



**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  
(JULY TO AUGUST 2017)**

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

<b>Date</b>	<b>Reference No.</b>	<b>Prepared By</b>	<b>Certified By</b>
14 September 2017	TCS00694/13/600/R1217v2	 Keith Wong (Ecologist)	 Tam Tak Wing (Environmental Team Leader)

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1	31 August 2017	First Submission
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**By Email & Post**

Attention: Mr Simon LEUNG

Dear Sirs

**Agreement No. CE 45/2008 (CE)  
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Independent Environmental Checker – Investigation  
Bimonthly Ecological Monitoring Report for Woodland Compensation Area (No. 6) –  
July to August 2017**

With reference to the Bimonthly Ecological Monitoring Report for Woodland Compensation Area No. 6 for July to August 2017 (Version 2) 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 Man CHEUNG on tel. 3995 8132 or by email to man.cheung@smec.com.

Yours faithfully  
for and on behalf of  
SMEC Asia Limited



**Antony WONG**  
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## **Table of Content**

1.	INTRODUCTION .....	1
1.1	General.....	1
2.	MONITORING REQUIREMENTS.....	2
2.1	Monitoring Program of the Initial and Enhancement Planting Phases.....	2
2.2	Monitoring methodology .....	2
2.3	Quadrat Sampling .....	2
2.4	Reporting.....	4
3.	RESULTS.....	5
3.1	Transect Inspection .....	5
3.2	Quadrat Sampling .....	6

## **LIST OF TABLES**

TABLE 1	TRIGGER AND ACTION LEVELS FOR MONITORING AND ACTION PLAN
TABLE 2	HEALTH CONDITION OF THE ESTABLISHED SEEDLINGS NOTED DURING THE TRANSECT INSPECTION
TABLE 3	THE NUMBER OF SEEDLING RECORDED FOR EACH SPECIES WITHIN THE SAMPLING QUADRATS
TABLE 4	NO. OF INDIVIDUAL RECORDED FOR EACH PLANTED SPECIES IN PREVIOUS MONITORING AND SURVIVAL RATE IN THE REPORTING MONTH (COMPARED WITH THE REFERENCE DATA COLLECTED IN NOVEMBER – DECEMBER 2016)
TABLE 5	RECOMMENDED REPLANTING QUANTITY FOR SPECIES RECORDED WITH SURVIVAL RATE <70%
TABLE 6	RECOMMENDED REMEDIAL ACTIONS FOR THE POOR SURVIVAL RATE OF THE PLANTED SPECIES
TABLE 7	SUMMARY OF THE RECOMMENDED REMEDIAL ACTIONS FOR SPECIES WITH A SURVIVAL RATE <80%

## **LIST OF APPENDICES**

APPENDIX A	DRAWING NO. 60212563/SK7037 OF THE WOODLAND COMPENSATION PLAN
APPENDIX B	LATEST PLANTING ARRANGEMENT
APPENDIX C	TRANSECT ROUTES AND SAMPLING QUADRATS OF WOODLAND COMPENSATION MONITORING
APPENDIX D	PHOTOGRAPHIC RECORDS

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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 4<sup>th</sup> 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 6<sup>th</sup> session of vegetation monitoring according to the latest status of the initial planting phase (refer to the **Appendix B** for details) and cover the Reporting Period from July to August 2017.



## 2. MONITORING REQUIREMENTS

### 2.1 MONITORING PROGRAM OF THE INITIAL AND ENHANCEMENT PLANTING PHASES

2.1.1 According to the implementation program and Section 6.5 of the WCP, the monitoring frequency for the first year of the initial and the enhancement planting phases would be bi-monthly and subsequently reduced to quarterly from the second year onward.

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**

<b>Parameters</b>	<b>Trigger and Action Level</b>	<b>Action Plan</b>
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"> <li>- the ET should inform Contractor and IEC immediately;</li> <li>- identify the causes(s) of the exceedance;</li> <li>- advise Contractor the necessity of replanting.</li> </ul>
	Action Level: Survival rate of individual plant species <70%	<ul style="list-style-type: none"> <li>- the ET should inform Contractor and IEC immediately;</li> <li>- identify the cause(s) of the exceedance;</li> <li>- 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;</li> <li>- once the remedial action has been accepted by AFCD, the Contractor should implement the remedial action.</li> </ul>

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 During the first year of the initial planting phase and the first year of the enhancement planting phase, the results and findings of the bi-monthly (i.e., once every two months) monitoring 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 From the second year of the initial planting phase and the enhancement planting phase, the results and findings of the quarterly monitoring will 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 11<sup>th</sup> August 2017 with the ecological specialist of the IEC, an overview of the site condition is presented in **Figure 1** of the **Appendix D** and the following presents the observations made during the transect inspection:

- It was sunny during the day of the transect inspection.
- Most of the seedlings noted were in fair condition, and the growth of some of the tree seedlings was found to be prominent, in particularly the tree *Phyllanthus emblica* (see **Appendix D** - Figure 2) and *Acacia mangium*, and the powdery mildew noted on the latter is mostly gone and the plants appeared to be in healthy condition. Nevertheless, insect herbivory was noticeable on *Melastoma candidum*, *Mallotus paniculatus*, *Melastoma sanguineum*, as well as *Castanopsis fissa* and *Litsea glutinosa* (see example photo in **Appendix D** - Figure 3).
- On the other hand, as reported previously, signs of disturbance from wild boar, i.e., vegetation trampling, earth ploughing, as well as uprooted seedlings (from planted/self-seeded vegetation) were noticeable along the transect, in particularly on the north-facing slope of Cheung Shan where the site was densely planted with tree/shrub seedlings route (see **Appendix D** - Figure 4).
- No sign of anthropogenic disturbance was noted within the planted area of the WCA. Moreover, it was noted that advanced enhancement planting has been undertaken within the woodland area at the bottom of the northern slope of Cheung Shan, i.e., the northwest corner of the WCA (see **Appendix D** - Figure 5).
- Regrowth of herbaceous vegetation cleared/cut during the pre-planting stage was vigorous throughout the whole WCA except along the ridgeline where the area has been disturbed by hill-fire prior the initial planting work.
- Colonization, re-sprouting and/or regrowth of the woody vegetation, such as the trees *Melicope pteleifolia* and *Cratoxylum cochinchinense*, the shrub *Baeckea frutescens*, *Rhodomyrtus tomentosa* and *Breynia fruticosa*, were found to be generally vigorous within the WCA, and some of those plants have out-grown and shadowed the seedlings planted in their vicinity, and may have a negative impact on the establishment of the planted seedlings because of the inter/intra-specific competition
- In addition, despite the re-growth of the natural vegetation as described above has impeded the range of observation that could made along the transect; the density of the planted native tree seedlings was found to be poorer and sparser along the inspection transect, 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
<b>Trees</b>			
<i>Acacia confusa</i>		√	
<i>Acacia mangium</i>		√ <sup>(2)</sup>	
<i>Castanopsis fissa</i>		√ <sup>(4)</sup>	
<i>Litsea glutinosa</i>		√ <sup>(3), (4)</sup>	
<i>Mallotus paniculatus</i>		√ <sup>(3), (4)</sup>	
<i>Phyllanthus emblica</i>	√ <sup>(3)</sup>		

<i>Sapium discolor</i>		$\sqrt{(1)(3)}$	
<i>Schima superba</i>		$\sqrt{\quad}$	
<b>Shrubs</b>			
<i>Gordonia axillaris</i>		$\sqrt{\quad}$	
<i>Melastoma candidum</i>		$\sqrt{(3)(4)}$	
<i>Melastoma sanguineum</i>		$\sqrt{(3), (4)}$	
<i>Rhaphiolepis indica</i>		$\sqrt{(1), (3)}$	
<i>Rhodomytus tomentosa</i>	$\sqrt{(3)}$		

Note:

(1) - re-sprouting of planted seedlings was noted and most of the foliage of this species were found to be smaller in size

(2) - Powdery mildew was occasionally noted on the tree seedlings

(3) - self-seeded seedlings or wild population of this species was presence within the planting area 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.

(4) - insect herbivory was noticeable

### 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 7<sup>th</sup> and 11<sup>th</sup> August 2017 and their latest condition is shown in **Appendix D**- Figure 6.

3.2.2 According to the information provided by the main contractor and the landscaping subcontractor, the distribution of plant seedlings of different species within the WCA are more or less random and usually in small cluster with 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, and 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 the retained woody vegetation.

3.2.3 **Table 3** below presents the findings of the quadrat monitoring; and a comparison of the no. of seedling recorded for each planted species between the current and reference data collected in November 2016, as well as the computed survival rate, are presented in **Table 4**.

**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	
<b>Trees</b>										
<i>Acacia confusa</i>	4	19	14	8	13	0	1	5	12	76
<i>Acacia mangium</i>	6	28	33	22	23	0	12	18	32	174
<i>Castanopsis fissa</i>	0	1	0	0	0	18	0	0	0	19
<i>Litsea glutinosa</i>	7	4	15	8	6	1	1	2	6	50
<i>Mallotus paniculatus</i>	12	11	12	8	19	20	6	9	13	110
<i>Phyllanthus emblica</i>	1	11	6	4	13	0	0	4	6	45

<i>Sapium discolor</i>	0	2	1	1	0	1	0	0	1	6
<i>Schima superba</i>	3	4	0	2	0	80	0	0	0	89
<b>Sub-Total</b>	<b>33</b>	<b>80</b>	<b>81</b>	<b>53</b>	<b>74</b>	<b>120</b>	<b>20</b>	<b>38</b>	<b>70</b>	<b>569</b>
<b>Shrubs</b>										
<i>Gordonia axillaris</i>	5	17	44	22	43	0	15	7	19	172
<i>Melastoma candidum</i>	7	29	49	20	52	10	14	25	34	240
<i>Melastoma sanguineum</i>	7	54	55	34	82	4	13	11	34	294
<i>Rhaphiolepis indica</i>	53	34	47	61	90	12	12	16	54	379
<i>Rhodomyrtus tomentosa</i>	86	91	172	92	98	36	42	26	90	733
<b>Sub-Total</b>	<b>158</b>	<b>225</b>	<b>367</b>	<b>229</b>	<b>365</b>	<b>62</b>	<b>96</b>	<b>85</b>	<b>231</b>	<b>1818</b>

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 established individuals of the planted species within the quadrat regardless whether they are self-seeded or planted (see Section 2.3.6)

**Table 4 No. of Individual Recorded for Each Planted Species in Previous Monitoring and Survival Rate in the Reporting Month (compared with the reference data collected in November – December 2016)**

Species	No. of Individual					Survival Rate (%)
	Nov 16	Jan 17	Apr 17	Jun 17	Aug 17	
<i>Acacia confusa</i>	113	80	84	84	76	67.26
<i>Acacia mangium</i>	179	162	182	182	174	97.21
<i>Castanopsis fissa</i>	39	29	21	21	19	48.72
<i>Litsea glutinosa</i>	77	58	56	54	50	64.94
<i>Mallotus paniculatus</i>	80	98	114	114	110	100 <sup>(1)</sup>
<i>Phyllanthus emblica</i>	48	23	48	48	45	93.75
<i>Sapium discolor</i>	18	8	10	10	6	33.33
<i>Schima superba</i>	82	66	91	91	89	100 <sup>(1)</sup>
<i>Gordonia axillaris</i>	148	144	185	185	172	100 <sup>(1)</sup>
<i>Melastoma candidum</i>	352	258	268	255	240	68.18
<i>Melastoma sanguineum</i>	313	223	328	328	294	93.93
<i>Rhaphiolepis indica</i>	438	355	387	387	379	86.53
<i>Rhodomyrtus tomentosa</i>	824	816	768	768	733	88.96

(1) As a result of re-sprouting of the planted or self-seeded plants, the total number of individual recorded is higher than the reference data collected in Nov 2016



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

- Health condition: most of the recorded seedlings were found in fair to good condition.
- Survival Rate: The survival rate of all of the planted species was declined during the monitoring period, and ranged from ~2% for the shrub *Rhaphiolepis indica* to ~22% for the tree *Sapium discolor*; and the overall survival rate is 75.7 % and 87.5% for tree and shrub respectively.
- 5 plant species has recorded with a survival rate less than 70% during the reporting period, including the tree *Acacia confusa* (67.26%), *Litsea glutinosa* (64.94%), *Castanopsis fissa* (48.72%) and *Sapium discolor* (33.33%); as well as the shrub *Melastoma candidum* (68.18%).

3.2.5 The possible cause of the poor survival rate of the 5 planted species has already been postulated in previous report, including:

- poor vigor of the planted seedling
- animal disturbance such as herbivory and trampling
- insufficient horticultural maintenance (such as watering/weeding)
- the seedlings of those species are out-competed (for light and space) by the adjacent planted, self-seeded or retained vegetation, in particularly the *Sapium discolor* where all of the plants recorded are small in size and mostly covered with a few small-sized leave, and hence prone to the shading impact from the neighbor plants.

3.2.6 Replanting of the tree *Sapium discolor* and *Castanopsis fissa* has already recommended in the previous report and it is understood from the Engineer that the replanting work will be undertaken by the end of the growing season, i.e., October 2017. Moreover, since there was no improvement in the survival rate of the other three species and their survival rates were kept declining and lowered than 70% in the reporting month, remedial actions including replanting of this three species is hence recommended in accordance with the action plan stated in the Table 1.

3.2.7 Therefore, with respect to the latest monitoring results, the quantity of replanting for all of the 5 species is tabulated in Table 5 below:

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

Species	Planted Qty.	Survival Rate/%	Replanting Qty.
<i>Acacia confusa</i>	4800	67.26	1572
<i>Castanopsis fissa</i>	3300	48.72	1692
<i>Litsea glutinosa</i>	2350	64.94	824
<i>Sapium discolor</i>	2350	33.33	1567
<i>Melastoma candidum</i>	13550	68.18	4311
		<b>TOTAL</b>	<b>9966</b>

3.2.8 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 4.7 of the WCP).

- 3.2.9 In addition, the original quantity recorded for these five species within the 9 monitoring quadrats should be restored during replanting to allow continuation of the monitoring program.
- 3.2.10 According to the action plan as shown in the Table 1 above, the Contractor is responsible for the implementation of the replanting and other remedial measures agreed by AFCD, and it is recommended that a detailed replanting plan, including the replanting and maintenance programme, should be prepared by the Contractor and submitted to the Engineer for prior approval; and the recommended remedial actions to address the possible causes of poor survival rate of the 5 species are presented in Table 6.

**Table 6 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 size of the seedlings fulfills the requirements of the pertinent specification during replanting; and all of the seedlings should be planted on the same day of delivery as far as possible and appropriate actions should be undertaken to minimize the desiccation stress of the seedlings
Vegetation maintenance	Strengthen the vegetation maintenance (in particularly weeding) within the WCA
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

- 3.2.11 **Table 7** below summarize the possible cause of the poor survival rate of the 5 species and recommended actions.



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

Species	Survival Rate (%)	Possible Cause	Recommended Remedial Action	Replanting
<i>Acacia confusa</i>	67.26	I, II, III	Refer to the bullets in Section 3.2.10 n/a	Yes
<i>Castanopsis fissa</i>	48.72	I, II, III, IV		Yes
<i>Litsea glutinosa</i>	64.94	I, II, III, IV		Yes
<i>Sapium discolor</i>	33.33	I, II, III, IV		Yes
<i>Melastoma candidum</i>	68.18	I, II, IV		Yes

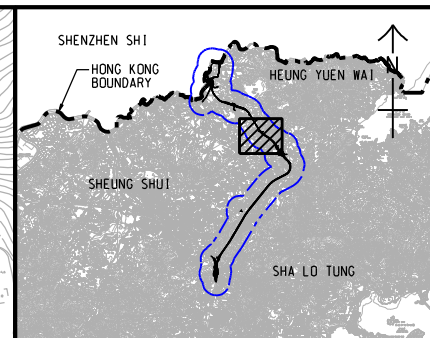
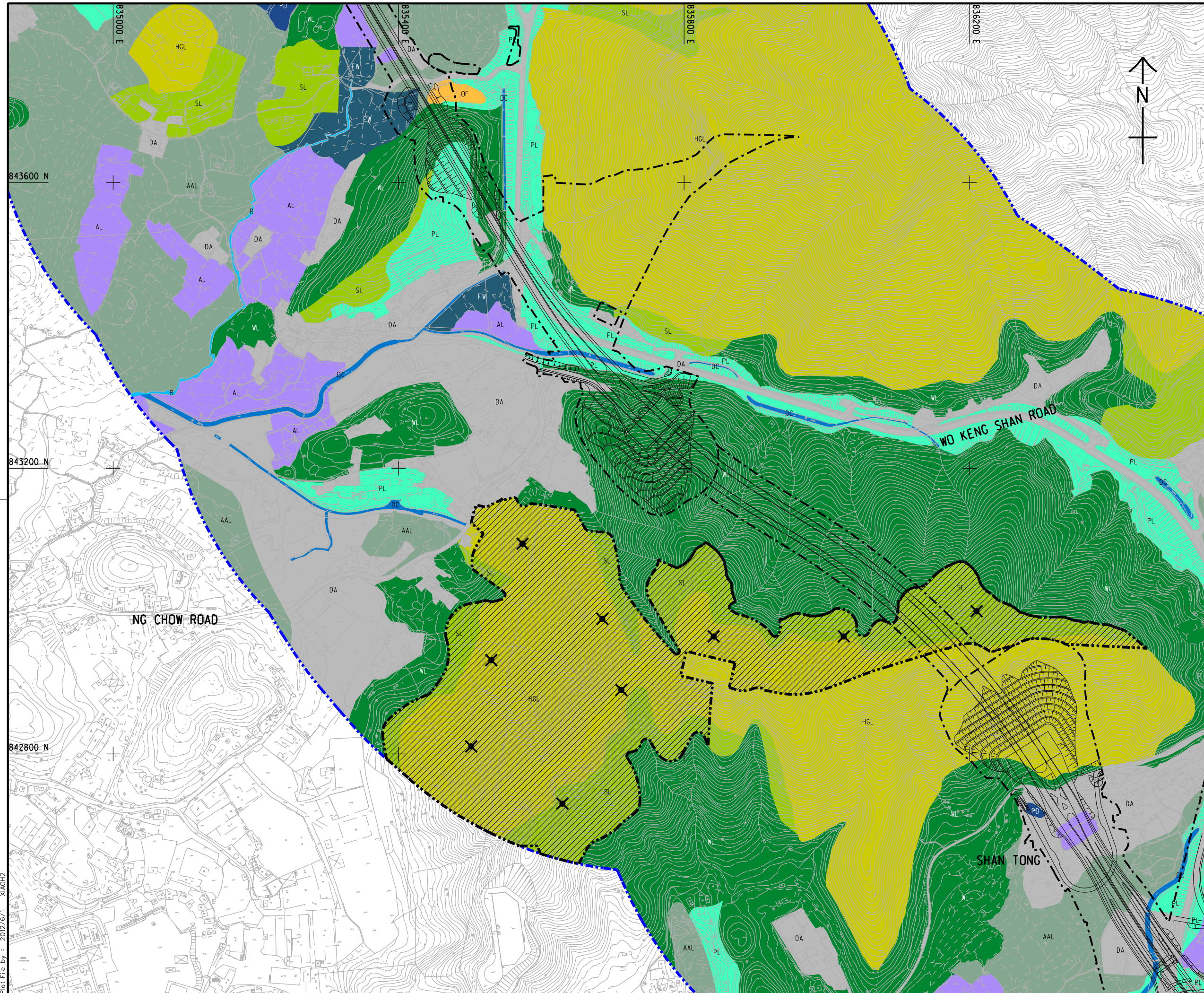
- I : Poor vigor of the planted seedling  
 II : Animal Disturbance/Trampling  
 III : Insufficient Maintenance  
 IV : Out-competed by adjacent plant

**-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
- WOODLAND
- SHRUBLAND
- PLANTATION
- FRESHWATER WETLAND [NET AGRICULTURAL LAND (ACTIVE/ABANDONED)]
- ACTIVE AGRICULTURAL LAND
- ABANDONED AGRICULTURAL LAND
- HILLSIDE GRASSLAND
- POND
- DRAINAGE CHANNEL
- WATERCOURSE
- OPEN FIELD
- DEVELOPED AREA
- EXTENT OF WOODLAND COMPENSATION PLANTING AREA
- X TENTATIVE WOODLAND MONITORING QUADRAT (THE EXACT LOCATION TO BE DETERMINED BY THE ENGINEER ON SITE)

REV.	DESCRIPTION	D.C.	P.C.	DATE

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

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

**PROPOSED WOODLAND  
COMPENSATION AREA**

**AECOM**

DRG.NO. 60212563/SK7037  
圖紙編號

DESIGNED BY 設計: KW	CONTRACT NO. 合約編號: -	P. Dir. APPROVED 批核人: -
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DRAWN BY 繪圖: YJP	STATUS 狀態: -	SCALE 比例: A1 1 : 2500
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DIMENSIONS ARE IN METRES  
尺寸單位: 公尺

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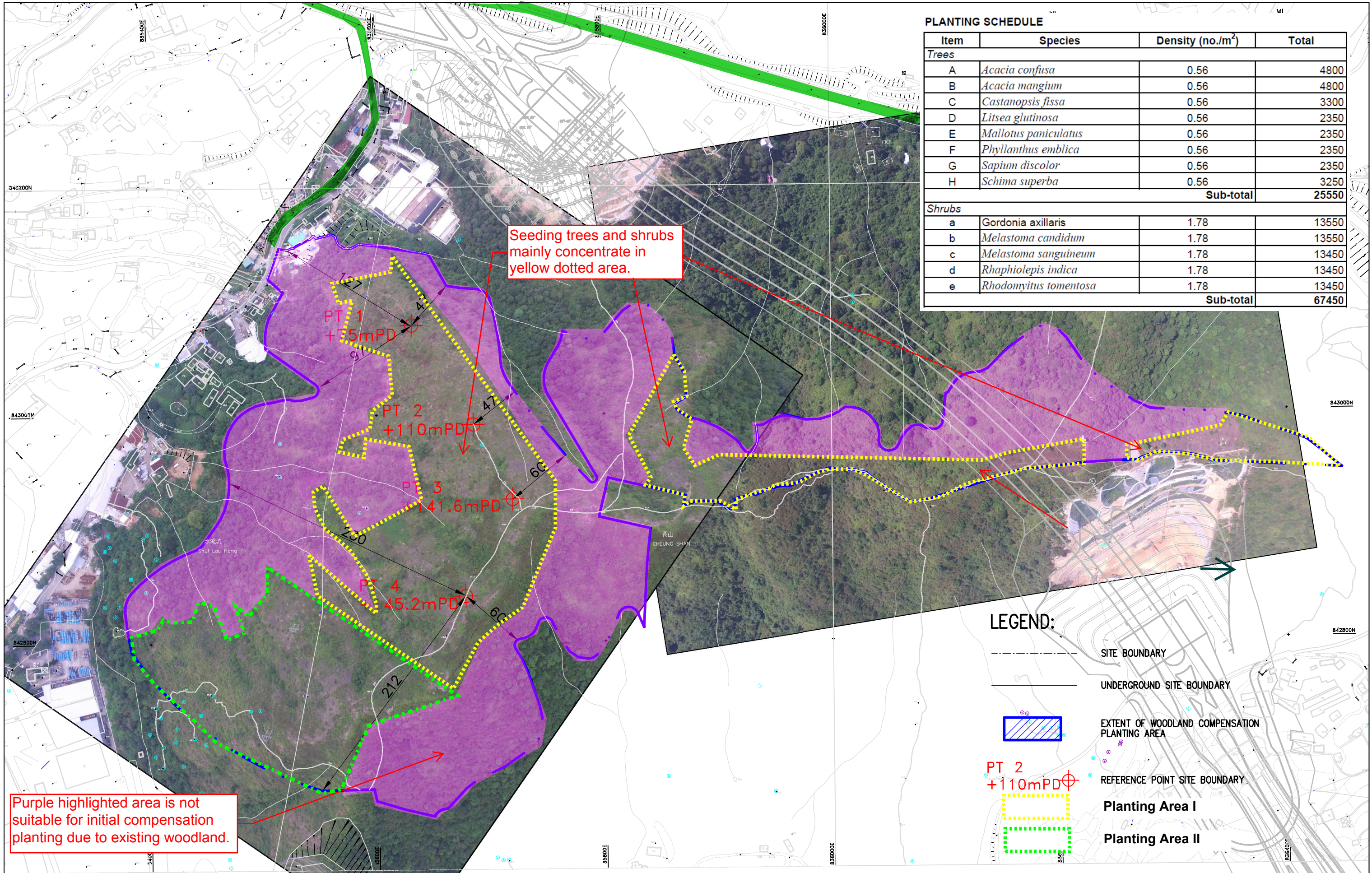
Plot File by : 2012/6/1 XIAO12



**Appendix B**

**Latest Planting Arrangement**








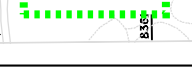
**PLANTING SCHEDULE**

Item	Species	Density (no./m <sup>2</sup> )	Total
<b>Trees</b>			
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
<b>Sub-total</b>			<b>25550</b>
<b>Shrubs</b>			
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>Rhodomlytus tomentosa</i>	1.78	13450
<b>Sub-total</b>			<b>67450</b>

Seeding trees and shrubs mainly concentrate in yellow dotted area.

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

**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 - SITE CONSTRAINTS AND LATEST PLANTING ARRANGEMENT OF THE INITIAL PLANTING PHASE (2016)**

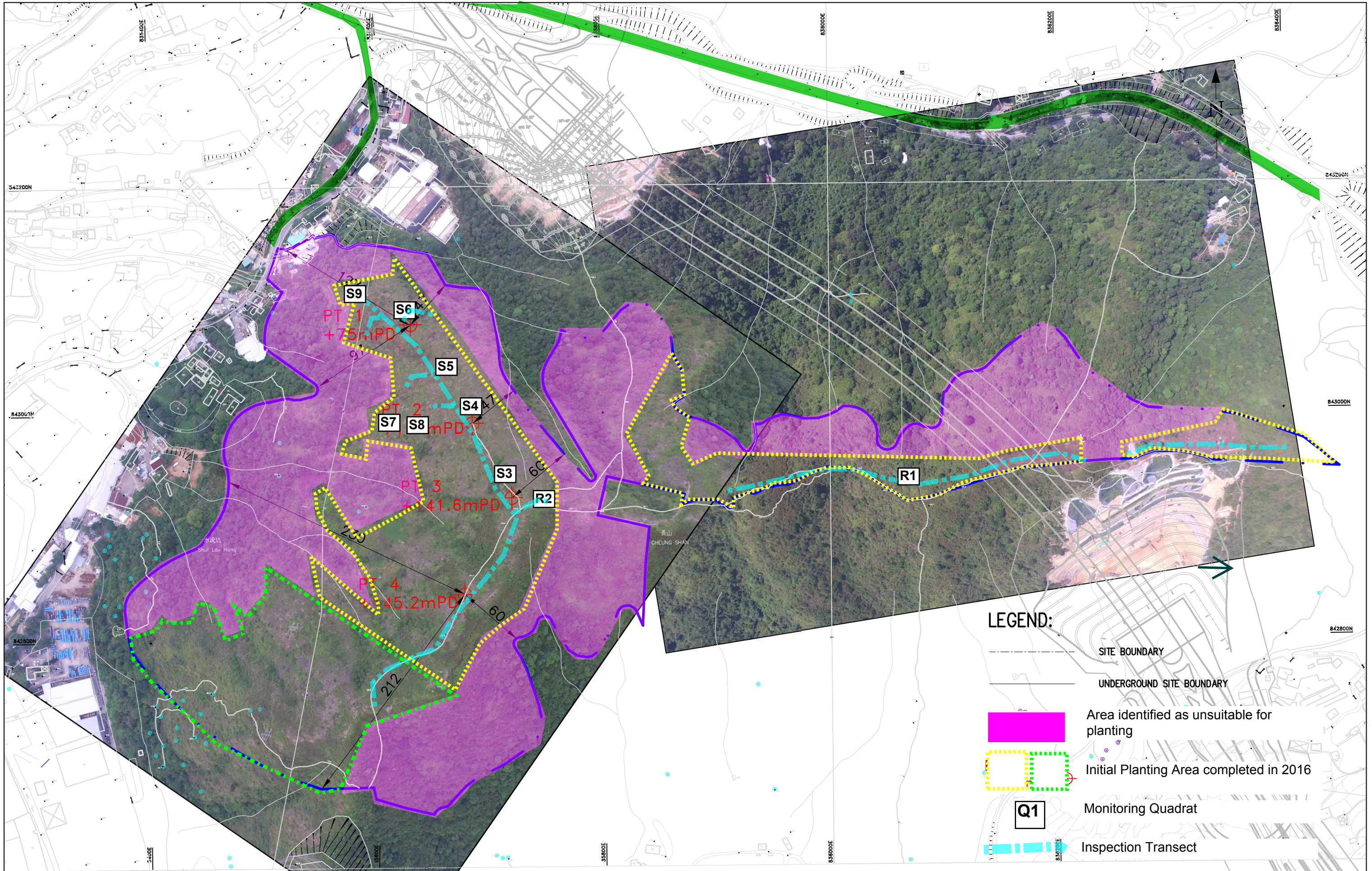
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CHECK		DRAWN	K W
JOB NO.		SKETCH NO.	
		REV	-









## **Appendix C**

### **Transect Routes and Sampling Quadrats of Woodland Compensation Monitoring**





**LEGEND:**

-  SITE BOUNDARY
-  UNDERGROUND SITE BOUNDARY
-  Area identified as unsuitable for planting
-  Initial Planting Area completed in 2016
-  Q1 Monitoring Quadrat
-  Inspection Transect

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

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

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



Fig 1a\_North Facing Slope



Fig 1b\_Eastern Ridgeline



Fig 2\_*Phyllanthus emblica*



Fig 3 \_ Insect herbivory on *Castanopsis fissa*



Fig 4\_*Acacia mangium* uprooted by wild boar



Fig 5\_Advanced Enhancement Planting



Fig 6\_R1



Fig 6\_R2



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



Fig 6\_S3



Fig 6\_S4



Fig 6\_S5



Fig 6\_S6



Fig 6\_S7



Fig 6\_S8



Fig 6\_S9