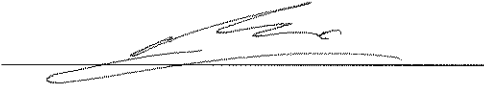
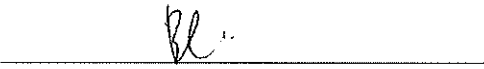


Drainage Services Department

**Contract No. SPW 09/2018
Environmental Team Baseline Surveys
for Sha Tin Cavern Sewage Treatment
Works**

**Woodland Compensation Plan
(Version 4.2)**

Approved By	 (Project Director: Mr. KS Lee)
Prepared By	 (Qualified Ecologist: Ms. Betty Choi)

REMARKS:

The information supplied and contained within this report is correct at the time of printing to the best of our knowledge.

CINOTECH accepts no responsibility for changes made to this report by third parties

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Our ref.: LES/J2021-03/CS/L046
Date : 11 May 2022

Drainage Services Department
Cavern Projects Division
Projects and Development Branch
44/F Revenue Tower
5 Gloucester Road
Wan Chai, Hong Kong

By Email

Attn. to: Mr. Stanley Hung

Dear Sir,

**Contract No. STW 01/2021
Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and
Access Tunnel Construction**

**Submission of Woodland Compensation Plan under Condition 2.15 of Environmental
Permit No. EP-533/2017**

We have reviewed the details of Woodland Compensation Plan V4.2 received via email on 10 May 2022 and hereby certify the submission in accordance with condition 2.15 of EP-533/2017.

Should you have any queries, please contact undersigned at 2882 3939.

Yours faithfully,
For and On Behalf Of
Lam Environmental Services Limited

Derek Lo
Environmental Team Leader

Encl.

c.c.	Cinotech Consultant Limited	Mr. Macavity Yau / Ms. Betty Choi	Via email
	AECOM (CRE Office)	Mr. Simon Leung	Via email
	Acuity Sustainability Consulting Limited	Mr. C.F. Ng	Via email



Date: 11 May 2022
Your Ref.:
Our Ref.: PL-20220511

AECOM Asia Limited
c/o Site Office
21 Hang Tai Road,
Ma On Shan, N.T.

Attn: Mr. Simon Leung, CRE

Dear Mr. Leung,

Contract No. DC/2018/05 & DC/2020/05

**Relocation of Sha Tin Sewage Treatment Works to Cavern – Site Preparation and
Access Tunnel Construction**

**Verification on Woodland Compensation Plan under Condition 2.15 of Environmental Permit No. EP-
533/201**

Reference is made to the Woodland Compensation Plan V4.2 received via email on 10 May 2022 provided by the Environmental Team on 10 May 2022.

Please be informed that we have no adverse comments on the captioned submission. We hereby verify the submission in accordance with Condition 2.15 of the Environmental Permit No. EP-533/2017.

Thank you for your attention.

Yours sincerely,
For and on behalf of
Acuity Sustainability Consulting Limited

Ir Y.H. LAW
Independent Environmental Checker

cc. Drainage Services Department
Lam Environmental Services Limited
China State Joint Venture

Attn.: Mr. Stanley Hung By e-mail
Attn.: Mr. Derek Lo By e-mail
Attn.: Mr. F. M. Chung By e-mail

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1 INTRODUCTION

- 1.1 To support social and economic development in Hong Kong, there is a pressing need to optimize the supply of land for various uses by sustainable and innovative approaches. One possible approach is rock cavern development. The Policy Agenda of the 2016 Policy Address has stated that works for the relocation of the Sha Tin Sewage Treatment Works (STSTW) is to commence as soon as possible to release the existing site, of a size about 28 hectares, for development purpose.
- 1.2 The Project is a Designated Project under the Environmental Impact Assessment Ordinance (EIAO). An Environmental Impact Assessment (EIA) Report for the Project was approved under EIAO in November 2016 in accordance with the EIA Study Brief (No.ESB-273/2014) and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The corresponding Environmental Permit was issued (EP no.: EP-533/2017) by the Director of Environmental Protection (DEP) in March 2017.
- 1.3 According to Section 8.8.3.2 of the approved EIA report, the minor ecological impact may arise from the temporary loss of woodland, plantation and shrubland habitats (about 2.48 ha) during construction phase will be compensated by reinstatement and enhancement of the temporarily affected habitats. With implementation of mitigation measures, no adverse ecological impact is anticipated from the temporary habitat loss.
- 1.4 In accordance to Section 8.8.4.1 – 8.8.4.2 of the approved EIA report, a permanent loss of about 0.65 ha woodland shall be compensated through “no net loss” and “like for like” basis, or providing a compensation area with equivalent or higher ecological function and about 0.92 ha of compensatory planting shall be provided to compensate the loss.

Environmental Permit Requirements

- 1.5 According to Section 8.8.4.4 of the approved EIA report and Condition 2.15 of the EP, a Detailed Woodland Compensation Plan shall be prepared by the qualified ecologist(s) appointed under Condition 2.6 of the EP to form the basis to guide the implementation of the proposed compensatory planting. The Detailed Woodland Compensation Plan shall include implementation details, management requirement, as well as monitoring requirements (e.g. frequency and parameters) of the compensatory planting area; and it shall be submitted to the Director for approval no later than 3 months before the commencement of compensatory woodland planting.
- 1.6 Condition 2.16 of the Environmental Permit also specified that upon completion of compensatory planting, monitoring by local ecologist with experience in maintenance works (e.g. irrigation, weeding, pruning, control of pests and diseases, replacement planting, repair of damage, etc.) shall be conducted. The monitoring frequency shall be monthly within the first year after planting. Parameters including health condition, survival rate of the plant and presence of weedy plant shall be monitored.

Preliminary Development Plan

- 1.7 The EIA Report identified Nui Po Shan as the best site location for the cavern due to good geological conditions, proximity to existing STSTW and Tolo Harbour Effluent Export Scheme (THEES) effluent export tunnel, minimal environmental nuisance to nearby residents and minimal traffic impact. The preliminary development plan is shown in **Figures 1a-1e**.
- 1.8 The EIA Report explored different location options for the Sewage Treatment Works facilities. The main portal was proposed near A Kung Kok Street (Site 3), which has the advantage of flexible integration of the sewage treatment works facilities with the THEES Tunnel Portal. The main portal will consist of access road to the cavern and outdoor facilities such as administration building, ventilation building and workshop. The slope modification work will be involved behind the THEES tunnel. The modification work will include both the existing SIMAR slope and its vicinity.
- 1.9 A ventilation shaft will be built uphill of A Kung Kok Shan Road (Site 1). This site is far away from sensitive receivers so as to minimize odour impact from the shaft. The access road to the ventilation shaft will follow the topography of the existing natural terrain to minimize slope cutting and vegetation clearance. Also, part of the road will be elevated for stream crossing to avoid habitat loss, habitat fragmentation and impact on a freshwater crab species *Cryptopotamon anacoluthon* (endemic to Hong Kong and is recognised as having Potential Global Concern (PGC) by Fellowes *et al.* (2002), Vulnerable by IUCN Red list (2021)). Near the shaft is a flat land, which will be used as explosive magazine site for cavern tunnelling works.
- 1.10 Secondary portal is proposed at an existing construction site office near Mui Tsz Lam Road (Site 2). It will consist of another ventilation building, secondary electrical substation and internal access road to the cavern.
- 1.11 During the construction phase, a community liaison center will be set up near the junction of Mui Tsz Lam Road and A Kung Kok Street in Site 3.
- 1.12 Since the ancillary facilities and portals to the cavern are constructed on the hill, the construction extent will also include slope stabilization works after slope cutting. Localized stabilization work will be required at road alignment with steep topography. Temporary works area is required adjacent to the permanent works for construction access and material storage.

2 WOODLAND COMPENSATION AREA

Review of Ecological Value of Woodland

- 2.1 Section 8.6.1.2 and Table 8.22 of the approved EIA report stated that the woodland habitat within the 500m assessment area has a moderate – high ecological value. The detailed evaluation is shown below:

**Table 2-1 Ecological Evaluation of Woodland within the Assessment Area
(Extracted from Table 8.22 of the EIA Report)**

Criteria	Woodland
Naturalness	High – habitat generated from natural succession
Size	Large (143.66 ha)
Diversity	Moderate to high – 205 flora species and 88 fauna species recorded from recent survey
Rarity	Common habitat in Hong Kong 10 flora species and 17 fauna species (12 avifauna, 3 mammals, 1 amphibian and 1 odonate species) of conservation importance recorded from recent survey and previous study
Re-creatability	Low to moderate – decades needed for woodland to establish and mature
Fragmentation	Moderate – woodland habitats in assessment area are interspersed with developed area and cultivated lands
Ecological Linkage	Structurally and functionally connected to Ma On Shan Country Park
Potential Value	Moderate to high (given protection for natural succession)
Nursery Ground	No record of nursery or breeding ground.
Age	20 – 40 years
Abundance / Richness of Wildlife	Moderate to High
Ecological Value	Moderate to High

Size of the Woodland Compensation Areas (WCA)

- 2.2 According to Section 8.8.4.1 – 8.8.4.2 and Table 8.42 of the approved EIA Report (AEIAR-202/2016), the permanent loss of 0.65 ha woodland would be compensated by about 0.92 ha of compensatory planting. The following table summarized the location of compensatory planting proposed within the EIA report. The location of compensation planting proposed in the EIA report is shown in **Appendix A**.

Table 2-2 Compensatory Planting Proposed under the Project within the Approved EIA report

Locations	Area (ha)
Main Portal	0.54
Secondary Portal	0.28
Along Access Road to Ventilation Shaft	0.1
Total (ha)	0.92

- 2.3 As more facilities, buildings, landslip prevention measures, slope stabilization works, natural terrain hazard mitigation and geotechnical works are required to be located the Main Portal and Secondary Portal, additional permanent secondary woodland loss would be resulted. The tables below indicate the difference of permanent and temporary woodland loss between Table 8.33 of the approved EIA report and current design. The revised design is shown in **Figure 1a-1e** while the change of woodland loss is shown in **Figure 2a-2c**.

Table 2-3 Difference of Permanent Woodland Loss Proposed under the Project between Approved EIA report and Current Design

Permanent Woodland Loss	Approved EIA Report	Current Design
	Area (ha)	
Main Portal	0.22	0.53
Secondary Portal	0.35	1.34
Along Access Road to Ventilation Shaft	0.08	0.09
Total (ha)	0.65	1.96

Table 2-4 Difference of Temporary Woodland Loss Proposed under the Project between Approved EIA report and Current Design

Temporary Woodland Loss	Approved EIA Report	Current Design
	Area (ha)	
Main Portal	0.44	0.19
Secondary Portal	0.33	0.22
Along Access Road to Ventilation Shaft	0.1	0.13
Total (ha)	0.87	0.54

- 2.4 To achieve the “no net loss” principle as specified by the approved EIA report, a compensation ratio of approximately 1:1 is proposed for permanent woodland loss. The total compensatory planting area to be provided will be accounted for mitigating only the permanent (1.96 ha) in subsequent sections.
- 2.5 In-situ woodland compensation is generally preferred as it can conserve genetic resources in their natural habitat and maintain interactions with other species. However, due to the insufficient planting space within the Project boundary, ex-situ woodland compensation must therefore be adopted to achieve the “no net loss” basis. The following table shows the current planting space for permanent woodland loss within the Project boundary and a gap of about 0.82 ha was identified.

Table 2-5 Available Planting Space for In-situ Woodland Compensation within Project boundary under Current Design

Available Planting Space	Current Design (ha)
Main Portal	0.08
Secondary Portal	0.01
Along Access Road to Ventilation Shaft	1.05
Total (ha)	1.14

- 2.6 **Table 2-6** shows the area of in-situ and ex-situ woodland compensation between the EIA report and this plan.

Table 2-6 Difference in Compensatory Planting Area Proposed under the Design between Approved EIA report and this WCP

Type of Woodland Compensation	Planting Locations	Approved EIA Report	This WCP
		Area (ha)	
In-situ	Main Portal	0.54	0.08
	Secondary Portal	0.28	0.01
	Along Access Road to Ventilation Shaft	0.1	1.05
Ex-situ	Ex-situ Location	Nil	0.86
Total (ha)		0.92	2.00

- 2.7 A total of 2.00 ha of woodland compensation area is proposed, with 1.14 ha from in-situ woodland compensation and 0.86 ha from ex-situ woodland compensation.

In-Situ Woodland Compensation

- 2.8 Construction of STSTW in Cavern ventilation shaft at Main Portal and A Kung Kok Site requires the removal of secondary woodland for slope cutting, stabilization works, site formation and utilities works. In order to mitigate the loss of existing tree due to the project, the compensatory mix planting with tree whips and seedlings are proposed for fill slopes equal to or less than 35° within the project site boundary upon works completion.
- 2.9 The 1.14 ha area under the management of Drainage Services Department will be provided in-situ for compensating the permanent loss of woodland due to the project as illustrated in **Figure 3a-3c**. The detailed contribution from each Site shall be referred to **Table 2-5**.

Ex-Situ Woodland Compensation

- 2.10 As there is about 0.82 ha of shortfall in terms of in-situ woodland compensation, ex-situ woodland compensation is required to fill the gap for fulfilling the basis of “no net loss” under Section 8.8.4.1 – 8.8.4.2 of the approved EIA report. The proposed ex-situ woodland compensation area has a size of 0.86 ha.
- 2.11 In general, the compensated woodland shall be connected to the affected woodland for allowing higher connectivity and supporting higher species richness and diversity. However, the upslope area of the project was relatively steep (28 – 30 degree in gradient) for proper tree planting. In addition, as reflected from the Detailed Vegetation Survey Report v.9.2 separately submitted under the same EP, the Project Site is overgrown with Small Persimmon *Diospyros vaccinoides*, a shrub species listed as Critically Endangered under the IUCN Red List. Given similar habitat types and ecological connectivity, compensatory planting in the area outside but close to the Project Site is recommended to avoid unnecessary clearance of the Small Persimmon *Diospyros vaccinoides* population.

2.12 The proposed ex-situ planting location is an upslope area of Ma Tai Stream (as shown in **Figure 4**), which is currently managed under Lands Department and falls outside of the WSD Reserved Area. About 0.86 ha area for ex-situ woodland compensation will be provided due to the following major reasons.

- During the site survey in 4 Dec 2020, this area suffered from hill fire in Feb 2020 and is now exposed with eroded topsoil and patches of shrubland and grassland dominated by pioneer species (e.g. *Dicranopteris pedata*, *Rhodomyrtus tomentosa*). Planting native tree species through woodland compensation at this location would assist recovery, succession and enhance the biodiversity.
- The selected site has a gentle gradient (17 – 23 degree) that planted trees can more easily adapt to than steep slopes.
- It is located in a watershed and contains a watercourse that connects to Ma Tai Stream with good access for vehicles and workers. Although no water flow was observed in this watercourse during site visit in dry season, the concave topography encourages groundwater to gather which would flavour the growth of vegetation.
- Selected location is partly overlapping with the existing woodland which allows higher connectivity to existing community. The existing woodland can also be the seed bank for the woodland compensation area.
- The selected location is managed under a single government department and does not include private land which flavours the ease of management.

2.13 Despite no plant species of conservation importance was found at the proposed ex-situ compensation area during site visit, the following precautionary measures are recommended for any floral species of conversation that is found by the qualified ecologist (as a member of the Environmental Team (ET)) during the compensatory planting process:

- Set up individual plant protection zone (full canopy for tree species and 1m set-back for herbaceous species or immature plant);
- Erect bright-coloured robust fencing around the plant protection zone to remind workers;
- Locate temporary storage area away from the plant protection zone.

Evaluation of Residual Impact

2.14 The EIA scheme will affect 1.52 ha of secondary woodland (including permanent and temporary losses) while the current scheme will affect 2.51 ha of secondary woodland (**Table 2-3** and **Table 2-4** refers). In both schemes, the temporary affected area will be reinstated. Although the proposed scheme will cause an additional permanent woodland loss of 1.31 ha (see **Table 2-3**), compensatory planting is proposed following the principles stated in the EIA Report: a “no net loss” and “like for like” basis, or by providing a compensation area with equivalent or higher ecological function.

2.15 Compensatory planting of a total of 2.00 ha was proposed near within and outside the Project Site to fully compensate the permanent loss of 1.96 ha. As mentioned in the EIA Report, native species found in the vicinity would be planted close to the existing woodland habitats. In addition, transplantation and compensatory planting of plant

species of conservation importance found in the affected woodland will be carried out as proposed in the Protection & Translocation Proposal (v.8.2). These help maintain the ecological function of secondary woodland.

- 2.16 Although planting in areas adjoining the Project Site cannot be pursued, a suitable ex-situ woodland compensation area, which connects to existing woodland, was selected to improve ecological connectivity. This area had been devastated by hill fires over the past decade and is maintained as a degraded grassland/shrubland. The proposed compensatory planting will accelerate the succession process to a secondary woodland by active planting, management and monitoring of human activity during the establishment period. Furthermore, the proposed fire break along its boundary will help reduce the chance of hill fire. These can provide a compensation area with equivalent or higher ecological function.
- 2.17 With the implementation of the proposed mitigation measures, there will be no net loss of secondary woodland and the ecological impact arising from the permanent loss of woodland habitat would be compensated as required in the EIA Report. The residual ecological impact is expected to be acceptable and the conclusion in the EIA Report remains valid.

3 SPECIES SELECTION

- 3.1 Table 8.43 of the EIA report had listed out the species to be considered for compensatory planting. In general, native flora species used for woodland compensation will be either similar to those native species recorded within the woodland nearby or commonly found from secondary woodland in Hong Kong. The compensatory planting area shall create a habitat with different layers that promotes habitat complexity and thus enhance the ecological values when matured. The reference list from the EIA report is shown as follows:

Table 3-1 Flora Species and their Availability to be considered for Compensatory Planting in the EIA Report

Species Name	Chinese Name	Growth Form	Availability in HK	
			GEO Report no.259	AFCD's Stock Availability
<i>Acronychia pedunculata</i>	山油柑	Tree	Yes	No
<i>Alangium chinense</i>	八角楓	Tree or shrub	Yes	No
<i>Aquilaria sinensis</i>	土沉香	Tree	No	No
<i>Bischofia javanica</i>	秋楓	Tree	Yes	No
<i>Bridelia tomentosa</i>	土蜜樹	Shrub or small tree	Yes	Yes
<i>Canthium dicoccum</i>	魚骨木	Tree or shrub	No info	No
<i>Celtis sinensis</i>	朴樹	Tree	Yes	No
<i>Cinnamomum camphora</i>	樟	Tree	Yes	Yes
<i>Cleistocalyx nervosum</i>	水翁	Tree	No info	Yes
<i>Daphniphyllum calycinum</i>	牛耳楓	Tree	No	Yes
<i>Elaeocarpus chinensis</i>	中華杜英	Tree or small tree	No	No
<i>Ficus microcarpa</i>	細葉榕	Tree	Yes	Yes
<i>Garcinia oblongifolia</i>	黃牙果	Tree	No	Yes
<i>Litsea glutinosa</i>	潺槁樹	Tree	Yes	Yes
<i>Machilus pauhoi</i>	刨花潤楠	Tree	No	Yes
<i>Mallotus paniculatus</i>	白楸	Tree or shrub	Yes	No
<i>Phyllanthus emblica</i>	油甘子	Tree or shrub	Yes	No
<i>Schefflera heptaphylla</i>	鴨腳木	Tree	Yes	Yes
<i>Schima superba</i>	木荷	Tree	Yes	Yes
<i>Sterculia lanceolata</i>	假蘋婆	Semi-deciduous tree	Yes	Yes
<i>Viburnum odoratissimum</i>	珊瑚樹	Shrub or small tree	No	Yes

- 3.2 In addition to the above list, findings from the vegetation survey in the EIA report and observations in detailed vegetation survey report and site visits to the proposed ex-situ compensation area have been reviewed. A full list of plant species reviewed from these sources is shown in **Appendix B**. A site specific recommended compensatory planting list is proposed in **Table 3-2** below, which that have considered the commonly found species in the affected area, their ecological functions and market availability. The market availability shall be referred to GEO Report No.259. Information from *Guiding Principles on Use of Native Plant Species in Public Works Projects* by Development Bureau shall be referred. Details of the selection shall be referred to **Appendix B**.

- 3.3 The Contractor is advised to check the most updated market availability before the compensation begins. In addition to the aforementioned sources, the Contractor is recommended to consider other sources available in Hong Kong (e.g. Kadoorie Farm and Botanic Garden).
- 3.4 It should be kept in mind that the Contractor is not bound to plant all the species listed in **Table 3-2**. **Table 3-2** aims to recommend eco-friendly native species for matrix planting and suggest alternatives when one species is out of stock. Despite some species may be out of stock at the time of preparing this report, they are included to allow more flexibility for the Permit Holder to arrange compensation in the future.

Table 3-2 Recommended Flora Species to be considered for Compensatory Planting in this Woodland Compensation Plan

Species Name	Chinese Name	Growth Form	Availability in HK	Suggested in the approved EIA
			GEO Report no.259	
<i>Acronychia pedunculata</i>	山油柑	Tree	Yes	Yes
<i>Alangium chinense</i>	八角楓	Tree or shrub	Yes	Yes
<i>Aporosa dioica</i>	銀柴	Shrub or small tree	No	No
<i>Baeckea frutescens</i>	崗松	Shrub or small tree	No	No
<i>Bischofia javanica</i>	秋楓	Tree	Yes	Yes
<i>Bridelia tomentosa</i>	土蜜樹	Shrub or small tree	Yes	Yes
<i>Castanopsis fissa</i>	鬘菊錐	Tree	Yes	No
<i>Cleistocalyx nervosum</i>	水翁	Tree	No info	Yes
<i>Cratoxylum cochinchinense</i>	黃牛木	tree or shrub	No	No
<i>Cyclobalanopsis glauca</i>	青岡	Tree	No	No
<i>Cyclobalanopsis myrsinifolia</i>	小葉青岡	Tree	No	No
<i>Daphniphyllum calycinum</i>	牛耳楓	Tree	No	Yes
<i>Desmos chinensis</i>	假鷹爪	Woody climbing shrub	No	No
<i>Elaeocarpus chinensis</i>	中華杜英	Tree or small tree	No	Yes
<i>Ficus hispida</i>	對葉榕	Shrub or small tree	No	No
<i>Garcinia oblongifolia</i>	黃牙果	Tree	No	Yes
<i>Helicteres angustifolia</i>	山芝麻	Subshrub	No	No
<i>Homalium cochinchinensis</i>	天料木	Shrub or tree	No info	No
<i>Litsea glutinosa</i>	潺槁樹	Tree	Yes	Yes
<i>Machilus pauhoi</i>	刨花潤楠	Tree	No	Yes
<i>Melastoma malabathricum</i>	野牡丹	Shrub	Yes	No
<i>Melastoma sanguineum</i>	毛荳	Shrub	Yes	No
<i>Ormosia emarginata</i>	凹葉紅豆	Tree	No	No
<i>Ormosia semicastrata</i>	軟莢紅豆	Tree	No	No
<i>Phyllanthus emblica</i>	油甘子	Tree or shrub	Yes	Yes
<i>Polyspora axillaris</i>	大頭茶	Shrub or small tree	Yes	No
<i>Rhaphiolepis indica</i>	春花	Shrub or small tree	Yes	No
<i>Schefflera heptaphylla</i>	鴨腳木	Tree	Yes	Yes
<i>Schima superba</i>	木荷	Tree	Yes	Yes
<i>Sterculia lanceolata</i>	假蘋婆	Semi-deciduous tree	Yes	Yes
<i>Syzygium hancei</i>	紅鱗蒲桃	Tree	Yes	No

Species Name	Chinese Name	Growth Form	Availability in HK	Suggested in the approved EIA
			GEO Report no.259	
<i>Viburnum odoratissimum</i>	珊瑚樹	Shrub or small tree	No	Yes
<i>Zanthoxylum avicennae</i>	箭標花椒	Tree	No info	No

- 3.5 Specific planting matrix for each planting area is proposed in **Section 4**. The Contractor shall stick to the proposed species as far as possible. In case the proposed species is unavailable on the market at the time of planting, a replacement species that can provide similar ecological function shall be proposed based on the recommended plant list as shown in **Table 3-2** above. The Contractor should inform and seek approval from Agricultural, Fisheries and Conservation Department (AFCD) and Environmental Protection Department (EPD) before the compensatory planting work begins.
- 3.6 In general, exotic species is not allowed to replace any of the proposed species. The Contractor must obtain agreement from AFCD and EPD if the replacement is a must.

4 WOODLAND COMPENSATION PROPOSAL

- 4.1 All parties shall keep in mind that implementation works and management works should make reference to relevant guidelines, especially Section 3 - Landscape Softworks and Establishment Works of General Specification for Civil Engineering Works (2006), GEO Publication No. 1/2011 Technical Guideline on Landscape Treatment for Slopes and GEO Publication No.1/2011 - Technical Guideline on Landscape Treatment for Slopes.
- 4.2 To ensure the proposed tree species are well-adapted to the specific site conditions, species which are commonly seen in the area will be proposed as far as possible. In general, fast growing pioneer species and species that can provide ecological functions (e.g. fruit and nectar plants for attracting seed dispersers and pollinators) are selected.
- 4.3 Shrub species should be planted between trees to enhance the biodiversity, with the exception of the flat area near access road (**Sections 4.9 – 4.10** refer) and firebreak at ex-situ woodland compensation (detailed in **Sections 4.16 - 4.17**) due to limited spacing.
- 4.4 The proposed compensation ratio is approximately 1:1.02 in order to achieve the “no net loss” basis. Except for dead trees and invasive species, no trees or shrubs will be felled during woodland compensation (with the exception of thinning process mentioned in **Sections 4.19 - 4.21**).
- 4.5 The exact planting number, proposed species, matrix spacing and pattern shall be decided based on the actual site condition. A proposal containing the aforementioned items shall be submitted to AFCD and EPD prior to the commencement of woodland compensation by the Project Proponent.

Site Preparation Work

- 4.6 The pre-planting works shall follow the instructions of the documents mentioned in **S.4.1**. For this Project, the following works will be conducted before the compensation begins.
- (i) Removal of material (such as rubbish and weed)
 - (ii) Scarification
 - (iii) Protection of prepared ground with the use mulch or litter

In-situ Woodland Compensation

- 4.7 Most of the in-situ woodland compensation area is located on slope, with the exception of the flat area located at the end of the Access Road near Ventilation Shaft. The following matrix are proposed to enhance local biodiversity and restore woodland.

Proposed Tree Planting on Slope

- 4.8 For in-situ woodland compensation, only slopes with a gradient about or less than 35 degree within the project boundary will be used upon works completion. It would take a long time for roots of heavy and light standard trees to grab hold onto slopes, which may create potential tree failure. Therefore, planting seedlings and whip trees are recommended as they are more adaptable to slope environment when it is maturing.

Proposed Tree Planting for Flat Area near Access Road

- 4.9 A flat area (approximately 0.32ha) is located at the end of the A Kung Kok Shan Road Access Road next to the ventilation shaft. The tree planting shall follow the approved Tree Preservation and Removal Plan (TPRP) as far as possible.

4.10 Referring to the approved TPRP, woodland mixed planting of the following species was suggested at 1m-spacing:

Table 4-1 Proposed In-situ Tree Whip Planting for Flat Area near Access Road

Species Name	Common Name	Chinese Name	Percentage	Remark
Tree Whips in Mix Planting				
<i>Alangium chinensis</i>	Chinese Alangium	八角楓	20	Summer nectar source
<i>Bredelia tomentosa</i>	Pikpoktai	土蜜樹	20	Summer nectar source, Fruit Plant
<i>Elaeocarpus chinensis</i>	Chinese Elaeocarpus	中華杜英	20	Summer nectar source, Fruit Plant
<i>Phyllanthus emblica</i>	Myrobalan	餘甘子	20	Fruit Plant
<i>Viburnum odoratissimum</i>	Sweet Viburnum	珊瑚樹	20	Summer nectar source, Fruit Plant

Ex-situ Woodland Compensation

4.11 The proposed ex-situ WCA is located at a valley that suffered from hill fire in Feb 2020. The site is exposed with eroded topsoil and several patches of pioneer species. To combat such site constraint, planting will be conducted in 2 phases in order to improve soil condition and enhance local biodiversity.

Phase 1: Soil Conditioning, Shade-provisioning & Reforestation

4.12 Due to the relatively poor soil condition at the proposed ex-situ woodland compensation location, the main goal of Phase 1 is to improve soil condition by preserving soil moisture, reducing soil erosion and improving soil nutrient level. The pioneer and fast-growing species would also provide shade for understorey species which in turn increase the complexity of the compensatory woodland.

4.13 In accordance to Appendix C (Recommended Native Plant Species for Use in Soil Erosion Control Planting on Natural Hill Slopes) of Guiding Principles on Use of Native Plant Species in Public Works Projects published by CEDD, it is recommended that a mix of largely native pioneer species and a small proportion of native non-pioneer species is recommended at the moderately eroded and exposed slope. For area with good soil condition (with plant cover), Phase 2 tree planting below can be applied upon the commencement of woodland compensatory planting.

4.14 The estimated duration of Phase 1 is 2.5 years (including the transition period). The details of programme for woodland compensation is shown in **Appendix C**.

Phase 2: Reforestation and Biodiversity Enhancement

4.15 After Phase 1, the soil conditions established by the pioneer species will create more suitable condition for additional species to enhance biodiversity. The following species are proposed to enhance biodiversity:

Proposed Tree Planting for Firebreak

- 4.16 Due to the history of hill fire, a firebreak is proposed to protect the compensatory woodland. A firebreak consisting of fire-resistant tree species will be planted along the edge of ex-situ compensation area.
- 4.17 To effectively minimize the spread of wildfire, the spacing between each tree shall be smaller. No shrubs will be provided in the understory, as they are more susceptible to burning than trees in case of hill fire. The fire-resistant species are shown in **Appendix B**.
- 4.18 The estimated duration of Phase 2 is 3 years (including the transition period). The details of programme for woodland compensation is shown in **Appendix C**.

Thinning Process

- 4.19 After Phase 1 of the ex-situ woodland compensation, thinning process shall be conducted before the commencement of Phase 2 planting. The time for thinning of ex-situ woodland compensation shall be reviewed by the qualified ecologist annually based on the actual condition. The objective of thinning process is to improve the growth rate and health of the targeted native trees as well as allowing space for Phase 2 tree planting. A qualified ecologist / botanist as part of the Environmental Team (ET) shall advise the Contractor on how and which tree shall be felled. Trees with poor structural or health condition shall be felled in priority.
- 4.20 The wood pieces of felled trees shall be scattered in the woodland floor. Not only can they retain soil moisture, they also act as soil conditioners by replenishing soil nutrient when decompose. Furthermore, crevices between the wood pieces can provide niches for small invertebrates for biodiversity enhancement of the area.
- 4.21 No large scale powered mechanical equipment should be employed for thinning work (e.g. excavator). Only hand tools will be allowed. According to EP Condition 2.16 and Section 7.3.13 of the EM&A Manual, the maintenance of compensatory planting shall be monitored by local ecologist with at least 10 years' experience in maintenance works. The Contractor shall then provide a detailed method statement for the thinning process and obtain approval from EPD and AFCD before the commencement of any thinning works.

Schedule for Tree Planting

- 4.22 Except for the flat area located near access road, the woodland compensation of the remaining locations of the Project Site can be initiated in 2022 and 2023. The flat area near access road will be freed up after the completion of blasting and decommissioning of temporary magazine site. The summary of tentative tree planting schedule is summarized as below:

Table 4-2 Tentative Commencement Year of Tree Planting

Location	Year
Main Portal	2023
Secondary Portal	2023
Along Access Road to Ventilation Shaft	2022
Near Access Road – Flat Area	2027
Ex-situ Compensation Site	2022

4.23 As the actual planting time will depend on the construction progress, a general tentative planting programme is now attached to the plan as **Appendix C**.

4.24 Tree planting shall be conducted in spring and/or summer, which encourage the growth of vegetation and maximises survivorship.

In-situ Woodland Compensation

4.25 Upon the approval of this plan, the Contractor shall implement the in-situ woodland compensation after the completion of construction of the access road to the Ventilation Shaft, slope work behind the Main Portal and boulder removal work above the Secondary Portal and decommissioning of the Magazine Site. To shorten the time lag between the occurrence of the ecological impact and establishment of the mitigation measures, tree planting works shall be initiated as the earliest advance.

Ex-situ Woodland Compensation

4.26 Since no works will be undergoing at the proposed location, the compensation shall be arranged as soon as possible once this plan is approved.

5 IMPLEMENTATION AND MAINTENANCE ARRANGEMENT

5.1 The contractor will be responsible for the planting and maintenance works during planting and establishment phases, including the 5-year post-planting monitoring period as shown in the following table. They shall be implemented by a landscape contractor engaged by the contractor.

5.2 In addition, Condition 2.16 of the EP stated that:

“Upon completion of compensatory planting, monitoring by local ecologist with experience in maintenance works (e.g. irrigation, weeding, pruning, control of pests and diseases, replacement planting, repair of damage, etc.) shall be conducted. The monitoring frequency shall be monthly within the first year after planting. Parameters including health condition, survival rate of the plant and presence of weedy plant shall be monitored.”

5.3 Although the EP specifies the monitoring frequency by ET would be once per month during the first year after planting, the monitoring period is proposed to be extended to 5 years to align with the compensatory planting.

Table 5-1 Inspection and Maintenance during 5-year Post-planting Period

Post-planting Period		
Inspection Frequency	1 st year Month 0 - 2	Bi-weekly
	1 st year Month 3 - 12	Monthly
	2 nd year	Bi-monthly
	3 rd year onwards	Quarterly
Duration	5-year Establishment Period	
Maintenance & Establishment Works	All necessary regular maintenance in accordance to General Specification for Civil Engineering Works (2006) Section 3 – Landscape Softworks and Establishment Works; As specified in Section 6	
Implementation Agent	Qualified Ecologist of the Environmental Team	

Planting Management

5.4 The purpose of setting up a planting management works is to ensure the compensation meets the planting performance in accordance with the requirements of planting strategy.

5.5 The specification for standard practises of inspection and establishment works shall follow General Specification for Civil Engineering Works (2006) Section 3 – Landscape Softworks and Establishment Works. The details on watering, weeding and replacement of dead plants shall also follow the aforementioned circular.

5.6 A 5-year post-planting monitoring is proposed to ensure proper establishment of the woodland area. In ideal situation, the handing-over will conducted after the 5-year-long monitoring period. However, the authorities (AFCD, DSD, EPD and Lands Department) and qualified ecologist hold the right to extend the post-planting monitoring programme if the performance is unsatisfactory.

5.7 To ensure proper maintenance, the following parties shall be responsible for the ad-hoc maintenance during different time period.

Time Period	Responsible Party
Establishment Period & Maintenance Period	Contractor
After Establishment Period & Maintenance Period, Before Handover Process Ends	Contractor
After Handover Process End	Responsible Government Department (In-situ: Drainage Services Department Ex-situ: Lands Department)

Control of Invasive Species

- 5.8 During weeding, invasive and unwanted species such as *Leucaena leucocephala* and *Mikania micrantha* on the whip trees should be removed.

6 MONITORING PROGRAMME

Review of Requirement from EM&A Manual and Environmental Permit

- 6.1 Condition 2.16 of the Environmental Permit (Application No.: AEP-533/2017) stated monitoring of woodland compensation shall be conducted by local ecologist with experience in maintenance works (e.g. irrigation, weeding, pruning, control of pests and diseases, replacement planting, repair of damage, etc.) upon completion of compensatory planting.
- 6.2 Condition 2.16 of the EP also stated the monitoring frequency shall be monthly within the first year after planting and parameters such as health condition, survival rate of the plant and presence of weedy plant shall be monitored.
- 6.3 In addition, Section 8.10.1.4 of the approved EIA report specifies that the local ecologist / botanist should have at least 10 years relevant experience.

Post-Planting Monitoring

- 6.4 The post-planting monitoring shall be carried out by a qualified ecologist / botanist with experience in maintenance works as a member of the Environmental Team (ET).
- 6.5 As the woodland compensation area is relatively large (a total of 2.00 ha), inspection walk and quadrat sampling are proposed for monitoring. General health condition (good/fair/poor/dead) and survival rate (%) of individual species of the planted trees and shrubs shall be recorded by direct observation.
- 6.6 Tree tagging shall be performed by the Contractor to maximize monitoring effectiveness and provide a more accurate general overview of the planting areas and inspection.
- 6.7 Areas shown in **Figures 3a-3c, 4** are proposed for detailed sampling, which aims to collect quantitative information for individual plant within the sampling area. To be specific, the following table shows the details of proposed sampling area:

Table 6-1 Details on Proposed Sampling Area

Location	Sampling Area Size
Near Access Road – Flat Area	400m ² (20m x 20m)
Near Access Road – Slope Area	400m ² (10m x 40m)
Secondary Portal – Slope Area	Due to small planting area, all plants should be inspected
Main Portal – Slope Area	A total of 400m ²
Ex-situ Woodland Compensation Area – Downslope	400m ² (20m x 20m)
Ex-situ Woodland Compensation Area – Upslope	400m ² (20m x 20m)

- 6.8 A 5-year long post-planting monitoring is proposed. The frequency of the monitoring in the first year is proposed to be bi-weekly in Month 0 – 2 and then monthly in Month 3 – 12 after planting as per the EP. The monitoring frequency should then be reduced to bi-monthly from the second year. The monitoring frequency is proposed to further reduce to quarterly from the third year onwards. Change of monitoring frequency should be advised by the Ecologist of the ET and approved by AFCD and EPD.

6.9 The Trigger and Action Level of the post-planting monitoring are shown below:

Table 6-2 Trigger and Action Levels for Post-Planting Monitoring

Parameter	Trigger Level	Action Level
General Health Condition	% of individual plant species in poor health condition >20%	% of individual plant species in poor health condition >30%
Survival of Plants	Survival rate of individual plant species < 80%	Survival rate of individual plant species < 70%

6.10 Natural colonization of nearby vegetation into the compensatory woodland area is also a part of the woodland regeneration process. Despite individuals living at the edge of the compensation area are prone to be competition by more tolerant and competitive species, regular removal of naturally occurred native plants is not preferred. Removal of exotic weedy species only is recommended. None the less, the need of weeding native species will be determined by the qualified ecologist and contractor during the monitoring.

6.11 The Event and Action Plan of the post-planting monitoring are shown below:

Table 6-3 Trigger and Action Levels for Post-Planting Monitoring

Parameter	Trigger Level	Action Level
General Health Condition	<ul style="list-style-type: none"> - the ET should inform Independent Environmental Checker (IEC), RE and Contractor immediately; - identify the cause(s) of the increased % in poor condition; - advise Contractor the necessity of replanting; - should replanting be considered necessary, Contractor should start the replanting works within one month or in the appropriate planting season 	<ul style="list-style-type: none"> - the ET should inform IEC, RE and Contractor immediately; - identify the cause(s) of the increased % in poor condition; - advise remedial action and work out solution including change of species in replanting; and seek acceptance from EPD; - Once the remedial action has been accepted by EPD, Contractor should start implementing the remedial action within two weeks or as agreed with EPD.
Survival of Plants	<ul style="list-style-type: none"> - the ET should inform IEC, RE and Contractor immediately; - identify the cause(s) of the drop in survival rate; - advise Contractor the necessity of replanting; - should replanting be considered necessary, Contractor should start the replanting works within one month or in the appropriate planting season. 	<ul style="list-style-type: none"> - the ET should inform IEC, RE and Contractor immediately; - identify the cause(s) of the drop in survival rate; - advise remedial action and work out solution including change of species in replanting; and seek acceptance from EPD; - Once the remedial action has been accepted by EPD, Contractor should start implementing the remedial action within two weeks or as agreed with EPD.

Post-Planting Maintenance

6.12 The detailed tentative maintenance programme for the 5-year post-planting period is shown below:

Table 6-4 Timeframe for Maintenance Activities

Activity	Timeframe
Planting	Spring & Summer of the 1 st year; The next Spring & Summer after thinning
Replacement Planting (if necessary)	Spring & Summer within establishment period
Thinning (for ex-situ woodland compensation only)	Reviewed annually by qualified ecologist after Phase 1 of ex-situ woodland compensation
Monitoring & Reporting	Bi-weekly in Month 0 – 2 and Monthly in Month 3 – 12 during the 1 st year; Bi-monthly during 2 nd year; Quarterly from 3 rd year onwards

- 6.13 The Contractor shall be responsible for regular irrigation, weeding, pruning, control of pest and disease, replacement planting and repairing of damage of the vegetation. The approved ecologist (as a member of ET) shall monitor the Contractor as per Condition 2.16 under EP (as shown in **Section 5.2**).

Reporting

Regular Monitoring Report

- 6.14 After each monitoring, a monitoring report shall be prepared to include at least but not limited to the following:
- (i) Introduction;
 - (ii) Methodology;
 - (iii) Site observation;
 - (iv) Monitoring results (survival rate, health condition, presence of weedy plant);
 - (v) Analysis of Monitoring Results and Non-compliances;
 - (vi) Recommendation

- 6.15 The report shall be certified by the ET, verified by the IEC and then submitted to the EPD and AFCD for record.

Report on Completion of Establishment

- 6.16 After the completion of establishment for each planting phase, the Permit Holder shall provide reports include at least but not limited to the following to AFCD and EPD for record after the certification of ET and verification of IEC:
- (i) Introduction;
 - (ii) Methodology;
 - (iii) Site photo;
 - (iv) Receipt of the number of seedling and saplings;
 - (v) Recommendation

- 6.17 The Permit Holder shall fulfil the requirements specified by Clause 3.93 of General Specification for Civil Engineering Works (2006) before submitting the Report on Completion of Establishment

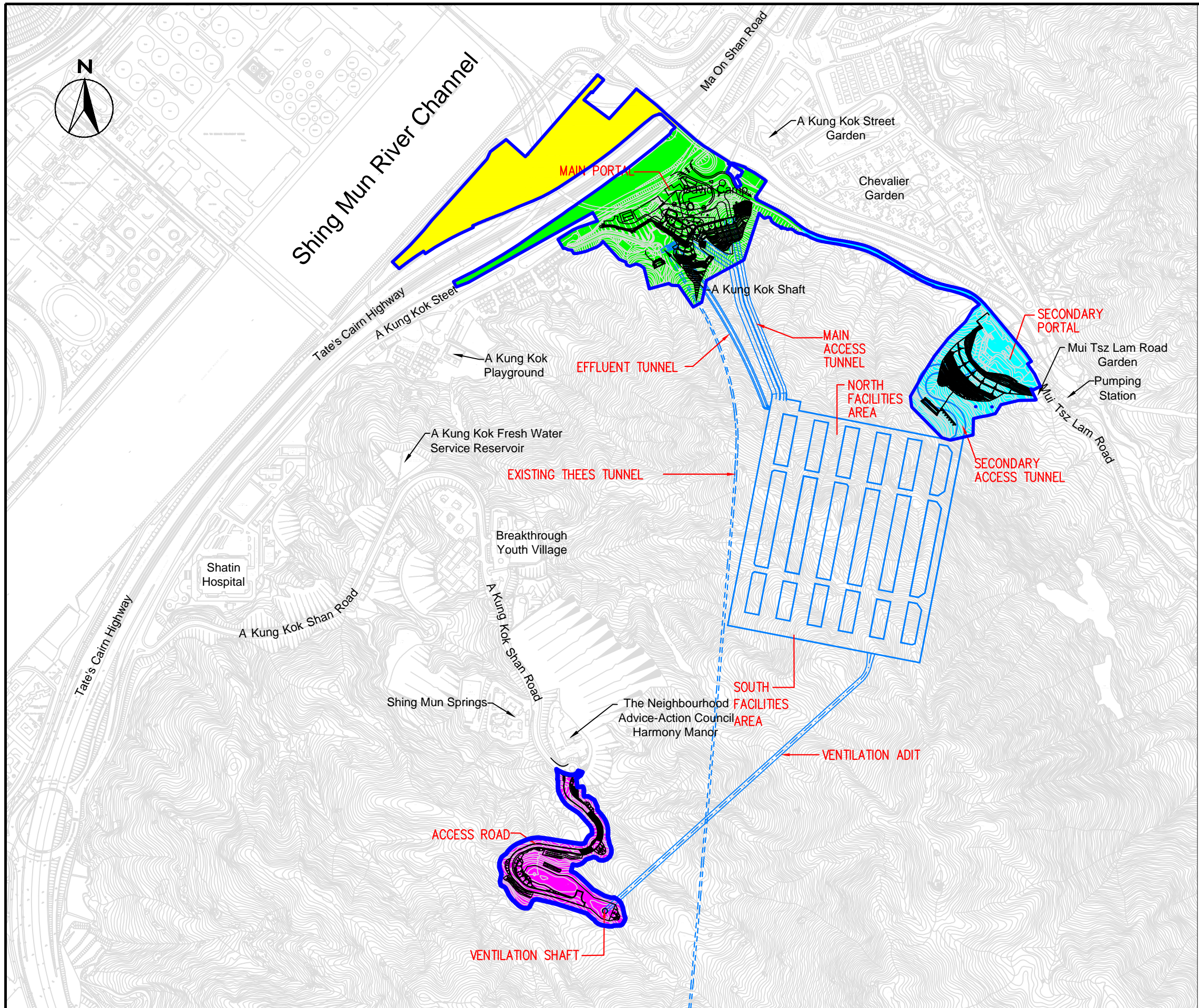
Final Summary Report

- 6.18 A final summary report shall be handed in within a month after the completion of the 5 years post-planting monitoring and maintenance. The necessity for further monitoring shall be reviewed in the 5 years post-planting summary report.

7 CONCLUSION

- 7.1 The Woodland Compensation Plan has been developed to facilitate the establishment of woodland compensation areas to mitigate the woodland loss due to the project. The original proposed woodland compensation within the approved EIA report was changed due to the increased loss of woodland due to change of design. In order to maintain the “no net loss” basis, ex-situ woodland compensation was deemed to be a necessity.
- 7.2 Different tree mixes had been proposed in various areas to enhance biodiversity. To ensure the planting works are properly implemented, a 5-year post-planting monitoring had been proposed.

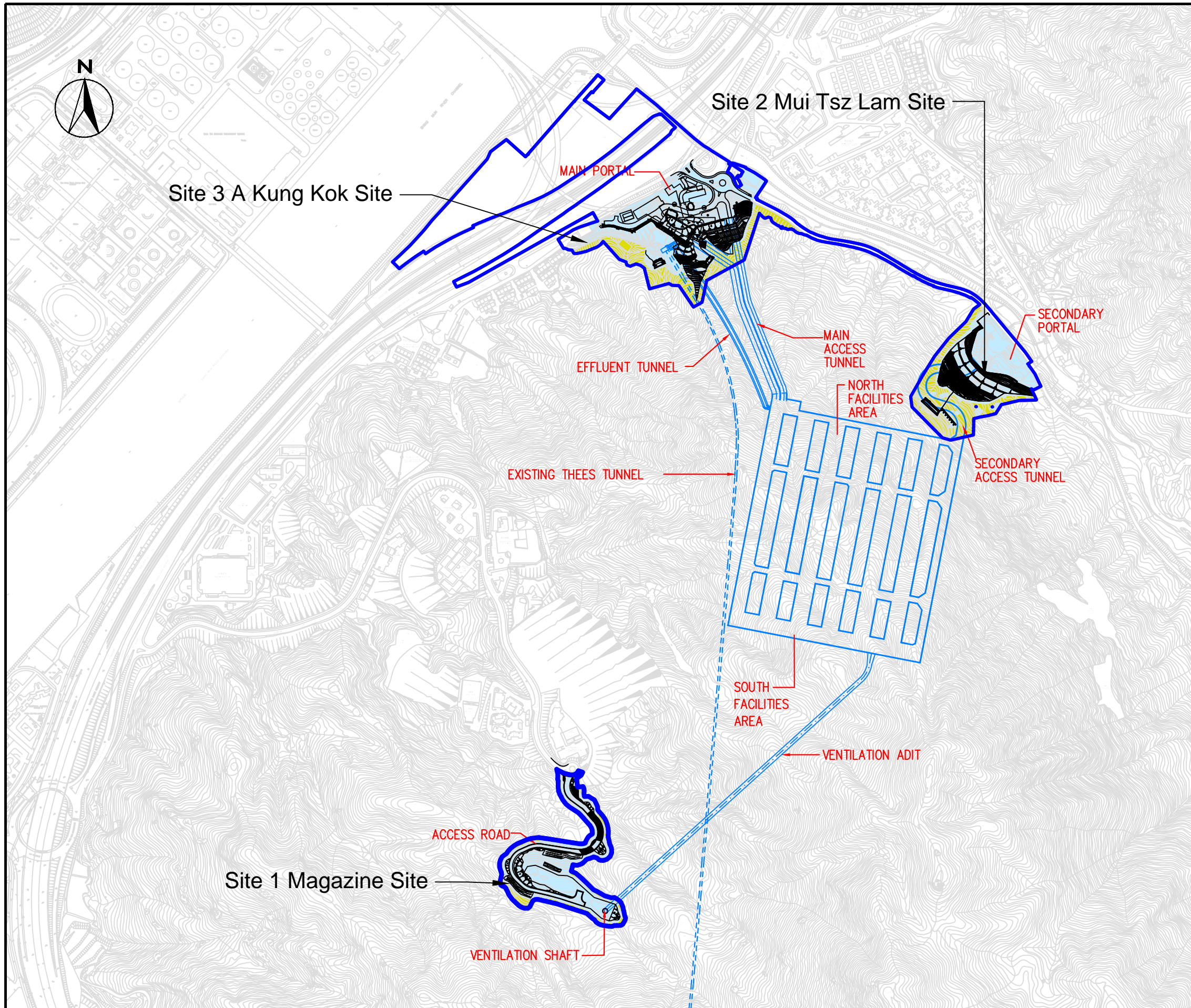
FIGURES



Legend

- Project Boundary
- Site 1 (Magazine Site)
- Site 2 (Mui Tsz Lam Site)
- Site 3 (A Kung Kok Site)
- Site 4 (Vehicle Detention Centre)

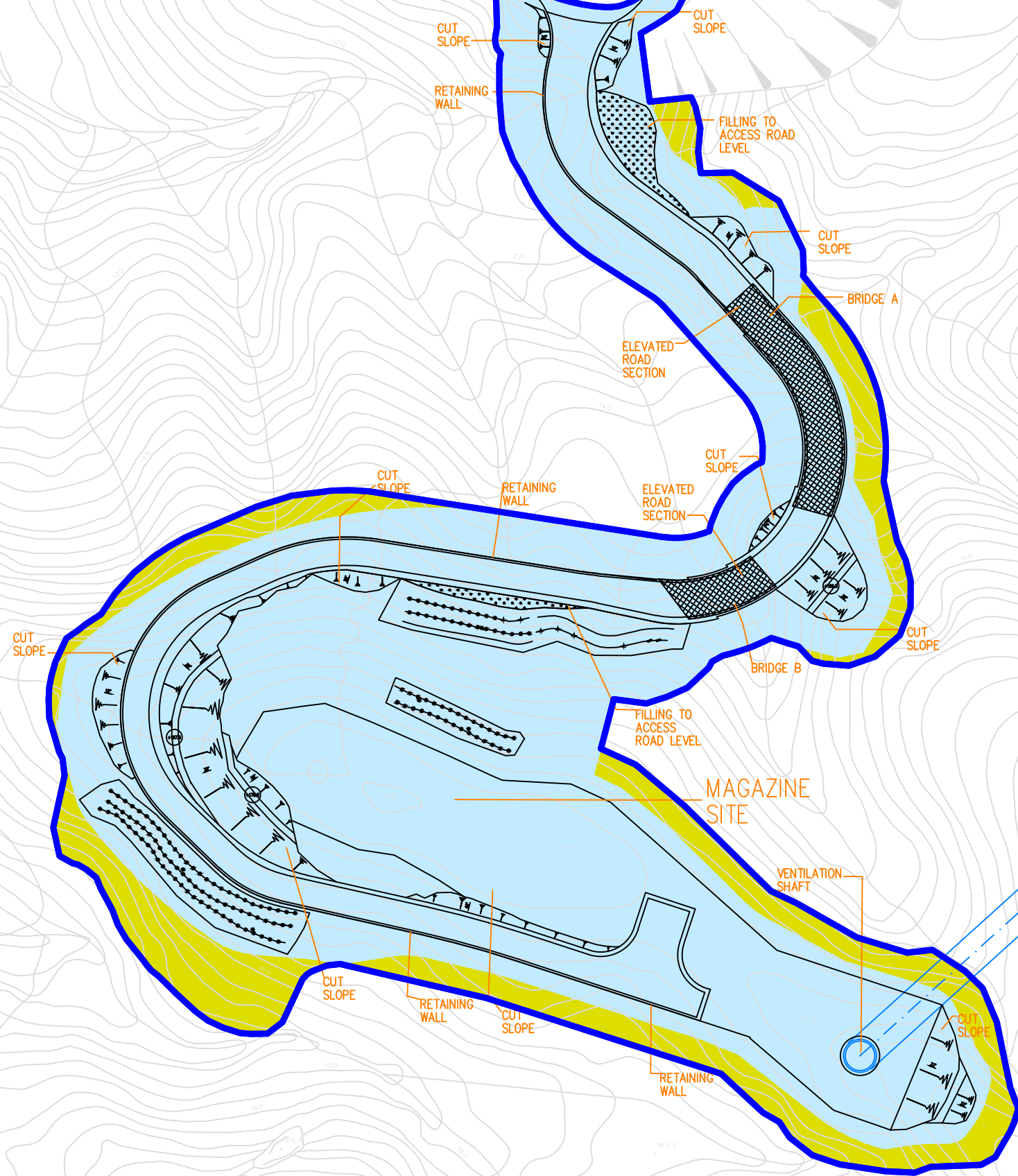
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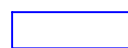
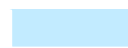

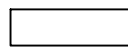
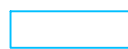
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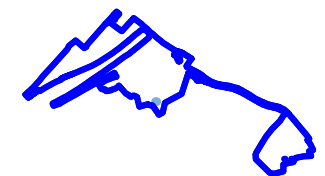
- Project Boundary
- Works Area
- Protection zone for vegetation to be retained
- Aboveground Works
- Underground Works

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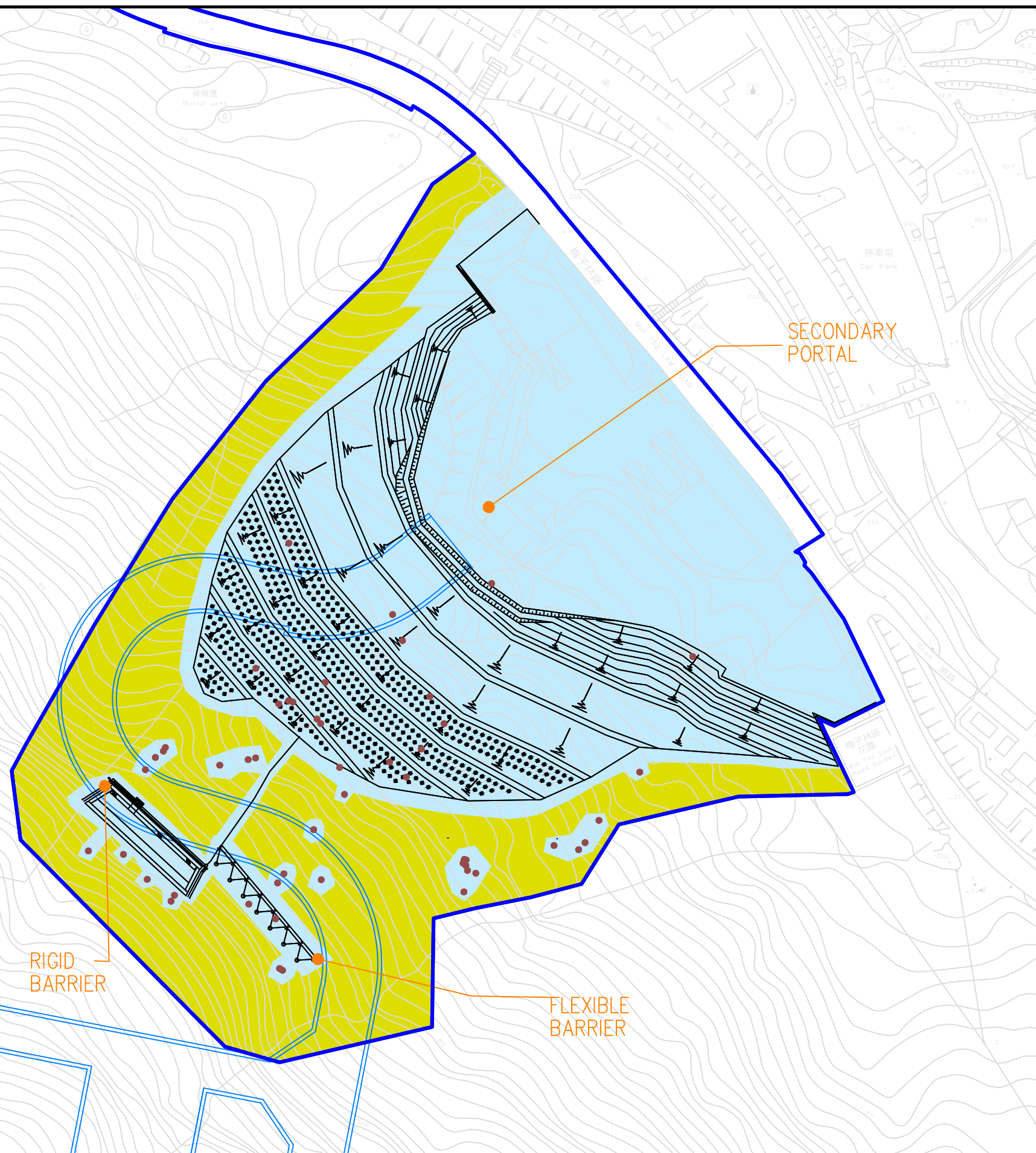


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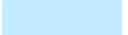

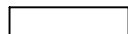

-  Project Boundary
-  Works Area
-  Protection zone for vegetation to be retained
-  Permanent Works
-  Underground Works

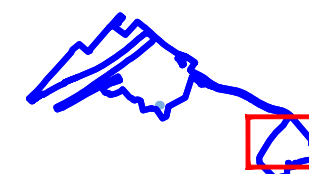


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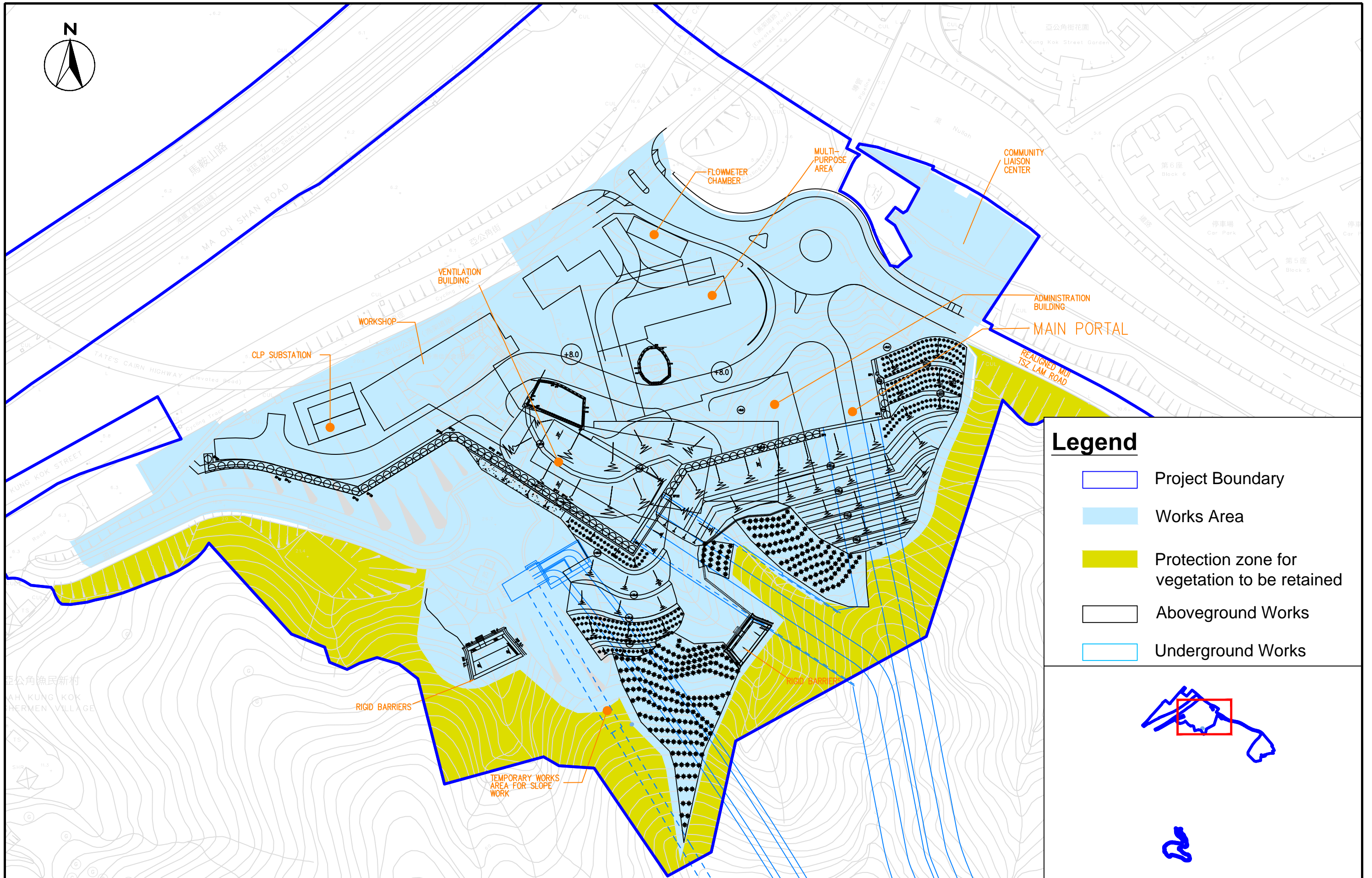
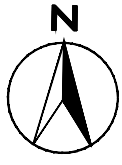


Legend

-  Project Boundary
-  Works Area
-  Protection zone for vegetation to be retained
-  Aboveground Works
-  Underground Works

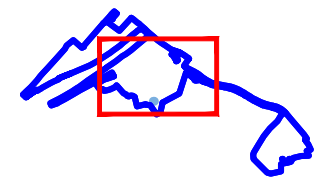


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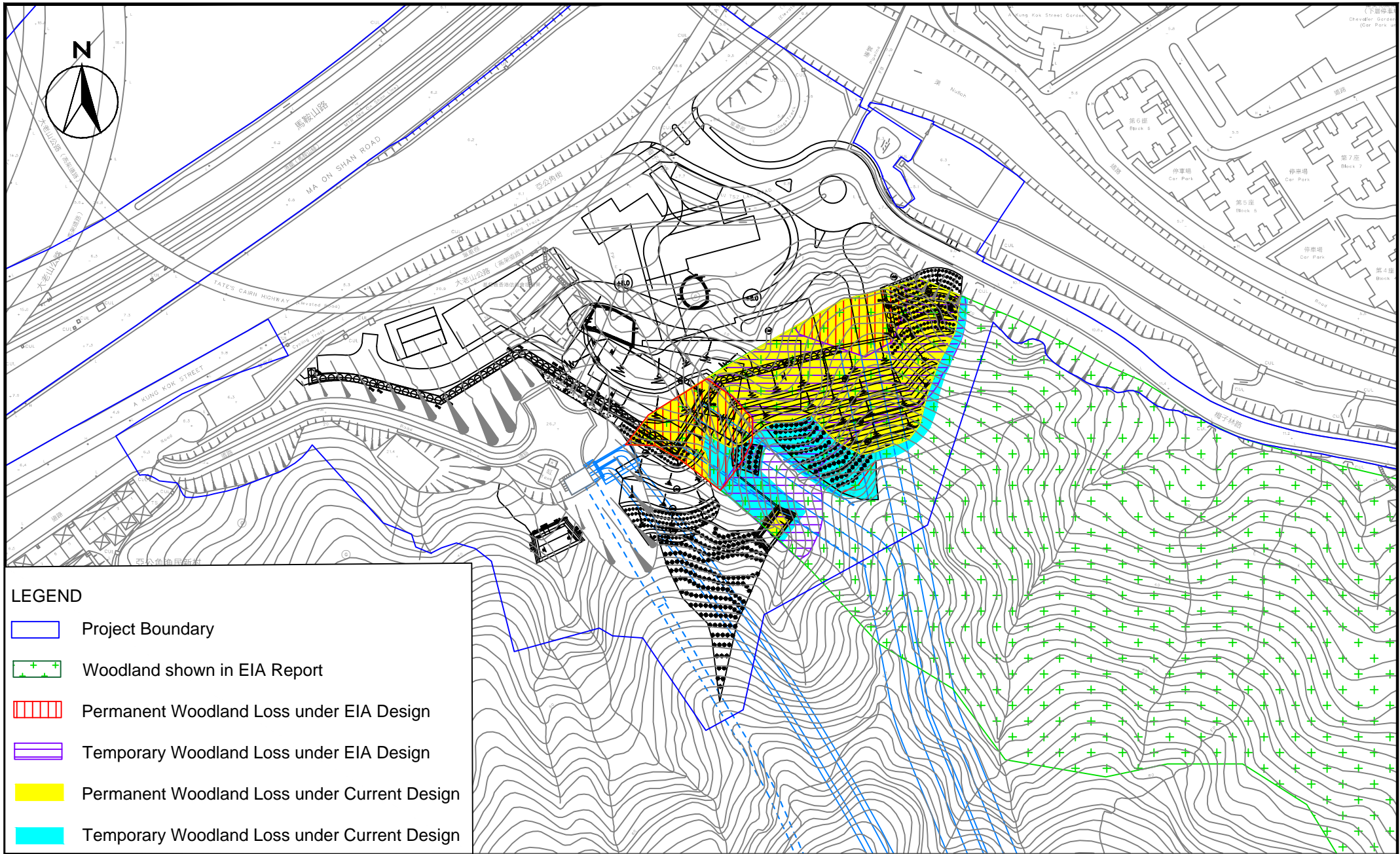


Legend

- Project Boundary
- Works Area
- Protection zone for vegetation to be retained
- Aboveground Works
- Underground Works



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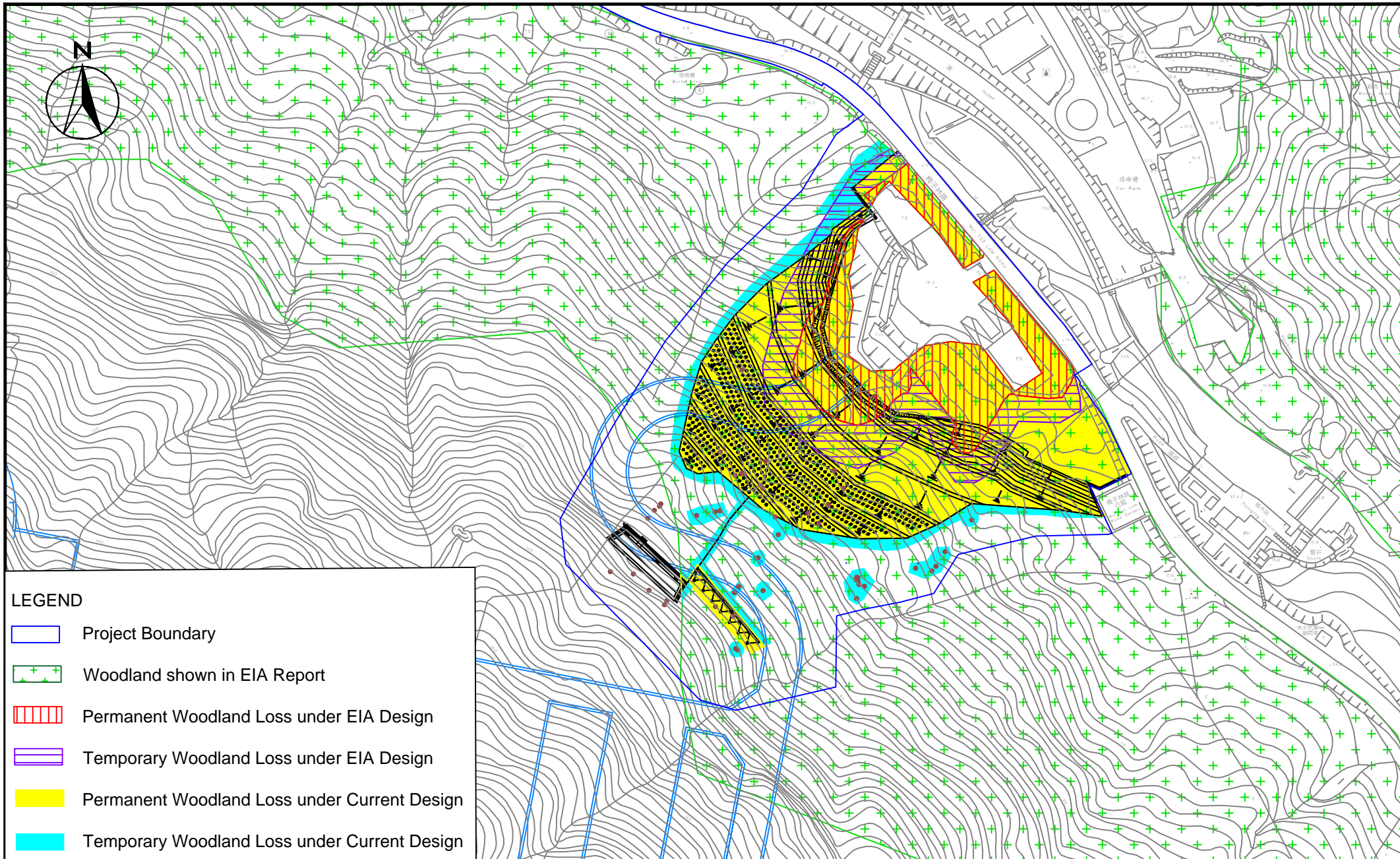
LEGEND

- Project Boundary
- Woodland shown in EIA Report
- Permanent Woodland Loss under EIA Design
- Temporary Woodland Loss under EIA Design
- Permanent Woodland Loss under Current Design
- Temporary Woodland Loss under Current Design

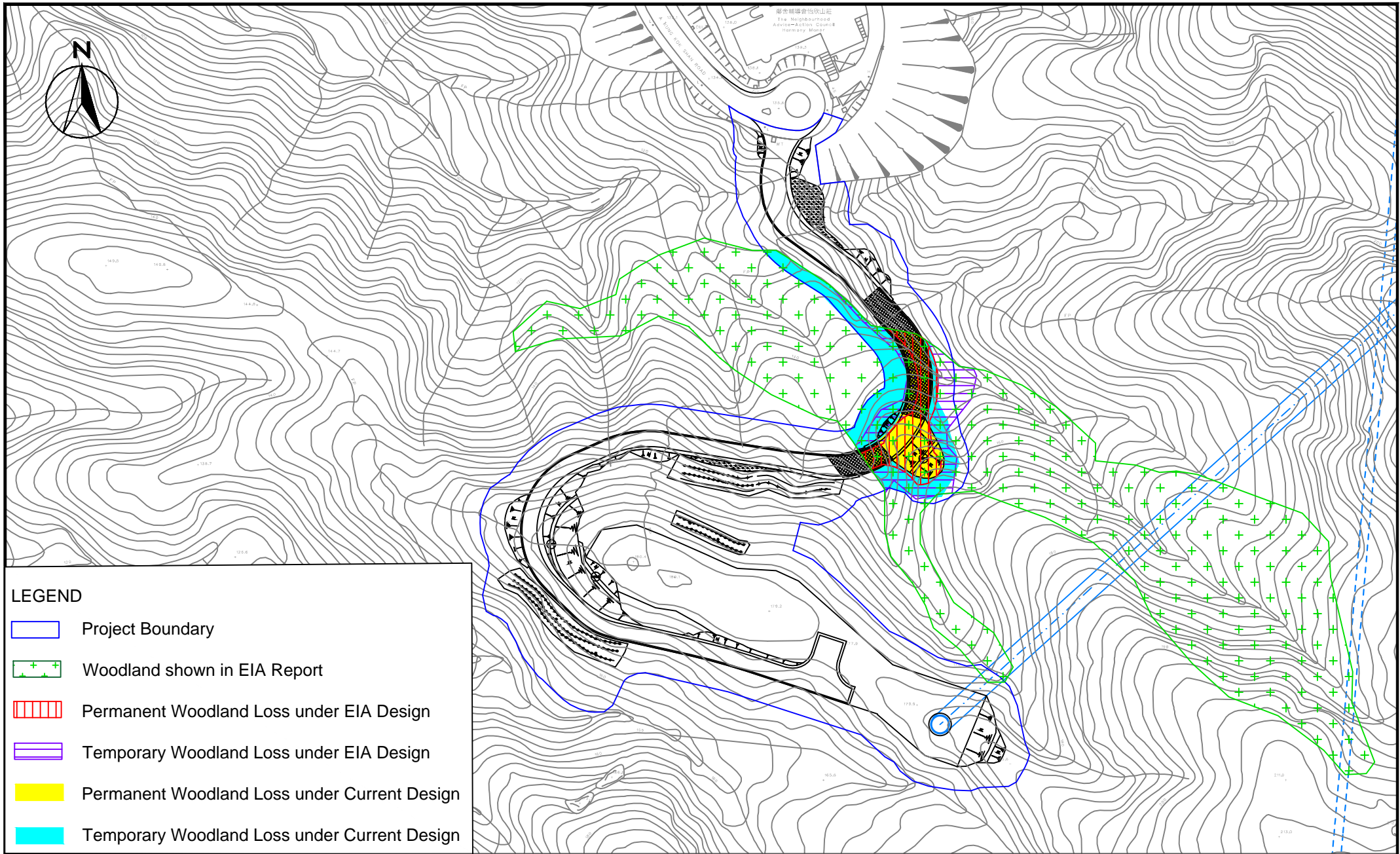


Contract No. SPW 09/2018
 Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
**Comparison of Temporary and Permanent Woodland Loss between EIA
 Design and Current Design (Main Portal)**

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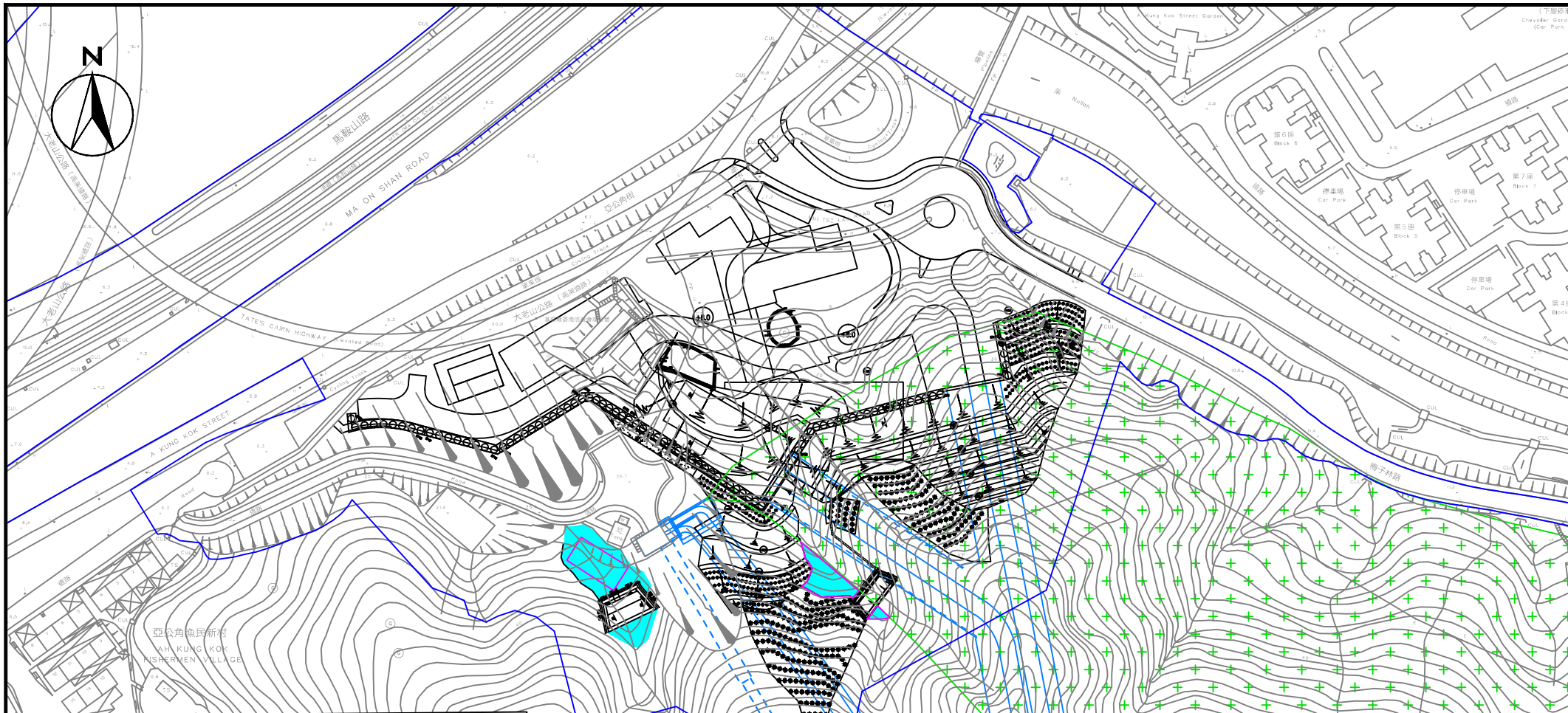
LEGEND

- Project Boundary
- + + Woodland shown in EIA Report
- Permanent Woodland Loss under EIA Design
- Temporary Woodland Loss under EIA Design
- Permanent Woodland Loss under Current Design
- Temporary Woodland Loss under Current Design



Contract No. SPW 09/2018
 Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
**Comparison of Temporary and Permanent Woodland Loss between EIA
 Design and Current Design (Along Access Road to Ventilation Shaft)**

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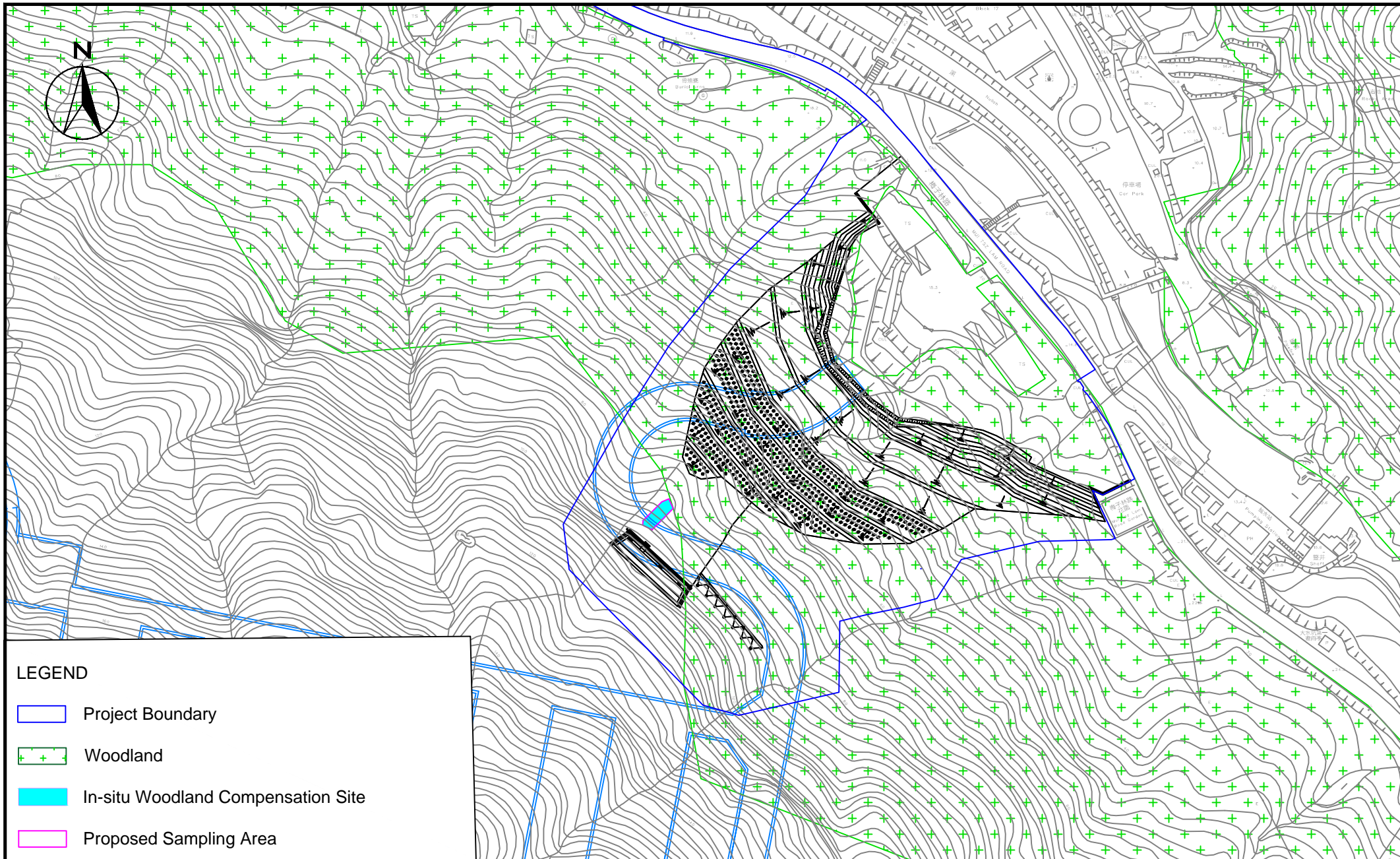
LEGEND

- Project Boundary
- Woodland
- In-situ Woodland Compensation Site
- Proposed Sampling Area



Contract No. SPW 09/2018
 Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
Location of In-situ Woodland Compensation Area (Main Portal)

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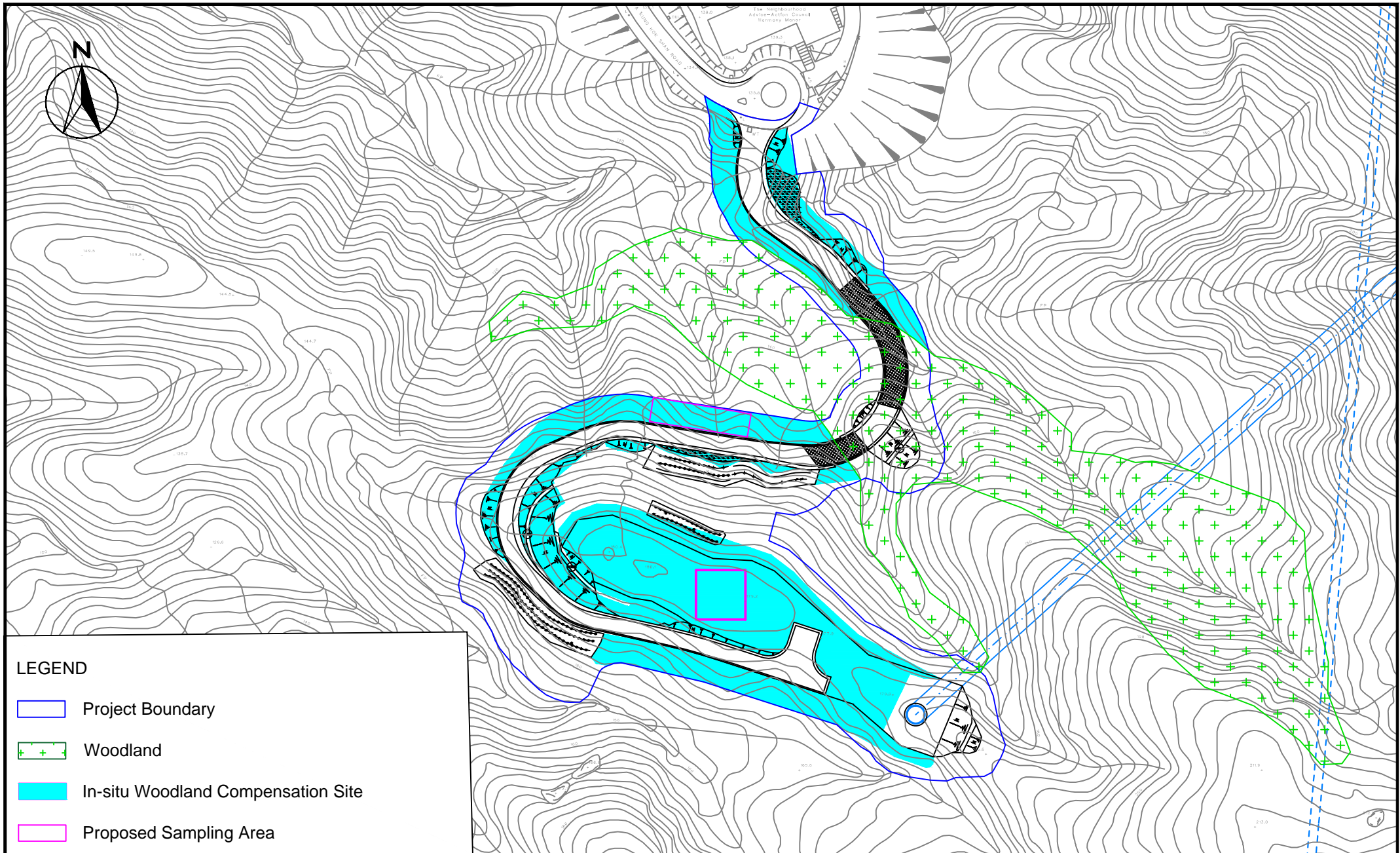
LEGEND

- Project Boundary
- Woodland
- In-situ Woodland Compensation Site
- Proposed Sampling Area



Contract No. SPW 09/2018
 Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
Location of In-situ Woodland Compensation Area (Secondary Portal)

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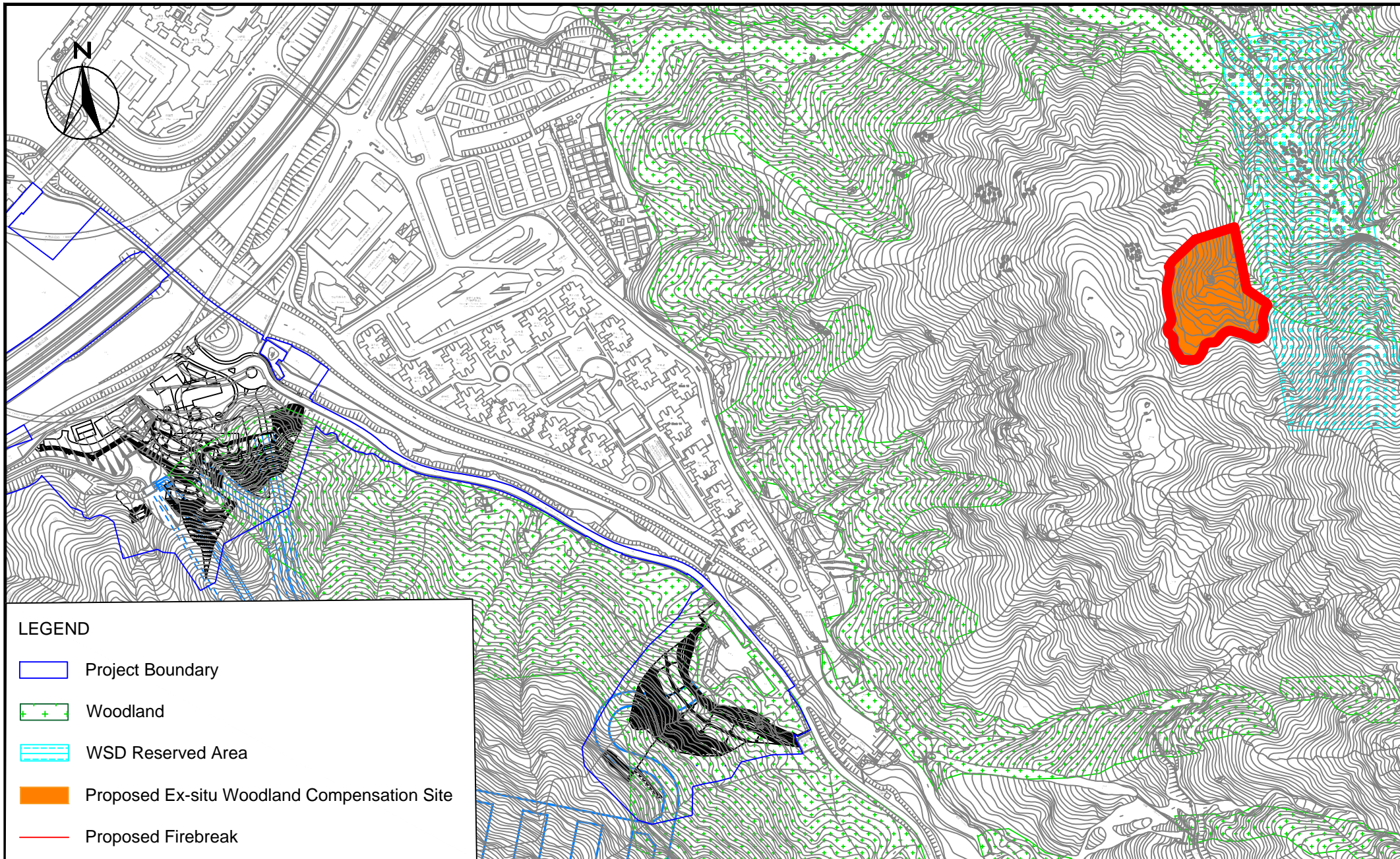
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- Project Boundary
- + Woodland
- In-situ Woodland Compensation Site
- Proposed Sampling Area

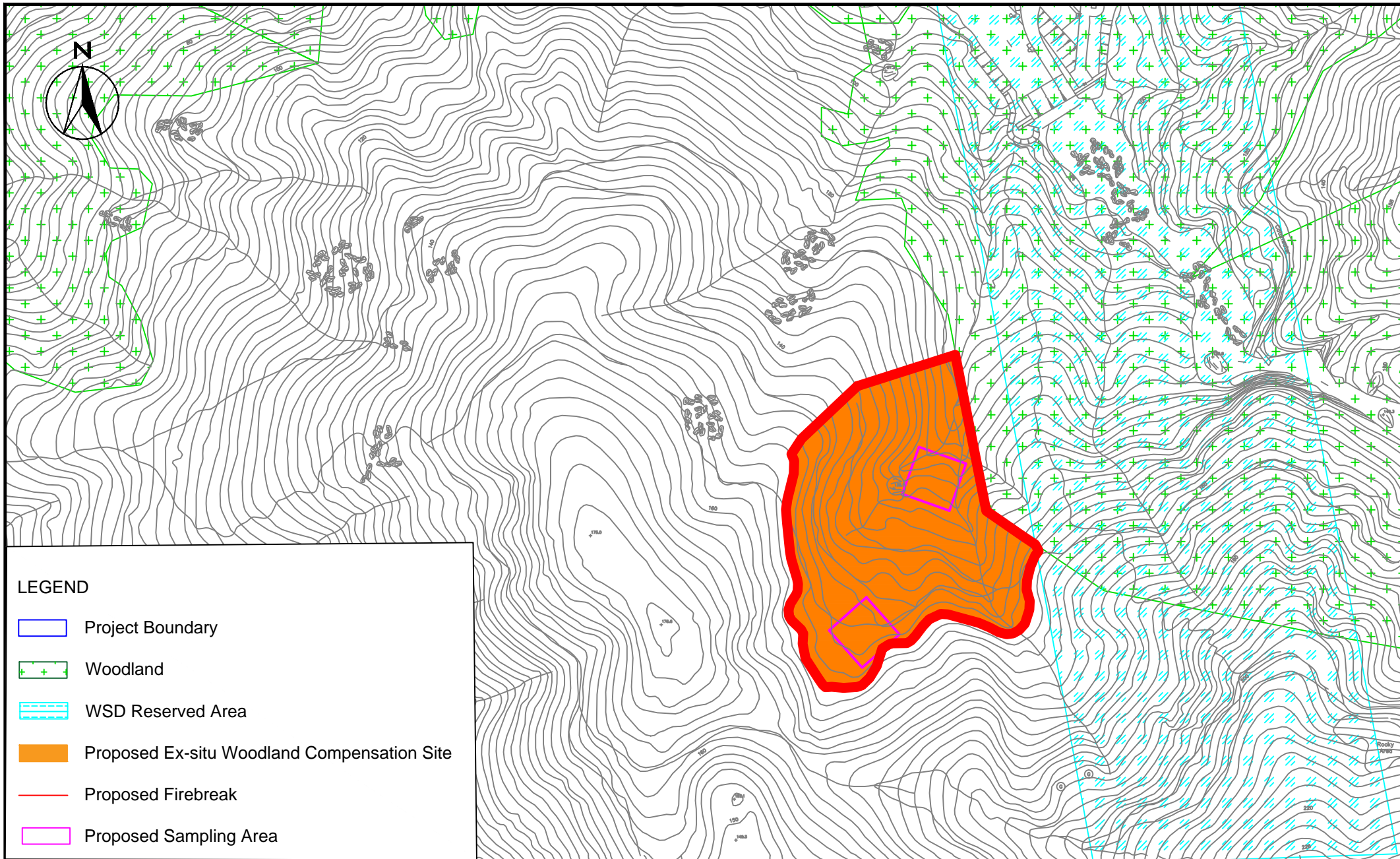


Contract No. SPW 09/2018
 Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
Location of In-situ Woodland Compensation Area
 (Along Access Road to Ventilation Shaft)

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JOB No.	IA18064	FIGURE NO.	4a
		REV	1



LEGEND

- Project Boundary
- Woodland
- WSD Reserved Area
- Proposed Ex-situ Woodland Compensation Site
- Proposed Firebreak
- Proposed Sampling Area

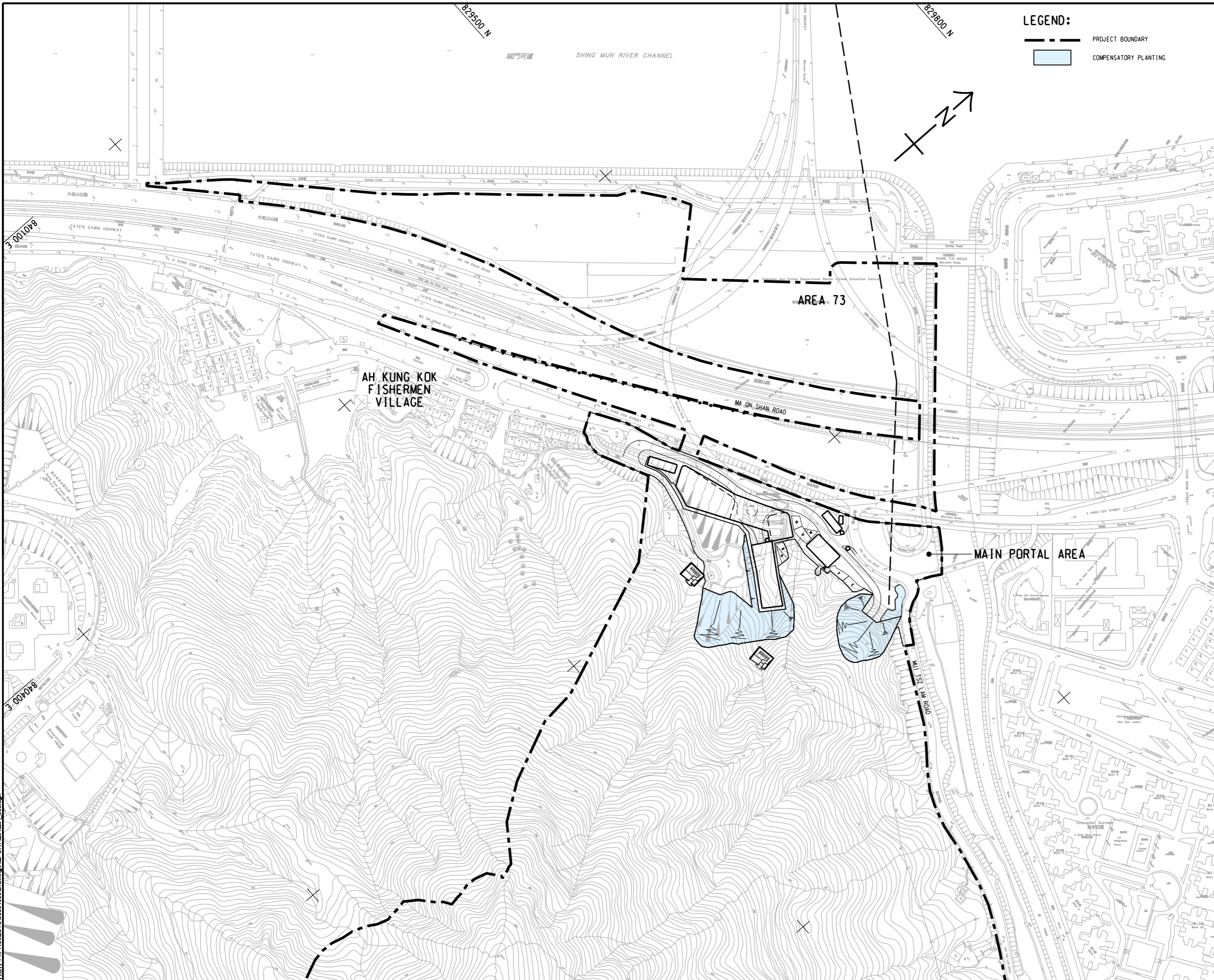


Contract No. SPW 09/2018
Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works



Location of Ex-situ Woodland Compensation Area

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JOB No.	IA18064	FIGURE NO.	4b	REV 1

**APPENDIX A
LOCATION FOR WOODLAND
COMPENSATION PROPOSED IN THE
APPROVED EIA REPORT**



LEGEND:

-  PROJECT BOUNDARY
-  COMPENSATORY PLANTING

AECOM

PROJECT

RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT



CONSULTANT

AECOM Asia Company Ltd.
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SUB-CONSULTANTS

分門工程顧問公司

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.

STATUS

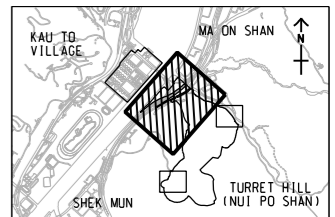
SCALE

A3 1 : 3000

DIMENSION UNIT

METRES

KEY PLAN A3 1 : 100000



PROJECT NO.

60334056

CONTRACT NO.

CE 30/2014 (DS)

SHEET TITLE

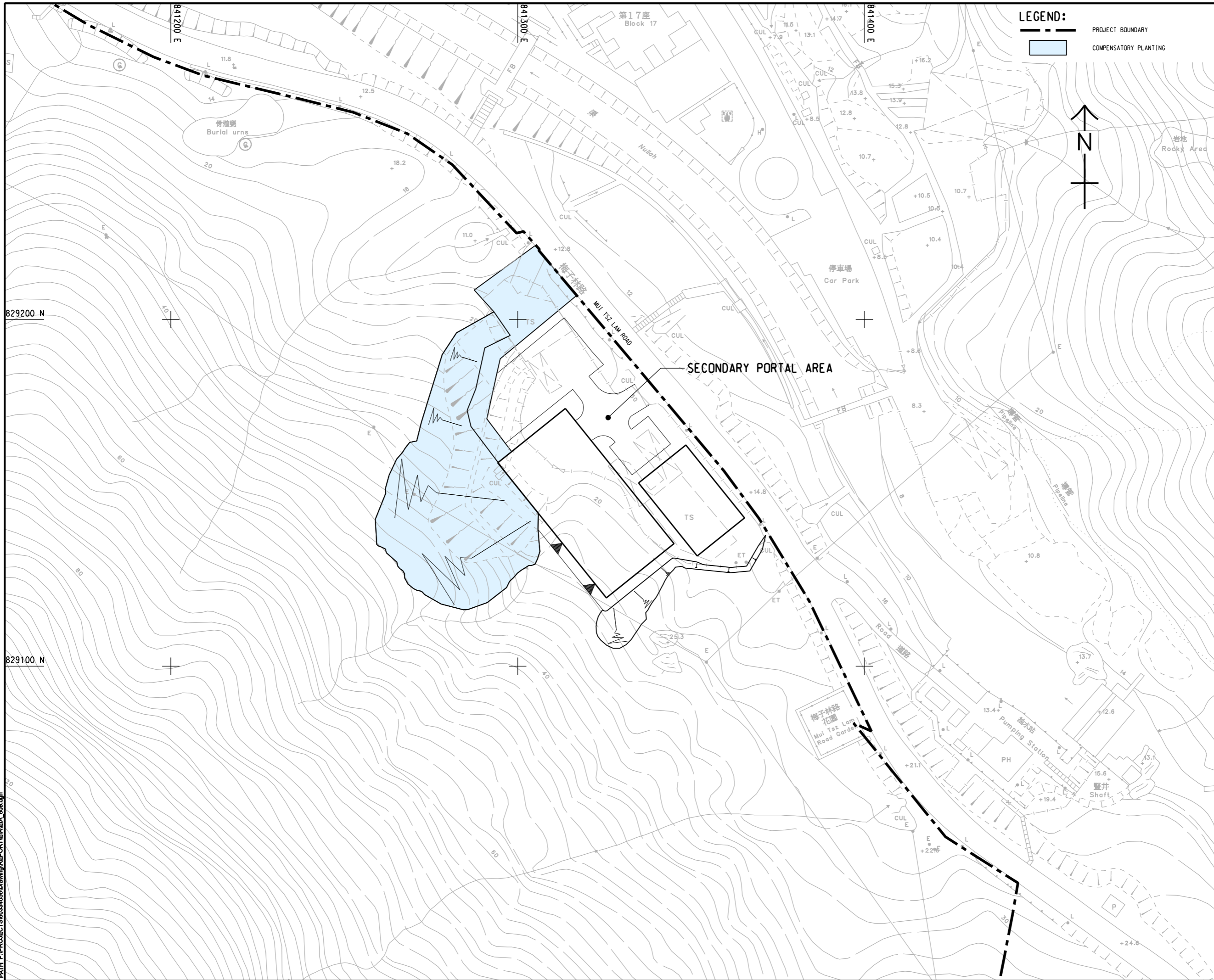
LOCATION FOR COMPENSATORY PLANTING

SHEET NUMBER

60334056/EIA/8.08a

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ISO A1 594mm x 841mm
Approved:
Checked:
Designer:
Project Management Initials:



LEGEND:

- PROJECT BOUNDARY
- COMPENSATORY PLANTING



PROJECT
項目
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
業主
 渠務署
Drainage Services Department

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分門工程顧問公司

ISSUE/REVISION
修改

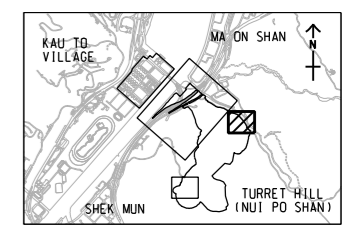
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號	日期	內容摘要	校核

STATUS
階段

SCALE
比例
A3 1:1000

DIMENSION UNIT
尺寸單位
METRES

KEY PLAN A3 1:100000



PROJECT NO.
項目編號
60334056

CONTRACT NO.
合約編號
CE 30/2014 (DS)

SHEET TITLE
圖紙名稱
LOCATION FOR COMPENSATORY PLANTING

SHEET NUMBER
圖紙編號
60334056/EIA/8.08b

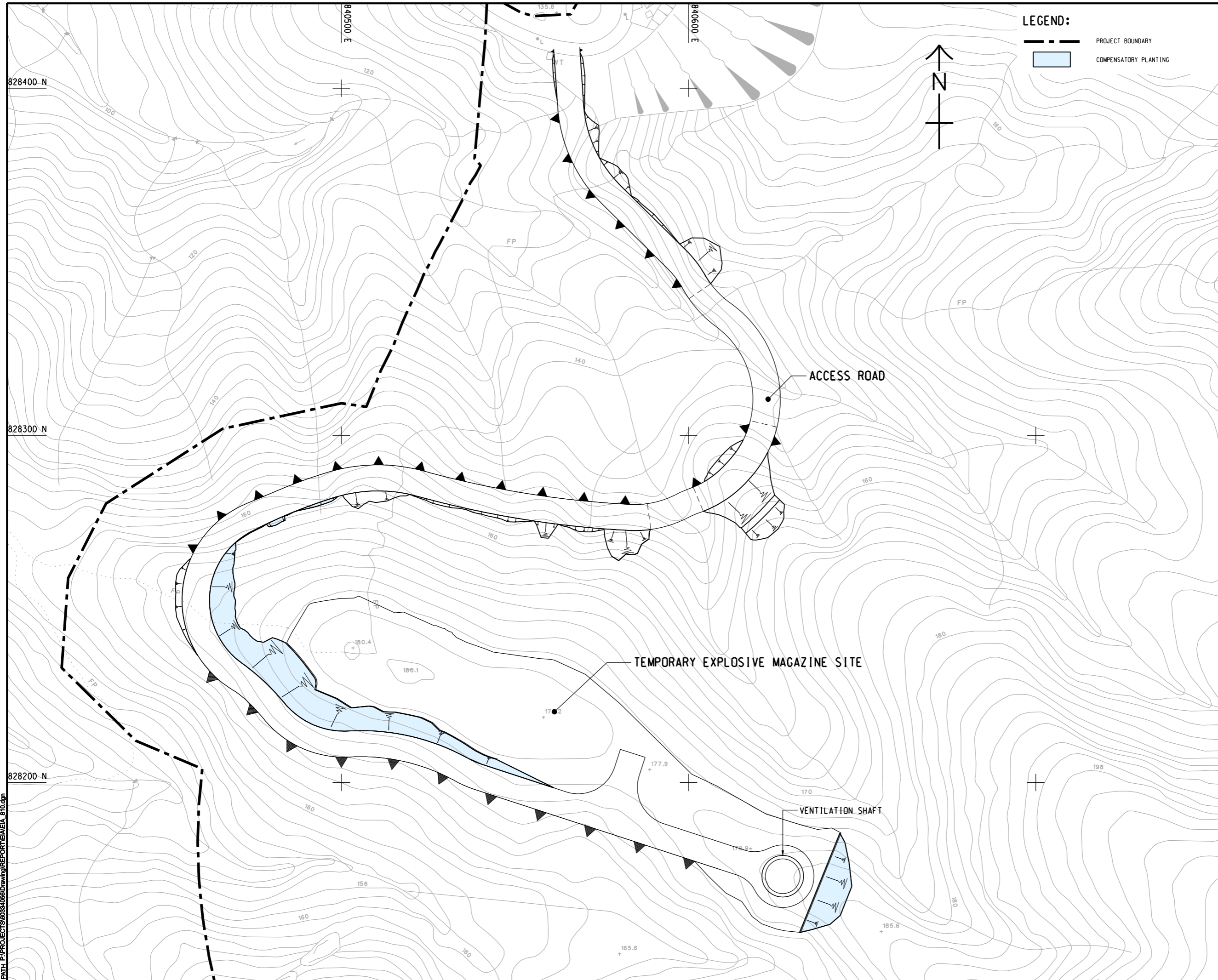
SHEET 2 OF 3

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 Checked:
 Designer:
 Project Management Initials:

Pld File by: PENGGW 2016/05/19
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LEGEND:

- PROJECT BOUNDARY
- COMPENSATORY PLANTING

AECOM

PROJECT
 項目
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
 業主
 渠務署
 Drainage Services Department

CONSULTANT
 工程顧問公司
 AECOM Asia Company Ltd.
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ISSUE/REVISION
 修訂

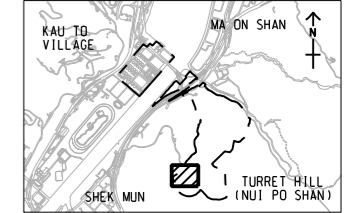
I/R	DATE	DESCRIPTION	CHK.

STATUS
 階段

SCALE
 比例
 A3 1:1000

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖
 A3 1:100000



PROJECT NO.
 項目編號
 60334056

CONTRACT NO.
 合約編號
 CE 30/2014 (DS)

SHEET TITLE
 圖名
 LOCATION FOR COMPENSATORY PLANTING

SHEET NUMBER
 圖號
 60334056/EA/8.08c

SHEET 3 OF 3

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**APPENDIX B
PROPOSED SPECIES AND
JUSTIFICATIONS**

APPENDIX B - SELECTED SPECIES LIST

Species Name	English Name	Chinese Name	Growth Form	E	F	FB	G	H	N	V
<i>Acronychia pedunculata</i>	Acronychia	山油柑	Tree	Y	Y		Y	Y		Y
<i>Adina pilulifera</i>	Chinese Buttonbush	水團花	tree or shrub					Y		Y
<i>Alangium chinense</i>	Chinese Alangium	八角楓	Tree or shrub	Y	Y					Y
<i>Aporosa dioica</i>	Aporosa	銀柴	Shrub or small tree		Y					Y
<i>Aquilaria sinensis</i>	Incense Tree	土沉香	Tree	Y						Y
<i>Baeckea frutescens</i>	Dwarf Mountain Pine	崗松	Shrub or small tree							Y
<i>Bauhinia championii</i>	Champion's Bauhinia	缺葉藤/龍鬚藤	climber: vine					Y		Y
<i>Bischofia javanica</i>	Autumn Maple	秋楓	Tree	Y	Y		Y			Y
<i>Bridelia tomentosa</i>	Pikpoktai	土蜜樹	Shrub or small tree	Y	Y		Y			Y
<i>Canthium dicoccum</i>	Butulang Canthium	魚骨木	Tree or shrub	Y	Y					Y
<i>Carallia brachiata</i>	India Carallia	竹節樹	Tree		Y					Y
<i>Castanopsis fissa</i>	Castanopsis	鰲菊錐	Tree			Y	Y			Y
<i>Celtis sinensis</i>	Chinese Hackberry	朴樹	Tree	Y	Y			Y		Y
<i>Cinnamomum camphora</i>	Camphor Tree	樟	Tree	Y	Y		Y	Y		Y
<i>Cleistocalyx nervosum</i>	Lidded Cleistocalyx	水翁	Tree	Y	Y				Y	Y
<i>Cratogeomys cochinchinense</i>	Yellow Cow Wood	黃牛木	tree or shrub					Y		Y
<i>Cyclobalanopsis glauca</i>	Blue Japanese Oak	青岡	Tree							
<i>Cyclobalanopsis myrsinifolia</i>	Small-leaved Oak	小葉青岡	Tree							
<i>Daphniphyllum calycinum</i>	N/A	牛耳楓	Tree	Y	Y					Y
<i>Desmos chinensis</i>	Desmos	假鷹爪	Woody climbing shrub		Y			Y		Y
<i>Elaeocarpus chinensis</i>	Chinese Elaeocarpus	中華杜英	Tree or small tree	Y	Y					Y
<i>Elaeocarpus sylvestris</i>	Woodland Elaeocarpus	山杜英	Tree		Y					
<i>Embelia laeta</i>	Twig-hanging Embelia	酸藤子	Scandent shrub or climber		Y			Y		Y
<i>Embelia ribes</i>	White-flowered Embelia	白花酸藤子	Climbing shrub		Y			Y		Y
<i>Ficus fistulosa</i>	Common Yellow Steg-fig	水同木	small tree		Y					Y
<i>Ficus microcarpa</i>	Chinese Banyan	細葉榕	Tree	Y	Y		Y			Y
<i>Ficus hispida</i>	Opposite-leaved Fig	對葉榕	Shrub or small tree		Y		Y			Y
<i>Ficus variegata</i>	Common Red-stem Fig	青果榕	Tree		Y					Y
<i>Garcinia oblongifolia</i>	Lingnan Garcinia	黃牙果	Tree	Y	Y					Y
<i>Gardenia jasminoides</i>	Cape Jasmine	梔子	shrub		Y			Y		Y
<i>Glochidion eriocarpum</i>	Hairy-fruited Abacus Plant	毛果算盤子	shrub		Y			Y		Y
<i>Glochidion lanceolarium</i>	Large-leaved Abcaus Plant	大葉算盤子	tree or shrub		Y			Y		Y
<i>Glochidion wrightii</i>	Wright's Abacus Plant	白背算盤子	tree		Y			Y		Y
<i>Glochidion zeylanicum</i>	Hong Kong Abacus Plant	香港算盤子	shrub or small tree		Y			Y		Y
<i>Helicteres angustifolia</i>	Narrow-leaced Screwtree	山芝麻	Subshrub					Y		Y
<i>Homalium cochinchinensis</i>	Cochin-china Homalium	天料木	Shrub or tree					Y	Y	Y
<i>Litsea cubeba</i>	Fragrant Litsea	木薑子	shrub or small tree		Y			Y	Y	Y
<i>Litsea glutinosa</i>	Pond Spice	潺槁樹	Tree	Y	Y		Y	Y		Y
<i>Litsea rotundifolia</i>	Oblong-leaved Litsea	豺皮樟	Tree		Y		Y			Y
<i>Machilus pauhoi</i>	Many-nerved Machilus	刨花潤楠	Tree	Y	Y				Y	Y
<i>Maesa perlaris</i>	N/A	鯽魚膽	shrub		Y			Y	Y	Y
<i>Mallotus paniculatus</i>	Turn-in-the-wind	白楸	Tree or shrub	Y			Y	Y	Y	Y
<i>Melastoma malabathricum</i>	Common Melastoma	野牡丹	Shrub		Y		Y		Y	Y
<i>Melastoma sanguineum</i>	Blood-red Melastoma	毛茛	Shrub		Y		Y		Y	Y
<i>Millettia nitida</i>	Glittering-leaved Millettia	亮葉崖豆藤/亮葉雞血藤	climbing shrub					Y		Y
<i>Mussaenda pubescens</i>	Splash-of-white	玉葉金花	climbing Shrub		Y			Y		Y
<i>Ormosia emarginata</i>	Emarginate-leaved Ormosia	凹葉紅豆	Tree							Y
<i>Ormosia semicastrata</i>	Soft-fruited Ormosia	軟莢紅豆	Tree							Y
<i>Oxalis corniculata</i>	Sorrel	酢漿草	perennial herb					Y		Y
<i>Pavetta hongkongensis</i>	Hong Kong Pavetta	香港大沙葉	tree or shrub		Y			Y	Y	Y
<i>Phyllanthus emblica</i>	Myrobalan	油甘子	Tree or shrub	Y	Y		Y			Y
<i>Polygonum chinense</i>	Smartweed	火炭母	herb		Y			Y		Y
<i>Polyspora axillaris</i>	Hong Kong Gordonia	大頭茶	Shrub or small tree				Y		Y	Y
<i>Rhaphiolepis indica</i>	Hong Kong Hawthorn	春花	Shrub or small tree		Y		Y		Y	Y
<i>Rubus reflexus</i>	Rusty-haired Berry	蛇泡筋	Climbing Shrub		Y			Y		Y
<i>Sapium discolor</i>	Mountain Tallow Tree	山烏柏	small tree		Y		Y	Y		Y
<i>Schefflera heptaphylla</i>	Ivy Tree	鴨腳木	Tree	Y	Y	Y	Y	Y	Y	Y
<i>Schima superba</i>	Schima	木荷	Tree	Y	Y	Y	Y			Y
<i>Scelopora saeva</i>	Scelopora	廣東刺蝟	Tree		Y					Y
<i>Smilax china</i>	Greenbrier	菝葜	Climbing Shrub		Y			Y		Y

Species Name	English Name	Chinese Name	Growth Form	E	F	FB	G	H	N	V
<i>Sterculia lanceolata</i>	Lance-leaved Sterculia	假蒺藜	Semi-deciduous tree	Y	Y		Y			Y
<i>Syzygium hancei</i>	Hance's Syzygium	紅鱗蒲桃	Tree		Y		Y			Y
<i>Ternstroemia gymnanthera</i>	Naked Anther Ternstroemia	厚皮香	Shrub or small tree		Y					Y
<i>Tetradium glabrifolium</i>	Melia-leaved Evodia	棟葉吳茱萸	tree		Y			Y		Y
<i>Trema tomentosa</i>	India-charcoal Trema	山黃麻	shrub or small tree		Y			Y		Y
<i>Tylophora ovata</i>	Ovate Tylophora	娃兒藤	slender woody vine					Y		Y
<i>Uvaria grandiflora</i>	Large-flower Uvaria	大花紫玉盤/山椒	woody climbing shrub		Y			Y		Y
<i>Uvaria macrophylla</i>	Uvaria	紫玉盤	woody climbing shrub		Y			Y		Y
<i>Viburnum odoratissimum</i>	Sweet Viburnum	珊瑚樹	Shrub or small tree	Y	Y	Y		Y	Y	Y
<i>Vitex negundo</i>	Yellow Bramble	黃荊	shrub or small tree		Y				Y	Y
<i>Zanthoxylum avicennae</i>	Prickly Ash	筲欖花椒	Tree		Y			Y	Y	Y
<i>Zanthoxylum nitidum</i>	Shiny-leaved Prickly Ash	兩面針	Climbing Shrub		Y			Y		Y

E: Suggested in EIA Study; F: Produce fruits for wild animals with ecological values;

FB: Reported as a fire-resistance species; G: Available in accordance to GEO Report No.259; H: Host plants for butterfly;

N: Nectar plants for insects; P: Categorized as pioneer species; V: Recorded in Vegetation Survey from EIA study

Reference:

AECOM. (2017). *Agreement No. CE 38/2010 (CE) Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructure) – Design and Construction, Woodland Compensation Plan (Rev. 2)*.

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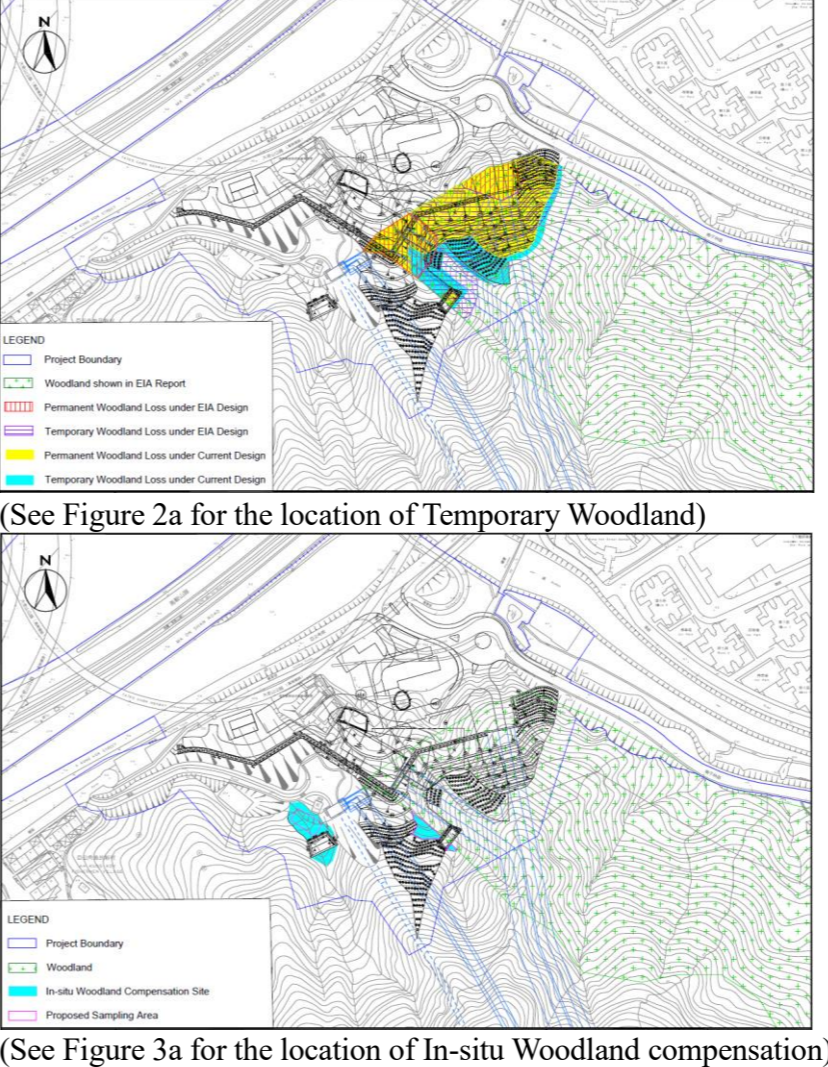
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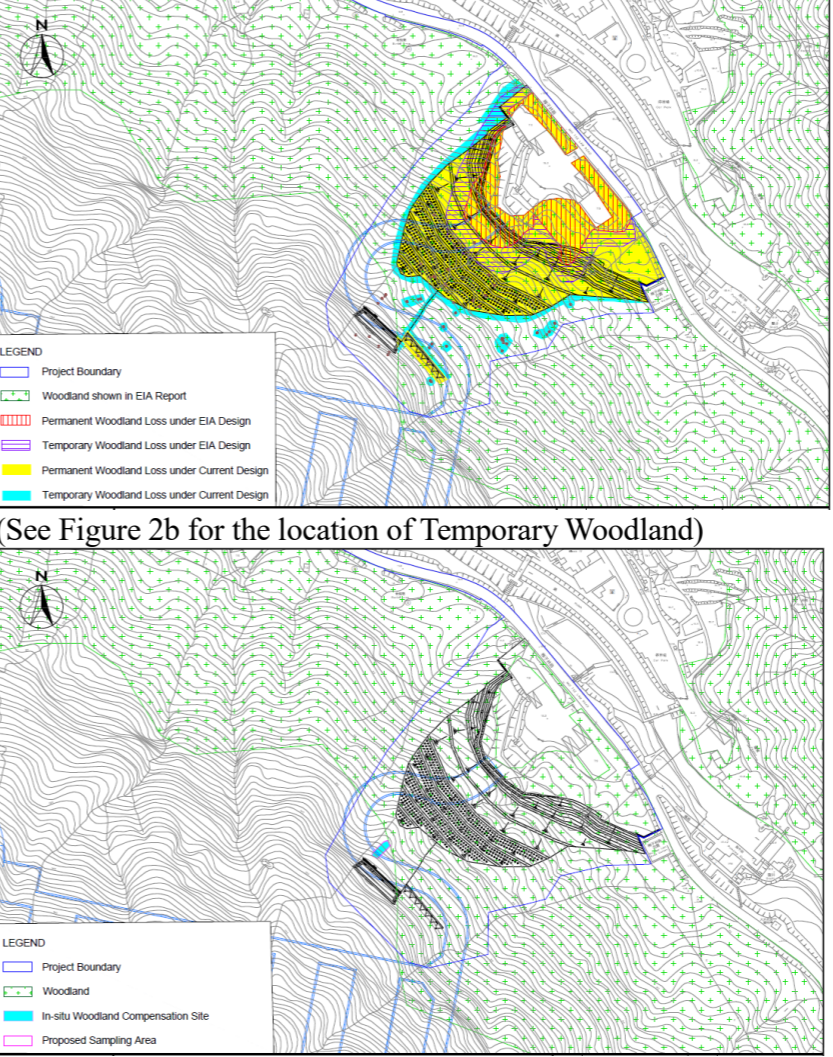
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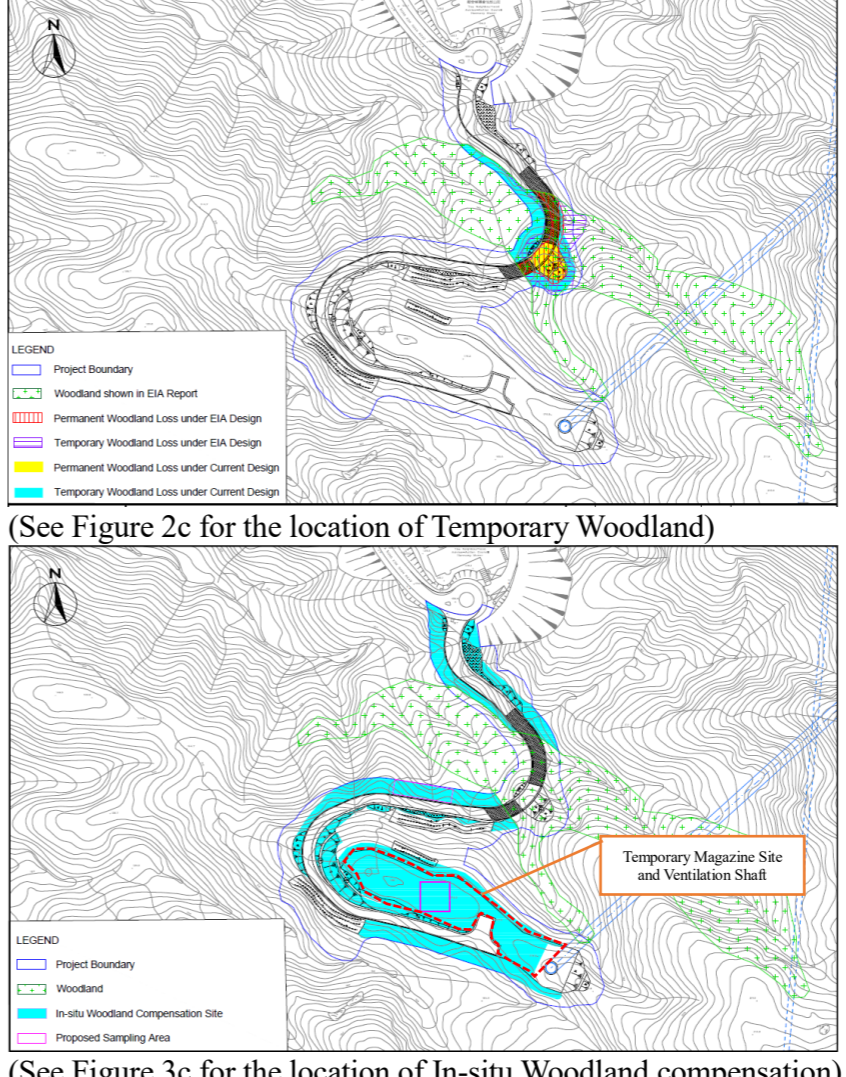
APPENDIX C
TENTATIVE PLANTING PROGRAMME

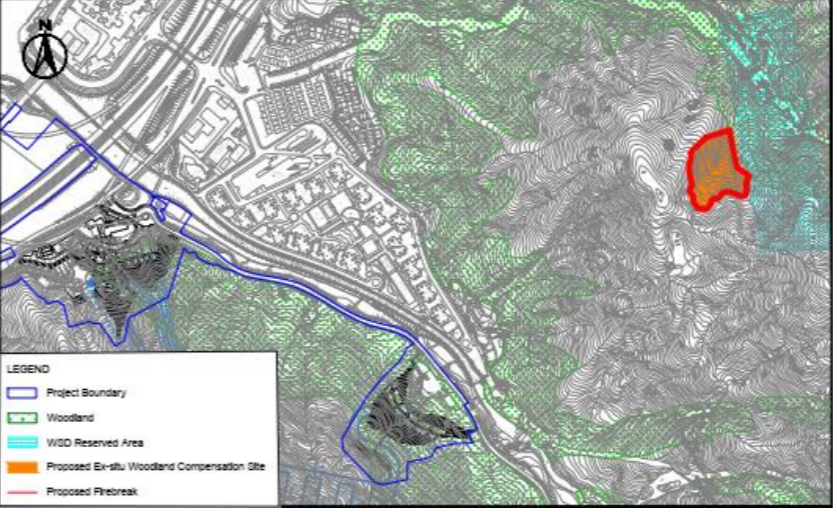
APPENDIX D
IMPLEMENTATION PROGRAMME

**Relocation of Sha Tin Sewage Treatment Works to Caverns
Implementation Schedule (IS) – Woodland Compensation Plan (WCP)**

Recommended Mitigation Measures (What Measures)	Objective of the Measures (What Requirements)	Who to Implement / Maintain the Measures? (Who)	Location of the Measures (Where)	When to Implement the Measures? (When)	Reference to paragraph(s) in this WCP
<p>Reinstatement of Temporary Woodland and In-situ Woodland Compensation nearby Main Portal Area</p> <p>Pre-planting</p> <ul style="list-style-type: none"> To clearly demarcate the planting area and location To identify planting species and spacing Site preparation <p>Planting</p> <ul style="list-style-type: none"> To execute woodland compensation <p>Post Planting Monitoring (5 years)</p> <ul style="list-style-type: none"> Checking of general health condition and survival rate Inspection Frequency: <ul style="list-style-type: none"> Bi-weekly during Month 0 – 2 in the 1st year; Monthly during Month 3 – 12 in the 1st year; Bi-monthly during 2nd year; Quarterly from 3rd year onwards. 	<p>To plan and implement the planting requirements for achieving successful woodland development</p>	<p>Permit holder / Resident Site Engineer to assign/plan the works</p> <p>Contractor & his Arborist to execute the works</p> <p>ET's Qualified Ecologist to monitor the works</p> <p>IEC to verify the works</p> <p>(Maintenance Parties: DSD)</p>	 <p>(See Figure 2a for the location of Temporary Woodland)</p> <p>(See Figure 3a for the location of In-situ Woodland compensation)</p>	<p>(1) Pre-planting (within Year 2022-2023)</p> <p>(2) Planting works (within Year 2022-2023)</p> <p>(3) Post-planting monitoring (Year 2024-2028)</p>	<p>S.2.8 – 2.9 S.3 S.4.1 - 4.10 S.4.22 – 4.25 S.5.3 – 5.8 S.6.4 – 6.18</p>

Recommended Mitigation Measures (What Measures)	Objective of the Measures (What Requirements)	Who to Implement / Maintain the Measures? (Who)	Location of the Measures (Where)	When to Implement the Measures? (When)	Reference to paragraph(s) in this WCP
<p>Reinstatement of Temporary Woodland and In-situ Woodland Compensation nearby Secondary Portal Area</p> <p>Pre-planting</p> <ul style="list-style-type: none"> To clearly demarcate the planting area and location To identify planting species and spacing Site preparation <p>Planting</p> <ul style="list-style-type: none"> To execute woodland compensation <p>Post Planting Monitoring (5 years)</p> <ul style="list-style-type: none"> Checking of general health condition and survival rate Inspection Frequency: <ul style="list-style-type: none"> Bi-weekly during Month 0 – 2 in the 1st year; Monthly during Month 3 – 12 in the 1st year; Bi-monthly during 2nd year; Quarterly from 3rd year onwards. 	<p>To plan and implement the planting requirements for achieving successful woodland development</p>	<p>Permit holder / Resident Site Engineer to assign/plan the works</p> <p>Contractor & his Arborist to execute the works</p> <p>ET's Qualified Ecologist to monitor the works</p> <p>IEC to verify the works</p> <p>(Maintenance Parties: DSD)</p>	 <p>(See Figure 2b for the location of Temporary Woodland)</p> <p>(See Figure 3b for the location of In-situ Woodland compensation)</p>	<p>(1) Pre-planting (within Year 2023-2024)</p> <p>(2) Planting works (within Year 2023-2024)</p> <p>(3) Post-planting monitoring (Year 2024-2028)</p>	<p>S.2.8 – 2.9 S.3 S.4.1 - 4.10 S.4.22 – 4.25 S.5.3 – 5.8 S.6.4 – 6.18</p>

Recommended Mitigation Measures (What Measures)	Objective of the Measures (What Requirements)	Who to Implement / Maintain the Measures? (Who)	Location of the Measures (Where)	When to Implement the Measures? (When)	Reference to paragraph(s) in this WCP
<p>Reinstatement of Temporary Woodland and In-situ Woodland Compensation along Access Road to Ventilation Shaft</p> <p>Pre-planting</p> <ul style="list-style-type: none"> • To clearly demarcate the planting area and location • To identify planting species and spacing • Site preparation <p>Planting</p> <ul style="list-style-type: none"> • To execute woodland compensation <p>Post Planting Monitoring (5 years)</p> <ul style="list-style-type: none"> • Checking of general health condition and survival rate • Inspection Frequency: <ul style="list-style-type: none"> ○ Bi-weekly during Month 0 – 2 in the 1st year; ○ Monthly during Month 3 – 12 in the 1st year; ○ Bi-monthly during 2nd year; ○ Quarterly from 3rd year onwards. 	<p>To plan and implement the planting requirements for achieving successful woodland development</p>	<p>Permit holder / Resident Site Engineer to assign/plan the works</p> <p>Contractor & his Arborist to execute the works</p> <p>ET's Qualified Ecologist to monitor the works</p> <p>IEC to verify the works</p> <p>(Maintenance Parties: DSD)</p>	 <p>(See Figure 2c for the location of Temporary Woodland)</p> <p>(See Figure 3c for the location of In-situ Woodland compensation)</p>	<p><u>Nearby Access Road</u></p> <p>(1) Pre-planting (within Year 2023-2024)</p> <p>(2) Planting works (within Year 2023-2024)</p> <p>(3) Post-planting monitoring (Year 2024-2028)</p> <p><u>Temporary Magazine Site and Ventilation Shaft</u></p> <p>(1) Pre-planting (within Year 2026-2027)</p> <p>(2) Planting works (within Year 2027)</p> <p>(3) Post-planting monitoring (Year 2027-2031)</p>	<p>S.2.8 – 2.9</p> <p>S.3</p> <p>S.4.1 - 4.10</p> <p>S.4.22 – 4.25</p> <p>S.5.3 – 5.8</p> <p>S.6.4 – 6.18</p>

Recommended Mitigation Measures (What Measures)	Objective of the Measures (What Requirements)	Who to Implement / Maintain the Measures? (Who)	Location of the Measures (Where)	When to Implement the Measures? (When)	Reference to paragraph(s) in this WCP
<p>Ex-situ Woodland Compensation near Ma Tai Stream</p> <p>Pre-planting</p> <ul style="list-style-type: none"> To clearly demarcate the planting area and location To identify planting species and spacing Site preparation <p>Planting</p> <ul style="list-style-type: none"> Phase 1: Tree Planting for Firebreak Phase 2: Reforestation and Biodiversity Enhancement <p>Post Planting Monitoring (5 years)</p> <ul style="list-style-type: none"> Checking of general health condition and survival rate Inspection Frequency: <ul style="list-style-type: none"> Bi-weekly during Month 0 – 2 in the 1st year; Monthly during Month 3 – 12 in the 1st year; Bi-monthly during 2nd year; Quarterly from 3rd year onwards. 	<p>To plan and implement the planting requirements for achieving successful woodland development</p>	<p>Permit holder / Resident Site Engineer to assign/plan the works</p> <p>Contractor & his Arborist to execute the works</p> <p>ET's Qualified Ecologist to monitor the works</p> <p>IEC to verify the works</p> <p>(Maintenance Parties: DSD during planting and establishment period and return to LandsD for self-sustain afterwards)</p>	 <p>(See Figure 4a and 4b for the location of Ex-situ Woodland compensation)</p>	<p>(1) Pre-planting (within Year 2022)</p> <p>(2) Planting works Phase 1: 2022-2023 Phase 2: 2023-2024</p> <p>(3) Post-planting monitoring (Year 2024-2028)</p>	<p>S.2.6 S.2.10 - 2.13 S.3 S.4.1 – S.4.6 S.4.11 – S.4.24 S.4.26 S.5.3 - 5.8 S.6.14 – 6.18</p>