
Musaceae	<i>Musa paradisiaca</i>	大蕉																																	
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																	
Araceae	<i>Pistia stratiotes L.</i>	大漂																																	
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																	
Asteraceae	<i>Bidens alba</i>	白花鬼針草			0.5	5	0.4	5					0.5	10	0.4	10					0.5	10	0.4	10					0.5	10	0.4	10			
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1.1	5						1.1	5																								
Solanaceae	<i>Solanum nigrum</i>	龍葵																																	
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																	
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1.1	7						1.1	7																								
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																	
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5						0.4	5																								
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.2	15	0.2	10	0.4	15	0.3	10	0.3	15	0.3	10	0.4	15	0.3	10	0.3	15	0.3	10	0.4	15	
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																	
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																	
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																	
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																	
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																	
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																	
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10							1.5	10																	1.5	10		
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.4	5							0.4	5																	0.4	5		
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5						0.3	5																				0.3	5			
Bare Gound				43		50		45		65		43		35		35		60		43		25		25		60		43		25		25		60	

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

(Continous) 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)

Family	Species	Chinese name	Post construction monitoring								Post construction monitoring								Post construction monitoring								Post construction monitoring							
			Jun-17								Jul-17								Aug-17								Sep-17							
			T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4		T1		T2		T3		T4	
			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	<i>Microstegium ciliatum</i>	剛秀竹																																
Fabaceae	<i>Pueraria lobata</i>	野葛	0.5	5					0.4	5	0.5	5					0.5	5	0.5	5			0.5	5	0.6	5			0.6	5				
Poaceae	<i>Pennisetum purpureum</i>	象草																																
Araceae	<i>Alocasia odora</i>	海芋	0.4	5	0.2	5	0.3	5	0.4	5	0.4	5	0.3	5	0.4	5	0.5	5	0.4	5	0.3	5	0.4	5	0.5	5	0.5	5	0.3	5	0.5	5	0.6	5
Caesalpiniaceae	<i>Cassia alata</i>	翅莢決明																																
Magnoliaceae	<i>Michelia alba</i>	白蘭																																
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.6	5	0.8	20	0.7	20	0.7	10	0.6	5	0.8	20	0.7	20	0.7	10	0.7	5	0.8	20	0.7	20	0.7	10	0.7	5	0.8	20	0.7	20	0.7	10
Moraceae	<i>Ficus hispida</i>	對葉榕																																
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.4	5	0.6	5	0.6	10	0.6	5	0.4	5	0.6	5	0.6	10	0.6	5	0.5	5	0.6	5	0.6	10	0.6	5	0.5	5	0.6	5	0.7	10	0.6	5
Musaceae	<i>Musa paradisiaca</i>	大蕉																																
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																
Araceae	<i>Pistia stratiotes L.</i>	大漂																																
Urticaceae	<i>Boehmeria nivea</i>	苧麻																																
Asteraceae	<i>Bidens alba</i>	白花鬼針草			0.5	8	0.4	5					0.5	8	0.4	5					0.5	8	0.4	5					0.5	8	0.5	5		
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1.3	5					1.3	5							1.3	5							1.3	5								
Solanaceae	<i>Solanum nigrum</i>	龍葵																																
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																																
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1.3	7					1.3	7							1.3	7							1.3	7								
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5					0.4	5							0.4	5							0.4	5								
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.3	10	0.3	15	0.3	10	0.4	15	0.3	10	0.5	15	0.5	10	0.4	15	0.3	10	0.5	15	0.5	10	0.4	15	0.3	10	0.5	15	0.5	10	0.4	15
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																																
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																																
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																																
Verbenaceae	<i>Lantana camara</i>	馬纓丹																																
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																																
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																																
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10						1.5	10					1.5	10								1.5	10					
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.4	5						0.4	5					0.5	5							0.5	5						
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5					0.3	5							0.3	5	0.2	5					0.3	5	0.2	5						
Bare Gound			48		47		50		60		48		47		50		60		48		47		50		60		48		47		50		60	

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

(Continous) 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								
		Oct-17								Nov-17								Dec-17								
Stream		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)	%		
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹																								
Fabaceae	<i>Pueraria lobata</i>	野葛	0.6	5					0.6	5	0.6	5					0.6	5	0.6	5				0.6	5	
Poaceae	<i>Pennisetum purpureum</i>	象草																								
Araceae	<i>Alocasia odora</i>	海芋	0.5	5	0.4	5			0.6	5	0.6	5	0.5	5			0.6	5	0.6	5	0.5	5		0.6	5	
Caesalpiniaceae	<i>Cassia alata</i>	翅葉決明																								
Magnoliaceae	<i>Michelia alba</i>	白蘭																								
Poaceae	<i>Brachiaria mutica</i>	巴拉草	0.7	5	0.8	20	0.7	20	0.7	10	0.7	5	0.9	20	0.8	20	0.8	10	0.7	5	0.9	20	0.8	20	0.8	10
Moraceae	<i>Ficus hispida</i>	對葉榕																								
Asteraceae	<i>Mikania micrantha</i>	薇甘菊	0.5	5	0.6	5	0.7	10	0.6	5	0.5	5	0.6	5	0.7	10	0.6	5	0.5	5	0.6	5	0.8	10	0.6	5
Musaceae	<i>Musa paradisiaca</i>	大蕉																								
Ulmaceae	<i>Celtis sinensis</i>	朴樹																								
Araceae	<i>Pistia stratiotes L.</i>	大漂																								
Urticaceae	<i>Boehmeria nivea</i>	芋麻																								
Asteraceae	<i>Bidens alba</i>	白花鬼針草			0.5	8	0.5	5					0.6	8	0.6	5					0.6	8	0.7	5		
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1.3	5							1.3	5							1.3	5						
Solanaceae	<i>Solanum nigrum</i>	龍葵																								
Cyperaceae	<i>Cyperus flabelliformis</i>	風車草																								
Poaceae	<i>Miscanthus floridulus</i>	五節芒	1.3	7							1.3	7							1.3	7						
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																								
Asteraceae	<i>Wedelia chinensis</i>	蟛蜞菊	0.4	5							0.4	5							0.4	5						
Commelinaceae	<i>Commelina diffusa</i>	節節草	0.5	10	0.6	15	0.6	10	0.4	15	0.5	10	0.6	15	0.8	10	0.4	15	0.5	10	0.6	15	0.8	10	0.4	15
Asteraceae	<i>Erechtites hieracifolia</i>	革命菜																								
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																								
Convolvulaceae	<i>Pharbitis nil</i>	牽牛																								
Verbenaceae	<i>Lantana camara</i>	馬纓丹																								
Mimosaceae	<i>Leucaena leucocephala</i>	銀合歡																								
Brassicaceae	<i>Nasturtium officinale</i>	西洋菜																		0.2	5	0.2	5	0.2	5	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																								
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				1.5	10						1.5	10							1.5	10				
Amaranthaceae	<i>Celosia argentea</i>	青葙				0.5	5						0.6	5								0.6	5			
Acanthaceae	<i>Dicliptera chinensis</i>	狗肝菜	0.3	5	0.3	5					0.3	5	0.3	5					0.3	5	0.3	5				
Bare Gound				48		47		55		60		48		47		55		60		48		42		50		55

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

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

Species name	Common name	Chinese name	Status	Commonness	Baseline 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	Aug-13	Dec-13
<i>Acisoma panorpoides panorpoides</i>	Asian Pintail	雜腹蜻	NP	VC												
<i>Ceragrion auranticum ryukyuanum</i>	Orange-tailed Sprite	琉球橘黃蟌	NP	VC												
<i>Copera marginipes</i>	Yellow Featherlegs	黃狹扇蟌	NP	VC	+							+		+		
<i>Crocothemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC	+	+	+	+		++						
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蟌	NP	VC												
<i>Ictinogomphus pertinax</i>	Common Flangetail	霸王葉春蜓	NP	C												
<i>Neurobasis chinensis</i>	Chinese Greenwing	華艷色蟌	NP	VC						+		+	+	+	+	+
<i>Neurothemis fulvia</i>	Russet Percher	網脈蜻	NP	VC												
<i>Neurothemis tullia tullia</i>	Pied Percher	截斑脈蜻	NP	C												
<i>Orthetrum chrysis</i>	Red-faced Skimmer	華麗灰蜻	NP	VC	+	+	+	+		+		+		++	++	+
<i>Orthetrum glaucum</i>	Common blue skimmer	黑尾灰蜻	NP	VC			+					+		+	+	
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC												
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC								+				
<i>Orthetrum sabina sabina</i>	Green Skimmer	狹腹灰蜻	NP	VC						+						
<i>Pantala flavescens</i>	Wandering Glider	黃蜻	NP	VC	+	+		+				++				
<i>Prodasineura autumnalis</i>	Black Threadtail	烏幽原蟌	NP	VC												
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蟌	NP	UC		+										
<i>Rhinocypha perforata perforata</i>	Common Blue Jewel	三斑鼻蟌	NP	VC		+				+						
<i>Trithemis aurora</i>	Crimson Dropwing	曉靛蜻	NP	VC										++	+	+
<i>Trithemis festiva</i>	Indigo Dropwing	靛靛蜻	NP	VC				+		+		+		+		
No. of species					4	5	3	4	0	6	0	7	1	6	4	3

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 according 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

Species name	Common name	Chinese name	Status	Commonness	Post construction monitoring							Post construction monitoring							Post construction monitoring							
					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	
<i>Acisoma panorpoides panorpoides</i>	Asian Pintail	雛腹蜻	NP	VC						+													+			
<i>Ceriatagrion auranticum ryukyuanum</i>	Orange-tailed Sprite	琉球橘黃蟓	NP	VC				+	+	+	+	+	+	+								+	+	+	+	
<i>Coperia marginipes</i>	Yellow Featherlegs	黃狹扇蟓	NP	VC				+	+	+	+	+	+	+								+	+	+	+	
<i>Crocothemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC			+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蟓	NP	VC				+	+																+	
<i>Ictinogomphus pertinax</i>	Common Flangetail	霸王葉春蜓	NP	C							+													+	+	
<i>Neurobasis chinensis</i>	Chinese Greenwing	華艷色蟓	NP	VC			+	+	+	+	+	+	+	+								+	+	+	+	
<i>Neurothemis fulvia</i>	Russet Percher	網脈蜻	NP	VC							+	+	+	+									+	+	+	
<i>Neurothemis tullia tullia</i>	Pied Percher	截斑脈蜻	NP	C								+														
<i>Orthetrum chrysis</i>	Red-faced Skimmer	華羅灰蜻	NP	VC																					+	
<i>Orthetrum glaucum</i>	Common blue skimmer	黑尾灰蜻	NP	VC									+													
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC																				+	+	
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC					+	+	+	+	+	+									+	+	+	
<i>Orthetrum sabina sabina</i>	Green Skimmer	狹腹灰蜻	NP	VC									+													
<i>Pantala flavescens</i>	Wandering Glider	黃蜻	NP	VC		+			+						+	+	+					+	+	+	+	
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原蟓	NP	VC				+	+	+	+	+	+	+									+	+	+	
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蟓	NP	UC					+	+	+	+	+	+									+	+		
<i>Rhinocypha perforata perforata</i>	Common Blue Jewel	三斑鼻蟓	NP	VC					+			+	+	+	+	+							+	+	+	
<i>Trithemis aurora</i>	Crimson Dropwing	曉褐蜻	NP	VC		+	+	+		+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	
<i>Trithemis festiva</i>	Indigo Dropwing	慶褐蜻	NP	VC						+	+	+	+	+	+	+	+	+	+	+	+		+	+	+	
No. of species						2	1	3	7	8	11	12	14	10	12	8	4	3	2	4	9	11	13	14	15	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 according 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

Species name	Common name	Chinese name	Status	Commonness	Post construction monitoring												Post construction monitoring															
					Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	
<i>Acisoma panorpoides panorpoides</i>	Asian Pintail	雛腹蜻	NP	VC																												
<i>Ceragrion auranticum ryukyuanum</i>	Orange-tailed Sprite	琉球橘黃蟓	NP	VC								+	+	+	+	+	+	+							+	+	+	+	+	+		
<i>Copera marginipes</i>	Yellow Featherlegs	黃狹扇蟓	NP	VC									+	+	+	+	+	+														
<i>Crocotemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC	+	+								+	+	+	+	+									+	+	+	+	+	
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蟓	NP	VC									+	+	+													+	+	+		
<i>Ictinogomphus pertinax</i>	Common Flangetail	霸王葉春蜓	NP	C	+							+	+	+	+	+																
<i>Neurobasis chinensis</i>	Chinese Greenwing	華麗色蟓	NP	VC	+	+						+	+	+	+	+	+	+						+	+	+	+	+	+	+	+	
<i>Neurothemis fulvia</i>	Russet Percher	網脈蜻	NP	VC									+	+	+	+	+								+	+	+	+	+	+		
<i>Neurothemis tullia tullia</i>	Pied Percher	截斑脈蜻	NP	C									+	+	+	+																
<i>Orthetrum chrysis</i>	Red-faced Skimmer	華麗灰蜻	NP	VC	+	+					+	+	+	+	+	+	+	+				+	+	+	+	+	+	+	+	+		
<i>Orthetrum glaucum</i>	Common blue skimmer	黑尾灰蜻	NP	VC																							+	+	+	+	+	
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC	+										+	+	+	+	+					+	+	+	+	+	+	+	+	
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC				+				+	+																			
<i>Orthetrum sabina sabina</i>	Green Skimmer	狹腹灰蜻	NP	VC		+																						+	+	+	+	
<i>Pantala flavescens</i>	Wandering Glider	黃蜻	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原蟓	NP	VC																				+	+	+	+	+	+	+		
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蟓	NP	UC																												
<i>Rhinocypha perforata perforata</i>	Common Blue Jewel	三斑鼻蟓	NP	VC	+								+	+	+	+	+	+										+	+	+	+	
<i>Trithemis aurora</i>	Crimson Dropwing	曉靄蜻	NP	VC	+	+							+	+	+	+	+	+	+							+	+	+	+	+	+	
<i>Trithemis festiva</i>	Indigo Dropwing	靄靄蜻	NP	VC	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
No. of species					9	7	2	3	1	3	7	11	14	14	13	13	10	7	2	2	2	4	8	12	14	15	15	14	11	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 according 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 Upper Lam Tsuen River

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

Species name	Chinese name	Status	Commonness	Baseline 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										
				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	Reference point	T1	T2	T3	T4					
Molluscs																																										
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Brotia hainanensis</i>	--	NP	VC	+++	++	++	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Melanoides tuberculata</i>	縮螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Sinotaiia quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
Insects																																										
<i>Baetis sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Caenis sp.</i>	--	NP	VC					+	+	+	+																															
<i>Chironomus sp.</i>	蠓幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Electrogenus sp.</i>	--	NP	VC																																							
<i>Hydropsyche sp.</i>	--	NP	VC																																							
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Mnais sp.</i>	--	NP	VC					+	+	+	+																															
<i>Orthetrum sp.</i>	--	NP	VC	+	+																																					
Crustaceans																																										
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Somaniathelphusa zanklon</i>	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	16	4	1	1	2	17	9	6	5	0

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

Table 4.5 Aquatic Macro invertebrates recorded at Upper Lam Tsuen River

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

Species name	Chinese name	Status	Commonness	Impact monitoring				Impact monitoring				Impact monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring																								
				Jul-12				Aug-13				Dec-13				Jan-14				Feb-14				Mar-14				Apr-14				May-14				Jun-14																				
				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													
Molluscs																																																								
<i>Biomphalaria sp.</i>	--	NP	VC	+	+					+	+	+			+	+					+	+					+	+					+	+					+	+																
<i>Brotia hainanensis</i>	--	NP	VC	++						++	+	+			++	+	+				++	+	+			++	+	+					++	+	+			++	+	+			++	+	+											
<i>Melanoides tuberculata</i>	縮螺	NP	VC	+	+					+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	+	+	+			+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+					+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	+				+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Insects																																																								
<i>Baetis sp.</i>	--	NP	VC	+						+					+						+					+																														
<i>Caenis sp.</i>	--	NP	VC																																																					
<i>Chironomus sp.</i>	蠓幼虫	NP	VC	+	+					+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+							
<i>Electrogenus sp.</i>	--	NP	VC	+						+					+	+					+	+				+	+																													
<i>Hydropsyche sp.</i>	--	NP	VC	+						+					+						+					+	+																													
<i>Indobaetis sp.</i>	--	NP	VC							+					+						+					+	+																													
<i>Mnais sp.</i>	--	NP	VC	+	+	+	+			+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+							
<i>Orthetrum sp.</i>	--	NP	VC	+	+	+	+			+	+	+	+	+	+	+					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+							
Crustaceans																																																								
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	++	+	+	++	++	++	++	+	+	++	++	++	++	+	+	++	++	++	++	+	+	++	++	++	++	++	++						
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC	+	+	+	+			+	+	+	+	+	+					+	+				+	+																														
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+						+					+						+	+				+	+																													
<i>Somaniathelphusa zanklon</i>	束腰蟹	NP	VC																																																					
No. of species				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		17	15	16	13	12		13	15	10	10	10		11	12	11	10	9

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

Table 4.5 Aquatic Macro invertebrates recorded at Upper Lam Tsuen River

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

Species name	Chinese name	Status	Commonness	Post construction monitoring																																																										
				Jul-14				Aug-14				Sep-14				Oct-14				Nov-14				Dec-14				Jan-15				Feb-15				Mar-15				Apr-15																						
				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																			
Molluscs																																																														
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
<i>Brotia hainanensis</i>	--	NP	VC	++	+	+	+	+	++	+	+	+	+	++	+	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++													
<i>Melanoides tuberculata</i>	縮螺	NP	VC																																																											
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
<i>Sinotarta quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
Insects																																																														
<i>Baetis sp.</i>	--	NP	VC	+					+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+																
<i>Caenis sp.</i>	--	NP	VC																																																											
<i>Chironomus sp.</i>	孿幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
<i>Electrogenus sp.</i>	--	NP	VC	+	+				+	+				+	+				+	+				+	+				+	+				+	+				+	+				+	+																	
<i>Hydropsyche sp.</i>	--	NP	VC	+		+	+		+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+																
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+																
<i>Mnais sp.</i>	--	NP	VC		+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+																
<i>Orthetrum sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
Crustaceans																																																														
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++	+	++	++	++	++														
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC			+	+			+	+				+	+				+	+				+	+				+	+				+	+				+	+				+	+																
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+														
<i>Somaniathelphusa zanklon</i>	束腰蟹	NP	VC																																																											
No. of species				13	11	13	13	10		13	13	15	15	9		13	14	16	14	12		13	14	16	15	11		13	14	15	14	12		13	12	12	13	11		13	11	11	13	12		11	12	12	11	11		11	13	13	12	12		11	9	12	15	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

Table 4.5 Aquatic Macro invertebrates recorded at Upper Lam Tsuen River

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

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-15				Jun-15				Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15								
				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		
Molluscs																																								
<i>Biomphalaria sp.</i>	--	NP	VC																																					
<i>Brotia hainanensis</i>	--	NP	VC	++	++	+	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	
<i>Melanoides tuberculata</i>	縮螺	NP	VC																																					
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Insects																																								
<i>Baetis sp.</i>	--	NP	VC	+																																				
<i>Caenis sp.</i>	--	NP	VC																																					
<i>Chironomus sp.</i>	孿幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Electrogenus sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Hydropsyche sp.</i>	--	NP	VC	+	+	+			+	+	+				+	+				+	+				+	+				+	+									
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+			+	+				+	+				+	+				+	+				+	+										
<i>Mnais sp.</i>	--	NP	VC																																					
<i>Orthetrum sp.</i>	--	NP	VC			+	+																																	
Crustaceans																																								
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC																																					
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+																																				
<i>Somaniathelphusa zanklon</i>	束腰蟹	NP	VC																																					
No. of species				11	9	11	13	12		11	9	11	13	12		11	9	11	13	12		11	9	11	13	12		11	9	11	13	13		11	9	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

Table 4.5 Aquatic Macro invertebrates recorded 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											
		Jan-16				Feb-16				Mar-16				Apr-16				May-16				Jun-16				Jul-16				Aug-16							
		Reference point				Reference point				Reference point				Reference point				Reference point				Reference point				Reference point				Reference point							
		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	T1	T2	T3	T4
Species name	Chinese name	Status	Commonness																																		
Molluscs																																					
<i>Biomphalaria sp.</i>	--	NP	VC																																		
<i>Brotia hainanensis</i>	--	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++		
<i>Melanoides tuberculata</i>	縮螺	NP	VC																																		
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	++	++	++	++	+++	++	++	++	+++	+++	++	++	+++	+++	++	++	+++	+++	++	++	+++	+++	++	++	+++	+++	++	++	+++	+++	++	++		
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Sinotaia quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
Insects																																					
<i>Baetis sp.</i>	--	NP	VC	+																																	
<i>Caenis sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Chironomus sp.</i>	蠓幼虫	NP	VC	+	+	+	+																														
<i>Electrogenus sp.</i>	--	NP	VC	+	+	+																															
<i>Hydropsyche sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Indobaetis sp.</i>	--	NP	VC																																		
<i>Mnais sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Orthetrum sp.</i>	--	NP	VC																																		
Crustaceans																																					
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++		
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC																																		
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+																																	
<i>Somaniathelphusa zanklon</i>	束腰蟹	NP	VC																																		
No. of species				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

Table 4.5 Aquatic Macro invertebrates recorded at Upper Lam Tsuen River

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

Species name	Chinese name	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring						
				Sep-16				Oct-16				Nov-16				Dec-16						
				Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3	T4	Reference point	T1	T2	T3
Molluscs																						
<i>Biomphalaria sp.</i>	--	NP	VC					+														
<i>Brotia hainanensis</i>	--	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
<i>Melanoides tuberculata</i>	縮螺	NP	VC	+			+	++	+			+	++	+			+	++	+			+
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	++	++	++	+++	+++	++	++	++	+++	+++	++	++	++	+++	+++	++	++	+++	+++
<i>Radix plicatulus</i>	羅白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Insects																						
<i>Baetis sp.</i>	--	NP	VC	+			+	+	+			+	+	+			+	+	+			+
<i>Caenis sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Chironomus sp.</i>	蠓幼虫	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+
<i>Electrogenus sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+
<i>Hydropsyche sp.</i>	--	NP	VC	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Indobaetis sp.</i>	--	NP	VC				+				+				+							+
<i>Mnais sp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Orthetrum sp.</i>	--	NP	VC			+	+	+			+	+	+			+	+	+			+	+
Crustaceans																						
<i>Caridina cantanensis</i>	廣東米蝦	NP	VC	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++
<i>Cryptopotamon anacoluthon</i>	鯉刺溪蟹	NP	VC				+	+				+	+			+	+				+	+
<i>Macrobrachium hainanense</i>	海南沼蝦	NP	VC	+		+	+	+	+			+	+	+		+	+	+			+	+
<i>Somaniathelphusa zanklon</i>	束腰蟹	NP	VC																			
No. of species				13	10	12	14	14	13	10	12	14	14	13	10	12	14	14	13	10	12	14

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

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)

Species	Chinese name	Status	Commonness	Baseline 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										
				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					
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R		+		+						+							+	+	+	+					+	+							+	+					
<i>Channa maculate</i>	斑鰱	NP	C				+																																			
<i>Cirrhina miltorella</i>	鰱魚	NP	C																				+				+															
<i>Clarias fuscus</i>	胡子鯰	NP	C																																							
<i>Cyprinus carpio var. viridivloaceus</i>	錦鯉	NP	C																																							
<i>Gambusia affinis</i>	食蚊魚	NP	VC			+	+	+			+	++	+	+	+	+		+		+	+	++	++		+		+	+	+	+	+	+	+	+	+	+	+	+				
<i>Liniparhomaloptera disparis</i>	擬平鰈	NP	C																																							
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+			+													+		+					+															
<i>Oreochromis niloticus</i>	尼羅口非鯰	NP	C		+		+							+								+	+	++		+	+	+		+	+	+	+	+	+	+	+	+				
<i>Parazacco spilurus</i>	吳鰱	V and NP	C	+			+													+	+						+	+														
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC			+	+																				+	+	+													
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰈	NP	C		+	+	+	++	++	++	+			++	++	+	+	+	+	++	++	++	++	++		++	+			++	+											
<i>Pterocryptis cochinchinensis</i>	黃鰱	NP	C																																							
<i>Puntius semifasciolatus</i>	七星魚	NP	C	++	+	++	+	+	+	+	++				+	++						+	+	+	+	+			+	+												
<i>Rhinogobius spp.</i>	鰓虎魚	NP	C/UN/R		+	+	+	+	+	+					+							+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Schistura fasciolata</i>	橫紋南鰈	NP	C		+	+	+	+	+	+				+	+					+	+					+	+															
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+	+		+	+	++	+	+		+	+	++	+	+	+	+	+	++	++		+		+	+	+	+	+	+	+	+	+	+	+	+			
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C			+	+	+	+					+												+	+															
<i>Zacco platypus</i>	寬鰭鰱	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
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
Amphibian																																										
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R	+		+	+	+				+						+	+								+												+	+		
<i>Fejervarya limnocharis</i>	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	1	0	0	0	0	0	1	0	1	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 study area
 -V - Listed as vulnerable in China Fish Red Data Book
 -Reference point was the sampling location outside the works area used to
 "Cap 170" - List in Wild Animals Protection Ordinance (Cap.170)
 "NT" - Near Threatened in IUCN Red List Status
 "PGC"-Potential Global 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)

Species	Chinese name	Status	Sampling point	Reference	Impact monitoring Jul-12				Impact monitoring Aug-13				Impact monitoring Dec-13				Post construction monitoring Jan-14				Post construction monitoring Feb-14				Post construction monitoring Mar-14				Post construction monitoring Apr-14				Post construction monitoring May-14				Post construction monitoring Jun-14											
					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					
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R	+	+	+				+	+	+				+	+	+	+		+	+	++	+++	+	+	++	++	+++	++		+	+	+	+		+	+	+	+								
<i>Channa maculata</i>	斑鱧	NP	C																																													
<i>Cirrhina moltorella</i>	鯪魚	NP	C																								+																					
<i>Clarias fuscus</i>	胡子鯪	NP	C	+		+				+					+		+				+		+		+			+	+										+									
<i>Cyprinus carpio var. viridiviolaceus</i>	錦鯉	NP	C											+									+						+																			
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
<i>Liniparhomaloptera disparis</i>	擬平鰻	NP	C																				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+						+											+		+						+	+	+	+	+	+	+	+	+	+	+	+								
<i>Oreochromis niloticus</i>	尼羅口鯪非鯪	NP	C	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
<i>Parazacco spilurus</i>	異鰻	V and NP	C	+	+	+				+	+	+	+			+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Poecilia reticulata</i>	孔雀花魚將	NP	VC	+						+	+	+				+	+						+	+	+			+	+	+	+	+	+	+	+	+	+	+	+									
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰻	NP	C	+						+						+	+	+				+	+	+			+	+					+	+				+	+									
<i>Pterocryptis cochinchinensis</i>	黃鰻	NP	C							+						+		+				+		+		+			+	+							+	+										
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+				+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C/UN/R	+	+	+	+			+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Schistura fasciolata</i>	橫紋南鰻	NP	C	+	+	+				+	+	+				+	+	+				+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C	+	+					+	+	+				+	+	+	+			+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Zacco platypus</i>	寬鰻	NP	C	+	+	+				+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
2x2m fish counting		No. of fish		8	5	2	0	0	5	2	3	2	3	5	2	3	2	3	6	20	60	20	10	16	40	70	40	30	60	70	80	90	80	40	50	60	60	50	20	30	30	20	20	6	12	10	6	8
No. of species				14	10	10	4	3	14	11	11	6	4	14	9	12	8	6	14	10	13	11	6	14	10	15	11	7	15	11	16	14	11	11	12	16	14	12	13	13	13	12	11	10	12	13	11	11
Amphibian																																																
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R			+				+	+				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Fejervarya limnocharis</i>	澤蛙	NP	VC																																													
No. of species				0	0	0	1	0	1	0	1	1	0	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 study area
 -V - Listed as vulnerable in China Fish Red Data Book
 -Reference point was the sampling location outside the works area used to
 "Cap 170" - List in Wild Animals Protection Ordinance (Cap.170)
 "NT" - Near Threatened in IUCN Red List Status
 "PGC"-Potential Golar 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)

Species	Chinese name	Status	Sampling point	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring														
				Jul-14					Aug-14					Sep-14					Oct-14					Nov-14					Dec-14					Jan-15									
				Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4	Referenc e	T1	T2	T3	T4					
Fish																																											
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R		+	++	++	+		++	++	++	+		++	++	++	+		++	++	++	+		++	++	++	+		++	++	++	+		++	++	++	+					
<i>Channa maculate</i>	斑鱧	NP	C																																								
<i>Cirrhina moltorella</i>	鱧魚	NP	C																																								
<i>Clarias fuscus</i>	胡子鯰	NP	C					+					+					+					+					+					+					+					
<i>Cyprinus carpio var. viridivloaceus</i>	錦鯉	NP	C																																								
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Liniparhomaloptera disparis</i>	擬平鰈	NP	C	+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+							
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Oreochromis niloticus</i>	尼羅口孵非鯽	NP	C		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+					
<i>Parazacco spilurus</i>	異鱸	V and NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Poecilia reticulata</i>	孔雀花魚將	NP	VC			+		+			+		+			+		+			+		+			+		+			+		+			+		+					
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰈	NP	C	+	+				+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	+							
<i>Pterocryptis cochinchinensis</i>	黃鰱	NP	C	+			+		+			+		+	+	+			+	+	+			+	+	+			+	+	+			+	+	+							
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+	+	+	+	+	++	+	+	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++					
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C/UN/R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	++	++	++	+	+	++	++	++	+	+	++	++	++	++					
<i>Schistura fasciolata</i>	橫紋南鰈	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C		+	+	+	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+					
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C			+	+				+					+	+				+	+				+	+				+	+				+	+						
<i>Zacco platypus</i>	寬鰭鱈	NP	C	+	+	+	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+	+	++	++	+	+					
2x2m fish counting		No. of fish		8	16	15	5	10	10	12	18	10	12	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					
No. of species				11	12	13	12	11	10	12	13	13	11	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					
Amphibian																																											
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Fejervarya limnocharis</i>	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					

Note: NP - Not protected in Hong Kong
 "VC" - Very Common; "UC" - Uncommon; "C" - Common; "R" - Rare
 +, occurred; ++, common; +++, abundant/dominant Species in 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
 Cap 170 - List in Wild Animals Protection Ordinance (Cap.170)
 NT - Near Threatened in IUCN Red List Status
 PGC-Potential Global 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)

Species	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																													
				Feb-15					Mar-15					Apr-15					May-15					Jun-15					Jul-15					Aug-15					Sep-15																								
				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																				
Fish																																																															
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R		++	++	++	++			++	++	++	++			++	++	++	++			+	+	++	++			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+													
<i>Channa maculate</i>	斑鰱	NP	C																																																												
<i>Cirrhina moltorella</i>	鰱魚	NP	C																																																												
<i>Clarias fuscus</i>	胡子鯰	NP	C					+						+						+						+						+						+						+						+													
<i>Cyprinus carpio var. viridivloaceus</i>	錦鯉	NP	C																																																												
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+													
<i>Liniparhomaloptera disparis</i>	擬平鰕	NP	C	+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+														
<i>Misgurnus anguillicaudatus</i>	泥鰕	NP	C	+				+		+	+			+		+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+														
<i>Oreochromis niloticus</i>	尼羅口野非鯰	NP	C		+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			++	++	++	++			++	++	++	++			++	++	++	++			++	++	++	++			++	++	++	++			++	++	++	++	
<i>Parazacco spilurus</i>	吳鯿	V and NP	C	+	+	+	+	+		+	+	++	+	+		+	+	++	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+													
<i>Poecilia reticulate</i>	孔雀花魚將	NP	VC				+				+	+					+	+					+	+					+	+	+				+	+	+				+	+	+				+	+	+														
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰕	NP	C	+	+	+	+			+	+	+	+			+	+	+	+			+	+					+	+					+	+					+	+					+	+																
<i>Pterocryptis cochinchinensis</i>	黃鰱	NP	C	+		+	+			+	+	+	+			+	+	+	+			+	+					+	+					+	+					+	+					+	+																
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	++	++	+		+	+	++	++	+		+	+	++	++	+		+	+	++	++	+		+	+	++	++	+		+	+	++	++	+		+	+	++	++	+		+	+	++	++	+													
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C/UN/R	+	++	++	++	++		+	++	++	++	++		+	++	++	++	++		+	++	++	++	++		+	++	++	++	++		+	++	++	++	++		+	++	++	++	++		+	++	++	++	++													
<i>Schistura fasciolata</i>	橫紋南鰕	NP	C	+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	++	++				+	++	++				+	++	++				+	++	++															
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C		+	++	++	+			+	++	++	+			+	++	++	+			+	++	++	+			+	++	+	+			+	++	+	+			+	++	+	+			+	++	+	+													
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C				+						+	+					+	+					+	+					+	+					+	+					+	+					+	+													
<i>Zacco platypus</i>	寬鰭鰕	NP	C	+	++	++	++	+		+	++	++	++	+		+	++	++	++	+		+	++	++	++	+		+	++	++	++	+		+	++	++	++	+		+	++	++	++	+		+	++	++	++	+													
2x2m fish counting		No. of fish		50	60	60	60	40		50	60	60	60	40		40	50	55	50	40		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													
No. of species				10	11	12	14	10		10	13	13	14	11		13	12	14	15	11		13	12	14	12	13		12	13	13	13	12		12	12	13	13	12		12	12	13	13	12		12	12	13	13	12		12	10	13	13	12							
Amphibian																																																															
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+													
<i>Fejervarya limnocharis</i>	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													

Note: NP - Not protected in Hong Kong
 "VC" - Very Common; "UC" - Uncommon; "C" - Common; "R" - Rare
 +, occurred; ++, common; +++, abundant/dominant Species in 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
 *Cap 170 - List in Wild Animals Protection Ordinance (Cap.170)
 *NT - Near Threatened in IUCN Red List Status
 *PGC - Potential Global 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)

Species	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					Post construction monitoring												
				Oct-15					Nov-15					Dec-15					Jan-16					Feb-16					Mar-16					Apr-16					May-16					Jun-16							
				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	Reference	T1	T2	T3	T4			
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R			+	+	+				+	+	+				+	+	++				+	+	++				+	+	++				+	+	++				+	+	++							
<i>Channa maculate</i>	斑鱧	NP	C					+						+																																					
<i>Cirrhina miltorella</i>	鯪魚	NP	C																																																
<i>Clarias fuscus</i>	胡子鯪	NP	C											+																																					
<i>Cyprinus carpio var. viridivloaceus</i>	錦鯉	NP	C																																																
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+				+	+	+	+				+	+	+	+				+	+	+	+																						
<i>Liniparhomaloptera disparis</i>	擬平鰈	NP	C	+	+	+	+																																												
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+	+	+	+	+																																											
<i>Oreochromis niloticus</i>	尼羅口鯪非鯪	NP	C	+	+	++	++	++																																											
<i>Parazacco spilurus</i>	異鱸	V and NP	C	+		+	+	+																																											
<i>Poecilia reticulata</i>	孔雀花魚將	NP	VC			+	+	+																																											
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰈	NP	C	+	+																																														
<i>Pterocryptis cochinchinensis</i>	黃鰱	NP	C	+																																															
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	++	++	+																																											
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C/UN/R	+	++	++	++	++																																											
<i>Schistura fasciolata</i>	橫紋南鰈	NP	C	+	++	++																																													
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	++	+	+																																											
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C			+	+																																												
<i>Zacco platypus</i>	寬鰭鱸	NP	C	+	+	++	++	+																																											
2x2m fish counting		No. of fish		25	20	22	18	20	40	35	40	35	40	55	40	45	45	40	60	50	50	50	40	65	55	55	55	40	60	60	60	55	40	45	45	45	40	30	45	25	25	20	15	40	30	25	25	20			
No. of species				12	10	13	13	12	12	10	13	13	12	12	10	13	12	12	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10			
Amphibian																																																			
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+																																											
<i>Fejervarya limnocharis</i>	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	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 study area
 -V - Listed as vulnerable in China Fish Red Data Book
 -Reference point was the sampling location outside the works area used to
 Cap 170 - List in Wild Animals Protection Ordinance (Cap.170)
 NT - Near Treated in IUCN Red List Status
 PGC-Potential Global 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)

Species	Chinese name	Status	Commonness	Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring					Post construction monitoring						
				Jul-16					Aug-16					Sep-16					Oct-16					Nov-16					Dec-16						
				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		
<i>Acrossocheilus parallens</i>	側條光唇魚	P, PGC	R			+	+	++			+	+	++			+	+	++			+	+	++			+	+	++			+	+	++		
<i>Channa maculate</i>	斑鱧	NP	C																																
<i>Cirrhina miltorella</i>	鱧魚	NP	C																																
<i>Clarias fuscus</i>	胡子鯰	NP	C				+							+																					
<i>Cyprinus carpio var. viridivola</i>	錦鯉	NP	C				+							+																					
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Liniparhomaloptera disparis</i>	擬平鰈	NP	C	+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+				
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+	+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			+	+	+	+			
<i>Oreochromis niloticus</i>	尼羅口鯪非鯪	NP	C	+	+	++	++	++			+	+	++	++	++			+	+	++	++	++			+	+	++	++	++			+	+	++	++
<i>Parazacco spilurus</i>	吳鱸	V and NP	C	+		+	+	+			+	+	+			+	+	+	+			+	+	+	+			+	+	+	+				
<i>Poecilia reticulata</i>	孔雀花魚將	NP	VC			+	+	+			+	+	+			+	+	+	+			+	+	+	+			+	+	+	+				
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰈	NP	C	+	+						+	+				+	+					+	+					+	+						
<i>Pterocryptis cochinchinensis</i>	黃鰱	NP	C	+							+					+						+						+							
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	++	++	++			+	+	++	++			+	+	++	++			+	+	++	++			+	+	++	++			
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C/UN/R	+	++	++	++	++			+	++	++	++	++			+	++	++	++			+	++	++	++			+	++	++	++		
<i>Schistura fasciolata</i>	橫紋南鰈	NP	C	+	++	++					+	++	++			+	++	++				+	++	++			+	++	++						
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	++	+	+			+	+	++	+	+	+	+	++	+	+			+	++	+	+			+	++	+	+			
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C			+	+				+	+				+	+					+	+					+	+						
<i>Zacco platypus</i>	寬鰭鱸	NP	C	+	+	++	++	++			+	+	++	++	++			+	+	++	++	++			+	+	++	++	++			+	+	++	++
2x2m fish counting		No. of fish		30	20	15	20	25	20	15	15	25	25	20	20	15	22	25	25	25	20	20	30	30	30	30	25	45	40	40	35	35			
No. of species				12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10	12	10	14	13	10		
Amphibian																																			
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P (Cap 170, NT, PGC)	R	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Fejervarya limnocharis</i>	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

Note: NP - Not protected in Hong Kong
 "VC" - Very Common; "UC" - Uncommon; "C" - Common; "R" - Rare
 +, occurred; ++, common; +++, abundant/dominant Species in 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
 Cap 170 - List in Wild Animals Protection Ordinance (Cap.170)
 NT - Near Threatened in IUCN Red List Status
 PGC-Potential Global Concern by Fellowes *et al* (2002)

Table 4.7 Abiotic data for Upper Lam Tsuen River

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

Parameter / date	Baseline monitoring	Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring							
	8-Aug	Jan-09				Jul-09				Jan-10				Jul-10				Jan-11				Jul-11				Jan-12			
		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
Replicate																													
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	9.4	9.2	9.4	9.2
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	7.1	7.2	6.9	6.8
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	0.2	0.3	0.5	0.6
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	0.04	0.05	0.06	0.2
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	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	92	84	96	110
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	<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	10	15	10	10
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	80	70	80	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	10	15	10	20

Table 4.7 Abiotic data for Upper Lam Tsuen River

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

Parameter / date	Impact monitoring				Impact monitoring				Impact monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring							
	Jul-12				Aug-13				Dec-13				Jan-14				Feb-14				Mar-14				Apr-14							
	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
Replicate																																
DO (mg/L)	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	7.8	8.7	9.8	9.8	7.5	7.8	8.2	8.1	7.7	7.6	7.8	8.0				
pH	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	8.2	8.5	8	7.8	8.3	8.2	7.6	7.2	7.6	7.8	8.2	7.8				
Nitrate (mg N/L)	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	1.3	1.8	1.6	2.1	1.2	1.4	1.1	1.3	1.5	1.5	1.3	1.2				
Ammonia (mg/L)	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	0.05	0.04	0.1	0.12	0.06	0.04	0.04	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Conductivity (µS/cm)	41	38	73	86	67	77	74	75	62	64	90	110	72	78	88	108	78	87	118	119	120	123	125	123	96	114	120	122				
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				0.01-0.2				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				0.2-0.6											
Sand (%)	10	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10				
Stone (%)	60	60	60	60	75	75	75	75	90	85	85	85	90	85	85	85	90	85	85	85	90	85	85	80	90	85	85	75				
Mud (%)	30	30	30	30	15	15	15	15	5	10	10	10	5	10	10	10	5	10	10	10	5	10	10	15	5	10	10	15				

Table 4.7 Abiotic data for Upper Lam Tsuen River

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

Parameter / date	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring			
	Sep-16				Oct-16				Nov-16				Dec-16			
Replicate	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
DO (mg/L)	8.0	8.1	8.1	8.0	7.9	7.9	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0
pH	7.7	7.6	7.6	7.7	7.7	7.7	7.6	7.7	7.6	7.7	7.6	7.7	7.6	7.7	7.6	7.6
Nitrate (mg N/L)	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
Salinity (ppt)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Conductivity (µS/cm)	33.0	34.0	39.0	43.0	29.0	32.0	34.0	45.0	28.0	31.0	31.0	32.0	32.0	32.0	34.0	36.0
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)	0.03-0.2				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			
Sand (%)	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
Mud (%)	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**

**Final Report
She Shan River**

March 2018

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February 02, 2018

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February 02, 2018

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

Final Report She Shan River

Table of the Contents

1	Introduction	3
2	Summary of Major Points	3
3	Monitoring Methodology	4
4	Monitoring Results	6
5	Summary and Commentary	10
6	References	11

FIGURES

Figure 1. Sampling location of ecological survey and monitoring at She Shan River, Tai Po.

Figure 4.1. Avifauna abundance.

Figure 4.2. Species richness of Avifauna.

Figure 4.3. Species richness of Odonata.

Figure 4.4. Species richness of aquatic macroinvertebrate.

Figure 4.5. Species richness of fish.

Figure 4.6. Fish Abundance.

TABLE

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

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

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

Table 4.4 Odonata species recorded at the She Shan River

Table 4.5 Aquatic Macro invertebrates recorded at She Shan River.

Table 4.6 Fish species and Hong Kong Newt recorded at She Shan River.

Table 4.7 Abiotic data for She Shan River.

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. A final report is required to be prepared by using the collected data from surveys from January 2014 to December 2017 under 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 January 2014 to December 2017.
- 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 January 2014.
- 1.4 This is the final report for the project summarising monitoring results collected from January 2014 to December of 2017. 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 2014 to December 2017;
- The species abundance and species richness of fauna and flora are presented by graphs;
- Fauna and flora along the drainage project sections is in a process of re-establishing or restoration;
- The abundance and species richness of avifauna recorded during post-construction period were obviously higher than the record from baseline to construction period;
- 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;
- The species diversity of aquatic marco-invertebrate was low during construction period and recovered after construction completed. Stable trend of species richness and abundance of marco-invertebrate kept were observed since the post-construction period;
- 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 from January 2014 to December 2017 due to seasonality;

- Hong Kong Newt was recorded since the commencement of post-construction period and the was mainly recorded at middle section of the river during dry season; and
- Measured water quality and physical characteristics showed no apparent change, overall water quality is not polluted and retain in an acceptable level to fauna and flora in She Shan 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 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 AFCDC 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 AFCDC 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°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

106 flora species were recorded along survey transects from January 2014 to December 2017. Most of the recorded floras were comprised of wetland species with few floating aquatic species such as *Lemna minor* 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 1.5 m as observed along survey transect. Dominant flora species were shown in the **Table 4.1** marked with relative abundance sign “+++”. Aquatic plants *Brachiaria mutica* and *Commelina diffusa* were the most abundant plants found at most section of the river channel all of the years. The composition of vegetation species had not changed greatly throughout three years, but relatively low vegetation coverage was recorded during wet season when flooding event was frequently occurred or sometimes in dry season after vegetation clearance work at lower to middle section. *Mucuna championii* and *Cibotium barometz* are classified as endangered and vulnerable in China respectively, were recorded in the woodland adjacent to She Shan River. *Cibotium barometz* is also classified as category II in wild plant under state protection. 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.

4.2 Fauna

4.2.1 Avifauna

The avifauna surveys were undertaken from January 2014 to December 2017 along survey transects 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, 56 species of birds were recorded during the bird surveys within project area. 16 species of total recorded were of conservation interest including *Dicrurus leucophaeus*, *Milvus lineatus*, *Buteo buteo*, *Ardeola bacchus*, *Garrulax canorus*, *Accipiter soloensis*, *Chalcophaps indica*, *Accipiter trivirgatus*, *Spilornis cheela*, *Centropus sinensis*, *Ardea alba*, *Ardea cinerea*, *Egretta garzetta*, *Nycticorax nycticorax*, *Stachyridopsis ruficeps* and *Ixobrychus sinensis*. Some of them were commonly found foraging in the river channel. The most common terrestrial birds recorded included *Pycnonotus jocosus*, *Sturnus nigricollis*, *Copsychus saularis*, and *Streptopelia chinensis*. Birds with conservation interest recorded from January 2014 to December 2017 were listed in the table below. The abundance and species richness of avifauna recorded during post-construction period were obviously higher than the record from baseline to construction period. It indicated that ecological conditions of the river became more mature and stable to support more wildlife.

Common Name	Scientific name	Chinese Name	Protection status
Ashy Drongo	<i>Dicrurus leucophaeus</i>	灰卷尾	LC
Black Kite	<i>Milvus lineatus</i>	麻鷹	RC, Cap.586
Common Buzzard	<i>Buteo buteo</i>	普通鵟	Cap.586
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	RC
Chinese Hwamei	<i>Garrulax canorus</i>	畫眉	Cap.586
Chinese Sparrowhawk	<i>Accipiter soloensis</i>	赤腹鷹	Cap.586
Common Emerald Dove	<i>Chalcophaps indica</i>	綠翅金鳩	VU
Crested Goshawk	<i>Accipiter trivirgatus</i>	鳳頭鷹	CR, Cap.586
Crested Serpent Eagle	<i>Spilornis cheela</i>	蛇鵟	VU, LC, Cap.586
Great Coucal	<i>Centropus sinensis</i>	褐翅鴉鵂	VU
Great Egret	<i>Ardea alba</i>	大白鷺	RC
Grey Heron	<i>Ardea cinerea</i>	蒼鷺	PRC
Little Egret	<i>Egretta garzetta</i>	小白鷺	RC

Night Heron	<i>Nycticorax nycticorax</i>	夜鷺	LC
Rufous-capped Babbler	<i>Stachyridopsis ruficeps</i>	紅頭穗鵲	LC
Yellow Bittern	<i>Ixobrychus sinensis</i>	黃葦鶩	LC
<p>Key:</p> <p>RC – Regional Concern; LC – Local Concern; PRC – Potential Regional concern by Fellowes et al. (2002)</p> <p>Cap.586 – Endangered Species of Animals and Plants Ordinance (Cap. 586)</p> <p>VU - Vulnerable in China Red Data Book Status</p> <p>CR - Rare in China Red Data Book Status</p>			

4.2.2 Adult Odonata Survey

Odonata surveys were performed from January 2014 to December 2017 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, 20 species of odonata were recorded from January 2014 to December 2017 and the pattern of species richness was similar to those results collected in recent years that number of species was fluctuating along with different seasons. *Burmagomphus vermicularis*, a species considered as local concern by Fellowes et al (2002), was recorded from the survey. Sampling transect for odonata survey was shown on **Figure 1**. Odonata species number increased after completion of construction and that record was higher than baseline level.

4.2.3 Aquatic Macro-invertebrates

The river benthic fauna collected was mainly comprised of insects, mollusks and crustaceans. 20 species were recorded during ecology surveys undertaken from January 2014 to December 2017. The species richness was observed with no significant change during the post-construction period, shown as **Figure 4.4**. Details of recorded benthic fauna refer to **Table 4.5**. Sampling location was shown on **Figure 1**. The number of Aquatic Macro-invertebrate species was

increased after the impact monitoring and that recorded was almost higher than baseline level.

4.2.4 Hong Kong Newt

Survey of Hong Kong Newt was conducted at She Shan River from January 2014 to December of 2017. Hong Kong Newt was recorded since the commencement of post-construction period and it was only recorded at middle section in She Shan River, where dense vegetations were found. Hong Kong Newt was present mostly in dry season, assuming that they were back to terrestrial habitats during their breeding period in wet season (Dudgeon, 2003). Record of Hong Kong Newts can be referred to **Table 4.6**.

4.2.5 Fish Fauna

Fish surveys were performed at She Shan River from January 2014 to December 2017 and total 15 species of freshwater fish were recorded. *Zacco platypus* and *Oreochromis niloticus* were the dominant fish species in the river channel. There was no apparent change on the species number and composition at She Shan River, shown as **Figure 4.5**. 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 4.6**. Details of recorded of fish fauna refers to **Table 4.6**. Sampling location was shown on **Figure 1**. The abundance of fish species was decreased after the initial stage of construction. After completion of construction in late 2013, fish abundance was increased and higher than the original level in baseline monitoring period.

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 from January 2014 to December 2017 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 Aquatic and riparian vegetation was re-established quickly after the completion of the drainage works. Aquatic and wetland 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.
- 5.2 The adult Hong Kong Newt was mainly recorded at middle section of the river during dry season. Hong Kong Newt was recorded since the commencement of post-construction period.
- 5.3 The species richness of fish was recorded in a stable level from January 2014 to December 2017. 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. The fish abundance and species richness were recorded in low level during the impact monitoring period. The fish abundance and species richness were recovered after completion of construction work since late 2013.
- 5.4 Abundance of the aquatic macro-invertebrates and avifauna were stable with no apparent seasonal change. Abundance of the aquatic macro-invertebrates was low during construction work period. After completion of construction, abundance was recovered and remained in at a stable level during post-construction monitoring period.
- 5.5 Species abundance and richness of avifauna at She Shan River was observed with no significant change from baseline monitoring to post-construction monitoring. The average abundance of avifauna recorded in post-construction monitoring was slightly higher than that recorded in baseline and impact monitoring.
- 5.6 The species richness of odonata fluctuated sharply along with different season, maximum species number was recorded during wet season due to seasonality. Low number of odonata species was recorded during baseline monitoring period and impact monitoring period. After the completion of construction in late 2013, more species were recorded in post-construction monitoring.
- 5.7 Measured water quality parameters and physical characteristics showed only minor monthly fluctuation.
- 5.8 To prevent using herbicide for control vegetation on river bed; prohibit using pesticide in the rivers. (This was observed when local farmers growing Watercress (*Nasturtium officinale*) in river channel and herbicide and pesticide were applied). Those chemicals will affect aquatic life and river biodiversity.

6 REFERENCES

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FIGURE

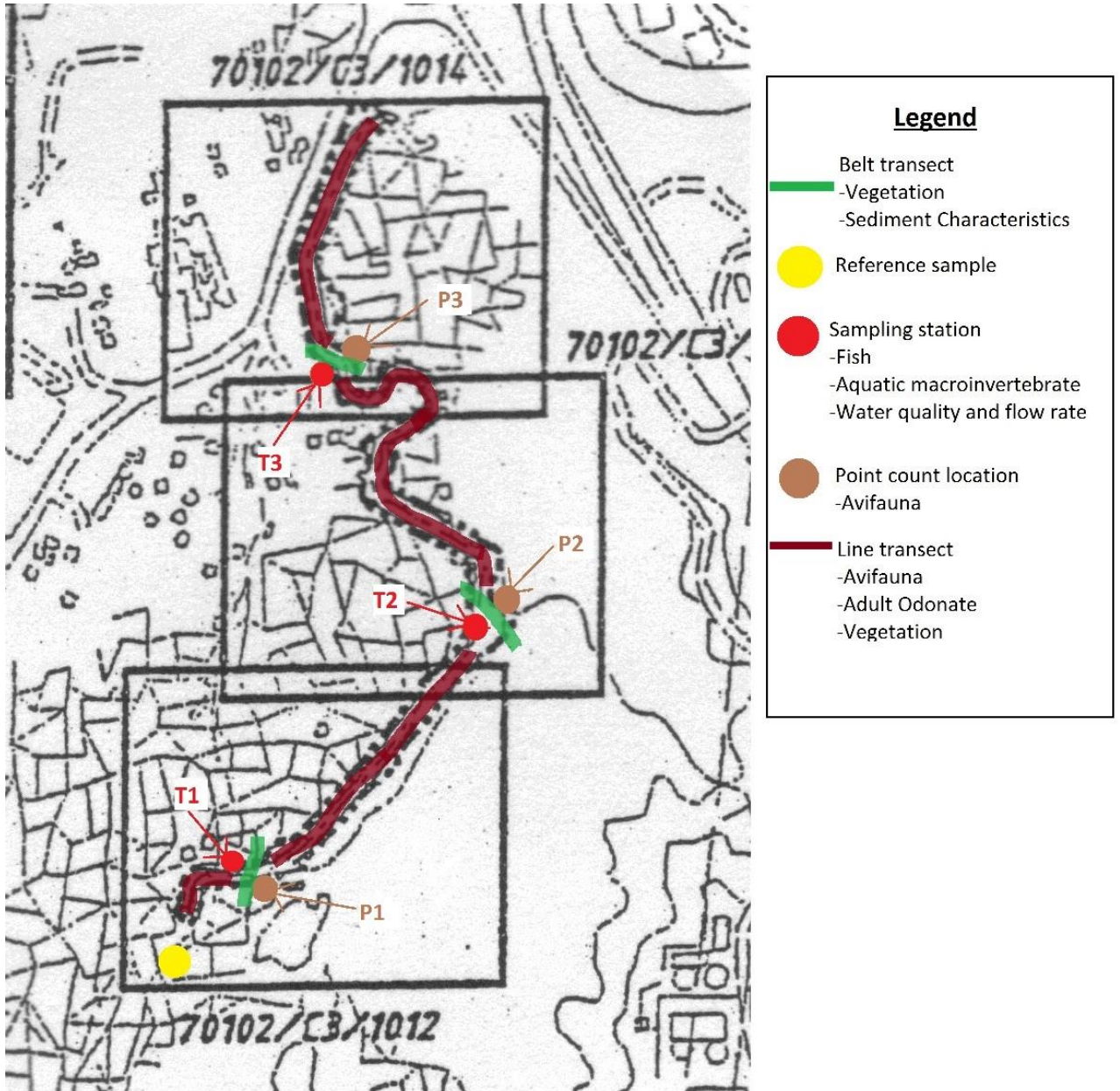


Figure 1. Sampling Location of Ecological Survey and Monitoring at She Shan River, Tai Po.

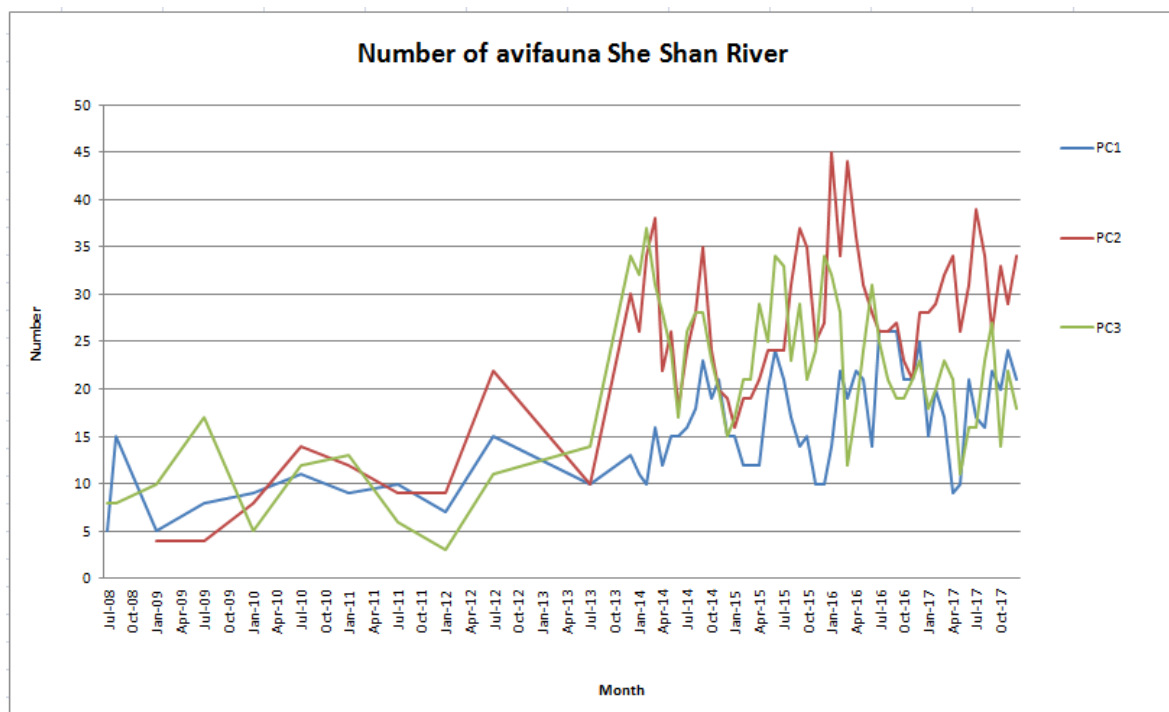


Figure 4.1. Avifauna abundance.

Key: “PC1,” “PC2” and “PC3” stand for the point count locations at the upper, middle and the lower portion of She Shan River channel respectively.

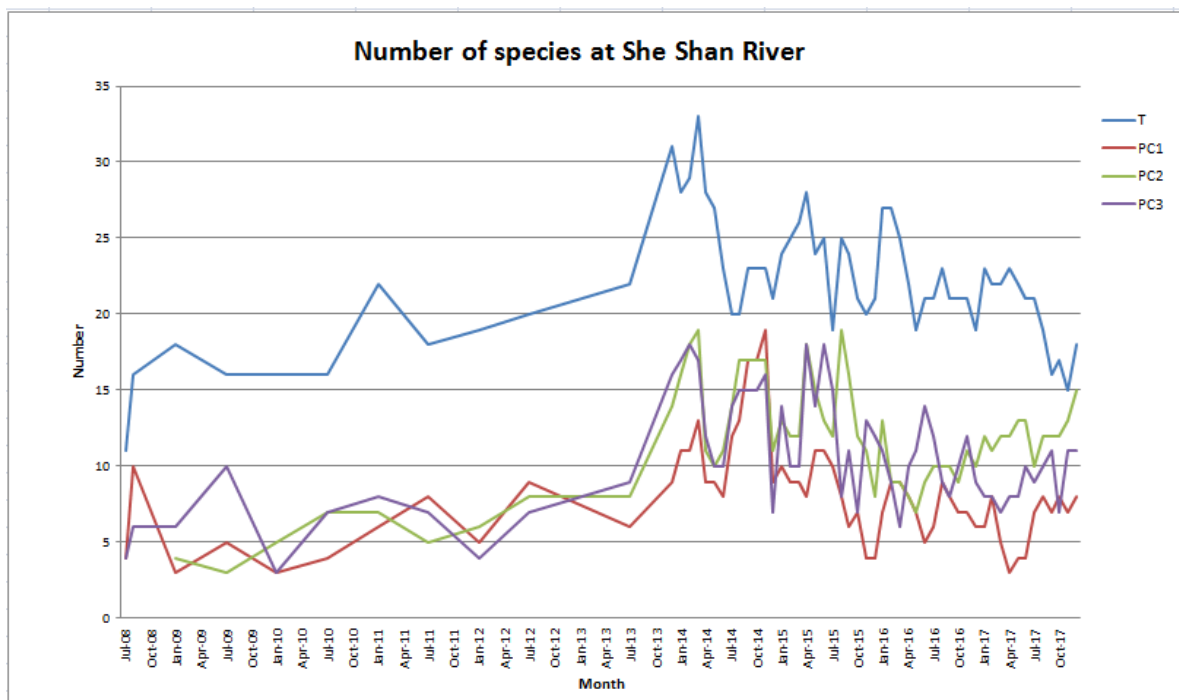


Figure 4.2. Species richness of avifauna.

Keys: “T” stand for the assemblage of transects which are set at the upper (T1), middle (T2) and lower (T3) section of She Shan River channel. “PC1,” “PC2” and “PC3” stand for the point count location at the upper, middle and the lower portion of She Shan River channel respectively.

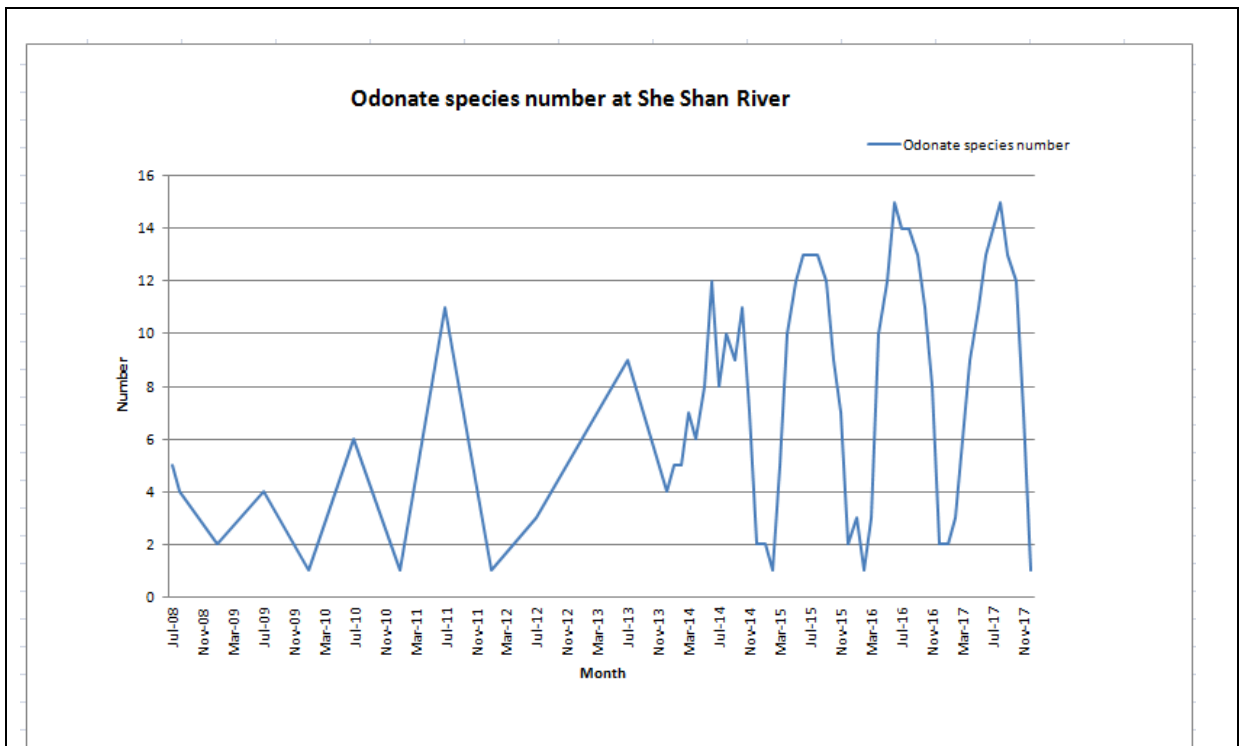


Figure 4.3 Species richness of Odonata.

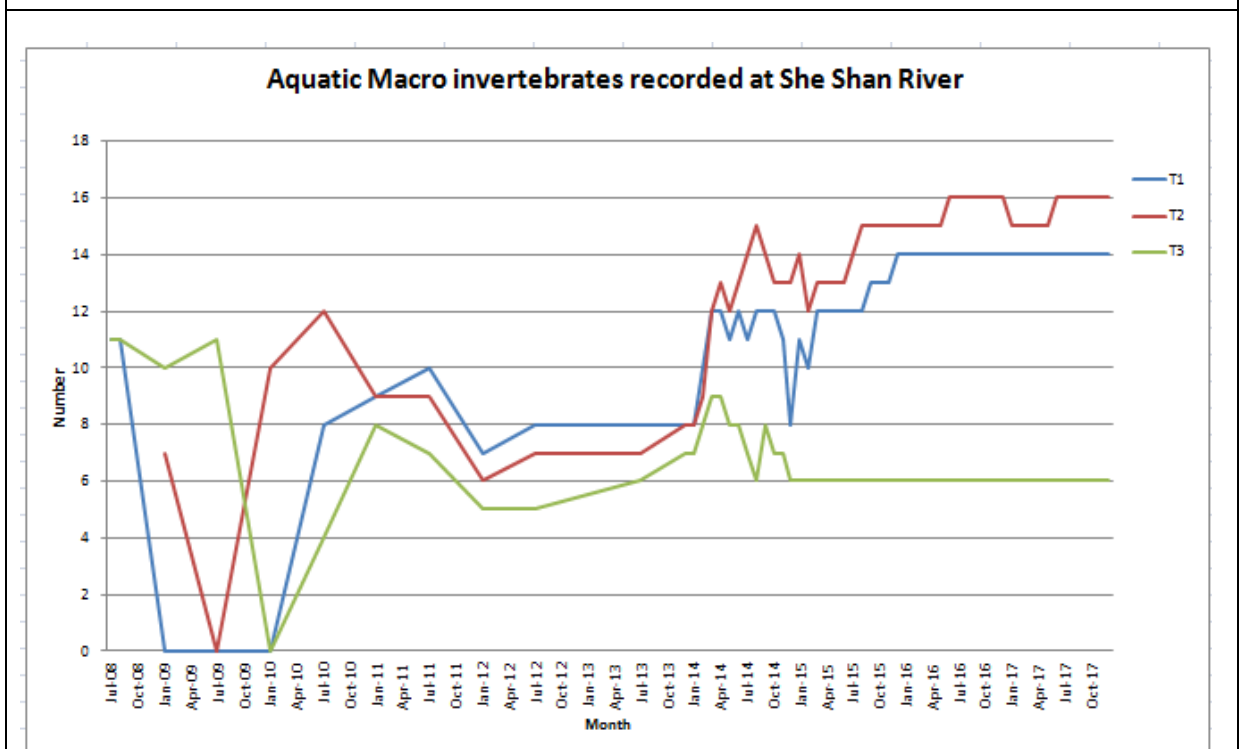


Figure 4.4 Species richness of aquatic macroinvertebrate.

Keys: “T1”, “T2” and “T3” stand for transects which are set at the upper, middle and the lower portion of She Shan River channel respectively.

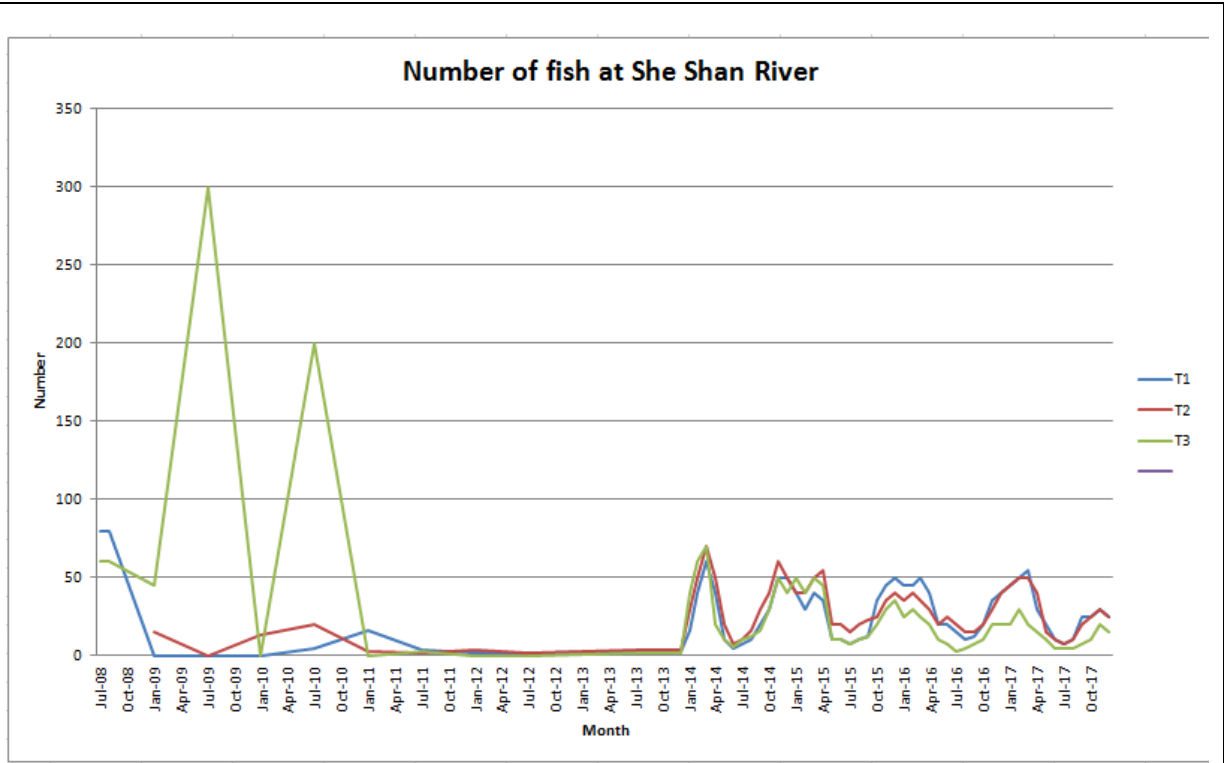


Figure 4.5 Species richness of fish.

Keys: "T1", "T2" and "T3" stand for transects which are set at the upper, middle and the lower portion of She Shan River channel respectively.

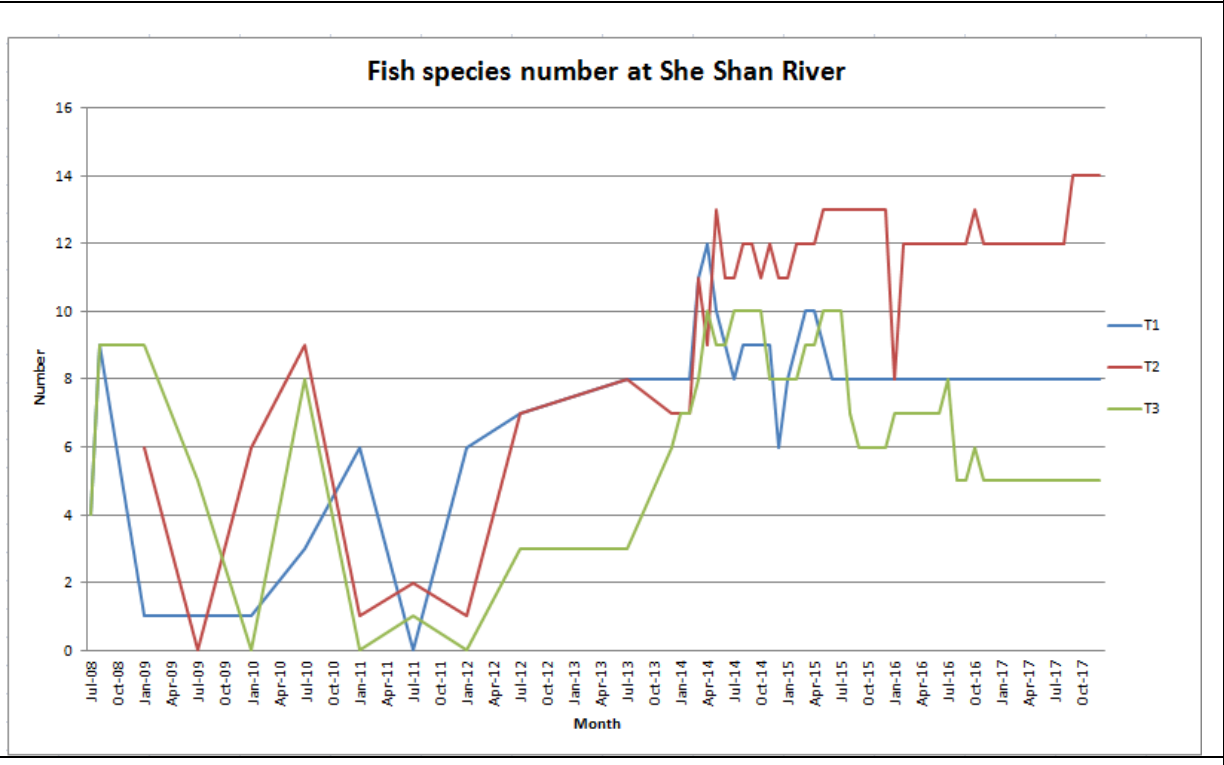


Figure 4.6 Fish Abundance.

Keys: "T1", "T2" and "T3" stand for transects which are set at the upper, middle and the lower portion of She Shan River channel respectively.

TABLE

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)

Family	Species	Chinese name	Post construction monitoring																																			
			Jul-15			Aug-15			Sep-15			Oct-15			Nov-15			Dec-15			Jan-16			Feb-16			Mar-16			Apr-16			May-16			Jun-16		
			T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3			
Compositae	<i>Composita diffusa</i>	菊科草		0.3	25																																	
Poaceae	<i>Panicum repens</i>	结茅草																																				
Asteraceae	<i>Milium micrantha</i>	雀舌草	0.4	10	0.4	10				0.5	10	0.4	5																									
Borraginaceae	<i>Ischaemum affinis</i>	雀舌草																																				
Moraceae	<i>Ficus microcarpa</i>	细果榕																																				
Poaceae	<i>Misostegium collatum</i>	细果草																																				
Fabaceae	<i>Parosela lobata</i>	野葛																																				
Araceae	<i>Colocasia esculenta</i>	芋																																				
Utriculariaceae	<i>Bolanderia nitida</i>	字面																																				
Asteraceae	<i>Bidens alba</i>	白花鬼针草	0.9	15			0.3	2	0.9	15			0.5	2	0.9	15			0.9	30																		
Poaceae	<i>Pennisetum purpuraceum</i>	象草																																				
Poaceae	<i>Cenchrus ciliaris</i>	雀舌草	1	2						1	2									1	2																	
Amaranthaceae	<i>Amaranthus phytolaccaefolius</i>	空心莲子草																																				
Poaceae	<i>Panicum maximum</i>	大黍																																				
Moraceae	<i>Broussonetia papyrifera</i>	破布																																				
Polygonaceae	<i>Polygonum chinense</i>	大蓼																																				
Onagraceae	<i>Ludwigia linearis</i>	草蓼																																				
Cyperaceae	<i>Cyperus sp.</i>	乱草																																				
Poaceae	<i>Miscanthus floridulus</i>	乱草																																				
Poaceae	<i>Brychiaria matricaria</i>	乱草	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	5	1	1	0.3	15	1	5		
Blechnaceae	<i>Blechnum orientale</i>	乌毛蕨																																				
Poaceae	<i>Pennisetum alopecuroides</i>	乱草																																				
Araceae	<i>Alocasia macrorrhiza</i>	海芋																																				
Lemnaceae	<i>Lemna minor</i>	浮萍																																				
Polygonaceae	<i>Polygonum hydropiper</i>	水蓼																																				
Cyperaceae	<i>Cyperus involucratus</i>	乱草		1.2	5					1.2	5									1.2	5	0.4	2															
Onagraceae	<i>Ludwigia erecta</i>	乱草																																				
Compositae	<i>Bomosa cutrica</i>	五爪金娘		0.3	5					0.3	5									0.3	5																	
Bare Ground			13	10		38	13	40	38		13	35	38	28	43	72	28	43	72	28	70	87	43	70	85	43	70	83	38	70	83	38	60	83	50	69		

P1 - Point count location 1, P3 - Point count location 3

Table 4.4. Odonate species recorded at the She Shan River

Species name	Common name	Chinese name	Status	Commonness	Baseline monitoring		Impact monitoring					Post construction monitoring										Post construction monitoring														
					Jul-08	Aug-08	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Jul-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			
<i>Burmagomphus vermicularis</i>	Dog-legged Clubtail	聯紋額春蜓	P, LC	C																																
<i>Ceriatagrion auranticum ryukyuanum</i>	Orange-tailed Sprite	琉球橘黃蜉	NP	VC																																
<i>Coperla ciliata</i>	Black-knees Featherlegs	白肢扇蜉	NP	VC																																
<i>Coperla marginipes</i>	Yellow Featherlegs	黃肢扇蜉	NP	VC																																
<i>Crocothemis servilla servilla</i>	Crimson Darter	紅蜻	NP	VC	+	+		+																												
<i>Ictinogomphus pertinax</i>	Common Flangetail	箭士葉春蜓	NP	C																																
<i>Ischnura senegalensis</i>	Common Bluetail	褐斑異痣蜉	NP	VC																																
<i>Neurobasis chinensis chinensis</i>	Chinese Greenwing	華綠翅蜉	NP	VC																																
<i>Neurothemis fulvia</i>	Russet Percher	網脈蜻	NP	VC																																
<i>Orithetrum chrysis</i>	Red-faced Skimmer	翠麗灰蜻	NP	VC	+	+	+	+																												
<i>Orithetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC																																
<i>Orithetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC																																
<i>Orithetrum Sabina sabina</i>	Green Skimmer	淡腹灰蜻	NP	C	+	+																														
<i>Pantala flavescens</i>	Wandering Glider	蒼蜻	NP	VC	+	+																														
<i>Prodasinieura autumnalis</i>	Black Threadtail	烏齒原蜉	NP	VC																																
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蜉	NP	UC	+		+	+																												
<i>Rhinozypha perforata perforata</i>	Common Blue Jewel	三斑鼻蜉	NP	VC																																
<i>Rhyothemis variegata arria</i>	Variagated Flutterer	斑麗扇蜉	NP	C																																
<i>Trithemis aurora</i>	Crimson Dropwing	曉靛蜻	NP	VC																																
<i>Trithemis festiva</i>	Indigo Dropwing	靛靛蜻	NP	VC																																
No of Species					5	4	2	4	1	6	1	11	1	3	9	4	5	5	7	6	8	12	8	10	9	11	7	2	2	1	5	10	12			

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 according to AFCD biodiversity website
 LC - Local Concern - Fellowes *et al.* (2002)
 PGC - Potential Global Concern - Fellowes *et al.* (2002)

Table 4.4. Odonate species recorded at the She Shan River

Species name	Common name	Chinese name	Status	Commonness	Post construction monitoring																Post construction monitoring								Post construction monitoring										
					Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17				
<i>Burmagomphus vermicularis</i>	Dog-legged Clubtail	聯紋額春蜓	P, LC	C																																			
<i>Ceriatodon auranticum ryukyuanum</i>	Orange-tailed Sprite	琉球橘黃蝶	NP	VC	+	+	+	+																															
<i>Copera ciliata</i>	Black-knees Featherlegs	白膝扇蝶	NP	VC																																			
<i>Copera marginipes</i>	Yellow Featherlegs	黃膝扇蝶	NP	VC	+	+	+	+																															
<i>Crocothemis servilia servilia</i>	Crimson Darer	紅蜻	NP	VC	+	+	+	+	+	+																													
<i>Ictinogomphus pertinax</i>	Common Flangetail	箭王葉春蜓	NP	C	+	+	+	+	+																														
<i>Ischnura senegalensis</i>	Common Bluetail	褐斑鼻結蝶	NP	VC																																			
<i>Neurobasis chinensis chinensis</i>	Chinese Greenwing	翠藍色蝶	NP	VC			+	+	+	+																													
<i>Neurothemis fulvia</i>	Russet Percher	湖濱蜻	NP	VC	+	+	+	+	+																														
<i>Orthetrum chrysis</i>	Red-faced Skimmer	紅面灰蜻	NP	VC			+	+	+	+																													
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC	+	+																																	
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC	+	+																																	
<i>Orthetrum Sabina sabina</i>	Green Skimmer	淡腹灰蜻	NP	C					+	+																													
<i>Pantala flavescens</i>	Wandering Glider	童蜻	NP	VC	+	+	+	+	+	+																													
<i>Prodasineura autumnalis</i>	Black Threadtail	黑齒原蝶	NP	UC	+	+	+																																
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蝶	NP	UC																																			
<i>Rhinoecypha perforata perforata</i>	Common Blue Jewel	三斑鼻蝶	NP	VC	+	+	+	+	+																														
<i>Rhyothemis variegata arria</i>	Variagated Flutterer	斑腹扇蝶	NP	C	+	+	+	+																															
<i>Triethemis aurora</i>	Crimson Dropwing	暗褐蜻	NP	VC	+	+	+	+	+	+																													
<i>Triethemis festiva</i>	Indigo Dropwing	慶褐蜻	NP	VC	+	+	+	+	+	+																													
No of Species					13	13	13	12	9	7					1	3	10	12	15	14	14	13	11			8	2	2	3	6	9	11	13	14	15	13	12	7	1

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 according to AFCD biodiversity website
 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 River.

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

Species	Chinese name	Sampling location		Baseline monitoring				Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Post construction monitoring																			
		Status	Commonness	Jul-08	Aug-08	Jan-09		Jul-09			Jan-10			Jul-10			Jan-11			Jul-11			Jan-12			Jul-12			Jan-13			Jul-13			Dec-13			Jan-14													
				Upper stream	Lower stream	Upper stream	Lower stream	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3								
Mollusks																																																			
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+	+	+		+	+				+	+	+			+	+	+																													
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+	+	+																																											
<i>Corbicula fluminea</i>	河蚶	NP	VC																																																
<i>Melanoides tuberculata</i>	縮艇里螺	NP	VC	+	+	+	++																																												
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	++	+	+	+																																											
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+																																											
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	+	++																																												
Insects																																																			
<i>Baetis sp.</i>		NP	VC	+	+	+	+	+																																											
<i>Chironomus sp.</i>	蠓幼虫	NP	VC	+	+	++	++	+																																											
<i>Euphaea sp.</i>		NP	VC																																																
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+	+	+																																											
<i>Odonate larvae</i>		NP	VC																																																
<i>Orthetrum spp.</i>	--	NP	VC																																																
<i>Pseudagrion spp.</i>	--	NP	UC																																																
<i>Pseudocloeon sp.</i>	--	NP	VC	+	+	+	+																																												
<i>Serratella sp.</i>		NP	VC	+	+	+	+																																												
Crustaceans																																																			
<i>Caridina cantanensis</i>	廣東水螳	NP	VC																																																
<i>Cryptopotamon anacoluthon</i>	雙刺溪蟹	NP	VC																																																
No of Species				11	11	11	11	8	0	7	10	8	0	0	11	9	0	10	0	9	8	12	4	9	9	9	8	10	10	9	7	11	7	6	5	9	8	7	5	11	8	7	6	11	8	8	7	11	8	8	7

Note: NP - Not protected in Hong Kong;
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 River.

(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				Post construction monitoring				Post construction monitoring				Post construction monitoring															
				Feb-14				Mar-14				Apr-14				May-14				Jun-14				Jul-14				Aug-14				Sep-14				Oct-14				Nov-14				Dec-14				Jan-15			
				Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3				
Mollusks																																																			
<i>Biomphalaria sp.</i>	--	NP	VC	+				+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+									
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
<i>Corbicula fluminea</i>	河蚶	NP	VC	+				+				+				+				+				+				+				+				+				+											
<i>Melanoides tuberculata</i>	縮螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Sinotia quadrata</i>	田螺	NP	VC	++	+	+	+	+	++	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+									
Insects																																																			
<i>Baetis sp.</i>		NP	VC	+	+			+	+	+		+				+				+	+			+	+			+	+	+		+	+	+		+	+	+		+	+	+									
<i>Chironomus sp.</i>	蠅幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Euphaea sp.</i>		NP	VC																																																
<i>Indobaetis sp.</i>		NP	VC	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Odonate larvae</i>		NP	VC																																																
<i>Orthetrum spp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Pseudagrion spp.</i>	--	NP	UC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
<i>Pseudocloeon sp.</i>	--	NP	VC					+	+																																										
<i>Serratella sp.</i>		NP	VC	+				+	+	+						+	+																																		
Crustaceans																																																			
<i>Caridina cantanensis</i>	廣東水螳	NP	VC																																																
<i>Cryptopotamon anacoluthon</i>	雙刺水螳	NP	VC																																																
No of Species				13	10	9	8	14	12	12	9	13	12	13	9	11	11	12	8	10	12	13	8	10	11	14	7	10	12	15	6	12	12	14	8	12	12	13	7	12	11	13	7	10	8	13	6	10	11	14	6

Note: NP - Not protected in Hong Kong;
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 River.

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

Species	Chinese name	Sampling location		Post construction monitoring Feb-15			Post construction monitoring Mar-15			Post construction monitoring Apr-15			Post construction monitoring May-15			Post construction monitoring Jun-15			Post construction monitoring Jul-15			Post construction monitoring Aug-15			Post construction monitoring Sep-15			Post construction monitoring Oct-15			Post construction monitoring Nov-15			Post construction monitoring Dec-15			Post construction monitoring Jan-16		
		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	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Mollusks																																							
<i>Biomphalaria sp.</i>	--	NP	VC			+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Corbicula fluminea</i>	河蚶	NP	VC			+																																	
<i>Melanoides tuberculata</i>	縮艇里螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Insects																																							
<i>Baetis sp.</i>	--	NP	VC			+																																	
<i>Chironomus sp.</i>	蠅幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Euphaea sp.</i>	--	NP	VC																																				
<i>Indobaetis sp.</i>	--	NP	VC	+	+			+	+	+																													
<i>Odonate larvae</i>	--	NP	VC																																				
<i>Orthetrum spp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Pseudagrion spp.</i>	--	NP	UC																																				
<i>Pseudocloeon sp.</i>	--	NP	VC																																				
<i>Serratella sp.</i>	--	NP	VC	+				+																															
Crustaceans																																							
<i>Caridina cantanensis</i>	廣東水螳	NP	VC																																				
<i>Cryptopotamon anacolumbon</i>	雙刺濠蟹	NP	VC																																				
No of Species				7	10	12	6	9	12	13	6	9	12	13	6	9	12	13	6	9	12	14	6	9	12	15	6	9	13	15	6	9	13	15	6	9	14	15	6

Note: NP - Not protected in Hong Kong
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"+++" - 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 River.

(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			Post construction monitoring			Post construction monitoring			Post construction monitoring											
				Feb-16			Mar-16			Apr-16			May-16			Jun-16			Jul-16			Aug-16			Sep-16			Oct-16			Nov-16								
				Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3				
Mollusks																																							
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Corbicula fluminea</i>	河蚶	NP	VC			+				+					+					+						+													
<i>Melanoides tuberculata</i>	縮艇螺	NP	VC	+	+	++	+	+	+	++	+	+	+	++	+	+	+	++	+	+	++	+	+	+	++	+	+	++	+	+	++	+	+	++	+	+	++	+	
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++
Insects																																							
<i>Baetis sp.</i>		NP	VC			+				+					+					+						+													
<i>Chironomus sp.</i>	蠅幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Euphaea sp.</i>		NP	VC	+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+		
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+		
<i>Odonate larvae</i>		NP	VC		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Orthetrum spp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Pseudagrion spp.</i>	--	NP	UC		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Pseudocloeon sp.</i>	--	NP	VC																																				
<i>Serratella sp.</i>		NP	VC		+					+					+					+						+													
Crustaceans																																							
<i>Caridina cantanensis</i>	廣東水螳	NP	VC		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Cryptopotamon anacolumbon</i>	雙刺濼蟹	NP	VC			+			+				+				+			+				+			+					+				+			
No of Species				9	14	15	6	9	14	15	6	9	14	15	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	

Note: NP - Not protected in Hong Kong;
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 River.

(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							
				Dec-16				Jan-17				Feb-17				Mar-17				Apr-17				May-17				Jun-17			
				Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Mollusks																															
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Corbicula fluminea</i>	河蚶	NP	VC			+				+				+				+				+				+				+	
<i>Melanoides tuberculata</i>	縮艇里螺	NP	VC	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	
Insects																															
<i>Baetis sp.</i>		NP	VC			+				+				+					+											+	
<i>Chironomus sp.</i>	蠅幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Euphaea sp.</i>		NP	VC		+	+				+	+			+	+			+	+			+	+			+	+			+	
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+			+	+	+			+	+	+			+	+	+			+	+	+			+	+	
<i>Odonate larvae</i>		NP	VC		+	+				+	+			+	+			+	+			+	+			+	+			+	
<i>Ortherum spp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Pseudagrion spp.</i>	--	NP	UC		+	+				+	+			+	+			+	+			+	+			+	+			+	
<i>Pseudocloeon sp.</i>	--	NP	VC																												
<i>Serratella sp.</i>		NP	VC		+					+				+					+							+					
Crustaceans																															
<i>Caridina cantanensis</i>	廣東水螳	NP	VC		+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Cryptopotamon anacoluthon</i>	雙刺溪蟹	NP	VC			+				+				+				+				+				+				+	
No of Species				9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	

Note: NP - Not protected in Hong Kong;
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 River.

(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							
				Jul-17				Aug-17				Sep-17				Oct-17				Nov-17				Dec-17			
				Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
Mollusks																											
<i>Biomphalaria sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Corbicula fluminea</i>	河蚶	NP	VC			+				+				+				+				+				+	
<i>Melanoides tuberculata</i>	縮艇里螺	NP	VC	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+
<i>Pomacea canaliculata</i>	蘋果螺	NP	VC	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+
<i>Radix plicatulus</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++
Insects																											
<i>Baetis sp.</i>		NP	VC			+				+				+				+				+				+	
<i>Chironomus sp.</i>	蠅幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Euphaea sp.</i>		NP	VC			+				+				+				+				+				+	
<i>Indobaetis sp.</i>	--	NP	VC	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Odonate larvae</i>		NP	VC		+	+			+	+			+	+			+	+			+	+			+	+	
<i>Orthetrum spp.</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pseudagrion spp.</i>	--	NP	UC			+			+	+			+	+			+	+			+	+			+	+	
<i>Pseudocloeon sp.</i>	--	NP	VC																								
<i>Serratella sp.</i>		NP	VC		+				+					+				+				+				+	
Crustaceans																											
<i>Caridina cantanensis</i>	廣東水螳	NP	VC		+	+			+	+			+	+			+	+			+	+			+	+	
<i>Cryptopotamon anacoluthon</i>	雙刺溪蟹	NP	VC			+				+				+				+				+				+	
No of Species				9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6	9	14	16	6

Note: NP - Not protected in Hong Kong;
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)

Species	Status	Commonness	Impact monitoring				Impact monitoring				Impact monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring								
			Jul-12				Jul-13				Dec-13				Jan-14				Feb-14				Mar-14				Apr-14				May-14								
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	
<i>Channa maculata</i>	斑鱧	NP	C																																				
<i>Clarias gariepinus</i>	革胡子鯪	NP	VC																																				
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																																				
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+				+				+				+				+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Oreochromis niloticus</i>	肥羅口非鯽	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC	+				+	+	+														+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Pterocryptis cochinchinensis</i>	越南隱鯰鯪	NP	C																	+				+				+				+				+			
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Tilapia jola</i>	喬克非鯽	NP, VU																																					
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Xiphophorus variatus</i>	錐色劍尾魚	NP	C									+				+				+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Zacco platypus</i>	寬鰭鱚	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
		2x2m fish number		4	2	2	0	5	3	4	2	5	3	4	2	12	16	30	40	30	40	50	60	60	60	70	70	40	40	50	40	20	10	20	10				
		No of Species		9	7	7	3	9	8	8	3	8	8	7	6	8	8	7	7	12	8	7	7	12	11	11	8	12	11	12	9	10	10	10	9				
Amphibian																																							
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, V	R													+				+		+		+	+	+				+					+				

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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)

Species	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring								
			Jun-14				Jul-14				Aug-14				Sep-14				Oct-14				Nov-14				Dec-14				Jan-15				
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	
<i>Channa maculata</i>	斑鱧	NP	C	+	+			+	+			+	+	+	+			+	+			+	+								+				
<i>Clarias gariepinus</i>	草胡子鯰	NP	VC			+				+	+			+	+					+	+										+				
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																																
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Oreochromis niloticus</i>	肥羅口非鯽	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC	+			+			+			+			+			+			+			+			+			+				
<i>Pterocryptis cochinchinensis</i>	越南隱鱈	NP	C			+				+			+			+			+			+			+			+			+				
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Tilapia jola</i>	喬克非鯽	NP, VU																																	
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
<i>Xiphophorus variatus</i>	錐色劍尾魚	NP	C			+				+			+			+			+			+			+			+			+				
<i>Zacco platypus</i>	寬鰭鱮	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
			2x2m fish number	12	5	8	6	16	8	10	10	12	10	16	12	20	30	16	40	30	40	30	50	50	60	50	60	50	50	40	50	40	50		
			No of Species	10	9	11	9	9	8	11	10	9	9	12	10	9	9	12	10	8	9	11	10	8	9	12	8	7	6	11	9	7	8	11	8
Amphibian																																			
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, V	R			+				+					+					+						+						+			

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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)

Species	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring									
			Feb-15				Mar-15				Apr-15				May-15				Jun-15				Jul-15				Aug-15					
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3		
<i>Channa maculata</i>	斑鱧	NP	C		+					+					+						+							+				
<i>Clarias gariepinus</i>	革胡子鯪	NP	VC			+					+				+							+						+	+			
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+		+	+		+		+	+		+		+	+		+		+	+		+	+		+	+	+			
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																													
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C		+	+			+	+	+			+	+	+			+	+	+			+	+	+		+	+			
<i>Oreochromis niloticus</i>	尼羅口非鯽	NP	C	+	+	+	+		+	+	++	+		+	+	++	++		+	+	++	++		+	+	++	++	+	++	++		
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+	+			
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC			+	+			+	+	+			+	+	+			+	+	+			+	+		+	+			
<i>Pterocryptis cochinchinensis</i>	越南隱鱈	NP	C			+				+					+					+							+		+			
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+	+			
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+	+			
<i>Tilapia jola</i>	荷克非鯽	NP, VU																														
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+		+	+	+	+	+	+			
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C			+			+	+				+	+				+	+				+	+		+	+	+			
<i>Zacco platypus</i>	寬鰭鱈	NP	C	+	++	++		+	++	++	+		+	++	++	+		+	++	++	+	+	++	++	+	+	++	++	+			
			2x2m fish number	40	30	40	40	40	40	50	50	30	35	55	45	40	20	10	20	10	20	10	15	8	15	8	15	8	20	10	20	10
			No of Species	7	9	12	8	8	10	12	9	8	10	12	9	8	9	13	10	8	8	13	10	8	8	13	10	8	8	13	7	
Amphibian																																
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, PGC	R			+				+						+					+											

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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)

Species	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring								
			Sep-15				Oct-15				Nov-15				Dec-15				Jan-16				Feb-16				Mar-16				Apr-16				
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	
<i>Channa maculata</i>	斑鱔	NP	C			+				+				+				+				+				+				+				+	
<i>Clarias gariepinus</i>	革胡子鯪	NP	VC		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																																
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Oreochromis niloticus</i>	尼羅口非鯽	NP	C	+	++	++		+	++	++		+	++	++		+	++	++		+	++	++		+	++	++		+	++	++		+	++	++	
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Pterocryptis cochinchinensis</i>	越南隱鱔	NP	C			+				+				+				+				+				+				+				+	
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Rhinogobius</i> spp.	鰻虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Tilapia jola</i>	烏克非鯽	NP, VU	C																																
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+		+	+	+	
<i>Xiphophorus variatus</i>	錐色劍尾魚	NP	C		+	+			+	+			+	+			+	+			+	+			+	+			+	+			+	+	
<i>Zacco platypus</i>	寬鰭鱈	NP	C	+	+	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+
	2x2m fish number			20	12	23	12	35	35	25	20	45	45	35	30	55	50	40	35	55	45	35	25	60	45	40	30	60	50	35	25	40	40	30	20
	No of Species			8	8	13	6	8	8	13	6	8	8	13	6	8	8	13	6	8	8	12	7	8	8	12	7	8	8	12	7	8	8	12	7
Amphibian																																			
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, R	R														+				+					+					+				

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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)

Species	Commonness	Status	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring						
			May-16				Jun-16				Jul-16				Aug-16				Sep-16				Oct-16						
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3			
<i>Channa maculata</i>	斑鱧	NP	C			+						+													+				
<i>Clarias gariepinus</i>	革胡子鯪	NP	VC			+		+				+		+												+			
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																										
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Oreochromis niloticus</i>	尼羅口非鯽	NP	C	+		++		++		+		++		+		++		++		++		++		++		++			
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC					+		+		+		+		+		+		+		+		+		+			
<i>Pterocryptis cochinchinensis</i>	越南隱鱈鯪	NP	C																										
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Tilapia jola</i>	喬克非鯽	NP, VU	C																										
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+		+		+		+		+		+		+		+		+		+		+		+			
<i>Xiphophorus variatus</i>	錐色劍尾魚	NP	C			+		+		+		+		+		+		+		+		+		+		+			
<i>Zacco platypus</i>	寬鰭鱈	NP	C	+		++		++		+		++		++		++		++		++		++		++		++			
				2x2m fish number		30	20	20	10	30	20	25	8	20	15	20	3	20	10	15	5	20	12	15	8	25	20	20	10
				No of Species		8	8	12	7	8	8	12	7	8	8	12	8	8	8	12	5	8	8	12	5	8	8	12	5
Amphibian																													
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, V	R																						+		+		

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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)

Species	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring							
			Nov-16				Dec-16				Jan-17				Feb-17				Mar-17				Apr-17				May-17			
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3
<i>Channa maculata</i>	斑鱧	NP	C			+						+								+								+		
<i>Clarias gariepinus</i>	草胡子鯰	NP	VC			+						+								+								+		
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																											
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C	+	+	+				+	+	+					+	+	+					+	+	+				
<i>Oreochromis niloticus</i>	尼羅口非鯽	NP	C	+	++	++	+	+	++	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+		
<i>Parazacco spilurus</i>	吳鰱	NP, V	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC			+						+								+								+		
<i>Pterocryptis cochinchinensis</i>	越南隱鱈	NP	C																											
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+				+	+	+					+	+	+					+	+	+				
<i>Rhinogobius spp.</i>	鰻虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Tilapia jola</i>	喬克非鯽	NP, VU																												
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+	+	+				+	+	+					+	+	+					+	+	+				
<i>Xiphophorus variatus</i>	錐色劍尾魚	NP	C			+						+								+								+		
<i>Zacco platypus</i>	寬鰭鱮	NP	C	+	++	++	+	+	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++	+	+	++	++		
			2x2m fish number	35	35	30	20	45	40	20	45	45	45	20	50	50	50	30	55	55	50	20	35	30	40	15	20	20	15	10
			No of Species	8	8	12	5	8	8	12	5	8	8	12	5	8	8	12	5	8	8	12	5	8	8	12	5	8		
Amphibian																														
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT, V	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 Animals Protection Ordinance (Cap.170)
“NT” - Near Threatened in IUCN Red List Status
“PGC” - Potential Global Concern by Fellowes *et al.* (2002)
“V” - Vulnerable - in Red China Data Book
“VU” - Vulnerable - in IUCN Red List

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)

Species	Status	Commonness	Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring				Post construction monitoring														
			Jun-17				Jul-17				Aug-17				Sep-17				Oct-17				Nov-17				Dec-17										
			Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3	Reference	T1	T2	T3							
<i>Channa maculata</i>	斑鱧	NP	C			+					+					+					+					+					+					+	
<i>Clarias gariepinus</i>	革胡子鯪	NP	VC			+					+					+					+					+					+					+	
<i>Gambusia affinis</i>	食蚊魚	NP	VC		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Hemiculter leucisculus</i>	藍刀	NP	UC																																		
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Oreochromis niloticus</i>	尼羅口非鯽	NP	C		+	++	++		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+
<i>Parazacco spilurus</i>	異鱚	NP, V	C		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Poecilia reticulata</i>	孔雀花魚	NP	VC				+				+					+					+					+					+					+	
<i>Pterocryptis cochinchinensis</i>	越南陰鱚鯪	NP	C																																		
<i>Puntius semifasciolatus</i>	七星魚	NP	C		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Rhinogobius</i> spp.	鰻虎魚	NP	C		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Tilapia jola</i>	荷克非鯽	NP, VU																																			
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C		+		+		+		+			+		+			+		+			+		+			+		+			+		+	
<i>Xiphophorus variatus</i>	雜色劍尾魚	NP	C				+				+					+					+					+					+					+	
<i>Zacco platypus</i>	寬綽鱮	NP	C		+	++	++		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+		+	++	++	+
		2x2m fish number		15	10	10	5	15	8	8	5	20	10	10	5	30	25	20	8	30	25	25	10	35	30	30	20	30	25	25	15						
		No of Species		8	8	12	5	8	8	12	5	8	8	12	5	8	8	14	5	8	8	14	5	8	8	14	5	8	8	14	5						
Amphibian																																					
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P, Cap 170, NT,	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 Animals Protection Ordinance (Cap.170)
 NT - Near Treated in IUCN Red List Status
 PGC - Potential Global Concern by Fellowes *et al* (2002)
 V - Vulnerable - in Red China Data Book
 VU - Vulnerable - in IUCN Red List

Table 4.7 Abiotic data for the Upper She Shan River

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

Parameter / date	Baseline monitoring	Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring						
	Aug-08	Jan-09			Jul-09			Jan-10			Jul-10			Jan-11			Jul-11			Jan-12			Jul-12			Jul-13			Dec-13			Jan-14			Feb-14			Mar-14			
Replicate	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3					
DO (mg/L)	8.9	--	9.1	8.3	6	5.8	6.5	--	8.9	--	8.2	8.3	8.3	8	8.5	8.8	8	8.5	9	8.6	8.2	8.8	7.7	7.7	6.3	7.8	7.8	7.7	8.7	8.6	9.2	8.3	8.2	8.6	7.2	7.6	7.8	7.1	7.2	7.2	
pH	7.29	--	7.51	7.42	7.22	7.16	7.35	--	7.5	--	7.5	7.5	7.5	6.9	7	7.2	7	7.2	7.5	6.9	6.6	7.1	6.7	6.6	6.6	6.8	7.2	7.6	6.6	6.9	7.1	6.8	7.3	7.4	7.8	6.7	7.6	7.2	6.8	7.5	
Nitrate (mg N/L)	0.5	--	1.6	1.5	0.22	0.3	0.4	--	0.75	--	0.1	0.14	0.2	0.1	0.2	0.7	0.1	0.3	0.4	0.2	0.2	0.4	0.84	0.86	1.14	0.6	0.61	0.7	0.78	0.63	0.53	1.2	1.12	1.02	1.5	1.2	1.6	1.2	1.1	0.77	
Ammonia (mg N/L)	0.1	--	PO4-P (µg P/L) <100	PO4-P (µg P/L) :110	0.83	0.97	0.99	--	0.03	--	0.25	0.2	0.12	0.1	0.1	0.12	0.1	0.1	0.15	0.2	0.2	0.3	0.05	0.02	1.08	0.14	0.06	0.05	0.08	<0.01	0.42	1.9	1.8	1.73	0.8	1.2	1.4	0.4	0.6	0.01	
Salinity (ppt)	<0.1	--	0.1	0.1	0	0	0	--	0	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	0	0	0.03	0.04	0.07	0.03	0.03	0.04	0	0	0	0	0	0	0	0	0	0	0	0	
Conductivity (µS/cm)	90	--	140	170	116	114	116	--	105	--	410	410	390	110	111	115	120	115	130	122	118	126	121	120	160	94	97	97	116	116	134	124	118	132	128	113	132	123	136	140	
BOD (mg/L)	<2	--	<2	4	<2	<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	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Water flow at pool (m/s)	0.1-0.3	--	<0.01-0.1		<0.01	N.A	<0.01-0.1	--	<0.01-0.1	--	0.1	0	0	0.1	0	0	0.2	0.05	0.1	0.2	0.05	0.1	0.2	0.05	0.1	0.2	0.05	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	
Water flow at riffle (m/s)	0.4-0.5	--	0.2-0.3		<0.01	N.A	0.2-0.3	--	0.01	--	0.1	0	0	0.1	0	0	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Sand (%)	55	65	23	65	23	23	65	5	23	--	5	30	5	5	30	2	5	30	2	10	25	5	10	25	5	15	25	5	15	10	5	15	10	5	15	10	5	15	10	5	
Stone (%)	25	30	75	30	75	75	30	40	75	--	40	65	80	40	65	2	40	65	2	45	65	5	45	65	5	65	65	15	65	80	20	65	80	20	65	80	20	65	80	20	
Mud (%)	30	5	2	5	2	2	5	5	2	--	5	5	5	5	5	1	5	5	1	5	10	10	5	10	10	10	10	10	10	10	5	10	10	5	10	10	5	10	10	5	
Concrete (%)	0	0	0	0	0	0	0	50	0	100	50	0	10	50	0	95	50	0	95	40	0	80	40	0	80	10	0	70	10	0	70	10	0	70	10	0	70	10	0	70	

Table 4.7 Abotic data for the Upper She Shan River

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

Parameter / date	Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring		
	Aug-17			Sep-17			Oct-17			Nov-17			Dec-17		
Replicate	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
DO (mg/L)	8.0	8.0	7.9	7.9	8.0	7.9	8.0	8.0	7.9	8.1	8.0	8.0	8.0	8.0	7.9
pH	7.7	7.7	7.7	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.6	7.7	7.7	7.7	7.7
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
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
Salinity (ppt)	0.01	0.01	0.01	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)	20	22	25	18	23	28	23	25	25	22	25	28	23	25	26
BOD (mg/L)	<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
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
Sand (%)	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
Mud (%)	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

**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
Upper Tai Po River**

**Final Report
Upper Tai Po River**

March 2018

Prepared by: Mike Pang



February 02, 2018

Validated by: Mark Shea



February 02, 2018

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
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Table of the Contents

1	Introduction	3
2	Summary of Major Points	3
3	Monitoring Methodology	4
4	Monitoring Results	6
5	Summary and Commentary	9
6	References	10

FIGURES

Figure 1. Sampling location of ecological survey and monitoring at Upper Tai Po River, Tai Po.

Figure 4.1. Avifauna abundance.

Figure 4.2. Species richness of Avifauna.

Figure 4.3. Species richness of Odonata.

Figure 4.4. Species richness of aquatic macroinvertebrate.

Figure 4.5. Species richness of fish.

Figure 4.6. Fish Abundance.

TABLES

Table 4.1 Flora species recorded along the Upper Tai Po River including riparian habitat.

Table 4.2 Flora species recorded from belt transect survey at the Upper Tai Po River.

Table 4.3 Avifauna recorded along survey transects and at three selected point count locations at Upper Tai Po River.

Table 4.4 Odonata species recorded at the Upper Tai Po River

Table 4.5 Aquatic Macro invertebrates recorded at Upper Tai Po River.

Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River.

Table 4.7 Abiotic data for Upper Tai Po River.

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. A final report is required to be prepared by using the collected data from surveys from January 2014 to December 2017 under 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 January 2014 to December 2017.
- 1.2 The scope of the ecological monitoring was detailed in EM & A Manual of the project. In the 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 January 2014.
- 1.4 This is the final report for the project summarising monitoring results collected from January 2014 to December of 2017. 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 2014 to December 2017;
- The species abundance and species richness of fauna and flora are presented by graphs;
- Fauna and flora along the drainage project sections is in a process of re-establishing or restoration;
- The abundance and species richness of avifauna was recovered and recorded during post-construction period were obviously higher than the record from impact monitoring period to construction period;
- Number of odonata and odonata species were increased after completion of construction in late 2013 and that recorded was higher than baseline monitoring and impact monitoring period. Number of odonata fluctuated along different season, especially high abundance of odonata was recorded during wet season;
- Abundance and richness of fish was recovered after the completion of construction in late 2013. Low number of fish was usually recorded during wet season throughout from January 2014 to December 2017 due to seasonality. Since in late of 2016, the fish abundance and richness was recorded low at transect at sampling station (T1 and T2);
- Hong Kong Newt was not recorded in baseline survey and impact monitoring. Until 2014, Hong Kong Newt was occasionally recorded at the reference site during dry season;

- The species diversity of aquatic macro-invertebrate was low in construction period and recovered after the completion of construction in late 2013.
- The species richness and abundance of macro-invertebrate, odonata and avifauna were in natural fluctuation;
- Lower section of the channel supported limited abundance of fish; and
- Measured water quality and physical characteristics showed no apparent change, overall water quality is acceptable level to fauna and flora in Upper Tai Po River.

3 Monitoring Methodology

3.1 Riparian Vegetation

Riparian vegetation including aquatic and emergent was sampled by line transects along the affected river channel and riparian habitat. Species, relative abundance and average heights were recorded. Vegetation surveys were conducted at three selected belt transects with one located at the upper portion of the river channel (T1) and another one at the middle section of the river (T2), as well as reference site (**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 along line transect, e.g., species inventory, relative abundance. Nomenclature and protection status of the species has 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 survey was 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 sections 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 two locations with one located at the lower portion of the river channel (T2) and the other located at the upper section of the river (T1). The point count locations, survey transect for bird survey and sampling sites for surveys of other faunal groups and flora was given 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 river channel were surveyed in three sampling sites with two located at upper (T1) and middle (T2) proportion of the river respectively and one reference site. It aims to collect necessary macro-invertebrate fauna for ecological monitoring programme (**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 Population and Hong Kong Newt

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

Sampling was conducted at three sampling locations with one located at upper section (T1) and one located at middle section (T2), as well as reference site. The selected sampling site 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 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°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

87 flora species was recorded within the survey transects along the river course from January 2014 to December 2017. Most of the recorded floras were comprised of wetland species with one floating aquatic species such as *Lemna mino*. The height of the dominated riparian grass and herb species were in a range from 0.2m to 1.5 m 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. The composition of vegetation species had not changed greatly throughout the year, but relatively low vegetation coverage was recorded during wet season when flooding event was frequently occurred or sometimes in dry season after vegetation clearance work at lower to middle section. 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.

4.2 Fauna

4.2.1 Avifauna

The avifauna surveys were undertaken from January 2014 to December 2017 along survey transects 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 Upper Tai Po River and the number of avifauna was presenting a natural fluctuation, shown as **Figure 4.1** and **Figure 4.2**. In total, 47 species of birds were recorded during the bird surveys within project area. 7 species of total recorded were of conservation interest species including *Milvus lineatus*, *Buteo buteo*, *Ardeola bacchus*, *Garrulax canorus*, *Centropus sinensis*, *Egretta garzetta* and *Nycticorax nycticorax*. Some of them were commonly found foraging in the river channel. The most common terrestrial birds recorded included –*Pycnonotus jocosus*, *Sturnus nigricollis*, *Copsychus saularis*, and *Streptopelia chinensis*. Birds with conservation interest recoded from January 2014 to December 2017 were listed in the table below. The abundance and species richness of avifauna was recovered and recorded during post-construction period were obviously higher than the record from impact monitoring period to construction period;

Common Name	Scientific name	Chinese Name	Protection status
Black-crown Night Heron	<i>Nycticorax nycticorax</i>	夜鷺	LC
Black Kite	<i>Milvus lineatus</i>	麻鷹	RC, Cap.586
Chinese Pond Heron	<i>Ardeola bacchus</i>	池鷺	RC
Eastern Buzzard	<i>Buteo japonicus</i>	普通鷲	Cap.586
Great Coucal	<i>Centropus sinensis</i>	褐翅鴉鵂	VU
Little Egret	<i>Egretta garzetta</i>	小白鷺	RC
<p>Key:</p> <p>RC – Regional Concern; LC – Local Concern; PRC – Potential Regional concern by Fellowes et al. (2002)</p> <p>Cap.586 – Endangered Species of Animals and Plants Ordinance (Cap. 586)</p> <p>VU - Vulnerable in China Red Data Book Status</p> <p>CR - Rare in China Red Data Book Status</p>			

4.2.2 Adult Odonata Survey

Odonata surveys were performed from January 2014 to December 2017 and a list of recorded odonata species in Upper Tai Po 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 number of odonata species during dry season was mainly related to seasonality. In total, 19 species of odonata were recorded from January 2014 to December 2017 and the pattern of species richness was similar to those results collected in this three years years that number of species was fluctuating along with different seasons. Sampling transect for odonata survey was shown on **Figure 1**. Number of odonata and number of odonata species were increased after completion of construction in late 2013 and that recorded was higher than baseline monitoring and impact monitoring period

4.2.3 Aquatic Macro-invertebrates

The river benthic fauna collected was mainly comprised of insects, mollusks and crustaceans. 23 species were recorded during ecology surveys undertaken from January 2014 to December 2017. 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**. The species diversity of aquatic marco-invertebrate was low in construction period and recovered after the completion of construction in late 2013.

4.2.4 Hong Kong Newt

Survey of Hong Kong Newt was conducted at Upper Tai Po River from January 2014 to December of 2017. Adult Hong Kong Newt was only recorded at reference site in Upper Tai Po River, where dense vegetations were found. Hong Kong Newt was present mostly in dry season, assuming that they were back to terrestrial habitats during their breeding period in wet season (Dudgeon, 2003). Record of Hong Kong Newts can be referred to **Table 4.6**.

4.2.5 Fish Fauna

Fish surveys were performed at Upper Tai Po River from January 2014 to December 2017 and total 13 species of freshwater fish were recorded. *Rhinogobius spp.* was the dominant fish species in the river channel. Only *Rhinogobius spp.* was recorded at Upper Tai Po River from September 2016 to December 2017, 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**. Fish abundance at lower section of the river was low due to low water level. Details of recorded of fish fauna refers to **Table 4.6**. Sampling location was shown on **Figure 1**. The species diversity of aquatic marco-invertebrate was low in construction period and recovered after the completion of construction in late 2013.

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 from January 2014 to December 2017 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 three years. Results of water test are presented in the **Table 4.7**.

The river substratum was comprised of over 20-80% stones or concrete in large proportion of the river sections with slow water flow (up to 0.3m/second at pool and 0.6m/second at riffle).

5 Summary and Commentary

- 5.1 Aquatic and riparian vegetation re-established quickly after the completion of the drainage works as demonstrated by the photographs in monthly report and annual 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.
- 5.2 The adult Hong Kong Newt was mainly recorded at reference site of the river during dry season.
- 5.3 The species richness of fish was recorded in a decrease level from January 2014 to December 2017. However, the fish abundance was observed significant low during wet season, it was believed that fishes were affected by heavy rain and floods. *Rhinogobius spp.* was the dominant species in the river channel. Abundance and richness of fish was recovered after the completion of construction in late 2013.
- 5.4 Abundance of the aquatic macro-invertebrates and avifauna were stable with no apparent seasonal change. The abundance and species richness of avifauna was recovered and recorded during post-construction period were obviously higher than the record from impact monitoring period to construction period
- 5.5 The species richness of odonata fluctuated sharply along with different season, maximum species number was recorded during wet season due to seasonality. Number of odonata and odonata species were increased after completion of construction in late 2013 and that recorded was higher than baseline monitoring and impact monitoring period.
- 5.6 Measured water quality parameters and physical characteristics showed only minor monthly fluctuation.
- 5.7 To prevent using herbicide for control vegetation on river bed; prohibit using pesticide in the rivers. (This was observed when local farmers growing Watercress (*Nasturtium officinale*) in river channel and herbicide and pesticide were applied). Those chemicals will affect aquatic life and river biodiversity.

6 REFERENCES

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FIGURE

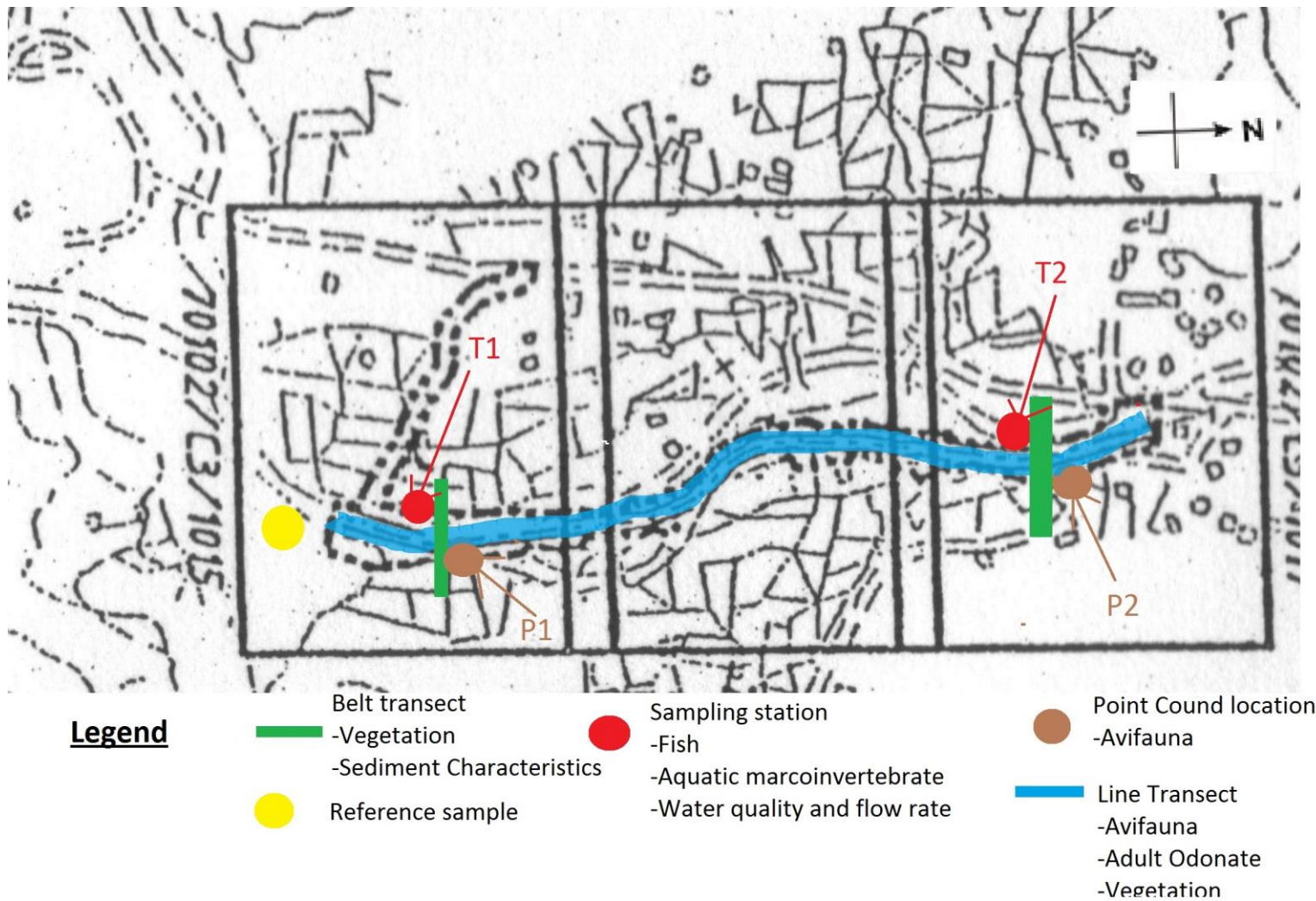


Figure 1. Sampling Location of Ecological Survey and Monitoring at Upper Tai Po River, Tai Po.

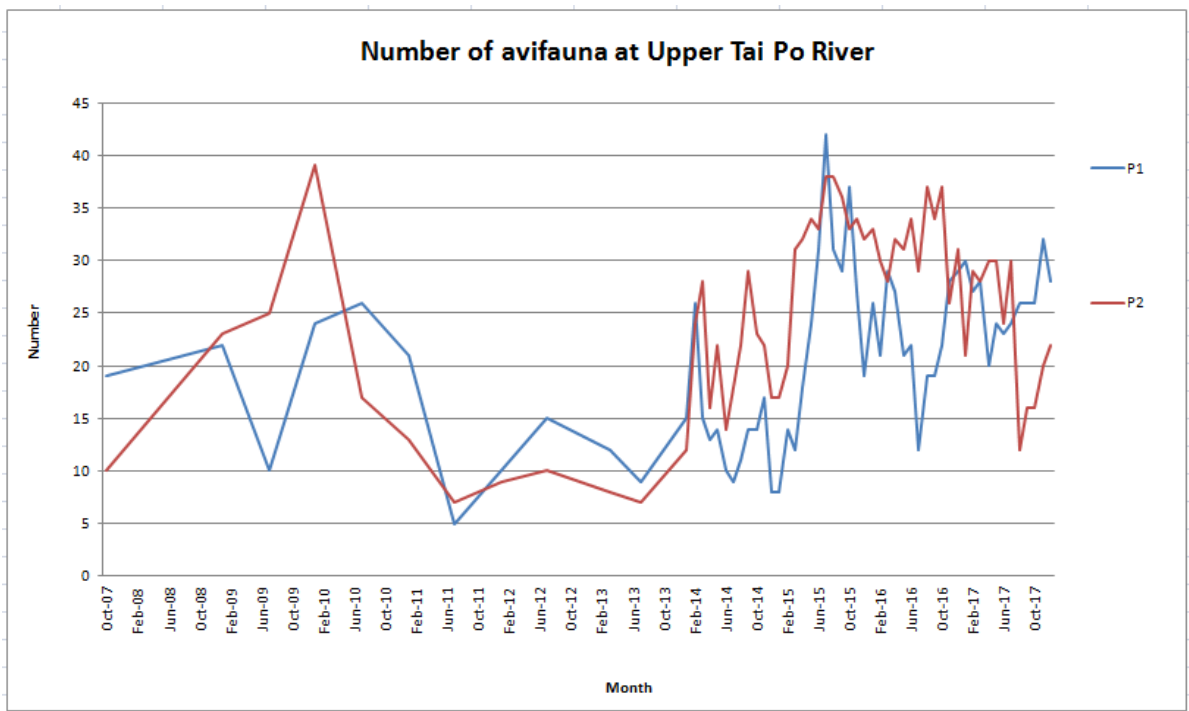


Figure 4.1. Avifauna abundance.

Key: “P1” and “P2” stand for the point count locations at the upper and the middle portion of Upper Tai Po River channel respectively.

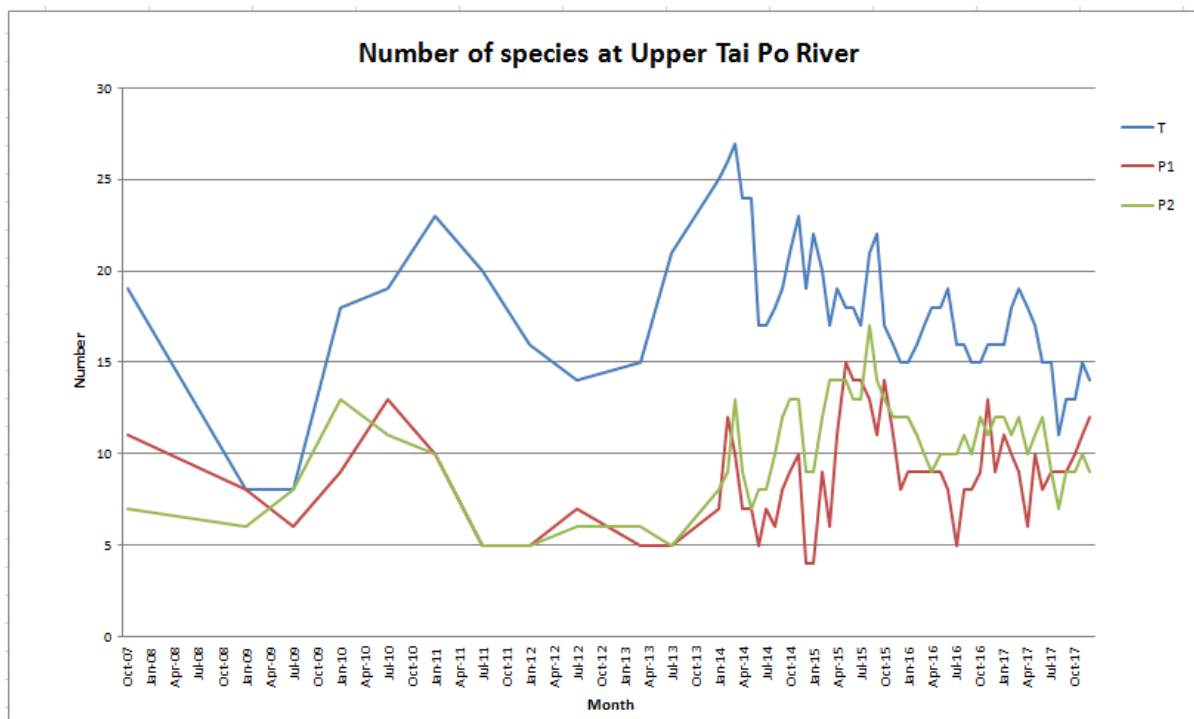


Figure 4.2. Species richness of avifauna.

Keys: “T” stand for the assemblage of transects which are set at the upper and middle section of Upper Tai Po River channel. “P1” and “P2” stand for the point count location at the upper and the middle portion of Upper Tai Po River channel respectively.

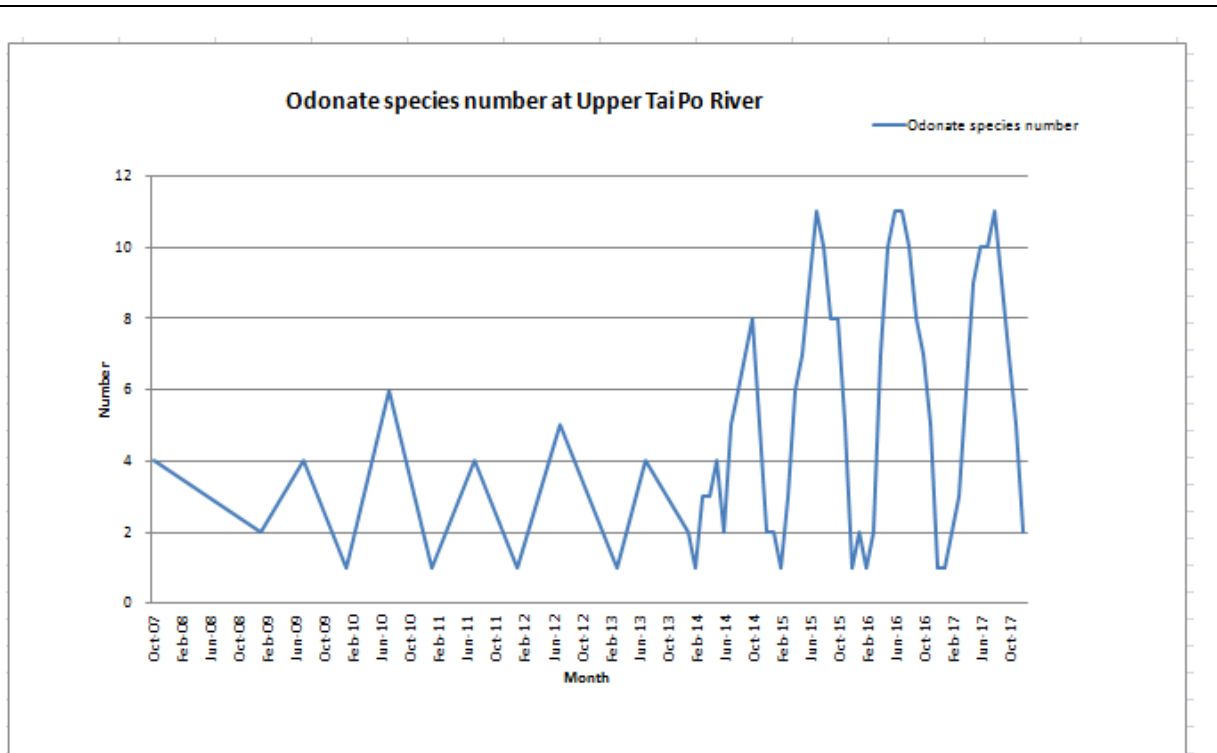


Figure 4.3 Species richness of Odonata.

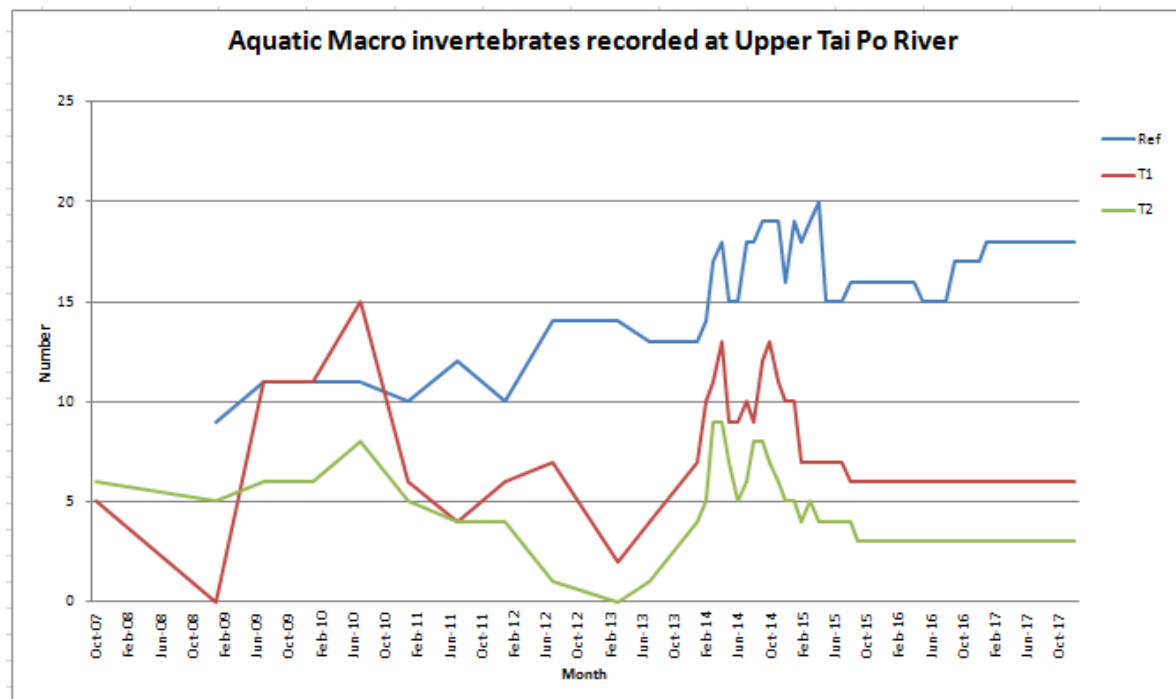


Figure 4.4 Species richness of aquatic macro-invertebrate.

Keys: “T1” and “T2” stand for sampling point which are set at the upper and the middle of Upper Tai Po River channel respectively. “Ref” stands for the reference site at the upper portion of Upper Tai Po River.

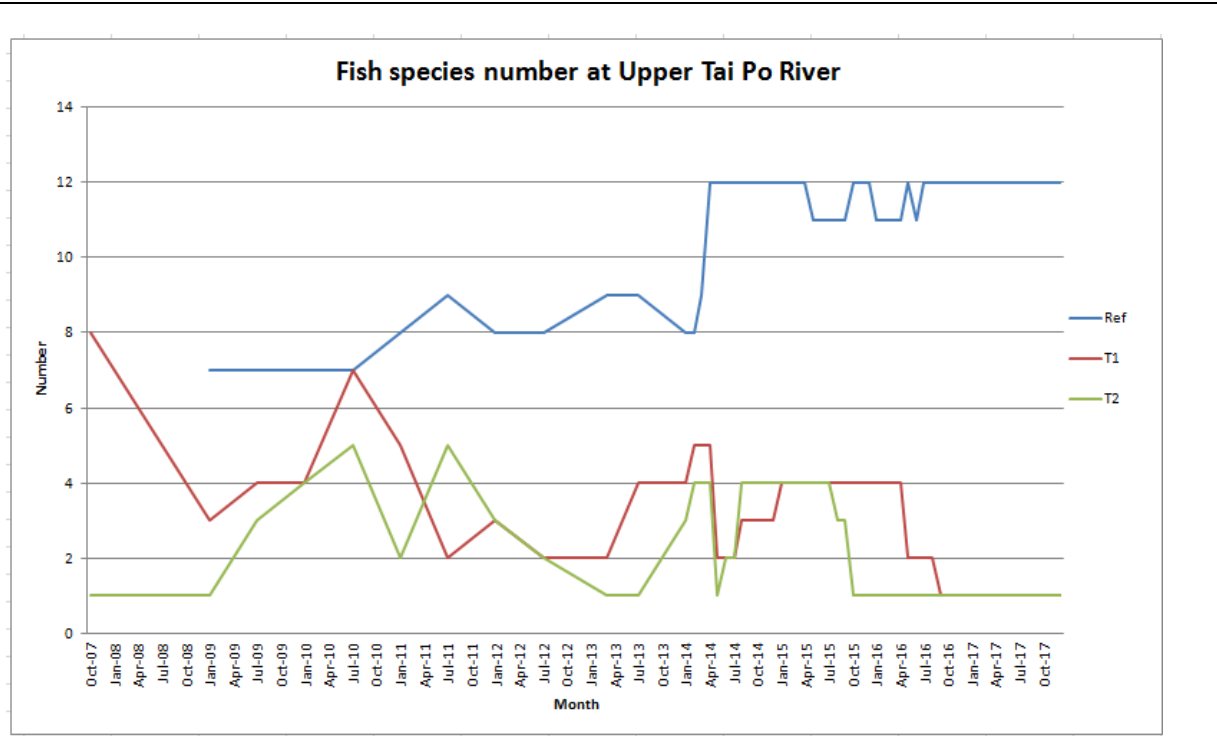


Figure 4.5 Species richness of fish.

Keys: “T1” and “T2” stand for sampling point which are set at the upper and the middle portion of Upper Tai Po River channel respectively. “Ref” stands for the reference site at the upper portion of Upper Tai Po River.

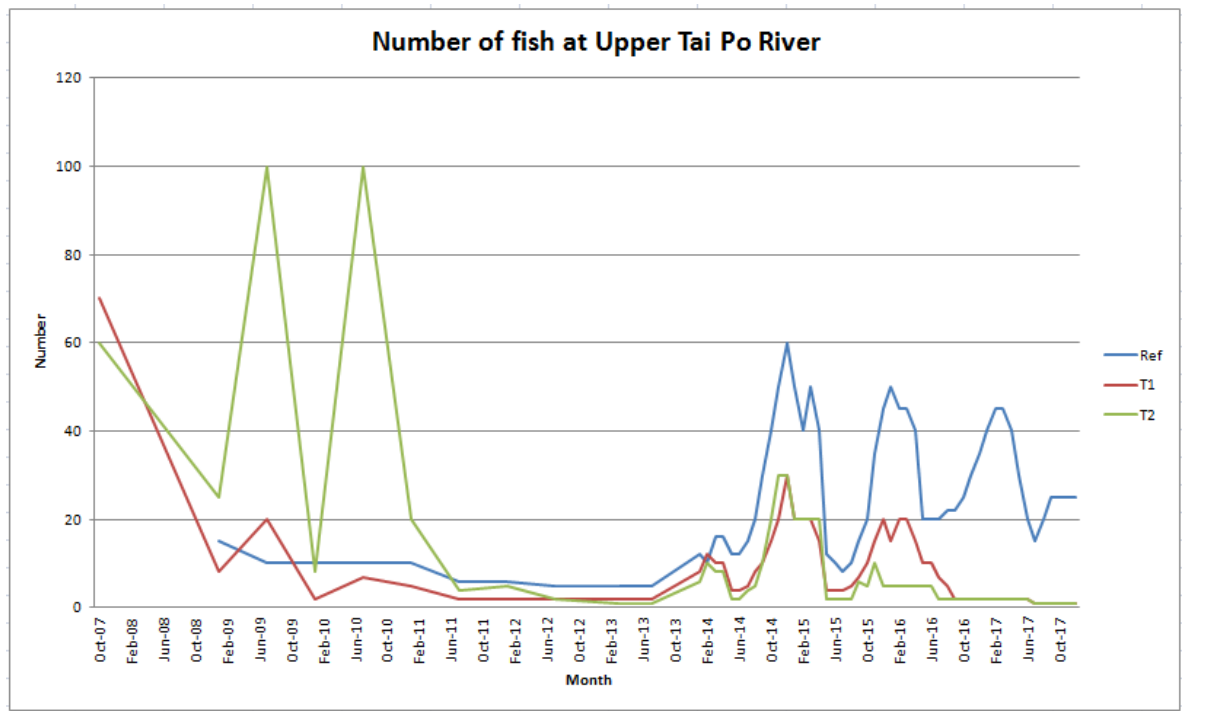


Figure 4.6 Fish Abundance.

Keys: “T1” and “T2” stand for sampling point which are set at the upper and the middle portion of Upper Tai Po River channel respectively. “Ref” stands for the reference site at the upper portion of Upper Tai Po River.

TABLE

Table 4.1. Flora species recorded at the transect along the Upper Tai Po River including riparian habitat.

Family	Species name	Species name in Chinese	Baseline	Impact Monitoring								Impact Monitoring		Post Construction Monitoring									
			Oct-07	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Mar-13	Jul-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14		
Ulmaceae	<i>Trema tomentosa</i>	山黃麻																					
Verbenaceae	<i>Duranta erecta</i>	假連翹															+	+	+	+	+		
Floating plant																							
Lemnaceae	<i>Lemna minor</i>	浮萍																					
No of Species			38	38	38	39	39	34	11	12	4	17	23	27	36	39	59	60	61	61	61		

Note:
+, occurred; ++, common; +++, abundant species recorded in study area

Table 4.1. Flora species recorded at the transect along the Upper Tai Po River including riparian habitat.

			Post Construction Monitoring																				
Family	Species name	Species name in Chinese	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	Jan-16	Feb-16	Mar-16	Apr-16	
Ulmaceae	<i>Trema tomentosa</i>	山黃麻					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Verbenaceae	<i>Duranta erecta</i>	假連翹	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Floating plant																							
Lemnaceae	<i>Lemna minor</i>	浮萍					+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
No of Species			62	63	63	63	61	63	63	66	67	67	67	67	67	67	67	67	67	65	65	66	66

Note:
+, occurred; ++, common; +++, abundant species recorded in study area

Table 4.1. Flora species recorded at the transect along the Upper Tai Po River including riparian habitat.

			Post Construction Monitoring																			
Family	Species name	Species name in Chinese	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17
Ulmaceae	<i>Trema tomentosa</i>	山黃麻	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Verbenaceae	<i>Duranta erecta</i>	假連翹	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Floating plant																						
Lemnaceae	<i>Lemna minor</i>	浮萍	+	+	+	+																
No of Species			52	52	52	52	52	52	52	52	52	55	55	55	55	55	55	55	55	55	55	55

Note:
+, occurred; ++, common; +++, abundant species recorded in study area

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1 - Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Baseline survey				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring				Impact monitoring																				
			Oct-07		Jan-09		Jul-09		Jan-10		Jul-10		Jan-11		Jul-11		Jan-12																														
			P1	P2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2																						
Asteraceae	<i>Mikania micrantha</i>	蕨甘菊	0.4	15	1	40	0.5	5	0.5	5	2	10	0.5	5	0.2	5	0.2	2	0.5	20	0.5	60	0.5	10	0.5	10	0.4	20																			
Moraceae	<i>Ficus hispida</i>	野桐	1	2			5	5			2	10	5	5					5	5																											
Ulmaceae	<i>Celtis sinensis</i>	朴樹	5	2							6	15										4m	5																								
Poaceae	<i>Microstegium ciliatum</i>	剛莠竹	1.2	45	1.2	30		0.8	10	0.5	12			0.7	30			1	35	1	5	0.5	10	1	15	1	5	0.5	2	1	2																
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	2	2			5	5	3	5	1.5	4	5	5	3	5	1.5	5	5	5	5			4m	5																						
Araceae	<i>Alocasia odora</i>	海芋	1.5	23							1.5	25										2	10			0.4	3																				
Araceae	<i>Colocasia esculenta</i>	芋	0.3	<1	0.4	<1	0.3	2			0.3	2	0.8	5			0.3	1																													
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁			0.4	10	0.4	10	7	5			0.4	10	7	5			0.4	10				0.4	5	5m	5																				
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨			0.6	1	0.8	10			0.4	10	0.8	10			0.4	2	0.8	6			0.8	6																							
Poaceae	<i>Phragmites karka</i>	卡爾蘆			1.5	51					1.5	51					1.5	53					1.5	10			1.5	2																			
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨	0.4	10							0.4	10					0.3	2																													
Equisetaceae	<i>Equisetum debile</i>	筆管草			0.6	<1	0.3	2					0.3	2																																	
Asteraceae	<i>Ageratum conyzoides</i>	勝紅菊					0.4	2					0.4	2					0.2	2						0.3	2	1.2	10		0.4	20															
Commelinaceae	<i>Commelina diffusa</i>	蘭花草																	0.2	5	0.2	5	0.2	5		0.5	20				0.4	10															
Solanaceae	<i>Solanum nigrum</i>	龍葵																																													
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸																	0.3	5											0.5	4															
Poaceae	<i>Eleusine indica</i>	牛筋草											0.5	5																	0.3	5															
Poaceae	<i>Pennisetum purpureum</i>	象草																																													
Asteraceae	<i>Wedelia chinensis</i>	錦繡菊																																													
Asteraceae	<i>Bidens alba</i>	白花鬼針草																								0.5	5				0.2	2															
Poaceae	<i>Panicum repens</i>	結骨草																																													
Poaceae	<i>Coix lacryma-jobi</i>	薏苡																														1.5	5														
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍																														1.5	5														
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜																														0.2	5														
Fabaceae	<i>Pueraria lobata</i>	野葛																																													
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草																																													
Poaceae	<i>Pennisetum alopecuroides</i>	銀尾草																																													
Poaceae	<i>Brachiaria mutica</i>	巴拉草																																													
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																													
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花																																													
Cyperaceae	<i>Cyperus sp.</i>	莎草																																													
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙																																													
Amaranthaceae	<i>Celosia argentea</i>	青葙																																													
Bare Ground							10		73		10		10		78		6		10		73		88		9		15		65		68		80		89		71		100		89		35		100		100

* Reference point was the sampling location outside the works area used to compare with the data within works area.
P1 - Point count location 1; P2 - Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1 - Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Impact monitoring								Impact monitoring								Impact monitoring								Post construction monitoring							
			Jul-12				Mar-13				Jul-13				Jan-14																			
			Reference		T1		T2		Reference		T1		T2		Reference		T1		T2		Reference		T1		T2									
Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%											
Asteraceae	<i>Mikania micrantha</i>	微甘菊	0.4	10					0.4	60									0.4	40	0.4	5												
Moraceae	<i>Ficus hispida</i>	對葉榕																																
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹	1	55										0.6	3							0.6	3											
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐																																
Araceae	<i>Alocasia odora</i>	海芋																																
Araceae	<i>Colocasia esculenta</i>	芋						0.3	2													0.3	3											
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁																																
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨																																
Poaceae	<i>Phragmites karka</i>	卡爾蘆												1.2	5							1.2	2											
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華雨手蕨																																
Equisetaceae	<i>Equisetum debile</i>	筆管草																																
Asteraceae	<i>Ageratum conyzoides</i>	勝紅菊																																
Commelinaceae	<i>Commelina diffusa</i>	蘭花草	0.4	5				0.4	5	(concret section)				0.4	5				(concret section)			0.4	6				(concret section)							
Solanaceae	<i>Solanum nigrum</i>	龍葵																																
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸																																
Poaceae	<i>Eleusine indica</i>	牛筋草												0.3	3								0.3	3										
Poaceae	<i>Pennisetum purpureum</i>	象草																																
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊																																
Asteraceae	<i>Bidens alba</i>	白花鬼針草						0.3	10					0.3	10	0.3	10					0.3	15	0.3	10									
Poaceae	<i>Panicum repens</i>	結骨草												0.6	5							0.6	5											
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	1.5	5				1.5	3																									
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍	0.2	5																														
Cucurbitaceae	<i>Bemisia hispida</i>	冬瓜																																
Fabaceae	<i>Pueraria lobata</i>	野葛						0.2	5					0.2	10							0.2	10											
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草						0.2	5																									
Poaceae	<i>Pennisetum alopecuroides</i>	銀尾草																																
Poaceae	<i>Brachiaria mutica</i>	巴拉草																																
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花													0.6	5							0.6	5										
Cyperaceae	<i>Cyperus sp.</i>	莎草																																
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙																																
Amaranthaceae	<i>Celosia argentea</i>	青葙																																
Bare Ground			20		100			100						10																				

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

P1 - Point count location 1; P2 - Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1 - Upper stream sampling site and T2 - Lower stream 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								Post construction monitoring							
		Dec-14				Jan-15				Feb-14				Mar-14				Apr-14				May-15				Jun-15				Jul-15				Aug-15				Sep-15																																			
Stream	Transect	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2																																				
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)	%																																				
Asteraceae	<i>Mikania micrantha</i>	蕨甘菊	0.4	12	0.4	30																																																																			
Moraceae	<i>Ficus hispida</i>	野桐																																																																							
Ulmaceae	<i>Celtis sinensis</i>	朴樹																																																																							
Poaceae	<i>Microstegium ciliatum</i>	剛莠竹	0.6	15																																																																					
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐			0.6	1																																																																			
Araceae	<i>Alocasia odora</i>	海芋																																																																							
Araceae	<i>Colocasia esculenta</i>	芋	0.5	5																																																																					
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁																																																																							
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨																																																																							
Poaceae	<i>Phragmites karka</i>	卡爾蘆	2	5																																																																					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華雨手蕨																																																																							
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.3	5																																																																					
Asteraceae	<i>Ageratum conyzoides</i>	醉紅薊																																																																							
Commelinaceae	<i>Commelina diffusa</i>	蘭花草		0.3	10																																																																				
Solanaceae	<i>Solanum nigrum</i>	龍葵																																																																							
Euphorbiaceae	<i>Mallotus paniculatus</i>	白樹																																																																							
Poaceae	<i>Eleusine indica</i>	牛筋草																																																																							
Poaceae	<i>Pennisetum purpureum</i>	象草																																																																							
Asteraceae	<i>Wedelia chinensis</i>	錦繡菊																																																																							
Asteraceae	<i>Bidens alba</i>	白花鬼針草		1	5																																																																				
Poaceae	<i>Panicum repens</i>	結節草	0.6	4																																																																					
Poaceae	<i>Coix lacryma-jobi</i>	薏苡																																																																							
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍																																																																							
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜																																																																							
Fabaceae	<i>Pueraria lobata</i>	野葛	0.4	20																																																																					
Convolvulaceae	<i>Merremia hederacea</i>	魚腥草																																																																							
Poaceae	<i>Pennisetum alopecuroides</i>	銀尾草		2	20																																																																				
Poaceae	<i>Brachiaria mutica</i>	巴拉草		1.5	25																																																																				
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																																																																							
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花																																																																							
Cyperaceae	<i>Cyperus sp.</i>	莎草																																																																							
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙																																																																							
Amaranthaceae	<i>Celosia argentea</i>	青葙																																																																							
Bare Ground			34	4							35	88	7	35	88	7	35	88	7	35	88	7	40	93	46	40	85	46	40	14	5	40	34	25	40	83	25																																				

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

P1 - Point count location 1; P2 - Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1 - Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	%
		Stream	
		Transect	
Asteraceae	<i>Mikania micrantha</i>	蕨甘菊	
Moraceae	<i>Ficus hispida</i>	對葉榕	
Ulmaceae	<i>Celtis sinensis</i>	朴樹	
Poaceae	<i>Microstegium ciliatum</i>	剛秀竹	
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐	10
Araceae	<i>Alocasia odora</i>	海芋	
Araceae	<i>Colocasia esculenta</i>	芋	
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁	
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨	
Poaceae	<i>Phragmites karka</i>	卡爾蘆	
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華雨手蕨	
Equisetaceae	<i>Equisetum debile</i>	筆管草	
Asteraceae	<i>Ageratum conyzoides</i>	勝紅菊	
Commelinaceae	<i>Commelina diffusa</i>	蘭花草	5
Solanaceae	<i>Solanum nigrum</i>	龍葵	
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸	
Poaceae	<i>Eleusine indica</i>	牛筋草	
Poaceae	<i>Pennisetum purpureum</i>	象草	
Asteraceae	<i>Wedelia chinensis</i>	錦繡菊	
Asteraceae	<i>Bidens alba</i>	白花鬼針草	8
Poaceae	<i>Panicum repens</i>	結骨草	
Poaceae	<i>Coix lacryma-jobi</i>	薏苡	
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍	
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜	
Fabaceae	<i>Pteraria lobata</i>	野葛	
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草	
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草	5
Poaceae	<i>Brachiaria mutica</i>	巴拉草	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香	
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花	
Cyperaceae	<i>Cyperus sp.</i>	莎草	
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙	
Amaranthaceae	<i>Celosia argentea</i>	青葙	
Bare Ground			72

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Stream Transect	Post construction monitoring						Post construction monitoring					
			Reference		Aug-16		T2		Reference		Sep-16		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>		0.6	5					0.5	10				
Moraceae	<i>Ficus hispida</i>													
Ulmaceae	<i>Celtis sinensis</i>													
Poaceae	<i>Microstegium ciliatum</i>		1.2	5				1.5	10					
Euphorbiaceae	<i>Macaranga tanarius</i>											1.5	10	
Araceae	<i>Alocasia odora</i>							0.4	5					
Araceae	<i>Colocasia esculenta</i>		0.5	5				0.5	5					
Myrtaceae	<i>Cleistocalyx operculatus</i>													
Athyriaceae	<i>Cullipteris esculenta</i>													
Poaceae	<i>Phragmites karka</i>		1.5	5				1.6	5					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>													
Equisetaceae	<i>Equisetum debile</i>		0.3	5				0.5	5					
Asteraceae	<i>Ageratum conyzoides</i>													
Commelinaceae	<i>Commelina diffusa</i>		0.4	5	0.3	5	0.4	5	0.4	10	0.4	10	0.4	10
Solanaceae	<i>Solanum nigrum</i>													
Euphorbiaceae	<i>Mallotus paniculatus</i>													
Poaceae	<i>Eleusine indica</i>													
Poaceae	<i>Pennisetum purpureum</i>													
Asteraceae	<i>Wedelia chinensis</i>													
Asteraceae	<i>Bidens alba</i>		0.7	5			0.5	8	0.7	5			0.5	8
Poaceae	<i>Panicum repens</i>		0.4	5				0.4	5					
Poaceae	<i>Coix lacryma-jobi</i>													
Convolvulaceae	<i>Ipomoea cairica</i>													
Cucurbitaceae	<i>Benincasa hispida</i>													
Fabaceae	<i>Pueraria lobata</i>													
Convolvulaceae	<i>Merremia hederacea</i>													
Poaceae	<i>Pennisetum alopecuroides</i>						2	5					1.6	5
Poaceae	<i>Brachiaria mutica</i>				1.2	2					1.2	5	1.3	5
Onagraceae	<i>Ludwigia erecta</i>													
Malvaceae	<i>Hibiscus rosa-sinensis</i>													
Cyperaceae	<i>Cyperus sp.</i>													
Balsaminaceae	<i>Impatiens walleriana</i>													
Amaranthaceae	<i>Celosia argentea</i>		1.7	5				1.5	5					
Bare Gound				55		93		72		35		85		62

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Stream Transect	Post construction monitoring						Post construction monitoring					
			Reference		Oct-16		T2		Reference		Nov-16		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>	Chinese name	0.5	10					0.5	10				
Moraceae	<i>Ficus hispida</i>	薔木												
Ulmaceae	<i>Celtis sinensis</i>	朴樹												
Poaceae	<i>Microstegium ciliatum</i>	闊葉竹	1.5	10				1.5	10					
Euphorbiaceae	<i>Macaranga tanarius</i>	魚尾					1.6	10				0.1	10	
Araceae	<i>Alocasia odora</i>	海芋	0.4	5				0.4	5					
Araceae	<i>Colocasia esculenta</i>	芋	0.5	5				0.5	5					
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁												
Athyriaceae	<i>Cullipteris esculenta</i>	菜蕨												
Poaceae	<i>Phragmites karka</i>	玉蘭蘆	1.6	5				1.6	5					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨												
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.5	5				0.5	5					
Asteraceae	<i>Ageratum conyzoides</i>	牻牛兒苗												
Commelinaceae	<i>Commelina diffusa</i>	箭筈草	0.5	10	0.3	10	0.3	10	0.5	10	0.1	10	0.1	10
Solanaceae	<i>Solanum nigrum</i>	龍葵												
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸												
Poaceae	<i>Eleusine indica</i>	牛筋草												
Poaceae	<i>Pennisetum purpureum</i>	象草												
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊												
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.8	5			0.5	8	0.8	5		0.1	8	
Poaceae	<i>Panicum repens</i>	結骨草	0.4	5				0.4	5					
Poaceae	<i>Coix lacryma-jobi</i>	薔草												
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍												
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜												
Fabaceae	<i>Pueraria lobata</i>	野葛												
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草					1.6	5				0.1	5	
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草												
Poaceae	<i>Brachiaria mutica</i>	巴拉草			1.2	5	1.3	5		0.1	5	0.1	5	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香												
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花												
Cyperaceae	<i>Cyperus sp.</i>	莎草												
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙												
Amaranthaceae	<i>Celosia argentea</i>	青葙	1.5	5				1.5	5					
Bare Ground				35		85		62		35		85		62

* Reference point was the sampling location outside the works area used to compare with the data within works area.
P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Stream Transect	Post construction monitoring						Post construction monitoring					
			Reference		Dec-16		T2		Reference		Jan-17		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>		0.5	10					0.5	10				
Moraceae	<i>Ficus hispida</i>													
Ulmaceae	<i>Celtis sinensis</i>													
Poaceae	<i>Microstegium ciliatum</i>		1.5	10				1.5	10					
Euphorbiaceae	<i>Macaranga tanarius</i>						0.2	10				0.3	10	
Araceae	<i>Alocasia odora</i>		0.4	5				0.4	5					
Araceae	<i>Colocasia esculenta</i>		0.5	5				0.5	5					
Myrtaceae	<i>Cleistocalyx operculatus</i>													
Athyriaceae	<i>Cullipteris esculenta</i>													
Poaceae	<i>Phragmites karka</i>		1.6	5				1.6	5					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>													
Equisetaceae	<i>Equisetum debile</i>		0.5	5				0.5	5					
Asteraceae	<i>Ageratum conyzoides</i>													
Commelinaceae	<i>Commelina diffusa</i>		0.5	10	0.2	10	0.2	10	0.5	10	0.3	10	0.2	10
Solanaceae	<i>Solanum nigrum</i>													
Euphorbiaceae	<i>Mallotus paniculatus</i>													
Poaceae	<i>Eleusine indica</i>													
Poaceae	<i>Pennisetum purpureum</i>													
Asteraceae	<i>Wedelia chinensis</i>													
Asteraceae	<i>Bidens alba</i>		0.8	5			0.3	8	0.8	5		0.3	8	
Poaceae	<i>Panicum repens</i>		0.4	5				0.4	5					
Poaceae	<i>Coix lacryma-jobi</i>													
Convolvulaceae	<i>Ipomoea cairica</i>													
Cucurbitaceae	<i>Benincasa hispida</i>													
Fabaceae	<i>Pueraria lobata</i>													
Convolvulaceae	<i>Merremia hederacea</i>													
Poaceae	<i>Pennisetum alopecuroides</i>						0.3	5				0.3	5	
Poaceae	<i>Brachiaria mutica</i>				0.3	5		0.3	5		0.3	5		0.3
Onagraceae	<i>Ludwigia erecta</i>													
Malvaceae	<i>Hibiscus rosa-sinensis</i>													
Cyperaceae	<i>Cyperus sp.</i>													
Balsaminaceae	<i>Impatiens walleriana</i>													
Amaranthaceae	<i>Celosia argentea</i>		1.5	5				1.5	5					
Bare Ground				35		85			62		35		85	62

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Stream Transect	Post construction monitoring						Post construction monitoring					
			Reference		Feb-17		T2		Reference		Mar-17		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>	Chinese name	0.5	10					0.5	10				
Moraceae	<i>Ficus hispida</i>	荔枝榕												
Ulmaceae	<i>Celtis sinensis</i>	朴樹												
Poaceae	<i>Microstegium ciliatum</i>	闊秀竹	1.5	10					1.6	10				
Euphorbiaceae	<i>Macaranga tanarius</i>	魚尾					0.3	10					0.3	10
Araceae	<i>Alocasia odora</i>	海芋	0.4	5					0.5	5				
Araceae	<i>Colocasia esculenta</i>	芋	0.5	5					0.5	5				
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁												
Athyriaceae	<i>Cullipteris esculenta</i>	菜蕨												
Poaceae	<i>Phragmites karka</i>	玉間蘆	1.6	5					1.6	5				
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨												
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.5	5					0.5	5				
Asteraceae	<i>Ageratum conyzoides</i>	牻牛兒苗												
Commelinaceae	<i>Commelina diffusa</i>	箭筈草	0.6	10	0.4	10	0.3	10	0.6	10	0.5	10	0.3	10
Solanaceae	<i>Solanum nigrum</i>	龍葵												
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸												
Poaceae	<i>Eleusine indica</i>	牛筋草												
Poaceae	<i>Pennisetum purpureum</i>	象草												
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊												
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.8	5			0.4	8	0.8	5			0.4	8
Poaceae	<i>Panicum repens</i>	結骨草	0.4	5					0.5	5				
Poaceae	<i>Coix lacryma-jobi</i>	薏苡												
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍												
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜												
Fabaceae	<i>Pueraria lobata</i>	野葛												
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草												
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草					0.3	5					0.3	10
Poaceae	<i>Brachiaria mutica</i>	巴拉草			0.3	5	0.3	5			0.5	10	0.3	5
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香												
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花												
Cyperaceae	<i>Cyperus sp.</i>	莎草												
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙												
Amaranthaceae	<i>Celosia argentea</i>	青葙	1.5	5					1.5	5				
Bare Ground				35		85		62		35		80		57

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Stream Transect	Post construction monitoring						Post construction monitoring					
			Reference		T1		T2		Reference		T1		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>	Chinese name	0.5	10					0.5	10				
Moraceae	<i>Ficus hispida</i>	薔木												
Ulmaceae	<i>Celtis sinensis</i>	朴樹												
Poaceae	<i>Microstegium ciliatum</i>	闊秀竹	1.6	10				1.7	10					
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐					0.3	10				0.3	10	
Araceae	<i>Alocasia odora</i>	海芋	0.5	5				0.6	5					
Araceae	<i>Colocasia esculenta</i>	芋	0.5	5				0.6	5					
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁												
Athyriaceae	<i>Cullipteris esculenta</i>	菜蕨												
Poaceae	<i>Phragmites karka</i>	玉間蘆	1.6	5				1.7	5					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨												
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.5	5				0.5	5					
Asteraceae	<i>Ageratum conyzoides</i>	牻牛兒苗												
Commelinaceae	<i>Commelina diffusa</i>	箭筈草	0.6	10	0.5	10	0.3	10	0.6	10	0.5	10	0.3	10
Solanaceae	<i>Solanum nigrum</i>	龍葵												
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸												
Poaceae	<i>Eleusine indica</i>	牛筋草												
Poaceae	<i>Pennisetum purpureum</i>	象草												
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊												
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.8	5			0.4	8	0.8	5			0.4	8
Poaceae	<i>Panicum repens</i>	結骨草	0.5	5				0.5	5					
Poaceae	<i>Coix lacryma-jobi</i>	薏苡												
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍												
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜												
Fabaceae	<i>Pueraria lobata</i>	野葛												
Convolvulaceae	<i>Merremia hederacea</i>	魚黃草												
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草					0.3	10				0.3	10	
Poaceae	<i>Brachiaria mutica</i>	巴拉草			0.5	10	0.3	5			0.5	10	0.3	5
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香												
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花												
Cyperaceae	<i>Cyperus sp.</i>	莎草												
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙												
Amaranthaceae	<i>Celosia argentea</i>	青葙	1.5	5				1.5	5					
Bare Gound				35		80			57		35		80	57

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Post construction monitoring						Post construction monitoring					
			Reference		T1		T2		Reference		T1		T2	
			Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%	Height (m)	%
Asteraceae	<i>Mikania micrantha</i>	蕨甘菊	0.5	5					0.5	5				
Moraceae	<i>Ficus hispida</i>	對基榕												
Ulmaceae	<i>Celtis sinensis</i>	朴樹												
Poaceae	<i>Microstegium ciliatum</i>	闊秀竹	1.7	5				1.7	5					
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐				0.3	5					0.4	5	
Araceae	<i>Alocasia odora</i>	海芋	0.6	5				0.6	5					
Araceae	<i>Colocasia esculenta</i>	芋	0.6	5				0.6	5					
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁												
Athyriaceae	<i>Cullipteris esculenta</i>	菜蕨												
Poaceae	<i>Phragmites karka</i>	玉間蘆	1.7	5				1.7	5					
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨												
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.5	5				0.5	5					
Asteraceae	<i>Ageratum conyzoides</i>	牻牛兒苗												
Commelinaceae	<i>Commelina diffusa</i>	箭筈草	0.6	5	0.5	10	0.3	5	0.6	5	0.5	10	0.3	5
Solanaceae	<i>Solanum nigrum</i>	龍葵												
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸												
Poaceae	<i>Eleusine indica</i>	牛筋草												
Poaceae	<i>Pennisetum purpureum</i>	象草												
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊												
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.8	5			0.4	3	0.8	5			0.4	3
Poaceae	<i>Panicum repens</i>	結骨草	0.5	5				0.6	5					
Poaceae	<i>Coix lacryma-jobi</i>	薏苡												
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍												
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜												
Fabaceae	<i>Pueraria lobata</i>	野葛												
Convolvulaceae	<i>Merremia hederacea</i>	魚貫草												
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草				0.3	10					0.4	10	
Poaceae	<i>Brachiaria mutica</i>	巴拉草			0.5	10	0.3	5			0.5	10	0.3	5
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香												
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花												
Cyperaceae	<i>Cyperus sp.</i>	莎草												
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙												
Amaranthaceae	<i>Celosia argentea</i>	青葙	1.5	5				1.5	5					
Bare Ground				50		80		72		50		80		72

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

P1 – Point count location 1; P2 – Point count location 2

Table 4.2. Flora species recorded from belt transect survey at the Upper Tai Po stream (T1- Upper stream sampling site and T2 - Lower stream sampling site)

Family	Species	Chinese name	Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						Post construction monitoring						
			Aug-17		T1		T2		Sep-17		T1		T2		Oct-17		T1		T2		Nov-17		T1		T2		Dec-17		T1		T2		
			Reference	Height (m)	%	Height (m)	%	Height (m)	%	Reference	Height (m)	%	Height (m)	%	Reference	Height (m)	%	Height (m)	%	Reference	Height (m)	%	Height (m)	%	Reference	Height (m)	%	Height (m)	%	Reference	Height (m)	%	Height (m)
Asteraceae	<i>Mikania micrantha</i>	蕨甘菊	0.5	5				0.5	5				0.5	5				0.6	5				0.6	5									
Moraceae	<i>Ficus hispida</i>	對基榕																															
Ulmaceae	<i>Celtis sinensis</i>	朴樹																															
Poaceae	<i>Microstegium ciliatum</i>	闊秀竹	1.7	5				1.7	5				1.7	5				1.6	5				1.6	5									
Euphorbiaceae	<i>Macaranga tanarius</i>	血桐			0.5	5					0.5	5					0.6	5								0.7	5				0.7	5	
Araceae	<i>Alocasia odora</i>	海芋	0.6	5				0.7	5				0.7	5				0.8	5				0.8	5						0.8	5		
Araceae	<i>Colocasia esculenta</i>	芋	0.6	5				0.7	5				0.7	5				0.8	5				0.8	5						0.8	5		
Myrtaceae	<i>Cleistocalyx operculatus</i>	水翁																															
Athyriaceae	<i>Callipteris esculenta</i>	菜蕨																															
Poaceae	<i>Phragmites karka</i>	玉間蘆	1.7	5				1.7	5				1.7	5				1.6	5				1.6	5						1.6	5		
Thelypteridaceae	<i>Cyclosorus parasiticus</i>	華南毛蕨																															
Equisetaceae	<i>Equisetum debile</i>	筆管草	0.5	5				0.6	5				0.6	5				0.7	5				0.7	5						0.7	5		
Asteraceae	<i>Ageratum conyzoides</i>	牻牛兒苗																															
Commelinaceae	<i>Commelina diffusa</i>	箭筈草	0.6	5	0.5	10	0.3	5	0.6	5	0.5	10	0.3	5	0.6	5	0.5	10	0.5	5	0.7	5	0.6	10	0.6	5	0.7	5	0.6	10	0.7	5	
Solanaceae	<i>Solanum nigrum</i>	龍葵																															
Euphorbiaceae	<i>Mallotus paniculatus</i>	白楸																															
Poaceae	<i>Eleusine indica</i>	牛筋草																															
Poaceae	<i>Pennisetum purpureum</i>	象草																															
Asteraceae	<i>Wedelia chinensis</i>	樹銀菊																															
Asteraceae	<i>Bidens alba</i>	白花鬼針草	0.8	5		0.4	3	0.8	5		0.4	3	0.8	5		0.4	3	0.8	5		0.5	3	0.9	5		0.5	3	0.9	5		0.5	3	
Poaceae	<i>Panicum repens</i>	結骨草	0.6	5				0.6	5				0.6	5				0.6	5				0.7	5						0.7	5		
Poaceae	<i>Coix lacryma-jobi</i>	薏苡																															
Convolvulaceae	<i>Ipomoea cairica</i>	五爪金龍																															
Cucurbitaceae	<i>Benincasa hispida</i>	冬瓜																															
Fabaceae	<i>Pueraria lobata</i>	野葛																															
Convolvulaceae	<i>Merremia hederacea</i>	魚貫草																															
Poaceae	<i>Pennisetum alopecuroides</i>	狼尾草			0.4	10				0.4	10				0.5	10					0.5	10				0.5	10			0.5	10		
Poaceae	<i>Brachiaria mutica</i>	巴拉草		0.5	10	0.3	5		0.5	10	0.3	5		0.5	10	0.3	5		0.5	10	0.4	5		0.5	10	0.4	5		0.5	10	0.5	5	
Onagraceae	<i>Ludwigia erecta</i>	美洲水丁香																															
Malvaceae	<i>Hibiscus rosa-sinensis</i>	大紅花																															
Cyperaceae	<i>Cyperus sp.</i>	莎草																															
Balsaminaceae	<i>Impatiens walleriana</i>	非洲鳳仙																															
Amaranthaceae	<i>Celosia argentea</i>	青葙	1.5	5				1.5	5				1.5	5				1.5	5				1.5	5					1.5	5			
Bare Ground				50		80		72	50		80		72		50		80		72		50		80		72		50		80		72		

- Reference point was the sampling location outside the works area used to compare with the data within works area.
P1 - Point count location 1; P2 - Point count location 2

Table 4.4. Odonate species recorded at the Upper Tai Po River

Species	Common name	Chinese name	Status	Commonness	Baseline survey	Impact monitoring					Impact monitoring				
					Oct-07	Jan-09	Jul-09	Jan-10	Jul-10	Jan-11	Jul-11	Jan-12	Jul-12	Mar-13	Jul-13
<i>Aethriamanta brevipennis brevipennis</i>	Evasive Adjutant	短腹異蜻	NP	U											
<i>Macrodiplox cora</i>	Coastal Glider	高翔浮蜻	NP	C											
<i>Ceriatrigon auranticum ryuksuanum</i>	Orange-tailed Sprite	琉球橘黃蜻	NP	VC											
<i>Coperia marginipes</i>	Yellow Featherlegs	黃條箭蜻	NP	VC											
<i>Crocotthemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC	+		+		+						
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蜻	NP	VC							+				
<i>Neurobasis chinensis</i>	Chinese Greenwing	綠帶色蜻	NP	C					+						
<i>Neurothemis fulvia</i>	Russet Percher	銅腹蜻	NP	VC											
<i>Orthetrum chrysis</i>	Red-faced Skimmer	紅面藍蜻	NP	VC		+	+		+				+		+
<i>Orthetrum glaucum</i>	Common blue skimmer	藍尾藍蜻	NP	VC	+	+	+								+
<i>Orthetrum lacinicum</i>	Marsh Skimmer	呂宋藍蜻	NP	VC									+		
<i>Orthetrum prunosum neglectum</i>	Common Red Skimmer	赤褐藍蜻	NP	VC											
<i>Palpopleura semaculata semaculata</i>	Asian Widow	六斑曲線蜻	NP	C									+		
<i>Pantala flavescens</i>	Wandering Glider	箭蜻	NP	VC	+		+	+	+	+	++	+	+	+	+
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒箭蜻	NP	VC											
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	橙面箭蜻	NP	C							+				
<i>Rhinoscypha perforata</i>	Common Blue Jewel	三斑藍蜻	NP	VC					+						
<i>Trithemis Aurora</i>	Crimson dropwing	鐵翅蜻	NP	VC	+										
<i>Trithemis festiva</i>	Indigo Dropwing	靛翅蜻	NP	VC							+		+		+
No of Species					4	2	4	1	6	1	4	1	5	1	4

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 according 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 Tai Po River

Species	Common name	Chinese name	Status	Commonness	Post construction monitoring																			
					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			
<i>Aethriamanta brevipennis brevipennis</i>	Evasive Adjutant	短腹異蜻	NP	U																				
<i>Macrodiplox cora</i>	Coastal Glider	高翔浮蜻	NP	C																				
<i>Ceriatrigon auranticum ryksuanum</i>	Orange-tailed Sprite	琉球橙黃蜻	NP	VC				+	+												+	+		
<i>Coperia marginipes</i>	Yellow Featherlegs	黃條拍翅	NP	VC							+	+	+	+								+	+	
<i>Crocthemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC					+														+	+
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蜻	NP	VC							+	+												
<i>Neurobasis chinensis</i>	Chinese Greenwing	華藍色蜻	NP	C			+	+	+													+	+	
<i>Neurothemis fulvia</i>	Russet Percher	縹緗蜻	NP	VC							+	+												
<i>Orthetrum chrysis</i>	Red-faced Skimmer	紅面藍翅	NP	VC	+																			
<i>Orthetrum glaucum</i>	Common blue skimmer	藍尾藍翅	NP	VC											+	+								
<i>Orthetrum laoticum</i>	Marsh Skimmer	呂宋藍翅	NP	VC								+	+									+	+	+
<i>Orthetrum prunosum neglectum</i>	Common Red Skimmer	赤褐藍翅	NP	VC																				+
<i>Palpopleura semaculata semaculata</i>	Asian Widow	六斑曲線蜻	NP	C																				
<i>Pantala flavescens</i>	Wandering Glider	黃蜻	NP	VC													+	+						
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒黑翅	NP	VC																				
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	橙面拍翅	NP	C							+													+
<i>Rhinocypha perforata</i>	Common Blue Jewel	三斑藍翅	NP	VC																			+	+
<i>Trithemis Aurora</i>	Crimson dropwing	縹緗拍翅	NP	VC				+				+	+	+	+	+	+	+	+	+				
<i>Trithemis festiva</i>	Indigo Dropwing	靛褐拍翅	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
No of Species					2	1	3	3	4	2	5	6	7	8	5	2	2	1	3	6	7			

Note: NP – Not protected in Hong Kong P; Protected in Hong Kong

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“+” – Species exists in the study area

“+” – Species common in the study area

“+++” – Species abundance in the study area

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

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

Table 4.4. Odonate species recorded at the Upper Tai Po River

Species	Common name	Chinese name	Status	Commonness	Post construction monitoring															
					Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	
<i>Aethriamanta brevipennis brevipennis</i>	Evasive Adjutant	短腹異蜻	NP	U													+	+	+	
<i>Macrodiplox cora</i>	Coastal Glider	高翔浮蜻	NP	C	+	+														
<i>Ceriatrion auranticum ryksuanum</i>	Orange-tailed Sprite	琉球橙黃蜻	NP	VC	+	+	+	+									+	+	+	+
<i>Coperia marginipes</i>	Yellow Featherlegs	黃條拍翅	NP	VC	+	+	+	+												
<i>Crocotthemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC		+	+	+	+	+									+	+
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蜻	NP	VC																
<i>Neurobasis chinensis</i>	Chinese Greenwing	綠翅色蜻	NP	C			+	+	+								+	+	+	+
<i>Neurothemis fulvia</i>	Russet Percher	銅藍蜻	NP	VC		+	+	+												
<i>Orthetrum chrysis</i>	Red-faced Skimmer	紅面灰蜻	NP	VC			+	+	+	+							+	+	+	+
<i>Orthetrum glaucum</i>	Common blue skimmer	藍尾灰蜻	NP	VC					+	+										
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻	NP	VC	+	+	+										+	+	+	+
<i>Orthetrum prunosum neglectum</i>	Common Red Skimmer	赤褐灰蜻	NP	VC	+	+											+	+	+	+
<i>Paltoptera semaculata semaculata</i>	Asian Widow	六斑曲線蜻	NP	C	+	+														
<i>Pantala flavescens</i>	Wandering Glider	箭蜻	NP	VC					+	+	+	+	+	+	+	+	+	+	+	+
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒箭蜻	NP	VC				+												
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	橙面拍翅	NP	C	+	+														
<i>Rhinocypha perforata</i>	Common Blue Jewel	三斑藍蜻	NP	VC	+	+	+	+												
<i>Trithemis Aurorea</i>	Crimson dropwing	鐵翅拍翅	NP	VC	+	+	+	+	+	+							+	+	+	+
<i>Trithemis festiva</i>	Indigo Dropwing	靛翅拍翅	NP	VC	+	+	+	+	+	+		+					+	+	+	+
No of Species					9	11	10	8	8	5	1	2	1	2	7	10	11	11	10	

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 according 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 UpperTai Po River

Species	Common name	Chinese name	Status	Commonness	Post construction monitoring																
					Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	
<i>Aethriamanta brevipennis brevipennis</i>	Evasive Adjutant	短腹異蜻	NP	U																	
<i>Macrodiplox cora</i>	Coastal Glider	高翔浮蜻	NP	C																	
<i>Ceriatrigon auranticum ryksuanum</i>	Orange-tailed Sprite	琉球橙黃蜻	NP	VC																	
<i>Coperia marginipes</i>	Yellow Featherlegs	黃條藍蜻	NP	VC									+	+	+	+	+				
<i>Crocotthemis servilia servilia</i>	Crimson Darter	紅蜻	NP	VC	+	+															
<i>Euphaea decorata</i>	Black-banded Gossamerwing	方帶幽蜻	NP	VC																	
<i>Neurobasis chinensis</i>	Chinese Greenwing	綠帶色蜻	NP	C	+	+							+	+	+	+	+	+	+	+	+
<i>Neurothemis fulvia</i>	Russet Percher	銅藍蜻	NP	VC																	
<i>Orthetrum chrysis</i>	Red-faced Skimmer	紅面藍蜻	NP	VC	+	+	+						+	+	+	+	+	+	+	+	+
<i>Orthetrum glaucum</i>	Common blue skimmer	藍尾藍蜻	NP	VC																	
<i>Orthetrum lacinicum</i>	Marsh Skimmer	尾尖藍蜻	NP	VC	+	+	+					+	+	+	+	+	+	+	+	+	+
<i>Orthetrum prunosum neglectum</i>	Common Red Skimmer	赤褐藍蜻	NP	VC																	
<i>Paltoptera semaculata semaculata</i>	Asian Widow	六斑曲線蜻	NP	C																	
<i>Pantala flavescens</i>	Wandering Glider	箭蜻	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒黑尾	NP	VC																	
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	橙面藍蜻	NP	C																	
<i>Rhinocypha perforata</i>	Common Blue Jewel	三斑藍蜻	NP	VC	+																
<i>Trithemis Aurora</i>	Crimson dropwing	藍翅藍蜻	NP	VC	+	+	+														
<i>Trithemis festiva</i>	Indigo Dropwing	藍翅藍蜻	NP	VC	+	+	+														
No of Species					8	7	5	1	1	2	3	6	9	10	10	11	9	7	5	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 according 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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Baseline survey		Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring								
			Oct-07		Jan-09		Jul-09		Jan-10		Jul-10		Jan-11		Jul-11		Jan-12		Jul-12									
			T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2						
Mollusca																												
<i>Biomphalaria</i> sp.	--	NP VC		+		+		+		+		+		+		+		+		+		+						
<i>Brotia hainanensis</i>	--	NP VC	++	+	++			++		++		++		+		+		+		+		+						
<i>Melanoides tuberculata</i>	螺絲里螺	NP VC				+		+		+		+		++		+		+		+		+						
<i>Physella acuta</i>	小綠球螺	NP VC												+		+		+		+		+						
<i>Pomacea canaliculata</i>	福壽螺	NP VC				+		+		++		+		+		+		+		+		+						
<i>Radix plicatulus</i>	鐘白螺	NP VC		++						+		+		+		+		+		+		+						
<i>Sinotia quadrata</i>	田螺	NP VC				++		+	++		++		++		+		+		+		+	+						
Insects																												
<i>Anisocentropus</i> sp.	--	NP VC																										
<i>Archipora</i> sp.	--	NP VC																										
<i>Aulocodes</i> sp.	--	NP VC								+																		
<i>Baetis</i> sp.	--	NP VC		+						+												+						
<i>Chironomus</i> sp.	孑孓	NP VC		+						+												+						
<i>Ephemera</i> sp.	--	NP VC																										
<i>Indobaetis</i> sp.	--	NP VC		+						+																		
<i>Mnais</i> sp.	--	NP VC		+						+												+						
Odonate Larvae	--	NP VC																										
<i>Orthetrum</i> sp.	--	NP VC		+						+												+						
<i>Petia</i> sp.	--	NP VC								+												+						
<i>Rhabdium</i> sp.	--	NP VC																				+						
Crustacea																												
<i>Caridina cantonensis</i>	雷車水蟹	NP VC								+												+						
<i>Cryptopotamon anacoluthon</i>	柳刺水蟹	NP C								+												+						
<i>Eriocheir japonica</i>	日本風車蟹	NP C								+												+						
<i>Macrobrachium hainanense</i>	海邊沼蟹	NP VC								+												+						
No of Species			5	6	9	0	5	11	2	5	11	11	6	11	15	8	10	6	5	12	4	4	10	6	4	14	7	1

Note:
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 "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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Impact monitoring			Impact monitoring			Post construction monitoring																		
			Mar-13			Jul-13			Jan-14			Feb-14			Mar-14			Apr-14			May-14			Jun-14			
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	
Mollusca																											
<i>Biomphalaria sp.</i>	--	NP	VC																								
<i>Brotia hainanensis</i>	--	NP	VC	+			+			+	+		+	+		+	+		+	+		+	+		+	+	
<i>Melanoides tuberculata</i>	螺絲里螺	NP	VC	+	+		+	+		+	+	+	+	+		+	+		+	+		+	+		+	+	
<i>Physella acuta</i>	小綠球螺	NP	VC	+																							
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+			+	+	+	+	+	+	+	+		+	+		+	+		+	+		+	+	
<i>Radix plicatulus</i>	鐘白螺	NP	VC	+			+			+	+	+	+	+		+	+		+	+		+	+		+	+	
<i>Sinoia quadrata</i>	田螺	NP	VC	+			+			+	+	+	+	+		+	+		+	+		+	+		+	+	
Insects																											
<i>Anisocentropus sp.</i>	--	NP	VC																								
<i>Archopora sp.</i>	--	NP	VC																								
<i>Aulocodes sp.</i>	--	NP	VC																								
<i>Baetis sp.</i>	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Chironomus sp.</i>	轉幼虫	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+		+	+		+	+	
<i>Ephemera sp.</i>	--	NP	VC																								
<i>Indobaetis sp.</i>	--	NP	VC				+			+			+			+			+			+			+		
<i>Mnais sp.</i>	--	NP	VC	+			+			+	+		+	+		+	+		+	+		+	+		+	+	
Odonate Larvae	--	NP	VC																								
<i>Orthetrum sp.</i>	--	NP	VC	+			+			+	+		+	+		+	+		+	+		+	+		+	+	
<i>Petia sp.</i>	--	NP	VC																								
<i>Rhabdium sp.</i>	--	NP	VC	+																							
Crustacea																											
<i>Caridina cantonensis</i>	雷東米蝦	NP	VC	+			+	+		+	+	+	+	+		+	+		+	+		+	+		+	+	
<i>Cryptopotamon anacoluthon</i>	柳刺潭蟹	NP	C	+			+			+			+			+			+			+			+		
<i>Eriocheir japonica</i>	日本風蟹	NP	C																								
<i>Macrobrachium hainanense</i>	海澄沼蟹	NP	VC	+			+			+	+		+	+		+	+		+	+		+	+		+	+	
No of Species				14	2	0	13	4	1	13	7	4	14	10	8	17	11	9	18	13	9	15	9	7	15	9	5

Note:
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 "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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring																							
			Jul-14			Aug-14			Sep-14			Oct-14			Nov-14			Dec-14			Jan-15					
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2			
Mollusca																										
<i>Biomphalaria</i> sp.	--	NP	VC	+			+			+			+			+			+			+				
<i>Brotia hainanensis</i>	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Melanoides tuberculata</i>	螺絲里螺	NP	VC	+	+		+			+			+			+			+			+				
<i>Physella acuta</i>	小綠珠螺	NP	VC							+			+			+			+			+				
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Radix plicatulus</i>	鐘白螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Sinoia quadrata</i>	田螺	NP	VC	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Insects																										
<i>Anisocentropus</i> sp.	--	NP	VC	+			+			+			+	+		+	+		+	+		+	+	+		
<i>Archipora</i> sp.	--	NP	VC				+			+			+			+			+			+		+		
<i>Aulocodes</i> sp.	--	NP	VC				+			+			+			+			+			+		+		
<i>Baetis</i> sp.	--	NP	VC	+			+			+			+			+			+			+		+		
<i>Chironomus</i> sp.	孑孓	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Ephemera</i> sp.	--	NP	VC	+			+			+			+			+			+			+		+		
<i>Indobaetis</i> sp.	--	NP	VC	+			+			+			+			+			+			+		+		
<i>Mnais</i> sp.	--	NP	VC	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Odonate Larvae	--	NP	VC																							
<i>Orthetrum</i> sp.	--	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Perla</i> sp.	--	NP	VC	+						+																
<i>Rhabdium</i> sp.	--	NP	VC	+			+			+			+													
Crustacea																										
<i>Caridina cantonensis</i>	雷車水蟹	NP	VC	+	+	+	+	+	+	+	+	+	+	++	+	+	++	+	+	++	+	+	++	+		
<i>Cryptopotamon anacoluthon</i>	柳刺水蟹	NP	C	+			+			+			+			+			+			+		+		
<i>Eriocheir japonica</i>	日本風蟹	NP	C																							
<i>Macrobrachium hainanense</i>	海邊沼蟹	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+		+	+	+		
No of Species				18	10	6	18	9	8	19	12	8	19	13	7	19	11	6	16	10	5	19	10	5		

Note:
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 "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
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Table 4.5 Aquatic Macro invertebrates recorded at Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring																							
			Feb-15			Mar-15			Apr-15			May-15			Jun-15			Jul-15			Aug-15			Sep-15		
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
Mollusca																										
<i>Biomphalaria</i> sp.	--	NP VC	+			+	+	+	+			+			+			+			+			+		
<i>Brotia hainanensis</i>	--	NP VC	+	+		+			+	+		+	+		+	+		+	+		+	+		+	+	
<i>Melanoides tuberculata</i>	螺絲螺	NP VC	+			+			+			+			+			+			+			+		
<i>Physella acuta</i>	小綠螺	NP VC	+			+			+			+			+			+			+			+		
<i>Pomacea canaliculata</i>	福壽螺	NP VC	+	+	+	+			+	+	+	+	+	+	++	+	++	++	+	++	+	+	++	+	+	++
<i>Radix plicatulus</i>	鐘白螺	NP VC	+			+	+		+			+			+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Insects																										
<i>Anisocentropus</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
<i>Arctophora</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
<i>Aulocodes</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
<i>Baetis</i> sp.	--	NP VC	+			+	+	+	+			+			+			+			+			+		
<i>Chironomus</i> sp.	孑孓	NP VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ephemera</i> sp.	--	NP VC	+			+	+		+			+			+			+			+			+		
<i>Indobaetis</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
<i>Mnais</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
Odonate Larvae	--	NP VC	+			+			+			+			+			+			+			+		
<i>Orthetrum</i> sp.	--	NP VC	+	+		+			+	+		+	+		+	+		+	+		+	+		+	+	
<i>Perla</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
<i>Rhabdium</i> sp.	--	NP VC	+			+			+			+			+			+			+			+		
Crustacea																										
<i>Caridina cantonensis</i>	雷車水蟹	NP VC	+	++	+	+	+		++	++		++	++	+	++	++	+	++	++	+	++	++	+	++	++	+
<i>Cryptopotamon anacoluthon</i>	柳刺水蟹	NP C	+			++	++	+	++	++	+	++	++		++	++		++	++		++	++		++	++	
<i>Eriocheir japonica</i>	日本風蟹	NP C	+			+			+			+			+			+			+			+		
<i>Macrobrachium hainanense</i>	海邊水蟹	NP VC	+	+		+			+	+		+			+			+			+			+		
No of Species			18	7	4	19	7	5	20	7	4	15	7	4	15	7	4	15	7	4	16	6	4	16	6	3

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Table 4.5 Aquatic Macro invertebrates recorded at Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring																								
			Oct-15			Nov-15			Dec-15			Jan-16			Feb-16			Mar-16			Apr-16			May-16			
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	
Mollusca																											
<i>Biomphalaria</i> sp.	--	NP	VC	+	+		+			+			+			+			+			+			+		
<i>Brotia hainanensis</i>	--	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+		+	+		+		
<i>Melanoides tuberculata</i>	螺絲里螺	NP	VC	+		+	+		+	+		+	+		+	+		+	+		+	+		+			
<i>Physella acuta</i>	小綠球螺	NP	VC																								
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	++	+	+	++	+	+	++	+	+	++	+	+	++	+	+	++	+	+	++	+	+	++		
<i>Radix plicatulus</i>	鐘白螺	NP	VC	+			+			+			+			+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+		+	+		+		
Insects																											
<i>Anisocentropus</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Archipora</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Aulocodes</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Baetis</i> sp.	--	NP	VC																								
<i>Chironomus</i> sp.	孑孓	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Ephemera</i> sp.	--	NP	VC																								
<i>Indobaetis</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Mnais</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
Odonate Larvae	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Orthetrum</i> sp.	--	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+		+	+		+		
<i>Petia</i> sp.	--	NP	VC	+			+			+			+			+			+			+			+		
<i>Rhabdium</i> sp.	--	NP	VC																								
Crustacea																											
<i>Caridina cantonensis</i>	雷車水蟹	NP	VC	++	+		++	+		++	+		++	+		++	+		++	+		++	+		++		
<i>Cryptopotamon anacoluthon</i>	柳刺水蟹	NP	C																								
<i>Eriocheir japonica</i>	日本風車蟹	NP	C																								
<i>Macrobrachium hainanense</i>	海邊沼蟹	NP	VC	+			+			+			+			+			+			+			+		
No of Species				16	6	3	16	6	3	16	6	3	16	6	3	16	6	3	16	6	3	16	6	3	15	6	3

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Table 4.5 Aquatic Macro invertebrates recorded at Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring																		
			Jun-16			Jul-16			Aug-16			Sep-16			Oct-16			Nov-16			
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	
Mollusca																					
<i>Biomphalaria</i> sp.	--	NP	VC	+			+			+			+			+			+		
<i>Brotia hainanensis</i>	--	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+	
<i>Melanooides tuberculata</i>	螺絲里螺	NP	VC	+		+	+		+	+		+	+		+	+		+	+	+	
<i>Physella acuta</i>	小綠珠螺	NP	VC																		
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Radix plicatulus</i>	鐘白螺	NP	VC	+			+			+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+	
Insects																					
<i>Anisocentropus</i> sp.	--	NP	VC	+			+			+			+			+			+		
<i>Archipora</i> sp.	--	NP	VC	+			+			+			+			+			+		
<i>Aulocodes</i> sp.	--	NP	VC																		
<i>Baetis</i> sp.	--	NP	VC																		
<i>Chironomus</i> sp.	孑孓	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Ephemera</i> sp.	--	NP	VC																		
<i>Indobaetis</i> sp.	--	NP	VC	+			+			+			+			+			+		
<i>Mnais</i> sp.	--	NP	VC	+			+			+			+			+			+		
Odonate Larvae	--	NP	VC	+			+			+			+			+			+		
<i>Orthetrum</i> sp.	--	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+	
<i>Perla</i> sp.	--	NP	VC	+			+			+			+			+			+		
<i>Rhabdium</i> sp.	--	NP	VC																		
Crustacea																					
<i>Caridina cantonensis</i>	雷東水螳	NP	VC	+	+		+	+		+	+		+	+		+	+		+	+	
<i>Cryptopotamon anacoluthon</i>	柳刺水螳	NP	C																		
<i>Eriocheir japonica</i>	日本風螯蟹	NP	C																		
<i>Macrobrachium hainanense</i>	海南沼蟹	NP	VC										+			+			+		
No of Species				15	6	3	15	6	3	15	6	3	17	6	3	17	6	3	17	6	3

Note:
 "NP" - Not protected in Hong Kong
 "r" - Listed in wild animals protection Ordinance (Cap. 170) and listed as "Near Threatened" in IUCN Red List Status
 "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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring											
			Dec-16			Jan-17			Feb-17			Mar-17		
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
Mollusca														
<i>Biomphalaria sp.</i>	--	NP VC	+			+			+			+		
<i>Brotia hainanensis</i>	--	NP VC	+	+		+	+		+	+		+	+	
<i>Melanoides tuberculata</i>	螺絲里螺	NP VC	+		+	+		+	+		+	+		+
<i>Physella acuta</i>	小綠球螺	NP VC												
<i>Pomacea canaliculata</i>	福寿螺	NP VC	+	+	+	+	+	+	+	+	+	+	+	+
<i>Radix plicatulus</i>	鐘白螺	NP VC	+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP VC	+	+		+	+		+	+		+	+	
Insects														
<i>Anisocentropus sp.</i>	--	NP VC	+			+			+			+		
<i>Archopora sp.</i>	--	NP VC	+			+			+			+		
<i>Aulocodes sp.</i>	--	NP VC												
<i>Baetis sp.</i>	--	NP VC												
<i>Chironomus sp.</i>	孑孓幼虫	NP VC	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ephemerella sp.</i>	--	NP VC												
<i>Indobaetis sp.</i>	--	NP VC	+			+			+			+		
<i>Mnais sp.</i>	--	NP VC												
Odonate Larvae	--	NP VC	+			+			+			+		
<i>Orithetrum sp.</i>	--	NP VC	+	+		+	+		+	+		+	+	
<i>Perla sp.</i>	--	NP VC	+			+			+			+		
<i>Rhabdium sp.</i>	--	NP VC												
Crustacea														
<i>Caridina cantonensis</i>	雷車水蟹	NP VC	+	+		+	+		+	+		+	+	
<i>Cryptopotamon anacoluthon</i>	柳刺水蟹	NP C	+			+			+			+		
<i>Eriocheir japonica</i>	日本風車蟹	NP C				+			+			+		
<i>Macrobrachium hainanense</i>	海邊沼蟹	NP VC	+			+			+			+		
No of Species			17	6	3	18	6	3	18	6	3	18	6	3

Note:

"NP" - Not protected in Hong Kong
 r - Listed in wild animals protection Ordinance (Cap. 100) and listed as "Near Threatened" in IUCN Red List Status
 "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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring														
			Apr-17			May-17			Jun-17			Jul-17			Aug-17		
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
Mollusca																	
<i>Biomphalaria sp.</i>	--	NP VC	+			+			+			+			+		
<i>Brotia hainanensis</i>	--	NP VC	+	+		+	+		+	+		+	+		+	+	
<i>Melanoides tuberculata</i>	螺絲里螺	NP VC	+		+	+		+		+		+		+		+	+
<i>Physella acuta</i>	小綠球螺	NP VC															
<i>Pomacea canaliculata</i>	福寿螺	NP VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Radix plicatulus</i>	鐘白螺	NP VC	+			+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP VC	+	+		+	+		+	+		+	+		+	+	
Insects																	
<i>Anisocentropus sp.</i>	--	NP VC	+			+			+			+			+		
<i>Archipora sp.</i>	--	NP VC	+			+			+			+			+		
<i>Aulocodes sp.</i>	--	NP VC															
<i>Baetis sp.</i>	--	NP VC															
<i>Chironomus sp.</i>	孑孓幼虫	NP VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ephemera sp.</i>	--	NP VC															
<i>Indobaetis sp.</i>	--	NP VC	+			+			+			+			+		
<i>Mnais sp.</i>	--	NP VC	+			+			+			+			+		
Odonate Larvae	--	NP VC	+			+			+			+			+		
<i>Orthetrum sp.</i>	--	NP VC	+	+		+	+		+	+		+	+		+	+	
<i>Perla sp.</i>	--	NP VC	+			+			+			+			+		
<i>Rhabdium sp.</i>	--	NP VC															
Crustacea																	
<i>Caridina cantonensis</i>	雷東米蝦	NP VC	+	+		+	+		+	+		+	+		+	+	
<i>Cryptopotamon anacoluthon</i>	柳刺潭蟹	NP C	+			+			+			+			+		
<i>Eriocheir japonica</i>	日本風蟹	NP C	+			+			+			+			+		
<i>Macrobrachium hainanense</i>	海南沼蟹	NP VC	+			+			+			+			+		
No of Species			18	6	3	18	6	3	18	6	3	18	6	3	18	6	3

Note:
 "NP" - Not protected in Hong Kong
 "r" - Listed in wild animals protection Ordinance (Cap. 170) and listed as "Near Threatened" in IUCN Red List Status
 "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 Upper Tai Po River (T1- Upper stream sampling site and T2- Lower stream sampling site)

Species	Chinese name	Sampling point	Post construction monitoring												
			Sep-17			Oct-17			Nov-17			Dec-17			
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	
Mollusca															
<i>Biomphalaria sp.</i>	--	NP	VC	+			+			+			+		
<i>Brotia hainanensis</i>	--	NP	VC	+	+		+	+		+	+		+	+	
<i>Melanoides tuberculata</i>	螺絲里螺	NP	VC	+		+	+		+		+		+		+
<i>Physella acuta</i>	小綠球螺	NP	VC												
<i>Pomacea canaliculata</i>	福寿螺	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+
<i>Radix plicatulus</i>	鐘白螺	NP	VC	+			+			+			+		
<i>Sinotia quadrata</i>	田螺	NP	VC	+	+		+	+		+	+		+	+	
Insects															
<i>Anisocentropus sp.</i>	--	NP	VC	+			+			+			+		
<i>Archipora sp.</i>	--	NP	VC	+			+			+			+		
<i>Aulocodes sp.</i>	--	NP	VC												
<i>Baetis sp.</i>	--	NP	VC												
<i>Chironomus sp.</i>	孑孓幼虫	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+
<i>Ephemera sp.</i>	--	NP	VC												
<i>Indobaetis sp.</i>	--	NP	VC	+			+			+			+		
<i>Mnais sp.</i>	--	NP	VC	+			+			+			+		
Odonate Larvae	--	NP	VC	+			+			+			+		
<i>Orthetrum sp.</i>	--	NP	VC	+	+		+	+		+	+		+	+	
<i>Perla sp.</i>	--	NP	VC	+			+			+			+		
<i>Rhabdium sp.</i>	--	NP	VC												
Crustacea															
<i>Caridina cantonensis</i>	雷車水蟹	NP	VC	+	+		+	+		+	+		+	+	
<i>Cryptopotamon anacolumbon</i>	柳刺水蟹	NP	C	+			+			+			+		
<i>Eriocheir japonica</i>	日本風車蟹	NP	C	+			+			+			+		
<i>Macrobrachium hainanense</i>	海邊沼蟹	NP	VC	+			+			+			+		
No of Species				18	6	3	18	6	3	18	6	3	18	6	3

Note:

- *NP* - Not protected in Hong Kong
- *r* - Listed in wild animals protection Ordinance (Cap. 170) and listed as "Near Threatened" in IUCN Red List Status
- *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 Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species	Status	Commonness	Baseline survey		Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Impact monitoring			Post construction monitoring									
			Oct-07		Jan-09		Jul-09			Jan-10			Jul-10			Jan-11			Jul-11			Jan-12			Jul-12			Mar-13			Jul-13			Jan-14			Feb-14				
			T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2				
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	++			+																																	
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R																																						
<i>Liniparhomaloptera disparis</i>	擬平鰈	NP	C																																						
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C					+						+						+																					
<i>Oreochromis niloticus</i>	尼羅白鰮非鯰	NP	C	+																																					
<i>Parazacco spilurus</i>	異鱸	V and	C	++				+						+						+																					
<i>Pseudobagrus trilineatus</i>	三線擬鰱	NP,GC	R																																						
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰕	NP	C	+				+						+						++																					
<i>Pterocryptis cochinchinensis</i>	越南鰮鰻	NP	C																																						
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+				+						+						+																					
<i>Rhinogobius spp.</i>	鰕鰂魚	NP	C	+				+						+						+																					
<i>Schistura fasciolata</i>	橫紋南鰈	NP	C	+				+						+						+																					
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	++				+						+						+																					
		2x2m fish		70	60	15	8	25	10	20	100	10	2	8	10	7	100	10	5	20	6	2	4	6	2	5	5	2	2	5	2	1	5	2	1	12	8	6	10	12	10
		No of Speices		8	1	7	3	1	7	4	3	7	4	4	7	7	5	8	5	2	9	2	5	8	3	3	8	2	2	9	2	1	9	4	1	8	4	3	8	5	4
Amphibian																																									
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC																																						

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 areae
V – Listed as vulnerable in China Fish Red Data Book
GC- Global Concern - Fellowes *et al* (2002)
- Reference point was the sampling location outside the works area used to compare with the data within works area.

Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species	Status	Commonness	Post construction monitoring																																							
			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			
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2				
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R				+				+				+				+				+				+					+				+						
<i>Liparohomaloptera disparis</i>	擬平鰾	NP	C	+			+			+			+			+			+			+			+			+				+				+						
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C				+			+			+			+			+			+			+			+				+				+						
<i>Oreochromis niloticus</i>	尼羅白鱔非鯽	NP	C	+			+			+			+			+			+			+			+			+				+				+						
<i>Parazacco spilurus</i>	異鱖	V and NP	GC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Pseudobagrus trilineatus</i>	三線擬鰻	NP	GC				+			+			+			+			+			+			+			+				+				+						
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰕	NP	C	+	+		+			+			+			+			+			+			+			+				+				+						
<i>Pterocryptis cochinchinensis</i>	越南鰻鯪	NP	C				+			+			+			+			+			+			+			+				+				+						
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Rhinogobius spp.</i>	鰻澤魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Schistura fasciolata</i>	橫紋南鰻	NP	C	+	+		+			+			+			+			+			+			+			+				+				+						
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+			+			+			+			+			+			+			+			+				+				+						
		2x2m fish		16	10	8	16	10	8	12	4	2	12	4	2	15	5	4	20	8	5	30	10	10	40	15	20	50	20	30	60	30	30	50	20	20	40	20	20	50	20	20
		No of Speices		9	5	4	12	5	4	12	2	1	12	2	2	12	2	2	12	3	4	12	3	4	12	3	4	12	3	4	12	3	4	12	4	4	12	4	4	12	4	4
Amphibian																																										
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC	+			+			+			+			+			+			+			+			+				+				+				+		

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 areae
 V – Listed as vulnerable in China Fish Red Data Book
 GC- Global Concern - Fellowes *et al* (2002)
 - Reference point was the sampling location outside the works area used to compare with the data within works area.

Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species	Status	Commonness	Post construction monitoring																																		
			Apr-15			May-15			Jun-15			Jul-15			Aug-15			Sep-15			Oct-15			Nov-15			Dec-15			Jan-16			Feb-16				
			Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference				
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R	+			+				+				+																						
<i>Lipiparhomaloptera disparis</i>	擬平鰾	NP	C	+			+								+																						
<i>Misgurnus anguillicaudatus</i>	泥鰱	NP	C	+																																	
<i>Oreochromis niloticus</i>	尼羅白鱒非鯽	NP	C			+			+				+					+																			
<i>Parazacco spilurus</i>	異鱸	V and	C	+	+		+	+		+	+		+	+		+	+		+	+		+	+		+	+		+	+		+						
<i>Pseudobagrus trilineatus</i>	三線擬鰱	NP,GC	R	+			+			+			+			+			+			+			+			+									
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰾	NP	C	+			+			+			+			+			+			+			+			+									
<i>Pterocryptis cochinchinensis</i>	越南鰻鯪	NP	C	+			+			+			+			+			+			+			+			+									
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+						
<i>Schistura fasciolata</i>	橫紋南鰾	NP	C	+			+			+			+			+			+			+			+			+									
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+			+			+			+			+			+			+			+			+									
		2x2m fish		40	15	20	12	4	2	10	4	2	8	4	2	10	5	2	15	7	6	20	10	5	35	15	10	45	20	5	50	15	5	45	20	5	45
		No of Speices		12	4	4	11	4	4	11	4	4	11	4	4	11	4	3	11	4	3	12	4	1	12	4	1	11	4	1	11	4	1	11	4	1	11
Amphibian																																					
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC	+			+			+			+			+			+			+			+			+									

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
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“+++” – Species abundance in the study areae
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GC- Global Concern - Fellowes *et al* (2002)
- Reference point was the sampling location outside the works area used to compare with the data within works area.

Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species		Status	Commonness	Post construction monitoring												Post construction monitoring						Post construction monitoring							
				Mar-16			Apr-16			May-16			Jun-16			Jul-16			Aug-16			Sep-16			Oct-16				
				T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+		+	+		+						+				+						+				
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R												+				+						+				
<i>Liniparhomaloptera disparis</i>	擬平鰾	NP	C			+			+						+				+						+				
<i>Misgurnus anguillicaudatus</i>	泥鰍	NP	C																										
<i>Oreochromis niloticus</i>	尼羅白鰾非鯽	NP	C			+			+						+				+						+				
<i>Parazacco spilurus</i>	異鱸	V and	C	+		+	+		+	+					+	+			+	+					+				
<i>Pseudobagrus trilineatus</i>	三線擬鱮	NP,GC	R						+						+				+						+				
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰾	NP	C			+			+						+				+						+				
<i>Pterocryptis cochinchinensis</i>	越南隱鰻鯪	NP	C			+			+						+				+						+				
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+		+	+		+						+				+						+				
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
<i>Schistura fasciolata</i>	橫紋南鰾	NP	C			+			+						+				+						+				
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C			+			+						+				+						+				
		2x2m fish		20	5	40	15	5	25	10	5	25	10	5	20	7	2		22	5	2			22	2	2	25	2	2
		No of Speices		4	1	11	4	1	12	2	1	11	2	1	12	2	1		12	2	1			12	1	1	12	1	1
Amphibian																													
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC			+			+																+				

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
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 “+” – Species exists in the study area
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Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species		Status	Commonness	Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring		
				Nov-16			Dec-16			Jan-17			Feb-17			Mar-17		
				Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+			+			+			+			+		
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R	+			+			+			+			+		
<i>Liniparhomaloptera disparis</i>	擬平鰲	NP	C	+			+			+			+			+		
<i>Misgurnus anguillicaudatus</i>	泥鰌	NP	C															
<i>Oreochromis niloticus</i>	尼羅口鱒非鯽	NP	C	+			+			+			+			+		
<i>Parazacco spilurus</i>	異鱸	V and	C	+			+			+			+			+		
<i>Pseudobagrus trilineatus</i>	三線擬鱮	NP,GC	R	+			+			+			+			+		
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰕	NP	C	+			+			+			+			+		
<i>Pterocryptis cochinchinensis</i>	越南隱鰕鯪	NP	C	+			+			+			+			+		
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+			+			+			+			+		
<i>Rhinogobius spp.</i>	鰕塘魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<i>Schistura fasciolata</i>	橫紋南鰕	NP	C	+			+			+			+			+		
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+			+			+			+			+		
		2x2m fish		30	2	2	35	2	2	40	2	2	45	2	2	45	2	2
		No of Speices		12	1	1	12	1	1	12	1	1	12	1	1	12	1	1
Amphibian																		
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC															

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Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species		Status	Commonness	Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			Post construction monitoring			
				Apr-17			May-17			Jun-17			Jul-17			Aug-17			Sep-17			
				Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	Reference	T1	T2	
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+			+			+			+			+			+			
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R	+			+			+			+			+			+			
<i>Liniparhomaloptera disparis</i>	擬平鰲	NP	C	+			+			+			+			+			+			
<i>Misgurnus anguillicaudatus</i>	泥鰌	NP	C																			
<i>Oreochromis niloticus</i>	尼羅口鱒非鯽	NP	C	+			+			+			+			+			+			
<i>Parazacco spilurus</i>	異鱸	V and	C	+			+			+			+			+			+			
<i>Pseudobagrus trilineatus</i>	三線擬鱮	NP,GC	R	+			+			+			+			+			+			
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰍	NP	C	+			+			+			+			+			+			
<i>Pterocryptis cochinchinensis</i>	越南鰻鯪	NP	C	+			+			+			+			+			+			
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+			+			+			+			+			+			
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
<i>Schistura fasciolata</i>	橫紋南鰻	NP	C	+			+			+			+			+			+			
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+			+			+			+			+			+			
		2x2m fish		40	2	2	30	2	2	20	2	2	15	1	1	20	1	1	25	1	1	
		No of Speices		12	1	1	12	1	1	12	1	1	12	1	1	12	1	1	12	1	1	
Amphibian																						
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC														+			+		

Note: NP – Not protected in Hong Kong; P - Protected in Hong Kong
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Table 4.6 Fish species and Hong Kong Newt recorded at Upper Tai Po River (T1- Upper stream sampling site and T2 - Lower stream sampling

Species		Status	Commonness	Post construction monitoring			Post construction monitoring			Post construction monitoring		
				Oct-17			Nov-17			Dec-17		
				Reference	T1	T2	Reference	T1	T2	Reference	T1	T2
<i>Gambusia affinis</i>	食蚊魚	NP	VC	+			+			+		
<i>Glyptothorax pallozonum</i>	白線紋胸鮡	NP	R	+			+			+		
<i>Liniparhomaloptera disparis</i>	擬平鰲	NP	C	+			+			+		
<i>Misgurnus anguillicaudatus</i>	泥鰌	NP	C									
<i>Oreochromis niloticus</i>	尼羅口鱒非鯽	NP	C	+			+			+		
<i>Parazacco spilurus</i>	異鱸	V and	C	+			+			+		
<i>Pseudobagrus trilineatus</i>	三線擬鱮	NP,GC	R	+			+			+		
<i>Pseudogastromyzon myersi</i>	麥氏擬腹吸鰍	NP	C	+			+			+		
<i>Pterocryptis cochinchinensis</i>	越南隱鰻鮠	NP	C	+			+			+		
<i>Puntius semifasciolatus</i>	七星魚	NP	C	+			+			+		
<i>Rhinogobius spp.</i>	鰕虎魚	NP	C	+	+	+	+	+	+	+	+	+
<i>Schistura fasciolata</i>	橫紋南鰻	NP	C	+			+			+		
<i>Xiphophorus hellerii</i>	劍尾魚	NP	C	+			+			+		
		2x2m fish		25	1	1	25	1	1	25	1	1
		No of Speices		12	1	1	12	1	1	12	1	1
Amphibian												
<i>Paramesotriton hongkongensis</i>	香港瘰螈	P	UC		+			+			+	

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