

Issue No. : Issue 1
Issue Date : October 2021
Project No. : 1825



UPDATED FISHERIES SURVEY REPORT

FOR

PORT SHELTER PHASE 3, PO TOI O SEWERAGE TREATMENT PLANT EM&A

Prepared by
Allied Environmental Consultants Limited
In Association with
China Hong Kong Ecology Consultants Ltd.

COMMERCIAL-IN-CONFIDENCE

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Certified by:

A handwritten signature in black ink, appearing to read 'Timmy Wong', written over a horizontal line.

Timmy WONG
Environmental Team Leader

Verified by:

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F.C. TSANG
Independent Environmental Checker



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Drainage Services Department
Special Duty Division
42/F, Revenue Tower, 5 Gloucester Road,
Wan Chai, Hong Kong.

Attention: Ms. Wing W.Y. Law

20 October 2021

Dear Wing,

Sewerage Works at Po Toi O
Updated Fisheries Survey Report

I refer to the email from the ET dated 20 October 2021 concerning the captioned. I have no further comment on the Updated Fisheries Survey Report (Issue 1) and hereby verify this document in accordance with Condition 2.11 of the Environmental Permit with permit No EP-516/2016.

Yours faithfully,

F.C. Tsang
Independent Environmental Checker

cc. ETL – Timmy WONG

Document Verification

**Project Title**

Port Shelter Phase 3, Po Toi
O Sewerage Treatment
Plant EM&A

Project No.

1825

Document Title

Updated Fisheries Survey Report

Issue Issue Date**No.**

1 October 2021

Description

1st Submission

Prepared by

Mark Shea

Checked by

Chris Lo

Approved by

Grace Kwok

Three handwritten signatures in blue ink are visible. The first signature is for Mark Shea, the second for Chris Lo, and the third for Grace Kwok. The signatures are written over the printed names.

Agreement No. CE41/2013 (EP)
Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O
Environmental Team Services (2020-2022)

UPDATED FISHERIES SURVEY REPORT (DRAFT)

Prepared by:
China Hong Kong Ecology Consultants Ltd.
Issue Date: August 2021



Prepared by: _____
Mark, Shea She Sang
Director

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1. INTRODUCTION

- 1.1 China Hong Kong Ecology Consultants Ltd. has been commissioned to conduct a supplementary fish survey (Adult fish) using standard methods to assess the impact on fish fauna and fisheries resources in the vicinity of the planned location of the outfall diffuser before the construction of the submarine outfall for the Project “Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O” in accordance with Condition 2.11 of the EP and Conditions of Approval under Section 8(3) of the EIA Ordinance (Application No. EIA- 244/2016). Detailed fisheries impact assessment had been conducted in the approved EIA report and this updated fisheries survey report is to affirm the assessment made by the approved EIA report based on the findings of the updated fisheries survey.

2 OBJECTIVES

- 2.1 The following objectives that was completed by China Hong Kong Ecology Consultants Ltd.
- Provide the details of the survey methodology, duration and timing to assess the impact on fisheries resources in the vicinity of the planned location of the outfall diffuser. As stated in EP-516/2016 Section 2.11 (i) and Conditions of Approval under Section 8(3) of the EIA Ordinance (Application No. EIA- 244/2016) , these details shall be submitted to the Director for approval before commencement of the survey ; and
 - Collect findings of the updated fisheries survey (adult fish survey) to ascertain the impact on fisheries resources in the vicinity of the planned location of the outfall diffuser before the construction of submarine outfall of the Project.

3 RELEVANT LEGISLATIONS, STANDARDS & GUIDELINES

- 3.1 Reference has been made to the following Ordinances and Regulations which are relevant to this study:
- The Environmental Impact Assessment Ordinance (Cap. 499) (EIAO) and the associated Technical Memorandum (TM) (i.e. EIAO-TM Annexes 9 & 17);
 - Fisheries Protection Ordinance (Cap. 171) and its subsidiary legislation, the Fisheries Protection Regulations;
 - Marine Fish Culture Ordinance (Cap. 353) and associated subsidiary legislation; and
 - Water Pollution Control Ordinance (Cap. 358) and its supporting regulations and statements.

4 STUDY AREA AND SENSITIVE RECEIVERS

4.1 The Study Area for fisheries impact assessment covering Po Toi O bay and Clearwater Bay (Figure 1). Sensitive receivers identified within the Study Area were as follows:

- Po Toi O Fish Culture Zone (PTOFCZ);
- Fishing ground in the eastern waters of Hong Kong including Po Toi O;
- Spawning and nursery grounds for commercial fisheries resources in the eastern waters of Hong Kong; and
- Artificial reefs in the outer Port Shelter.

5 METHODOLOGY

5.1 Gill netting and cage trapping were the fishing methods proposed to collect site specific data for the updated fisheries survey. These proposed fish survey methods are commonly used in EIA for marine project. Two daytime surveys covering each of the dry and wet seasons were carried out in 17 and 21 June of 2021 (wet season) and 28 and 29 January of 2021 (dry season) respectively. The updated fisheries survey was conducted by fisheries specialist who has at least 5 years of relevant experience (**Appendix I**).

5.2 The fisheries survey method proposed is as follows:

- i) Four survey locations are proposed to sample pelagic (gill netting) and demersal (cage trapping) adult fish resources. The locations are comprised of two impact sites (I1 & I2) located nearby proposed submarine outfall and two reference sites (R3 & R4) located approximately 500m (R3) and 300m (R4) away from the submarine outfall (**Figure 1**). The purpose of reference sites is to provide comparable result of an unaffected area by the project. To avoid marine traffic and for safety of sampling operation, locations were chosen as near shore as possible, i.e. within approx. 50 meters from shore line. Actual sampling locations were recorded by using global positioning system (GPS) when conduct field surveys.
- ii) **Gill netting (Adult fish survey)** - A pair of gill nets were deployed for one hour at each sampling location. The dimension of nets was 1m deep, 30 – 50 m in length, depending on commercial availability. The net was comprised of three layers, with two 20cm mesh stretches sandwiching a 5 cm mesh stretch.
- iii) **Cage trapping (Adult fish survey)** - Demersal fish survey was performed by cage trapping, a commonly fishing method used by local fisherman. Two sets of cage traps with mesh size approx. 2.5cm, 50cm in diameter and 20cm in

depth was deployed for three hours at each sampling location, at a distance about 20m. The cage traps were baited with fish or shrimps or other suitable bait.

- iv) The catches from the adult fish survey were washed and recorded immediately and identified to species level as far as practicable. The specimens were analysed for species composition and diversity, abundance, size (total length, standard length and fork length as appropriate), biomass in weight. Diversity of fisheries resources was presented as species richness, Shannon-Wiener diversity (H) and Pielou's evenness (J). Descriptive statistics for the measured parameters described above, including sum, mean value and standard deviation, analysed for the survey locations over the dry and wet seasons as appropriate.

6 LITERATURE REVIEW

Port Survey

- 6.1 Port surveys 2016/17 and 2006, are comprehensive interview surveys, conducted by the Agriculture Fisheries and Conservation Department to collect updated information on fishing operations and fisheries production within Hong Kong waters in 2015-2016 and 2006. According to the Port Surveys, Po Toi O is regarded as one of the homeport of local fishing vessel in Hong Kong. The overall fisheries production within the Study Area was relatively medium abundance among Hong Kong Waters as stated in Port surveys 2016/17 and 2006 (AFCD, 2006; AFCD, 2021).

Main Commercial Families of Fisheries Resources

- 6.2 Based on the Survey on Fisheries Resources in Hong Kong (2010-2015) (SCSFRI, 2017), the main commercial Families within the Study Area (South-Eastern Waters of Hong Kong) from shrimp trawl surveys and stern trawl surveys are provided in **Table 1**. Leiognathidae was the family ranked as top one among the main commercial families in South-Eastern (SE) Water of Hong Kong from both shrimp trawl surveys and stern trawl surveys.

Table 1. Main Commercial Families in South-Eastern (SE) Water of Hong Kong from Shrimp Trawl Surveys and Stern Trawl Surveys (SCSFRI, 2017)

Rank#	Shrimp Trawl Surveys	Stern Trawl Surveys
1	Leiognathidae	Leiognathidae
2	Platycephalidae	Sparidae
3	Sparidae	Carangidae
4	Portunidae	Clupeidae
5	Sciaenidae	Engraulidae
6	Polynemidae	Sciaenidae
7	Cynoglossidae	Trichiuridae
8	Penaeidae	Stromateidae
9	Terapontidae	Nemipteridae
10	Synodontidae	Synodontidae
# Consolidated ranking based on the biomass of each family collected in the surveys		

Fish Spawning and Nursery Grounds

6.3 According to the consultancy paper “Fisheries Resources and Fishing Operations in Hong Kong Waters” (ERM 1998), the Eastern Waters where the Study Area is located, is an important spawning area. The major species recorded in the Eastern Waters included *Apogon quadrifasciatus*, *Parapristipoma trilineatum*, *Sebasticus marmoratus*, *Trichiurus haumela*, *Upeneus sulphureus* and *U. tragula*. However, the consultancy paper indicated that no fish fry was caught in Po Toi O Bay and only 1,000 – 2,000 tails/ha/year fry caught (a relatively low productivity among Hong Kong waters) was recorded in the edge of the Study Area, adjacent to the outer Port Shelter (ERM 1998). Similarly, the Port Survey 2006 pointed out that fish fry production within the Study Area was low (> 0 & ≤ 50 tails/ha) among Hong Kong waters (AFCD, 2014).

Culture Fisheries

6.4 With reference to Legislative Council discussion paper “Marine Fish Culture in Hong Kong” (LC Paper No. CB(2)2520/11-12(01)) prepared in 2012, Po Toi O is regarded as one of the designated fish culture zones in Hong Kong. The licensed area of the Po Toi O fish culture zone at May 2012 is 38,200m².

6.5 Po Toi O fish culture zone is also under the list of rafts allowed to conduct recreational fishing (AFCD, 2021a). The expiry date of recreational fishing consent letter of Po Toi O fish culture zone is 18/11/2021.

7 SURVEY RESULTS

Adult Fish Survey

7.1 Based on the survey results, a total of 8678 g of 94 individual comprising of 15 species and 14 families were recorded covering dry and wet seasons in four sampling locations, in which 11 species were record in dry season and 9 species were recorded in wet season. Among the recorded species, Chordata was the major phylum captured, followed by Crustacea, Mollusca and Echinodermata. *Siganus fuscescens* and *Stethojulis interrupta* were the dominated species in terms of biomass and abundance for the four sampling locations. These two species were of low commercial value. The fisheries survey result is summarised in **Appendix 2-4**. Survey photos are showed in **Appendix 5**.

7.2 The overall adult fish resources recorded from the four sampling locations are presented in **Table 2**. The highest record of species, biomass and abundance for fish resources were at sampling location I2. While, the lowest record of species, biomass and abundance for fish resources were at sampling location I1. The total length of the recorded species ranged from 6cm to 20cm.

Table 2a. The Overall Fish Resources within the Study Area

Sampling Location	Mean No. of species (\pm S.D.)	Mean Biomass (g) (\pm S.D.)	Mean No. of Individual (\pm S.D.)	Total No. of Species	Total Biomass (g)	Total No. of Individual	Dominant Species
I1	1 \pm 0	403 \pm 343.7	1.3 \pm 0.5	4	1168	5	<i>Siganus fuscescens</i>
I2	3.5 \pm 1	720 \pm 471.7	13.3 \pm 10.7	14	3351	53	<i>Stethojulis interrupta</i>
R3	1.3 \pm 0.5	457.5 \pm 230.5	1.8 \pm 0.5	5	1057	7	<i>Siganus fuscescens</i>
R4	2.8 \pm 2.1	661.5 \pm 772.4	7.3 \pm 5.1	10	3102	29	<i>Stethojulis interrupta</i>
Overall total	2.1 \pm 1.5	542.4 \pm 522.7	5.9 \pm 7.3	15	8678	94	<i>Stethojulis interrupta</i> , <i>Siganus fuscescens</i>

7.3 In **Table 2b**, the fish resources captured by cage trapping and gill netting were presented. In terms of cage trapping, total of 577g of 5 individuals comprising 3 species from 2 families were recorded. The highest record in terms of species, biomass and abundance was recorded at sampling location R4. For gill netting, a total of 8101g of 89 individuals comprising 14 species from 14 families were recorded. The highest record in terms of species, biomass and abundance was recorded at sampling location I2. Based on the survey result, the method of gill netting was found more productive in

capturing fish resources in terms of biomass, abundance and number of species at all sampling locations. The summary of overall adult fish resources by two methods are provided in **Table 2b**.

Table 2b. The Overall Adult Fish Resources by Cage Trapping and Gill Netting

Sampling Location	Cage Trapping			Gill netting		
	Mean No. of Species (\pm S.D.)	Mean Biomass (g) (\pm S.D.)	Mean No. of Individual (\pm S.D.)	Mean No. of Species (\pm S.D.)	Mean Biomass (g) (\pm S.D.)	Mean No. of Individual (\pm S.D.)
I1	0.3 \pm 0.5	9.5 \pm 19	0.3 \pm 0.5	0.8 \pm 0.5	282.5 \pm 353.4	1 \pm 0.8
I2	0.3 \pm 0.5	70.8 \pm 141.5	0.3 \pm 0.5	3.3 \pm 1	767 \pm 466.8	13 \pm 10.8
R3	0.3 \pm 0.5	9.5 \pm 19	0.3 \pm 0.5	1 \pm 1	254.8 \pm 243.3	1.5 \pm 1
R4	0.5 \pm 1	54.5 \pm 109	0.5 \pm 1	2.3 \pm 1.5	721 \pm 759.5	6.8 \pm 5.4

Commercial Value

7.4 According to the Fish Marketing Organisation's (FMO) wholesale prices of fresh marine fish, the wholesale average price is 74.79HK\$/kg in 2018 and 2019 (FMO, 2021). The commercial value of the captured species were ranked as three classes (High >80HK\$/kg); Medium \$70-80HK\$/kg); Low <70HK\$/kg) with reference Fish Marketing Organisation's (FMO) wholesale prices and EIA study for Three-runway System (FMO 2021a and Mott 2013).

7.5 Among the captured 15 species of fish resources, 12 species was classified as species with commercial value, occupying 83% of the total biomass and 91% of the total abundance. Among the three ranked price for the fish resources, the fish resources with low commercial value occupied the highest proportion (48% of the total biomass and 83% of the total abundance) among the captured fish. The dominated species were *Siganus fuscescens* and *Stethojulis interrupta* at four sampling locations, which accounted for 41% and 33% of the total abundance of the captured fish. These two species were both of low commercial value. *Sebastiscus marmoratus* and *Portunus pelagicus* were recorded as species of high commercial value, however, biomass and abundance of these two species were only 6% and 4% of the total biomass and abundance. Therefore, the overall commercial value of fish resources captured within the Study Area is considered to be low. The list of commercial value of the fish resources captured is shown in **Appendix 2**. The top ten species of commercial importance within the Study Area are summarized in **Table 3**.

Table 3. The Top Ten Species of Commercial Importance within the Study Area

Family	Species	Level of Commercial Value ^(a)	Biomass (g)	% of Total Biomass (Rank)	Abundance	% of Total Abundance (Rank)
Loliginidae	Squid	Medium	1990	22.9(1)	3	3.2(4)
Siganidae	<i>Siganus fuscescens</i>	Low	1637	18.9(2)	39	41.5(1)
Mugilidae	<i>Mugil cephalus</i>	Low	1128	13.0(3)	2	2.1(6)
Labridae	<i>Stethojulis interrupta</i>	Low	839	9.7(4)	31	33.0(2)
Portunidae	<i>Charybdis japonica</i>	Nil	761	8.8(5)	5	5.3(3)
Holothuriidae	<i>Holothuria atra</i>	Nil	632	7.3(6)	1	1.1(7)
Monacanthidae	<i>Monacanthus chinensis</i>	Medium	472	5.4(7)	1	1.1(8)
Carangidae	<i>Trachinotus blochii</i>	Low	320	3.7(8)	1	1.1(9)
Portunidae	<i>Portunus pelagicus</i>	High	283	3.3(9)	1	1.1(10)
Sebastidae	<i>Sebastes marmoratus</i>	High	260	3.0(10)	3	3.2(5)

Notes:

(a) High: >80HK\$/kg; Medium: 70-80 HK\$/kg; Low: (<70 HK\$/kg)

Catch per Unit Effort (CPUE)

7.6 Catch per Unit Effort was calculated by using the equation as shown below:

$$CPUE = \frac{\text{Number of Individual}}{\text{Fishing time (hour)} \times (\text{Number of net and cage})}, \text{ Where}$$

Fishing time = 4 hour; Number of net =2; number of cage = 2.

7.7 The mean CPUE of the four sampling locations ranged from 0.1 to 0.8 no. per hour per net/cage, shown in **Table 4**.

Table 4. Mean Catch per Unit Effort of Fish Resources at each Sampling Location

Sampling Location	Mean CPUE (±S.D.) (no. per hour per net/ cage)
I1	0.1±0
I2	0.8±0.7
R3	0.1±0
R4	0.5±0.3
Overall total	0.4±0.5

Yield per Unit Effort (YPUE)

7.8 Yield per Unit Effort was calculated by using the equation as shown below:

$$\text{YPUE} = \frac{\text{Weight of Fish}}{\text{Fishing time (hour)} \times (\text{Number of net and cage})}, \text{ Where}$$

Fishing time = 4 hour; Number of net =2; number of cage = 2.

7.9 The mean YPUE of the four sampling locations ranged from 16.5 to 52.4 g per hour per net/cage, shown in Table 5.

Table 5. Mean Yield per Unit Effort of Fish Resources at each Sampling Location

Sampling Location	Mean YPUE(± S.D.) (g per hour per net/ cage)
I1	18.3±21.5
I2	52.4±29.5
R3	16.5±14.4
R4	48.5±48.3
Overall total	33.9±32.7

Spatial-seasonal Variation in Adult Fish Resources

7.10 In the dry season surveys, a total of 2273g of 40 individual comprising 7 species from 7 families were recorded from impact sites (sampling locations I1 and I2), whilst a total of 1921g of 22 individuals comprising 6 species from 6 families were recorded from reference sites (sampling locations R3 and R4). In the wet season surveys, a total of 2246g of 18 individual comprising 6 species from 6 families were recorded from impact sites (sampling locations I1 and I2), whilst a total of 2238g of 14 individuals comprising 7 species from 7 families were recorded from reference sites (sampling locations R3 and R4). Referring to the **Figure 3**, abundance of fish resources were higher in dry season survey at sampling locations I2 and R4. The higher biomass of fish resources were recorded at sampling locations I2 and R4 in dry season and I1 and R3 in wet season respectively.

7.11 Referring to the **Figure 3**, the overall species richness, diversity and evenness within the Study Area is considered to be low. Low species richness of fish resources was recorded (mean value <4) among the four sampling locations. Moreover, the mean value of Shannon's Diversity Index (H') at four sampling locations is lower than 1.5, indicating the species was not diverse within the Study Area. Moreover, the species

was not evenly distributed (mean value of Evenness Index (J) <1), which reflected that the species community of was dominated by several species only.

8 REVIEW OF FISHERIES IMPACT ASSESSMENT

8.1 With regard to the approved EIA report for the Agreement No. CE 41/2013 (EP) Port Shelter Sewerage, Stage 3 – Sewerage Works at Po Toi O, Environmental Impact Assessment Studies – Investigation, no direct encroachment on the Po Toi O Fish Culture Zone and Artificial Reefs in the Study Area will be anticipated, while direct impact of permanently loss of benthic spawning ground will be limited to 5m². It was concluded that overall impact on fisheries was considered to be acceptable with the adoption of proposed mitigation measures. Supplementary fisheries surveys were conducted by using standard methods in accordance with Condition 2.11 of the EP and Conditions of Approval under Section 8(3) of the EIA Ordinance (Application No. EIA- 244/2016). Survey findings outlined in Section 7 showed that the overall species richness, diversity and evenness was low within the Study Area and the captured species were dominated by species with low commercial value. It was considered that the Study Area was not regarded as important site for adult fisheries resources with commercial value. As such, the conclusion presented in the approved EIA report for potential impacts to adult fish resources during construction and operational phase will be remained unchanged. Additional mitigation measures or environmental monitoring and audit programme were considered to be not necessary.

9 MITIGATION MEASURES

9.1 The potential fisheries impact during construction phase and operational phase resulting from the project were evaluated in the approved EIA report and the overall impact to the fisheries resources are considered to be insignificant. Furthermore, the mitigation measures for avoiding and minimizing impacts on water quality have been proposed in Chapter 5 - Water Quality Impact Assessment of the approved EIA report in detail. With the adoption of proposed mitigation measures, no adverse water quality impact will be anticipated and thus no additional mitigation measure on fisheries is proposed.

10 RESIDUAL IMPACT

10.1 With implementation of mitigation measures proposed in the approved EIA report, no residual fisheries impact will be anticipated during construction and operational phase.

11 ENVIRONMENTAL MONITORING AND AUDIT PROGRAMME

11.1 With implementation of mitigation measures proposed in the approved EIA report, no impact on fisheries will be expected. Therefore, environmental monitoring and audit

programme for fisheries is considered to be not necessary. While, water quality impact monitoring shall be conducted during marine works and dredging works as requested in Chapter 5 - Water Quality Impact Assessment of the approved EIA report.

12 CONCLUSIONS

- 12.1 As required in EP-516/2016 Section 2.11 (i) and Conditions of Approval under Section 8(3) of the EIA Ordinance (Application No. EIA- 244/2016), two daytime surveys covering each of the dry and wet seasons were carried out in 17 and 21 June of 2021 (wet season) and 28 and 29 January of 2021 (dry season) respectively in order to collect findings of the updated fisheries survey (adult fish survey) to ascertain the impact on fisheries resources in the vicinity of the planned location of the outfall diffuser before the construction of submarine outfall of the Project. Detailed fisheries impact assessment had been conducted in the approved EIA report and this updated fisheries survey report is to affirm the assessment made by the approved EIA report based on the findings of the updated fisheries survey.
- 12.2 According to the findings collected from the surveys, a total of 8678 g of 94 individual comprising of 15 species and 14 families were recorded covering dry and wet seasons in four sampling locations, in which 11 species were record in dry season and 9 species were recorded in wet season. *Siganus fuscescens* and *Stethojulis interrupta* was the dominated species in terms of biomass and abundance for the four sampling locations. These two species were of low commercial value. Survey findings also outlined that the overall species richness, diversity and evenness was low within the Study Area. It is therefore considered that the overall commercial value of adult fish resources in the Study Area is low
- 12.3 Survey findings and desktop review affirmed the conclusion made in the approved EIA report that overall impact on fisheries was considered to be acceptable with the adoption of mitigation measures suggested. As such, the content presented in the approved EIA report with respect to the potential impacts to adult fish resources during construction and operational phase will be remained unchanged. Additional mitigation measures or environmental monitoring and audit programme were considered to be not necessary.

13 REFERENCE

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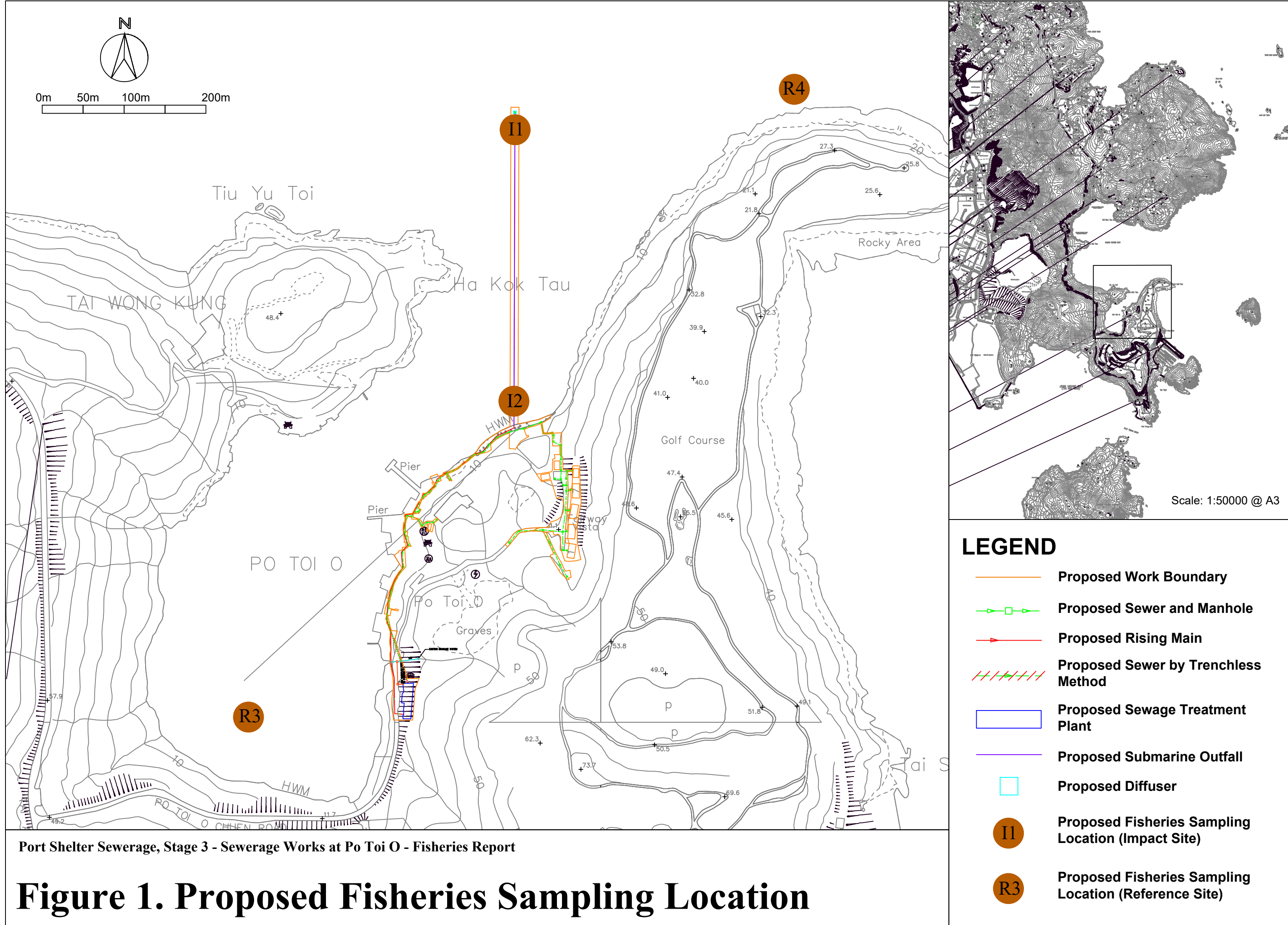
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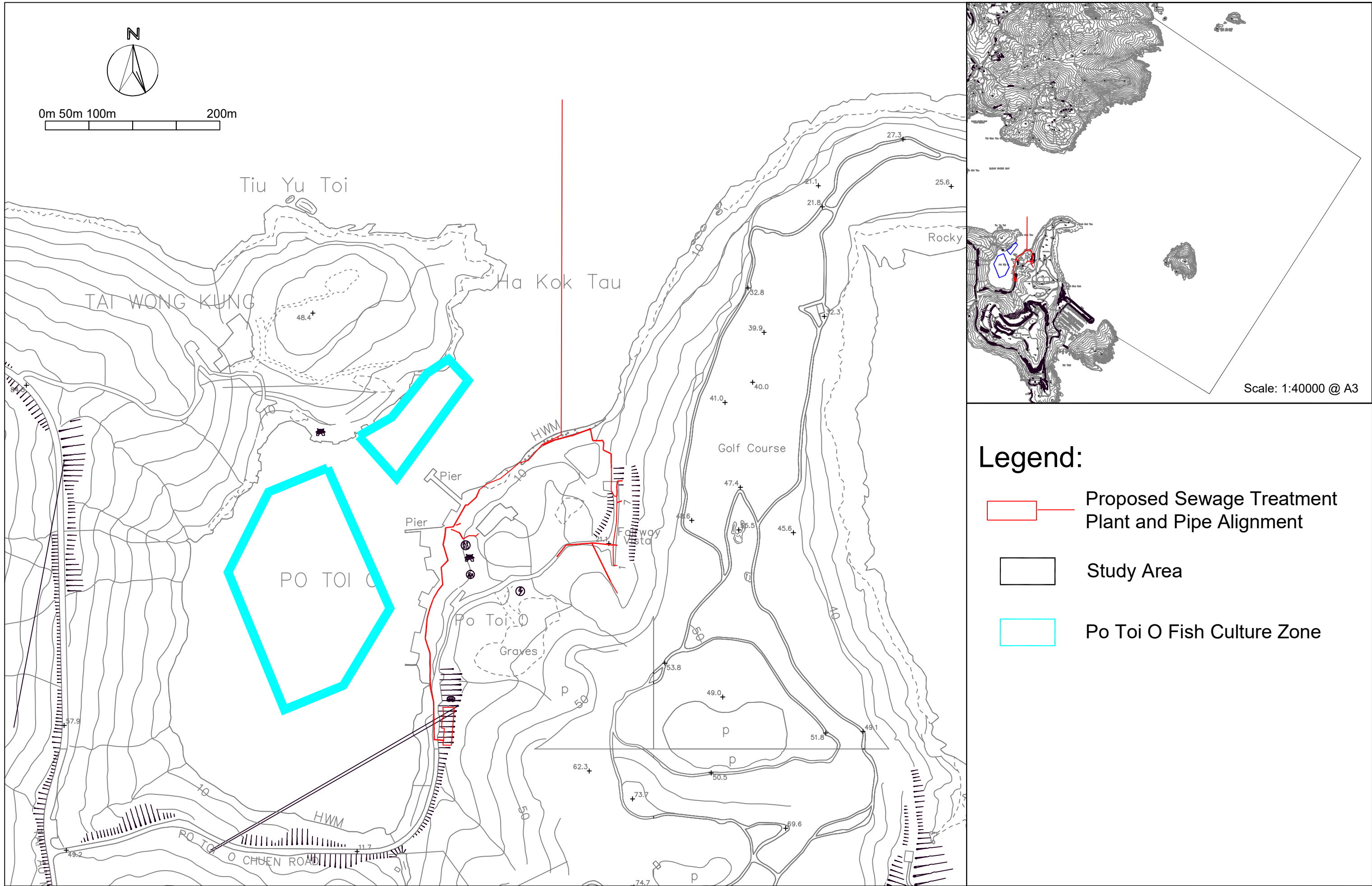
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Figures





Port Shelter Sewerage, Stage 3 - Sewerage Works at Po Toi O - Fisheries Report

Figure 2. Locations of Po Toi O Fish Culture Zone

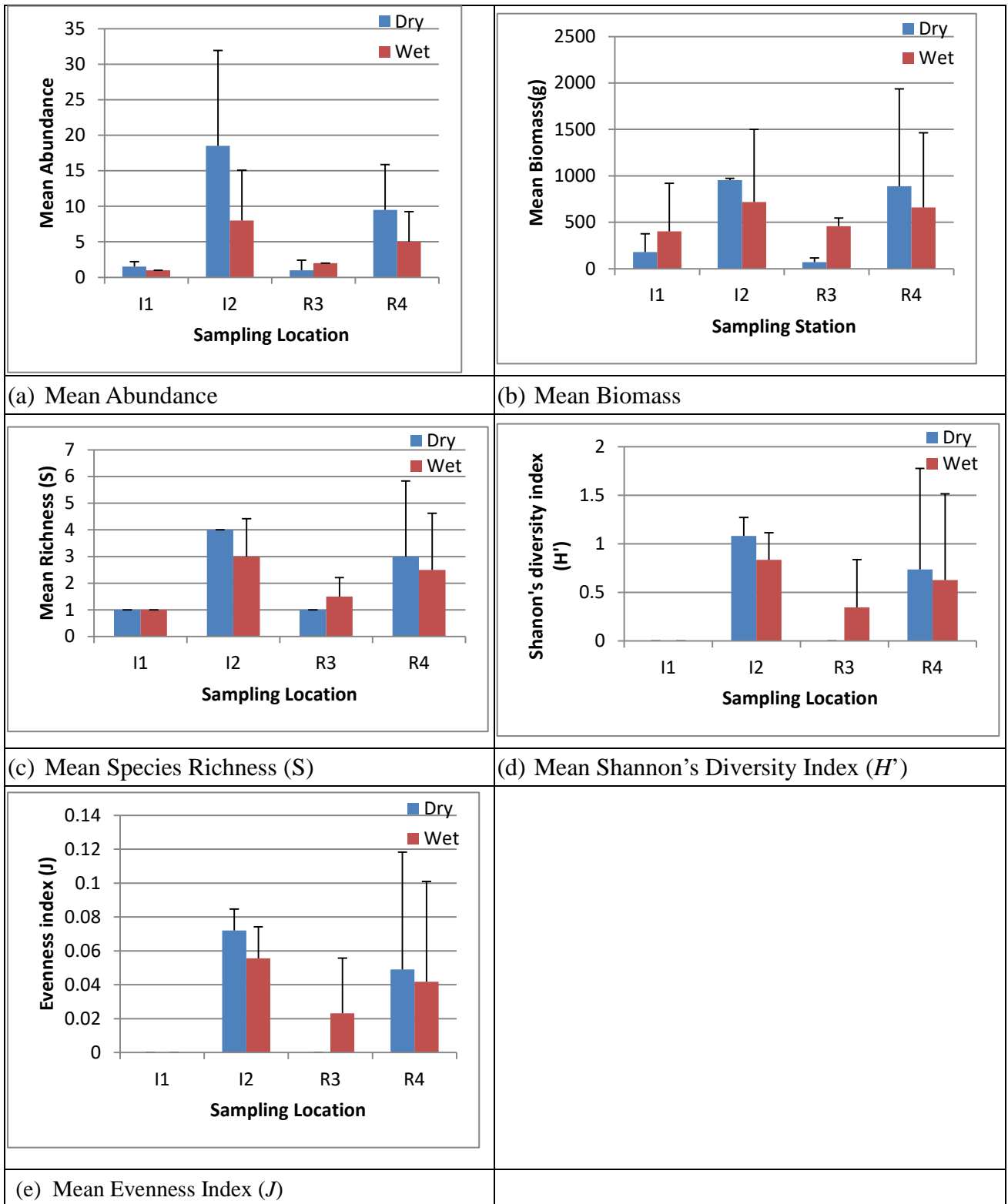


Figure 3. Spatial and Seasonal Variation for Adult Fish Resources within the Study Area

Appendices

CURRICULUM VITAE

Personal Details



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Education, Professional Qualifications and Memberships

B.Sc. Biology, Hunan Normal College, PRC, 1981
 M.Sc. Zoology, Nanjing Normal University, PRC, 1987
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Certified Arborist of International Society of Arboriculture (2011-2014)
 Member of China Flower Association (2008-)
 Council member of Southern China Palm Plants Association (2001-)
 Member of The Institution of Hong Kong Environmental Impact Assessment (1995-)
 Member of The Marine Biological Association of Hong Kong 1989 - 2006
 Member of International Association for Landscaping Ecology (1996-2004)
 Member of International Association of Impact Assessment (2002-2005, 2013-2018)
 Member of Zoological Society of China (1994-)
 Member of Ecological Society of China (1995-)

Key Qualifications

Dr. Mark Shea is an ecology consultant with over 25 years of experience in the field of biology, ecology and environmental impact assessment in Hong Kong, China and the region. He has undertaken over 250 projects with ecological component dealing with terrestrial ecology, wetland ecology, insect taxonomy, pollution biology, mangrove, herpeto-fauna, avi-fauna, terrestrial vertebrates, fishery, benthic community ecology in Hong Kong's stream, river, coast, marine and terrestrial environments. During last fifteen years, he conducted and led over 200 tree survey projects and a number of tree risk assessment projects. Dr. Shea is a Certified Arborist of International Society of Arboriculture. In addition, he has experience for ecology related projects in Mainland China, Taiwan and Macau.

Employment History

1997.4-present: Senior Ecology Consultant, China Hong Kong Ecology Consultants.
1995.5 – 1997.3 Senior Ecology Consultant, Hyder (formerly Axis and Acer) Consulting Ltd.
1993.7 – 1995.4 Ecology Consultant, Binnie Consulting Ltd.
1988. 9- 1993.6 Ph.D Research Student and Demonstrator, The University of Hong Kong

Project Experience Records (*Selected projects*):

BEAM Plus SA 5 - Ecology Impact Assessment Residential Development at NKIL 6551 Kai Tak Area 4C, Site 3, Kai Tak, Kowloon. Survey and preparing SA 5-Ecological Site Appraisal Report.. Survey and preparing SA 5-Ecological Site Appraisal Report. Client: Apex Testing & Certification Ltd. April 2020.

BEAM Plus SA 5 - Ecology Impact Assessment Proposed Residential Redevelopment at R.B.L. 801, No. 3 South Bay Close, Hong Kong. Survey and preparing SA 5-Ecological Site Appraisal Report. Client: Apex Testing & Certification Ltd. March 2020.

BEAM Plus SA5 - Ecology Impact Assessment Residential Development at NKIL 6576 Kai Tak Area 4B, Site 1, Kai Tak, Kowloon. Survey and preparing SA 5-Ecological Site Appraisal Report. Client: Apex Testing & Certification Ltd. February 2020.

Contract No. WD/07/2019- Ecological Survey for the Study on River Revitalisation and Flood Attenuation Facilities for Hung Shui Kiu New Development Area. Client: CEDD. 2019-2020

Contract No. WD/06/2019- Ecological Impact Assessment Study for a Potential Housing Development Site at Chung Yip Road, Yuen Long. Client: CEDD. 2019-2020

Ecological Impact Assessment (EcoIA) for Proposed School cum Recreational Development in Nai Chung. Client: Ramboll Hong Kong Limited. Dec 2019- Dec 2020.

Contract No. YL/2017/03 Wetland creation - wetland and ecology consultancy services. Client: Sang Hing - Kuly Joint Venture. 2019-2022.

BEAM Plus SS 7- Hoarding Works for Proposed Residential Development at Kwu Tung North NDA FSSTL 263. Survey and preparing SA 5 - Ecological Site Appraisal Report. Client: Apex Testing & Certification Ltd. August 2019.

PARK YOHO Ecological Consultancy Services: Avifauna Survey and data preparation (2020-2022) Fairyland, Client: Fugro.

Programme No. 140KA- Consultancy Services To Carry Out Environmental Impact Assessment For Construction of Annex Block(s) at Hong Kong Observatory Headquarters, Tsim Sha Tsui. Client: ASD/AEC. 2019.

Tender ND/2019/03 - 古洞北及粉嶺北新發展區第一階段一發展塋原自然生態公園。 Supporting contract Sang Hing - Kuly Joint Venture to bid the project. Provision of ecologists, wetland specialist, and preparing method statements for translocation of Rose Bitterling and Mussels, Ecological Conservation and Compensation; and Construction on Constructed / Treatment Wetland and associated Birdhide. July 2019.

BEAM Plus SA5 Ecology (Cingleot Premium Logistics) for a Hong Kong Airport site. Survey and preparing SA 5-Ecological Site Appraisal Report. Client: Apex Testing & Certification Ltd. July 2019.

Applicaion for Small House Development of Lot No. 1082 S.B in D.D . 45 Kai Kuk Shue Ha Village, Sha Tau Kok, N.T. Impact Assessment; Client: Mr. Lee, 2019.

Resorts World Macau at Lago 1 Nam Van, Macau. Macau Ecological Impact Assessment for Lago 1 Nam Van, Macau on Habitat and Vegetation, Bird, Macro-invertebrate, Fish and crustacean and other fauna; September 2019; Client: Institute for the Development and Quality, Macau

Contract No: HY/2011/03 Ecological impact mudflat monitoring/survey (quarterly) at Tung Chung; Ecological monitoring and reporting, Client: Atkins, 2019-2020.

Contract No. NDO 14/2018 Environmental Team for Pre-construction Environmental Monitoring and Audit Works for Advance and First Stage Works for Kwu Tung North and Fanling North New Development Areas, Ecological Baseline survey and reporting ; Client: Fugro, 2019-2020.

Contract No. SS G511 Construction of Columbarium at Cape Collinson Road in Chai Wan; Provide surveys and special treatment to existing Short-legged Toads and Red Fire Ants and reporting, Client: Build King, 2018.

Agreement No. CE 50/2014 (GE) Landslip Prevention and Mitigation Programme, 2014, Package G, Landslip Prevention and Mitigation Works - Investigation, Design and Construction, Study Area No.11SW-B/HPSA4, Below Magazine Gap Road and Above Bowen Road, Provision of Full Time Residential Ecologist for Ground Investigation Works : Vegetation Survey and Protection; Client: CEDD/CMA, 2018-2019.

Architectural Services Department Quotation Contract No. CPM301_13/18: Mui Wo Lai Chi Yuen Extension. Ecological survey, plant transplantation proposal and other related ET tasks. Client: AEC, 2018-2020.

BEAM Plus SA 5-Ecological Site Appraisal Report For Proposed Residential Development at N.K.I.L. 6549, Off Hing Wah Street West, Cheung Sha Wan, Kowloon. Client: AEC, 2018.

BREEAM (UK) LE02 & LE04 -Ecological Site Appraisal Report For Refurbishment Works at International Commerce Centre (ICC): Ecological survey and preparing required submissions. Client: AEC, 2018.

Section 12A Rezoning Application Proposed Rezoning For An Extension Of The Ling To Monastery, Including A Temple, Columbarium And Access Road, At San Wai, Ha Tsuen, Yuen Long: Ecological Impact Assessment. Client: Man Fung Industries Holding Ltd., 2018.

BREEAM (UK) LE02 & LE04 -Ecological Site Appraisal Report For Refurbishment Works at 4 Headland Road, Repulse Bay: Ecological survey and preparing required submissions. Client: AEC, 2018.

Planning Consultancy Services for Sassoon Road Campus Expansion for the Hong Kong University: Ecological impact assessment. Client: BMT, 2018.

Agreement No. CE/35/2015 (GE) Landslip Prevention and Mitigation Programme, 2015, Package A Landslip Prevention and Mitigation Works and Provision of Emergency Works Services for Natural Terrain Landslides Occurring in Mainland East (North) – Investigation, Design and Construction: Behind Shuen Wah Chim Uk, Ting Kok Road, Tai Po (Feature No. 3SE-C/C23): Ecological survey and reporting, Client: CEDD/CMA, 2018-2019.

Wanke (萬科) Building renovation project in Xiong An (雄安), He Bei Province, China: Ecological Baseline Survey/Condition Report and Suggestion on Plants for Green Design: Client: Biodiversity by Design (UK), 2018.

Section 12A rezoning application site (Kam Sheung Road, Yuen Long) from "Agriculture", "Village Type Development" to "Residential (Group C)": Ecological Impact Assessment. Aikon Planning, 2018.

Contract No. NDO/02/2018 Baseline Survey for Golden-Headed Cisticola for Site Formation and Infrastructure Works for Police Facilities In Kong Nga Po: Ecological Baseline Survey and report. Client: CEDD/AECOM, 2017-2018.

Ecological Impact Assessment for Section 16 Application To Allow Columbarium Use At Lot Nos. 879, 880A1, 880B1, 881, 882, 883, 884, 885, 889RP (Part), 891(Part), 1318, 1326 and 1344(Part) all in D.D. 115 and adjoining Government Land, Au Tau, Yuen Long. Client: Ramboll 2018.

Agreement No. CE 51/2016 (HY): Route 11 (between North Lantau and Yuen Long – Feasibility Study. Responsible for ecological survey and reporting. Client: Meinhardt. 2018 – 2020.

Agreement No. CE 36/2011 (HY): Further Study and Preliminary Design for Improvement of Hiram's Highway from Marina Cove to Sai Kung Town – Investigation Addition Service No.4 – Ecology Survey and Ecology Impact Assessment. Responsible for ecological survey and reporting. Client: Meinhardt. 2018 – 2020.

Project title.: ([RFQ-EMD14033VW]) Consultancy Services on Provision of Ecological Baseline Survey and Monitoring at Ma On Kong River. Responsible for ecological survey, monitoring and reporting. Client: Hong Kong Productivity Council. 2018 – 2020.

Contract No. CV/2017/04: Environmental Monitoring of Sediment Disposal to the South of Brothers, East of Sha Chau and East of Tung Lung Chau: diving monitoring of coral and sea bottom; demersal trawling samples of fishes and invertebrates. In supporting of EGS/Lam, responsible for on-board sampling supervision, sorting, taxonomic identification, tissue preparation for chemical testing, data analysis and reporting. Sub-consultant of EGS. 2018-2022.

Contract No. CM 14/2016: Environmental Team for Operational Environment Monitoring and Audit for Siu Ho Wan Sewage Treatment Plant. Responsible for undertaking bi-monthly marine benthic sampling, sorting, identification and reporting. Client: Fugro / DSD, 2018-2023.

Mountain Bike Training Gound & Expansion of Mountain Bike Trail Net Works in Mui Wo and Chi Ma Wan, S.L. Employed as independent ecologist responsible for ecological survey, eco report updating, supporting mountain bike specialist in ecology aspects. Client: Sheung Moon Construction Ltd., / CEDD, HKSAR, 2016-2019.

Contract No.: CV/2012/05. Bathing Beach at Lung Mei, Tai Po, Rule of qualified ecologist responsible for ecological baseline surveys, rat snake capture survey, marine benthic, fish and intertidal fauna monitoring, mangrove plantation, fauna relocation. Client: Welcome Construction / CEDD, HKSAR, 2016-2019.

Landscape Consultancy Service Campus Landscape Master Plan : Ecological Enhancement Proposal; Clent: Earth Asia / The Chinese University of Hong Kong, 2014-2018.

Application for Small House Re-Development of Lot 966 RP in D.D. 22 Pan Chung San Tsuen, Tai Po. Site Investigation and Landscape Proposal. Client: Ms. Peggy Wong, 2016-2017.

CE44 & CE51 - Ecological Surveying Services for features 7SW-D/C46 Lion Rock Tunnel Road, HSR; 7SW-A/CR200, Shing Mun Management Center, Shing Mun Reservoir, Tsuen Wan; and 7SW-D/C5, Lion Rock Tunnel Road, HSR. Client: CEDD/Fugro, 2017.

Rezoning proposal for Various lots at Ha Wo Hang, Sha Tau Kok: Ecological impact assesement and mitigation. Client: Eton Properties Agency Co Ltd, 2016-2019.

Contract No. DP 01/2016 Drainage Improvement Works at North District –Package B – Investigation: Ecology, Client: DSD, HKSAR, 2016-2018.

Section 12A Application for Proposed Amendments to the Ma On Shan Outline Zoning Plan in Support of Private Residential Development and Primary School at Various Lots and Adjoining Government Land in DD 167, Nai Chung, Ma On Shan: Ecological Impact Assessment, Client/leading consultant: Ramboll Environ Hong Kong Limited, 2016-2017.

CEDD Improvement to Sharp Bend of Keung Shan Road near Shek Pik Reservoir Service Access Road, Lantau: conduct ecological survey and ecological impact assessment for slope habitat. Client: HyD/ Maurice Lee & Associates Ltd. 2016.

BEAM Plus V1.2 SA5 Ecological Assessment for Shum Shui Po building site, Client/leading consultant: Fugro, 2016.

Contract WQ/053/15: Consultancy Study on Strategic Street Ecology for Hong Kong. Client, LCSD/ HKSAR, Leading consultant: Earth Asia Ltd. 2016-2017.

BEAM Plus V1.2 SA5 Ecological Assessment for Proposed Factory Development at 95-99 Fuk Hi Street, Yuen Long Industrial Estate, Yuen Long, Client/leading consultant: Hip Hing, 2016.

BEAM Plus V1.2 SA5 Ecological Assessment for Proposed building at Wai Yip Street, Knowloon Bay, Client/leading consultant: Hip Hing, 2016.

AGREEMENT NO. CE 13/2009 (WS) IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS, Ecology: site investigation and woodland compensation plan. Client, DSD/ HKSAR, Leading consultant: Acumen Environment Ltd. 2015-2016,

BEAM Plus V1.2 SA5 Ecological Assessment for proposed property development at Tsuen Wan Town, Client/leading consultant: Acumen Environment Ltd., 2016.

Tree survey at a proposed property development at Tai Po. Client/leading consultant: SCENIC Landscape Studio Ltd. 2016.

Programme No.: 085MM: Consulting engineer services in connection with Preliminary Environmental Review, Traffic Impact Assessment and Drainage & Sewerage Impact Assessment for Hospital Authority Supporting Services Centre in Tin Shui Wai. Ecological Impact Assessment, Client/leading consultant: ASD/HKSAR / Parsons Brinckerhoff (Asia) Limited, 2016.

Improvement to sharp bend of Keung Shan Road near shek pik reservoir service access road (slope works): Preliminary Ecological Assessment. Client/leading consultant: HyD/HKSAR / Maurice Lee Limited, 2015.

BEAM Plus V1.2 SA5 Ecological Assessment for proposed property development at Kwun Tong, Client/leading consultant: Meinhardt Environment Ltd., 2015.

Application for Proposed Low Density Residential Development at Various Lots in D.D. 433, Chuen Lung, New Territories. Conducting full scale of ecological surveys including habitat, flora and fauna and ecological impact assessment. Client: Environ, 2015.

Ecological Impact Assessment for the Proposed Development at STTL 601 Yiu Sha Road Whitehead Ma On Shan. Conducting ecological surveys including habitat, flora and fauna and ecological impact assessment. Client: AEC, 2015.

Agreement No. CE9/2006 (DS) Tolo Harbour Sewerage of Unsewered Areas, Stage II-Investigation, Design and Construction: Conducting full scale of ecological surveys including habitat, flora, diving monitoring of coral and sea bottom; and fauna and ecological impact assessment. Client: DSD/AECOM, 2015.

Ecological consultation for a site at Ka Wai Man Road and Ex-Mount Davis Cottage Area, Kennedy Town: Conducting ecological surveys including habitat, flora and fauna and ecological impact assessment. Client: Environ, 2015.

Contract No. 12-06337: Provision of Services for the Post Project Monitoring of HATS 2A (also named as Performance Verification of Discharge of HATS 2A). Undertaken marine benthic sampling, sorting, identification, data analysis and reporting. Sub-consultant of EGS. 2014-2016.

Site Formation and Infrastructural Works for Eight Housing Sites in Ma On Shan Feasibility Study, Conducting ecological surveys including habitat, flora and fauna and ecological impact assessment. Client: Environ, 2015-2018.

Environmental Consultancy Services For Planning, Supervision And Management Of The Proposed Fish Fry Release Scheme By Ecologist/Biologist For Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities. Sub-consultant of AEC. 2014.

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. Client: AEC/DSD, 2014-2017.

Contract No. 2013/11: Environmental Monitoring of Sediment Disposal to the South of Brothers, East of Sha Chau and East of Tung Lung Chau: diving monitoring of coral and sea bottom; demersal trawling samples of fishes and invertebrates. In supporting of EGS/Lam, responsible for on-board sampling supervision, sorting, taxonomic identification, tissue preparation for chemical testing, data analysis and reporting. Sub-consultant of EGS. 2014-2017.

Theme Park and Resort Hotel Development in Macau - Ecological Impact Assessment: Responsible for ecological consultancy services including eco impact assessment and mitigation. Client: BMT, 2014.

Agreement No. CE16/2012 (CE) Engineering Feasibility Study for Kong Nga Po - Feasibility Study: Ecological field survey and reporting. Conducting full scale of ecological surveys including habitat, flora and fauna. Client: CEDD/Mott MacDonald, 2013.

Agreement No. LD01/2012 Eco-hydraulics Study on Green Channels – Stage 1 Provision of Services of Ecological Field Survey. Conducting full scale of ecological surveys including habitat, flora and fauna for 12 drainage channels. Client: DSD/Mott MacDonald, 2012-2013.

Contract No. SPW 03/2012 Ecological Survey for Relocation of Sha Tin Sewage Treatment Works to Caverns – Feasibility Study. Conducting full scale of ecological surveys including habitat, flora and fauna of terrestrial and marine environment (benthic survey, scuba diving coral survey and intertidal survey). Client: DSD, 2012-2013.

Proposed Student Hostel of The City University of Hong Kong within “CDA(1)” Zone, South of Yiu Sha Road Whitehead, Ma On Shan, The New Territories: Environmental Assessment - Responsible for

ecological consultancy services including eco impact assessment and mitigation. Client: Environ, 2013 - 2014.

Residential cum Recreational Development at Kam Tsin Road, Kwu Tung: Environmental Assessment: Responsible for ecological consultancy services including eco impact assessment and mitigation. Client: Environ, 2013-2014.

Construction of Public Rental Housing at Ex-Au Tau Departmental Quarters at Yuen Long (Contract No : 20120746) Trade : Independent Tree Specialist, responsible for tree survey, tree risk assessment and tree protections, and other arborist consultancy. Client: Housing Authority / Hsin Chong Construction Co. Ltd. 2014-2016.

Architectural Services Department – Consultancy Agreement No. 9AA 115 for Provision of Columbarium at Wo Hop Shek Cemetery –Phase I. Responsible for ecological consultancy services including eco-assessment and mitigation. Client: DLN, 2013-2014.

Contract 823B – Shek Kong Stabling Sidings & Emergency Rescue Siding: Sub-Contract for Provision of Consultancy Services for Stream Habitat Restoration Works (M50/153), provision of wetland construction specialist and wetland plant botanist for the project. Client: MTR / Maeda – China State Construction JV, 2011-2018.

Agreement No. DP/01/2010 Services as Independent Environmental Checker for Drainage Improvement Works in Shatin and Tai Po: Responsible for ecology aspects for transplanted projected plants, ecological mitigation wetland, ecological monitoring in areas under Contract 1 & 2. 2011 – 2014. Client: DSD / Environ Hong Kong Ltd.

Contract No. CV 2005/06, Contract No. CV 2008/07 & Contract No. 2009/16: Field Sampling and Laboratory Testing for Contaminated Mud Pit IV and V East of Sha Chau -- Demersal trawling samples of fishes and invertebrates. In supporting of Lamlab Ltd. And EGS, responsible for on-board sampling supervision, sorting, taxonomic identification, tissue preparation for chemical testing, data analysis and reporting. Sub-consultant of Lam Lab and EGS. March 2006- February 2009; and 2010-2014.

Contract No. CV 2008/07 & Contract No. 2009/16: Testing and Sampling for Contaminated Mud Pits IV and V at East of Sha Chau, - Benthic Survey, sorting, taxonomy and reporting. Sub-consultant of EGS (Asia) Ltd. 2009 - 2014.

Contract No. DC/2007/06 River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River. Employed by Contractor (Chiu Hing Construction & Transportation Co. Ltd.) as ecology specialist responsible for conducting ecological baseline survey (flora and fauna), impact monitoring, mitigation, part of post-construction monitoring and as well as capture surveys. The project also required to capture and relocate some rare fish and amphibian species with conservation value to unaffected river sections to reduce adverse impact by the river works construction period. 2007 - 2014.

澳門“小潭山旅遊休憩計劃”項目，生態及景觀初步評估研究。顧主：澳門瑞峰工程顧問有限公司 / SMEC；2013.

Construction of public house at Tuen Mun Area 18: Independent tree specialist responsible for tree monitoring, tree risk assessment, mitigation and protection. Client: Housing Authority / Shui On Construction. 2010-2013.

Contract No. DC/2006/09: Drainage Improvement Works in Kau Lung Hang, Yuen Leng, Nam Wa Po and Tai Hang Areas and Construction of Ping Kong Drainage Channels. Employed by Contractor (Chiu Hing Construction & Transportation Co. Ltd.) as ecology specialist responsible for conducting ecological baseline survey, impact monitoring, fish relocation operation and mitigation/post monitoring. The project also required to capture and relocate some rare fish species with conservation value to

temporal constructed fish aquarium and to unaffected river sections to reduce adverse impact by the river works during construction period. The fish will be released back to new river channel after completion of river works. Committed in April 2007 and estimated completion in 2013.

Residential cum Recreational Development at Various Lots and Adjoining Government Land in Pine Hill, Tai Po: Environmental Assessment. Conducting full scale of ecological surveys including habitat, flora and fauna of terrestrial and coastal environment. Client: sub-consultant with Environ HK Ltd. 2013.

Proposed Residential Development at Nai Chung, Ma On Shan: Ecological Impact Assessment. Conducting full scale of ecological surveys including habitat, flora and fauna of terrestrial and coastal environment. Client: sub-consultant with Environ HK Ltd. 2013.

CE58/2011(HY) Widening of Castle Peak Road – Castle Peak Bay – Investigation: Conducting full scale of ecological surveys including habitat, flora and fauna of terrestrial and coastal environment. Client: Highway Department/Scott Wilson. 2012-13.

Application for Amendment to the Draft Tai Tong Outline Zoning Plan No. S/YL-TT/15 from “Agriculture” and “Open Storage” to “Village Type Development”, Various Lots in D.D. 177 and Adjoining Government Land, Tai Tong, Yuen Long. Responsible for ecological survey and impact assessment. Client: City Development Ltd, 2012.

Agreement No. CE 38/2010 (CE) Liantang / Heung Yuen Wai Boundary control Point and associated Works (Site formation and Infrastructures) - Design and Construction – conducted brush and detailed tree surveys. Client: AECOM, 2012-2013.

Contract No. DC/2007/08 Drainage Improvement Works at Tai Po Tin, Ping Che, Man Uk Pin and Lin Ma Hang. Responsible for ecological impact monitoring during late stage of construction. Client: DSD/Chiu Hing, 2012.

Construction of public house at Shatin Area 4C: Independent tree specialist responsible for tree risk assessment, mitigation and protection. Client: Housing Authority / Hsin Chong Construction. 2013.

Proposed Nam Sang Wai development: tree survey and visual assessment field survey. Client: Belt Collins. 2012.

NENT Landfill EM & A – Vegetation/ tree Monitoring: yearly contracted with Sita, 2010-2014.

Section 16 application for P1258 DD129 Mong Tseng Tsuen, Yuen Long: Further ecological survey and impact assessment. Client: Axon Consultancy Ltd., 2012.

Proposed residential development at Fung Lok Wai, Yuen Long: Firefly survey and impact assessment. Client: supporting leading consultant Environs, 2011.

Proposed Hung Shui Kui Town Concept Ecomasterplan New Territories, Hong Kong: conducted preliminary ecological review, rapid field survey and comments on eco-masterplan. Client: Biodiversity by Design. 2012.

Ecological surveys for some slope features along Shing Mun Catchwater, Tai Lam Catchwater and Golden Hill Catchwater. Client: AECOM, 2012.

Agreement No. CE19/2010 (TP) Greening Master Plans for New Territories North East – Investigation, Design and Construction in Shatin District: Responsible for ecological review and background study, Client: Hyder-ACLA Joint Venture, 2011-2012.

Agreement No. CE20/2010 (TP) Greening Master Plans for New Territories North West – Investigation, Design and Construction in Tuen Mun District: Responsible for ecological review and background study, Client: Hyder-ACLA Joint Venture, 2011-2012.

Proposed development at Sha Po North: conducting ecological survey and reporting. Client: supporting leading consultant Environs, 2011.

WENT Landfill, New Territories: Conducting vegetation survey, Client: SITA, 2011.

Agreement No. CE 65/2006 (DS) Port Shelter Sewerage Stage 2 and Stage 3 Design and Construction Land Features, Manhole & Trees Survey & Baseline Noise Monitoring (Package 3): conducting tree surveys, Client: DSD / EGS, 2011-2012.

Agreement NO. DP 06/2011 Environmental Impact Assessment for Drainage Improvement Works at Ngong Ping: Conducting ecological baseline surveys in wet season 2011 and ecological impact assessment. Scope of ecological survey including flora and fauna. Major terrestrial faunal groups were surveyed including mammals, birds, herpetofauna, butterfly, dragonfly and stream organisms. The consultancy lasted from September 2011 to March 2012. Dr. Mark Shea led a team performed comprehensive field surveys and prepared section of ecological impact assessment report with recommended mitigations. Sub-consultant to Meinhardt.

Project Contract No. HK1100393 Application Of Lease Modification / Land Exchange Various Sections of Lot 723 in DD 137 Lung Kwu Tan, Tuen Mun: Ecological Survey and Impact Assessment. Client: Environs, 2011- 2012.

Contract No. GE/22011/19. Landslip Prevention and Mitigation Programme, 2008, Package N, Natural Terrain Hazard Mitigation Works, West Lantau – Topographic and Tree survey for Tai O West, Nam Chung, Shum Wat, Keung Shan Road, and Wang Hang. Conducting tree surveys, Client, Sam Mak & Associates Surveyors (HK) Ltd. 2011-2012.

Revitalization of Old Tai Po Police Station: Ecological consultancy service for Preliminary Ecological Review of the project including ecological surveys and assessment. Client: Hyder Consulting, 2011.

Construction of public house at Shek Kei Mei phase 5: Independent tree specialist responsible for routine tree monitoring and tree risk assessment. Client: Housing Authority / Shui On Construction. 2011-2012.

Ecological Baseline Monitoring for DSD Drainage Improvement Works at Ping Che, Fanning. Conducting ecological surveys on habitat, flora, fauna including aquatic fauna, amphibians, butterfly, odonates, mammals, 2011. Client: DSD / Meinhardt; 2011-2012.

Construction of Secondary Boundary Fence (SBF) and New Sections of Primary Boundary Fence and Boundary Patrol Road: EM & A, responsible for preparing landscape plan for Lok Ma Chau Section. Client: Architect Department / AEC; 2010-2012.

Kai Tak Nullah and Sha Tin Waste Water Treatment Plant: Plant trial. Responsible as independent ecologist for plant monitoring and arborist consulting in supporting of contractor, 2010-2011. Client: DSD / Lam Construction 2011-2012.

Section 16 application for proposed village house development at Nam Sang Wai, Yuen Long: Ecological impact assessment. Client: Troika Engineering, 2011.

Section 16 application for proposed housing development at Au Tau, Yuen Long: Ecological impact assessment. Client: Environ Hong Kong Ltd., 2010.

Macau C&D Waste transfer facilities. Ecological impact assessment, 2011. Client: Macau Government / Scoott Wilson. 2011.

Section 16 application for proposed housing development at Tung Shing Lei, Yuen Long: Ecological impact assessment. Client: Environ Hong Kong Ltd., 2010.

Macau Phase 1 LRT System Tunnel Alignment Option - Ecological Impact Assessment for the Barra Station at Macau. Ecological impact assessment. 2010. Clients: Macau Government / Scott Wilson.

Section 16 application for proposed housing development at Pak Lap, Sai Kung: Ecological impact assessment. Client: Hyder Consulting Ltd., 2010-2011.

Proposed residential development at Dalajia Island, Dapeng Bay, Shenzhen. Ecological survey and reporting, 2010. Client: Vanke Property / Buro Happold.

Contract No. DC/2006/01 Drainage Improvement Works in Sai Kung – Design and Construction: Undertaken ecological monitoring during EIA stage, construction and post-construction. 2003- 2012. Client: DSD / Maunsell; Sunkee Construction.

Macau Phase 1 LRT System Tunnel Alignment Option - Ecological Impact Assessment for the Nan Van Lake and Sai Van Lake. Responsible for undertaken flora, fauna including fish, benthic and general ecological surveys in two seasons, and reporting. March to July 2010. Clients: Macau Government / Scott Wilson.

Agreement No. CE3/2006 (DS) Kai Tak Nullah (Ecology) : Preparation of Specification for ecological survey and bio-contamination testing by fish. Client: ScottWilson. 2008-2009.

Strategic cooperative study on contaminated sediments of Shenzhen River – Benthic organism investigation. 深圳河污染底泥治理策略合作研究底泥特徵調查專題工作-底棲生物調查 (BENTHIC SURVEY) ; Client: 深圳治河辦 Shenzhen River Administration Office / EGS (HK) Ltd., 2010.

Verification of animal species purchased from USA laboratory supplier for eco-toxic testing of contaminated sediments. Employed by ALS Laboratory as benthic specialist consultant, committed in March 2010.

Wo Hop Shek Creamatorium Construction – Monitoring of transplanted plants. One year contract with AEC Ltd. August 2009 to August 2010.

Additional Tree Survey for Agreement No.NEX2212 of MTR's Shatin to Central Railway Line. Client: MTR/China ARSC, 2009.

Shatin Union Hospital Development project: Tree Survey, Client: Ted and Chen Associates, 2009.

Fire Services Training School cum Driving Training School At Pak Shing Kok, Area 78, Tseung Kwan O. Ecological impact assessment. Client: FSD/Hyder Consulting. 2009.

Lantau – Tuen Mun Link Project: ecological baseline surveys. Client, Meinhardt Infrastructure and Environment Ltd. Scope of works including terrestrial, inter-tidal, mangrove, stream flora and fauna surveys. 2008-2009.

Agreement No. CE 65/2006 (DS) Port Shelter Sewerage Stage 2 and Stage 3 – Design and Construction– Ecological Survey. Client, DSD/Black and Veatch Consultants. Scope of works: conducting terrestrial, intertidal and marine ecological surveys including coral diving surveys. 2008-2009.

Contract No. DC/2008/07, Lam Tsuen Valley Sewerage – Investigation, Design & Construction. Conducting ecological wet season baseline survey. Client: DSD/Ove Arup. October to December 2008

Contract No. DC/2008/07, Lam Tsuen Valley Sewerage – Investigation, Design & Construction. Conducting tree survey. Client: China ARSC. 2008.

Mangrove Survey in North West New Territories. Conducted field survey of mangrove community structure, diversity, growth formation. The collected data was used in modeling of drainage flood risk assessment and mitigation. Client: DSD/MottConell. October to December 2008.

Ma On Shan Development, Engineering Works At Whitehead and Lok Wo Sha phase 1: Design and Construction. Scope of works: Vegetation Surveys and Transplantation Scheme. Client: Maunsell. January to August 2009.

Agreement No. CE 7/2008 (EP) Organic Waste Treatment Facilities, Phase I, Lantau – Feasibility Study. Client: ENSR Asia (HK) Ltd. Conduct tree survey. February 2009.

Construction and Development Office of Macau SAR: Macau Nature Reserve Ecological Monitoring. Conduct monthly ecological monitoring activities including fish, benthic fauna (Mangrove habitat), insect, amphibians, reptiles, mammals, micro-algae sampling at wetland habitat, inter-tidal, mangrove habitats. Also responsible for produce monthly and annual monitoring reports. Client: Macau Government/Macau ecology consultant. Completed two contracts with extensions from 2004 to 2010.

Repositioning and Long Term Operation Plan of Ocean Park. EM & A practice. Conduct vegetation survey to identify and locate some protected plants for transplantation. Plant transplantation and monitoring. Supporting Contractor / Dragages-Bouygues JV, Committed in February 2007 and completed in September 2008.

Express Rail Link project (Client: MTR/China ARSC): Tree Survey Services – Conduct tree surveys and reporting for areas of West Knowloon, Sheng Monk Road, Lok On Pak, Siu Lam and Shek Kong Nursery site. September to December 2008.

10-year Extended LPM Project Landslip Preventive Works on Government Slopes and Related Studies: Ecological survey and impact assessment for slope No. 7NW-D/C-126 and 3SE-D/C135 at Tai Po. Conduct field flora and fauna surveys and reporting. Supporting C M Wong & Associates Ltd. November 2007 to March 2008.

10-year Extended LPM Project Landslip Preventive Works on Government Slopes and Related Studies: Ecological Assessment for Feature No. 11SW-C/F50, The Peak, Hong Kong West. Conduct field flora and fauna surveys and reporting. Supporting C M Wong & Associates Ltd. October 2007 to March 2008.

Civil Engineering and Development Department: Contract No. CV / 2002 / 04 Penny's Bay Reclamation Stage 2 Environmental Monitoring and Audit: White-bellied Sea Eagle monitoring at Penny's Bay for the Disneyland Theme Park project on Lantau. 2005 – 2008.

Bat Survey and Impact Assessment at The Chik Kwai Study Hall, Sheung Tsuen, Pat Heung, Yuen Long. The scope of work include bat field surveys in daytime and night time, impact assessment and propose of mitigation measures; bat box design, installation and monitoring. Client: AMO; in supporting AEC Ltd., 2007-2009.

Proposed development at Pak Kung, Sai Kung: tree surveys. Client: Belt Collins Hong Kong Ltd., committed and completed in 2007.

Proposed development at So Kwun Wat, Tuen Mun: tree survey. Client: Sun Hung Kai Architects & Engineering Ltd., committed and completed in 2007.

Proposed residential re-development at Severn Road, Hong Kong island: tree survey. Client: Sun Hung Kai Architects & Engineering Ltd., committed and completed in 2007.

Agreement No. CE69/2001 (HY) Tsuen Wan Road Upgrading – Investigation: EIA – vegetation and habitat surveys. In supporting Scott Wilson Limited, committed and completed in November 2007.

Proposed development at Fairview Park, Yuen Long: bird surveys at various habitats including fish ponds, cultivation and urban land. Supporting Environ Hong Kong Limited, committed and completed in 2007.

Feature No. 11SW-C/F50, Peak Road and Harlech Road, The Peak, Hong Kong: conduct ecological Surveys, impact assessment and report in September 2007. Client: CED / CM Wong & Associate Ltd.

Ecological Survey for North District Sewerage Stage 2 Phase 1: ecological baseline survey and reporting, including fish and stream benthic surveys at Kowloon Hang stream. Committed in October 2006 and completed in 2007.

Monthly bird monitoring at a site of wind turbine station at Lamma. In supporting of Enviro Natural Ltd./Hong Kong Electric Ltd. 2006 -2007.

Agreement No. CE 28/2004 (GE), Landslide Preventive Works at Po Shan, Mid-levels - Design and Construction. Ecological survey and impact assessemnt. In supporting of Maunsell Environmental Management Consultants Ltd. Committed in 2006 and competed in December 2006.

Ecological Impact Assessment for TWGHs Proposed Youth Holiday Camp at Tai O, Lantau. Ecological surveys (covered terrestrial, inter-tidal channel, mangrove, marsh habitats) and impact assessment in supporting AEC Ltd. 2006.

Residential Development in DD99, DD105, San Tin Yuen long: Conducting tree surveys, Committed in September 2006 and completed in December 2006.

Proposed village house development at Tai Mong Tsai, Sai Kung. Conducted ecological surveys, impact assessment in supporting AEC Ltd. Completed in August 2006.

Tsang Kun O Central Park Development and Sha Ha, Sai Kung Development: Tree surveys. Completed in August 2006.

Planning study for costal region of Xun Liao, Hui Yang County, Guang Dong Province. Conducted ecological (flora nad fauna) surveys and impact assesement including varous habitats such as sea shore, river estuarine, mangrove, agricultural land, woodlands, and etc. Completed in September 2006.

Assessment of the conservation study at Tai Po Kau Headland, conducted ecological rapid surveys in supporting Hyder Consultants in September 2006.

Ecological impact assesement at Wo Sang Wai development site. Involving ecological surveys including, birds, bats, amphibians, reptiles, insects, aquatic animals and flora. In supporting MottConnell Consulting Ltd. Committed in 2004 and completed in June 2006.

Lantau Cable Car Project (Ngong Ping 360): Tree surveys, EM & A – responsible for tree surveys, ecological baseline surveys, impact monitoring and ecological mitigation during stage of construction period, and as well as fauna and flora relocation and transplantation. Client: MTR Corporation, sub-contractor of MottConnell, 2002 - 2007.

Lantau Cable Car Project (Ngong Ping 360): Stream diversion – responsible for ecological restoration of newly constructed stream channel with ecologically friendly design; involved stream bank vegetation

restoration by transplanting natural vegetation from old stream bank (to be demolished) and monitoring of plant and fauna establishment and pest control (red ants). Client: MTR Corporation, sub-contractor of MottConnell, 2004 - 2006.

Lantau Cable Car Project (Ngong Ping 360): Feasibility study – responsible for ecological surveys, Client: MTR Corporation, sub-contractor of BMT, 1999-2000.

Repositioning and Long Term Operation Plan of Ocean Park. Conduct vegetation survey to identify and locate some protected plants for transplantation. Proposal of plant transplantation plan. 2006-2007.

Ocean Park Corporation – Master Redevelopment Project: Contract No. CI 03 – Parkwide Tree Identification and Condition Survey; vegetation surveys to identify protected plant species. 2006.

Highways Department: Reconstruction and Improvement of Tuen Mun Road, Design and Construction. Tree survey. In supporting EDAW Ltd. Committed in March 2006 and completed in May 2006.

EIA Study for Provision of Crematorium at Wo Hop Shek Crematorium: Ecological survey and impact assessment; Tree survey, compensation planting proposal and reporting. In supporting Hyder Consultants Ltd. Client: Architect Services Department. 2006 - 2008.

Consultancy Agreement No. 9SN005 Construction of a Secondary Boundary Fence - Ecological Impact Assessment for the Project Profile; Tree Surveys, In supporting Mott Connel Ltd., 2005-2006.

Agreement No. CE 11/2004. Tree Survey on masonry wall at Hong Kong Island. In supporting ADI Limited. Committed in 2004 and completed in 2005.

Term Consultancy for Minor Works to Government Properties – Region I Contract No. P1000179 (PM1.31) Slope Upgrading Works at Kennedy Town Bus Terminals, Victoria Road. Involved advise on preservation of significant tree for slope engineering works and monitoring tree health. Client: ASD / ADI / L&O, committed in October 2003 and completed in 2005 .

Territory Development Department, HKSAR, Agreement No. CE 59/94 Main Drainage Channels for Fanling, Sheung Shui and Hinterland: EM & A: ecological monitoring for River Beas and Indus River, N.T.. Scope of monitoring: vegetation, fish, dragonfly, benthic invertebrates, amphibians and birds. Monthly monitoring committed in April 2002 and completed in 2005.

Civil Engineering Department: Contract No. CV/2000/09 Infrastructure for Penny's Bay Development - Contract 1 Impact Environmental Monitoring and Audit (EM&A): White-bellied Sea Eagle monitoring at Penny's Bay for Contract of the Disneyland Theme Park project on Lantau.

Agreement No. CE 25/2002 (DS) Drainage Improvement in Northern Hong Kong Island – Hong Kong West Drainage Tunnel Environmental Impact Assessment: Ecological Baseline Survey. The job also involved stream faunal surveys for several streams. Client: DSD / Black & Veatch Hong Kong Limited; committed in August 2003 and completed in 2005.

Contract No. HY/2000/18 Construction of Kam Tin Bypass - Constructed wetland. Being appointed as wetland specialist involving wetland surveys, monitoring, advise on construction of wetland habitats and design, sourcing, verification and supervision of wetland plant plantation. (Client: Highway Department; Employer: ZHUHAI International Economic & Technical Cooperation Corporation, committed in June 2001 and completed in 2006).

Ecological Monitoring at NENT landfill - Vegetation monitoring on selected tree species and natural vegetation adjacent to operational landfill. (Client: Far East Landfill Technology Ltd.; sub-contracted to BMT Asia Ltd., commissioned in March 1999 and completed in 2005.).

Feasibility Study for Proposed Resort and Residential Development at Hai Tung Bay, Sanya, Hainan, China: Involving field ecological surveys and reporting in 2005. Client: Henderson Land / Belt Collins.

Proposed Residential Development at Various Lots in DD 129, Deep Bay Road, Lau Fau Shan, Yuen Long. Ecological Review and impact assessment for proposed Access Road and Stream Wiedning Works. 2004.

S16 Application for site at Tin Fook Wai, Yuen Long: Ecological supporting works including pond benthic plagic sampling, sorting, identification in 2001-2002. Ecological baseline updating involving birds, amphibians, mammals and Odonata surveys in 2005. Client: Henderson Land / EcoSchemes / BMT.

Section 16 application: Proposed Residential Development at Ha Wo Hang, Sha Tau Kok – Ecological Impact Assessment. Scope of ecological surveys and assessment: Flora and fauna in Fung Shui woodland, woodland, shrubland, stream course, agricultural land, pond. Client: Eton Property; Committed in July 2003 and completed in 2004.

Tree survey and assessment for residential development site at Tao Fung Shan, Sha Tin, N.T., completed in December 2004. Client: Hong Chui Landscaping Ltd.

Tree survey and assessment for residential development site at Beacon Hill No. 1., Kowloon, completed in December 2004. Client: Wing Hong Construction Ltd.

Residential Re-development at No. 12 Headland Road, Hong Kong Island: Tree Survey/Updating (Client: Belt Collins Hong Kong Ltd., completed in February 2005).

Marine Surveys and Performance Verification of Cyberport Sewage Outfall - Investigation- Benthic Sampling, Sorting and Identification, committed in March 2004 and completed in October 2004 (sub-contractor of LamGeotechnical).

Agreement No. PW 02/2003. Engineering Feasibility and Environmental Assessment Study for Restoration of the East Lamma Channel Marine Borrow Area – Investigation: Fish Fry Survey, conducted in 2004.

Quotation Contract No. UB 038-04 Routine Maintenance Inspection to 114 Nos. of Slope Features in Tai Po New Territories. Manage and partially conduct tree surveys for all 114 slopes completed in November 2004. In support of Hyder / ADI.

Agreement No. PW 02/2003. Engineering Feasibility and Environmental Assessment Study for Restoration of the East Lamma Channel Marine Borrow Area – Investigation: Fish Fry Survey, conducted in 2004 (sub-contractor of Scott Wilson).

Ecological Study and Impact Assessment of Kau To Hang within a Village Small House Development, in supporting Section 16 application. Client: Ove Arup. 2002 – 2003.

Section 16 application: ecological assessment for a open car storage for sale at Kam Tin, Yuen Long. Client: Sharp Gain Limited. Committed in October 2003 and completed in 2004.

Section 16 application for proposed residential development at Nam Sang Wai, Yuen Long - Tree Survey, appointed by Belt Collins Ltd. 2004 .

Section 16 application for proposed Comprehensive Hotel (Mega Hotel)/Residential Redevelopment on Land Zoned OU-CRA, O and R(A), Site on Kennedy Road and Ship Street, Wan Chai - Tree Survey, appointed by Townland Consultants Ltd. 2002-2004.

Drainage Diversion Works for Comprehensive Residential Development at Various Lots in DD 227 & DD 229, Tai Po Tsai, Sai Kung. Conduct ecology study for the site in response to AFCD's comments on ecology issues. 2002 – 2003. Client: New World Development.

Proposed hotel development at the Old Marine Police Head Quarters at Tsim Sha Tsui, Kowloon: Tree Survey. July 2003.

Proposed Development at Sai Sha, Ma An Shan: tree survey. Client: Belt Collins Asia Limited. 2003.

Tree survey for slope works at Llyon Path, Hong Kong Island. Client: ASD / L & O Architect. 2003

Planning study of Bo An, Shenzhen, China: Ecological surveys for identify ecological degradation areas and proposal of mitigations. A joint project with Beijing University. Completed in October 2003.

Proposed HKYWCA Guesthouse and Conference Centre at San Shek Wan, Lantau - Tree Survey, Tree Felling Application and Tree Compensation. Client: HKYWCA, Committed in August 2003.

Proposed Cable Car project at Lantau: tree surveys (Client: MTRC; Sub-contracted with Mott Connell Ltd. Committed in 2002.)

Residential Development on NKIL 6277 at Beacon Hill Road, Kowloon Tong: tree checking. Client: ADI Ltd., in August 2003.

Agreement No. CE 50/2001 (DS) Drainage Improvement in Sha Tin and Tai Po – Design and Construction - Ecology Survey. Being appointed by Maunsell Consultants to carry out ecological surveys of habitats, flora and fauna for the project. Scope of surveys include terrestrial, freshwater and marine environment. Committed in August 2002 and completed in July 2003.

Agreement No. CE 11/2002 (DS) Drainage Improvement in Sai Kung – Design and Construction: Ecology Survey. Being appointed by Maunsell Consultants to carry out ecological surveys of habitats, flora and fauna for the project. Scope of surveys include terrestrial, freshwater and marine environment. Committed in October 2002 and completed in July 2003.

Agreement No. CE 11/2002 (DS) Drainage Improvement in Sai Kung – Design and Construction: Tree Survey. Being appointed by Ted & Chan Associates to carry out all surveys for the project. Completed in June 2003.

Development at Ting Kok: Rezoning Application and Section 16 Application – Tree Survey. Appointed by ADI Limited. Completed in 2003.

Proposed development at Lo Lau Uk, Tai Po: Stream ecological survey. Sub-consultant of Ecosystem Asia Limited. Completed in 2002.

Ecological Monitoring at WENT landfill - Vegetation monitoring on selected tree species and natural vegetation adjacent to operational landfill; Marine benthic in-fauna identification; bio-monitoring by oyster population, growth, health, survive rate and as well as metal/organic contamination. (Client: SWIRE SITA Waste Services Ltd.; 2001-2002).

Proposed extension of Discovery Golf Course, Lantau: stream ecological survey (contract with Atkins China, 2002)

Tree survey for a development site at Greg Road, Tai Koo Shin, Hong Kong. (sub-contract to Belt Collins Hong Kong Ltd. 2003)

Re-zoning application for proposed development at Kau To Shan, Shatin – ecological survey, assessment and reporting. Appointed by Ove Arup in 2002.

Agreement No. CE 109/98, Deep Bay Link Investigation and Preliminary Design - EIA - Specialist Ecological Survey and Impact Assessment. Involved in two season ecological surveys on mangrove, inter-tidal in-fauna/epi-fauna surveys, stream fauna, mammal, reptile, amphibian surveys and fishery impact assessment. Completed in August 2002. (sub-contracted to EcoSchemes Asia Ltd.; Leading consultants: Ove Arup/EML)

Agreement No. CE 109/98, Deep Bay Link Investigation and Preliminary Design. Tree survey, completed part of the tree surveys. Appointed by EcoSchemes Asia Limited in 2002.

Proposed Development at Fung Lok Wai, Yuen Long at Lot 1457 R.P. in D.D. 123. - Tree Survey, Appointed by ADI Limited.

Ecological assessment of the proposed Theme Park project at Ma Wan – report revising and re-submission. Appointed by CH2M Hill (China) Limited in 2002.

Agreement No. CE 31/98, Lantau North-South Road Link between Tai Ho Wan and Mui Wo - Specialist Ecological Survey and Impact Assessment. Responsible for four season ecological surveys and ecological impact assessment and was commissioned in August 1998. The scope of work include terrestrial flora, fauna including avi-fauna, stream fauna, marine flora/fauna and estuarine fishes. (sub-contracted to Mouchel Asia Ltd., completed in March 2001)

Ecological impact assessment and damage quantification for AMORGOS Oil Spill in Kenting, Taiwan. (Client: confidential, commissioned in 2001 and completed in 2002).

Plant Inventory/Surveys for CLP 11k voltage power lines – (Client: Belt Collins Ltd., 2001- 2002).

Vegetation Inventory/Surveys for proposed CLP 11k voltage power line renovation between Tung Chung and Cheung Sha Wan, Lantau – (Client: CLP/BMT Asia Ltd., 2002).

Ecological review and preliminary impact assessment for a project of low density residential/recreational development of various lots in DD104 Yeun Long. The project involved design of mitigation wetland habitats. Appointed by Ove Arup in 2001.

Route Ten Project: Tree Survey, commissioned in November 2000 and completed in 2002.

Review of ecology issues in Tuen Mun Area 54 Government Farm. (Client: TDD; sub-contracted to Scott Wilson Ltd., Completed in November 2000).

Tree Survey at R.B.L.1138 Stanley, Hong Kong, July 2001.

Tree survey at RBL. No.801 No.3 South Bay Close, Hong Kong, July 2001.

Agreement No. CE 17/2000 10 Year Extended LPM Project Phase 2, Package F – Shatin Works – Tree Survey at 11 slope sites, August, 2001.

Tree survey at Shatin section for Route nine project. May to July 2001.

Tree surveys at 11 slope sites on Hong Kong Island for Slope project. July 2001.

Tree survey at a proposed slope work site at Yau Tong, Knowloon. October 2000.

Tree survey at a proposed slope work site at San Shek Village, Tuen Mun. October 2000.

Tree survey at a proposed build restore site at No 30 Peak Road, Hong Kong Island. September 2000.

Tree survey at a electronic sub-station site at Cyberport, Telegraphy Bay, Hong Kong Island. September 2000.

Tree identification at construction site at Tai Po Kau, New Territories, Hong Kong. September 2000.

Agreement No CE 2/98 Performance Verification of Stanley and Shek O Outfalls. Responsible for benthic sieving, sorting, identification and preliminary data analysis. In total 168 grab samples were taken from seabed for each season (dry and wet season). Over 180 taxa were recorded from each sampling season (Client: EPD; sub-contracted to ERM Ltd., Completed in August 2000).

Tree survey at a proposed development site at Tin Kau, Hong Kong. July 2000.

Ecological impact assessment for a re-zoning project of residential development at Au Tau, Yeun Long. Completed in June 2000 (Appointed by Hyder Consulting Limited).

Proposed Theme Park Project at Ma Wan: Tree survey, involved over 3000 trees survey work. Completed in March 2000.

Proposed development at Lau Fau Shan, Yuen Long: Tree survey. February 2000 and May 2000.

Tree survey at a proposed development site at Leighton Hill, Hong Kong. June and July 2000.

Agreement No. CE 73/98. Investigation Assignment for Widening of Tolo Highway/ Fanling Highway between Island House Interchange and Fanling- Ecological survey and impact assessment. Ecological surveys covered vegetation, mammals, birds, reptiles, amphibians, large inveterbrates and stream fauna. (sub-contracted to Environs Hong Kong Ltd., Completed in March 2000).

Agreement No. CE 17/98 Development of an Ecological Monitoring Programme for the Mai Po and Inner Deep Bay Ramsar Site. (Client: AFD; sub-consultant of Hyder Environmental Ltd.) Involving the Study as benthic specialist. (2000).

Proposed development at Tong Fu, Lantau Island: Ecological survey and impact assessment. Ecological survey covered vegetation, birds, reptiles and large inveterbrates. sub-contracted to ERM Hong Kong Ltd., 2000.

Sludge Treatment and Disposal Strategy Study – Site Specific Feasibility Study: Ecology Study at Nim Wan Site. Ecological surveys covered vegetation, mammals, birds, reptiles, amphibians, large inveterbrates and stream fauna. (Client: EPD; sub-contracted to ERM Hong Kong Ltd., Completed in 2000).

Wetland off-site compensation study at out Deep Bay for site selection study of Waste to Energy Incinerator Facilities (Ha Pak Nai site). Ecological surveys covered vegetation, mammals, birds, reptiles, amphibians, large invertebrates and stream fauna. Client: EPD, Sub-consultant of CDM International, Completed in 2000.

Strategic Master Plan for Expansion of the Main Campus of The University of Hong Kong. Preliminary ecology survey and impact assessment for PPFS. . Ecological surveys covered vegetation, mammals, birds, reptiles, amphibians, large inveterbrates and stream fauna. (Client: The University of Hong Kong; sub-contracted to Over Arup & Partners Hong Kong Ltd., completed in 1999).

Agreement No. CE 5/96: Sludge Treatment and Disposal Strategy Study – Site Specific Feasibility Study: Terrestrial Ecology Surveys and impact assessment at Siu Ho Wan and Nim Wan site. (Client: EPD; sub-contracted to ERM Ltd., completed in 1999).

Preliminary Project Feasibility Study of the Proposed Lantau Cable Car between Tung Chung and Ngong Ping. Botanical and mammal surveys. (Client: MTR Corporation; sub-contracted to an environmental consultant firm, 1999).

Agreement No. CE 64/98 Study on Wetland Compensation. (Client: AFD; sub-consultant to Binnie Black & Veatch Hong Kong Ltd.) Involving the Study as a team leader in conducting wetland field surveys. (completed in 1999).

Waste-to-Energy Incineration Feasibility Study: Ecological habitat survey, stream fauna and riparian flora surveys at Ha Pak Nai. Habitat surveys at Tim Chim Chau and Black Point. (sub-contracted to CDM International Inc., completed in 1999)

Preliminary ecological survey at East and West Lake (constructed brackish water lake/or wetland) in Nanwan, **Macau**. (Client: Nanwan Development Ltd., completed in 1999).

Long Term Ecological Monitoring at SENT landfill - Mammal live-trapping: monitoring population of small mammals in the natural habitats adjacent to operational landfill. (sub-contracted to EcoSchemes Ltd., January to December 1998)

Nam Sang Wai Development - Ecological Monitoring: Benthic sample sorting, identification and biomass estimation. (sub-contracted to EcoSchemes Ltd., January to December 1998)

Proposed private development at Pak Kong, Sai Kung, conducting onsite tree surveys, responsible for tree identification and measuring over 1500 trees on site. (Completed in October 1998)

Agreement No. CE 24/97 Desilting and Renovation of Impounding Reservoirs on Hong Kong Island and Lantau Island Investigation Study, undertaking ecological surveys on flora and fauna. (sub-contracted to Enviros Hong Kong Ltd.; Completed in Jan. 1999)

Agreement No. CE 92/97 - Engineering Feasibility Study for Infrastructure Works for Housing Development at Telegraph Bay (cyber port site). Responsible for ecological surveys including flora and fauna. (sub-contracted to Enviros Hong Kong Ltd.; Completed in Jan. 1999)

Ecological resources review of Shenzhen coastal line. Client: Shenzhen Land Bureau. (sub-consultant of Atkins China Ltd., Completed in November 1998)

Agreement CE 6/97 Feasibility Study for Housing Sites in Sha Tin District - Shing Mun Valley-undertaken the Additional Ecological Survey and Impact Assessment (main consultant: Binnie Black & Veatch Hong Kong Ltd.). (Completed in September 1998)

Agricultural expert's opinion on ten agricultural products of Hong Kong - a report for Henderson Land Development Co. Ltd. (completed in August 1998)

Agreement No. CE 66/96, Planning and Development Study on North West New Territory - conduct specialist ecological survey at a variety of areas in the New Territories in Hong Kong. (completed in June 1998)

Tree survey at Tai Lam Chung, involving species identification, photographing and recording (completed in July 1998).

Tree survey at Ngong Ping, Lantau, involving species identification, photographing, mapping and recording. (completed in August 1998)

Proposed private development at Pak Kong, Sai Kung, conducting on-site tree surveys, responsible for tree identification and measuring over 1500 trees on site, 1998.

Tree Survey at Ping Shan, Yuen Long, involving species identification, photographing and recording, 1998.

Tree Survey for a proposed governmental building renovation site at Aberdeen, Hong Kong Island , involving species identification, photographing, recording, evaluation and reporting, 1999.

Tree Survey for a proposed bus station site at Stanely, Hong Kong Island , involving species identification, photographing, recording and reporting, 1999.

Renewal of Hong Kong Federation of Youth Clubs, Tai Mong Tsai Outdoor Training Camp, Sai Kung: EIA - Botanical survey and impact assessment; tree survey; mangrove and intertidal zone survey; and butterfly survey. 1998.

Agreement CE 52/97. Planning & Engineering Feasibility Study for Redevelopment of Mount Davis Cottage Area & Kennedy Town Police Married Quarters.- Ecological Survey and Impact Assessment.

Proposed Residential Development at Shek Wu Wai Village, north N.T.: Stream survey, impact assessment and reporting.

Proposed Residential Development at DD 92; Development at DD 92; Lot Nos.D 92; Lot Nos. 2558, 915sC and 947;8, 915sC and 9Kam Tsin Tsuen, Sheung Shui, N. T.: Ecological survey and impact assessment.

Planning and Development Study on Hong Kong Island South and Lamma Island. Responsible for fauna surveys (birds, reptile, amphibians, stream benthos and large terrestrial insects) at a number sites including Fok Fu Lam area. Sub-contract to Atkins China Ltd, completed in 2001.

Proposed Section 16 Planning Application, Planning Application for Residential Development at Lot 101 & DD111, Yuen Long N. T.: Ecological survey and impact assessment.

Engineering Feasibility Study for Proposed Housing Development at North of Pamela Youde Hospital, Chai Wan: Ecological survey, impact assessment and reporting.

Route 9, Detailed Feasibility Study: Ecological Surveys (fauna) and Reporting.

Discovery Bay Development: shoreline/habitats survey and marine resources review.

EIA for Tin Kau Development: benthic ecologist responsible for identifying invertebrates collected from the stream and the estuarine.

Ecological Impact Assessment for a proposed resort development at Ngong Ping, Lantau Island: responsible for site surveying, stream benthic sampling, sorting, identifying, evaluating, assessing impacts and propose of ecological mitigation 1998.

1995.7-1997.3 Senior Environmental Consultant - Hyder Environmental Ltd. (formerly AXIS Environmental Consultants Ltd. Projects involved:

Deep Bay Water Quality Regional Control Strategy: Project Co-ordinator for a large study developing a management strategy for Deep Bay which borders Hong Kong and the PRC.

Shenzhen River Regulation Project Phase I: Environmental Monitoring and Audit Programme: Project Manager and specialist for the benthic and sediment sampling and sample processing at the Mai Po mudflats.

Shenzhen River Regulation Project Phase II Stage II Works: Project manager and specialist supporting Atkins Haswell Ltd. with environmental aspects especially ecological mitigation.

Community Impact Assessment for West Railway Project: Responsible for identification of ecological sensitive receivers along the proposed railway and stations; recommendation on mitigation measures on relevant ecological component.

Upgrading of Water Quality and Hydraulic Mathematical Models: Responsible for assisting the leading consultant - Delft Hydraulics - in data collection for modelling purpose.

ECCI Calcium Carbonate Grinding Facility, Nanling, Wuhu, PRC: Site investigation, scoping of environmental impact assessment, costing and liaison with local environmental protection/regulation authorities for a British invested factory.

Revised Sha Lo Tung Development EIA: Responsible for the ecological survey of three stream courses in the Sha Lo Tung valley.

Discovery Bay Development - Environmental Consultancy Services for Mangrove Restoration: Specialist to organise and carry out habitat, mangrove and rock shore surveys; supervise and undertake stream channel, mudflat design and nursery construction.

Literature Review on Chinese White Dolphin (*Sousa chinensis*): Supporting study for Hyder Consultants to provide information on spatial distribution and population of white dolphins; and to provide information on status and views of biological conservation of the species.

Part-time Tutor for Environmental Impact Assessment Course: Employed by Hong Kong Open Learning Institute as a Part-time tutor during April 1995 to April 1996 and October 1996 to April 1997.

1993 - 1995 Binnie Consultants - Environmental Scientist and Benthic Ecologist, Projects involved:

Tai Po and Butterfly Valley Additional Water Treatment Works EIA: Responsible for ecological surveys of terrestrial and freshwater flora and fauna, 1994.

Proposed Explosive Storage Development, Kau Shek Wan, Lantau: Responsible for the ecological survey of the site of the proposed explosive storage depot, 1994.

Ting Kau Bridge EIA: Ecological survey and impact assessment (terrestrial and freshwater flora and fauna) of proposed Ting Kau Bridge project.

North Lantau Port Development EIA: Ecological survey and EIA of the proposed port development site at Tsing Chau, Lantau.

Kwu Tung Residential Development EIA: Ecological survey and impact assessment (terrestrial and freshwater flora and fauna) of a proposed residential development at North and South of Kwu Tung, North New Territories.

Hoi Ha Wan Ecological Study: Studied benthic communities in streams and the estuary at Hoi Ha Wan, Hong Kong.

Along Bay Resort Development: undertaken a preliminary ecological assessment at Along Bay, a proposed national resort development in Hainan, PRC.

WENT Landfill EIA: Involved in the ecological studies for the supplementary EIA and ecological monitoring at the WENT landfill site on the edge of Deep Bay.

NENT Landfill Environmental Review: Performed an ecological survey of the NENT landfill site as part of the Environmental Review of the project.

East Sha Chau Contaminated Mud Pit Environmental Monitoring: Benthic ecologist and team leader responsible for long-term benthic monitoring for the East Sha Chau contaminated mud pits during 1993-1995. Work included sampling, sample sorting, identification, data analysis and reporting.

South Cheung Chau Spoil Disposal Site Monitoring: Benthic ecologist and team leader responsible for benthic faunal sampling, sorting, identification and reporting.

Seabed Ecology Study: Conducted part of the Remote Seabed Survey (REMOTS) and also a benthic ecologist and team leader (of Binnie Consulting Ltd) undertook the 'Remote Ground Truthing' of benthic communities in west, south and east waters of Hong Kong. Work included project co-ordination, grab sampling, sorting, identification, data analysis and reporting 1993-1995.

Fill Management EIA of Ninepin Islands: Benthic ecologist and team leader undertook a baseline benthic study and impact assessment of the proposed dredging site near the Ninepin Islands. 1994.

Environmental Audit of Dredging in the Lamma Channel: Benthic ecologist and team leader carried out the baseline ecological study and impact assessment of dredging on benthic fauna in the Lamma Channel. 1994.

1991 - 1993 - Freelance ecological consultant, Project involved:

Team 73, Townland consultants and New World Development. Independent undertaken or involved the following projects:

Sha Lo Tung Development EIA: Ecological survey of proposed golf course development at Sha Lo Tung.

Mai Po Tsuen, Yuen Long and Tai Po Kau Development EIAs

1988 - 1993 The University of Hong Kong - Ph.D. candidate and part-time demonstrator for a variety of biological and ecological courses.

River/Stream Benthic Community and Water Chemistry Studies: Ph.D project studying macroinvertebrate communities in both polluted and unpolluted streams in Hong Kong. The project focused on the various environmental factors influencing animal communities and community structure. Both biotic (e.g. algae and riparian vegetation) and abiotic factors (e.g. water chemistry, substrate, hydraulics and organic pollution) were studied. A relatively new multivariate statistical analysis technique (CANOCO) was used to analyse large community data sets with multivariate environmental parameters. The data on the benthic community and some identified sensitive species could be applied to aquatic environmental stress assessment in Hong Kong.

1984 - 1987 Study for Master of Science degree at the Biology Department of Nanjing Normal University: Research on animal taxonomy.

1987 - 1988 Biology teacher at Nanjing Normal School: Teaching biology and Human Physiology.

1978 - 1981 Undergraduate at the Biology Department of Hunan Normal University: Project research on animal taxonomy. Undertaken plant phenology record of a variety of trees and shrubs.

Publications and Thesis (not including technical reports)

Shea She Sang (junior editor), 1986. Proceedings of Nature Calendar of China. Sinica Science press. 421 pp.

Shea She Sang and You, D., 1988. A new species of Isonychia from China (Ephemeroptera: Oligoneuriidae). Pan-Pacific Entomologist. 64(1): 29-31.

Shea She Sang, 1992. Benthic community transitions from freshwater to sea water at Hoi Ha Wan, Hong Kong. In The marine flora and fauna of Hong Kong and Southern China III (ed. B. Morton). Proceedings of the Fourth International Marine Biological Workshop, Hong Kong, 11-29 April 1989. Hong Kong University Press. pp. 801-814.

Shea She Sang, 1993. Determinants of macroinvertebrate community structure in stone surfaces in Hong Kong streams. Ph.D thesis. The University of Hong Kong.

Shea She Sang, 1994. The effects of water quality, epilithic algae and organic matter on the communities of stone-dwelling macroinvertebrates in a Hong Kong river. Mitt. Internat. Verein. Limnol. 24: 327-336.

Shea She Sang and Gui Hong, 1995. Studies on Ephemeroptera (Insecta) of Hainan Province. Acta Nanjing Normal University.

Shea She Sang, Lynn Smith and Pamela Sanders, 1995. Ecological Impact Assessment and Ecological Monitoring of a Strategic Landfill: A Case Study in Hong Kong. Proceedings of The First Symposium of Chinese Zoologist in Southeast Asian, Guangzhou, 14-17 December 1994. In Supplement to The Journal of Sun Yatsen University. 1995 (3): 30 - 39.

Cai Lizhe, Lin Peng, She Shusheng (Mark Shea) and Lawman Law, 1998. Studies on polychaete ecology on the mudflat of the intertidal zone in Shenzhen Estuary. Marine Environmental Science. Vol. 17 (1): 41-47.

Zhou Weichuan, She Shu-Sheng (Mark Shea) etc. 2006. STUDY ON GEOGRAPHY DISTRIBUTION MODEL OF *HEMIBERLESIA PITYSOPHILA*. (周卫川, 余书生 等: 松突圆蚧地理分布模型的研究). To be published.

Zhou Weichuan, She Shu-Sheng (Mark Shea) etc. 2007. A study on the land and freshwater mollusks as hosts of *Angiostrongylus cantonensis* Chen. (周卫川, 余书生 等: 广州管圆线虫中间宿主- 软体动物概述). Chinese Journal of Zoonoses Vol. 23. No. 4; P. 401-408.

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Appendix 2. Full List of Adult Fish Data

Gear	Season	Year	Date	Location	Group	Family	Species Name	Common Name	Chinese Name	Commercial Value ^(a)	Quantity	Weight(g)	TL (cm)
Cage	Dry	2021	28-Jan	R3	Crab	Portunidae	<i>Charybdis japonica</i>	Asian paddle crab	日本蟳	Nil	1	38	6
Cage	Dry	2021	29-Jan	I2	Crab	Portunidae	<i>Portunus pelagicus</i>	Blue crab	遠海梭子蟹	High	1	283	10
Cage	Wet	2021	17-Jun	R4	Fish	Pomacentridae	<i>Neopomacentrus cyanomos</i>	Regal demoiselle	藍新雀鯛	Low	1	53	9
Cage	Wet	2021	21-Jun	I1	Crab	Portunidae	<i>Charybdis japonica</i>	Asian paddle crab	日本蟳	Nil	1	38	6.5
Cage	Wet	2021	21-Jun	R4	Crab	Portunidae	<i>Charybdis japonica</i>	Asian paddle crab	日本蟳	Nil	1	165	9.5
Net	Dry	2021	28-Jan	I2	Fish	Labridae	<i>Halichoeres nigrescens</i>	Bubblefin wrasse	雲斑海豬魚	Low	1	20	7
Net	Dry	2021	29-Jan	I2	Fish	Monacanthidae	<i>Monacanthus chinensis</i>	Fan-bellied leatherjacket	單棘魷	Medium	1	472	12
Net	Dry	2021	28-Jan	R4	Fish	Sebastidae	<i>Sebastiscus marmoratus</i>	Sea ruffe	石狗公	High	1	70	9
Net	Dry	2021	28-Jan	I1	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	2	42	7-9
Net	Dry	2021	28-Jan	I2	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	12	533	6-11
Net	Dry	2021	29-Jan	I2	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	3	123	7-10
Net	Dry	2021	29-Jan	R3	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	2	104	6-9
Net	Dry	2021	28-Jan	R4	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	4	120	6-10
Net	Dry	2021	29-Jan	R4	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	5	150	6-10
Net	Dry	2021	28-Jan	I2	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	14	298	7-11
Net	Dry	2021	29-Jan	I2	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	4	90	7-10
Net	Dry	2021	28-Jan	R4	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	5	92	7-11
Net	Dry	2021	28-Jan	I2	Fish	Synodontidae	<i>Synodus dermatogenys</i>	Sand lizardfish	革狗母魚	Low	1	92	14
Net	Dry	2021	28-Jan	R4	Fish	Tetraodontidae	<i>Takifugu alboplumbeus</i>	Spotted puffer	鉛點東方魷	Nil	2	115	7-9
Net	Dry	2021	29-Jan	I1	Fish	Carangidae	<i>Trachinotus blochii</i>	Snubnose pompano	黃立鯧	Low	1	320	15
Net	Dry	2021	28-Jan	R4	Cephalopod	Loliginidae	-	Squid	魷魚	Medium	2	1232	14-18
Net	Wet	2021	17-Jun	R4	Fish	Pomacentridae	<i>Neopomacentrus cyanomos</i>	Regal demoiselle	藍新雀鯛	Low	1	41	8
Net	Wet	2021	17-Jun	I2	Fish	Sebastidae	<i>Sebastiscus marmoratus</i>	Sea ruffe	石狗公	High	1	90	7
Net	Wet	2021	21-Jun	I2	Fish	Sebastidae	<i>Sebastiscus marmoratus</i>	Sea ruffe	石狗公	High	1	100	9
Net	Wet	2021	17-Jun	I2	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	8	395	7-12
Net	Wet	2021	21-Jun	R4	Fish	Siganidae	<i>Siganus fuscescens</i>	Pinspotted spinefoot	泥魷	Low	3	170	8-11
Net	Wet	2021	17-Jun	I2	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	3	156	8-10
Net	Wet	2021	21-Jun	I2	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	2	67	8-10
Net	Wet	2021	21-Jun	R4	Fish	Labridae	<i>Stethojulis interrupta</i>	Cutribbon wrasse	斷紋紫胸魚	Low	3	136	8-10
Net	Wet	2021	17-Jun	I1	Fish	Mugilidae	<i>Mugil cephalus</i>	Flathead grey mullet	烏頭	Low	1	768	20
Net	Wet	2021	21-Jun	R3	Fish	Mugilidae	<i>Mugil cephalus</i>	Flathead grey mullet	烏頭	Low	1	360	14
Net	Wet	2021	21-Jun	R3	Fish	Mullidae	<i>Parupeneus biaculeatus</i>	Pointed goatfish	雙帶海鯪	Low	1	35	7
Net	Wet	2021	17-Jun	R3	Crab	Portunidae	<i>Charybdis japonica</i>	Asian paddle crab	日本蟳	Nil	2	520	8-12
Net	Wet	2021	17-Jun	I2	Holothuriida	Holothuriidae	<i>Holothuria atra</i>	Black sea cucumber	黑海參	Nil	1	632	13
Net	Wet	2021	21-Jun	R4	Cephalopod	Loliginidae	-	Squid	魷魚	Medium	1	758	18

Note: 94 8678

(a): References of Catch Value

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H = High (>80 HK\$/kg); M = Medium (70 - 80 HK\$/kg); L = Low (<70 HK\$/kg); X = not commercially important species; Nil = no commercial value is evaluated

Appendix 3. Biomass (g) of Audlt Fish Surveys

[illegible]

Appendix 4. Abundance of Audlt Fish Surveys

[illegible]

Appendix 5: Photo records from the fisheries survey



Photo 1. General view of Study Area



Photo 2. General view of Study Area



Photo 3. General view of Study Area



Photo 4. General view of Study Area



Photo 5. Setting up of gill net

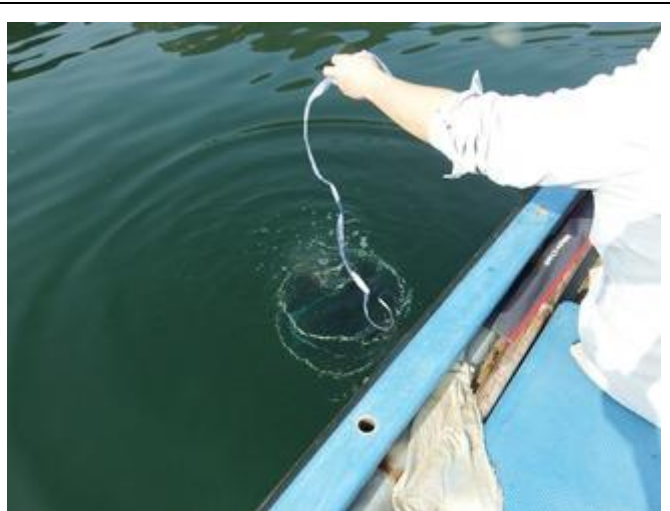


Photo 6. Setting up of cage trap



Photo 7. Fishes trapped by gill net



Photo 8. Fishes trapped by cage trap