

CONTRACT NO. STW 01/2021

**ENVIRONMENTAL TEAM FOR
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO
CAVERNS – SITE PREPARATION
AND ACCESS TUNNEL CONSTRUCTION
UNDER ENVIRONMENTAL PERMIT NO. EP-533/2017/A
41st ECOLOGICAL MONITORING REPORT
DECEMBER 2022**

Contents

1. Recommendation on plant species of conservation importance under approved protection and transplantation proposal	3
2. Results of Ecological monitoring	6
2.1. Transplantation monitoring	6
<i>Pre-construction survey</i>	6
<i>Transplantation</i>	6
<i>One-year Establishment Period after Planting (Post-Transplantation Monitoring)</i>	6
<i>Post-transplantation monitoring findings</i>	7
<i>Recommendation on post-transplantation monitoring maintenance</i>	7
2.2. Compensatory Planting monitoring	9
<i>Summary of the transplantation and recommended after establishment period</i>	10
FIGURES	11
Appendix 1	16
Photos Records for Compensatory Seeds Collection and planting of <i>Diospyros vaccinioides</i>	16

1. Recommendation on plant species of conservation importance under approved protection and transplantation proposal

1.1.1. According to the latest approved Protection and Transplantation Proposal (ver. 9.2), four out of six recorded plant species of conservation importance are to be transplanted. The relevant information of the plant species were summarized in **Table 1, Table 2 and figure 1-4**. Base on the ongoing detailed design of the Project, the details of approved Protection and Transplantation Proposal and ecological monitoring will be updated in stages subject to further changes.

Table 1. Recommendations (by Site) on the recorded plant species of conservation importance (Approved Protection and Transplantation Proposal Version 9.2)

Common Name	Species Name	Units	Recommendations				
			Retain	Transplant	Fell	Total (in Project Boundary)	Compensatory Planting in Temporary Works Area
Adopted from previously approved Protection and Transplantation Proposal Version 9.2							
Site 1							
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	930	350	4810	6090	Seedlings + Broadcast Seeding
Luofushan Joint-fir	<i>Gnetum luofuense</i>	m ²	270	0	1660	1930	Seedlings
Purple Bulb Orchid	<i>Ania hongkongensis</i>	No.	4	1	0	5	N/A
Site 2							
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	3240	250	4050	7540	Seedlings + Broadcast Seeding
Luofushan Joint-fir	<i>Gnetum luofuense</i>	m ²	750	0	3230	3980	Seedlings
Hong Kong Eagle's Claw	<i>Artabotrys hongkongensis</i>	No.	0	0	1	1	1 Seedling
Butulang Canthium	<i>Canthium dicoccum</i>	No.	6	3	5	14	5 Whip Trees

Common Name	Species Name	Units	Recommendations					Compensatory Planting in Temporary Works Area
			Retain	Transplant	Fell	Total (in Project Boundary)		
Lamb of Tartary	<i>Cibotium barometz</i>	No.	860	61	30	951	No suitable habitat for compensatory planting	
Buttercup Orchid	<i>Spathoglottis pubescens</i>	No.	0	16	1	17	Difficult to propagate from seed & not available in market	
Site 3								
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	4510	100	8250	12860	Seedlings + Broadcast Seeding	
Luofushan Joint-fir	<i>Gnetum luofuense</i>	m ²	990	0	1990	2980	Seedlings	
Butulang Canthium	<i>Canthium dicoccum</i>	No.	0	0	4	4	4 Whip Trees	
Lamb of Tartary	<i>Cibotium barometz</i>	No.	101	7	50	158	No suitable habitat for compensatory planting	
Incense Tree	<i>Aquilaria sinensis</i>	No.	0	1	0	1	N/A	

**Table 2. Recommendations on the recorded plant species of conservation importance
(Approved Protection and Transplantation Proposal Version 9.2)**

Common Name	Species Name	Units	Recommendations				Compensatory Planting in Temporary Works Area
			Retain	Transplant	Fell	Total	
Adopted from previously approved Protection and Transplantation Proposal Version 9.2							
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	8680	700	17110	26490	Seedlings (17,110)
Luofushan Joint-fir	<i>Gnetum luofuense</i>	m ²	2010	0	6680	8890	Seedlings (22 locations at 50m interval)
Purple Bulb Orchid	<i>Ania hongkongensis</i>	No.	4	1	0	5	N/A
Hong Kong Eagle's Claw	<i>Artabotrys hongkongensis</i>	No.	0	0	1	1	1 Seedling
Butulang Canthium	<i>Canthium dicoccum</i>	No.	6	3	9	18	9 Whip Trees
Lamb of Tartary	<i>Cibotium barometz</i>	No.	961	68	80	1,109	No suitable habitat for compensatory planting
Incense Tree	<i>Aquilaria sinensis</i>	No.	0	1	0	1	N/A
Buttercup Orchid	<i>Spathoglottis pubescens</i>	No.	0	16	1	17	Difficult to propagate from seed & not available in market

2. Results of Ecological monitoring

2.1. Transplantation monitoring

Pre-construction survey

- 2.1.1. As per Section 3.1 of the approved Protection and Transplantation Proposal, pre-construction survey shall be carried out by a qualified ecologist which includes: -
- 1) Desktop study and survey preparation based on the specific area of site clearance as notified by the construction contractor and confirmed with the Resident Site Staff;
 - 2) Schedule and conduct physical site survey to locate the affected species, reconfirm the species condition and record the physical condition before transplantation; and
 - 3) Report site survey results and provide recommendations to contractor on transplantation and post-transplantation maintenance.
- 2.1.2. No pre-construction survey was conducted in December 2022.

Transplantation

- 2.1.3. Based on method statement in the approved Protection and Transplantation Proposal, all of the plants affected by project should be transplanted as soon as possible. Where possible, transplantation work is preferably done on the same day of lifting. Otherwise, the plants dug out shall be transported to a nursery before transplanting into their final receptor sites.
- 2.1.4. No Transplantation was conducted in December 2022.

One-year Establishment Period after Planting (Post-Transplantation Monitoring)

- 2.1.5. Regular monitoring of health condition of transplanted plants, also called post-transplantation monitoring, should be carried out in monthly basis in the first three months, quarterly afterwards during one-year establishment period after transplanting to receptor site/ nursery as per Section 5.4 and 5.5 of the approved Protection and Transplantation Proposal.
- 2.1.6. The schedule of the on-going for Post-transplantation monitoring were summarized in **Table 3**.

Table 3 schedule of the on-going for Post-transplantation monitoring

Common Name	Species Name	Nos.	Contract No.	Date of Transplantation (MM/Year)	Post-transplantation monitoring Period																
					2021						2022										
					J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O
u	u	u	e	c	o	e	a	e	a	a	a	u	u	u	e	c	o	v			
Small Persimmon	<i>Diospyros vaccinioides</i>	530 (DV 001-DV0530)	DC/2018/05	05/2021	X	X	X			X			X			X					
Small Persimmon	<i>Diospyros vaccinioides</i>	20 (DV 0531-DV 0550)	DC/2018/05	09/2021					X	X	X			X			X			X	
Small Persimmon	<i>Diospyros vaccinioides</i>	150 (ADV 551 - ADV 700)	DC/2020/05	10/2021						X	X	X			X			X			X
Butulang Canthium	<i>Canthium dicoccum</i>	3	DC/2020/05	10/2021						X	X	X			X			X			X

X: Monitoring schedule

Post-transplantation monitoring findings

2.1.7. No monthly monitoring for the on-going for Post-transplantation was conducted in December 2022 according to the schedule in **Table 3**.

Recommendation on post-transplantation monitoring maintenance

2.1.8. According to environmental condition and location of the receptor sites/ nursery, watering frequency was recommended in daily practice for at least the first 3 months as the transplant time is in summer months with strong sunlight and high temperature; except the days with fog and rain. Water frequency may be reduced based on the plant condition after monitoring in the first 3 months.

2.1.9. In contrast, the Landscape Contractor was recommended to check all transplanted plants after heavy rains/ typhoon under safe condition, in order to carry out any stabilization/ maintenance work. Blocked drainage shall be cleared; excessive water shall be pumped or diverged from nursery ground; saturated soil shall be aerated.

2.1.10. Other maintenance works (e.g. weeding, spraying off construction dust, use of approved pesticide and fertilization) shall be determined throughout the monitoring period in agreement with the Supervisor of the Contract and ET.

2.1.11. **Summary of the transplantation and recommended after establishment period**

2.1.12. The status of the transplantation were shown in **Table 4**.

Table 4 Summary of the transplantation

Common Name	Species Name	Units	Recommendations for Transplant *	Pre-construction survey implementation**	Transplantation Date		Monitoring Status		
					To Nursery (MM/YY)	To Receptor Site (MM/YY)	Started at	Ended at	Status
Site 1									
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	228	12/2019	2/2020	5/2021	6/2021	6/2022	Completed
			122	7/2020	9/2020	5/2021	6/2021	6/2022	Completed
Purple Bulb Orchid	<i>Ania hongkongensis</i>	No.	1	NA	-	7/2019	8/2019	7/2020	Completed
Site 2									
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	40	before transplantation	8/2019	5/2021	6/2021	6/2022	Completed
			10	7/2020	9/2020	5/2021	6/2021	6/2022	Completed
			50	before transplantation	11/2020	5/2021 & 9/2021	6/2021 & 10/2021	6/2022 & 9/2022	Completed
			150	9/2021	-	10/2021	11/2021	10/2022	Completed
Butulang Canthium	<i>Canthium dicoccum</i>	No.	3	NA	-	10/2021	11/2021	10/2022	Completed
Lamb of Tartary	<i>Cibotium barometz</i>	No.	19	NA	-	9/2020	10/2020	9/2021	Completed
			42	NA	-	-	-	-	Pending
Buttercup Orchid	<i>Spathoglottis pubescens</i>	No.	16	NA	-	-	-	-	Pending
Site 3									
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	100	7/2020	9/2020	5/2021	6/2021	6/2022	Completed
Lamb of Tartary	<i>Cibotium barometz</i>	No.	7	NA	-	7/2019	7/2019	6/2020	Completed
Incense Tree	<i>Aquilaria sinensis</i>	No.	1	NA	-	7/2019	7/2019	6/2020	Completed

*Adopted from previously approved Protection and Transplantation Proposal Version 9.2

**Pre-construction survey implementation was conducted on *Diospyros vaccinioides* only

- 2.1.13. Based on latest conditions of the after-establishment period, regular monitoring is not recommended after establishment period except replacement planting if found dead (subject to agreement with AFCD).

2.2. Compensatory Planting monitoring

Methodology

- 2.2.1. The Compensatory planting methods and monitoring should be followed by approved Protection and Transplantation Proposal. The potential of compensatory planting for 17,110 nos. of *Diospyros vaccinioides*, 6,880m² *Gnetum luofuense*, 9 nos. of *Canthium dicoccum*, about 80 nos. of *Cibotium barometz* and 1 *Artabotrys hongkongensis*. Base on the ongoing detailed design of the Project, the details of approved Protection and Transplantation Proposal and ecological monitoring will be updated in stages subject to further changes.

Seeds Collection

Diospyros vaccinioides

- 2.2.2. According to the section 3.8 under approved Protection and Transplantation Proposal, Healthy seedlings will be selected within the fruiting period (October – February). Before the receptor site is available, the collected seeds should be stored in sealed container, with moisture content below 7% and at temperatures of less than 15°C.
- 2.2.3. No seeds collection were conducted in December 2022.
- 2.2.4. A total 3000 nos. seeds of *Diospyros vaccinioides* were collected by contractor of Contract no. DC/2020/05 between November and December 2021. Photo records of *Diospyros vaccinioides* are illustrated in **Appendix 1**.

Germination

- 2.2.5. According to the section 5.8 under approved Protection and Transplantation Proposal, A total 13,600 nos. seedlings of *Diospyros vaccinioides* would be planted on newly formed SIMAR slopes in Sites 1 and 3. In order to fulfill the requirements of seedling planting, a total 3,000 nos. seeds of *Diospyros vaccinioides* were sown on plates in nursery by contractor of Contract no. DC/2020/05 in April 2022. Photo records of *Diospyros vaccinioides* are illustrated in **Appendix 1**.

Broadcast Seeding & Seedlings

- 2.2.6. According to the section 5.13 under approved Protection and Transplantation Proposal, Seeds of *Diospyros vaccinioides* shall be broadcasted in spring.

2.2.7. In order to improve the germination rate of seeds, soaking seeds is recommended by contractor. Seeds of *Diospyros vaccinioides* were soaked by contractor from late February to April 2022.

2.2.8. Soaked seeds of *Diospyros vaccinioides* were broadcasted in the nursery on 20 April 2022. 3000 nos. seedlings of *Diospyros vaccinioides* have been planted on newly formed SIMAR slopes in Sites 1 (Portion 12: RMZ3 downhill) in August and September 2022 during the wet season. The contractor was reminded that frequent watering is required in order to reduce loss due to heat stress. Photo records of *Diospyros vaccinioides* are illustrated in **Appendix 1**.

Summary of the transplantation and recommended after establishment period

2.2.9. The status of the Compensatory Planting were shown in **Table 5**.

2.2.10. Monthly monitoring for the on-going Compensatory Planting was conducted on 21 December 2022. The seedlings of *Diospyros vaccinioides* were generally in fair condition under dry season. Photo records of *Diospyros vaccinioides* are illustrated in **Appendix 1**.

Table 5 Summary of Compensatory Planting

Common Name	Species Name	Units	Compensatory Planting in Temporary Works Area	Contract No.	Seeds Collection		Broadcast Seeding	Seedling Planting	Monitoring Status		
					Nos. of Seed Collected	Date (MM/YY)	Date (MM/YY)	Date (MM/YY)	Started at	Ended at	Status
Small Persimmon	<i>Diospyros vaccinioides</i>	No.	Seedlings (17,110)	DC/2020/05	3000	11/2021-12/2021	4/2022	8/2022 & 9/2022	9/2022 & 10/2022	-	On-going
Luofushan Joint-fir	<i>Gnetum luofuense</i>	m ²	Seedlings (22 locations at 50m interval)	Pending	-	-	-	-	-	-	-
Hong Kong Eagle's Claw	<i>Artabotrys hongkongensis</i>	No.	1 Seedling	Pending	-	-	-	-	-	-	-
Butulang Canthium	<i>Canthium dicoccum</i>	No.	9 Whip Trees	Pending	-	-	-	-	-	-	-

FIGURES

Figure 1 Original location of DV0229-DV0268 and DV0001-DV0228 at Site 1.

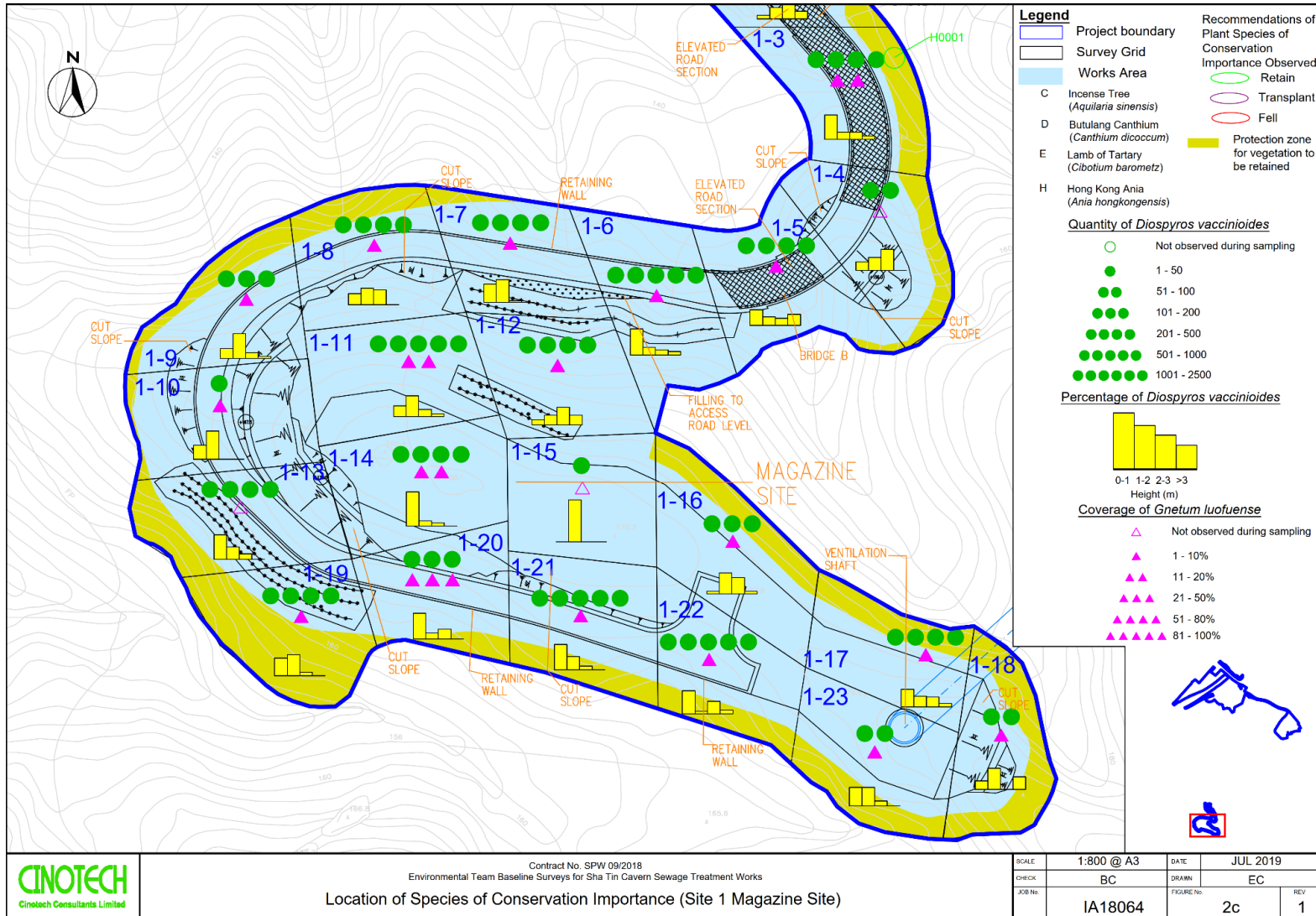
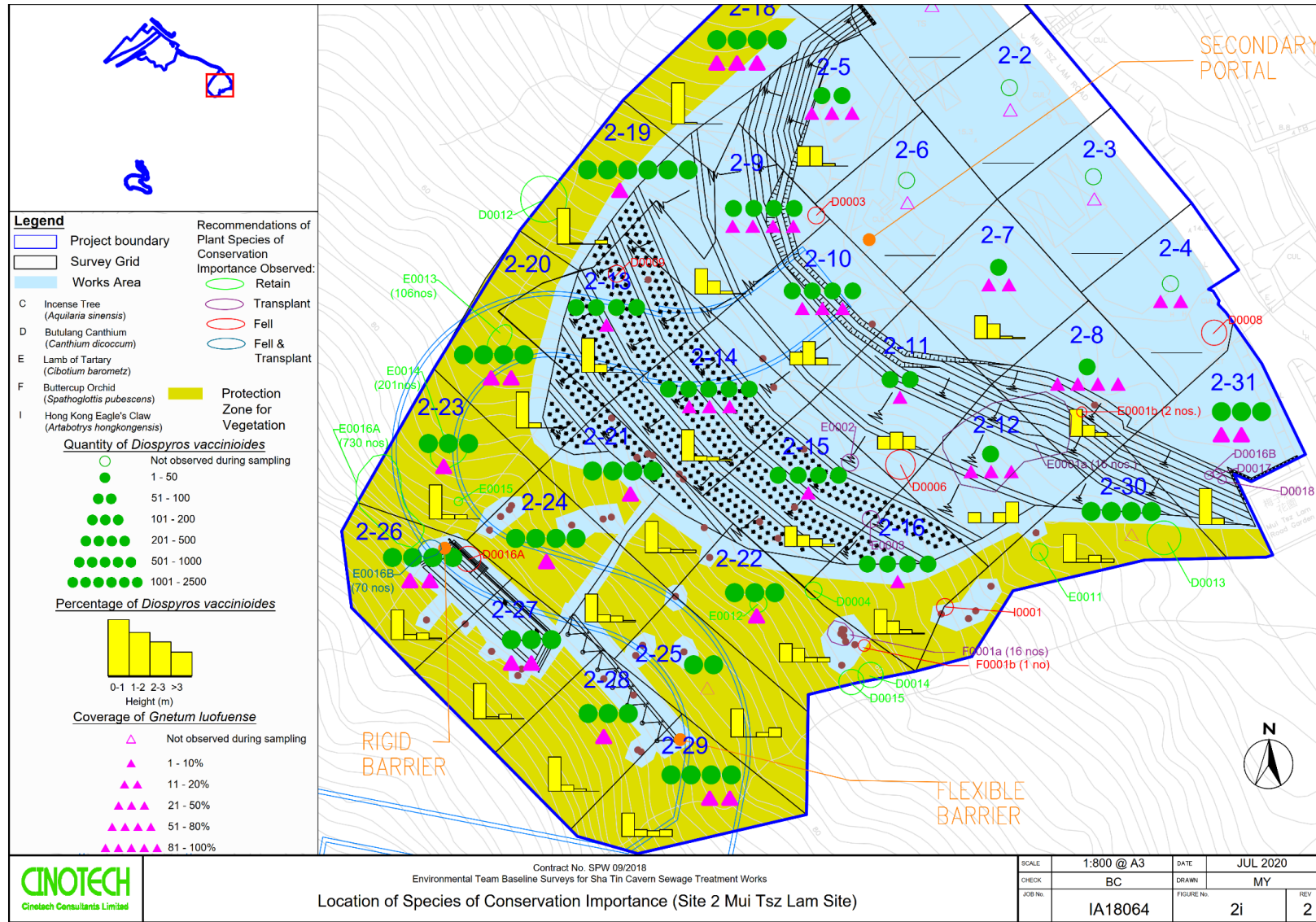


Figure 2. Original location of DV0269-DV0500 and DV0501-DV0550 at Site 2. Nursery site highlighted in red frame for DV0229-DV0268, DV0001-DV0228, DV0269-DV0500 and DV0501-DV0550 at Site 2.



Contract No. SPW 09/2018
Environmental Team Baseline Surveys for Sha Tin Cavern Sewage Treatment Works
Location of Species of Conservation Importance (Site 2 Mui Tsz Lam Site)

SCALE	1:800 @ A3	DATE	JUL 2020
CHECK	BC	DRAWN	MY
JOB No.	IA18064	FIGURE No.	21
			REV 2

Figure 3. Original location of species of conservation Importance frame and its receptor site.

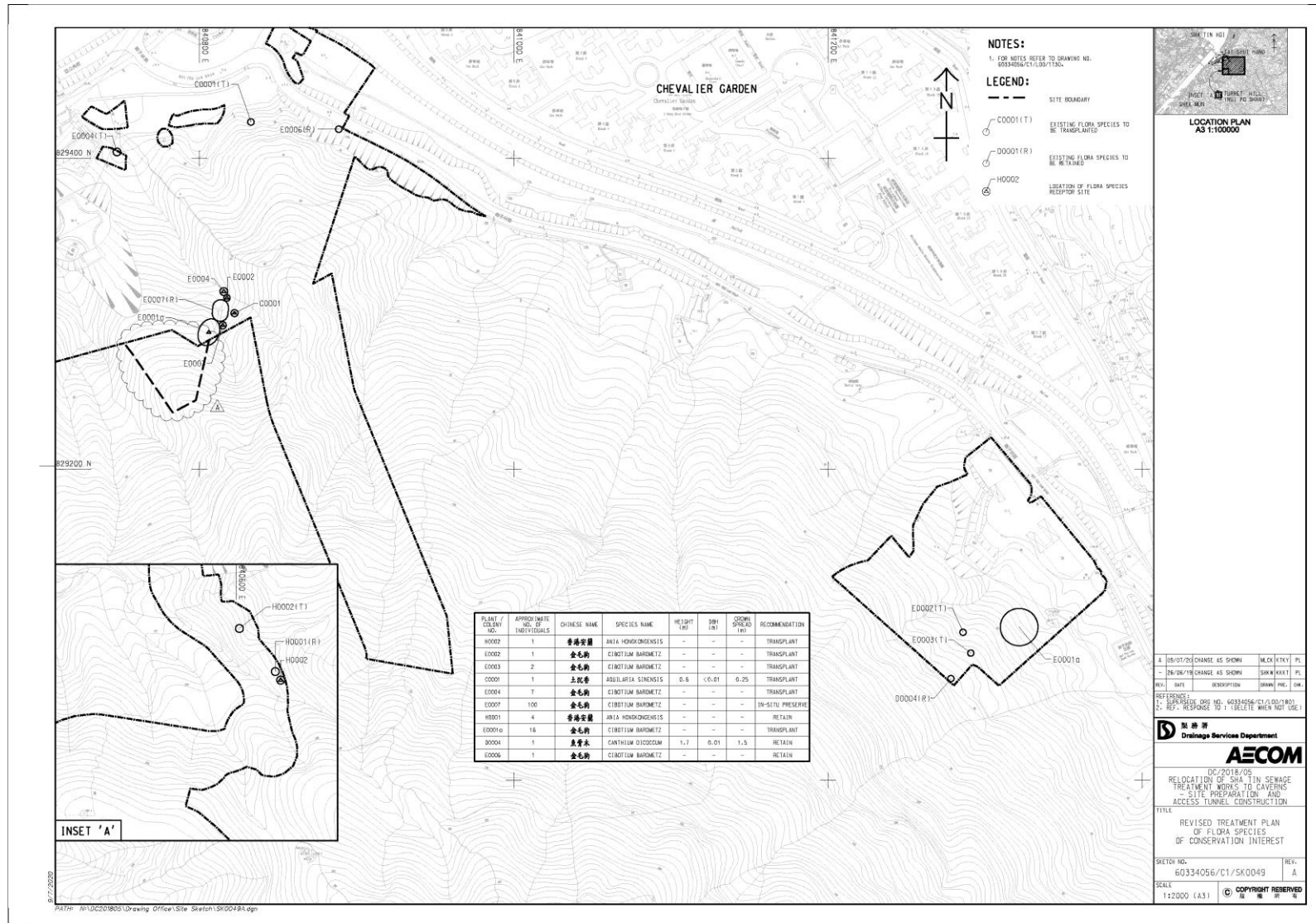


Figure 4. Receptor site for C0001 and E0001a-E0004, the area highlighted in red frame is enlarged.

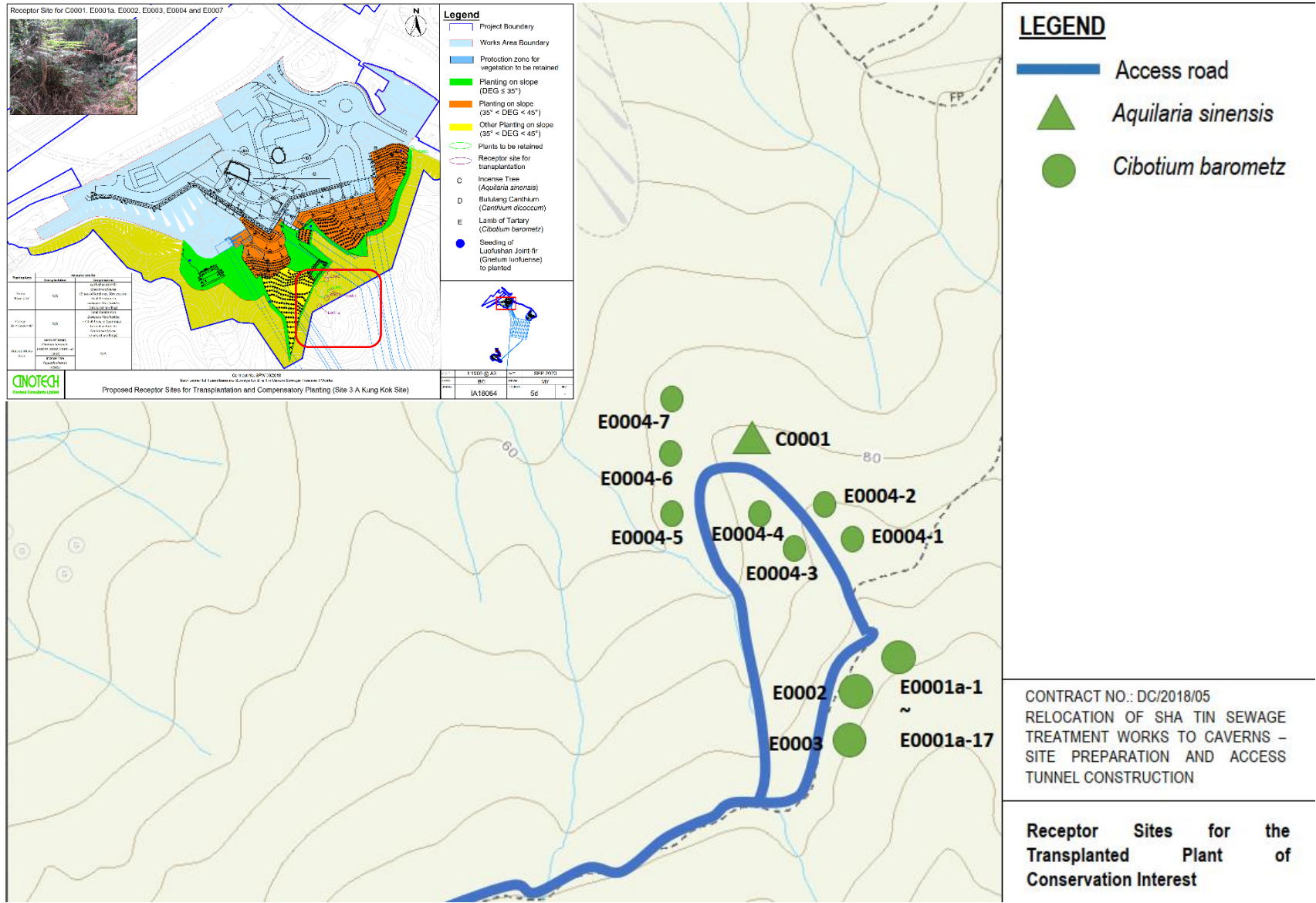
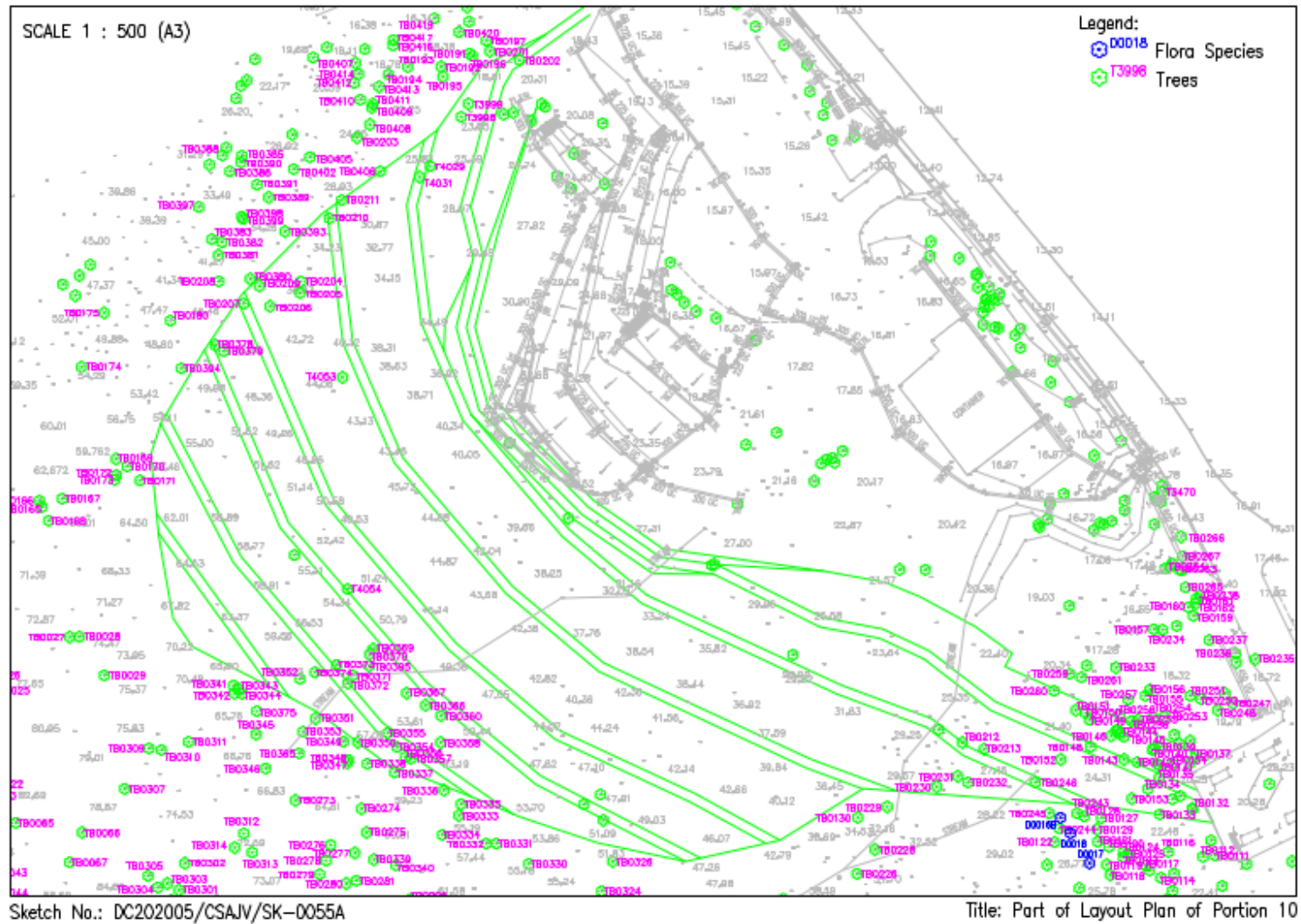






Figure 5. Receptor site for *Canthium dicoccum*



Appendix 1
Photos Records for Compensatory Seeds Collection
and planting of *Diospyros vaccinioides*

Photos Records for Compensatory Seeds Collection of *Diospyros vaccinioides*

	
<p>Seeds Collection by Contractor</p>	<p>Seeds of <i>Diospyros vaccinioides</i></p>
	
<p>Weight of <i>Diospyros vaccinioides</i></p>	<p>Seeds of <i>Diospyros vaccinioides</i> were sown on plates in nursery</p>

	
<p>Seedlings of <i>Diospyros vaccinioides</i> in nursery</p>	<p>Seedlings of <i>Diospyros vaccinioides</i> planted in receptor site observed on 21 Dec 2022</p>
	
<p>Seedlings of <i>Diospyros vaccinioides</i> planted in receptor site observed on 21 Dec 2022</p>	<p>Seedlings of <i>Diospyros vaccinioides</i> planted in receptor site observed on 21 Dec 2022</p>