



JOB No.: TCS00694/13

**AGREEMENT NO. CE 45/2008 (CE)
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT AND ASSOCIATED WORKS**

**ECOLOGICAL MONITORING REPORT FOR THE
WOODLAND COMPENSATION AREA
(DECEMBER 2017 TO FEBRUARY 2018)**

**PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT (CEDD)**

Date	Reference No.	Prepared By	Certified By
13 March 2018	TCS00694/13/600/R1459v3	 Keith Wong (Ecologist)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	15 February 2018	First Submission
2	7 March 2018	Amended according to the IEC's comments on 27 February 2018
3	13 March 2018	Amended according to the IEC's comments on 9 March 2018

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1. INTRODUCTION

1.1 GENERAL

- 1.1.1 The “Liantang/Heung Yuen Wai Boundary Control Point and Associated Works Project” (hereinafter referred to as “the Project”) comprises a new Boundary Control Point (BCP) proposed at Liantang/Heung Yuen Wai (LT/HYW), its connecting road and other associated works; and the Environmental Impact Assessment (EIA) report (Register No.:AEIAR-161/2011) of the Project has identified that ~6.2ha of secondary woodlands will be directly lost due to the construction of the portals of tunnels and some sections of the connecting road. Subsequently, creation of a 18.6 ha compensatory woodland at Cheung Shan has been recommended in the EIA report to avoid residual ecological impacts from the Project.
- 1.1.2 Under the Environmental Permit (EP-404/2011/D), an updated Woodland Compensation Plan (WCP) detailed with the planting strategy and the subsequent maintenance and monitoring requirements of the compensatory woodland has been submitted and approved by the Authority in the 4th Quarter of 2015, and a revision of the updated WCP (i.e., WCP Revision 2) has been approved by EPD in 2017.
- 1.1.3 The woodland compensation include an initial planting phase and enhancement planting phase over a 6 years period on the grassland and shrubland at Cheung Shan, i.e., the “Woodland Compensatory Area” (WCA) as shown in the **Drawing No. 60212563/SK7037 of the WCP** and included here as **Appendix A**; and the planting works fall within the work scope of Contract No. CV/2013/08 Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 6.
- 1.1.4 As part of the EM&A’s requirements of the Project, this submission presents the findings of the 2nd quarterly vegetation monitoring after the first year of initial planting and in according to the latest status of the initial planting phase (refer to the “as-built” plan as shown in **Appendix B** for details), and cover the Reporting Period from December 2017 to February 2018.

2. MONITORING REQUIREMENTS

2.1 MONITORING PROGRAM OF THE INITIAL AND ENHANCEMENT PLANTING PHASES

2.1.1 According to the Section 6.5 of the WCP (ver. 2), the frequency of the monitoring is proposed to be bi-monthly during the first year of the initial planting phase and should be reduced to quarterly from the second year.

2.1.2 Change of monitoring frequency if needed will be advised by the Project Ecologist of the ET and approved by Environmental Protection Department (EPD) and Agriculture, Fisheries and Conservation Department (AFCD) before implementation.

2.2 MONITORING METHODOLOGY

2.2.1 An inspection walk monitoring by means of “transect route” and “direct observation” has been undertaken within the WCP as such to provide an overview and observe the general condition of the WCA; After due considerations of the latest planting arrangement within the WCA, the potential trampling damage to the planted seedlings, as well as the limitations in visibility, site access and safety concern when undertaking the monitoring among the steep hillslope, the transect routes has been selected to cover all representative areas where planting has been undertaken within the WCA as far as practicable.

2.2.2 The transect routes are illustrated in **Appendix C**, and the following observations have been made during the inspection walk:

- Weather condition during the time of monitoring
- The general condition of the WCA, including any signs of anthropogenic or natural disturbance/events (such as landslide, lightning strikes, wildlife damage) that has affected the health condition of the planted seedlings, or regeneration or invasive of grassy or self-seeded weedy plants that would or have affected the establishment of the planted vegetation
- The general health condition of each planted species graded in “Good”, “Fair” or “Poor” with the following criteria:
 - i) Phenology – signs of any abnormality in the phenology of the species (such as abnormal flowering/fruitletting/ leaf shedding)
 - ii) Foliage – colour, size and general appearance, signs and severity of insect and fungal infection
 - iii) Branches – presence and extent of die-back, and signs and severity of insect and fungal infection
 - iv) Stem/Trunk - signs and severity of cavities or internal/external decay; signs and severity of insect infection and mechanical damage

2.2.3 Since the monitoring approach adopted for the transect inspection, i.e., “*direct observations*”, would not yield any quantitative information, the survival rate (%) of the planted seedling will be evaluated from the results collected from the quadrat sampling as detailed in next section.

2.3 QUADRAT SAMPLING

2.3.1 A sampling approach has been proposed in the WCP to monitor the survival rate of the planted seedlings by the use of nine 20mx20m quadrats which are to be evenly located within the planted area of the WCA. Based on the as-built planting plan provided by the contractor (see **Appendix B**), as well as the local topography of the planted area within the WCA, the practicality in accessing, placing and monitoring nine 20m x 20m fixed quadrats within the planted area of the WCA has been extensively reviewed, 2 of the monitoring quadrats are fixed on the ridgeline of Cheung Shan and 7 of them are located on the north-facing slope of the WCA (see **Appendix C**).

- 2.3.2 Information collected within each sampling unit include:
- General condition of the sampling quadrat especially those factors that would or have found affected the survival rate of the planted vegetation, including biological or environmental factors (such as inter-specific competition as well as signs of stress from water, heat, or pest and disease, etc)
 - The total number of established seedlings for each planted tree and shrub species
 - Health condition of each planted species graded in “Good”, “Fair” or “Poor” with the following criteria:
 - i) Phenology – signs of any abnormality in the phenology of the species (such as abnormal flowering/fruitletting/ leaf shedding)
 - ii) Foliage – colour, size and general appearance, signs and severity of insect and fungal infection
 - iii) Branches – presence and extent of die-back, and signs and severity of insect and fungal infection
 - iv) Stem/Trunk - signs and severity of cavities or internal/external decay; signs and severity of insect infection and mechanical damage

2.3.3 Since the quantity of seedlings planted for each species within a particular area (including the sampling units) would be varied and subject to the constraints imposed by the local site condition (e.g., the steepness and presence of rocky outcrops or existing woody vegetation); the survival rate of the planted species will be evaluated against the data collected from the first monitoring session in which 20m x 20m quadrats were applied for the initial planting phase; and if needed the implementation of the measures as detailed in the “Trigger and Action Levels” specified in the **Table 3** of the WCP would be recommended (included here as **Table 1** below) .

Table 1 Trigger and Action Levels for Monitoring and Action Plan

Parameters	Trigger and Action Level	Action Plan
General Health Condition of planted species (i.e. good/fair/poor; based on parameters e.g. wilting, insect attack, disease, fungal infection, browsing damage)	Trigger Level: % of individual plant species in poor health condition >20%	- the ET should inform Contractor and IEC immediately; - identify the causes(s) of the exceedance; - advise Contractor the necessity of replanting
	Action Level: % of individual plant species in poor health condition >30%	- the ET should inform Contractor and IEC immediately; - identify the cause(s) of the exceedance; - advise remedial action and work out solution including change of species in re-planting, re-soiling of the target areas; and seek acceptance from AFCD; - once the remedial action has been accepted by AFCD, the Contractor should implement the remedial action.

Survival of Planted Species (i.e. dead)	Trigger Level: Survival rate of individual plant species <80%	<ul style="list-style-type: none"> - the ET should inform Contractor and IEC immediately; - identify the causes(s) of the exceedance; - advise Contractor the necessity of replanting.
	Action Level: Survival rate of individual plant species <70%	<ul style="list-style-type: none"> - the ET should inform Contractor and IEC immediately; - identify the cause(s) of the exceedance; - advise remedial action and work out solution including change of species in re-planting, re-soiling of the target areas; and seek acceptance from AFCD; - once the remedial action has been accepted by AFCD, the Contractor should implement the remedial action.

2.3.4 Since most of the planted native species are also naturally grown within the WCA and it would be infeasible and impracticable to differentiate whether the individual plant encountered along the transect or within the quadrat is planted, natural recruited, or regenerated after the pre-planting clearance of the site; and hence all established individuals of the planted species found within the sampling unit has been counted during the monitoring.

2.3.5 The WCA monitoring was undertaken by the Environmental Team (ET) and under the supervision of the Qualified Ecologist of the ET, and the Qualified Ecologist has also undertaken a joint transect inspection with representative of the IEC in the reporting.

2.4 REPORTING

Bi-monthly Woodland Compensation Monitoring Reports

2.4.1 The results and findings of the bi-monthly (i.e., once every two months) monitoring including the landscape inspection during the first year of the initial planting phase and the first year of the enhancement planting phase will be recorded in a bi-monthly woodland compensation monitoring reports prepared and submitted by the ET Leader within 10 working days from the end of each reporting month. The details to be included in the report will follow the Section 7.3 of the WCP.

Quarterly Woodland Compensation Monitoring Reports

2.4.2 Starting from the second year of the initial planting phase and the enhancement planting phase, the frequency of the monitoring is reduced to quarterly basis, the results and findings of the quarterly monitoring as well as the landscape inspection after the first year of the initial planting phase and the first year of the enhancement planting phase shall be recorded in the quarterly woodland compensation monitoring reports prepared and submitted by the ET Leader within 10 working days from the end of each reporting month. The details to be included in the report will follow the Section 7.3 of the WCP.

3. RESULTS

3.1 TRANSECT INSPECTION

3.1.1 The transect inspection was carried out on 22nd January 2018 with the ecological specialist of the IEC, an overview of the site condition is presented in *Appendix D* and the following presents the observations made during the transect inspection:

- It was sunny during the day of the transect inspection.
- The health condition of the planted species noted along the transect were generally fair and the growth of the exotic tree *Acacia mangium* was found to be vigorous.
- The establishment of the replanted seedlings along the eastern ridgeline and on the northern hillslope of the Cheung Shan as noted in previous reporting period was found to be fair and steady.
- No sign of anthropogenic disturbance was noted within the planted area of the WCA.
- Signs of disturbance from wild boar, i.e., vegetation trampling, earth ploughing, as well as uprooted seedlings (from planted/self-seeded vegetation) were occasionally noted on the north-facing slope of Cheung Shan.
- Colonization, re-sprouting and/or regrowth of native woody plants, such as the trees *Melicope pteleifolia* and *Cratoxylum cochinchinense*, the shrub *Baeckea frutescens*, *Rhodomyrtus tomentosa* and *Breynia fruticosa*, were also found to be vigorous within the planted area (initial planting) of the WCA, and some of those have out-grown the planted seedlings and may have a negative impact on the establishment of the planted plants because the inter/intra-specific competition.
- According to the information provided by the main contractor, the seedlings within the WCA were more or less planted randomly in small cluster during the initial planting phase, and the planting density has also been varied and subjected to the site constraints of the planted area. On the other hand, since the replanting and supplementary planting works for the initial planting phase has been undertaken within the WCA (including the sampled quadrats), the referenced “baseline data” for evaluating the survival rate of the planted species, as well as the quantity that would need to be replanted within the WCA and replenished in the sampled quadrats has been updated in accordance to the “as-built” planting schedule for the initial planting phase as shown in the Appendix B since the quarterly monitoring commenced in November 2017.

3.1.2 The general health condition of the planted species, based on the observations made along the transect, is tabulated in the following table.

Table 2 Health condition of the established seedlings noted during the transect inspection

Species	Health Condition		
	Good	Fair	Poor
Trees			
<i>Acacia confusa</i>		√	
<i>Acacia mangium</i>	√		
<i>Castanopsis fissa</i>		√	
<i>Litsea glutinosa</i>		√ ⁽²⁾	
<i>Mallotus paniculatus</i>		√ ⁽²⁾	
<i>Phyllanthus emblica</i>		√ ⁽²⁾	
<i>Sapium discolor</i>		√ ⁽¹⁾⁽²⁾	
<i>Schima superba</i>	√ ⁽²⁾		
Shrubs			

Species	Health Condition		
	Good	Fair	Poor
<i>Gordonia axillaris</i>		√	
<i>Melastoma candidum</i>		√ ⁽²⁾	
<i>Melastoma sanguineum</i>		√ ⁽²⁾	
<i>Rhaphiolepis indica</i>		√ ^{(1),(2)}	
<i>Rhodomyrtus tomentosa</i>	√ ⁽²⁾		

Note:

(1) - Most of the foliage of this species was found to be smaller in size

(2) – self-seeded seedlings or wild population of this species was presence within the planting area (initial planting) of the WCA, and since it is impracticable and sometimes unfeasible to differentiate them from the planted seedlings, the health condition was evaluated as a whole for this species encountered during the transect walk.

3.2 QUADRAT SAMPLING

3.2.1 The nine 20m x 20m sampling quadrats have been placed within the planted area of the WCA, and at area where the majority of the seedlings were planted and considered suitable for long term monitoring; in which 2 of them were located on the ridgeline and the rest are located on the north-facing slope of Cheung Shan (see **Appendix C**). The quadrat monitoring was conducted on 8th and 22nd January 2018, and the weather was humid with rain on 8th Jan and sunny and dry on 22nd Jan respectively.

3.2.2 The condition of the quadrats during the time of monitoring is shown in **Appendix D** and the monitoring result of the reporting period and the survival rate of the planted species since the commencement of the quarterly monitoring (initial planting phase) are shown in **Table 3** and **Table 4** respectively.

Table 3 The number of seedling recorded for each species within the sampling quadrats

	Quantity* and General Health [^] Condition of the Established Seedling Recorded in Each Sampling Quadrat									Total Qty.
	R1	R2	S3	S4	S5	S6	S7	S8	S9	
Trees										
<i>Acacia confusa</i>	5	13	10	8	8	0	1	2	12	59
<i>Acacia mangium</i>	26	31	32	16	22	0	16	17	30	190
<i>Castanopsis fissa</i>	0	2	0	0	0	11	0	0	0	13
<i>Litsea glutinosa</i>	10	6	12	7	6	1	1	2	6	51
<i>Mallotus paniculatus</i>	16	12	9	7	16	12	5	8	8	93
<i>Phyllanthus emblica</i>	5	5	6	3	8	0	3	2	6	38
<i>Sapium discolor</i>	0	7	9	1	1	0	0	0	4	22
<i>Schima superba</i>	3	8	0	8	0	60	0	0	0	79
Sub-Total	65	84	78	50	61	84	26	31	66	545
Shrubs										
<i>Gordonia axillaris</i>	4	14	35	42	43	19	20	8	10	195
<i>Melastoma candidum</i>	8	11	33	33	33	20	20	21	35	214
<i>Melastoma sanguineum</i>	6	67	37	53	57	4	12	11	22	269
<i>Rhaphiolepis indica</i>	48	35	32	48	64	12	12	20	42	313
<i>Rhodomyrtus tomentosa</i>	71	60	79	65	81	26	41	43	92	558

<i>Sub-Total</i>	137	187	216	241	278	81	105	103	201	1549
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Notes: ^ General Health Condition:

- Good - No. in normal font type (e.g., “99”)
- Fair - No. in Italic font (e.g., “99”)
- Poor - No. in italic & underlined (e.g., “99”)

* the quantity include all individuals of the planted species within the quadrat regardless whether they are self-seeded or planted (see Section 2.3.4)

Table 4 Survival Rate of the Planted Species since the Commencement of the Quarterly Monitoring of the Initial Planting Phase

Species	Qty. of Seedlings			Survival Rate (%)	
	Reference baseline [^]	Nov 17	Jan 18	Nov 17	Jan 18
<i>Acacia confusa</i>	113	59	59	52.21	52.21
<i>Acacia mangium</i>	193	188	190	97.41	98.45
<i>Castanopsis fissa</i>	39	14	13	35.90	33.33
<i>Litsea glutinosa</i>	79	52	51	65.82	64.56
<i>Mallotus paniculatus</i>	80	93	93	100.00	100.00
<i>Phyllanthus emblica</i>	64	61	38	95.31	59.38
<i>Sapium discolor</i>	39	27	22	69.23	56.41
<i>Schima superba</i>	82	82	79	100.00	96.34
<i>Gordonia axillaris</i>	148	162	195	100.00	100.00
<i>Melastoma candidum</i>	352	222	214	63.07	60.80
<i>Melastoma sanguineum</i>	313	227	269	72.52	85.94
<i>Rhaphiolepis indica</i>	438	312	313	71.23	71.46
<i>Rhodomyrtus tomentosa</i>	824	549	558	66.63	67.72

[^] updated in Sep 2017 in accordance with the “as-built” planting plan for the initial planting phase as well as the monitoring findings between Aug 2017 and Nov 2017

* no. in bold denotes the survival rate trigger action listed in Table 1

3.2.3 Based on the recorded data and observations made within the sampled quadrats and the data presented in **Table 3** and **Table 4**, the following provides a brief account of the findings from the quadrat monitoring:

- Health condition: Generally speaking all of the planted seedlings were found in fair health condition, and re-sprouting of leaves was noted on the seedlings of *Sapium discolor*.
- Survival Rate: The survival rate of all of the planted species were found to be more or less steady except the tree species *Phyllanthus emblica* and *Sapium discolor* where the survival rate of these two species was found to be dropped by ~36% and ~13% respectively.
- 7 plant species has recorded with a survival rate less than 70% during the reporting period, including the trees *Castanopsis fissa* (33.33%), *Acacia confusa* (52.21%), *Litsea glutinosa* (64.56%), *Phyllanthus emblica* (59.38%) and *Sapium discolor* (56.41%); as well as the shrubs *Melastoma candidum* (60.80%) and

Rhodomyrtus tomentosa (67.72%).

- On the other hand, the shrub *Rhaphiolepis indica* has recorded with a survival rate in between 70% to 80% during the reporting period, i.e., 71.46%;

3.2.4 The possible causes of poor survival rate has been postulated in previous reports, including

- poor vigor of the planted seedling
- animal disturbance such as herbivory and trampling
- insufficient horticultural maintenance (such as watering/weeding)
- the seedlings were out-competed (for light and space) by the adjacent planted, self-seeded or retained vegetation
- human disturbance during the maintenance activities, including replanting and weeding.

3.2.5 According to the action plan as stated in the **Table 1**, replanting of the 7 species with survival rate less than 70% would be required; however, since the poor survival rate recorded for *Phyllanthus emblica*, *Sapium discolor* and *Rhodomyrtus tomentosa* may be related to the deciduous nature of the former two species as well as the disturbance caused by previous maintenance activities for the latter species, it is recommended to further review the necessity to replant these three species after the onset of the growing season in 2018, when re-sprouting would likely be observed.

3.2.6 Based on the latest monitoring results and “as-built” planting schedule, Table 5 shows the quantity of seedlings that would need to be replanted for the other 4 species. However, since replanting has already been undertaken within the WCA in September 2017 and during which the replanting requirement as identified in the August 2017’s report has only been partially addressed, the recommended replanting quantity covers the outstanding quantity yet to be replanted or required for restoring the updated referenced baseline for the continuity of the quadrat monitoring.

Table 5 Recommended Replanting Quantity for Species Recorded with Survival Rate <70%

Species [^]	Survival Rate/% (Jan’18)	Quantity			
		As-built [#]	Replanting Required (Jan’18)	Replanted in Sep’17 [#]	Outstanding/ Recommended*
<i>Acacia confusa</i>	52.21	5480	2619	680	1939 (57)
<i>Castanopsis fissa</i>	33.33	3300	2200	2200	(26)
<i>Litsea glutinosa</i>	64.56	2350	833	2200	(30)
<i>Melastoma candidum</i>	60.80	15340	6013	4900	1113 (139)

[^] the necessity to replant *Phyllanthus emblica*, *Sapium discolor* and *Rhodomyrtus tomentosa* to be further reviewed from next monitoring result

[#] Information provided and updated by the Main Contractor

^{*} replanting quantity required to restore the referenced baseline data in the monitoring quadrats

3.2.7 All of the replanting works should make reference and conform to the Section 5 “Planting Management” of the approved Woodland Compensation Plan (WCP), in

particularly it should be undertaken within the planting season and in suitable locations within the WCA where pre-planting site preparation such as clearance of herbaceous plants (in particularly the fern *Dicranopteris pedata*) should be undertaken prior the planting work as such to expedite the planting work once the seedlings on-site and facilitate their recovery from the planting shocks and establishment; and the planted seedlings would not be shaded from adjacent plants to avoid competition for light and other resources (see Section 4.9 of the WCP).

3.2.8 Other remedial actions recommended to address the possible causes of poor survival rate of the 8 species reported above are presented in **Table 6**. According to Table 1, the Contractor is responsible for the implementation of replanting and other remedial measures agreed by AFCD.

Table 6 Remedial Actions Recommended for the Poor Survival Rate of the Planted Species

Possible Cause	Remedial Action
Animal disturbance	Prominent signs of disturbance from animal activities, in addition to those previous noted, has not been observed within the WCA as a whole after the replanting conducted in September 2017. Moreover, the necessity for further action to be reviewed from the monitoring results to be collected after replanting within the quadrats.
Poor vigor of the planted seedlings	The Contractor should ensure the seedlings fulfills the requirements of the pertinent specification during replanting; and they should be planted on the same day of delivery as far as possible with appropriate actions to minimize their desiccation stress
Vegetation maintenance	Strengthen the vegetation maintenance (in particularly weeding) within the WCA, and provide adequate briefing to the maintenance team to avoid/minimize the potential trampling/mechanical damage to the woody plants within the WCA. In addition, the use of motorized weeding equipment in areas densely covered with woody vegetation should be avoided as far as practicable, and the removed weed should be properly disposed to avoid shadowing of the planted seedlings.
Inter-specific competition	Undertake weeding of herbaceous plants in particularly the fern <i>Dicranopteris pedata</i> around the planted <i>Castanopsis fissa</i> and <i>Sapium discolor</i> within the WCA; and any replacement planting should be strategically planted to minimize the shading effect from other vegetation

3.2.9 **Table 7** below summarizes the possible cause of the poor survival rate recorded for the 8 species with survival rate <80% and the recommended actions.

Table 7 Summary of the Recommended Remedial Actions for Species with Survival Rate <80%

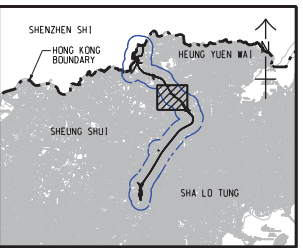
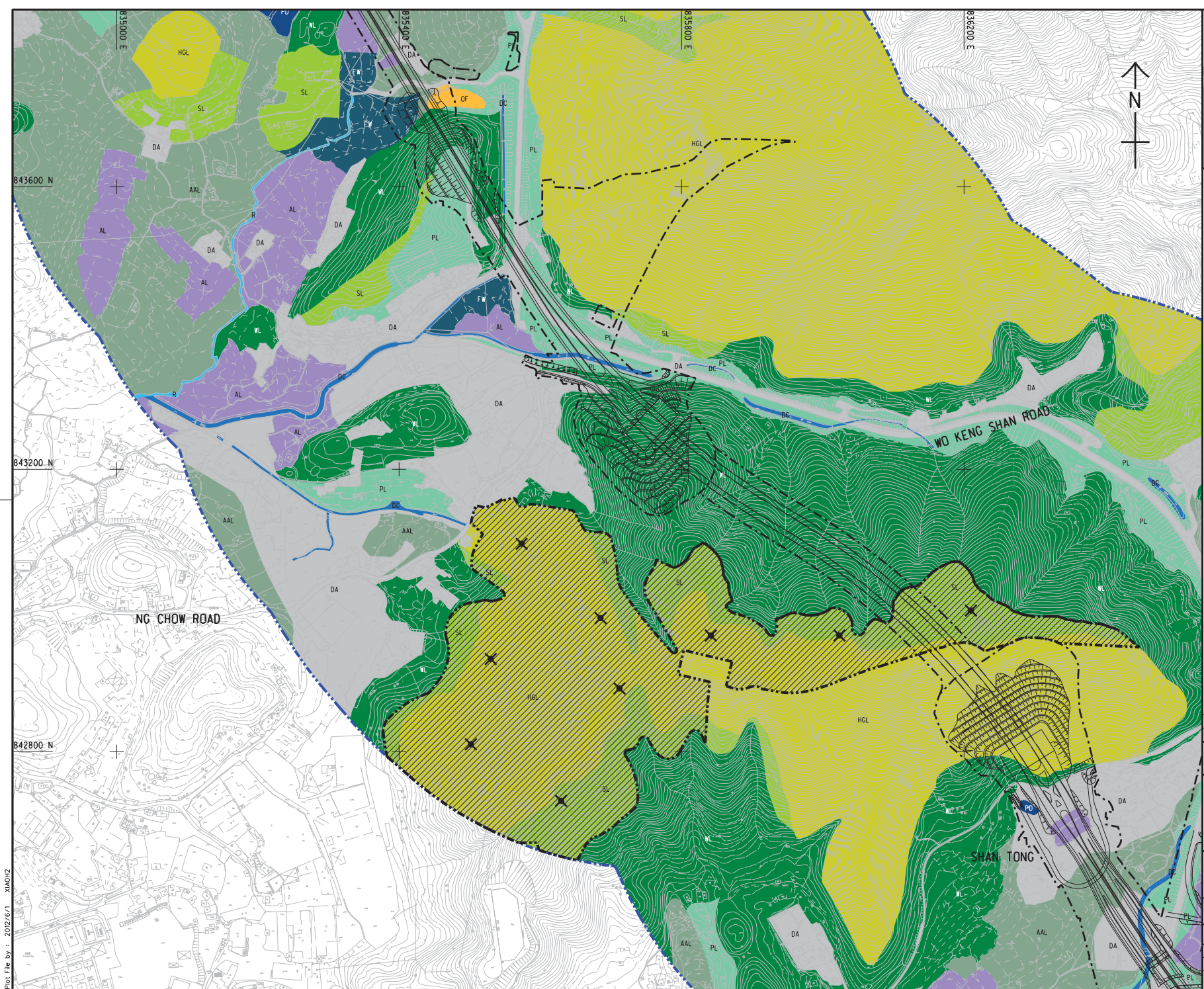
Species	Survival Rate (%)	Possible Cause	Recommended Remedial Action	Replanting
<i>Acacia confusa</i>	52.21	I, II, III, V	Refer to the Table 6	Yes
<i>Castanopsis fissa</i>	33.33	I, II, III, IV, V		Yes
<i>Litsea glutinosa</i>	64.56	I, II, III, IV		Yes
<i>Phyllanthus emblica</i>	59.38	I, II, III, IV, VI		To be confirmed in next report (see 3.2.8)
<i>Sapium discolor</i>	56.41	I, II, III, IV, VI		Yes
<i>Melastoma candidum</i>	60.80	I, II, III, IV, V		Yes
<i>Rhaphiolepis indica</i>	71.46	I, II, III, IV, V		No
<i>Rhodomyrtus tomentosa</i>	67.72	III, V		To be confirmed in next report (see 3.2.8)

- I : Poor vigor of the planted seedling
- II : Animal Disturbance/Trampling/Herbivory
- III : Insufficient Maintenance
- IV : Out-competed by adjacent vegetation
- V : Human Disturbance (Maintenance Activities)
- VI : Seasonal changes

-End-

Appendix A

Drawing No. 60212563/SK7037 of the Woodland Compensation Plan



KEY PLAN
SCALE 1 : 150000

LEGEND:

- 500m ASSESSMENT AREA
- TENTATIVE WORKS AREA
- TUNNEL SECTION
- WL WOODLAND
- SL SHRUBLAND
- PL PLANTATION
- FW FRESHWATER WETLAND [NET AGRICULTURAL AND (ACTIVE/ABANDONED)]
- AL ACTIVE AGRICULTURAL LAND
- AAL ABANDONED AGRICULTURAL LAND
- HGL HILLSIDE GRASSLAND
- PD POND
- DC DRAINAGE CHANNEL
- R WATERCOURSE
- OF OPEN FIELD
- DA DEVELOPED AREA
- EXTENT OF WOODLAND COMPENSATION PLANTING AREA
- ✕ TENTATIVE WOODLAND MONITORING QUADRAT (THE EXACT LOCATION TO BE DETERMINED BY THE ENGINEER ON SITE)

REV.	DESCRIPTION	REV.	DATE

CEDD 土木工程拓展署
Civil Engineering and Development Department

LIANGTANG/YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) DESIGN AND CONSTRUCTION

PROPOSED WOODLAND COMPENSATION AREA

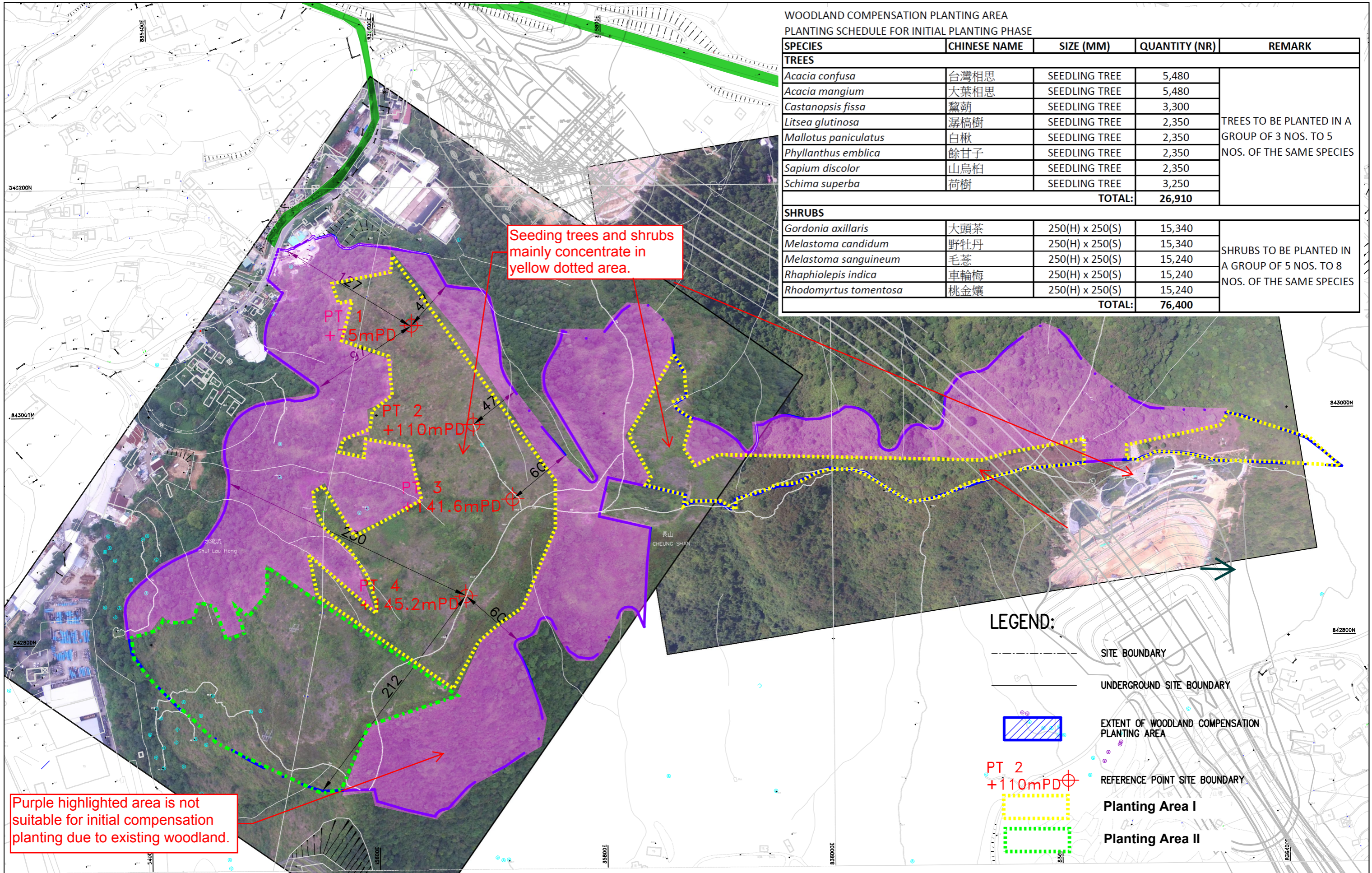
DRGNO.
圖紙編號

DESIGNED BY DWG: KW	CONTRACT NO. SFR01	P. Dtr. APPROVED AREA: -
DRAWN BY YJP	STATUS REV	
SCALE AS 1 : 2500	DRAWING AREA IN METRES	

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Appendix B

As-built Planting Schedule for Initial Planting Phase






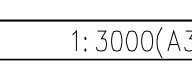
WOODLAND COMPENSATION PLANTING AREA
PLANTING SCHEDULE FOR INITIAL PLANTING PHASE

SPECIES	CHINESE NAME	SIZE (MM)	QUANTITY (NR)	REMARK
TREES				
<i>Acacia confusa</i>	台灣相思	SEEDLING TREE	5,480	TREES TO BE PLANTED IN A GROUP OF 3 NOS. TO 5 NOS. OF THE SAME SPECIES
<i>Acacia mangium</i>	大葉相思	SEEDLING TREE	5,480	
<i>Castanopsis fissa</i>	蠟菊	SEEDLING TREE	3,300	
<i>Litsea glutinosa</i>	潺槁樹	SEEDLING TREE	2,350	
<i>Mallotus paniculatus</i>	白楸	SEEDLING TREE	2,350	
<i>Phyllanthus emblica</i>	餘甘子	SEEDLING TREE	2,350	
<i>Sapium discolor</i>	山烏柏	SEEDLING TREE	2,350	
<i>Schima superba</i>	荷樹	SEEDLING TREE	3,250	
			TOTAL:	26,910
SHRUBS				
<i>Gordonia axillaris</i>	大頭茶	250(H) x 250(S)	15,340	SHRUBS TO BE PLANTED IN A GROUP OF 5 NOS. TO 8 NOS. OF THE SAME SPECIES
<i>Melastoma candidum</i>	野牡丹	250(H) x 250(S)	15,340	
<i>Melastoma sanguineum</i>	毛蕊	250(H) x 250(S)	15,240	
<i>Rhaphiolepis indica</i>	車輪梅	250(H) x 250(S)	15,240	
<i>Rhodomyrtus tomentosa</i>	桃金娘	250(H) x 250(S)	15,240	
			TOTAL:	76,400

Purple highlighted area is not suitable for initial compensation planting due to existing woodland.

Seeding trees and shrubs mainly concentrate in yellow dotted area.

LEGEND:

- SITE BOUNDARY
- UNDERGROUND SITE BOUNDARY
-  EXTENT OF WOODLAND COMPENSATION PLANTING AREA
-  REFERENCE POINT SITE BOUNDARY
-  Planting Area I
-  Planting Area II

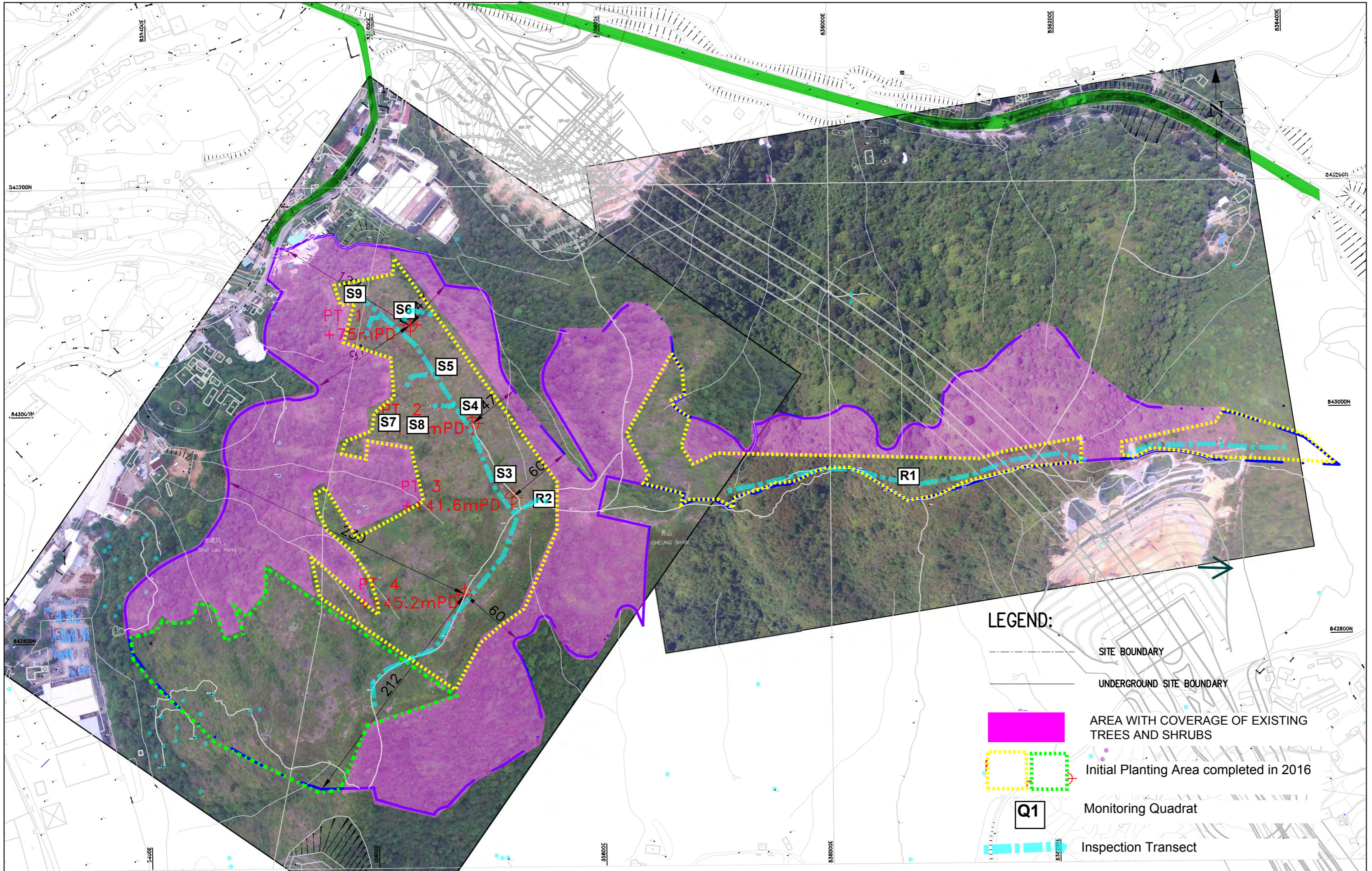
CONTRACT NO. CV/2013/08
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 6

APPENDIX B - As-built Planting Schedule for Initial Planting Phase

SCALE	1:3000(A3)	SURVEY DATE	8 September 2016
CHECK		DRAWN	K W
JOB NO.		SKETCH NO.	
		REV	-

Appendix C

Transect Routes and Sampling Quadrats of Woodland Compensation Monitoring



LEGEND:

- SITE BOUNDARY
- UNDERGROUND SITE BOUNDARY
- AREA WITH COVERAGE OF EXISTING TREES AND SHRUBS
- Initial Planting Area completed in 2016
- Monitoring Quadrat
- Inspection Transect

CONTRACT NO. CV/2013/08
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 6

APPENDIX C - LOCATION OF THE THE INSPECTION TRANSECTS AND MONITORING QUADRATS, 2016

SCALE	1:3000(A3)	SURVEY DATE	N/A
CHECK		DRAWN	K W
JOB NO.		SKETCH NO.	WCA_Monitoring Plan-161130
		REV	-

Appendix D

Photographic Records

Contract No. CV/2013/08, Woodland Compensation Area - Vegetation Monitoring



Site Condition - North Facing Slope



Site Condition - Western Ridgeline



Site Condition - Eastern Ridgeline



R1



R2



S3



S4



S5



S6



S7



S8

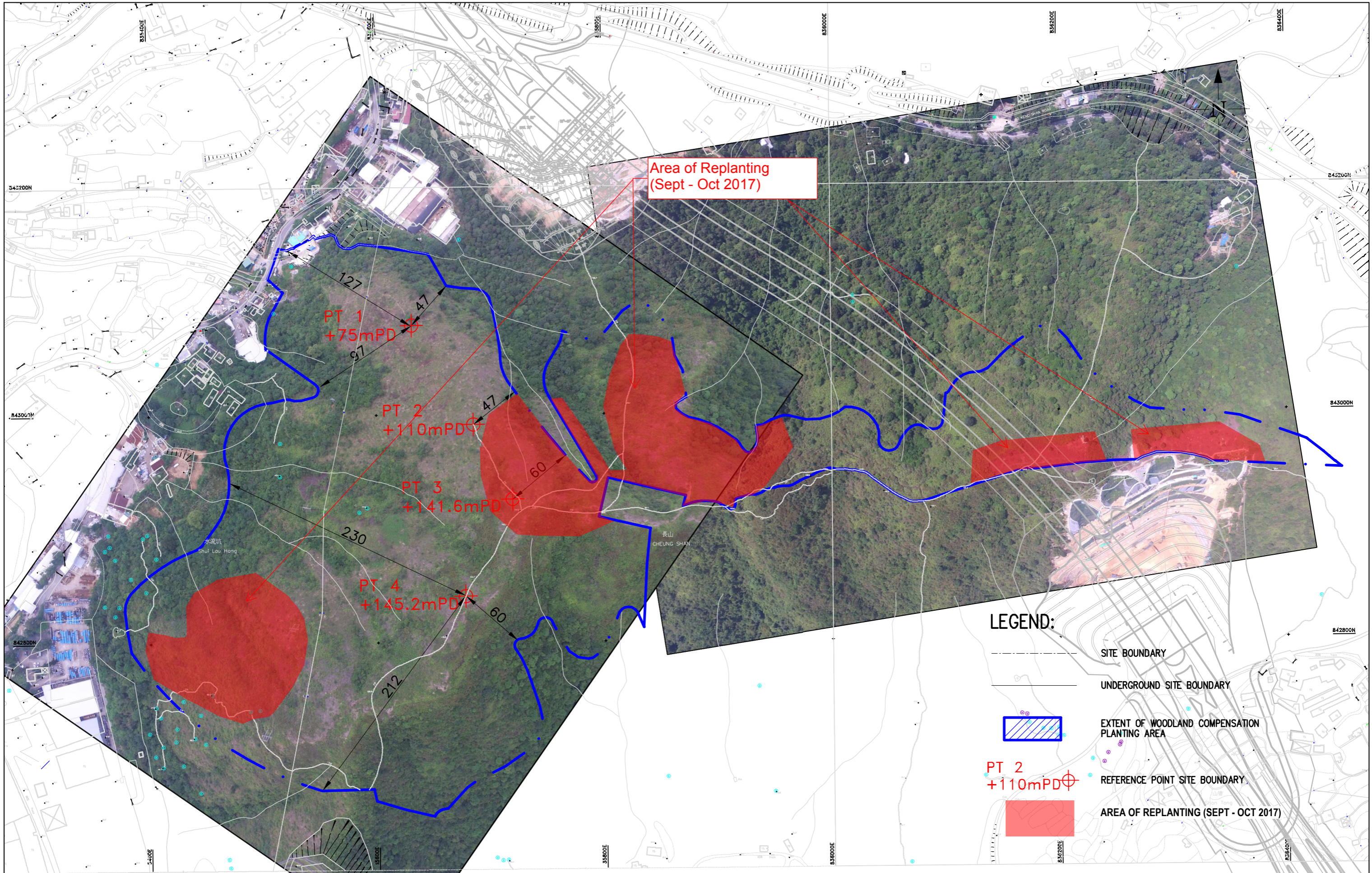


S9

Appendix E

Replanting Plan

		Replanting List of Initial Planting			Total Qty.
		Area A	Area B	Area C	
Trees					
<i>Acacia confusa</i>	台灣相思	200	280	200	680
<i>Acacia mangium</i>	大葉相思	200	280	200	680
<i>Castanopsis fissa</i>	蠟菊	544	1018	638	2200
<i>Litsea glutinosa</i>	潺槁樹	544	1018	638	2200
<i>Mallotus paniculatus</i>	白楸	68	127	425	620
<i>Phyllanthus emblica</i>	餘甘子	68	127	425	620
<i>Sapium discolor</i>	山烏柏	544	1018	638	2200
<i>Schima superba</i>	荷樹	544	1018	638	2200
Sub-total		2712	4886	3802	11400
Shrubs					
<i>Gordonia axillaris</i>	大頭茶	1415	2123	1362	4900
<i>Melastoma candidum</i>	野牡丹	1415	2123	1362	4900
<i>Melastoma sanguineum</i>	毛茛	1415	2123	1362	4900
<i>Rhaphiolepis indica</i>	車輪梅	1415	2123	1362	4900
<i>Rhodomyrtus tomentosa</i>	桃金娘	1415	2123	1362	4900
Sub-total		7075	10615	6810	24500
Total					35900



Area of Replanting
(Sept - Oct 2017)




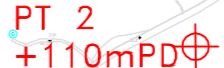

PT 1
+75mPD

PT 2
+110mPD

PT 3
+141.6mPD

PT 4
+145.2mPD

LEGEND:

-  SITE BOUNDARY
-  UNDERGROUND SITE BOUNDARY
-  EXTENT OF WOODLAND COMPENSATION PLANTING AREA
-  REFERENCE POINT SITE BOUNDARY
-  AREA OF REPLANTING (SEPT - OCT 2017)

CONTRACT NO. CV/2013/08
LIANTANG/HEUNG YUEN WAI
BOUNDARY CONTROL POINT
SITE FORMATION AND
INFRASTRUCTURE WORKS
- CONTRACT 6

Location Plan of Replanting at WC1 and WC2 (Sept-Oct 2017)

SCALE	1:3000(A3)	SURVEY DATE	15 Oct 2017
CHECK		DRAWN	YUNG
JOB NO.		SKETCH NO.	
		REV	-