



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
(SEPTEMBER TO NOVEMBER 2017)**

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

Date	Reference No.	Prepared By	Certified By
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1	1 December 2017	First Submission
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15 December 2017

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By Email & Post

Attention: Mr Simon LEUNG

Dear Sir

**Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Quarterly Ecological Monitoring Report for Woodland Compensation Area (No .1) –
September to November 2017**

With reference to the Quarterly Ecological Monitoring Report for Woodland Compensation Area No. 1 for September to November (Version 3) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Section 8.3.2.2 of the EM&A Manual.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995-8120 or by email to antony.wong@smec.com; or our Mr Arthur CHIU on tel. 3995 8144 or by email to arthur.chiu@smec.com.

Yours faithfully



Antony WONG
Independent Environmental Checker

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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 lose 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.
- 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 1st 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 **Appendix B** for details), and cover the Reporting Period from September to November 2017.

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 latest planting schedule and planting arrangement/pattern 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 23rd October 2017 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.
- Replanting of tree and shrub species was noted within the initial planting area of the WCA, in particularly along the eastern ridgeline and on the northern hillslope of the Cheung Shan. The replanting schedule and replanting plan provided by the Contractor is included in *Appendix E* for information.
- Weeding has also been noted within the replanted areas, including all the monitoring quadrats. Moreover, damage to the originally planted seedlings from the above operations has also been noticed for all planted species.
- The health condition of the planted species are generally fair and the growth of some of the tree species, in particularly the *Phyllanthus emblica* and *Acacia mangium*, was found to be vigorous.
- Colonization, re-sprouting and/or regrowth of woody plants, such as the trees *Melicope pteleifolia* and *Cratogeomys cochinchinense*, the shrub *Baekea frutescens*, *Rhodomyrtus tomentosa* and *Breynia fruticosa*, were 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 seedlings because the inter/intra-specific competition.
- 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, in particularly on the north-facing slope of Cheung Shan.

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>		√ ⁽²⁾	
<i>Schima superba</i>	√ ⁽²⁾		
Shrubs			
<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 23rd October and 1st November 2017, and the weather of both days were sunny with humidity ranged from 47 to 78%.

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 is shown in **Table 3**.

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>	4	13	11	8	8	0	1	2	12	59
<i>Acacia mangium</i>	30	28	30	16	22	0	16	17	29	188
<i>Castanopsis fissa</i>	0	2	0	0	0	12	0	0	0	14
<i>Litsea glutinosa</i>	10	7	12	7	6	1	1	2	6	52
<i>Mallotus paniculatus</i>	12	12	9	7	16	14	6	8	9	93
<i>Phyllanthus emblica</i>	27	5	7	3	8	0	3	2	6	61
<i>Sapium discolor</i>	0	10	11	1	1	0	0	0	4	27
<i>Schima superba</i>	3	9	0	8	0	62	0	0	0	82
Sub-Total	86	86	80	50	61	89	27	31	66	576
Shrubs										
<i>Gordonia axillaris</i>	3	18	17	24	44	16	21	9	10	162
<i>Melastoma candidum</i>	17	22	31	25	35	17	19	23	33	222
<i>Melastoma sanguineum</i>	5	58	34	32	58	2	9	8	21	227
<i>Rhaphiolepis indica</i>	54	31	32	46	68	12	12	18	39	312
<i>Rhodomyrtus tomentosa</i>	69	63	82	63	70	24	41	41	96	549
Sub-Total	148	192	196	190	275	71	102	99	199	1472

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)

3.2.3 According to the information provided by the main contractor and the landscaping subcontractor, the seedlings of different species within the WCA are more or less planted randomly during the initial planting undertaken in the 3rd quarter of 2016, and the species are usually planted in small cluster with plant spacing in accordance with the

latest planting arrangement, i.e. group of 3 to 5 with 1.5m spacing for tree and group of 5 to 8 with 0.75m spacing for shrubs. In addition, the planting density of a particular area would also be varied and subject to the site constraints such as local topography and the abundance/coverage of any preserved woody vegetation. As such, the result obtained from the first monitoring has been treated as “baseline data” and referenced to evaluate the survival rate of the planted species since the commencement of the monitoring program.

3.2.4 However, since replanting within the planted area of the WCA, including the monitoring quadrats has been undertaken in September 2017 and also in a randomly manner, and quantity of each species planted in each sampling quadrat could not be made available for use in this quantitative monitoring, the referenced “baseline data” for each sampling quadrat has been adjusted with the following assumptions:

- For those species with the recorded quantity more than the previous reporting period, all of the additional plants are considered from replanting and not self-seeded or re-sprouts from previous planted plants.
- For those species with the quantity equal or less than the previous reporting period, the reference data will remain unchanged and assumed that replanting of those species have not been undertaken in the sampling unit.

3.2.5 **Table 4** below shown the adjusted baseline and the survival rate of each species in the reporting month.

Table 4 Referenced Baseline after Adjustment for the Replanting Work and Survival Rate of the Planted Species in the Reporting Month

Species	Qty. of Seedlings					Survival Rate
	Aug 17	Nov 17	Replanted	Nov 16 (Ori. Ref.)	Sep 17 (Adj. Ref)	Nov 17
<i>Acacia confusa</i>	76	59	0	113	113	52.21
<i>Acacia mangium</i>	174	188	6	179	<u>193</u>	97.40
<i>Castanopsis fissa</i>	19	14	0	39	39	35.90
<i>Litsea glutinosa</i>	50	52	2	77	79	65.82
<i>Mallotus paniculatus</i>	110	93	0	80	80	100.00
<i>Phyllanthus emblica</i>	45	61	16	48	<u>64</u>	95.31
<i>Sapium discolor</i>	6	27	21	18	<u>39</u>	69.23
<i>Schima superba</i>	89	82	0	82	82	100.00
<i>Gordonia axillaris</i>	172	162	0	148	148	100.00
<i>Melastoma candidum</i>	240	222	0	352	352	63.07
<i>Melastoma sanguineum</i>	294	227	0	313	313	72.52
<i>Rhaphiolepis indica</i>	379	312	0	438	438	71.23
<i>Rhodomyrtus tomentosa</i>	733	549	0	824	824	66.63

* no. in bold denotes the surviving rate trigger action

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

- Health condition: All of the planted seedlings were found in good condition, despite mechanical damage, probably from the weeding operation, was noted on some of the *Rodomyrtus tomentosa*.
- Survival Rate: The survival rate of all of the planted species, excluded the three species where replanting was assumed within the sampling quadrats (i.e., *Acacia mangium*, *Phyllanthus emblica* and *Sapium discolor*), was all declined during the monitoring period, and ranged from ~5% for the shrub *Melastoma candidum* to ~22% for the shrub *Rhodomyrtus tomentosa*; and the overall survival rate is 79.76 % and 76.58% for tree and shrub respectively.
- 2 shrub species has recorded with a survival rate less than 80% but higher than 70% during the reporting period, i.e., the *Melastoma sanguineum* (72.52%) and *Rhaphiolepis indica* (71.23%)
- 6 plant species has recorded with a survival rate less than 70% during the reporting period, including the tree *Castanopsis fissa* (35.90%), *Acacia confusa* (52.21%), *Litsea glutinosa* (65.82%) and *Sapium discolor* (69.23%); as well as the shrub *Melastoma candidum* (63.07%) and *Rodomyrtus tomentosa* (66.63%).

3.2.7 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

3.2.8 Moreover, based on the observations made during the monitoring month, human disturbance during the maintenance activities, including replanting and weeding, may have affected damaged the planted seedlings and affect their survival rate.

3.2.9 According to the action plan as stated in the **Table 1**, the Contractor is responsible for the implementation of replanting and other remedial measures agreed by AFCD, and the recommended remedial actions to address the possible causes of poor survival rate of the 8 species are presented in **Table 5**.

Table 5 Recommended Remedial Actions for the Poor Survival Rate of the Planted Species

Possible Cause	Remedial Action
Animal disturbance	The necessity for taking any remedial actions to avoid or minimize the impact of wild animal (such as trampling) to be further reviewed from the monitoring results to be collected after replanting.
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

Possible Cause	Remedial Action
	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

3.2.10 6 species were found with survival rate less than 70% and replanting 5 of the 6 species (except *Rhodomyrtus tomentosa*) to restore their original planted quantity within the WCA, including those within each of the 9 monitoring quadrats, have already been recommended in previous report. Moreover, based on the replanting plan provided by the Contractor, those two requirements have only been partially fulfilled for some of the species, and the original quantity in each of the quadrat has not been restored (see Table 7 below) to facilitate the monitoring after the replanting work.

3.2.11 Accordingly, with respect to the latest monitoring results, the original planting schedule and the replanting list provided by the Contractor, it is assumed that for the four tree species, i.e., the *Castanopsis fissa*, *Litsea glutinosa*, *Melstoma candidum* and *Sapium discolor* where the originally quantity within the WCA has already been fully replenished outside the monitoring quadrats, further action would not be required but replanting to restore their original quantity in each of the monitoring quadrats would be required to allow continuity of the monitoring program as stated in previous report. On the other hand, for the tree *Acacia confusa* where the replanting requirements has yet to be fully addressed, the replanting quantity will base on the survival rate recorded in this monitoring month, minus the amount of seedlings has already be planted within the WCA during the replanting work. **Table 6** and **Table 7** show the recommended/outstanding replanting quantity for each of the species, as a whole within the WCA and within each individual quadrat respectively.

Table 6 Recommended Replanting Quantity for Species Recorded with Survival Rate <70%

Species	Replanting Req. (Aug 17)	Replanted Qty. in Sep 17	Replanting Req. (Nov 17)	Recommended Qty.
<i>Acacia confusa</i>	1572	680	2506	1826
<i>Castanopsis fissa</i>	1692	2200	1185	26*
<i>Litsea glutinosa</i>	824	2200	1587	29*
<i>Sapium discolor</i>	1567	2200	1627	9*
<i>Melastoma candidum</i>	4311	4900	8546	133*

* to restore the original qty. in each monitoring quadrats only

Table 7 Minimum Number of Seedlings to be Replanted in the Monitoring 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>	18	1	22	8	4	4	0	0	0	57
<i>Castanopsis fissa</i>	0	0	0	0	0	26	0	0	0	26
<i>Litsea glutinosa</i>	0	9	3	4	2	4	1	5	1	29
<i>Sapium discolor</i>	3	0	0	4	0	2	0	0	0	9
<i>Melastoma candidum</i>	7	24	21	16	0	18	24	10	13	133

- 3.2.12 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).
- 3.2.13 On the other hand, since it is suspected the low survival rate of the *Rhodomyrtus tomentosa* is resulted from the maintenance activities and this species is one of the commonest species in Hong Kong hillside, the necessity to replant this species will be further reviewed after the onset of the next growing season in 2018.
- 3.2.14 **Table 8** below summarizes the possible cause of the poor survival rate recorded for the 8 species with survival rate <80% and the recommended actions.

Table 8 Summary of the Recommended Remedial Actions for Species with Survival Rate <80%

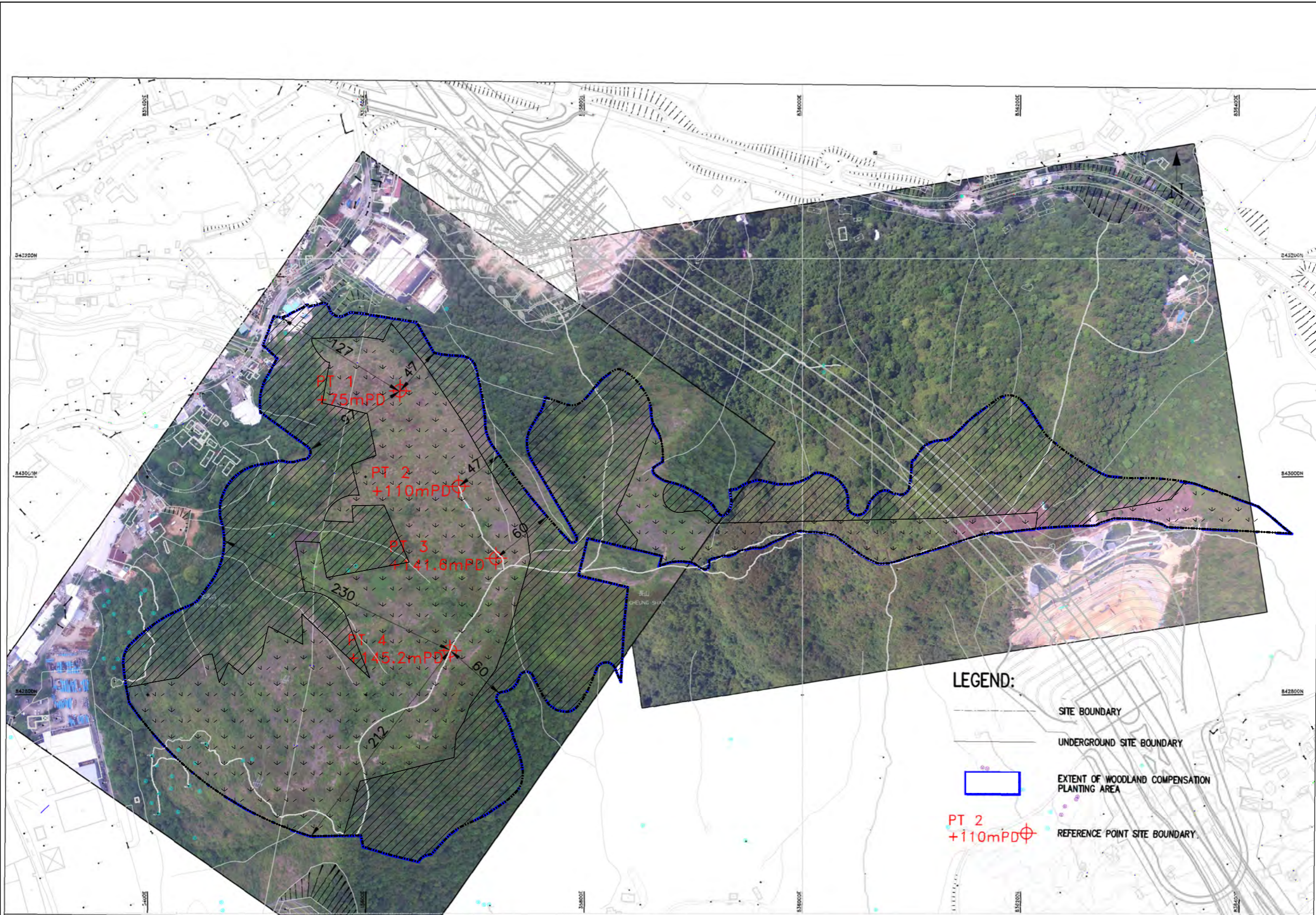
Species	Survival Rate (%)	Possible Cause	Recommended Remedial Action	Replanting
<i>Acacia confusa</i>	52.21	I, II, III, V	Refer to the Table 6	Yes
<i>Castanopsis fissa</i>	35.9	I, II, III, IV, V		Yes
<i>Litsea glutinosa</i>	65.82	I, II, III, IV		Yes
<i>Sapium discolor</i>	69.23	I, II, III, IV		Yes
<i>Melastoma candidum</i>	63.07	I, II, III, IV, V		Yes
<i>Rhaphiolepis indica</i>	71.23	III, IV, V		No
<i>Melastoma sanguineum</i>	72.52	III, IV, V		No
<i>Rhodomyrtus tomentosa</i>	66.63	III, V		No

- 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)




-End-

Appendix A





Drawing No. 60212563/SK7037 of the Woodland Compensation Plan



LEGEND:

-  BOUNDARY OF WOODLAND COMPENSATION PLANTING AREA
-  AREA WITH COVERAGE OF EXISTING TREES AND SHRUBS
-  AREAS OF HILLSIDE GRASSLAND

LEGEND:

-  SITE BOUNDARY
-  UNDERGROUND SITE BOUNDARY
-  EXTENT OF WOODLAND COMPENSATION PLANTING AREA
-  REFERENCE POINT SITE BOUNDARY

REFERENCE:

Rev.	Date	Description	Drawn	Prepared	Checked
-	07/12/16	ISSUE FOR CONSTRUCTION	MCYT	CW	

AECOM

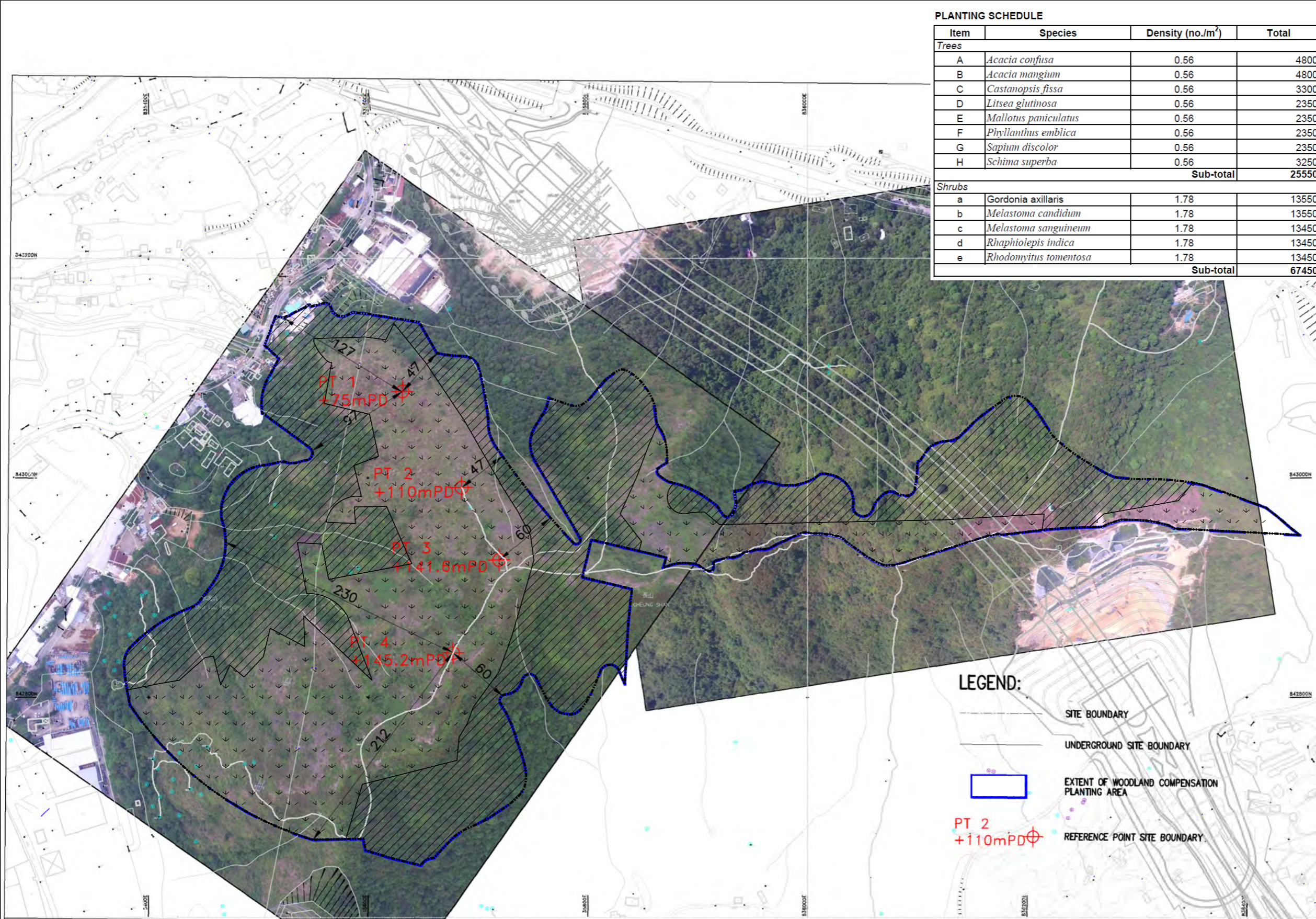
CEDD CONTRACT NO. CV/2013/08
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT
SITE FORMATION AND INFRASTRUCTURE WORKS -
CONTRACT 6

TITLE: AERIAL VIEW OF EXISTING WOODLAND COMPENSATION AREA

SKETCH NO. CV/2013/08/SK1219 SCALE N.T.S.

Appendix B

Latest Planting Arrangement



PLANTING SCHEDULE

Item	Species	Density (no./m ²)	Total
<i>Trees</i>			
A	<i>Acacia confusa</i>	0.56	4800
B	<i>Acacia mangium</i>	0.56	4800
C	<i>Castanopsis fissa</i>	0.56	3300
D	<i>Litsea glutinosa</i>	0.56	2350
E	<i>Mallotus paniculatus</i>	0.56	2350
F	<i>Phyllanthus emblica</i>	0.56	2350
G	<i>Sapium discolor</i>	0.56	2350
H	<i>Schima superba</i>	0.56	3250
Sub-total			25550
<i>Shrubs</i>			
a	<i>Gordonia axillaris</i>	1.78	13550
b	<i>Melastoma candidum</i>	1.78	13550
c	<i>Melastoma sanguineum</i>	1.78	13450
d	<i>Rhaphiolepis indica</i>	1.78	13450
e	<i>Rhodomyrtus tomentosa</i>	1.78	13450
Sub-total			67450

LEGEND:

- BOUNDARY OF WOODLAND COMPENSATION PLANTING AREA
- AREA WITH COVERAGE OF EXISTING TREES AND SHRUBS
- AREAS OF HILLSIDE GRASSLAND

LEGEND:

- SITE BOUNDARY
- UNDERGROUND SITE BOUNDARY
- EXTENT OF WOODLAND COMPENSATION PLANTING AREA
- REFERENCE POINT SITE BOUNDARY

REFERENCE:

07/12/16	ISSUE FOR CONSTRUCTION	MCYT	CW		
Rev.	Date	Description	Drawn	Prepared	Checked

AECOM

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

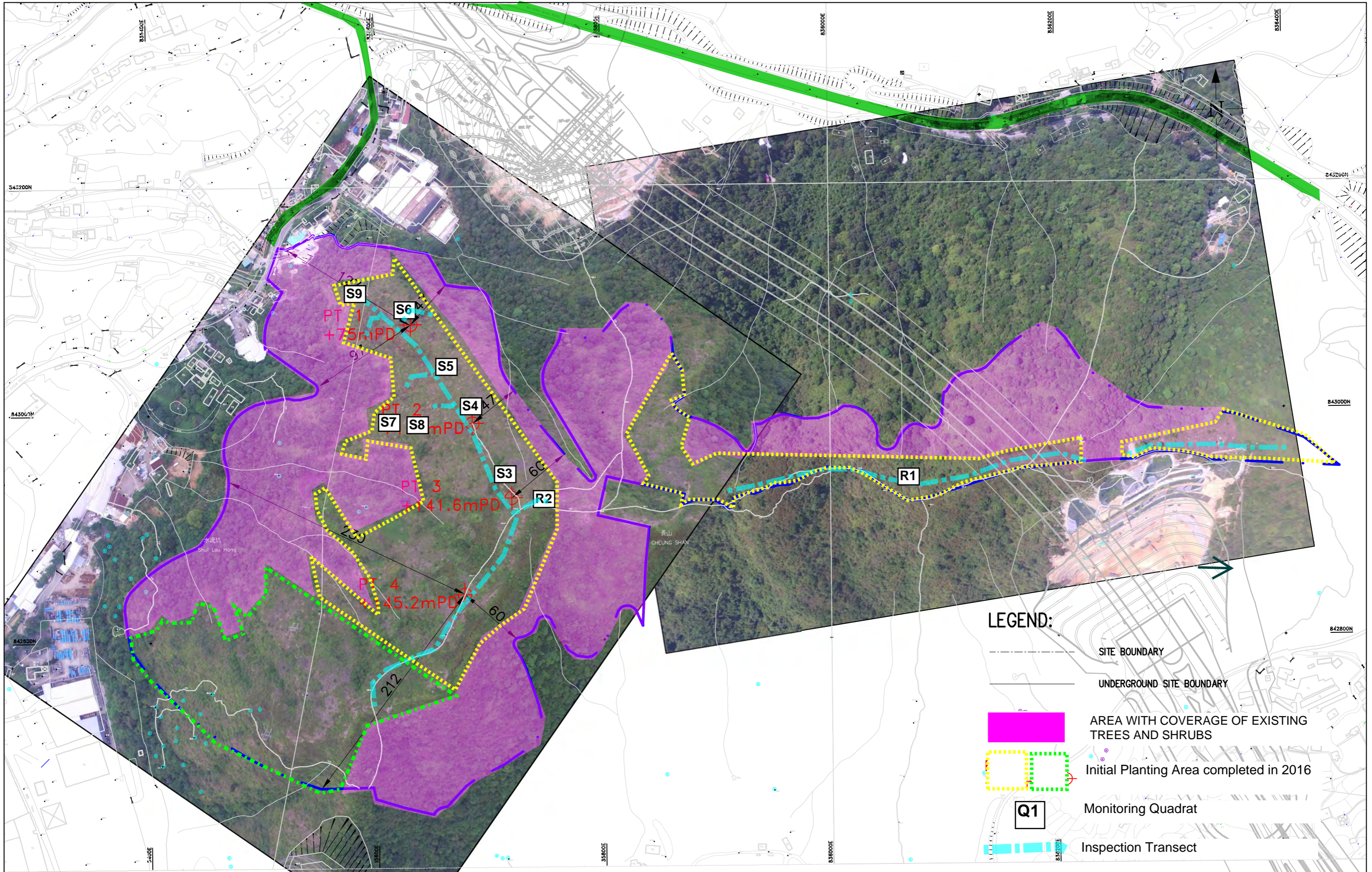
TITLE: AERIAL VIEW OF EXISTING
WOODLAND COMPENSATION AREA

SKETCH NO. CV/2013/08/SK1219 SCALE N.T.S.

APPENDIX B THE PLANTING ARRANGEMENT FOR THE INTITAL PLANTING PHASE IN 2016

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



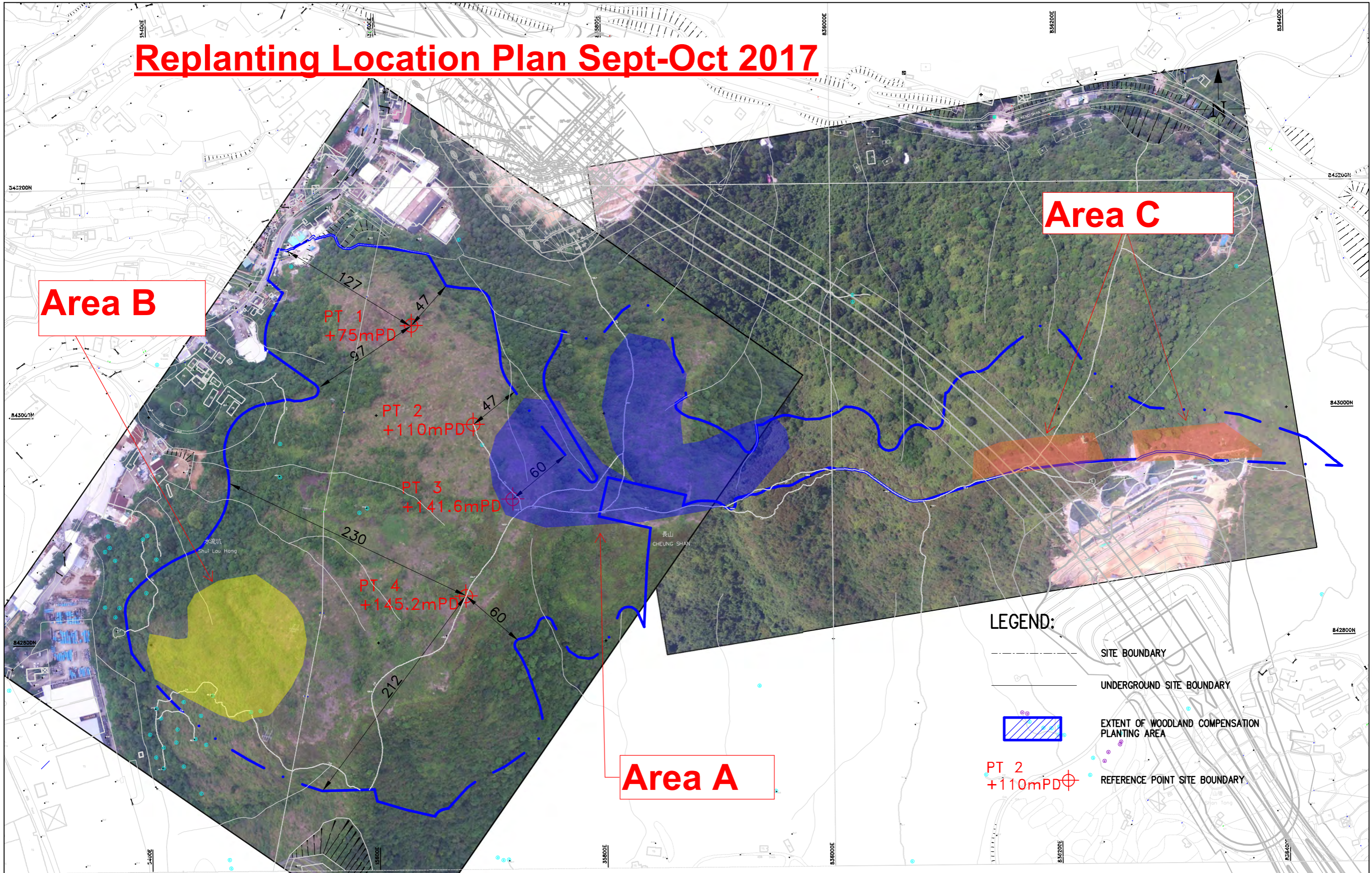
S9

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

Replanting Location Plan Sept-Oct 2017



Area B

Area C

Area A

LEGEND:

- SITE BOUNDARY
- UNDERGROUND SITE BOUNDARY
- EXTENT OF WOODLAND COMPENSATION PLANTING AREA
- +
 PT 2 +110mPD REFERENCE POINT SITE BOUNDARY

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

Sketch of site boundary reference point at
Woodland compensation planting area

SCALE	1:3000(A3)	SURVEY DATE	15 Apr 2016
CHECK		DRAWN	YUNG
JOB NO.		SKETCH NO.	
		REV	-