



Revised Translocation Proposal for the Endemic Freshwater Crab *Somanniathelphusa zanklon*

Northeast New Territories Landfill Extension (NENTX)

0092/22/ED/0093 00 | 16 June 2022

Formal Submission

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30 June 2022

By Post and Email

Meinhardt Infrastructure & Environment Ltd
10/F Genesis
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Hong Kong

Attn: Ms. Claudine Lee.

Dear Claudine,

**Re: Contract No. EP/SP/77/15
Northeast New Territories landfill extension
Revised Translocation Proposal for the Endemic Freshwater Crab - *Somanniathelphusa zanklon***

In accordance with the requirement specified in Conditions 2.8 and 2.10 of Environmental Permit No. EP-292/2007 and Conditions 2.6 and 2.8 of Further Environmental Permit No. FEP-01/292/2007, we are pleased to submit the certified "Revised Translocation Proposal for the Endemic Freshwater Crab - *Somanniathelphusa zanklon*" dated on 16 June 2022 for your verification.

Should you require any further information or clarification, please do not hesitate to contact the undersigned or our Mr. Keith Chau on 3664 6788.

Yours faithfully
for and on behalf of
Aurecon Hong Kong Limited

A handwritten signature in blue ink, appearing to read "Fredrick Leong", is written over a faint, light blue circular stamp.

Fredrick Leong
Environmental Team Leader

Encl.

1. Revised Translocation Proposal for the Endemic Freshwater Crab - *Somanniathelphusa zanklon* dated on 16 June 2022

cc.

1. IEC – Ms. Claudine Lee (By email: claudinelee@meinhardt.com.hk)

Our Ref.: CL/91823/0041-VES
Date: 6 July 2022

By Email

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Dear Sir

Re: Contract No. EP/SP/77/15
North-East New Territories Landfill Extension (NENTX)
Revised Translocation Proposal for the Endemic Fresh Water Crab –
Somanniathelphusa zanklon

I refer to Condition 2.6 under FEP-01/292/2007 regarding the submission of a detailed methodology for capture surveys and translocation on the endemic freshwater crab *Somanniathelphusa zanklon* and its monitoring requirements on the translocation site. I hereby verified the captioned "Revised Translocation Proposal for the Endemic Freshwater Crab – *Somanniathelphusa zanklon*" dated 16 June 2022.

Yours faithfully
MEINHARDT INFRASTRUCTURE AND ENVIRONMENT LTD



Claudine Lee
Independent Environmental Checker

Document Control

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00	16 June 2022	For Review	Awaiting comments	KJB	FN	CY

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1. Introduction

- 1.1.1 The North East New Territories (NENT) Landfill is reaching its designed capacity. The Environmental Protection Department (EPD) is actively pressing ahead the NENT Landfill Extension to extend the capacities of the landfill, with the view to meeting the long-term waste disposal needs of Hong Kong.
- 1.1.2 The North East New Territories Landfill Extension (the NENTX Project) is a designated project. The Environmental Impact Assessment (EIA) Report was approved with conditions on 20 September 2007 and the Environmental Permit (EP) EP-292/2007 (the "EP") was issued on 26 November 2007. Additionally, a Further Environmental Permit FEP-01/292/2007 (the "FEP") was also issued under the EIA Ordinance on 28 April 2022.
- 1.1.3 In order to fulfil the FEP conditions 2.6 and 2.8 on translocation on the endemic freshwater crab *Somanniathelphusa zanklon* surveys shall be carried out with the purpose of providing details for the formulation and implementation of translocation scheme for this endemic freshwater crab recorded within the NENTX Project area prior to the commencement of the NENTX Project.
- 1.1.4 Specifically, FEP condition 2.6 states that "the Permit Holder shall, no later than six month before the commencement of construction of the Project, submit to the Director for approval four hard copies and one electronic copy of a detailed methodology for capture surveys and translocation on the endemic freshwater crab *Somanniathelphusa zanklon* affected by the Project area and monitoring requirements on the establishment of the *Somanniathelphusa zanklon* community in the translocated site. The submission shall be prepared by a qualified botanist or ecologist and shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the approved EIA Report".
- 1.1.5 To prepare the translocation proposal in order to fulfil the above FEP conditions, the Environmental Protection Department, Hong Kong have commissioned ERM-Hong Kong, Limited (ERM) to undertake the Provision of Consultancy Services for Study on Ecological Conditions and Corresponding Transplantation and Translocation for NENT Landfill Extension.
- 1.1.6 The NENTX Design-Build-Operate (DBO) Contractor (the Contractor), on behalf of EPD/LDG, will be responsible for carrying out the capture survey and translocation works afterwards. The Contractor will follow all requirements in the approved Translocation Proposal after seeking EPD's approval. If there are any updates or changes of the capture surveys and translocation, the Contractor will re-submit a detailed methodology before the survey (and seek EPD/SAG's approval again) in accordance with EP condition 2.8 and the EIA Report Approval Condition No.3.
- 1.1.7 The NENTX Design-Build-Operate (DBO) contract was awarded to Veolia Environmental Services Hong Kong Ltd.

- 1.1.8 Fugro Technical Services Limited (Fugro) has been appointed by Veolia Environmental Services Hong Kong Ltd. to implement the capture survey and translocation works in accordance with approved Translocation Proposal.

1.2 Purpose of this Document

This document was prepared to update the Translocation Proposal (V4) prepared by ERM. This revised Translocation Proposal will include the post-translocation monitoring to fulfil FEP conditions 2.6 and 2.8 of FEP-01/292/2007 and the EIA Report Approval Condition no. 4.

1.3 Scope of the Deliverables

- 1.3.1 According to FEP condition 2.6, a Translocation Proposal shall be prepared to detail the methodology for capture surveys and translocation of the endemic freshwater crab *S. zanklon* affected by the Project area and as well as the monitoring requirements on the establishment of this species in the translocated site.
- 1.3.2 As aforementioned in Section 1.2, this revised Translocation Proposal will include the post-translocation monitoring requirements on the establishment of *S. zanklon* community in the translocated site.
- 1.3.3 Succeeding this Section 1 Introduction, the remainder of this revised Translocation Proposal is presented as follows:
- Section 2 details the methodology of the capture-translocation activities;
 - Section 3 details the reporting requirements of the capture-translocation activities; and
 - Section 4 post-translocation monitoring programme.

2. Capture-Translocation Methodology

- 2.1.1 This section presents the methodology and approach of the capture surveys and translocation with reference to FEP condition 2.8 which states that the capture surveys, and translocation of the endemic freshwater crab *S. zanklon* shall be carried out according to the submission approved under FEP condition 2.6 before commencement of construction of the Project.
- 2.1.2 As detailed in the Translocation Plan (v4), a desktop review of relevant existing literature on *S. zanklon* was conducted, and a detailed aquatic fauna survey was carried out three times in the wet season between July and August 2021. The results of these studies are detailed in the Translocation Plan (v4) as well.
- 2.1.3 This revised Translocation Plan will focus on the approach and methodology of the actual capture surveys and translocation works.

2.2 The Capture-Translocation Area

- 2.2.1 The survey area for translocation of *S. zanklon* will cover the watercourse sections where the crab were recorded during the current aquatic fauna survey, i.e. watercourse section from the upstream deep pool to slow flowing downstream section adjacent to truck water filling station. The survey area will also cover the identified recipient site to re-confirm the suitability prior to the start of translocation survey. As *S. zanklon* is mobile, those areas within the NENTX Project Site where the species was recorded in the literature review but not during the current aquatic fauna survey (i.e. the ditch in the approved EIA study) will also be surveyed for translocation.
- 2.2.2 The translocation survey will target *S. zanklon*, in case of presence of other aquatic fauna of conservation importance, the observation will be reported to EPD and AFCD to discuss on the way forward.

2.3 Personnel

- 2.3.1 The capture-translocation survey team shall be led by a qualified ecologist with minimum of five years' experience in aquatic ecology or other related experience as accepted by AFCD and EPD. In particular, the survey team leader should have the experience in surveys of *S. zanklon*.

2.4 Capture Activities

- 2.4.1.1 The capture-translocation activities will be conducted in a period close to the actual commencement of the works that affect the concerned watercourse(s). It will start no earlier than one month prior to the commencement of site clearance works, with the last day of the capture no earlier than one week before the commencement of site clearance works. This is to avoid the recolonization of other *S. zanklon* individuals in the concerned watercourse(s) after the capture survey.

- 2.4.1.2 The capture-translocation activities will be conducted on wet season when the crab is more active (Black & Veatch, 2020). Where possible, the activities will be conducted at time with lower surface water, i.e. avoiding period of heavy rainfall and/ or during period of lower rainfall. The lower surface water in watercourse would allow surveyors to maximise the survey extent for the translocation survey. Each time of translocation survey will be conducted in both day time and night time during the capture-translocation period.
- 2.4.1.3 Standard survey methodology for aquatic fauna, including active searching by hand netting and kick sampling will be adopted to search for the presence of *S. zanklon*. Examples of nets for the purpose of hand netting and kick sampling are shown in **Figure 2.1**. In addition, direct observation will be conducted along the stream riparian zone, where potential hiding space (e.g. under rocks and fallen tree branches) will also be checked to search for *S. zanklon*. Permit under Cap. 170 will be obtained from AFCD before the use of nets to collect freshwater fauna in the streams.



Figure 2.1: Net for kick sampling

2.4.1.4 All *S. zanklon* individuals caught during the capture-translocation activities will be recorded and photographed on site. The surveyor will record the individual's size, sex and any other observation such as injuries. The capture-translocation activities will be conducted for at least three times until new individuals of *S. zanklon* are not discovered within the watercourse sections of collection.

2.4.2 Hand Netting

2.4.2.1 Hand netting can be used as a quick search at potential habitats along the watercourse. As most aquatic species spend majority of their time amongst vegetation, leaf litter or on the bottom of water body, hand netting will be aimed in these areas. The sweeping motion of the hand netting shall aim to scrape the layer of the stream bottom substrate into the net, e.g. soil and leaf litter where possible, as *S. zanklon* is likely to be among these substrates.

2.4.2.2 After taking the hand net out of the water, it will be allowed to drain, and the net content will be emptied on to a large sorting tray. Any caught *S. zanklon* will be carefully moved to a plastic container for translocation (see **Figure 2.2**).



Figure 2.2: Plastic container for translocation

2.4.3 Kick-netting

- 2.4.3.1 Kick-netting will be done along the watercourse by moving upstream with the net facing the water current. The surveyor will disturb the substrate by kicking the streambed substrate by kicking, such that the *S. zanklon* dislodged from the streambed will be trapped in the net. In order to maximise the survey effort within the stream, the surveyor will move up the stream in a zigzag direction to increase the kick sampling coverage. It should be noted that the net will be checked after a maximum of one minute of kick sampling. However, the net will be checked more frequently if large amount of substrate is kicked into the net.
- 2.4.3.2 Similar to hand netting, the net content will be emptied on to a large sorting tray. Any caught *S. zanklon* will be carefully moved to a plastic container for translocation (see **Figure 2.2**).

2.4.4 Marking

- 2.4.4.1 Captured *S. zanklon* individuals shall be marked first prior to translocation to the recipient site. The marker shall be an epoxy-resin based paint (Jotamastic Wintergrade). This contains a metallic component and cures in contact with water. Earlier laboratory and field trials had established that crab survival and behaviour was unaffected by paint marking on the carapace and that the marks persisted in field conditions (Eaton et. al., 2001). Recaptures shall be re-marked with black numerals to indicate the month of capture. In this way, it will also be possible to construct a complete capture history for each marked individual (Bell et. al., 2003). All recaptures shall be re-released.

2.5 Translocation Activities

2.5.1 Background of the Recipient Site

- 2.5.1.1 The proposed recipient site is located at the middle section of Ping Yuen River tributary, and adjacent to Ping Yuen Road, to the north of Ping Yeung Village. In this tributary, *S. zanklon* was previously recorded during the approved EIA studies (i.e. EIA-133/2007 and EIA-190/2010) (ERM, 2022) suggesting that this watercourse is suitable for *S. zanklon*.

2.5.1.2 While channelisation features (e.g. concrete bank and gabions) and an inflatable water dam are present about 100m to the east of this middle stream section, this section is considered largely natural with a low gradient and low water flow. The streambed is mainly covered by soil and stream banks are vegetated with grass. During the ecological survey (July-August 2021), *S. zanklon* was not recorded in this section of the tributary. However, this section is generally considered as a suitable recipient site for the crab considering the stream characteristics, which meet the habitat requirements of the species. The soft soil stream substrate and the availability of riparian vegetation would be ideal for *S. zanklon* to create microhabitat to inhabit. In addition, the natural meander would also reduce the water flow, which is preferred by the *S. zanklon*. As revealed by up-to-date satellite images, similar habitat is present over a long distance as the stream stretches west toward Ping Che Road. It is anticipated that pollution or disturbance would be in a low level in this section, considering there is limited roads and houses (and therefore human activities) until the stream reaches Kan Tau Wai and Tong Fong along Ping Che Road. It is considered that there is approximately 1.2km of relatively undisturbed habitat for the *S. zanklon*.

2.5.1.3 However, this recipient site shall be surveyed again to re-confirm its suitability prior to the start of translocation survey.

2.5.2 Translocation to Recipient Site

2.5.2.1 During the translocation activities, any caught *S. zanklon* at the collection sites will be moved to a plastic container for translocation. The plastic container will be filled with water from the watercourse where *S. zanklon* was caught. The plastic container will also be placed with small amount of leaf litter to provide temporary habitat for the caught individuals. In order to avoid stress and mortality, all *S. zanklon* individuals will be translocated to the identified recipient site within four hours after being caught.

2.5.2.2 Upon arrival to the recipient site, the surveyor will gradually mix the water at recipient site into the plastic container before releasing all individuals to the recipient site. This acclimatisation process would lower the risk of mortality due to temperature shock on the translocated individuals. It should be noted that any deceased individuals will not be released into the recipient site, but it will be reported.

3. Reporting

- 3.1.1 During the translocation works, a datasheet (**Table 3.1**) will be used for recording and reporting the data and findings of the translocation survey activities. Updated descriptions of the physical environment of the capture and recipient sites, data; and photos of the collected *S. zanklon* will be included in the Detailed Translocation Report to be submitted to EPD and AFCD within 14 working days upon completion of the capture-translocation activities.
- 3.1.2 The Detailed Translocation Report shall at least contain the following sections to detail the aforementioned information.
1. Introduction
 2. Methodology
 3. Survey Results
 4. Summary and Conclusions

Table 3.1: Data sheet for aquatic fauna translocation survey

Information		Description		
Date:		Capture Site1:		
Weather:		Capture Site2:		
Start Time:		Capture Site2:		
Finish Time:		Recipient Site:		
Remarks:				
Qualified Ecologists:				
Individual Number	Abundance	Size (Carapace width, cm)	Sex (M/F)	Remarks

4. Post-translocation Monitoring

- 4.1.1 As required in FEP condition 2.8 and the EIA Report Approval Condition No. 4, monitoring on the endemic freshwater crab *Somanniathelphusa zanklon* shall be carried out according to the submission approved under FEP condition 2.6 before commencement of construction of the Project.
- 4.1.2 Particularly, the EIA Report Approval Condition No.4 requires post-translocation monitoring activities to monitor the establishment and effectiveness of the measures given to the endemic *S. zanklon* community in the translocated site.
- 4.1.3 The post-translocation monitoring will be conducted by qualified ecologists using the mark-recapture method. Mark-recapture method is a tool for conservation measures where animals are marked and detected later by capture or sighting. The method can be used to estimate population size and survival rates (Lettink and Armstrong, 2003) of the translocated *S. zanklon* individuals in the recipient site.
- 4.1.4 For the monitoring frequency, the post-translocation monitoring will be conducted once a month (at night-time) for the first 3 months after the translocation activities, and then will be done quarterly after the third month for one year. This is to ensure that only minimal disturbance will be created to the newly establishing translocated *S. zanklon* community in the recipient site.
- 4.1.5 Hand netting and kick sampling on the recipient site will be conducted during the monitoring activities. Information as included in datasheet at **Table 3.1** will also be collected.

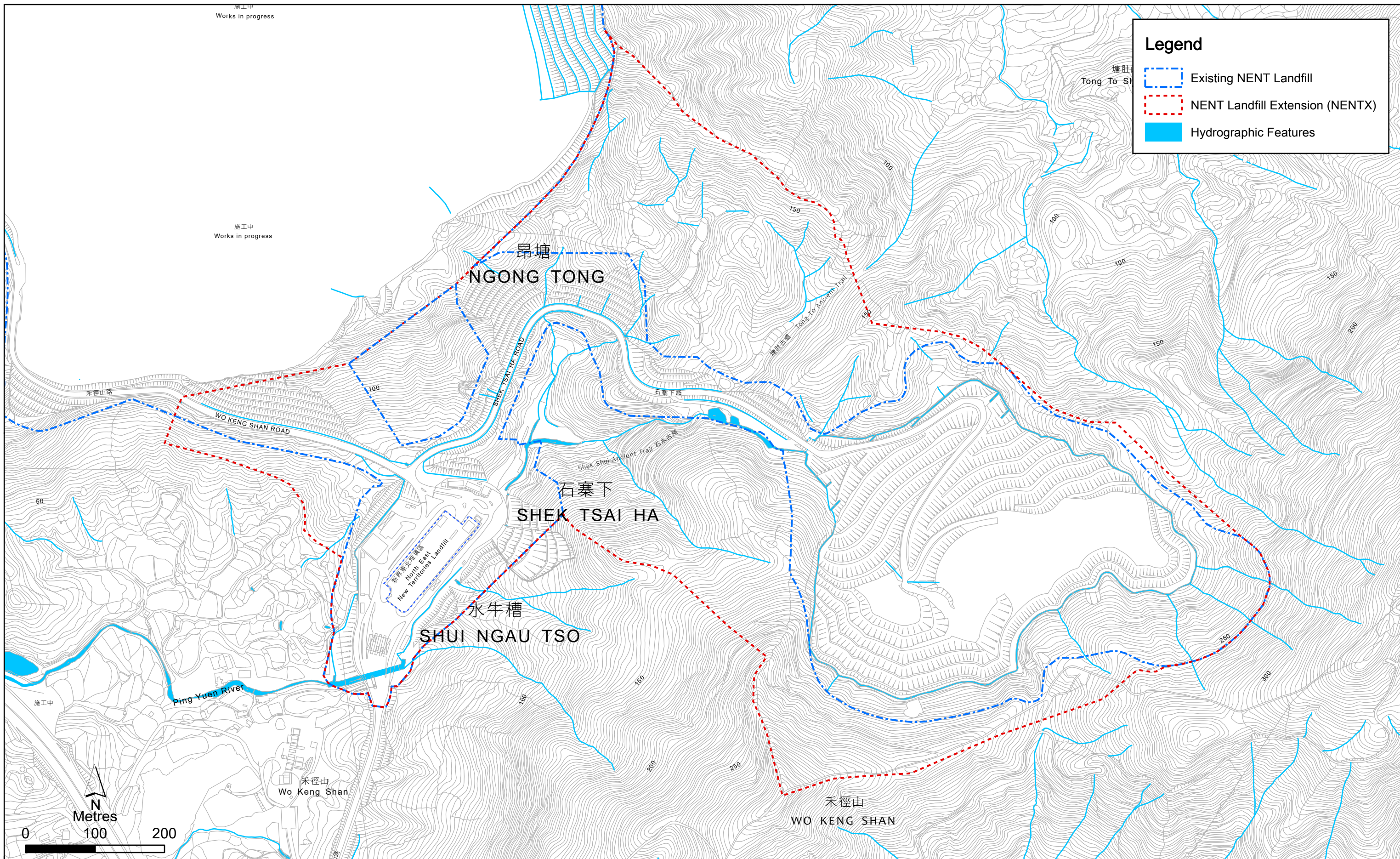
5. References

- Bell, M.C., D.R. Eaton, R.C.A. Bannister, J.T. Addison. 2003. A mark-recapture approach to estimating population density from continuous trapping data: application to edible crabs, *Cancer pagurus*, on the east coast of England. Fisheries Research (65):361–378.
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Appendix A

Survey Area

A.1 Survey Area (within NENTX) for the Endemic Freshwater Crab
Somanniathelphusa zanklon



Project Site

File: T:\GIS\CONTRACT\0589607\mxd\0589607_Project_Site.mxd
Date: 27/10/2021

Environmental
Resources
Management



A.2 Photos of the Collection Sites (May 2022)



A.2.1: Watercourse Section adjacent to the truck water filling station within the Survey Area (NENTX)



A.2.2: Watercourse Section adjacent to the truck water filling station within the Survey Area (NENTX)



A.2.3: Watercourse Section along the Shek Shui Ancient Path, within the Survey Area (NENTX)

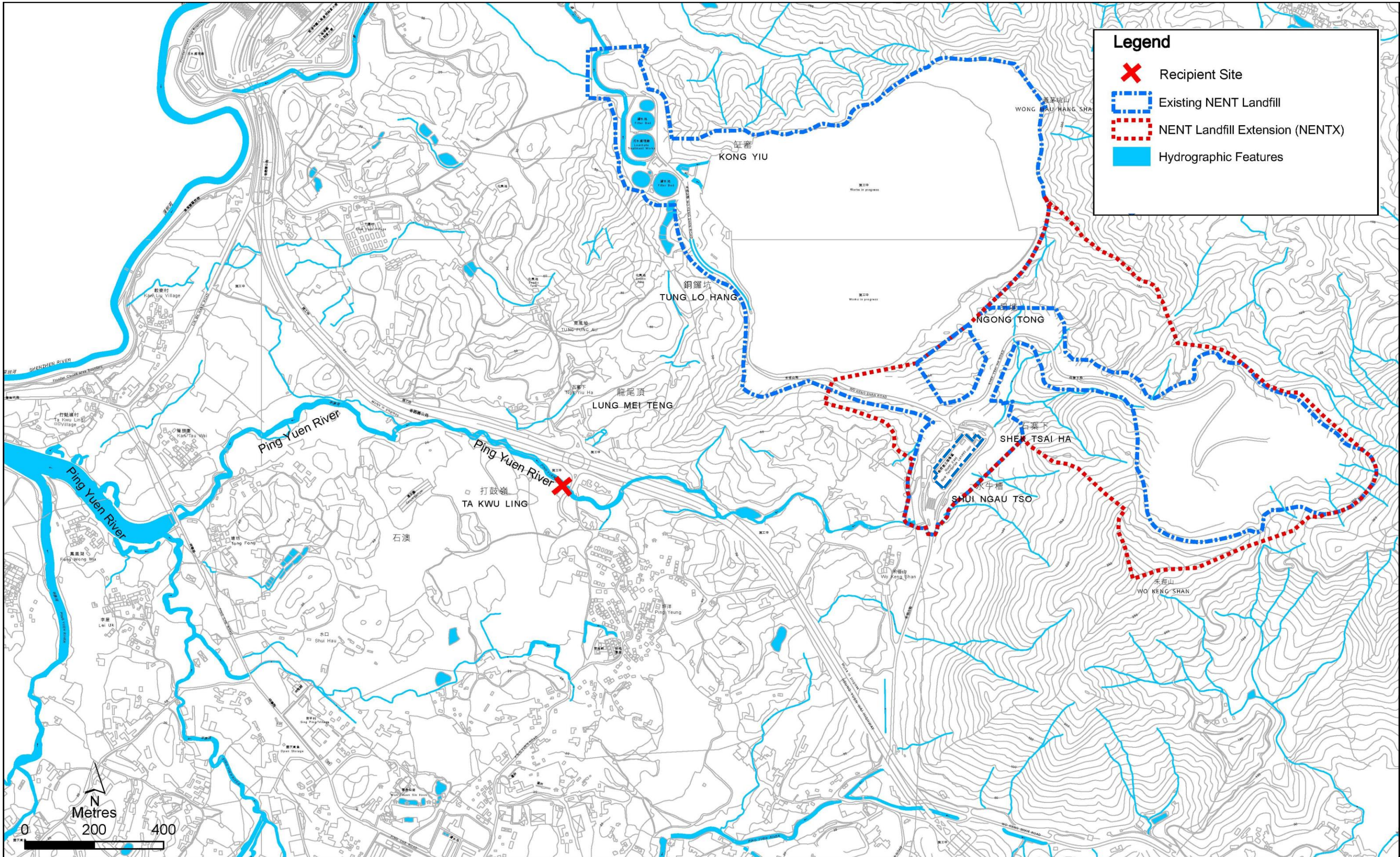


A.2.4: Watercourse Section along the Shek Shui Ancient Path, within the Survey Area (NENTX)

Appendix B

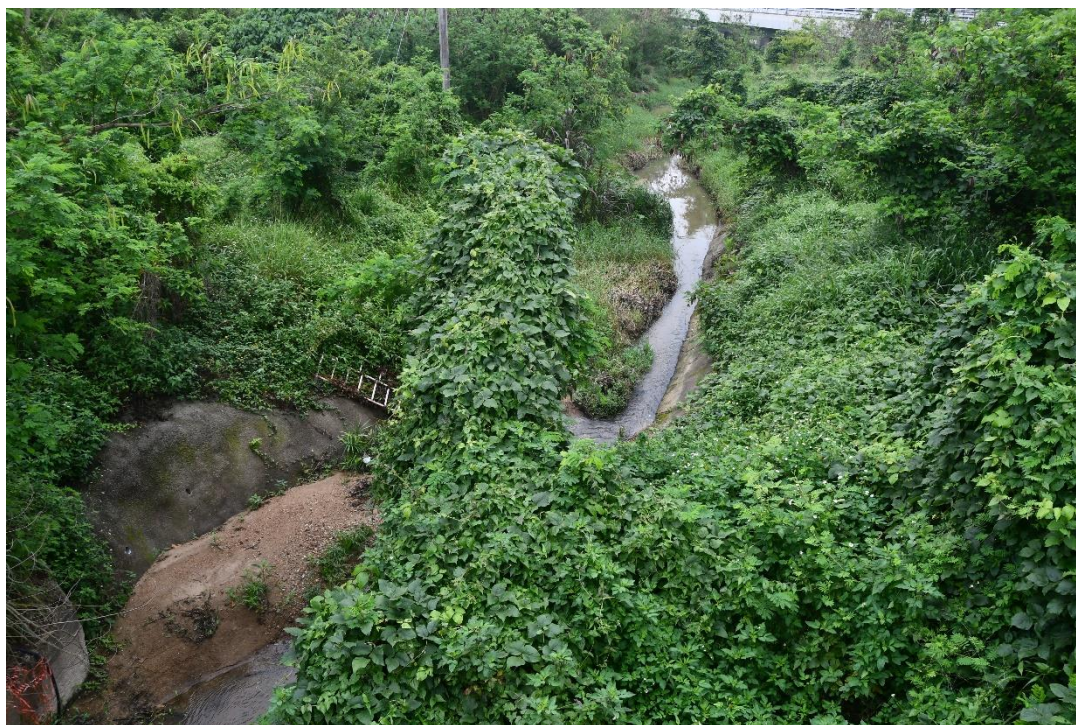
Recipient Site

B.1 Recipient Site (outside NENTX) for the Endemic Freshwater Crab
Somanniathelphusa zanklon



Location for Potential Recipient Site

B.2 Photos of the Recipient Site (May 2022)



B.2.1: Recipient site located at the middle section of Ping Yuen River tributary, and adjacent to Ping Yuen Road (outside NENTX)



B.2.2: Recipient site located at the middle section of Ping Yuen River tributary, and adjacent to Ping Yuen Road (outside NENTX)