MTR Corporation Limited

HONG KONG SECTION OF GUANGZHOU – SHENZHEN – HONG KONG EXPRESS RAIL LINK

(No. EP-349/2009)

Tree Planting and Landscape Plan TLP-3: Works in Kwai Tsing District

(Rev 1)

Verified by: _____

Position: Independent Environmental Checker

Date: 4 June 2010

MTR Corporation Limited

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Verified by: Glenn Fronmer

Position: Environmental Team Leader

Date: 3 June 2010

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TREE PLANTING AND LANDSCAPE PLAN
TLP- 3: WORKS IN KWAI TSING DISTRICT

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Chapter 1

Introduction

1 INTRODUCTION

1.1 THE XRL PROJECT

1.1.1 The Guangzhou-Shenzhen-Hong Kong Express Rail Link is a committed cross boundary transport infrastructure project to provide high-speed rail services between Hong Kong (HK) and Guangzhou, and a connection to the national high-speed passenger rail network serving major mainland cities outside of Guangdong province. This network, which will comprise some 12,000 km, is now under construction in the Mainland. It is understood that the section from Guangzhou to Shenzhen (Futian) will start operation in 2010. The Hong Kong section of the Express Rail Link (XRL) is scheduled for urgent implementation, following the announcement by the Chief Executive (CE) of the HKSAR in the 2007-08 Policy Address. The XRL, measuring about 26 km from West Kowloon to the boundary, will use a dedicated corridor to ensure that the required line capacity can be achieved and to ensure operational compatibility with the Mainland.

1.1.2 The XRL Scheme consists of an underground terminus in West Kowloon, approximately 26 km of tunnels from the terminus to the boundary at Mai Po, tunnel ventilation shafts/adits and associated buildings and facilities, an emergency rescue siding, stabling sidings and associated facilities in Shek Kong, approach tunnel to the stabling sidings, and access roads to the ventilation buildings. After crossing the boundary, the Mainland section of the high-speed railway runs north for a further 116 km to Guangzhou, with new stations at Futian, Longhua (New Shenzhen Station), Gongming, Dongchung, Humen and Shibi (New Guangzhou Station). Trains on the Hong Kong section are intended to operate at speed up to 200 kmph.

1.1.3 With a footprint of about 10 ha., the XRL West Kowloon Terminus (WKT) is an underground station located immediately north of the proposed West Kowloon Cultural District (WKCD) between the Airport Railway Kowloon Station to the west and the future West Kowloon (Austin) Station to the east.

1.1.4 The XRL tunnel configuration will vary depending upon the geological conditions and methods of construction. The TBM tunnels will adopt a twin cell tunnel configuration with interconnecting cross passages. Twin bore tunnels are envisaged for the section of tunnel underneath the Mai Po Marshes and the RAMSAR Site for final crossing over into the Mainland.

1.1.5 Seven intermediate ventilation shafts/adits, with associated ventilation buildings, are proposed along the alignment of the XRL tunnel alignment providing ventilation for the main tunnels. The ventilation shafts/adits also function as emergency access points (EAPs) for emergency rescue teams in case of incident or emergency inside the tunnels. One additional EAP (EAP3) is provided at Tai Kong Po.

1.1.6 A depressed emergency rescue siding (ERS) is to be provided in Shek Kong for emergency evacuation of passengers from an incident train. Two tunnel ventilation plants will also be located at either end of the SSS. The Shek Kong Stabling Sidings (SSS), will provide at grade stabling sidings and running maintenance tracks to the east of the ERS.

1.1.7 The XRL Project will resume about 114 ha. surface land area together with underground strata on a permanent and temporary basis for construction of the XRL related facilities.

1.2 TREE PLANTING AND LANDSCAPE PLAN

1.2.1 In accordance with the Environmental Permit (EP No. 349/2009) of the Express Rail Link (XRL), the Permot holder is required to submit a Tree Planting and Landscape Plan, including the compensatory woodland, in consultation with the Planning Department and Agriculture, Fisheries and Conservation Department, for approval by the Director.

1.2.2 A number of trees will be affected by the proposed works, and it is proposed to fell some trees and transplant others, following the rationale described later in this Plan.

1.2.3 The Plan for the XRL works will be split into seven submissions based on the District boundaries and the Works programme. There will be separate Plans as follows:

a) TLP-1 : Works in Yau Tsim Mong District;

b) TLP-2 : Works in Sham Shui Po District;

c) TLP-3 : Works in Kwai Tsing District

d) TLP-4 : Works in Tsuen Wan District

e) TLP-5 : Works in Tuen Mun District

f) TLP-6 : Works in Yuen Long District - Mai Po

g) TLP-7 : Works in Yuen Long District - Remainder

1.2.4 A Key Plan (Dwg. No. C8001/T/XRL/URB/C04/901) is attached in **Appendix IV** showing the XRL alignment, the locations of the survey sheet numbers, and the District Boundaries.

1.2.5 The current application is for **TLP-3: Works in Kwai Tsing District**, which comprises works related to the Kwai Chung Ventilation Building (VB6) at Wing Yip Street, the temporary barging point at Rambler Channel and 2 other temporary works areas.

1.3 STRUCTURE OF THE PLAN

1.3.1 The plan contains a Tree Survey and a Proposal for Tree Transplanting and Compensatory Tree Planting.

1.3.2 **Chapter 2** summarises the findings and recommendations of the Tree Survey.

1.3.3 **Chapter 3** presents the Tree Transplanting and Compensatory Tree Planting Proposal and landscape mitigation measures.

1.3.4 **Chapter 4** provides a summary of the total cumulative tree felling, tree transplanting and compensatory tree planting for the entire XRL Project.

1.3.5 The detailed findings and recommendations of the Tree Survey are tabulated in a Tree Assessment Schedule in **Appendix I**. For ease of review by Government departments, the Schedule is split into separate parts containing trees for which individual Departments are responsible to advise DLO (e.g. LCSD, AFCD and HyD etc.)

1.3.6 Survey sheets showing the locations of the trees, overlaid with the engineering layouts, are provided in **Appendix II**.

1.3.7 Drawings showing the Compensatory Tree Planting and Transplanting Proposals and landscape mitigation measures are provided in **Appendix III**.

1.3.8 Supplementary Information to support the TLP is provided in **Appendix IV**.

1.3.9 The Particular Specification for Tree Works and Soft Landscape Works (including particular specification for protecting existing trees, pruning existing retained trees, and transplanting trees) is provided in **Appendix V.**

1.3.10 Photographs of all the trees within the works boundaries are provided in **Appendix VI**.

1.4 TREE NUMBERING AND CROSS REFERENCE STYLE

1.4.1 For ease of cross-reference between drawings, schedule and photographs, and for ease of checking on site, the following tree numbering and cross reference system has been adopted in the Report:

- individual trees are numbered T0001, T0002, T0003 etc. and have been labelled on site;
- every tree has been photographed, the photographs have been numbered, and the tree numbers have been marked on the photographs;
- the Tree Assessment Schedule in **Appendix I** identifies the survey sheet number, tree number and photograph number for each tree;
- the trees in the Tree Assessment Schedule are listed first by survey sheet number and then by tree number - in this way all trees found on one survey sheet are located together in the Tree Assessment Schedule for ease of cross reference between the schedule and the drawings;
- similarly, each page of tree photographs in **Appendix VI** has the relevant survey sheet number identified at the bottom right corner of the page, and the photographs are grouped by survey sheet for ease of cross reference and checking on site; and
- for ease of cross-reference a colour coding is used in the tree survey plans – green for retain, grey for retain and prune, red for fell, blue for transplant and black for outside gazettal boundary.

Chapter 2

Tree Survey Findings and Recommendations

2 TREE SURVEY FINDINGS AND RECOMMENDATIONS

2.1 TREE SURVEY

2.1.1 A comprehensive survey of all trees potentially impacted by the XRL over all works sites and works areas was conducted in mid 2008 under MTRCL consultancy NEX2110. The tree survey information presented herein is an extract from that survey.

2.1.2 Since the 2008 survey was undertaken, the XRL gazettal boundary has been slightly revised, necessitating an additional survey which has been undertaken in early 2009. The trees identified from this additional survey are identified in the tree survey drawings and schedules by a prefix "U" before the tree number (e.g. U0001).

2.1.3 The following technical circulars, practice notes and publications have been referenced:

- Forests and Countryside Ordinance (Cap. 96);
- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586);
- Agriculture, Fisheries & Conservation Department – Nature Conservation Practice Note No. 02 (Rev. Jun 2006)
- Country Park Ordinance (Cap. 208);
- Environment, Transport and Works Bureau Technical Circular (Works) No. 2/2004 - Maintenance of Vegetation and Hand Landscape Features;
- Environment, Transport and Works Bureau Technical Circular (Works) No. 3/2006 – Tree Preservation;
- Environment, Transport and Works Bureau Technical Circular (Works) No. 29/2004 - Registration of Old and Valuable Trees and Guidelines for their Preservation;
- Highways Department Technical Circular No. 3/2008 - Independent Vetting of Tree Works under the Maintenance of Highways Department;
- General Regulation (GR) 740;
- Standing Interdepartmental Landscape Technical Group (SILTECH) Publication - 'Tree Planting and Maintenance in Hong Kong' (Webb, 1991);
- Agriculture, Fisheries & Conservation Department Publication - 'Rare and Precious Plants of Hong Kong' (2004) and
- Agriculture, Fisheries & Conservation Department Publication - 'Check List of Hong Kong Plants' (2004).
- Highways Department – Landscape Unit – Requirements for Handover of Vegetation to Highways Department (undated)

2.1.4 Trees were surveyed individually and the following characteristics are recorded in the Tree Schedule in **Appendix I**:

- tree reference number;
- District within which tree is located;
- photograph number;
- botanical name;
- Chinese common name;
- Height (m);
- trunk diameter at 1.3m above ground level (m);
- crown spread (m);
- form (good / fair / poor);
- health (good / fair / poor);
- amenity value (high / medium / low);
- survival rate after transplanting (high / medium / low);
- Government Department responsible for maintenance of the tree. This is based on the ETWBTC(W) 2/2004 "Maintenance of Vegetation and Hard Landscape features", Appendix A "Areas of Responsibilities of Departments on Maintenance of Vegetation";
- Government Department responsible for providing expert advice to LandsD on removal of the tree. This is based on the ETWBTC(W) 3/2006 "Tree Preservation", Appendix B "Departmental Responsibilities for Providing Expert Advise to LandsD for vetting of Tree Removal Applications";
- trees in the Register of Old and Valuable Trees are identified in accordance with ETWBTC(W) No. 29/2004 - Registration of Old and Valuable Trees and Guidelines for their Preservation;
- trees considered as "Important Trees" in accordance with ETWBTC(W) 3/2006 "Tree Preservation"
- trees considered as "Wall Trees" as defined in HyD TC No. 3/2008 on Independent Vetting of Tree Works under the Maintenance of Highways Department
- other remarks.

2.1.5 Following the assessment of the impacts of the XRL works on the trees, the following information has been added to the Tree Schedule:

- Recommendation (Retain / Retain and Prune / Transplant / Fell); and
- Justification for the Recommendation (i.e. reason why the tree is unavoidably affected by the works)

2.2 TREE CLASSIFICATION CRITERIA

2.2.1 In the tree survey, trees have been assessed and classified in accordance with criteria for classification of form, health, survival rate and amenity value, as described below.

Form (Good / Fair / Poor)

2.2.2 Tree Form is classified as follows:

a) **Good**: trees with well-balanced form, upright, evenly branching, well-formed head and generally in accordance with the standard form for its species;

b) **Fair**: trees with generally balanced form with natural compensations for loss of branches or leaning trunks;

c) **Poor**: trees with very unbalanced form, leaning, contorted, bending trunk, suffering from loss of major branches with general damage and growing close to adjacent trees.

Health (Good / Fair / Poor)

2.2.3 The "Health and Condition" of trees is assessed by evaluating the following criteria:

a) Foliage

- Colour and general appearance; and
- Presence of insect and/or fungal infection.

b) Branches

- Presence of dead, broken, cut or crossing branches;
- Presence of heavy horizontal branches which may cause tree instability; and
- Presence of any special phenomena of the branches likely to cause hazard.

c) Trunk

- Presence of tightly forked or multi-ascending trunk may be a sign of weakness (depends on specie);
- Presence of cavities or internal/ external rot as may be evidenced by presence of moisture seeping through the trunk, and / or fungi growing on the trunk; and
- Serious bark damage.

2.2.4 Based on evaluation of above criteria, the classification of 'Health and Condition' is as follows:

a) **Good**: Trees with a low incidence of the less serious features listed above and a high chance of a fast recovery from such features.

b) **Fair**: Trees with a higher incidence of the less serious features and a medium chance of recovery from those features.

c) **Poor**: Trees with more serious health features listed above and with a low chance of recovery from those features, even with remedial treatment.

Survival Rate Following Transplanting (High / Medium / Low)

2.2.5 The assessment of the survival rate of trees following transplanting is evaluated as High, Medium or Low, taking account of the following criteria:

- the typical ability of that tree species to survive transplanting;
- the tree size, form and existing health condition;
- the presence of any physical impediments to the preparation of root balls, such as wall, utilities, manholes, rocks, foundations etc.; and
- the inclined angle of the tree roots – the steeper the incline, the less chance of survival.

2.2.6 The grading of "Survival Rate following Transplanting" is therefore as follows:

a) **High**: Over 60% chance of survival provided that proper preparation and transplanting methodology is adopted.

b) **Medium**: 30-60% chance of survival provided that proper preparation and transplanting methodology is adopted.

c) **Low**: Less than 30% chance of survival even if proper preparation and transplanting methodology is adopted.

Amenity Value (High/Medium/Low)

2.2.7 The positive contribution of trees to their surrounding urban and landscape context is expressed as their "Amenity Value". Factors that are taken into consideration in the assessment include:

- Conservation value: Trees on the Register of Old and Valuable Trees (ETWBTC(W) 29/2004). "Important Trees" as defined in ETWBTC(W) 3/2006 "Tree Preservation". Rare or protected species, as listed by the Agriculture and Fisheries & Conservation Department. Fung Shui significance is also taken into account.
- Functional value: provide screening, shade or shelter.
- Age and maturity.
- Visual impact: the degree of positive visual impact created by the tree, or conversely, the degree of adverse visual impact that would result from loss of the tree.
- Status & form: a good representative specimen of its species, present condition, potential hazard and stability.

2.2.8 The grading of "Amenity Value" is therefore as follows:

a) **High**: "Old and Valuable Trees" and "Important Trees". Rare or protected species. Trees with fung shui significance. Mature trees with good health condition and form.

b) **Medium**: Common species with average health, medium condition and acceptable form. Rare or protected species, fung shui significance , but with poor health condition and form.

c) **Low**: Common weedy species, little or non-functional common species with poor health condition and poor form. Young and small trees of common species in accordance with the mature size for its species.

2.2.9 Trees with conservation value, rare and protected tree species, trees with ecological, trees with historical significance and fung shui trees are identified in the remarks column of the assessment schedule.

"Old and Valuable Tree" or "Important Tree"

2.2.10 If the tree is on the Register of Old and Valuable Trees, it is identified in the Schedule as an **"Old and Valuable Tree"** (OVT).

2.2.11 In accordance with ETWBTC(W) 29/2004 "Registration of Old and Valuable Trees, and Guidelines for their Preservation", if a tree meets one or more of the following criteria, it is identified in the Schedule as an "**Important Tree**" (IT):

- Trees of 100 years old or above;
- Trees of cultural historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or event;

- Trees of precious or rare species;
- Trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. tree with curtain like aerial roots, trees growing in unusual habitat; or
- Trees with trunk diameter equal or exceeding 1.0m (measured at 1.3m above ground level), or with height/canopy spread equal or exceeding 25m.

"Wall Trees"

2.2.12 Wall trees as defined in HyD TC No. 3/2008 on Independent Vetting of Tree Works under the Maintenance of Highways Department are identified in the Remarks column in the Schedule.

"Exempted Trees"

2.2.13 Certain types of tree are exempted from the control requirements of ETWBTC(W)3/2006, including:

- Trees made hazardous due to natural causes such as lightning, typhoon, torrential rain or landslide;
- Dead, dying or diseased trees; and
- Self-seeded trees of undesirable 'weed' species such as *Leucaena leucocephala*.

2.3 ASSESSMENT OF IMPACTS ON TREES

Design Reference Documents

2.3.1 In order to determine whether or not the existing trees will be affected by the proposed works, reference has been made to the latest available engineering designs.

2.3.2 For ease of reference, the engineering design for the engineering works has been overlaid on the tree survey drawings in **Appendix II**.

Description of Project Works in Kwai Tsing District

2.3.3 The XRL section within the Kwai Tsing District involves the following major works.

- Kwai Chung Ventilation Building (VB6) at Wing Yip Street

Additional Works Areas

2.3.4 Recognizing the necessity of adequate site area required for an extensive work of the XRL, additional works areas have been reserved for part or the entire duration of the project in the following locations:

- a temporary works area adjacent to Kwai Chung Ventilation Building (VB6) at Wing Yip Street;
- a temporary works area at San Kwai Street; and
- a temporary barging point at Rambler Channel.

Necessity for Removal of Trees

2.3.5 In order for these Works to be constructed a certain minimum number of trees must inevitably be removed.

2.3.6 Detailed discussions have been held with the design engineers to ensure that the impact on these existing trees along is minimised, and the total number of affected trees is kept to the minimum required to undertake the works.

2.3.7 The Tree Schedule in **Appendix I** includes a column providing the justification why a tree is unavoidably affected by the works.

Basis of Recommendation to Transplant

2.3.8 Trees that are unavoidably affected by the works and need to be removed are selected for transplanting instead of felling on the basis of a combination of factors including the location of the tree; the species, form, health and amenity value of the tree; the ease and cost of transplanting; the survival rate following transplanting and safety of transplanting operation. All of the following criteria must be satisfied for a tree to be recommended for transplanting instead of felling:

- Form and health are at least "fair";
- one of the categories "Amenity Value" and "Survival Rate" is "high" and the other is at least "medium" (ETWBTC(W) 3/2006, clause 17(c));
- the tree is of high conservation value, including rare and precious species (ETWBTC(W) 3/2006, clause 17(c));
- the tree is easily accessible, not on steeply sloping ground, and safe to transplant;
- there are no objects such as manholes, waterpoints, hydrants etc. that would interfere with rootball preparation; and
- tree preparation and transplanting must be able to be undertaken safely.

2.3.9 In addition affected street trees in paving and in roadside planters are also recommended for transplanting if they are in good condition.

Basis of Recommendation to Fell

2.3.10 If a tree that has to be removed is not selected to be transplanted according to the criteria above, then it is recommended to be felled.

2.3.11 In addition, the following trees are recommended to be felled, irrespective of whether or not they are affected by the works:

- all dead trees within the gazettal boundary;
- trees within the gazettal boundary considered hazardous to public safety and which cannot be rendered safe by tree pruning work; and
- trees within the gazettal boundary with contagious pests or diseases that cannot be eradicated by pest or disease control measures.

2.4 SUMMARY OF IMPLICATIONS FOR TREES

2.4.1 In summary, the Tree Survey reveals that:

a) There are **67** living trees (including **13** 'exempted' weed trees) identified inside, or just outside, the Gazettal Boundary in the Kwai Tsing District.

b) **38** of the living trees (including **2** 'exempted' weed trees) can be retained in situ during and after the Works, of which **0** (none) are currently recommended to be pruned.

c) **4** trees are recommended to be transplanted as a result of the Works.

d) **14** trees are recommended to be felled as a result of the Works. (In addition, **11** 'exempted' weed trees are to be felled)

Old and Valuable Trees and Important Trees

2.4.2 There are no Old or Valuable Trees (as listed in the Register of Old and Valuable Trees) in the Gazettal Boundary in the Kwai Tsing District.

2.4.3 There are **2** Important Trees (as defined by ETWBTC(W) 3/2006) in the Gazettal Boundary in the Kwai Tsing District as described below.

- T6612 - *Celtis sinensis* (10m height, 1.01m diameter, 8m spread) located in Highways Department Depot at Tai Lin Pai Road which is classed 'Important' due to its diameter greater than 1m.
- T7128 - *Aquilaria sinensis* (6m height, 0.24m diameter, 3m spread) located in Highways Department Depot at Tai Lin Pai Road which is classed 'Important' due to the fact that it is scheduled under Cap. 586 (Protection of Endangered Species of Animals and Plants Ordinance) and also recorded in AFCD's book "Rare and Precious Plants of Hong Kong' (2004).

2.4.4 Both Important Trees are proposed to be retained.

Wall Trees

2.4.5 There are no Wall Trees in the Gazettal Boundary in the Kwai Tsing District.

Breakdown of Affected Trees by Species

2.4.6 A breakdown of the affected trees by species is provided in **Table 2.1**.

Table 2.1 – Impacts on Trees by Species

TREE SPECIES	Retain	Retain & Prune	Transplant	Fell	TOTAL
Albizia lebbeck	1				1
Aleurites moluccana	2				2
Aquilaria sinensis	1				1
Artocarpus macrocarpus	1				1
Bombax ceiba	1				1
Bridelia tomentosa				1	1
Casuarina equisetifolia	5			2	7
Celtis sinensis	2			1	3
Cleistocalyx operculatus			2	1	3
Delonix regia	2				2
Ficus hispida	1			2	3
Ficus microcarpa	1		2		3
Ficus superba var. japonica	1				1
Ficus variegata var. chlorocarpa	2				2
Ficus virens var. sublanceolata	1				1
Leucaena leucocephala	(2)*			(11)*	(13)*
Ligustrum sinense				1	1
Litsea glutinosa	1				1
Macaranga tanarius	10			4	14
Mallotus paniculatus	1				1
Melia azedarach	1			2	3
Rhus succedanea	1				1
Trema tomentosa	1				1
Grand Total	**36 (38)***	**0**	**4**	**14 (25)***	**54 (67)***

*Under ETWBTC(W)3/2006 *Leucaena leucocephala* is considered a self-seeded weed tree and can be felled w/o compensation. Totals without brackets exclude *Leucaena*. Totals in brackets include *Leucaena.*

Breakdown of Affected Trees by Government Department

2.4.7 A breakdown of the affected trees according to the Government Department responsible to advise Lands Department under ETWBTC(W) 3/2006 is provided in **Tables 2.2, 2.3 and 2.4.**

Table 2.2 – Affected Trees for which LCSD advise DLO under ETWBTC(W) 3/2006

TREE SPECIES	Retain	Retain & Prune	Transplant	Fell	TOTAL
Albizia lebbeck	1				1
Aleurites moluccana	2				2
Artocarpus macrocarpus	1				1
Bombax ceiba	1				1
Bridelia tomentosa				1	1
Casuarina equisetifolia				2	2
Celtis sinensis	2			1	3
Cleistocalyx operculatus			2	1	3
Delonix regia	2				2
Ficus hispida	1			1	2
Ficus microcarpa	1		2		3
Ficus superba var. japonica	1				1
Leucaena leucocephala	(2)*			(7)*	(9)*
Ligustrum sinense				1	1
Macaranga tanarius	10			4	14
Mallotus paniculatus	1				1
Melia azedarach				2	2
Rhus succedanea	1				1
Trema tomentosa	1				1
Grand Total	**25 (27)***	**0**	**4**	**13 (20)***	**42 (51)***

*Under ETWBTC(W)3/2006 *Leucaena leucocephala* is considered a self-seeded weed tree and can be felled w/o compensation. Totals without brackets exclude *Leucaena*. Totals in brackets include *Leucaena.*

Table 2.3 – Affected Trees for which AFCD advise DLO under ETWBTC(W) 3/2006

TREE SPECIES	Retain	Retain & Prune	Transplant	Fell	TOTAL
Casuarina equisetifolia	5				5
Ficus hispida				1	1
Ficus variegata var. chlorocarpa	1				1
Leucaena leucocephala				(4)*	(4)*
Melia azedarach	1				1
Grand Total	**7**	**0**	**0**	**1 (5)***	**8 (12)***

*Under ETWBTC(W)3/2006 *Leucaena leucocephala* is considered a self-seeded weed tree and can be felled w/o compensation.
Totals without brackets exclude *Leucaena*. Totals in brackets include *Leucaena*

Table 2.4 – Affected Trees for which HyD advise DLO under ETWBTC(W) 3/2006

TREE SPECIES	Retain	Retain & Prune	Transplant	Fell	TOTAL
Aquilaria sinensis	1				1
Ficus variegate var. chlorocarpa	1				1
Ficus virens var. sublanceolata	1				1
Litsea glutinosa	1				1
Grand Total	**4**	**0**	**0**	**0**	**4**

Chapter 3

Compensatory Tree Planting & Transplanting Proposal

3 COMPENSATORY TREE PLANTING AND TRANSPLANTING PROPOSAL

3.1 INTRODUCTION

3.1.1 The compensatory tree planting and transplanting proposals are indicated on the drawings in **Appendix III** and described below. The drawings indicate

- the existing trees that have been recommended to be retained;
- proposed trees; and
- locations of trees transplanted back to the site at the end of the works.

3.2 TREE PROTECTION, TREE PRUNING, AND TREE TRANSPLANTING PROPOSALS

Tree Protection Strategy

3.2.1 As identified in the Tree Survey, a number of trees that are proposed to be retained will be within the railway works areas and great care will need to be taken during construction to ensure that no damage occurs to them. Tree protection measures written into the contract documents shall include the provision of sturdy protective fencing located underneath the edge of the tree canopy (not just around the tree trunk); prohibition of storage of any materials under the tree canopy; prohibition of construction traffic under the tree canopy; and prohibition of cleaning out of concrete mixers, or washing of equipment underneath the tree canopy. The specification for the tree protection works will be according to the Soft Landscape Works Particular Specification, attached in **Appendix V**.

Tree Pruning Strategy

3.2.2 During the course of construction work, some trees which are recommended to be retained in their existing positions may need to have their roots or branches pruned to enable nearby construction work. The specification for the tree pruning works will be according to the Soft Landscape Works Particular Specification, attached in **Appendix V**.

Tree Transplanting Strategy

3.2.3 Whenever possible along the XRL, trees proposed to be transplanted will be moved directly to a final location within the works boundary. However, such final receptor locations will not be immediately available for all transplanted trees due to the works programme, in which case the trees that cannot be immediately located to a final receptor site will be transplanted to a Temporary Holding Nursery until such time as it is appropriate to transplant them to their final location.

3.2.4 In Kwai Tsing District, **4** trees are identified for transplanting from the Vent Building site. It is considered practical to immediately relocate these transplanted trees to final receptor locations in the vicinity of the Vent Building adjacent works area (in the HyD Depot).

3.2.5 The specification for the tree transplanting works will be according to Particular Specification for Tree Works, Soft Landscape Works and Nursery Works, attached in **Appendix V**.

3.3 COMPENSATORY TREE PLANTING

Compensatory Tree Planting Strategy

3.3.1 In accordance with ETWBTC(W) 3/2006, the compensatory planting proposal has the basic primary objective of planting compensatory trees in a ratio not less than 1:1 in terms of quality and quantity.

Numbers of Compensatory Trees

3.3.2 A total of **14** trees are proposed to be felled (not including dead and 'exempted' trees). The aggregate girth of the **14** trees to be felled is **9.92** m. The proposed compensatory tree planting plans is attached in Appendix III.

3.3.3 Given the tight space available for compensatory planting at the Vent Building, it is proposed to plant a minimum of **26** Standard Trees (or a mix of trees sizes with equivalent total girth) representing a ratio not less than 1:1 by number. More trees will be planted if space allows.

Locations for Compensatory Tree Planting

3.3.4 Generally, the project design provides the following opportunities for compensatory tree planting in the **Kwai Tsing District:**

- Specimen tree planting around the Vent Building.

3.3.5 Please also note that it is not proposed to undertake any compensatory planting within the temporary works areas or the temporary barging point, since the long term land use of these areas is not known and the permanence of any trees planted there cannot be guaranteed.

Recommended Tree Species for use in XRL Project

3.3.6 **Tables 3.1, 3.2 and 3.3** list suggested tree compensation species to be used along the XRL. There are three lists for different primary functions – street / roadside avenue trees; native woodland planting; and ornamental planting.

Programme for Compensatory Tree Planting

3.3.7 The compensatory tree planting will be undertaken as part of the XRL works contracts. The compensatory planting will be programmed to be complete by the time of the opening of the railway, so that the mitigation effect of the planting is felt from day one of the railway operation. The detailed programme for the compensatory tree planting will be determined by the works contractors to meet this requirement. The trees will be planted at the earliest possible time.

3.4 CONSOLIDATED FINDINGS OF TREE SURVEY AND COMPENSATORY PROPOSALS IN THIS APPLICATION

3.4.1 **Table 3.4** summarises the consolidated findings and recommendations of the tree survey and compensatory planting proposals.

Table 3.4 : Summary of Tree Totals for TLP-3: Works in Kwai Tsing District

(1)	(2)	(3)	(4)	(5)	(6)
Total Trees in Kwai Tsing District	**Trees to be retained**	**Trees to be retained and pruned**	**Trees to be transplanted**	**Trees to be felled**	**Proposed Compensatory Tree Planting (Minimum)**
54 (67)*	36 (38)*	0	4	14 (25)*	26 Standard

*Under ETWBTC(W)3/2006 *Leucaena leucocephala* is considered a self-seeded weed tree and can be felled w/o compensation. Totals without brackets exclude *Leucaena*. Totals in brackets include *Leucaena.*

3.4.2 A total of **54** trees (excluding 13 "exempted" weed trees) currently exist in the area covered by **TLP-3**. There are no Old or Valuable Trees (as listed in the Register of Old and Valuable Trees), however, there are **2** 'Important Trees' (as defined by ETWBTC(W) 3/2006), both of which will be retained. There are no Wall Trees.

3.4.3 A total of **36** trees will be retained (excluding the **2** 'Important Trees'), **14** trees will be felled, **4** trees will be transplanted, and a minimum **26** compensatory standard trees will be planted.

3.4.4 In addition the **4** transplanted trees will be relocated immediately within the project site (the HyD Depot).

3.5 COMPLIANCE TO EIA REPORT AND EP REQUIREMENT

3.5.1 The landscape mitigation measures as stated in the EIA report are shown in the drawings in Appendix III and summarized in table 3.5.

Table 3.5 Proposed Planting as Landscape and Visual Mitigation Measures as Stated in the EIA Report (plan ref. NOL/ERL/300/C/XRL/ENS/M54/622 - 624.)

ID No.	Landscape and Visual Mitigation Measures	Drawing No. Showing the Mitigation Measures
OM3	Tall buffer tree planting should be incorporated to provide screening to vent buildings, engineering structures and associated facilities.	821/T/KCV/ATK/A58/824
OM3a	Roof greening to mitigate the visual impact of the vent building on the VSRs at high level.	822/W/SMV/ATK/A58/826

3.5.2 The landscape plan, compensatory tree planting and transplanting plans shown in Appendix III are based on the latest design at the date of this submission. Subsequent design, if any, would comply with the requirement of provision of minimum number of compensatory trees and mitigation measures as stated in the approved EIA.

Chapter 4

Cumulative Tree Impacts and Tree Compensation

4 CUMULATIVE TREE FELLING AND TREE COMPENSATION FOR THE XRL

4.1.1 ***Table 4.1*** summarises the total tree felling, transplanting and compensatory tree planting incorporated in the Tree Felling Applications submitted up to now and planned for submission in future. The contribution of this TLP to the cumulative total is highlighted in bold italics.

Table 4.1 Summary of Tree Felling, Transplanting and Compensation

	(1)	(2)	(3)	(4)	(5)	(6)
Tree Felling Application	**Trees Surveyed in Gazettal Boundary**	**Trees to be Retained**	**Trees to be Retained and Pruned**	**Trees to be transplanted**	**Trees to be Felled**	**Compensatory Tree Planting**
***TLP-1: Works in Yau Tsim Mong District	2410 (2540)*	1497 (1533)*	4	373	536 (630)*	835
***TLP-2: Works in Sham Shui Po District	1116 (1458)*	427 (580)*	2 (3)*	474	213 (391)*	281
****TLP-3: Works in Kwai Tsing District**	**54 (67)***	**36 (38)***	**0**	**4**	**14 (25)***	**26**
***TLP-4: Works in Tsuen Wan District	372 (386)*	297 (309)*	0	42	33(35)	51
***TLP-5: Works in Tuen Mun District	1084 (1150)*	897 (954)*	9 (16)*	0	178 (180)*	240
***TLP-6: Works in Yuen Long District – Mai Po	109 (121)*	16 (20)*	1	8	84 (92)*	99
***TLP-7: Works in Yuen Long District - Remainder	4245# (4937)*	1301# (1462)*	0	176#	2768# (3299)*	4650#
CUMULATIVE TOTAL	**9390 (10659)***	**4471 (4906)***	**16# (24)***	**1077#**	**3826 (4652)***	**6182#**

*Under EWBTC(W)3/2006 *Leucaena leucocephala* is considered a self-seeded weed tree and can be felled w/o compensation. Totals without brackets exclude *Leucaena*. Totals in brackets include *Leucaena.*

** *Current Submission*
*** *Currently being processed by Government at the date of this Submission*
**** *Previously Approved by Government.*
***** *Not yet submitted to Government*
Estimated tree numbers based on latest information in hand

Appendix I

Tree Assessment Schedule

Part 1 : Schedule for LCSD

Part 2 : Schedule for AFCD

Part 3 : Schedule for HyD

EXPRESS RAIL LINK

CONSULTANCY AGREEMENT NO. C8001 - TREE TRANSPLANTING / FELLING

TLP-3: WORKS IN KWAI TSING DISTRICT

Part 1 - Existing Tree Assessment Schedule for LCSD

SURVEY SHEET No. C8001/T/XRL/ URB/	TREE No.	PHOTO No.	**BOTANICAL NAME**	CHINESE COMMON NAME	MAINTENANCE DEPARTMENT	DEPARTMENT TO ADVISE LandsD (ArchSD, AFCD, LCSD, HyD, HD)	SIZE (m)			FORM (Good/Fair/Poor)	HEALTH (Good/Fair/Poor)	AMENITY VALUE (High/Med/Low)	Old & Valuable Tree or Important Tree (OVT/IT)	SURVIVAL RATE AFTER TRANSPLANTING (High/Med/Low)	RECOMMENDATION	JUSTIFICATION	REMARKS
							OVERALL HEIGHT	TRUNK DIAMETER	CROWN SPREAD								
C04/202	T6601	2, 3	*Macaranga tanarius*	血桐	DLO	LCSD	6	0.58	6	Fair	Fair	Med		Low	Fell	E	Die-back branches
C04/202	T6604	4	*Bridelia tomentosa*	土蜜樹	DLO	LCSD	3	0.10	2	Fair	Fair	Low		Low	Fell	E	-
C04/202	T6605	5	*Macaranga tanarius*	血桐	DLO	LCSD	6	0.15	3	Fair	Fair	Low		Low	Fell	E	Leaning trunk
C04/202	T6606	6	Dead Tree	枯樹	DLO	LCSD	4	0.15	2	-	-	-		-	Dead	-	-
C04/202	T6607	7	*Celtis sinensis*	朴樹	DLO	LCSD	5	0.24	3	Fair	Fair	Med		Low	Fell	E	-
C04/202	T6608	8	*Macaranga tanarius*	血桐	DLO	LCSD	6	0.26	3	Fair	Fair	Med		Low	Fell	E	Leaning trunk
C04/202	T6609	9	*Macaranga tanarius*	血桐	DLO	LCSD	6	0.25	5	Fair	Fair	Med		Low	Fell	E	-
C04/202	T6610	10	*Ligustrum sinense*	山指甲	DLO	LCSD	5	0.38	4	Fair	Fair	Med		Med	Fell	E	Multi-trunk
C04/202	T6611	11	*Celtis sinensis*	朴樹	DLO	LCSD	10	0.59	6	Good	Good	High		Low	Retain	-	-
C04/202	T6612	12	*Celtis sinensis*	朴樹	DLO	LCSD	10	1.01	8	Good	Good	High	IT	Low	Retain	-	This tree is “important” because it has trunk diameter in excess of 1m
C04/202	T6613	13	*Macaranga tanarius*	血桐	DLO	LCSD	10	0.68	7	Fair	Fair	Med		Low	Retain	-	Die-back branches, water sprout
C04/202	T7128	14, 15	*Trema tomentosa*	山黃麻	DLO	LCSD	7	0.17	4	Good	Good	Med		Med	Retain	-	-
C04/202	T7129	16	*Macaranga tanarius*	血桐	DLO	LCSD	6	0.23	4	Fair	Fair	Med		High	Retain	-	Unbalanced crown
C04/202	T7129A	17	*Ficus hispida*	對葉榕	DLO	LCSD	5	0.15	4	Fair	Fair	Med		High	Retain	-	
C04/202	T7139	19	*Leucaena leucocephala*	銀合歡	Arch SD	LCSD	6	0.14	3	Fair	Fair	Low		High	Retain	-	-
C04/202	T7144	18	*Ficus microcarpa*	細葉榕	Arch SD	LCSD	3	0.16	2	Fair	Good	Med		High	Transplant	C, E, H	-
C04/202	T7145	20	*Melia azedarach*	楝	Arch SD	LCSD	4	0.13	2	Fair	Fair	Low		High	Fell	C, E, H	-
C04/202	T7147	21	*Melia azedarach*	楝	Arch SD	LCSD	4	0.11	3	Fair	Fair	Low		High	Fell	C, E, H	-
C04/202	T7148	22	*Casuarina equisetifolia*	木麻黃	Arch SD	LCSD	9	0.28	4	Good	Good	Med		Low	Fell	C, E, H	Climber growing on tree
C04/202	T7150	23	*Cleistocalyx operculatus*	水翁	Arch SD	LCSD	5	0.13	3	Fair	Good	Med		High	Transplant	C, E, H	-
C04/202	T7151	24	*Casuarina equisetifolia*	木麻黃	Arch SD	LCSD	10	0.36	4	Fair	Good	Med		Low	Fell	C, E, H	-
C04/202	T7153	25	*Cleistocalyx operculatus*	水翁	Arch SD	LCSD	3	0.12	2	Fair	Good	Med		High	Transplant	C, E, H	-
C04/202	T7154	28	*Cleistocalyx operculatus*	水翁	Arch SD	LCSD	3	0.12	2	Fair	Fair	Med		Med	Fell	C, E, H	Water sprouts observed
C04/202	T7155	26, 27	*Ficus microcarpa*	細葉榕	Arch SD	LCSD	2	0.11	2	Fair	Good	Med		High	Transplant	C, E, H	-
C04/202	T7184	33	*Artocarpus macrocarpus*	菠蘿蜜	HyD	LCSD	6	0.11	2	Fair	Fair	Med		Low	Retain	-	-
C04/202	T7187	34	*Macaranga tanarius*	血桐	HyD	LCSD	6	0.18	4	Fair	Fair	Med		High	Retain	-	-
C04/202	T7196	35	*Macaranga tanarius*	血桐	HyD	LCSD	6	0.24	4	Fair	Fair	Med		Med	Retain	-	-
C04/202	T7197	36	*Macaranga tanarius*	血桐	HyD	LCSD	6	0.16	2	Fair	Fair	Med		Med	Retain	-	-
C04/202	T7198	37	*Macaranga tanarius*	血桐	HyD	LCSD	6	0.20	3	Fair	Fair	Med		Low	Retain	-	-
C04/202	T7199	38	*Ficus hispida*	對葉榕	HyD	LCSD	3	0.10	2	Fair	Fair	Low		Med	Fell	E	-
C04/203	T7059	1, 2, 3	*Macaranga tanarius*	血桐	DLO	LCSD	4	0.29	3	Fair	Fair	Med		Med	Retain	-	Wound found on trunk, water sprouts
C04/203	T7060	4, 5	*Delonix regia*	鳳凰木	DLO	LCSD	8	0.63	6	Good	Good	High		Med	Retain	-	-
C04/203	T7061	6	*Macaranga tanarius*	血桐	DLO	LCSD	5	0.37	5	Fair	Fair	Med		Med	Retain	-	Die-back branches, two branches
C04/203	T7062	7	*Aleurites moluccana*	石栗	DLO	LCSD	7	0.23	4	Good	Fair	Med		Med	Retain	-	Die-back branches
C04/203	T7063	8, 9	*Ficus microcarpa*	細葉榕	DLO	LCSD	7	0.69	5	Fair	Fair	High		Med	Retain	-	-
C04/203	T7064	10	*Aleurites moluccana*	石栗	DLO	LCSD	8	0.21	3	Fair	Fair	Med		Med	Retain	-	-
C04/203	T7065	11	*Delonix regia*	鳳凰木	DLO	LCSD	7	0.37	6	Good	Good	High		Med	Retain	-	-
C04/203	T7066	12, 13	*Macaranga tanarius*	血桐	DLO	LCSD	4	0.13	4	Fair	Fair	Low		Med	Retain	-	-
C04/203	T7067	14, 15	*Mallotus paniculatus*	白楸	DLO	LCSD	4	0.13	3	Fair	Fair	Low		Low	Retain	-	-
C04/203	T7068	16, 17	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.12	4	Fair	Fair	Low		High	Retain	-	-
C04/203	T7069	18	*Bombax ceiba*	木棉	DLO	LCSD	6	0.18	3	Good	Good	Med		High	Retain	-	-

EXPRESS RAIL LINK

CONSULTANCY AGREEMENT NO. C8001 - TREE TRANSPLANTING / FELLING

TLP-3: WORKS IN KWAI TSING DISTRICT

Part 1 - Existing Tree Assessment Schedule for LCSD

SURVEY SHEET No. C8001/T/XRL/ URB/	TREE No.	PHOTO No.	**BOTANICAL NAME**	CHINESE COMMON NAME	MAINTENANCE DEPARTMENT	DEPARTMENT TO ADVISE LandsD (ArchSD, AFCD, LCSD, HyD, HD)	SIZE (m)			FORM (Good/Fair/Poor)	HEALTH (Good/Fair/Poor)	AMENITY VALUE (High/Med/Low)	Old & Valuable Tree or Important Tree (OVT/IT)	SURVIVAL RATE AFTER TRANSPLANTING (High/Med/Low)	RECOMMENDATION	JUSTIFICATION	REMARKS
							OVERALL HEIGHT	TRUNK DIAMETER	CROWN SPREAD								
C04/203	T7070	19, 20	*Macaranga tanarius*	血桐	DLO	LCSD	4	0.27	3	Fair	Fair	Med		High	Retain	-	Wound found on turnk, die-back branches
C04/204	T10686	1	*Ficus superba var. japonica*	筆管榕	DLO	LCSD	4.5	0.19	7	Fair	Fair	Med		Med	Retain	-	Multi-trunk
C04/204	T10687	2	*Rhus succedanea*	木蠟樹	DLO	LCSD	5	0.15	3	Fair	Fair	Med		Med	Retain	-	-
C04/204	T10688	3	*Leucaena leucocephala*	銀合歡	DLO	LCSD	5	0.10	4	Fair	Fair	Low		High	Fell	E, K	-
C04/204	T10689	4	*Leucaena leucocephala*	銀合歡	DLO	LCSD	6	0.21	8	Fair	Fair	Low		High	Fell	E, K	-
C04/204	U0001	12, 13	*Albizia lebbeck*	大葉合歡	DLO	LCSD	7	0.33	12	Poor	Poor	Low		Low	Retain	-	Fork, embedded in fence
C04/204	U0002	14	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.10	3	Poor	Fair	Low		High	Fell	E, K	
C04/204	U0003	15	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.10	3	Poor	Fair	Low		High	Fell	E, K	
C04/204	U0004	16	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.14	4	Fair	Fair	Low		High	Fell	E, K	
C04/204	U0005	18	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.10	3	Fair	Fair	Low		High	Fell	E, K	
C04/204	U0006	19	*Leucaena leucocephala*	銀合歡	DLO	LCSD	4	0.13	4	Fair	Fair	Low		High	Fell	E, K	

Key to notation in “Justification” column

Note A: Affected by Temporary Traffic Management works (TTM)
Note B: Affected by Retaining Walls and Slope Works construction
Note C: Affected by Vent Building construction
Note E: Affected by contractors works area
Note F: Affected by Public Transport Interchange (PTI) construction
Note G: Affected by Footbridge Demolition/ Reconstruction
Note H: Affected by Ground Treatment works
Note I: Affected by Utilities Diversion, Box Culvert Reconstruction, Pile Removal, Pier Demolition
Note J: Affected by Tunnel Boring Machine (TBM) Launch Shaft Construction, Temporary Construction Shaft
Note K: Affected by Barging Point Area
Note L: Affected by Explosive Magazine Site
Note M : Poor Tree Health

Summary of trees	Including Leu.Leu	excluding Leu.Leu
Retained trees	27	25
Retain and Pruned	0	0
Transplanted trees	4	4
Felled trees	20	13
Total trees	51	42
* excluding 1 no. of Dead tree.		

EXPRESS RAIL LINK

CONSULTANCY AGREEMENT NO. C8001 - TREE TRANSPLANTING / FELLING

TLP-3: WORKS IN KWAI TSING DISTRICT

Part 2 - Existing Tree Assessment Schedule for AFCD

SURVEY SHEET No. C8001/T/XRL/ URB/	TREE No.	PHOTO No.	**BOTANICAL NAME**	CHINESE COMMON NAME	MAINTENANCE DEPARTMENT	DEPARTMENT TO ADVISE LandsD (ArchSD, AFCD, LCSD, HyD, HD)	SIZE (m)			FORM (Good/Fair/Poor)	HEALTH (Good/Fair/Poor)	AMENITY VALUE (High/Med/Low)	Old & Valuable Tree or Important Tree (OVT/IT)	SURVIVAL RATE AFTER TRANSPLANTING (High/Med/Low)	RECOMMENDATION	JUSTIFICATION	REMARKS
							OVERALL HEIGHT	TRUNK DIAMETER	CROWN SPREAD								
C04/202	T6600	1	*Ficus hispida*	對葉榕	HyD	AFCD	4	0.12	2	Fair	Fair	Low		Low	Fell	E	-
C04/204	T10690	5	*Leucaena leucocephala*	銀合歡	DLO	AFCD	6	0.17	6	Fair	Fair	Low		High	Fell	E, K	-
C04/204	T10691	6	*Ficus variegata var. chlorocar*	青果榕	DLO	AFCD	2	0.10	3	Fair	Fair	Med		Med	Retain	-	-
C04/204	T10693	7	*Casuarina equisetifolia*	木麻黃	DLO	AFCD	10	0.36	7	Fair	Fair	Med		Low	Retain	-	-
C04/204	T10694	8	*Casuarina equisetifolia*	木麻黃	DLO	AFCD	10	0.22	5	Fair	Fair	Med		Low	Retain	-	-
C04/204	T10695	9	*Casuarina equisetifolia*	木麻黃	DLO	AFCD	7	0.15	3	Fair	Fair	Med		Low	Retain	-	Bifurcating trunk
C04/204	T10696	10	*Casuarina equisetifolia*	木麻黃	DLO	AFCD	8	0.24	6	Good	Good	Med		Low	Retain	-	-
C04/204	T10697	11	*Casuarina equisetifolia*	木麻黃	DLO	AFCD	7	0.13	5	Fair	Fair	Med		Low	Retain	-	Bifurcating trunk
C04/204	U0008	17	*Leucaena leucocephala*	銀合歡	DLO	AFCD	5	0.14	4	Fair	Good	Low		High	Fell	E, K	
C04/204	U0009	20	*Leucaena leucocephala*	銀合歡	DLO	AFCD	5	0.19	4	Fair	Good	Low		High	Fell	E, K	
C04/204	U0010	21	*Leucaena leucocephala*	銀合歡	DLO	AFCD	6	0.14	4	Fair	Good	Low		High	Fell	E, K	
C04/204	U0011	22, 23	*Melia azedarach*	楝	DLO	AFCD	7	0.29	8	Good	Good	Med		High	Retain	-	

Key to notation in “Justification” column

Note A: Affected by Temporary Traffic Management works (TTM)
Note B: Affected by Retaining Walls and Slope Works construction
Note C: Affected by Vent Building construction
Note E: Affected by contractors works area
Note F: Affected by Public Transport Interchange (PTI) construction
Note G: Affected by Footbridge Demolition/ Reconstruction
Note H: Affected by Ground Treatment works
Note I: Affected by Utilities Diversion, Box Culvert Reconstruction, Pile Removal, Pier Demolition
Note J: Affected by Tunnel Boring Machine (TBM) Launch Shaft Construction, Temporary Construction Shaft
Note K: Affected by Barging Point Area
Note L: Affected by Explosive Magazine Site
Note M : Poor Tree Health

Summary of trees	Including Leu.Leu	excluding Leu.Leu
Retained trees	7	7
Retain and Pruned	0	0
Transplanted trees	0	0
Felled trees	5	1
Total trees	12	8
* excluding 0 nos. of Dead trees.		

EXPRESS RAIL LINK

CONSULTANCY AGREEMENT NO. C8001 - TREE TRANSPLANTING / FELLING

TLP-3: WORKS IN KWAI TSING DISTRICT

Part 3 - Existing Tree Assessment Schedule for HyD

Date : June 2009

SURVEY SHEET No. C8001/T/XRL/ URB/	TREE No.	PHOTO No.	BOTANICAL NAME	CHINESE COMMON NAME	MAINTENANCE DEPARTMENT	DEPARTMENT TO ADVISE LandsD (ArchSD, AFCD, LCSD, HyD, HD)	SIZE (m) OVERALL HEIGHT	SIZE (m) TRUNK DIAMETER	SIZE (m) CROWN SPREAD	FORM (Good/Fair/Poor)	HEALTH (Good/Fair/Poor)	AMENITY VALUE (High/Med/Low)	Old & Valuable Tree or Important Tree (OVT/IT)	SURVIVAL RATE AFTER TRANSPLANTING (High/Med/Low)	RECOMMENDATION	JUSTIFICATION	REMARKS
C04/202	T7180	30	*Ficus virens var. sublanceolat*	黃葛樹	HyD	HyD	9	0.20	5	Fair	Fair	Med		Low	Retain	-	Cavity found on trunk, HyD SIMAR Slope Feature No. 7SW-C/C232
C04/202	T7181	31	*Ficus variegata var. chlorocar*	青果榕	HyD	HyD	10	0.30	4	Fair	Fair	Med		Low	Retain	-	Die-back branches, HyD SIMAR Slope Feature No. 7SW-C/C231
C04/202	T7182	29	*Aquilaria sinensis*	土沉香	HyD	HyD	6	0.24	3	Fair	Fair	High	IT	Low	Retain	-	Die-back branches. Recorded in AFCD's book "Rare and Precious Plants of Hong Kong' (2003). HyD SIMAR Slope Feature No. 7SW-C/C231
C04/202	T7183	32	*Litsea glutinosa*	潺槁樹	HyD	HyD	6	0.21	3	Fair	Fair	Med		Low	Retain	-	Die-back branches, HyD SIMAR Slope Feature No. 7SW-C/C231

Key to notation in “Justification” column

Note A: Affected by Temporary Traffic Management works (TTM)
Note B: Affected by Retaining Walls and Slope Works construction
Note C: Affected by Vent Building construction
Note E: Affected by contractors works area
Note F: Affected by Public Transport Interchange (PTI) construction
Note G: Affected by Footbridge Demolition/ Reconstruction
Note H: Affected by Ground Treatment works
Note I: Affected by Utilities Diversion, Box Culvert Reconstruction, Pile Removal, Pier Demolition
Note J: Affected by Tunnel Boring Machine (TBM) Launch Shaft Construction, Temporary Construction Shaft
Note K: Affected by Barging Point Area
Note L: Affected by Explosive Magazine Site
Note M : Poor Tree Health

Summary of trees	Including Leu.Leu	excluding Leu.Leu
Retained trees	4	4
Retain and Pruned	0	0
Transplanted trees	0	0
Felled trees	0	0
Total trees	4	4
* excluding 0 nos. of Dead trees.		

Appendix II

Tree Survey Drawings (with Engineering Design overlaid)

KWAI TSING DISTRICT
TSUEN WAN DISTRICT

202

203

204

SHA TIN DISTRICT
KWAI TSING DISTRICT

TSING TSUEN BRIDGE
TSING LAI BRIDGE
TSING YI BRIDGE
KWAI TSING ROAD
CHEUNG TSING HIGHWAY
TSING KWAI HIGHWAY
KWAI CHUNG ROAD
CONTAINER PORT ROAD SOUTH
RAMBLER CHANNEL
TYPHOON SHELTER
Breakwater
Seawall
Fence
Tsing Yi Swimming Pool
Tsing Yi Sports Ground
Tsing Yi Park
Tsing Yi Promenade
Tsing Yi Sitting-out Area
Tsing Yi Service Reservoir
Tsing Yi Fire Station
Tsing Yi Police Station
Tsing Yi Ambulance Depot
Tsing Yi Vehicle Detention Ground
Abattoir
Kwai Shing West Estate
Kwai Shing Sports Centre
Kwai Shing Swimming Pool
Kwai Shing Park
Kwai Shing Playground
Kwai Shing Public Library
Kwai Shing Theatre
Kwai Chung Sports Centre
Kwai Chung Park
Kwai Chung Playground
Kwai Chung Swimming Pool
Kwai Chung Theatre
Kwai Chung Town Hall
Kwai Chung Complex
Kwai Chung Hospital
Kwai Chung Police Married Quarters
Kwai Chung Police Station
Kwai Chung Police Headquarters
Kwai Chung Police Pier
Kwai Chung Police Pier Heliport
Kwai Chung Police Pier Helipad
Kwai Chung Police Pier Helicopter Apron
Kwai Chung Police Pier Helicopter Hangar
Kwai Chung Police Pier Helicopter Workshop
Kwai Chung Police Pier Helicopter Store
Kwai Chung Police Pier Helicopter Fuel Store
Kwai Chung Police Pier Helicopter Fuel Tank
Kwai Chung Police Pier Helicopter Fuel Pump
Kwai Chung Police Pier Helicopter Fuel Dispenser
Kwai Chung Police Pier Helicopter Fuel Hydrant
Kwai Chung Police Pier Helicopter Fuel Hydrant Valve
Kwai Chung Police Pier Helicopter Fuel Hydrant Pit
Kwai Chung Police Pier Helicopter Fuel Hydrant Cover
Kwai Chung Police Pier Helicopter Fuel Hydrant Box
Kwai Chung Police Pier Helicopter Fuel Hydrant Key
Kwai Chung Police Pier Helicopter Fuel Hydrant Wrench
Kwai Chung Police Pier Helicopter Fuel Hydrant Hose
Kwai Chung Police Pier Helicopter Fuel Hydrant Nozzle
Kwai Chung Police Pier Helicopter Fuel Hydrant Adaptor
Kwai Chung Police Pier Helicopter Fuel Hydrant Reducer
Kwai Chung Police Pier Helicopter Fuel Hydrant Coupling
Kwai Chung Police Pier Helicopter Fuel Hydrant Gasket
Kwai Chung Police Pier Helicopter Fuel Hydrant Seal
Kwai Chung Police Pier Helicopter Fuel Hydrant Ring
Kwai Chung Police Pier Helicopter Fuel Hydrant Bolt
Kwai Chung Police Pier Helicopter Fuel Hydrant Nut
Kwai Chung Police Pier Helicopter Fuel Hydrant Washer
Kwai Chung Police Pier Helicopter Fuel Hydrant Spring
Kwai Chung Police Pier Helicopter Fuel Hydrant Pin
Kwai Chung Police Pier Helicopter Fuel Hydrant Clip
Kwai Chung Police Pier Helicopter Fuel Hydrant Chain
Kwai Chung Police Pier Helicopter Fuel Hydrant Lock
Kwai Chung Police Pier Helicopter Fuel Hydrant Key
Kwai Chung Police Pier Helicopter Fuel Hydrant Wrench
Kwai Chung Police Pier Helicopter Fuel Hydrant Hose
Kwai Chung Police Pier Helicopter Fuel Hydrant Nozzle
Kwai Chung Police Pier Helicopter Fuel Hydrant Adaptor
Kwai Chung Police Pier Helicopter Fuel Hydrant Reducer
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Kwai Chung Police Pier Helicopter Fuel Hydrant Seal
Kwai Chung Police Pier Helicopter Fuel Hydrant Ring
Kwai Chung Police Pier Helicopter Fuel Hydrant Bolt
Kwai Chung Police Pier Helicopter Fuel Hydrant Nut
Kwai Chung Police Pier Helicopter Fuel Hydrant Washer
Kwai Chung Police Pier Helicopter Fuel Hydrant Spring
Kwai Chung Police Pier Helicopter Fuel Hydrant Pin
Kwai Chung Police Pier Helicopter Fuel Hydrant Clip
Kwai Chung Police Pier Helicopter Fuel Hydrant Chain
Kwai Chung Police Pier Helicopter Fuel Hydrant Lock
Container Terminal 1
Container Terminal 2
Container Terminal 3
Container Terminal 5
Open Storage
Workshop
Tollgate
ATL Logistics Centre
Tsing Yi Sewage Treatment Plant
Tsing Yi Central Centre
Tsing Yi Industrial Centre
Tsing Yi Industrial Estate
Tsing Yi Industrial Park
Tsing Yi Industrial Zone
Tsing Yi Industrial Area
Tsing Yi Industrial Building
Tsing Yi Industrial Factory
Tsing Yi Industrial Warehouse
Tsing Yi Industrial Workshop
Tsing Yi Industrial Yard
Tsing Yi Industrial Depot
Tsing Yi Industrial Storage
Tsing Yi Industrial Office
Tsing Yi Industrial Canteen
Tsing Yi Industrial Toilet
Tsing Yi Industrial Shower
Tsing Yi Industrial Changing Room
Tsing Yi Industrial Locker
Tsing Yi Industrial Cabinet
Tsing Yi Industrial Shelf
Tsing Yi Industrial Rack
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Tsing Yi Industrial Container
Tsing Yi Industrial Pallet
Tsing Yi Industrial Forklift
Tsing Yi Industrial Crane
Tsing Yi Industrial Hoist
Tsing Yi Industrial Conveyor
Tsing Yi Industrial Belt
Tsing Yi Industrial Roller
Tsing Yi Industrial Chain
Tsing Yi Industrial Sprocket
Tsing Yi Industrial Gear
Tsing Yi Industrial Motor
Tsing Yi Industrial Engine
Tsing Yi Industrial Generator
Tsing Yi Industrial Transformer
Tsing Yi Industrial Switchgear
Tsing Yi Industrial Control Panel
Tsing Yi Industrial Wiring
Tsing Yi Industrial Cable
Tsing Yi Industrial Conduit
Tsing Yi Industrial Trunking
Tsing Yi Industrial Lighting
Tsing Yi Industrial Fixture
Tsing Yi Industrial Bulb
Tsing Yi Industrial Tube
Tsing Yi Industrial Lamp
Tsing Yi Industrial Shade
Tsing Yi Industrial Reflector
Tsing Yi Industrial Diffuser
Tsing Yi Industrial Ballast
Tsing Yi Industrial Starter
Tsing Yi Industrial Capacitor
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Tsing Yi Industrial Inductor
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Tsing Yi Industrial Rectifier
Tsing Yi Industrial Inverter
Tsing Yi Industrial Converter
Tsing Yi Industrial Amplifier
Tsing Yi Industrial Speaker
Tsing Yi Industrial Microphone
Tsing Yi Industrial Antenna
Tsing Yi Industrial Satellite Dish
Tsing Yi Industrial Radio
Tsing Yi Industrial Television
Tsing Yi Industrial Computer
Tsing Yi Industrial Server
Tsing Yi Industrial Network
Tsing Yi Industrial Router
Tsing Yi Industrial Switch
Tsing Yi Industrial Hub
Tsing Yi Industrial Modem
Tsing Yi Industrial Telephone
Tsing Yi Industrial Fax
Tsing Yi Industrial Printer
Tsing Yi Industrial Scanner
Tsing Yi Industrial Photocopier
Tsing Yi Industrial Shredder
Tsing Yi Industrial Laminator
Tsing Yi Industrial Binder
Tsing Yi Industrial Punch
Tsing Yi Industrial Stapler
Tsing Yi Industrial Tape Dispenser
Tsing Yi Industrial Scissors
Tsing Yi Industrial Knife
Tsing Yi Industrial Ruler
Tsing Yi Industrial Pencil
Tsing Yi Industrial Pen
Tsing Yi Industrial Eraser
Tsing Yi Industrial Sharpener
Tsing Yi Industrial Marker
Tsing Yi Industrial Highlighter
Tsing Yi Industrial Correction Fluid
Tsing Yi Industrial Glue
Tsing Yi Industrial Tape
Tsing Yi Industrial Paper
Tsing Yi Industrial Envelope
Tsing Yi Industrial Folder
Tsing Yi Industrial File
Tsing Yi Industrial Drawer
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Tsing Yi Industrial Rack
Tsing Yi Industrial Bin
Tsing Yi Industrial Container
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Tsing Yi Industrial Shade
Tsing Yi Industrial Reflector
Tsing Yi Industrial Diffuser
Tsing Yi Industrial Ballast
Tsing Yi Industrial Starter
Tsing Yi Industrial Capacitor
Tsing Yi Industrial Resistor
Tsing Yi Industrial Inductor
Tsing Yi Industrial Transformer
Tsing Yi Industrial Rectifier
Tsing Yi Industrial Inverter
Tsing Yi Industrial Converter
Tsing Yi Industrial Amplifier
Tsing Yi Industrial Speaker
Tsing Yi Industrial Microphone
Tsing Yi Industrial Antenna
Tsing Yi Industrial Satellite Dish
Tsing Yi Industrial Radio
Tsing Yi Industrial Television
Tsing Yi Industrial Computer
Tsing Yi Industrial Server
Tsing Yi Industrial Network
Tsing Yi Industrial Router
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Tsing Yi Industrial Scissors
Tsing Yi Industrial Knife
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Tsing Yi Industrial Pen
Tsing Yi Industrial Eraser
Tsing Yi Industrial Sharpener
Tsing Yi Industrial Marker
Tsing Yi Industrial Highlighter
Tsing Yi Industrial Correction Fluid
Tsing Yi Industrial Glue
Tsing Yi Industrial Tape
Tsing Yi Industrial Paper
Tsing Yi Industrial Envelope
Tsing Yi Industrial Folder
Tsing Yi Industrial File
Tsing Yi Industrial Drawer

0 50 100 150 200 250
METRES
1 : 5000

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A3	THIRD ISSUE	SAN	27NOV09	AD
A2	SECOND ISSUE	SAN	30JUN09	AD
A1	FIRST ISSUE	SAN	21APR09	AD

DRAWN	SAN
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CHECKED	TO
APPROVED	AD
DATE	21.APR.2009

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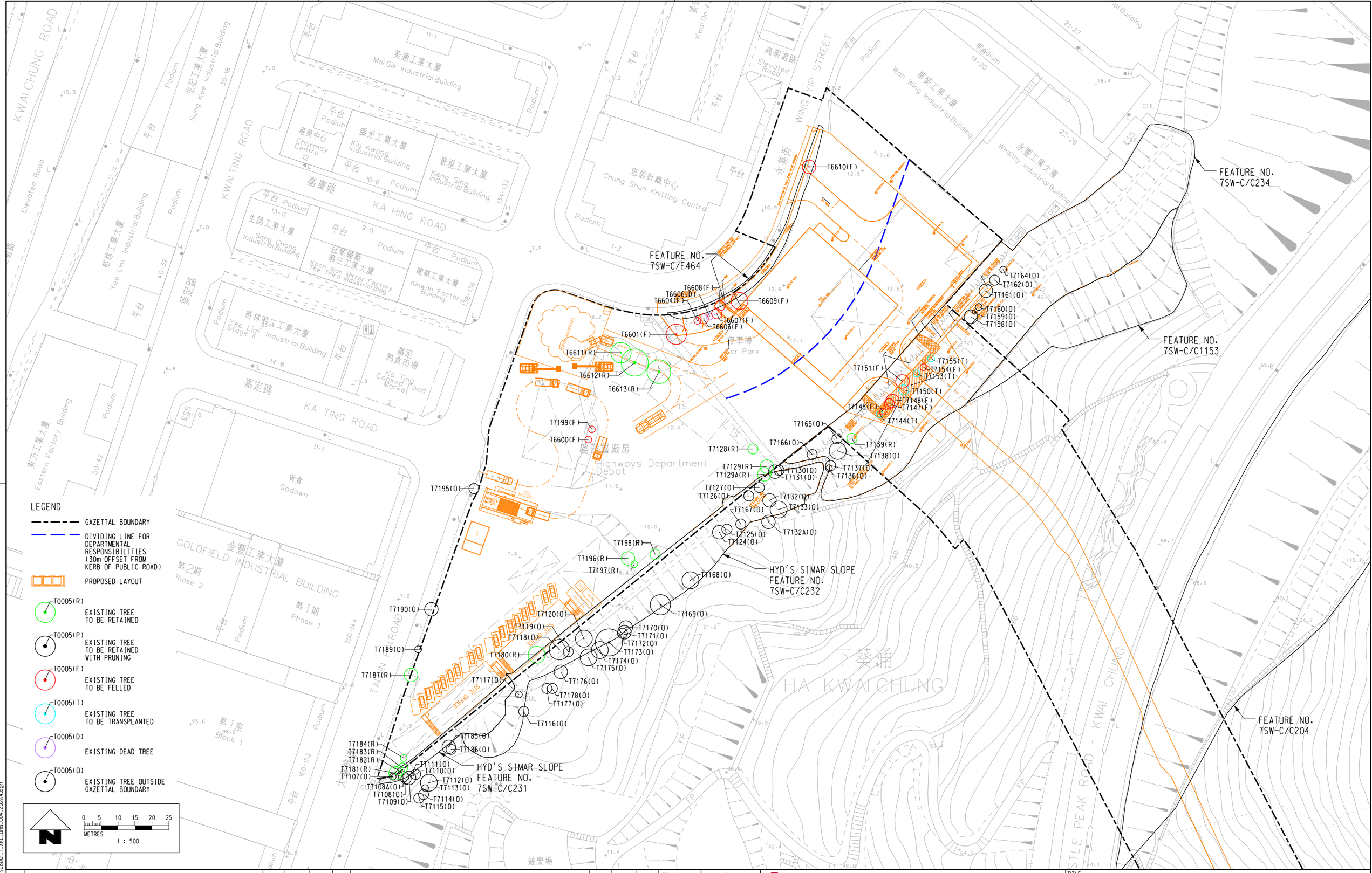
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TITLE
CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
TREE SURVEY KEYPLAN OF KWAI TSING DISTRICT

SCALE	DRAWING NO.	REV.
1 : 5000 @ A1	C8001/T/XRL/URB/C04/201	A3



REV	DESCRIPTION	BY	DATE	APPROVED
A4	FOURTH ISSUE	SAN	03MAR10	AD
A3	THIRD ISSUE	SAN	27NOV09	AD
A2	SECOND ISSUE	SAN	30JUN09	AD
A1	DRAFT TREE SURVEY REPORT	SAN	21APR09	AD

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DATE	21.APR.2009

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TITLE
CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
TREE SURVEY PLAN OF KWAI TSING DISTRICT (SHEET 1 OF 3)

SCALE	DRAWING NO.	REV.
1 : 500 @ A1	C8001/T/XRL/URB/C04/202	A4

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A2	SECOND ISSUE	SAN	30JUN09	AD
A1	DRAFT TREE SURVEY REPORT	SAN	01APR09	AD

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DATE	21.APR.2009

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TITLE
CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
TREE SURVEY PLAN OF KWAI TSING DISTRICT (SHEET 2 OF 3)

SCALE	DRAWING NO.	REV.
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T10692(O)
T10694(R)
T10695(R)
T10696(R)
T10691(R)
T10693(R)
T10697(R)
T10698(O)
T10699(O)
T10689(F)
T10690(F)
T10686(R)
T10687(R)
T10688(F)
U0006(F)
U0005(F)
U0004(F)
U0003(F)
U0002(F)
U0008(F)
U0009(F)
U0001(R)
U0010(F)
U0011(R)
CUL
斜路 Ramp
海堤 Seawall
HWM 碎石 Rubble
政府爛船處理中心
KWAI YUE LANE
葵裕里
葵裕街
KWAI YUE STREET
KWAI TAI ROAD
高架道路 Elevated Road
煙囪 Chimney
雅務署葵涌基本污水處理廠 Drainage Services Department Kwai Chung Preliminary Treatment Works
FW
TS

LEGEND

- GAZETTAL BOUNDARY
- DIVIDING LINE FOR DEPARTMENTAL RESPONSIBILITIES (30m OFFSET FROM KERB OF PUBLIC ROAD)
- PROPOSED LAYOUT
- T0005(R) EXISTING TREE TO BE RETAINED
- T0005(P) EXISTING TREE TO BE RETAINED WITH PRUNING
- T0005(F) EXISTING TREE TO BE FELLED
- T0005(T) EXISTING TREE TO BE TRANSPLANTED
- T0005(D) EXISTING DEAD TREE
- T0005(O) EXISTING TREE OUTSIDE GAZETTAL BOUNDARY

N

0 5 10 15 20 25
METRES
1 : 500

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A3	THIRD ISSUE	SAN	27NOV09	AD
A2	SECOND ISSUE	SAN	30JUN09	AD
A1	FIRST ISSUE	SAN	21APR09	AD

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DESIGNED	JP
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DATE	21.APR.2009

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TITLE
CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
TREE SURVEY PLAN OF KWAI TSING DISTRICT (SHEET 3 OF 3)

SCALE 1 : 500 @ A1
DRAWING NO. C8001/T/XRL/URB/C04/204
REV. A3

Appendix III

Compensatory Tree Planting & Transplanting Plans & Mitigation Measures

Drawing List of Appendix III

Compensatory Tree Planting & Transplanting Plans

Drawing	Revision	Title
C8001/T/XRL/URB/C04/251	A2	Compensatory Tree Proposal Key Plan
C8001/T/XRL/URB/C04/252	A3	Compensatory Tree Proposal for Kwai Tsing District (Sheet 1 of 1)

Landscape Plan of Kwai Chung Ventilation Building (VB6)

Drawing	Revision	Title
821/T/KCV/ATK/A58/800	A	General Notes
821/T/KCV/ATK/A58/801	A	General Legends
821/T/KCV/ATK/A58/824	A	Landscape Planting Plan G/F (Sheet 1 of 3)
821/T/KCV/ATK/A58/825	A	Landscape Planting Plan G/F (Sheet 2 of 3)
821/T/KCV/ATK/A58/826	A	Planting Plan - R/F (Sheet 3 of 3)
821/T/KCV/ATK/A58/827	A	Landscape Soiling Plan G/F (Sheet 1 of 2)
821/T/KCV/ATK/A58/828	A	Landscape Soiling Plan R/F (Sheet 2 of 2)
821/T/KCV/ATK/A58/845	A	Landscape Detail – Upper Roof Details
821/W/KCV/ATK/A58/857	A1	Planter Detail Plan
821/W/KCV/ATK/A58/858	A1	Planter Section

KWAI TSING DISTRICT

TSUEN WAN DISTRICT

252

SHA TIN DISTRICT

KWAI TSING DISTRICT

TSING TSUEN BRIDGE

TSING LAI BRIDGE

TSING KWAI HIGHWAY

CHEUNG TSING HIGHWAY

TSING YI BRIDGE

KWAI TSING ROAD

KWAI TSUN BRIDGE

CHEUNG FAI ROAD

CONTAINER TERMINAL ROAD

KWAI CHUNG ROAD

RAMBLER CHANNEL

TSING YI

KWAI CHUNG

METRES

0 50 100 150 200 250

1 : 5000

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A2	SECOND ISSUE	SAN	27NOV09	AD
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TITLE

CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
COMPENSATORY TREE PROPOSAL KEY PLAN FOR KWAI TSING DISTRICT

SCALE	DRAWING NO.	REV.
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FEATURE NO.
7SW-C/F464

FEATURE NO.
7SW-C/C234

HYD'S SIMAR SLOPE
FEATURE NO.
7SW-C/C232

HYD'S SIMAR SLOPE
FEATURE NO.
7SW-C/C231

ALL 4 NOS. TRANSPLANTED TREES TO BE MAINTAINED BY LANDSD

4 NOS. TRANSPLANTED TREES (5m MIN. SPACING)
2 NOS. CLE.OPE. (T7150 & T7153)
2 NOS. FIC.MIC. (T7144 & T7155)

LEGEND

- DISTRICT BOUNDARY
- GAZETTAL BOUNDARY
- EXISTING TREES RETAINED
- TREES OUTSIDE GAZETTAL BOUNDARY
- PROPOSED AREAS FOR COMPENSATORY TREE PLANTING AT THE END OF WORKS CONTRACT
- PROPOSED AREAS FOR TRANSPLANTING RECEPTOR SITES AT THE END OF WORKS CONTRACT
- PROPOSED AREAS FOR COMPENSATORY TREE PLANTING & IMMEDIATE TREE TRANSPLANTING RECEPTOR SITES

NOTE:

1. TONE AND TREE SYMBOLS ARE INDICATIVE ONLY.
2. FINAL LOCATIONS OF TRANSPLANTED TREES SUBJECT TO DETAILED DESIGN.
3. FOR TOTAL NUMBERS OF COMPENSATORY TREE PLANTING REQUIRED WITHIN KWAI TSING DISTRICT, REFER TO TABLE 3.4

0 5 10 15 20 25
METRES
1 : 500

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A3	THIRD ISSUE	SAN	XXFEB10	AD
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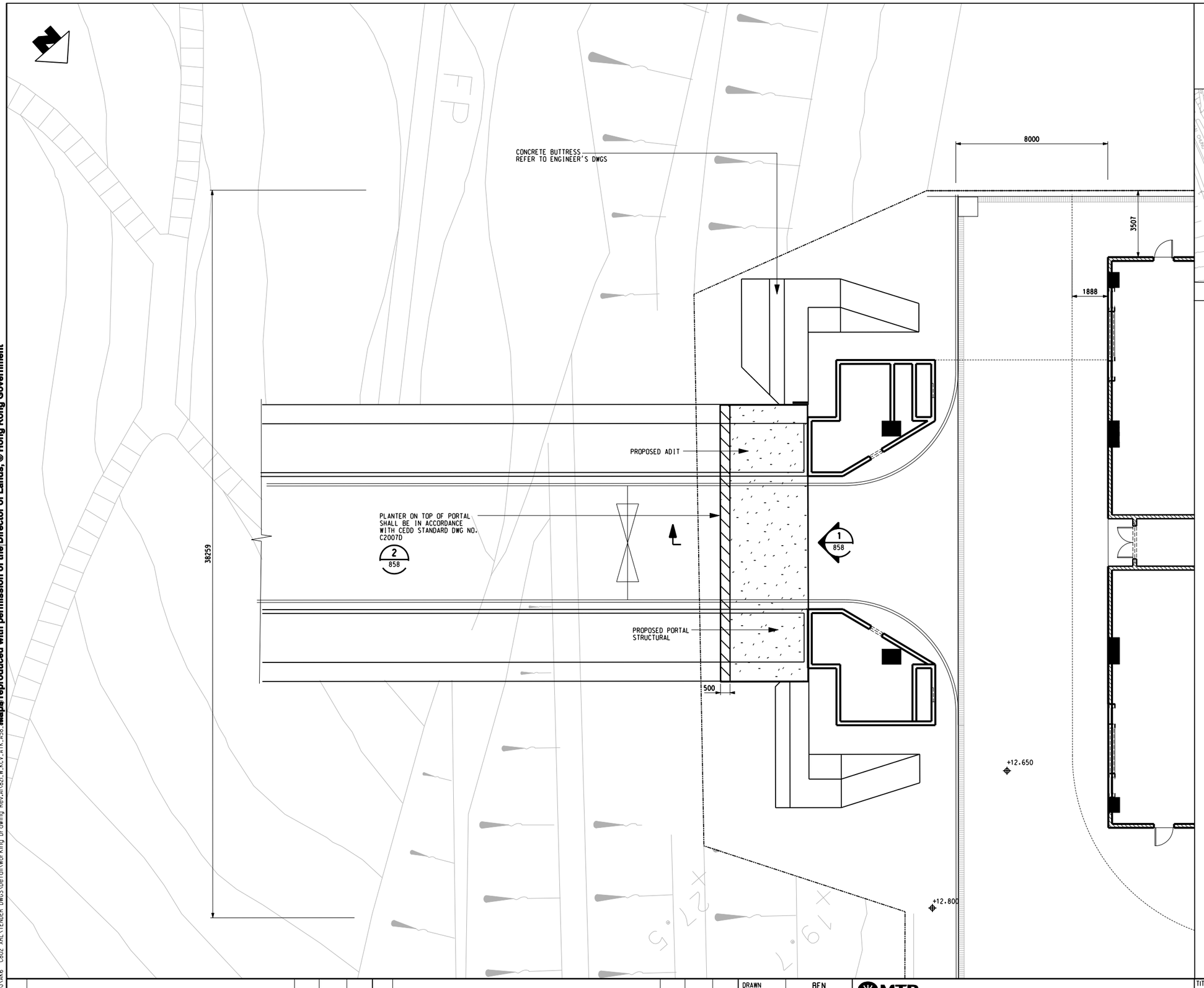
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TREE TRANSPLANTING / FELLING
COMPENSATORY TREE PROPOSAL FOR KWAI TSING DISTRICT (SHEET 1 OF 1)

SCALE	DRAWING NO.	REV.
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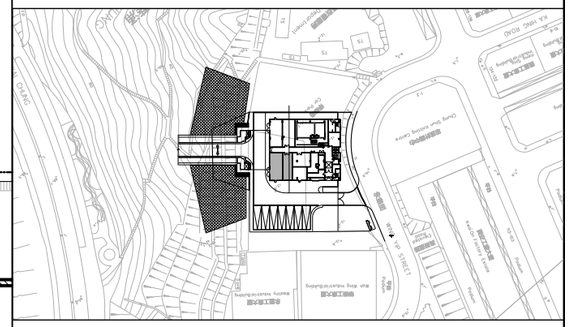


NOTES:

FOR GENERAL NOTE, REFER TO DWG.NO. 821/W/KCV/ATK/A58/800

LEGEND:

FOR GENERAL LEGEND, REFER TO DWG.NO. 821/W/KCV/ATK/A58/801



KEY LOCATION PLAN NTS

0 1 2 3 4 5
METRES
1 : 100

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DRAWN	BEN
DESIGNED	AC
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DATE	02/OCT/2009

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ORIGINATOR

ATKINS

Supported by
Arup, TFP Farrells, DLS
Kenneth Ng

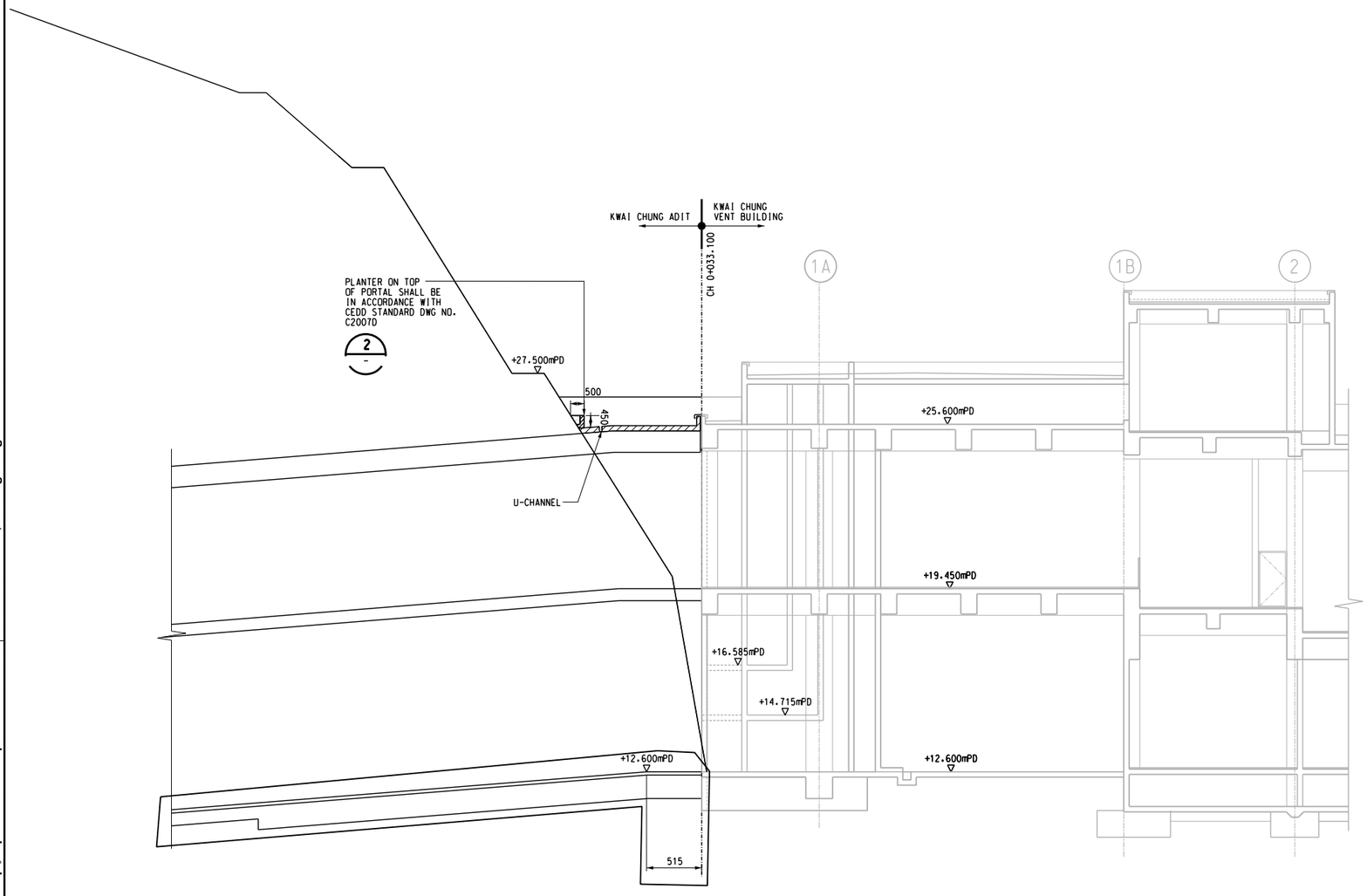
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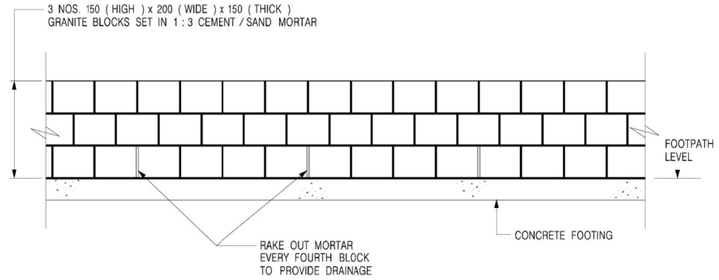
CONTRACT 821
SHEK YAM TO MEI LAI ROAD TUNNELS
KWAI CHUNG VENTILATION BUILDING (VB6)
PLANTER DETAIL PLAN

SCALE	DRAWING NO.	REV.
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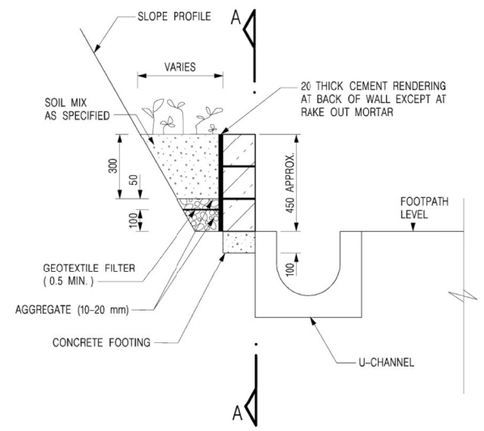
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SECTION ELEVATION 1
SCALE 1:100



SECTIONAL ELEVATION A – A



TYPICAL SECTION

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. HARD SURFACE TO SLOPE NOT REQUIRED BELOW TOP LEVEL OF SOIL MIX.
3. FINISH OF WALL AND U-CHANNEL AS SPECIFIED.
4. SPECIFICATIONS OF GEOTEXTILE FILTER:
   a) MATERIAL = POLYPROPYLENE
   b) MIN. TENSILE STRENGTH = 17 kN / m
   c) APPARENT OPENING SIZE = 140 μm
   d) COEFFICIENT OF PERMEABILITY UNDER 2 kN / m^2 = 5 x 10^{-3} m / s
   e) FLOW RATE (AT 100 mm HEAD) UNDER 2 kN / m^2 = 195 L / m^2 s

REF.	REVISION	SIGNATURE	DATE
D	MINOR AMENDMENT.	Original Signed	01.2005
C	GENERAL REVISION.	Original Signed	12.2002
B	SPECIFICATIONS ADDED.	Original Signed	12.2001
A	MINOR AMENDMENT.	Original Signed	08.2001

GRANITE STONE PLANTER WALL

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

SCALE 1:15

DATE FEB 1994

DRAWING NO. C2007D

PLANTER DETAIL 2
SCALE 1:15

0 1 2 3 4 5
METRES
1 : 100

REV	DESCRIPTION	BY	DATE	APPROVED
A	WORKING DRAWING ISSUE (ACP)	AC	APR10	TM

DRAWN	IL
DESIGNED	AC
CHECKED	KN
APPROVED	TM
DATE	08/APR/2010

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CADD REF. 821_W_KCV_ATK_A58_858A1.dgn

TITLE
CONTRACT 821
SHEK YAM TO MEI LAI ROAD TUNNELS
KWAI CHUNG VENTILATION BUILDING (VB6)
PLANTER SECTION

SCALE AS SHOWN
DRAWING NO. 821/W/KCV/ATK/A58/858
REV. A1

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Appendix IV

Supporting Information

Key Plan for XRL Tree Planting and Landscape Plan

LEGEND

GAZETTAL BOUNDARY

DISTRICT BOUNDARY

PLANNED TREE FELLING APPLICATION SCHEDULE

PLANNED TREE FELLING APPLICATION	SUBMITTED TO GOVERNMENT	STATUS
TRA-1 : WORKS IN YAU TSIM MONG DISTRICT	02 MARCH 2010	PENDING
TRA-1P1 : PRIVATE LOT STT-KX 2027	06 JANUARY 2010	PENDING
TRA-2 : WORKS IN SHAM SHUI PO DISTRICT	09 FEBRUARY 2010	PENDING
TRA-2P1 : PRIVATE LOT NKIL6436	01 FEBRUARY 2010	PENDING
TRA-2P2 : PRIVATE LOT STT-KX2382	01 FEBRUARY 2010	PENDING
TRA-2P3 : PRIVATE LOT NKIL6363	01 FEBRUARY 2010	PENDING
TRA-2P4 : PRIVATE LOT STT-KX2416	01 FEBRUARY 2010	PENDING
TRA-3 : WORKS IN KWAI TSING DISTRICT	CURRENT	PENDING
TRA-4 : WORKS IN TSUEN WAN DISTRICT	15 DECEMBER 2009	PENDING
TRA-5 : WORKS IN TUEN MUN DISTRICT	11 FEBRUARY 2010	PENDING
TRA-6 : WORKS IN YUEN LONG DISTRICT - MAI PO	22 OCTOBER 2009	APPROVED
TRA-7 : WORKS IN YUEN LONG DISTRICT - REMAINDER	13 NOVEMBER 2009	PENDING
TRA-8 : WORKS IN TUEN MUN DISTRICT - SIU LANG SHUI		
TRA-9 : WORKS IN YUEN LONG DISTRICT - YICK YUEN		

YUEN LONG DISTRICT

NORTH DISTRICT

TAI PO DISTRICT

TUEN MUN DISTRICT

TSUEN WAN DISTRICT

SHA TIN DISTRICT

KWAI TSING DISTRICT

SHAM SHUI PO DISTRICT

WONG TAI SIN DISTRICT

SAI KUNG DISTRICT

KOWLOON CITY DISTRICT

KWUN TONG DISTRICT

YAU TSIM MONG DISTRICT

ISLANDS DISTRICT

MP NTM TKP SK YY HSK TL LKS SLS SL LOP TCW SY KC SMR WKT

0 500 1000 1500 2000 2500 METRES

1 : 50000

REV	DESCRIPTION	BY	DATE	APPROVED
A22	TWENTY-SECOND ISSUE FOR TRA-3	SAN	12MAR10	AD
A21	TWENTY-FIRST ISSUE FOR TRA-9	SAN	12MAR10	AD
A20	TWENTIETH ISSUE FOR TRA-1	SAN	01MAR10	AD
A19	NINETEENTH ISSUE FOR TRA-8	SAN	12FEB10	AD
A18	EIGHTEENTH ISSUE FOR TRA-9	SAN	11FEB10	AD
A17	SEVENTEENTH ISSUE FOR TRA-2	SAN	10FEB10	AD
A16	SIXTEENTH ISSUE FOR TRA-5	SAN	09FEB10	AD
A15	FIFTEENTH ISSUE FOR TRA-1	SAN	29JAN10	AD

DRAWN	SAN
DESIGNED	JP
CHECKED	TO
APPROVED	AD
DATE	01.APR.2009

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EXPRESS RAIL LINK (XRL)

ORIGINATOR

Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong.
Tel:2802 3333 Fax 2802 8662

CADD REF. C8001_T_XRL_URB_C04_901A22.dgn

TITLE

CONSULTANCY AGREEMENT NO. C8001
TREE TRANSPLANTING / FELLING
XRL TREE FELLING APPLICATIONS
KEY PLAN

SCALE 1 : 50000 @ A1

DRAWING NO. C8001/T/XRL/URB/C04/901

REV. A22

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Appendix V

Particular Specification for Tree Works

APPENDIX V

TREE WORKS, SOFT LANDSCAPE WORKS AND RELATED WORKS

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AN1 PRESERVATION AND PROTECTION OF EXISTING TREES AND VEGETATION

AN1.1 GENERAL

Definitions regarding trees AN1.1.01

(1) "Tree" means a plant with tree-like growth habit with diameter measuring 95mm or more at breast height. Plants growing on retaining structures shall also be measured and considered.

(2) "Diameter at breast height" means the diameter of the trunk of the plant measured at a height of 1.3m above ground level. For trunk with an obviously elliptical cross-section, the diameter at breast height shall be the average of any two-diameter measurements taken at right angle.

(3) "Tree crown spread" means the diameter of the tree crown defined by the outermost branches of the tree. For tree crown with an obviously elliptical cross-section, the diameter of the tree crown shall be the average of any two- diameter measurements taken at right angle.

(4) "Tree height" means the height from ground level to the top of the tree.

(5) "Dripline" of a tree means the imaginary vertical plumb line that extends downward from the tips of the outermost tree branches and intersects the ground.

(6) "Tree protection zone" means an area the perimeter of which is defined by the dripline of the tree.

(7) "Preserved tree," means an existing tree not earmarked to be felled, which may be a tree to be retained at its existing location, a tree at its existing location before transplanting, or a tree transplanted within the Site.

(8) "Arboricultural work" means any work related to the cultivation and care of trees for any purpose other than timber production, including but not limited to planting, replanting, transplanting, tree surgery work and control of pest and disease.

(9) "Removal of trees" means either felling or transplanting of trees.

(10) "Transplanting of trees" means tree transplanting to be carried out under Contract No. 801.

Specialist Contractor AN1.1.02

If the Contractor is not included in the "List of Approved Suppliers of Materials and Specialist Contractors for Public Works" under the category of "Landscaping: Class I - General Landscape Work", he shall enter into a written sub-contract with a specialist contractor to carry out the arboricultural work to trees, including planting, replanting, transplanting, tree surgery work, and control of pest and disease.

General requirements AN1.1.03

(1) The Contractor shall submit a method statement for Tree Preservation and Protection, including tree protection plans before commencing any works on site, which may affect any tree.

(2) The Contractor shall make all necessary allowance for the preservation and protection of existing trees in his programming of, and method of construction of the works, including the full extent of all temporary works and vehicular access arrangements.

(3) The Contractor shall assign a person to oversee the implementation of Tree Preservation and Protection Plan and delegate to that person the full authority to make all decisions related to such works. The person assigned shall be working full time on the Site but not necessarily working solely for matters related to preservation and protection to existing trees. The assigned person shall have attended relevant training on the subject organised by training institutes (such as Construction Industry Training Authority), or similar courses as considered appropriate by the Engineer. The Contractor shall submit to the Engineer for approval within 45 days of the date of the Employer's letter of acceptance of the Tender particulars of the assigned person (including his name, experience and position) together with a copy of the certificate issued by the training institute confirming `his satisfactory completion of the relevant course.

(4) The limits of site clearance shall be agreed by the Engineer on the Site before site clearance commences.

Reference Standards AN1.1.04

(1) The latest editions of the following reference standards are applicable:

(a) BS 3998 : Recommendations for Tree Work

(b) BS 4428 : General Landscape Operations.

(c) BS 4043:1989 : Transplanting

(d) BS 5837 : Guide for trees in relation to construction

(2) For any inconsistencies, the provisions contained in this Particular Specification and the Drawings shall prevail over the provisions contained in the documents listed in sub-clause (1) of this clause.

AN1.2 SITE CLEARANCE

Demolition AN1.2.01

(1) Areas adjacent to demolition works shall be protected from damage resulting from the demolition.

(2) Structures that are to be demolished shall be surveyed by the Contractor and the result given to the Engineer, before demolition starts.

(3) Particulars of the proposed methods of carrying out demolition works, handling and sorting of recyclable materials and disposal of construction and demolition waste shall be submitted to the Engineer for information at least 14 days before the demolition starts.

(4) The proposed methods shall enhance site safety, maximize recovery of recyclable materials and minimize generation of construction and demolition waste. The recommendations of the Code of Practice for Demolition of Buildings (year 2004), issued by the Buildings Department shall be followed.

Pipes and cables AN1.2.02

The Contractor shall make all arrangements with and obtain the necessary approvals from the relevant authorities for disconnecting utilities inside and outside the Site. The ends of disconnected utilities shall be made good and sealed; the positions of the ends shall be marked with marker posts or by other methods agreed by the Engineer.

Trees	AN1.2.03	The Contractor shall comply with the requirements of preservation and protection of existing trees stipulated in Sections AN1.3 to AN1.6 before commencing site clearance.
Reinstatement	AN1.2.04	(1) Unless otherwise permitted by the Engineer, areas affected by site clearance shall be reinstated as stated in Clause AN1.2.04(2) to (5). (2) Fine fill material shall be deposited and compacted in voids that are left in the ground. (3) Holes that are left in structures and pavements shall be made good using material similar to that in the adjoining area. (4) The ends of fences, walls, structures, utilities and other items shall be made good in such a manner that the affected parts will not corrode or deteriorate, and will remain stable. (5) Straining posts shall be fixed at the end of strained fences that have been cut, and the fences shall be restrained.
Materials and equipment for re-use and storage	AN1.2.05	(1) Items that are to be re-used or taken to store shall be dismantled and removed by a suitable method so as to avoid damage or minimise the damage if this is unavoidable. The items shall be cleaned before re-use or taking to store. (2) Items that are to be re-used in the Works shall be kept in storage areas provided by the Contractor. Storage areas shall be on levelled, well drained and maintained hard-standing ground to facilitate cleansing and minimize dust generation. (3) Items that are to be taken to the Employer's store shall be delivered by the Contractor. (4) Materials or equipment which are to be re-used or taken to store and which are damaged due to the Contractor's negligence shall be repaired by the Contractor by a method agreed by the Engineer. Materials or equipment that are lost or, in the opinion of the Engineer, are not capable of being repaired satisfactorily shall be replaced by the Contractor. Except for items which are to be re-used or taken to store, demolished items, trees, shrubs, vegetation, boulders, debris, rubbish and other items arising from site clearance shall be disposed of by the Contractor and shall become the property of the Contractor when they are removed from the Site.

AN1.3 SURVEY AND IDENTIFICATION OF EXISTING TREES

Tree Survey AN1.3.01

(1) The Employer has carried out a tree survey (hereinafter called "previous tree survey") and obtained a Permit for the removal of certain trees within the site, in some cases by transplanting and in others by felling. The trees which are to be transplanted and felled are identified in the Tree Removal Application prepared by the Employer.

(2) The Contractor shall carry out a detailed check of the previous tree survey and submit the results to the Engineer within 28 days of the date for commencement of the Works, identifying any discrepancies between the previous tree survey and the site condition at the date of the Contractor taking possession of the site.

(3) If discrepancies are found in the previous tree survey and actual site conditions the Contractor shall carry out a tree survey to correct the discrepancies. Each tree shall be assigned a unique identification number according to a numbering system agreed with the Engineer beforehand. The tree survey record shall be in the form of an A4-sized, bound report which shall bear a report cover indicating the Contract number, Contract title, and date of the report and shall include the following documents, the format of which shall be agreed by the Engineer before submission of the report:

(a) A tree survey plan showing the locations of all existing individual trees in the area where discrepancies have been found in the previous tree survey and identifying:
  (i) Trees which are earmarked under the Contract for retention at their existing locations,
  (ii) Trees which are earmarked under the Contract for retention at their existing locations, and which require to be pruned,
  (iii) Trees which are earmarked under the Contract for transplanting,
  (iv) Trees which are earmarked under the Contract for felling and
  (v) Any other trees which have not been reported/identified under the Contract and their treatment has yet to be instructed by the Engineer,

(b) A tree schedule for all the trees under sub-clause (a) of this Clause comprising the following information of each individual tree:
  (i) Botanical name of the tree species and the identity code/number as shown on the tree survey plan and marked on the Site,
  (ii) Diameter of the tree at 1.3m above ground level,
  (iii) Tree crown spread,
  (iv) Tree height,
  (v) Condition of the tree including its form and health (highlighting any structural defects or unhealthy or decaying symptoms which may pose danger to the public if the tree falls), amenity value, survival rate after transplanting and special features, and
  (vi) Existing ground level at the trunk base;

(c) Photographic record for each individual tree under sub-clause (a) of this Clause complying with the following:
  (i) All photographs shall be date-stamped to indicate the dates that the photographs are taken and shall be well-annotated, and
  (ii) The photograph of each tree or tree group shall show clearly the whole tree or entire tree group as far as possible, the identification number of the tree or tree group, and the status of the tree as identified by the labelling or marking system on the Site as required in Clause AN1.3.02.

Labelling of Trees AN1.3.02

(1) The Contractor shall mark on the Site with labelling or marking systems to identify trees of different status in accordance with the classification in sub-clauses (3)(a)(i) to (v) of Clause AN1.3.01. The Contractor shall comply with the following in providing the identification labelling or marking systems:

(d) If applicable, the Contractor shall follow the labelling or marking system adopted in the previous survey;

(e) The identification labelling or marking systems for different tree status shall be in different colours and be clearly distinguishable,

(f) The tree identification number of each tree or tree group shall be clearly shown on the label or mark.

(g) The identification labelling or marking system for the trees shall be made of durable materials that are non-injurious to preserved the trees, be placed at a position not easily accessible but clearly visible to the public, and be attached in such a manner that allows for the growth of the trees and does not injure the trees.

(h) The identification labelling or marking systems and the on-site status identification of trees shall be agreed by the Engineer and installed before commencing site clearance, demolition, construction of permanent or temporary works, and any other site operations which may affect the trees, and

(i) The Contractor shall reinstate or replace, where necessary, the identification labelling or marking systems for the preserved trees and shall remove these identification labelling or marking systems from the Site upon completion of the Works, or earlier if so directed by the Engineer.

(2) For those individual trees or tree groups identified under sub-clause (a)(v) of Clause AN1.3.01, the Contractor shall change the label or mark on them to reflect their updated status immediately once the Engineer has instructed the treatment to them.

AN1.4 REMOVAL OF EXISTING TREES

Felling of existing trees AN1.4.01

(1) Site clearance should be carried out in stages to suit the actual clearance requirement as works progress. The limits of site clearance for any part of the Site shall be agreed by the Engineer before site clearance at the respective part commences. No clearance shall be carried out until such requirement is met.

(2) The Contractor shall comply with the following requirements in respect of tree felling:

(a) Fell only those trees earmarked for such purposes under the Contract and labelled for such purposes on the Site pursuant to Clause AN1.3.02 or those as directed or approved by the Engineer,

(b) Take all necessary precautions to protect the people engaged in the tree felling work as well as the people and property in the vicinity,

(c) Adopt working methods that avoid any damage to adjacent plants to be retained, including damage to their root systems,

(d) Completely remove the tree to be felled including the stumps and rootballs,

(e) If, in the opinion of the Engineer or as required in the Contract, removal of stumps and rootballs is not necessary, fell the trees by cutting them near the ground, with their stumps ground rather than pulled,

(f) Remove all debris, cut wood, and roots pursuant to sub-clauses (2)(d) and 2(e) of this Clause, from the trees felled from the Site as soon as possible, and

(g) Reinstate where appropriate the ground around the adjacent plants to be retained to ensure their continued healthy growth and stability.

Transplanting of existing trees AN1.4.02

(1) If tree transplanting is to be done by a separate designated tree transplanting contractor, the Contractor shall provide attendance and access to the tree transplanting contractor to carry out transplantation.

(2) If tree transplanting is to be done by the Contractor, the Contractor shall comply with the following requirements in respect of tree transplanting, either within or off the Site:

(a) Transplant only those trees earmarked for such purposes under the Contract and labelled for such purposes on the Site pursuant to Clause AN1.3.02 or those as directed or approved by the Engineer,

(b) Commence any work related to tree transplanting on the Site only after the Engineer is satisfied that the Contractor has complied with the requirements stipulated for completion before tree transplanting work commences; and

(c) Undertake tree transplanting work in accordance with Section AN2.11.

Unplanned tree removal AN1.4.03

Where it is found necessary for the completion of the Works to remove, either by felling or by transplanting, any trees other than those earmarked for such purposes under the Contract and labelled purposes on the Site pursuant to Clause AN1.3.02 or those directed or approved purposes during the progress of the Works by the Engineer, the Contractor shall comply with the following requirements:

(a) Report to the Engineer the necessity on such tree removal,

(b) Prepare and submit to Government, and obtain Government approval of, a Tree Removal Application in accordance with the relevant Government Technical Circular(s)

(c) Fell or transplant the trees only after the Engineer's approval of the tree removal has been given. Such approval shall normally be given after the Tree Removal Application has been approved by the Government approving authority, and

(d) Make due allowance in his programme for the time required to obtain the Engineer's approval and Government approval of the Tree Removal Application.

(e) Undertake approved tree transplanting work in accordance with Section AN2.11. The Contractor shall submit a proposal, with justification, for the root cutting period for each unplanned tree to be transplanted, in accordance with one of the Groups listed in Clause AN2.11.05(3). No root cutting works shall proceed until the proposal is approved by the Engineer and the Tree Removal Application is approved by Government.

AN1.5 PRESERVATION AND PROTECTION OF EXISTING TREES

General Precautionary Measures to Preserved Trees AN1.5.01

(1) The Contractor shall submit a Tree Preservation and Protection Plan for the Engineer's approval before commencing any works on site.

(2) The Contractor shall exercise the greatest care to avoid any damage to the preserved trees and shall comply with the following in respect of all the preserved trees during the Construction Period and Establishment Period:

(a) Take all necessary precautions to ensure that:

(i) No nails or other fixings shall be driven into the trees, including the exposed tree roots,

(ii) No fencing, services, or signs other than the identification labels or markings required under Clause AN1.3.02 shall be attached to any part of the trees,

(iii) No trees shall be used as anchorages for ropes or chains used in guying or pulling or for equipment used for removing stumps, roots or other trees, or for any other purposes,

(iv) No soil, materials, equipment or machinery shall be stockpiled or stored within the tree protection zones,

(v) No site offices, workshops, canteens, containers or similar structures shall be installed within the tree protection zones,

(vi) Petrol, oil, bitumen, creosote, cement and other materials likely to be injurious to the trees shall be kept away from the tree protection zones, and any accidental spills of these materials shall be cleaned up immediately,

(vii) Excessive water shall be drained away from the tree protection zones to prevent damage to tree roots by asphyxiation,

(viii) The surface on slopes shall be shaped so that water will not drain to the tree trunks but bypass them,

(ix) No passage or parking of vehicles and no operation of equipment or machinery shall take place within the tree protection zones unless otherwise agreed by the Engineer,

(x) No stripping of surface vegetation or top layer of soil, and no paving or earth filling shall be carried out within the tree protection zones unless otherwise agreed by the Engineer,

(xi) No fires shall be lit within the tree protection zones or in a position where the flames will likely extend to within 5m of foliage, branches or trunks of the trees, bearing in mind the size of the fire and the wind direction,

(xii) No concrete mixing, gas tank filling, paintbrush and tool cleaning, or equipment maintenance shall be carried out within the tree protection zones,

(xiii) Any necessary scarification or cultivation within the tree protection zones shall be carried out carefully by hand so as not to cause damage to the trees, in particular the bark and the roots,

(xiv) Any equipment, in particular delivery vehicles, overhead cranes, mechanical excavations, drilling rigs and piling rigs, shall be carefully operated so as not to cause striking of the trunks, branches, foliage or root collars of the trees,

(xv) The trees to be felled, which are adjacent to, or which lie within a continuous canopy of the preserved trees, shall be carefully removed, and if necessary in sections but not using bulldozers in any circumstances, so as not to cause damage to the preserved trees such as scraping bark off trunks or breaking branches of trees,

(xvi) Where it is necessary to use herbicides to kill any vegetation, herbicides that can leach through the soil, such as the products containing sodium chlorate, and any other herbicides that are injurious to the trees shall not be used,

(xvii) Allowance shall be made for the slope of the ground so that damaging materials such as concrete washings, mortar or diesel oil cannot run towards the trees,

(xviii) Alkaline clay or limestone shall not be used for filling or paving, concrete shall be mixed on a thick plastic tarpaulin, and mixing trucks shall not be rinsed out on the Site, so as not to cause changes, in particular increases, in the soil pH, and

(xix) All building debris and chemical wastes shall be hauled away for proper disposal, and in any circumstances shall not be burned or buried on the Site or be disposed of by pouring them on the soil within the Site,

(b) Repair any damage to the trees in accordance with the requirements stipulated in Section AN1.6,

(c) Where the passage or parking of vehicles or the operation of equipment or machinery within the tree protection zones as referred to in sub-clause (a)(ix) of this Clause is considered necessary and is agreed by the Engineer, carry out the following measures to reduce soil compaction:

(i) Minimize the traffic of the vehicles, equipment or machinery, and

(ii) Confine the passage or parking of vehicles or operation of equipment or machinery to the areas laid with temporary protective mulching as stipulated in sub-clause (5)(b) of Clause AN1.5.02 and with double, overlapping, thick metal sheet coverings, or other materials of equivalent strength as agreed by the Engineer placed on top,

(d) Where it is necessary to clear the existing undergrowth within the tree protection zones to allow access and visibility for, and operation of any construction work,

(i) Shrubs shall be pruned and grass or other herbaceous plants shall be cut to a height of not less than 50 mm above the ground level but not pulled out by equipment in any circumstances, and

(ii) The agreement of the Engineer shall be obtained before vegetation clearance commences,

(e) Protect the preserved trees, where necessary, from increased exposure to sun and wind due to removal of adjacent trees,

(f) Align all routes of the overhead services within the Site and all access routes to the Site or within the Site away from the preserved trees as far as possible and seek the Engineer approval to the alignment,

(g) Report to the Engineer any preserved tree that has structural defects or unhealthy or has decaying symptoms,

(h) Update the photographic record taken in accordance with Clause AN1.3.01(3)(c) and submit a report comprising the updated photographic records of all the preserved trees to the Engineer every two months or at intervals agreed by the Engineer, complying with the following:

(i) Each of the reports shall be in the form of an A4-sized,bound document which shall bear a report cover indicating the Contract number, Contract title, and date of the report,

(ii) The format of the reports shall be agreed by the Engineer before submission of the first report,

(iii) All photographs shall be date-stamped to indicate the dates that the photographs are taken and shall be well-annotated,

(iv) The photograph of each tree shall show clearly the whole tree as far as possible, the identification number of the tree, and the status of the tree as identified by the labelling or marking system on the Site as required in Clause AN1.3.02, and

(v) Each of the reports shall include details of any damage caused to the trees and any signs of health deterioration of the trees in the reporting period, accompanied with photographic record of the damage and the tree

deterioration.

(vi) Each of the reports shall be submitted with details of the Contractor's proposed works for each tree in the forthcoming period, including but not limited to, excavation, protection, pruning, repair of damages, and establishment operation

Protection of preserved trees from physical damage and soil compaction AN1.5.02

(1) The Contractor shall erect, secure and maintain in good condition temporary protective fencing with a minimum height of 1.5m to protect the preserved trees. Details of the temporary protective fencing are shown in Drawing Nos. TP001 and TP002 in Annex 1. The Contractor shall submit method statements including proposed design details of the temporary protective fencing to the Engineer for approval and obtain such approval before commencing the erection of the fencing.

(2) The temporary protective fencing shall be erected along or beyond the perimeter of the tree protection zone of each individual tree. Where the tree protection zones of two or more trees overlap with each other, the temporary protective fencing shall be erected along or beyond the perimeter of the aggregate tree protection zone of the trees or as directed by the Engineer.

(3) The Contractor shall complete erection of the temporary protective fencing before commencing of site clearance, demolition, construction of permanent or other temporary works, and any other site operations that may affect the trees.

(4) The Contractor shall remove the temporary protective fencing from the Site upon completion of the Works or earlier if so directed by the Engineer. The Contractor shall not remove or relocate the temporary protective fencing or enter the area enclosed by the temporary protective fencing without the prior agreement of the Engineer.

(5) If, in the opinion of the Engineer, erection of temporary of protective fencing is not practical, or the preserved tree grows on a retaining structure, then the following precautions shall be taken by the Contractor:

(a) The Contractor shall provide temporary protective hessian armouring around tree trunks to protect the preserved trees. When instructed by the Engineer, the Contractor shall provide temporary protective hessian and plank armouring as an alternative to the same trees for enhanced protection. The minimum height of the hessian armouring or hessian and plank armouring from the ground shall be 1.5m. Details of the temporary protective hessian armouring and hessian and plank armouring are shown in Drawing No. TP003 in Annex 1. The Contractor shall submit details of the temporary protective hessian armouring and hessian and plank armouring to the Engineer for approval and obtain such approval before commencing installing such protection measures.

(b) Unless otherwise agreed by the Engineer, the ground of the tree protection zones of the trees referred to in the sub-clause (5)(a) of this Clause shall be protected from damage by construction activities through the use of temporary protective mulching to cover the entire tree protection zone. When instructed by the Engineer, double, overlapping, thick metal sheet coverings, or other materials of equivalent strength as agreed by the Engineer, shall be laid on top of the temporary protective mulching to provide additional protection from soil compaction due to passage or parking of vehicles or operation of equipment or machinery. Details of the temporary protective mulching are shown in Drawing No. TP004 in Annex 1. The Contractor shall submit details of the temporary protective mulching to the Engineer for approval and obtain such approval before commencing installing such protection measures.

(c) The Contractor shall complete erection of the temporary protective armouring and application of the temporary protective mulching before commencing site clearance, demolition, construction of permanent or other temporary works, and any other site operations that may affect the trees.

(d) The Contractor shall remove the temporary protective armouring and the temporary protective mulching from the Site upon completion of the Works, or earlier if so directed by the Engineer. The Contractor shall not remove or relocate the temporary protective armouring or the temporary protective mulching without the prior agreement of the Engineer.

Protection of preserved trees from changes in ground levels AN1.5.03

(6) Without the Engineer's prior approval, the Contractor shall not change the existing ground levels within the tree protection zones of the preserved trees unless the Contract explicitly requires such changes.

(7) Where it is necessary for completion of the Works and the Engineer's approval has been obtained for temporarily or permanently reducing the existing ground level around a preserved tree, but this will result in lowering the existing ground level within the tree protection zone, the Contractor shall comply with the following requirements:

(a) Construct a retaining wall as shown in Drawing No. TP005 in Annex 1 or similar measures as agreed by the Engineer to accommodate the reduction in the existing ground level around the tree and to ensure the stability of the tree,

(b) Before commencing implementation of the measures to accommodate reduction in the ground level pursuant to sub-clause 2(a) of this Clause, submit method statements for the measures, including the necessary engineering design, construction details, and associated precautionary works such as those noted in sub-clause 2(e) of this Clause, for the Engineer's approval,

(c) Commence implementation of the measures only after the Engineer's approval of the method statements has been given,

(d) Follow the requirements stipulated in Clause AN1.5.04 regarding excavation and cutting of tree roots, and

(e) Maintain balanced moisture content in the tree and in the soil after implementation of the measures, by carrying out necessary precautionary measures such as crown thinning, watering and mulching.

(8) Where it is necessary for completion of the Works and the Engineer's approval has been obtained for temporarily or permanently raising the existing ground level around a preserved tree, but this will result in a rise in the existing ground level within the tree protection zone, the Contractor shall comply with the following requirements:

(a) Construct a dry well and soil aeration system as shown in Drawing No. TP006 in Annex 1 or similar measures as agreed by the Engineer to accommodate minor to moderate rise of up to 300 mm in the existing ground level around the tree,

(b) Construct a dry well and soil aeration system as shown in Drawing No. TP007 in Annex 1 or similar measures as agreed by the Engineer to accommodate major rise of more than 300mm in the existing ground level around the tree,

(c) Before commencing implementation of the measures to accommodate raising the ground level pursuant to sub-clause (3)(a) or (b) of this Clause, the Contractor shall submit method statements, including the necessary engineering design, construction details, and associated precautionary works for the measures for the Engineer's approval, and

(d) Commence implementation of the measures only after the Engineer's approval to

the method statements has been given.

Protection of preserved trees from excavation including trenching AN1.5.04

(1) Without the Engineer's prior approval, the Contractor shall not carry out any excavation within the tree protection zones of the preserved trees unless the Contract explicitly requires such excavation work to be carried out. For the approved excavation work within the tree protection zones, the Contractor shall comply with the following requirements:

(a) Obtain agreement from the Engineer about the detailed locations and extent of the excavations before commencing any excavation work,

(b) Carry out the following work before commencing any cutting work to the aerial roots or underground roots of the preserved trees:

(i) Determine the locations of the major roots and the bulk of their absorbing roots so as to keep the cutting of tree roots to a minimum and to preserve the tap roots, sinker roots and support roots of the trees in any circumstances,

(ii) Obtain agreement from the Engineer about the extent of root cutting on the Site, and

(iii) Where the stability of the trees is likely to be jeopardised, comply with the requirements stipulated in Clause AN1.5.06.

(c) Submit to the Engineer photographic records showing the condition of the affected trees and the agreed extent of excavations and root cuttings as marked on the Site before commencing the excavation work and root-cutting work and thereafter submit photographic records showing the condition of the affected trees and the progress of the excavation work and root-cutting work at weekly intervals until backfilling of the excavation is complete,

(d) Excavate the trench on the paved side of the tree if one exists

(e) Tunnel the service in the following manner and as shown in Drawing No. TP008 in Annex 1 close to the tree trunk on one side:

(i) excavate a trench as narrow as possible directly towards the tree along a radius to not closer than 1.0 m from the trunk or where roots larger than 25 mm in diameter are encountered, whichever distance is farther away from the trunk,

(ii) tunnel straight beneath the tree at a depth of not less than 750 mm and in a way to avoid damaging any tap root, sinker roots or support roots,

(iii) exit on the opposite side along another radius, and

(iv) sleeve the service where it passes beneath the tree to reduce the risk of damage to the service and facilitate future servicing and repair,

(f) Pile the excavated materials outside the tree protection zones to reduce soil compaction,

(g) Carry out the excavation work carefully so as not to damage the bark and root collars of the preserved trees,

(h) Maintain balanced moisture content in the trees and in the soil after backfilling of the excavation, by carrying out necessary precautionary measures such as crown thinning, watering and mulching, and

(i) Move the temporary protection fencing stipulated in Clause AN1.5.02 to the edge of the intended excavation area, between the excavation area and the rest of the tree protection zone, during the duration of excavation work, and move back the same to its original location after backfilling.

(2) The Contractor shall take the following precautions when carrying out excavation that involves cutting of the roots of the preserved trees:

(a) Excavation shall be carried out using only hand-held tools such as hoe and spade, but not mechanical diggers or bulldozers in any circumstances,

(b) Whenever roots are encountered and before root cutting is carried out, soil shall be carefully forked away from the roots using hand-held tools up to the edge along which root cutting is required,

(c) Root cutting shall be carried out carefully using sterilised hand-held pruning tools, and roots greater than 25mm in diameter shall be pruned carefully so as not to result in shattered and frayed roots,

(d) Any roots damaged during excavation shall be cut back cleanly with sharp tools to undamaged tissue and treated with an approved fungicidal dressing before backfilling,

(e) All cut and exposed roots shall be prevented from drying out during excavation by adopting the following measures until backfilling, unless otherwise agreed by the Engineer:

(i) Wrap the tap roots, sinker roots, support roots, and roots with diameter exceeding 50mm with hessian, straw or other porous, absorbent fabric once they are exposed,

(ii) Hang thick hessian or other porous, absorbent fabric from top of the cut surface over the exposed roots and soil immediately after root cutting, and

(iii) Mist the hessian or fabric in a frequency that keeps the roots and the soil at the cut surface moist all the time,

(f) The hessian, straw or other porous, absorbent fabric stipulated in sub-clause (2)(e)(i) of this Clause and the hessian or fabric stipulated in sub-clause (2)(e)(ii) of this Clause shall be removed immediately before backfilling, and

(g) Excavations shall be backfilled with soil mix incorporated with slow release fertiliser at a rate of 500g/m3 or at a rate as directed by the Engineer to a level equivalent to the original soil level at the root collar after settlement.

Protection of preserved trees from drilling AN1.5.05

(1) Without the Engineer's prior approval, the Contractor shall not carry out drilling, such as soil nailing and drilling for bore holes, rock bolts or dowels, within the tree protection zones of the preserved trees unless the Contract explicitly requires such drilling work within the tree protection zones. For the approved drilling work within the tree protection zones, the Contractor shall comply with the following requirements:

(a) Obtain agreement from the Engineer about the detailed locations and extent of the drill holes before commencing any drilling work. The Contractor should bear in mind that the drill holes shall be located in such a way that the structures to be placed into the drill holes, including the surface elements of the structures such as soil nail heads, are at a minimum distance of 500mm from the trunks of the preserved trees unless otherwise agreed by the Engineer in exceptional circumstances, and

(b) Carry out the following before commencing any cutting work to the aerial roots or underground roots of the preserved trees:

(i) Determine the locations of their major roots and the bulk of their absorbing

roots so as to keep the cutting of tree roots to a minimum and to preserve the tap roots, sinker roots and support roots of the trees in any circumstances,

(ii) Obtain agreement from the Engineer about the extent of root cutting on the Site,

(iii) Where the stability of the trees is likely to be jeopardised, comply with the requirements stipulated in Clause AN1.5.06,

(c) Carry out the drilling work carefully so as not to damage the branches, foliage, trunk, bark and root collars of the preserved trees when gaining access for, supporting, mobilising, positioning and operating the drilling rig, and

(d) Maintain balanced moisture content in the trees and in the soil after the drilling work, by carrying out necessary precautionary measures such as crown thinning, watering and mulching. Crown thinning shall be by prior approval from the Engineer.

(2) The Contractor shall take the following precautions when carrying out drilling work that involves cutting of the roots of the preserved trees:

(a) Drilling work and root cutting work shall be carried out carefully,

(b) Roots greater than 25mm in diameter shall be pruned carefully in order to prevent shattered and frayed roots, and

(c) Any roots damaged during drilling shall be cut back cleanly with sharp tools to undamaged tissue and treated with an approved fungicidal dressing.

Protection of preserved trees from instability AN1.5.06

(1) Where the Works involve cutting of any major roots or other major parts of the preserved trees or any other works that may jeopardise the stability of the preserved trees, the Contractor shall install all necessary physical support measures that will ensure the stability of the preserved trees. The Contractor shall pay particular attention to the preserved trees growing on retaining structures in order to prevent the trees from being dislodged from its position as a result of inadequate support.

(2) The physical support measures for the preserved trees shall be installed securely before commencing root cutting, tree pruning or any other works that may affect the stability of the trees. Before commencing installation of these measures, the Contractor shall submit the method statements of these measures to the Engineer for approval. The Contractor shall commence installation of the support measures only after the Engineer's approval to the method statements has been given.

(3) The physical support for the preserved trees shall be securely founded in footings independent of existing walls or building structures or in other supporting systems as appropriate, without interfering with other works, other existing features, and the preserved trees. Where the affected tree is growing on a retaining structure, the Contractor shall make a detailed assessment to estimate the weight of the tree and identify the best position of supporting the tree in relation to its overall spread and centre of gravity. The method statements of the support measures designed by the Contractor in respect of the trees growing on retaining structures shall include the following information:

(a) Details of the form of construction for the support measures to demonstrate the bearing capacity of each element,

(b) Details of the foundation of the support measures to demonstrate that the support measures shall not interfere with other works, other existing features, and the preserved trees and shall not affect the stability of the retaining structure,

(c) Means of securing the tree to the supporting measures, including how cups and ties are adjusted to the form of the tree, and

(d) Method of fabrication and erection on the Site.

(4) The Contractor shall remove the physical support for the preserved trees from the Site upon completion of the Works, or earlier if so directed by the Engineer. The Contractor shall not remove or relocate the physical support for the trees without the Engineer's prior agreement. The Contractor shall ensure the true is stable before removing or relocating the physical support for the trees.

Pruning of preserved trees AN1.5.07

(1) The Contractor shall not carry out pruning to the preserved trees unless the pruning work is required under the Contract or is directed by the Engineer. The Contractor shall notify the Engineer of any preserved trees whose branches interfere with the Works and thus require pruning. Pruning shall only commence after the Engineer's approval has been obtained. The Contractor shall carry out the approved pruning work during the site clearance stage unless otherwise instructed or agreed by the Engineer.

(2) The Contractor shall comply with the requirements in Clause AN2.9.10 when carrying out the pruning work.

Control of pest and disease for preserved trees AN1.5.08

(1) The Contractor shall take all necessary precautionary measures to protect the preserved trees from pest and disease attack and all necessary control measures to eradicate pest and disease from the infected trees in the execution of the Works. The Contractor shall regularly check for any pest and disease attack particularly during known periods of activity and shall report to the Engineer on any such occurrence.

(2) Before commencing application of the pest and disease control measures, the Contractor shall submit the method statements of the control measures to the Engineer for approval. The Contractor shall commence application of the control measures only after obtaining the Engineer's approval for the method statements.

(3) The method statements for the pest and disease control measures shall cover, amongst other aspects as required by the Engineer, the pesticide, insecticide or fungicide to be used and any other necessary associated arboricultural work to the infected areas.

(4) The Contractor shall comply with the requirements in Clause AN2.9.14 in applying the pest and disease control measures.

AN1.6 REPAIR OF DAMAGE

Repair of damage to preserved trees and other affected plants AN1.6.01

(1) The Contractor shall carry out all necessary work of repair of any damage to the preserved trees and any other plants affected. All necessary work of repair of damage shall be carried out at the Contractor's own costs if the necessity for such work is, in the opinion of the Engineer, due to negligence or failure on the part of the Contractor to comply with any obligation expressed or implied on the Contractor's part under the Contract.

(2) The work of repair of damage as referred to in sub-clause (1) of this Clause shall include the following:

(a) All necessary arboricultural work to the preserved trees and any other plants damaged, which may include:

(i) Tree surgery work to remove dead, damaged, diseased or hazardous parts, to repair wounds, or to provide cables or braces for additional support,

(ii) Watering and/or mulching in case of water deficiency,

(iii) Applying appropriate fertilizers in case of nutrient deficiency, and

(iv) Applying appropriate pest and disease control measures in case of pest and disease attack;

(b) The replacement planting pursuant to sub-clause (7)(b) of this Clause for the trees and any other plants damaged to an extent as described in sub-clause (6) of this Clause and the subsequent Establishment Works for the new plants for 1 year, when instructed by the Engineer, and

(c) Any other reinstatement work necessary to bring the damaged plants to their original condition before occurrence of the damage, as directed by the Engineer.

(3) The Contractor shall notify the Engineer of any damage to the preserved trees and other affected plants within the same day of the occurrence of damage and shall submit to the Engineer within 3 days of the occurrence of damage, a report comprising the following information in a format agreed by Engineer:

(a) The timing of the damage,

(b) The nature and extent of the damage,

(c) Photographic records of the damage,

(d) The proposed work of repair of the damage, and

(e) The proposed protection measures to avoid recurrence of similar incident.

(4) When directed by the Engineer, the Contractor shall firm up and secure all dislodged trees and any other dislodged plants and shall treat all wounds of the damaged trees/plants within 3 days of the occurrence of the damage.

(5) Save as stated in sub-clause (4) of this Clause, the Contractor shall not carry out any work of repair of the damage before the Engineer's acceptance of the report as required in sub-clause (3) of this Clause.

(6) The Contractor shall provide replacement planting of the damaged trees and any other affected plants under the following circumstances

:

(a) In the opinion of the Engineer the damaged trees or other affected plants are dead,

(b) In the opinion of the Engineer, the trees/plants have been substantially damaged, resulting in one or more of the following conditions:

(i) That imminent death of the trees or other affected plants within the coming growing season is predicted,

(ii) That the structural integrity of the damaged trees or other affected plants is permanently compromised and consequently the trees or other affected plants become an irreparable public hazard,

(iii) That any major parts of the damaged trees or other affected plants have been lost and consequently their form, habit and balance have been grossly altered so that their function cannot be reasonably recovered or the trees or other affected plants are causing harm to other preserved trees.

(7) When instructed by the Engineer, the Contractor shall carry out the following work:

(a) Removal of the damaged trees or other affected plants for which replacement planting as sub-clause (6) of this Clause is required, in accordance with the following requirements:

(i) For the removal of the damaged trees, the Contractor shall prepare and submit to Government, and obtain Government approval of, a Tree Removal Application in accordance with the relevant Government Technical Circular(s)

(ii) The Contractor shall fell the damaged trees only after the Engineer's approval to the tree felling, which shall normally be given only after the Tree Removal Application has been approved by the Government approving authority, and

(iii) The Contractor shall remove the damaged plants from the Site, and

(b) Unless otherwise agreed by the Engineer, replacement planting of new plants in accordance with the following requirements:

(i) The Contractor shall complete the replacement planting within 28 days of the Engineer's instruction or other time duration as agreed by the Engineer, and

(ii) For replacement planting, the Contractor shall plant new plants of the same species and of similar size and form as the damaged plants before the damage or provide other alternative replacement planting as agreed by the Engineer.

AN2 LANDSCAPE SOFTWORKS

AN2.1 GENERAL

General requirements AN2.1.01

(1) This Section takes precedence over any other landscape softworks specification contained within any other General Specification referenced in the Contract.

(2) The works and materials specified in Clauses AN2.1.03 to AN2.1.07 shall comply with the sections stated, unless otherwise stated in this Section.

Specialist Contractor AN2.1.02 If the Contractor is not included in the "List of Approved Suppliers of Materials and Specialist Contractors for Public Works" under the category of "Landscaping: Class I - General Landscape Work", he shall enter into a written sub-contract with a specialist contractor to carry out the landscape softworks.

Site clearance AN2.1.03 Site clearance shall comply with PS Section AN1. During site clearance, where appropriate and as required by the Engineer, existing soil shall be stripped and stockpiled by a method agreed by the Engineer and in an area designated or agreed by the Engineer.

Tree Protection AN2.1.04 All clearance of existing vegetation, tree felling, pruning, transplanting and new planting shall be undertaken by a specialist landscape contractor in accordance with PS Section AN1. In addition to the general requirements of the Contract the Contractor shall demonstrate that the proposed specialist landscape sub-contractor has sufficient experience and skilled labour to undertake the tree work specified.

Nursery Works AN2.1.05 Nursery Works shall comply with PS Section AN3.

Drainage Works AN2.1.06 Drainage Works shall comply with M&W Specification Section 5.

Earthworks AN2.1.07 Earthworks shall comply with M&W Specification Section 6.

Planting Season AN2.1.08 Unless otherwise permitted by the Engineer, planting shall be carried out between 1st April and 30th September except as stated in Clause AN2.1.09. If planting is permitted at other times, particulars of changes to the materials and methods for planting shall be submitted to the Engineer for approval.

Weather and ground conditions AN2.1.09

(1) Soiling, cultivation, planting and other similar landscape softworks and establishment works operations shall not be carried out at times when weather or ground conditions may in the opinion of the Engineer adversely affect the permanent works. Ideally planting shall take place in overcast or moist conditions, but not in weather conditions which will result in initial drying out of root systems and/or scorching of leaves. If planting has to be carried out in hot sun or drying winds, plants awaiting planting shall at all times be shaded to prevent drying out.

(2) The Contractor shall cease the soiling, cultivation, planting and other similar landscape softworks and establishment works operations immediately when in the opinion of the Engineer the weather or ground conditions may adversely affect the permanent works.

Reference Standards AN2.1.10 The latest editions of the following reference standards are applicable:

(a) BS 3936 – Part 1 : Nursery Stock, Tree and Shrubs;

(b) BS 3998 : Recommendations for Tree Work

(c) BS 4428 : General Landscape Operations.

(d) BS 4043:1989 : Transplanting

(e) BS 5837 : Guide for trees in relation to construction

(f) American National Standards Institute ANSI Z60.1- American Standard for Nursery – Stock.

(g) "General Guidelines on Tree Pruning" issued by Development Bureau,

(h) "Arborists' Certification Study Guide" and "Best Management Practices - Tree Pruning" issued by International Society of Arboriculture.

Environmental Sustainability AN2.1.11 The use of organic, eco-friendly and environmentally sustainable products for the soft landscape works shall be incorporated.

Integrated Pest Management AN2.1.12 An Integrated Pest Management strategy that minimizes the use and dependence on chemicals shall be operated.

Use of inorganic chemicals AN2.1.13 Inorganic chemicals shall not be used for landscape softworks and establishment works unless approved by the Engineer. Inorganic chemicals shall be used, stored, mixed and applied in accordance with the manufacturer's recommendations. Containers for inorganic chemicals shall be disposed of off Site by methods agreed by the Engineer.

AN2.2 GLOSSARY

Landscape softworks AN2.2.01 Landscape softworks are all works of a horticultural nature, and shall include the placing, cultivation and preparation of soil-mix and subsoil layers, and the supply and planting of trees, shrubs and other plant material, and any work essentially associated with these.

Landscape hardworks AN2.2.02 Landscape hardworks are the tree grilles, tree guards and tree rings and any other items stated as such in the Contract and described in General Specification.

Establishment works AN2.2.03 Establishment works are the regular inspections, cultivation, watering, fertilizing and other operations specified to be performed during the period stated in the Contract for such inspections and operations.

AN2.3 SUBMISSIONS

Contractor's Programme AN2.3.01 The Contractor's Detailed Programme of soft landscaping works execution and completion shall be submitted to the Engineer for approval within 4 weeks of the commencement of the contract.

Method Statement AN2.3.02 The Contractor's Detailed Method Statement of soft landscaping works execution and completion shall be submitted to the Engineer for approval at least 4 weeks before the commencement of the relevant soft landscape works.

Shop Drawings AN2.3.03 The Contractor's Shop drawings of planting plans and details of installation shall be submitted to the Engineer for approval at least 4 weeks before the

commencement of the relevant soft landscape works.

Particulars of materials AN2.3.04

(1) The following particulars of the proposed materials for landscape softworks and establishment works shall be submitted to the Engineer for approval:

(a) Origin of trees, shrubs, turfs, sprigs and other plant materials,

(b) Details of supplying nurseries or other plant sources,

(c) Source of water for irrigation.

(d) Sources of completed decomposed granite, imported subsoil, topsoil and soil conditioner.

(e) A certificate of analysis for completely decomposed granite including details of the composition and results of tests for the characteristics specified in Clause AN2.4.34

(f) A certificate of analysis for topsoil including details of the composition and results of tests for the characteristics specified in Clause AN2.4.36

(g) A certificate of analysis for soil-mix including details of the composition and results of tests for the characteristics specified in Clause AN2.4.37

(h) A certificate of analysis for soil conditioner including details of the composition and results of tests for the properties stipulated for compliance in Clause AN2 4.36 and the following properties,

(i) Organic carbon content (using loss of ignition 'Ashing' Method of testing); and

(ii) Nitrogen content (using 'Kjeldahl' Method),

(2) The particulars shall be submitted to the Engineer at least 2 weeks before the relevant work starts.

(3) The Contractor shall not deliver the relevant materials to the Site, unless the written approval of the Engineer for the particulars referred to in sub-clause (1) of this Clause is obtained.

Samples of materials AN2.3.05

(1) Samples of the following proposed materials shall be submitted to the Engineer for approval at the same time as particulars of the material are submitted and before confirming orders, and delivery to and use on the Site:

(a) 0.5kg sample of each seed mixture,

(b) A sample of 5 turfs (each turf 300mm x 300mm with a minimum thickness of 50mm),

(c) A sample of 10 sprig individuals of each grass species,

(d) 0.027m^3 of completely decomposed granite.

(e) 0.027m^3 of imported subsoil.

(f) 0.027m^3 of topsoil.

(g) 0.027m^3 sample of soil conditioner,

(h) 0.027m^3 sample of each soil-mix,

(i) 0.027m^3 sample of each mulch,

(j) 0.5kg sample of each fertilizer,

(k) A sample of tree stake,

(l) A sample of tree tie,

(m) A sample of tree guy,

(n) A sample of tree guying stake,

(o) A sample of underground tree guy anchor.

(p) A sample of tree guy cover.

(q) 0.5kg sample of water absorbing soil additive.

(r) A sample of root barrier.

(s) A sample of salt barrier.

(t) A sample of each planter drainage and planter liner component.

(u) 0.5kg sample of sand.

(v) 5kg sample of lime.

(2) Samples of materials for landscape works and establishment works may be inspected by the Engineer at nurseries and other sources before the materials are delivered to the Site.

As Built Drawings AN2.3.06 As Built Drawings showing all completed works (or completed section of the works) shall be submitted to the Engineer for approval within 4 weeks of the practical completion of the works (or completed section of the works).

Operation and Maintenance Manual AN2.3.07 An Operation and Maintenance Manual for all completed works (or completed section of the works) shall be submitted to the Engineer for approval within 4 weeks of the practical completion of the works (or completed section of the works).

AN2.4 MATERIALS

Seedling trees AN2.4.01 Seedling trees shall have the following characteristics:

(a) Aged between 1 and 2 years,

(b) A single slender stem,

(c) A well developed vigorous root system,

(d) Total height above soil level of at least 150mm but not exceeding 900 mm,

(e) Grown and supplied in a container at least 75mm in diameter and 150mm deep, or a tube at least 60mm in diameter and 150mm long, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Whip trees AN2.4.02 Whip trees shall have the following characteristics:

(a) Aged between 2 and 3 years,

(b) A single central stem well furnished with side branches according to species,

(c) A well developed vigorous root system,

(d) Total height above soil level exceeding 900mm but not exceeding 2000mm,

(e) Grown and supplied in a container at least 125mm in diameter and 200mm deep, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Light standard trees AN2.4.03 Light standard trees shall have the following characteristics:

(a) A sturdy straight stem at least 1500mm high from the root collar to the lowest branch,

(b) Stem diameter of at least 25mm but not exceeding 45mm measured at a height of 1 m from the root collar,

(c) According to species, either a well balanced branching head or a well defined straight and upright leader with branches growing out from the stem with reasonable symmetry,

(d) Total height above the root collar exceeding 2000mm but not exceeding 3000mm,

(e) A rootball at least 300mm in diameter and 300mm deep,

(f) When container-grown trees are required, grown in a container at least 350mm in diameter and 400mm deep, and

(g) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Standard trees AN2.4.04 Standard trees shall have the following characteristics:

(a) A sturdy straight stem at least 1800mm high from the root collar to the lowest branch,

(b) Stem diameter exceeding 45mm but not exceeding 75mm measured at a height of 1m from the root collar,

(c) According to species, either a well balanced branching head or a well defined straight and upright leader with branches growing out from the stem with reasonable symmetry, and a minimum length of 600mm,

(d) Total height above the root collar exceeding 2750mm but not exceeding 3500mm,

(e) A rootball at least 450mm in diameter and 300mm deep,

(f) When container grown trees are required, grown in a container at least 500mm in diameter and 500mm deep, and

(g) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Heavy standard trees AN2.4.05 Heavy standard trees shall have the following characteristics:

(a) A sturdy straight stem at least 2000mm high from the root collar to the lowest branch,

(b) Stem diameter exceeding 75mm but not exceeding 125mm measured at a height of 1m from the root collar,

(c) According to species, either a well balanced branching head or a well defined straight and upright leader with branches growing out from the stem with reasonable symmetry, and a minimum length of 800mm,

(d) Total height above the root collar exceeding 3500mm but not exceeding 5000mm,

(e) A rootball at least 750mm in diameter and 400mm deep,

(f) When container grown trees are required, grown in a container at least 750mm in diameter and 600mm deep, and

(g) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts / cankers.

Extra Heavy standard trees AN2.4.06 Extra Heavy standard trees shall have the following characteristics:

(a) A sturdy straight stem at least 2000mm high from the root collar to the lowest branch,

(b) Stem diameter exceeding 125mm but not exceeding 175mm measured at a height of 1m from the root collar,

(c) According to species, either a well balanced branching head or a well defined straight and upright leader with branches growing out from the stem with reasonable symmetry, and a minimum length of 1200mm,

(d) Total height above the root collar exceeding 5000mm but not exceeding 6500mm,

(e) A rootball at least 1000mm in diameter and 500mm deep,

(f) When container grown trees are required, grown in a container at least 750mm in diameter and 600mm deep, and

(g) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Semi-mature trees AN2.4.07 Semi-mature trees shall have all the following characteristics:

(a) A sturdy straight stem at least 2200mm high from the root collar to the lowest branch,

(b) Stem diameter exceeding 175mm measured at a height of 1m from the root collar,

(c) According to species, either a well balanced branching head or a well defined straight and upright leader with branches growing out from the stem with reasonable symmetry, and a minimum length of 1500mm,

(d) Total height above the root collar exceeding 6500mm,

(e) A rootball at least 1500mm in diameter and 600mm deep,

(f) A root system previously undercut a minimum of one year before lifting, to encourage compact fibrous growth, and

(g) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Small shrubs AN2.4.08 Small shrubs shall have the following characteristics:

(a) A minimum of three vigorous, one-year old shoots with a well balanced shape and bushy habit,

(b) A well developed, vigorous root system,

(c) Total height above soil level at least 300mm but not exceeding 600mm,

(d) Grown and supplied in a container at least 125mm in diameter and 150mm deep, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Large shrubs AN2.4.09 Large shrubs shall have the following characteristics:

(a) A minimum of five vigorous, one-year old shoots, with a well balanced shape and bushy habit to produce a diameter 2/3 of the height,

(b) A well developed, vigorous root system,

(c) Total height above soil level exceeding 600mm,

(d) Grown and supplied in a container at least 200mm in diameter and 250mm deep, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Conifers AN2.4.10 Conifers shall have the following characteristics:

(a) A well developed, upright stem well furnished with vigorous leaf or needle bearing side shoots with good symmetry,

(b) A well developed, vigorous root system,

(c) For small conifers, total height above the root collar at least 1500 mm but not exceeding 2500mm,

(d) For large conifers, total height exceeding 2500mm but not exceeding 3500mm,

(e) Grown and supplied in a container at least 350mm in diameter and 400mm deep for small conifers and at least 500mm in diameter and 500mm deep for large conifers, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Palms AN2.4.11 Palms shall have the following characteristics:

(a) A well developed, upright habit and vigorous fronds with good symmetry,

(b) A well developed, vigorous root system,

(c) For small palms, a minimum height from soil level to the base of the lowest frond as stated in the Contract and a rootball at least 300mm in diameter and 300mm deep, and

(d) For medium palms, a minimum height from soil level to the base of the lowest frond as stated in the Contract and a rootball at least 500mm in diameter and 450mm deep.

(e) For large palms, a minimum height from soil level to the base of the lowest frond as stated in the Contract and a rootball at least 700mm in diameter and 600mm deep, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Multi-stem Palms AN2.4.12 Palms shall have the following characteristics:

(a) A well developed, upright habit and vigorous fronds with good symmetry,

(b) A well developed, vigorous root system,

(c) A minimum of five stems each with a clear trunk height of 1.5m from the root collar to the base of the leaf sheath. There shall be at least three fronds on each stem and evidence of one new growing shoot per stem. An overall height above ground as specified in the drawings.

(d) A rootball at least 500mm in diameter and 500mm deep, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Heavy Palms AN2.4.13 Heavy Palms shall have the following characteristics:

(a) A well developed, upright habit and vigorous fronds with good symmetry,

(b) A well developed, vigorous root system,

(c) No less than 7 fronds,

(d) A sturdy straight stem not less than 3000mm in trunk height from soil level to the base of the crown shaft. An overall height as specified in the Plant Schedule or drawing,

(e) A rootball not less than 800mm in diameter and 600mm deep, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Semi-Mature Palms AN2.4.14 Semi-mature Palms shall have the following characteristics:

(a) A well developed, upright habit and vigorous fronds with good symmetry,

(b) A well developed, vigorous root system,

(c) No less than 10 fronds,

(d) A sturdy straight stem not less than 5000mm in trunk height from soil level to the base of the crown shaft. An overall height as specified in the Plant Schedule or drawing.

(e) A rootball not less than 1000mm in diameter and 800mm deep, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Uniformity of trees and palms AN2.4.15 (1) The Contractor shall ensure that individual specimens of each species of trees and palms used for avenue planting are uniform in size and shape. Variations in overall height of no more than 500mm, and in stem diameter of

no more than 20mm will be permitted, within the specified tree sizes.

(2) The Contractor shall ensure that any replacement of trees or palms required in these areas at a later date will allow for additional growth the planted trees have made and shall still meet the variation tolerances stated above.

Bamboos AN2.4.16 Bamboos shall have the following characteristics:

(a) A well developed, vigorous root system, with a healthy rhizome capable of shooting fresh culm,

(b) For diffuse clump species, a single stem with total height above soil level not less than the size stated in the schedule.

(c) For unicaepitose and pluricaespitose species, a clump of at least five stems with total height above soil level not less than the size stated in the schedule,.

(d) Grown and supplied in container at least 450mm in diameter and 450mm deep, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Herbaceous plants AN2.4.17 Herbaceous plants shall have the following characteristics:

(a) A minimum of four well developed, vigorous shoots,

(b) A well developed, vigorous root system,

(c) Total height above soil level or diameter of plant for clumps not less than the height or diameter stated in the Contract,

(d) Healthy well developed bulbs, corms, rhizomes or tubers,

(e) Grown and supplied in a container at least 125mm in diameter and 150mm deep, and

(f) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Ground covers AN2.4.18 Ground cover plants shall have the following characteristics:-

(a) A minimum of four well developed, vigorous shoots,

(b) A well developed, vigorous root system,

(c) Total height above soil level at least 150mm,

(d) Grown and supplied in a container at least 125mm in diameter and 150mm deep, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Climbers AN2.4.19 Climbers shall have all the following characteristics: -

(a) A minimum of four vigorous, one-year old shoots at least 600mm long unless otherwise specified,

(b) A well developed, vigorous root system,

(c) Grown and supplied in a container at least 125mm in diameter and 150mm deep, and

(d) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Aquatic Plants AN2.4.20 Aquatic Plants shall have all the following characteristics: -

(a) Vigorous well developed main stems and healthy foliage,

(b) Pot grown in humus rich compost, and

(c) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Hedging Plants AN2.4.21 Hedging Plants shall have all the following characteristics: -

(a) A seedling or rooted cutting which has been undercut and transplanted or container grown,

(b) Good symmetry and bushiness encouraged by pruning,

(c) Vigorous lateral shoots starting no more than 100mm above the root collar,

(d) Total height above soil level at least 450mm or not less than the height stated in the Plant Schedule or drawings, and

(e) Free of any pest, non-symbiotic fungi, disease, rubbing branches, inwardly growing branches, bark tears/abrasion and tie cuts/cankers.

Bulbs AN2.4.22 Bulbs shall have all the following characteristics: -

(a) Plump and firm to touch,

(b) Sufficient nutrient reserves to ensure healthy growth and flowering, and

(c) Free of any pest, non-symbiotic fungi and disease.

Containerised plants AN2.4.23 Containerised plants shall be grown in open ground and then lifted and placed in a rigid or semi-rigid container of dark colour; plants shall be left to grow in the containers for at least 3 months before being delivered to the Site. The dimensions of containers shall not be less than the relevant rootball or container dimensions stated in Clauses AN2.4.01 to AN2.4.21. Containerised plants shall be well watered before despatch from the nursery and shall remain in the containers until required for planting.

Turf AN2.4.24 (1) Turf shall possess the following characteristics:-

(a) Free of sticky clay, weeds, impurities, pests, non-symbiotic fungi and disease with grass of even density, green colour and capable of healthy growth;

(b) With a sufficiently fibrous root system to hold together during handling;

(c) Size of 300mm x 300mm with a minimum thickness of 50mm and with an even thickness of grass sward and soil thickness.

(2) Turf species shall be one of the following species unless otherwise specified:

(a) Axonopus compressus

(b) Cynodon dactylon

(c) Paspalum vaginatum 'Salam'

(d) Zoysia japonica

(e) Zoysia matrella

Sprigs AN2.4.25

(1) Sprigs shall be at least 100mm long and shall be free of pests, non-symbiotic fungi and disease.

(2) Sprigs shall be one of the following species unless otherwise specified:

(a) Axonopus compressus

(b) Cynodon dactylon

(c) Paspalum vaginatum 'Salam'

(d) Zoysia japonica

(e) Zoysia matrella

Grass Seed AN2.4.26

(3) All seed shall be covered by an appropriately numbered seed analysis report or certificate. The date of testing as stated in the report or certificate shall be not more than one year before the date of use of the seeds. The numbered reports or certificates shall always refer to the number on the seed containers. The origin of all seed and the name of the supplier shall be stated on the seed containers.

(4) The quality of grass seed shall be gauged by purity, germination percentage and freedom from weeds. The total weed seed content shall not exceed 0.5% by mass and the total content of other crop seed shall not exceed 1% by mass. The germination capacity of each constituent of the mixture over a seven-day test period shall not be less than 80%, and the purity of the mixture shall not be less than 90%.

(5) The basic minimum grass seed mix for hydroseeding shall be as follows, unless otherwise specified: -

(a) Between April and August inclusive, the minimum spreading rate shall be 25g/sq.m. The mix proportions shall lie within the following limits:

Cynodon dactylon	13-15 g / sq.m.
Paspalum notatum	8-10 g / sq.m.
Other species from list below:	1-4 g / sq.m.
- *Chloris gayana*	
- *Eragrostis curvula* (0.5 g/sq m max.)	
- *Eremochloa opihuroides*	
- *Cenchius ciliaris*	
TOTAL	25 g / sq.m. (minimum)

(b) Between September and March inclusive the minimum spreading rate shall be 30 g/sq.m. and shall consist of:

Cynodon dactylon	15 g / sq.m.
Paspalum notatum	10 g / sq.m.
Lolium perenne	5 g / sq.m.
TOTAL	30 g / sq.m. (minimum)

Grass and Tree Seed Mix AN2.4.27

(1) The hydroseeding mix in this Clause shall not be applied on slopes with gradient steeper than 35 degrees.

(2) All seed shall be covered by an appropriately numbered seed analysis report or certificate. The date of testing as stated in the report or certificate shall be not more than one year before the date of use of the seeds. The numbered reports or certificates shall always refer to the number on the seed containers. The origin of all seed and the name of the supplier shall be stated on the seed containers.

(3) The quality of seed shall be gauged by purity, germination percentage and freedom from weeds. The total weed seed content shall not exceed 0.5% by mass and the total content of other crop seed shall not exceed 1% by mass. The germination capacity of each constituent of the mixture over a seven-day test period shall not be less than 80%, and the purity of the mixture shall not be less than 90%.

(4) The basic minimum grass and tree seed mix for hydroseeding shall be as follows, unless otherwise specified: -

(a) Between April and August inclusive, the minimum spreading rate shall be 30g/sq.m, comprising 25g/sq.m. of grass seed and 5g/sq.m. of tree seed. The mix proportions shall lie within the following limits:

(iii) The basic minimum grass seed component of the mix shall be in accordance with Clause AN2.4.26(3)(a).

(iv) The basic minimum tree seed component of the mix shall contain a minimum of 4 tree species from the list below:

Acacia mangium

Albizia lebbek

Alnus formosana

Cassia siamea

Macaranga tanarius

Mallotus paniculatus

Sapium discolor

Schefflera octophylla

(b) Between September and March inclusive, the minimum spreading rate shall be 35g/sq.m, comprising 30g/sq.m. of grass seed and 5g/sq.m. of tree seed. The mix proportions shall lie within the following limits:

(i) The basic minimum grass seed component of the mix shall be in accordance with sub-clause AN2.4.26(3)(b).

(ii) The basic minimum tree seed component of the mix shall contain a minimum of 4 tree species from the list below:

Acacia mangium

Albizia lebbek

Alnus formosana

Cassia siamea

Macaranga tanarius

Mallotus paniculatus

Sapium discolor

Schefflera octophylla

(5) All tree seeds, except the Acacia species, shall be soaked for 4-8 hours in water at room temperature immediately before mixing with other ingredients of the hydroseeding mix.

(6) Seeds of *Acacia mangium* shall be put into water which is then brought to the boil and then removed immediately. The drained seed shall then be mixed with other ingredients of the hydroseeding mix.

(7) The Contractor shall note that in order to provide the tree seeds as specified it shall be necessary to collect the tree seeds in advance of commencing hydroseeding works on Site.

Plant name AN2.4.28 In the event that botanical name, English common name and Chinese common name are given for any plant specified, the botanical name shall always take precedence.

Plant materials to be as specified AN2.4.29

(1) All plant materials and seeds shall be true to species as specified.

(2) All plant materials shall exhibit the habit of growth as specified and shall not be less than the minimum size specified in this Section or the Plant Schedule or the Drawings.

Plant materials and seeds to be free of pest AN2.4.30 All plant materials shall be healthy, and free of pests, disease, disease-causing fungi, parasites, discolouration and mechanical damage.

Source of plant materials AN2.4.31

(1) The Contractor shall obtain all plant materials from a recognised cultivated source and not from the wild. Native plants that are not commercially available may be propagated from seeds collected in the wild without damaging the wild plants.

(2) In exceptional circumstances plants may be transplanted from sites where existing plants have to be removed to make way for development. Prior written approval of the Engineer must be obtained before any plants are sourced in this manner.

(3) The Contractor shall state the source of all plant materials, in good time before planting so that the Engineer may inspect the nursery and agree on a selection of all plant materials for approval. All plant materials subsequently delivered to the Site shall be to at least the same standard in all respects as that approved. The Contractor shall note that in order to provide all the plant materials as specified it may be necessary for him to grow the materials in his own nursery in advance of commencing planting works on the Site.

Substitution of Plant Material AN2.4.32

(1) In the event of plant material as specified herein not being available due to special circumstances, the Contractor shall notify the Engineer at the beginning of the Contract in order that suitable substitutes can be considered. The Contractor shall propose substitutes which are similar in height, shape, flowering characteristics and function as the original species.

(2) The Contractor shall have photographs taken of approved samples for each species and plant size to be used. The photographs shall be used as a standard to which similar species to be supplied and planted in the Contract shall be equivalent.

(3) Any changes, such as planting densities, as necessitated by the need for substituting plant species requested by the Contractor shall be carried out at no extra cost to the Contract.

(4) No substitution of plants shall be made without the prior written approval of the Engineer.

Depth of rootballs or containers of plant materials AN2.4.33 Soil above the root collar shall not be included in the rootball or container depth measurement. If the resulting depth measurement of the rootball or containers does not meet the specified minimum, the plant material can be rejected.

Completely Decomposed Granite AN2.4.34 Completely Decomposed Granite (CDG) shall have the following characteristics:

(a) Free from grass or weed growth, sticky clay, salt, chemical contamination, and any other deleterious materials and stones exceeding 25mm in diameter in any dimension,

(b) Original rock texture preserved,

(c) Can be crumbled by hand and finger pressure into constituent grains,

(d) Easily indented by point of geological pick,

(e) Slakes in water,

(f) Completely discoloured compared with fresh rock, Yellowish brown to reddish brown in colour,

(g) Feldspars powdery to soft,

(h) Hand penetrometer shear strength index <250 kPa, and

(i) Zero rebound from N Schmidt hammer.

Imported Subsoil AN2.4.35

(1) Imported subsoil shall be evenly textured, good clean material, free from all impurities including pernicious weeds, roots, sticky clays, salt, non-soil material, chemical contamination such as oils and cement, stones exceeding 25mm in any dimension, and any other deleterious materials.

(2) Imported subsoil shall be free of gypsum or any saline deposits.

Topsoil AN2.4.36 Topsoil shall be a fertile, free draining material of sandy loam character taken from the top 300mm of land previously supporting vegetation growth but not from recent paddy field cultivation and shall have the following properties:

(a) Free from impurities, grass or weed growth, substances injurious to plants, other foreign matter or contamination and stones exceeding 25mm diameter in any dimension,

(b) Evenly textured,

(c) Dark brown or black colour,

(d) Organic matter not less than 7.5%, and

(e) pH value between 5.5 and 7.0.

Soil-Mix / Lightweight Soil-Mix AN2.4.37

(1) The Contractor shall prepare soil-mix or lightweight soil-mix on Site. Mixing shall not take place during periods of heavy rain, nor when the soil is saturated. Mixing shall cease if the moisture content is too high to achieve even, thorough mixing.

(2) Soil-mix shall consist of friable, completely decomposed granite and soil conditioner in the proportions of 2:1 by volume. Soil-mix shall be free of

grass or weed growth, roots, pathogens, sticky clay, salt, chemical contamination, and any other deleterious materials and stones exceeding 25mm diameter in any direction.

(3) Lightweight soil-mix shall consist of friable, completely decomposed granite, expanded clay or vermiculite pellets with a maximum particle size of 5mm and soil conditioner in the proportions of 2:1:1 by volume, and shall have a maximum weight of 1000 kg per m^3. Lightweight soil-mix shall be free of grass or weed growth, sticky clay, salt, chemical contamination, and any other deleterious materials and stones exceeding 25mm diameter in any direction.

(4) Mixing of the soil-mix components should be carried out in the specified proportions, with thorough mixing (manual or mechanical) ensuring an even distribution of the components. Over compaction must be avoided. In the event of over compaction, remediative aeration is required.

(5) Soil-mix / lightweight soil-mix shall possess the following properties:

(a) pH value between 5.5 and 7.0,

(b) Organic matter more than 10%,

(c) Organic carbon content 2.0% to 3.0%,

(d) Nitrogen content 0.09% to 0.15%,

(e) Carbon:Nitrate ratio 25:1 to 45:1,

(f) Extractable phosphorous (P) content 70 mg/kg to 100 mg/kg,

(g) Extractable potassium (K) content 150 mg/kg to 300 mg/kg,

(h) Extractable magnesium (Mg) content more than 80 mg/kg,

(i) Cation Exchange Capacity 16 to 20 m.e. %, and

(j) Soil texture content:

(i)	Sand (0.05 - 2.0 mm)	in the range 20-75%
(ii)	Silt (0.002 – 0.05 mm)	in the range 5-60%
(iii)	Clay (< 0.002 mm)	in the range 0-10%

(6) Soil-mix / lightweight soil-mix delivered and installed on site shall be tested for N.P.K. value, organic matter content, Cation Exchange Capacity ratio, organic carbon, pH value, physical content of sand, silt and clay, and water content. Soil testing shall be arranged by the Contractor and carried out by an approved reputable firm or institute at the contractor's cost, and the report shall be submitted to the Engineer for approval.

(7) Should the results of the soil analysis show that the soil-mix does not meet the nutrient and organic status required for plantings soil mix, then the Contractor shall make good the soil mix by bringing it to the nutrient and organic status specified. The Contractor shall obtain approval for his proposed remedial measures from the Engineer before undertaking any work.

(8) The Contractor shall ensure that planting soil mix heaps are properly maintained and that planting soil mix shall be placed in its final position within 12 months of importation to Site or, for site strip material, deposition for storage on Site. Weed control shall be carried out by spraying with approved weed killer.

(9) If the period between the analysis of the soil mix as above and the commencement of any deposition of soil mix exceeds 12 months then the Contractor shall carry out a second analysis of the soil mix. If this second analysis shows that the soil mix has deteriorated in the nutritional requirements for soil mix the Contractor shall make good the soil mix by bringing it to the nutrient and organic status specified.

(10) The Contractor shall give the Engineer four weeks notice of his intention to commence deposition of soiling operations in order to allow for the results of the analysis to be available before commencing soiling.

(11) No change in the source of soil mix shall be allowed without the prior approval of the Engineer based on such tests and samples as specified herein.

Soil conditioner AN2.4.38

(1) Soil conditioner shall be properly composted organic material and shall be free of weed growth, impurities, foreign materials, contamination and substances injurious to plants. Soil conditioner shall have the following properties:

(a) PH value between 4.0 and 7.0,

(b) Moisture content between 30% and 50%,

(c) Fine and freely flowing consistency,

(d) Stable composition and not liable to further decomposition,

(e) Not capable of raising the temperature of the treated soil more than 5°C above the temperature of the untreated soil,

(f) Not giving off toxic nor obnoxious fumes,

(g) Organic matter content not less than 85% (dry matter), and

(h) Carbon: nitrogen ratio between 20 and 55.

(2) The Contractor shall produce a certificate of analysis stating the composition and physical and chemical characteristics. The analysis shall be carried out by a laboratory approved by the Engineer.

Water absorbing soil additive AN2.4.39

(1) Water absorbing soil additive shall be a proprietary type approved by the Engineer and shall have the following properties:

(a) Capable of absorbing water up to 400 times its weight in de-ionized water and releasing the water later,

(b) Have a quick soil wetting ability and capable of lasting for at least five years with at least 95% of its original storage capacity retained in the first two years,

(c) Physically stable, resisting fast natural degradation processes and not degradable by chemicals,

(d) Compatible with all fertilisers and soil ameliorants and with a neutral pH value,

(e) Environmentally friendly with no short or long term impacts on the environment, non toxic and non-hazardous to any ecosystem, soil organisms, humans, animals and underground water.

(f) Not contain levels of any element above those specified in the rules and regulations of local authorities, particularly heavy metals.

(g) Not hinder plant nutrient uptake or interfere with / affected by application of fertilizers, pesticides or any treatment whether chemical or biological.

(h) Belong to one of the following categories:

(i) Organic co-polymers,

(ii) Acrylamides,

(iii) Acrylic polymers,

(iv) Volcanic ash/Basaltic volcanic parent material,

(v) Amorphous silica or

(vi) Coated silica.

(i) Have a minimum absorption capacity of 75-100 ml water/ gm of material with a minimum of 85-90% available as plant water.

(j) Reduce irrigation water consumption by a minimum of 45%.

(2) Water absorbing soil additive shall be supplied in sealed, water-proof containers and kept dry at all times.

Sand AN2.4.40

(1) Sand shall be a clean, coarse grained and angular material with a minimum 1mm diameter section. It should be well graded, free from soluble salts ranging in size so that 80–100% passes the 3mm sieve and 0–50% passes the 2mm sieve, with 0% passing through a 1mm sieve.

(2) Sand shall be river sand from fresh-water courses or shall be from terrestrial sources. Sand shall not be marine sand or from tidal river sources.

(3) The Contractor shall inform the Engineer of the source of all sand used and shall submit a laboratory report for review by the Engineer to identify its structural composition (as defined in Standard Specification for Civil Works as amended by this Section) as well as identifying the salt content of the Sand. All laboratory testing shall be at the Contractor's own cost.

(4) A 0.5kg sample of Sand shall be submitted to the Engineer for Approval prior to its use in the Works.

Lime AN2.4.41

Ground dolomitic limestone not less than 80% total carbonates, minimum 20% calcium and 10% magnesium. Ranging in size so that 50% passes through the 250 microns sieve and 90% passes through the 1mm sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionally on the basis of 1 quantities passing the 250 micron sieve.

Peat Moss AN2.4.42

Peat Moss shall not be used as it is not a sustainable resource.

Organic Mulch AN2.4.43

(1) Organic mulch shall be a fully composted, stable, non-toxic organic material comprising shredded bark, wood chips, rice straw, decomposed leaf litter or similar approved, or a combination of these. The mulch shall be free from impurities and be heavy enough to prevent dispersal by wind.

(a) Wood chips shall be of a nominal size of 5mm to 20mm,

(b) Pine tree bark shall be of a nominal length of 60mm to 100mm and a nominal width of 50mm to 70mm,

(c) Any wood content shall be inert and free of resinous toxins and the pH of the Mulch shall be not less than 6.0, and

(d) Composting shall entail that the material is held at 60°C for a period of at least six weeks, kept moist and turned regularly.

(2) The Engineer shall be invited to inspect production techniques and the suppliers' facilities, prior to any approvals.

Inorganic Mulch AN2.4.44

Inorganic mulch shall be granite, limestone or slate based aggregate approved by the Engineer.

Organic Fertilizer AN2.4.45

(1) Organic fertilizer shall be from a source approved by AFCD.

(2) Organic fertilizer shall be fermented, heat treated, odourless, free of noxious weeds, soil or sand, free of any harmful pathogens/nematodes, and free of any toxic heavy metals (lead, mercury, cadmium, etc.).

(3) Organic fertilizer analysis shall have the following chemical properties:

(a) Organic Matter (OM) 40-50%

(b) PH value between 6 and 7

(c) Moisture content up to 25% of its weight

(d) Electrical conductivity (EC) not to exceed 10mmhos/cm

(e) C/N ratio not to exceed 20:1

(f) Sodium chloride not more than 2%

(g) Soluble sodium not more than 0.8%

(4) Organic fertilizer shall be supplied in sealed waterproof bags under shelter away from water and direct sunlight.

(5) Peanut cake or any other substance likely to encourage vermin shall not be used.

Inorganic Fertilizer AN2.4.46

(1) Inorganic fertiliser shall not be used without prior written approval of the Engineer. It is strongly preferred that organic fertilizer is used instead of inorganic fertilizer. However, use of inorganic fertiliser may be accepted by the Engineer if suitable justification from the Contractor is provided.

(2) Inorganic fertilizer shall be chloride free, environmentally friendly, slow release and in the lower PH range.

(3) Inorganic fertilizer shall be furnished in standard containers with the name, weight and guaranteed analysis of the contents clearly marked.

(4) Pre-planting fertilizers shall be slow release granular NPK chemical fertilizer with a minimum four month release period at 32°C with the following formula or an equivalent approved by the Engineer:

(a) 14-18 parts N (Nitrogen)

(b) 7-12 parts P (Phosphorous)

(c) 12-16 parts K (Potassium)

(d) 1-3 parts MgO_2 (Magnesium Oxide) plus other trace

(5) Post-planting fertilizers shall be granular NPK chemical fertilizer with a minimum two week release period at 32°C with the following formula or an

equivalent approved by the Engineer:

(a) 14-16 parts N (Nitrogen)

(b) 14-16 parts P (Phosphorous)

(c) 14-16 parts K (Potassium)

(6) Phosphate fertilizer shall be triple superphosphate powder or an equivalent approved by the Engineer.

(7) Inorganic fertilizer shall be supplied in sealed waterproof bags under shelter away from water and direct sunlight.

(8) Peanut cake or any other substance likely to encourage vermin shall not be used.

Hydroseeding Fertiliser AN2.4.47 Hydroseeding fertiliser shall be post-planting fertilizer and applied at a rate of at least 100 g/sq m

Root activator AN2.4.48 Root activator shall be a chemical which can activate root growth and which contains plant hormones at the approved dilution e.g. IAA / IBA / NAA, which shall be approved by the Engineer.

Soil binder AN2.4.49 Soil binder shall be a proprietary type approved by the Engineer and shall consist of a binding medium applied in aqueous suspension by spraying onto the surface of the soil to stabilise and condition the soil. The binding agent shall not be injurious to plant growth.

Sacks, bags, containers etc. AN2.4.50 The Contractor shall retain for inspection by the Engineer all sacks, bags, containers and the like in which fertiliser, mulch, grass-seed, pesticides, herbicides and the like are supplied and shall not dispose of these without the consent of the Engineer. Sacks, bags and containers shall be cleaned and recycled as far as possible, without causing contamination.

Tree stakes and ties AN2.4.51

(1) Metal stakes shall be 40 mm x 40 mm x 4 mm thick galvanized mild steel angle painted with one coat of approved primer and one coat of approved finishing coat before installation. Total length of stake shall be 1800 mm or as specified to suit the height of the plant being supported. All sharp edges of the metal stakes shall be removed to avoid damage to the plant. The primer and finishing coat shall be approved by the Engineer before its application.

(2) Bamboo tripod staking shall comprise three nos. of 50mm diameter x 1800mm long bamboo poles or as specified to suit the height of the plant being supported.

(3) Ties shall be of dark colour and shall be one of the following which shall be capable of adjustment after fixing, and shall be fitted with flexible rubber or plastic sleeves to prevent chafing, rubbing or abrasion of the plant:

(a) 5mm diameter rot-proof rope,

(b) 3mm overall diameter plastic coated wire,

(c) 3mm diameter stainless steel braided wire with 20mm adjustable stainless steel screw clamp.

Tree Wire Guys AN2.4.52

(1) Trees larger than Heavy Standard size shall be tied with wire guys. Three guys per tree shall be used and guys shall be adjustable. Guys shall be of dark colour and shall be fitted with a flexible rubber or plastic sleeve to prevent chafing, rubbing or abrasion of the plant, and a 100mm long stainless steel turnbuckle for adjustment. Guys shall be one of the following:

(a) 8 mm diameter rot-proof rope,

(b) 4 mm overall diameter plastic coated wire,

(c) 4mm to 6mm diameter stainless steel braided wire with 20mm adjustable stainless steel screw clamp.

(2) Guying stakes shall be 25mm x 25mm x 5mm thick galvanized mild steel angle with 5mm to 10mm diameter hole drilled 30mm from the top before galvanizing, painted with one coat of approved primer and one coat of approved finishing coat before installation. The primer and finishing coat shall be approved by the Engineer before its application.

Underground Guying AN2.4.53

(1) Trees larger than Heavy Standard size with large rootballs may be secured using underground wire guys tied to secure underground anchors. Underground guying may be appropriate for large trees in locations where stakes and guys may cause hazard to pedestrians.

(2) Underground wire guys shall be 4mm to 6mm diameter stainless steel braided wire with 20mm adjustable stainless steel screw clamp.

(3) Anchors may be timber railway sleepers, heavy concrete slabs or metal pieces as approved by the Engineer.

(4) Sturdy protective timber slats shall be provided to sit on the surface of the rootball, to spread the pressure imposed by the guys evenly over the whole rootball surface and to protect the rootball surface from any downward cutting action that would otherwise be caused by the guys.

Trunk Protection Material AN2.4.54

(1) Trunk protection materials shall be used to protect the trunk from any abrasion from ties and / or guy wires.

(2) Trunk protection materials shall be one of the following:

(a) Clear unplasticised polyvinyl chloride (uPVC) plastic hosing, 10mm to 25mm in diameter, as guy cover and trunk protection hosing, or

(b) Flexible rubber pad, 2mm thick and 150mm wide with length enough to wrap twice round the trunk as trunk protection.

Mowing Edge AN2.4.55

(1) Plastic edger shall be used, where gravel/pebbles areas are interfaced with planting beds. It shall also be used to separate lawn areas from planting beds. A plastic mowing whip edge shall be placed around all trees/palms planted in lawn areas.

(2) Material shall be 3.5-4% Carbon Black for UV stabilization, height 10-15cm, and thickness 2-2.5mm.

(3) Concrete blocks, clay bricks or aluminium edging shall be used whenever specified on the Drawings.

Pots AN2.4.56

(1) Pots for Herbaceous Plants which are to remain in their pots shall be unglazed fireclay free from cracks or damage and with adequate drainage holes in the base. Pots shall have a diameter of 250mm and a minimum depth of 300mm.

(2) Pots for Aquatic Plants shall be unglazed fireclay free from cracks or damage with adequate drainage holes in the base. They shall have a diameter and depth of the dimensions stated on the Drawings.

(3) The base of each pot shall have a drainage layer of clean pea gravel, broken fireclay or equal and approved material to a depth of 50mm.

(4) Dragon Pots for feature plants shall be 450mm in diameter at the tip and 400mm in depth and shall be free from cracks, damage or other imperfections.

Root Barrier	AN2.4.57	Root barrier shall be a composite, non woven geotextile and HDPE material, that prevents the penetration of tree roots.
Stackable Load Bearing Cells	AN2.4.58	Stackable Load Bearing Cells shall be 'Silva Cell' manufactured by Deep Root, or equal and approved by the Engineer.
Drainage Cell	AN2.4.59	Drainage cells shall be subsoil drainage honeycomb modules produced out of recycled 60% polypropylene. They shall weigh approximately 2.7kg/m2, and carry a load of >100t/m2. The modules shall be resistant to biological attacks and to chemicals. They shall not allow root penetration.
Drainage aggregate	AN2.4.60	Drainage aggregate shall be clean crushed rock 6mm to 19mm nominal size.
HDPE Waterproof Liner	AN2.4.61	High Density Polyethylene waterproof liner shall have a thickness of 1.00mm, with break strength of 40kN/m, carbon black content of 2.0-3.0%, and 50% UV resistance.
Filter membrane	AN2.4.62	Filter membrane shall be a permeable non-woven, thermally bonded geotextile filter fabric, which is not affected by salinity, acids, alkalis, bacteria, humidity, or rotting, and shall meet performance requirements for a minimum 12 years.
U Pins	AN2.4.63	U-pins for securing erosion control mat around planting pits in the hydroseeded area shall be aluminium wire, bent to form a 'U' shape, with a diameter, length spacing of prongs sufficient to securely attach the mat to the slope face. The Contractor shall demonstrate to the satisfaction of the Engineer that the size and shape of the u-pins is sufficient to ensure that the specified erosion control mat is securely fastened.
Salt barrier	AN2.4.64	Salt barrier shall be a geotextile composite product, non-woven, thermally laminated either side to a drainage core, enabling permeable capillary break and barrier to salt. It shall have a tensile strength of 30 KN/m, mass per unit area 850g.m2, and a thickness of 5.5mm.
Structural Soil	AN2.4.65	(1) Structural soil shall be a uniformly blended mixture of crushed stone, clay loam and hydrogel mixed to following proportion: (a) 100% 1-1/2" to 3" crushed highly angular stone, with no fines. (b) 20% Clay Loam consisting of 25-30% Sand, 20-40% Silt and 25-50% Clay. Organic matter not to exceed 5%. (c) 0.03% hydrogel polymer (dry weight). (2) Hydrogel for Structural Soil shall be a non-toxic potassium propenoate-propenamide copolymer, proprietary made product for horticultural usage.

AN2.5 HANDLING, STORAGE AND TRANSPORT

Handling and storage of rootballed stock	AN2.5.01	(1) Plants grown in open ground shall be well watered before lifting and shall be lifted in such a manner that the specified rootball is obtained with minimum disturbance to the roots. The rootball shall be securely wrapped immediately after lifting to prevent loss of soil and moisture using hessian, straw or other material agreed by the Engineer. The wrapping material shall not be removed until the plant is required for planting. (2) Root pruning and undercutting of the root system of rootballed stock to the specified size of root-ball shall be carried out 12 months before lifting from the nursery.
Handling and storage of container grown and containerised stock	AN2.5.02	Container grown and containerised stock shall be well watered before despatch from the nursery and shall remain in the containers until required for planting.
Transport of plants	AN2.5.03	(1) Plant material shall be lifted or moved in such a manner that the roots are not disturbed. Plant material shall be lifted or moved by holding the container and not the above ground portion of the plant. (2) Plants shall be wrapped and protected to prevent mechanical damage during lifting and transport. The trunk from soil level to the lower branches of trees in the light standard, standard, heavy standard and semi-mature categories shall be securely wrapped to prevent moisture loss using hessian, straw or other material agreed by the Engineer. (3) Immediately prior to lifting, palm trees shall have their fronds reduced in length by 30%, sprayed with anti-desiccant and tied up with 3 layers of hessian to enclose the growing tip. The roots shall be pruned and the root ball protected with three layers of hessian tied up with wire and kept moist. (4) Root systems of all plants shall not be allowed to dry out at any time and shall not be exposed to excessive or artificial heat. (5) All plant materials that are to be lifted and transported while in leaf shall be treated with anti-desiccant prior to transportation and shall be covered with tarpaulin during transport to reduce excessive transpiration. (6) All materials used for protection of plants during transport shall be removed before planting or as directed or agreed by the Engineer. Damaged plant material may be rejected by the Engineer and the Contractor shall replace such damaged material. Damaged material which is not so rejected shall be carefully pruned using sharp clean implements to give a single flat sloping face.
Storage of plants	AN2.5.04	(1) Prior to planting, plants shall be maintained healthy and vigorous and shall be protected from exposure to conditions which may affect the plants adversely. This includes, but is not limited to, maintaining root balls with adequate moisture. Plants grown in shade conditions shall be stored and maintained in equivalent shade conditions prior to planting. (2) Plants stored on-site shall be spaced to allow clearance for light and air and not be spaced together such that limbs may die or wilt. (3) Plants shall be protected from damage and damaged plants shall not be used in the permanent work unless permitted by the Engineer. If the Engineer permits damaged plants to be used, damaged material shall be pruned and treated as stated in Clause AN2.9.10. Any additional costs and time involved in the replacement of damaged plants which are rejected by

the Engineer or in the treatment of damaged plants which are permitted by the Engineer shall be borne by the Contractor.

(4) The Contractor shall seek the written approval of the Engineer on the storage of plants, method, equipment and storage facilities on Site.

Storage of trees and shrubs AN2.5.05 Plants which are not immediately planted in their permanent positions shall be maintained in good condition and shall be stored as follows:

(a) Trees, palms, bamboos and shrubs shall be supported upright on level ground, regularly watered and maintained in good condition.

(b) Bare-rooted trees, palms, bamboos or shrubs which shall be heeled into the ground at an angle to the horizontal with all the roots covered by soil-mix, and

(c) Where trees and shrubs are delivered to the Site with shoots and branches bundled, all tying materials shall be removed immediately after arrival to the Site to prevent heating up and subsequent defoliation.

Handling and storage of turf and sprigs AN2.5.06 Turf and sprigs shall not be lifted when waterlogged or very dry and shall be packed to avoid drying out. Turf and sprigs shall be stored by spreading out and shall not be stacked. Turf and sprigs shall be kept moist and in good condition and shall be delivered and laid within 36 hours after lifting.

Storage of grass seed AN2.5.07 Grass seed shall be stored in bags off the ground in a clean, dry, well-ventilated location free of vermin. Prolonged storage shall be carried out under controlled conditions of temperature and humidity.

Storage of fertilizer AN2.5.08 Fertilizer shall be stored off the ground in sealed waterproof bags and shall be protected from exposure to conditions that may adversely affect the fertilizer.

AN2.6 PRE-PLANTING WORKS

Preparatory works AN2.6.01 (1) Before soiling or planting for landscape softworks and establishment works starts, preparatory works shall be carried out by one or more of the treatments stated in this Section AN2.6, as appropriate or as stated elsewhere in the Contract.

(2) Location of existing underground services shall be determined prior to the start of any excavation and preparatory works.

Cleaning ground AN2.6.02 (1) Weeds and any unwanted vegetation as confirmed by the Engineer, rubbish, litter, stones exceeding 25mm diameter and all deleterious material shall be removed from the surface of the ground and the soil for planting.

(2) The Contractor shall not use chemicals including herbicide or fire for clearance of vegetation, unless otherwise instructed or approved by the Engineer. When the use of herbicide is approved by the Engineer, the Contractor shall comply with the requirements in Clause AN2.9.09.

(3) Clearance of vegetation by cutting grass and vines, if specified or if instructed or agreed by the Engineer, shall include cutting of grass and vines to within 25mm of ground level on either sloping ground or flat ground around trees or other vegetation.

(4) Clearance of vegetation by cutting and grubbing out vines and undergrowth, if specified or if instructed or agreed by the Engineer, shall include severing of the stems of all vines and undergrowth stumps on either sloping ground or flat ground within woodland. Prior to commencement of vegetation clearance, the Contractor shall clearly confirm with the Engineer which vegetation, if any, is to be retained.

(5) All cut materials resulting from vegetation clearance shall be disposed of from the Site to locations approved by the Engineer.

(6) Any voids left by the operation of cleaning ground shall be backfilled with imported subsoil.

Ripping AN2.6.03 The ground shall be ripped by drawing a tine through the soil to a depth of 300mm at 500mm centres. All obstructions to cultivation or deleterious material brought to the surface shall be removed and voids left by the ripping operation shall be filled with soil of the same type as existing. Ground at a slope exceeding 15° to the horizontal shall not be ripped.

Contaminated ground AN2.6.04 Ground that is contaminated by oil, chemicals or other substances, which in the opinion of the Engineer may affect plant growth adversely, shall be excavated to 500mm below the contaminated depth and beyond the extent of the contamination. Voids left by excavation shall be filled with uncontaminated soil of the same type as existing.

Excavation to soil formation level AN2.6.05 (1) Areas to be filled with uniform layers of topsoil and / or soil-mix shall be excavated to the soil formation levels as indicated in the Drawings. If not specified in the Drawings, soil formation levels shall be as follows:

(a) shrub planting – 600mm below finished soil level;

(b) ground cover planting – 300mm below finished soil level;

(c) turfing - 150mm below finished soil level;.

(2) At-grade tree pits shall be excavated to the specified tree pit depth.

(3) The base of the planting area / tree pit shall be broken up to a further depth of 300mm to ensure proper drainage.

(4) All excavated subsoil material shall be removed from site unless it satisfies the criteria for imported subsoil, in which case it may be used for creation of soil-mix.

Root barrier AN2.6.06 (1) If specified, root barriers layers shall be installed prior to soiling in the locations shown on the drawings.

(2) Proprietary root barriers shall be installed according to the manufacturer's instruction.

Drainage layer AN2.6.07 (1) If specified, drainage layers shall be installed prior to soiling in the locations shown on the drawings.

(2) Proprietary drainage layers shall be installed according to the manufacturer's instruction.

Stackable load bearing cells AN2.6.08 (1) If specified, stackable load bearing cells shall be installed prior to soiling in the locations shown on the drawings.

(2) Stackable load bearing cells shall be installed according to the manufacturer's instruction.

Soiling AN2.6.09 (1) No topsoil or soil-mix shall be spread before the soil formation level and

subsoil condition has been checked and approved by the Engineer.

(2) Placing and spreading of soil shall not take place during periods of heavy rains, nor when the topsoil and / or soil-mix is saturated. When, in the opinion of the Engineer, conditions are unsuitable for placing and spreading of soil, operations shall cease and shall only be resumed when authorised by the Engineer.

(3) The Contractor shall ensure that the topsoil or soil-mix heaps are properly maintained, including weed control where necessary, until such time as the topsoil or soil-mix is placed in its final position.

(4) Topsoil and / or soil-mix shall be spread and levelled to the depth stated in the Contract unless otherwise directed. The loose depth of the applied material shall be sufficient to allow the level of the area to comply with the finished levels as specified after natural settlement and natural compaction have taken place. After natural settlement and natural compaction, the finished level of the applied material shall be 50mm below all edges of the planting area unless otherwise specified or directed. The finished level of soil-mix over areas to be hydroseeded shall be 25mm above adjacent kerbs, paving, covers, frames and other hardware.

(5) After soiling, the Contractor shall take all necessary preventative measures to control erosion and siltation. The Contractor shall restore or replace any portion of the Site, including those which have been both the subject of a certificate of completion of a Section, which erodes, silts up or is otherwise damaged. The Contractor shall be responsible for ensuring that the topsoil or soil-mix maintains its specified quality between the time after deposition and the planting operations.

Cultivation AN2.6.10

(1) Cultivation is the controlled de-compaction of the upper layer of soil to provide an evenly textured, friable planting medium with sufficient air penetration and water retention for favourable plant growth.

(2) Cultivation of areas stated in the Contract or instructed by the Engineer shall be carried out in accordance with the following or as stated elsewhere in the Contract:

Minimum depth of cultivation (mm)	Pre-planting fertilizer (g/m^2)	Thickness of pre-planting fertilizer and soil conditioner over the surface before cultivation (mm)
150	25	100
300	50	200
450	75	300

(3) Cultivated soil shall be hand picked to remove any stones exceeding 25mm diameter and all other deleterious materials. All such materials shall be disposed of from the Site.

(4) Cultivation shall not be carried out on slopes of gradient 1:2 or steeper so as to maintain the slope stability and to prevent erosion.

Scarifying AN2.6.11

(1) Scarifying shall be carried out by loosening the soil to a depth of between 10mm and 20mm using a pronged implement such as a rake but without turning the soil.

(2) All slopes to be grassed shall be scarified. Ground at a slope exceeding 15 degrees to the horizontal shall be scarified parallel to the contours.

Protection of prepared ground AN2.6.12

(1) Prepared ground shall be protected from compaction, erosion and siltation and shall not be used by construction plant, other vehicles or pedestrian traffic.

(2) Prepared ground that becomes compacted, eroded, silted up or damaged shall be replaced or dealt with by methods agreed by the Engineer.

Removal of material AN2.6.13

Weeds, rubbish, litter, stones exceeding 25mm diameter and deleterious material removed during ground preparation shall be disposed of by the Contractor by methods agreed by the Engineer.

AN2.7 PLANTING

General AN2.7.01

Planting for landscape softworks and establishment works shall be carried out as stated in this Section AN2.7.

Notice of operation, inspection of Works, and instruction for remedial works AN2.7.02

In respect to Landscape Softworks and Establishment Works, the Contractor shall give at least two working days' notice or such period of notice so instructed by the Engineer, to the Engineer, of his intention to carry out any critical operation, including ground preparation, soiling, setting out, planting, grassing, pruning of existing and newly planted vegetation, fertilising, visits to carry out Establishment Works, and any other operations as required by the Engineer, or to cover up or put out of view of any works to enable the Engineer's staff to attend for the purpose of examining such works.

Setting out AN2.7.03

(1) The Contractor shall be responsible for accurately setting out according to the Drawings all areas to be planted to the satisfaction of the Engineer prior to the commencement of planting, and shall rectify errors in setting out at his own expense. Any discrepancy in Site area between that shown on the plans and the actual area on the ground shall be notified to the Engineer as soon as it is discovered and prior to commencement of any relevant operations.

(2) Tree and shrub areas shall be marked in outline with pegs, spaced not less than 15m apart. The pegs shall be not less than 750mm long and 50mm in thickness and shall be firmly driven into the ground. The top 300mm of each peg shall be painted white.

(3) The Contractor shall mark out the required planting interval with canes, stones, chalk or other suitable markers along the longest edge of the area to be planted.

(4) The first row of plants shall be the required distance from this edge and directly in line with each marker. In the case of planting areas edged by kerbs or walls, the first row of plants shall be planted as close to the edge as foundations will permit. In the case of planting areas adjacent to other planting areas, the first row of plants shall be planted at a distance which is half the specified planting distance for that species from the edge.

(5) The second row shall be required distance from the first. The pattern will be repeated over the whole planting area.

(6) In the case of woodland mix and shrub mix planting, the plants shall be

planted in positions indicated on the Drawings.

(7) The approximate numbers of plants to be planted per half day shall be set out by laying them down beside the hole in which they are to be planted. Plants shall not be removed from their containers until planting is taking place. All setting out shall be to the approval of the Engineer.

(8) During the setting out of the planting, the Contractor shall notify the Engineer or the Engineer's Representative of the position of any tree or group of trees which occur within the following tolerance:

(a) trees to be planted in verges adjacent to major and secondary roads which distance from the edge of the road is less than 1.3 m,

(b) trees to be planted in verges adjacent to minor roads (design speed 50 km/hr or less) which distance from the edge of the road is less than 0.8 m,

(c) large shrubs to be planted within 1.0 m of the road edge; medium shrubs to be planted within 0.6 m of the road edge and small shrubs to be planted within 0.3 m of the road edge. (The above dimensions do not apply where crash barriers are provided between the planting and the carriageway or where planting is located within a raised planting bed),

(d) trees within 10 m of the end of a central divider,

(e) trees within 5 m of a road lamp stand,

(f) trees which because their location serve to obscure traffic signs, signals etc., and

(g) trees within 1.5 m of a fire hydrant.

(9) The Contractor shall notify the Engineer or the Engineer's Representative of any of the above situations prior to carrying out any relevant works in those areas.

Use of excavated material AN2.7.04

Material excavated from planting pits, which complies with the specified requirements for topsoil, may be used for soiling. Material excavated from planting pits, which complies with the specification for either imported subsoil or completely decomposed granite may be used in the fabrication of soil-mix. Material excavated from planting pits, which does not comply with the specified requirements for topsoil or imported subsoil or completely decomposed granite, shall be disposed of by the Contractor.

Planting AN2.7.05

(1) Rootballs of light standard trees, standard trees, heavy standard trees, semi-mature trees, conifers and palms shall be thoroughly soaked with water before planting. If rootballs or containers are very dry, the roots shall be immersed in water until air bubbles cease to rise. The soil in the container or rootball shall be moist and cohesive. Containers or rootball wrapping shall not be removed until the time of planting and the rootball shall not be disturbed by loosening or breaking. After removal of containers or rootball wrapping and before planting, any broken roots shall be cut and any encircling roots or kinked roots that may compress the stem tissues shall be straightened or pruned. Root cutting or pruning shall be carried out using clean, sharp secateurs or knife.

(2) Each plant shall be placed upright in the pit and set at the same level as planted in the nursery or container, except for trees which shall be set at a level so that the root collars are exposed just above the finished soil level.

(3) Planting soil-mix or backfilling materials shall be deposited in layers and tamped gently around the rootball until level with surrounding ground in such a manner that the rootball is not disturbed. Plants shall be well watered to soak the rootballs and the backfilling materials immediately after planting.

(4) Container or rootball wrapping shall be completely removed and disposed of off the Site properly.

(5) Plants shall be planted in staggered rows unless otherwise specified or instructed.

Timing of Planting AN2.7.06

All plants shall be planted in their final position within one day of delivery to the Site, unless otherwise approved by the Engineer.

Tree Staking and Tying AN2.7.07

(1) Metal stakes shall be driven into the ground after the pit has been excavated and before planting in such a manner that the rootball and aerial parts of the plant are not damaged. The stake shall be secure after driving and shall not be higher than 30% of the overall height of the plant.

(2) Bamboo stakes shall be used in locations stated in the Contract and where in the opinion of the Engineer it is impracticable to use steel stakes or guys. Bamboo stakes shall be driven into the ground before planting so as not to damage the rootball or aerial parts of the tree. Bamboo stakes shall be securely tied with "scaffold tie" to form a tripod not exceeding 60% of the overall height of the plant.

(3) Stakes shall be secured to the tree so as not to cause any chafing, rubbing or abrasion of the tree of restrict its growth,

(4) The method of staking and tying shall be subject to approval by the Engineer.

Tree Wire Guying AN2.7.08

(1) Trees larger than Heavy Standard size shall be tied with wire guys. Guys and sleeves shall be fixed in such a manner that chafing, rubbing and abrasion of the plant is prevented and shall be secured to a well driven steel stake or other anchor. Each plant shall be fitted with three adjustable guys secured at a point not higher than 60% of the overall height of the plant. Guying stakes shall be driven 600mm into the ground with 200mm remaining above the ground. Turnbuckles shall be adjusted as necessary after planting.

(2) The method of guying shall be subject to approval by the Engineer.

Tree Underground Wire Guying AN2.7.09

(1) Trees larger than Heavy Standard size with large rootballs may be secured using underground wire guys tied to secure underground anchors. Underground guying may be appropriate for large trees in locations where stakes and guys may cause hazard to pedestrians.

(2) A minimum of 4 wire guys shall be bolted to underground structure or tied securely to heavy underground anchors. Large rootballs may require more guys. Guys shall be distributed evenly over the rootball surface and shall be positioned to maximise the guying effect, relative to the rootball size.

(3) Anchors shall be buried at a depth not less than the total rootball depth, and shall be distributed evenly around the rootball.

(4) Sturdy protective timber slats shall be provided to sit on the surface of the rootball, to spread the pressure imposed by the guys evenly over the whole rootball surface and to protect the rootball surface from any downward

cutting action that would otherwise be caused by the guys. Guys must not rest on the rootball surface, nor cut into the edges of the rootball, nor damage the rootball in any way.

(5) Anchors, slats and guys shall be positioned and guys tightened before any backfilling around the rootball is undertaken. The adjustable screw clamps shall be positioned over the rootball at an easily accessible location.

(6) The underground guying methodology shall be submitted to the Engineer for prior approval.

Mulching AN2.7.10

(1) After planting and watering, mulch shall be spread to a consolidated thickness of at lease 75mm in planters and all planted areas except those areas with creeping rooting ground covers.

(2) Mulch shall be dished around the base of the plants. The Contractor shall take care not to damage the plant material during mulching operations. Mulch shall be applied after planting and watering have taken place.

Notch planting of seedlings AN2.7.11

Notch planting of seedlings shall be carried out by forming a notch making two cuts at approximately 90°using a hand held pick or spade with the apex pointing up any slope; the notch shall be sufficiently deep to accommodate the root system of the seedling. The notch shall be opened on the second cut to receive the plant and shall then be pushed firmly back into place.

Pit planting of seedlings, whips, shrubs, climbers, ground covers and herbaceous plants AN2.7.12

(1) The diameter of pits for whips, seedlings, shrubs, ground covers, herbaceous plants and climbers shall be 100mm greater than the specified rootball or container diameter. The depth of the pits shall be 50mm deeper than the specified rootball or container.

(2) The following materials shall be mixed into the topsoil / soil-mix or backfilling materials for each pit :

(a) 50 g of pre-planting fertilizer (or at rate specified by manufacturer); and

(b) if specified or instructed by the Engineer, 5g of water absorbing soil additive (or at rate specified by manufacturer).

(3) Where the existing materials excavated from the pits shall be used as backfilling materials, the excavated materials shall be mixed with soil conditioner in the proportions of 2:1 by volume before backfilling.

(4) Each of the seedlings and whips, which require to be staked as specified or as instructed by the Engineer, shall be secured using one stake as Clause AN2.4.51(2) with one tie as Clause AN2.4.51(3) or using other securing method as approved by the Engineer.

(5) Unless otherwise instructed by the Engineer, the Contractor shall remove the staking or other securing measures from the Site at the end of the period for establishment works or when instructed by the Engineer.

Pit planting of light standard trees and standard trees AN2.7.13

(1) The diameter of pits for light standard and standard trees shall be 200mm greater than the specified rootball or container diameter. The depth of the pits shall be 100mm deeper than the specified rootball or container. The following materials shall be mixed into the topsoil / soil-mix or backfilling materials for each pit :

(c) 150 g of pre-planting fertilizer; and,

(d) if specified or instructed by the Engineer, 50 g of water absorbing soil additive.

(2) Where the existing materials excavated from the pits shall be used as backfilling materials, the excavated materials shall be mixed with soil conditioner in the proportions of 2:1 by volume before backfilling.

(3) Each of the light standard trees and standard trees, which require to be staked as specified or as instructed by the Engineer, shall be secured using stakes and ties as Clause AN2.7.07 or using other securing method as approved by the Engineer:

(4) Unless otherwise instructed by the Engineer, the Contractor shall remove the staking or other securing measures from the Site at the end of the period for establishment works or when instructed by the Engineer.

Pit planting of heavy standard tree and semi-mature trees AN2.7.14

(1) The diameter of pits for heavy standard and semi-mature trees shall be 300mm greater than the specified rootball or container diameter. The depth of the pits shall be 150mm deeper than the specified rootball or container. The following materials shall be mixed into the soil-mix or backfilling materials for each pit :

(a) 250 g of pre-planting fertilizer; and

(b) if specified or instructed by the Engineer, 100 g of water absorbing soil additive.

(2) Where the existing materials excavated from the pits shall be used as backfilling materials, the excavated materials shall be mixed with soil conditioner in the proportions of 2:1 by volume before backfilling.

(3) Each of the heavy standard trees not exceeding 4m overall height, which require to be staked as specified or as instructed by the Engineer, shall be secured using stakes and ties as Clause AN2.7.07 or using other securing method as approved by the Engineer:

(4) Each of the heavy standard trees exceeding 4 m overall height and the semi-mature trees, which require to be staked as specified or as instructed by the Engineer, shall be secured using tree wire guys as Clause AN2.7.08 or tree underground wire guys as Clause AN2.7.09 or using other securing method as approved by the Engineer.

(5) Unless otherwise instructed by the Engineer, the Contractor shall remove the staking or guying or other securing measures from the Site at the end of the period for establishment works or when instructed by the Engineer.

Pit planting of bamboo, conifers and palms AN2.7.15

Bamboos, conifers and palms shall be planted in accordance with the following:

(a) Height not exceeding 2000mm	Clause AN2.7.12
(b) Height exceeding 2000mm and not exceeding 4000mm	Clause AN2.7.13
(c) Height exceeding 4000mm	Clause AN2.7.14

Pit planting on slopes AN2.7.16

Pits excavated for planting on or adjacent to slopes shall not be left open during wet weather.

Planting into previously AN2.7.17

In programming the planting works, sufficient time shall be allowed for the hydroseeding to establish and provide 90% cover, to the satisfaction of the

hydroseeded areas		Engineer, and when instructed by the Engineer grass shall then be cut to a height of not less than 50mm above ground level, before the notch/pit planting operations commence.
Planting into and adjacent to existing vegetation	AN2.7.18	(1) Where planting works are required within and adjacent to existing vegetation, existing shrubs shall be pruned and existing grass or other herbaceous plants shall be cut to a height of not less than 50mm above ground level but not pulled out by equipment in any circumstances. (2) The Contractor shall obtain agreement of the Engineer prior to commencing the vegetation clearance. (3) The Contractor shall be responsible for removing all rubbish and cut vegetation from the Site and reinstating any existing planted areas affected by the planting works to the satisfaction of the Engineer.
Planting through erosion control mat	AN2.7.19	(1) In areas where erosion control mat has been laid, the Contractor shall prepare trial panels demonstrating the technique for pit planting through the erosion control mat (panel size min. 4m x 4m / 9 no. pits) in-situ, as instructed by the Engineer. Approval of the sample should be obtained from the Engineer prior to commencement of planting through erosion control mat generally. (2) The Contractor shall comply with the following in pit planting through erosion control mat: (a) Erosion control mat shall be cut in 'T' shape with sharp knife and flaps folded back to allow pit to be excavated. Complete holes shall not be cut in the erosion control mat. (b) Plants shall be planted at correct level with respect to surrounding slope face and heeled in to create slight depression in slope around plant. (c) Flaps folded back into original position and secured with 200mm long aluminium U-pin as Clause AN2.4.63.
Watering	AN2.7.20	Immediately after planting, all plants shall be thoroughly watered with fresh water such that the roots of the plants are soaked.
Insect and disease control	AN2.7.21	(1) The Contractor shall use integrated pest management techniques to control pests. (2) The Contractor shall regularly check for any insect attraction or fungal infestation particularly during periods of known activity. (3) The Contractor shall report to the Engineer any such occurrence and shall carry out remedial eradication. (4) If the Contractor considers that it is necessary to use chemical insecticide or fungicide, he shall obtain prior written approval of the Engineer. Chemical insecticide or fungicide shall be used in accordance with the manufacturer's instructions. Use of sprays is to be with care and with due regard to the health, safety and convenience of the general public and in accordance with Government guidelines. Spraying shall be carefully controlled to avoid unnecessary dispersion.
Notices and instructions	AN2.7.22	(1) In respect to Landscape Works, the Contractor shall give forty-eight hours notice to the Engineer , of his intention to commence any one of the following operations: soiling, setting out, planting, grassing, sprigging, turfing, fertilising, use of inorganic chemicals, visits to carry out Establishment Works. (2) The Contractor shall undertake any remedial Landscape Works within twenty-four hours of notice by the Engineer.
Post planting works	AN2.7.23	After planting, all planted areas and grassed areas shall be kept free of weed and rubbish and all plants and grass shall continue to be watered thoroughly as necessary to maintain a sufficiently moist soil for healthy plant growth at all times for the duration of the Works.
Cultural operations prior to the commencement of Establishment Works	AN2.7.24	During the period between planting and the issue of the Practical Completion Certificate and/or Certificate of Commencement of Establishment Works, the Contractor shall perform all works as specified for the healthy establishment of plants in accordance with the requirements as specified.
Replacement planting prior to the commencement of Establishment Works	AN2.7.25	The Contractor shall ensure that at the time of application for the Practical Completion Certificate and / or Certificate of Commencement of Establishment Works that all planted areas are clean, free of rubbish and weeds and in a healthy growing condition. The Contractor shall be responsible for any replacement planting which is necessary prior to the issue of the certificate.

AN2.8 GRASSING

Hydroseeding	AN2.8.01	(1) Hydroseeding for landscape softworks and establishment works shall be carried out as stated in this Section. (2) Unless otherwise permitted by the Engineer, hydroseeding shall be carried out between 1st March and 30th September except as stated in Clause AN2.1.09. If hydroseeding is permitted at other times, particulars of changes to the materials and methods for hydroseeding shall be submitted to the Engineer for approval.
Hydroseeding Cover	AN2.8.02	Hydroseeding shall achieve a cover by grass species of at least 90% of the surface area of each 10sq m of the area to be hydroseeded not more than 100 days after the area has been hydroseeded. The grass cover shall be healthy, vigorous and free of perennial and other weeds. The method of determining the cover shall be as stated in Clauses AN2.10.01 and AN2.10.02.
Surface Conditions for Hydroseeding	AN2.8.03	The surface to be hydroseeded shall be finished to a coarse open textured surface and shall not be smooth or glazed. Finishing work on slopes by machines shall be carried out across the slope. Vehicle track marks and bucket teeth marks shall not be left parallel to the line of maximum gradient of the slope.
Application of hydroseeding	AN2.8.04	(1) Hydroseeding shall be carried out using a proprietary type of hydroseeding equipment unless otherwise approved by the Engineer. (2) Materials for hydroseeding shall be well mixed on the Site in the hydroseeding equipment immediately before spraying, ensuring that seed is not damaged. The area to be hydroseeded shall be moistened immediately prior to hydroseeding. (3) At the time of spraying, fertilizer shall be applied at a minimum rate of 100 g/sq m. Mulch shall be applied at a minimum rate of 200 g/sq m. Soil binders shall be applied at the rate 25 g/sq m or as recommended by the

manufacturer, modified as necessary to suit conditions in Hong Kong. Dye shall be used to demonstrate that adequate cover has been achieved, unless in the opinion of the Engineer runoff or water-courses will be coloured to an unacceptable level. Where used, dye shall be applied at a maximum rate of 0.05 g/sq m.

(4) The hydroseeding mixture shall be constantly agitated during spraying to keep it homogeneous and avoid blockage to pipes. Measures shall be taken during application to ensure that material is not lost due to runoff.

(5) Walking on areas that have been hydroseeded shall be restricted to access for fixing protective material and for patching up. After spraying, the Contractor shall water the hydroseeded areas as often as is required to keep the ground evenly moist.

Protective Material AN2.8.05

(1) Immediately following spraying of hydroseeding slurry, protective fabric material shall be laid and spiked or stapled to the soil surface with a minimum of 150mm overlap to prevent soil erosion. On sloping ground, the material shall be laid along the greatest slope and shall be made to fully adhere to the hydroseeded surface by sprinkling with water with an approved spray. Care must be taken not to sprinkle excessive water onto the slope causing erosion of the slope. The material shall also be applied to all areas to be subsequently re-sprayed. The protective material shall be biodegradable non-toxic, porous, translucent and 1mm or less thick. Unless otherwise instructed by the Engineer, the Contractor shall remove the material from the Site at 10 weeks after placement or when instructed by the Engineer.

Patching Up AN2.8.06

(1) Immediately after germination and a general greening of the hydroseeded area is apparent, areas where in the opinion of the Engineer germination has been unsuccessful shall be re-sprayed. Areas affected by repairs to washout and gullies and other erosion on slopes shall be re-sprayed.

(2) Areas that in the opinion of the Engineer are not accessible or are too small for the use of a hydroseeder may be patched up by broadcasting seed. The area shall be lightly scarified with a rake or similar implement and the seed and fertilizer shall be broadcast over the area at a rate of not less than 75g/m^2. The seed shall be covered by lightly working into the surface or by spreading sufficient soil to just cover the seed. Broadcast seeding shall be carried out using the appropriate seed species.

Post Planting Fertiliser AN2.8.07

Unless otherwise directed or agreed by the Engineer, post-planting fertilizer shall be applied not less than 100 days, and not more that 300 days, after application of hydroseeding and, unless otherwise permitted by the Engineer, shall be applied between 1st March and 30th September.

Turfing AN2.8.08

(1) Turf shall not normally be laid on slopes exceeding 25° to the horizontal.

(2) The area to be turfed shall be cultivated by applying pre-planting fertilizer at a uniform rate of 40g/m^2 and shall then be raked and consolidated to the required level. The finished level after turfing shall be 25 mm above adjacent kerbs, paving, covers, frames and other hardware.

(3) The turfs shall be laid on the prepared soil and shall be firmed into position using wooden beaters; the beaters shall be frequently scraped clean of accumulated soil or mud. A top dressing of soil-mix shall be applied and well worked into joints and spaces. Irregularities in finished levels due to variation in turf thickness or uneven consolidation of the soil shall be adjusted.

(4) Turfed areas shall be watered immediately after turf has been laid and as often as is necessary to ensure establishment. If shrinkage occurs and the joints open, soil-mix shall be worked in and well watered.

(5) Turf edges and margins shall be laid with whole turfs.

Sprigging AN2.8.09

(1) Sprigging shall not be used on slopes exceeding 45° to the horizontal.

(2) The area to be sprigged shall be scarified before sprigging and sprigs shall be evenly spread over the area at approximately 50mm centres. The area shall be top-dressed with soil-mix to just cover the sprigs and pre-planting fertilizer shall be applied at a uniform rate of 40g/m^2.

Completion of Turfing AN2.8.10

The Contractor shall deliver at Practical Completion an excellent turf surface that satisfies the following requirements:

(a) Purity: turfgrass shall be 100% pure specified grass variety, totally free from weeds and unspecified grass species and varieties;

(b) Coverage: there shall be 100% grass cover;

(c) Health: all turf shall be healthy and free from disease and pests;

(d) Uniformity: turf shall be uniform in density, texture, colour and appearance;

(e) Colour: turfgrass shall have consistent colour with no patchiness;

(f) Density: turf shall have uniform density; and

(g) Smoothness: junctions between turf sods shall not be discernable, and the surface texture of the turf shall be smooth without any unevenness or bumps.

Completion of sprigging AN2.8.11

(1) Sprigging shall be considered to be complete when the first flush of growth achieves 95% cover. The method of determining the cover shall be as stated in PS Section AN2.10.

(2) Bare patches or areas that in the opinion of the Engineer fail to become established shall be returfed or resprigged to maintain at least 98% cover throughout the establishment period. Areas affected by repairs to washouts and gullies and other erosion shall be returfed or resprigged.

AN2.9 ESTABLISHMENT WORKS

Establishment Works AN2.9.01

(1) The Contractor shall be required to maintain the planting works for a period of 12 months or as specified after the date certified by the Engineer that the Landscape Works have been satisfactory completed and in that time will be required to carry out establishment works whether or not instructed by the Engineer.

(2) Establishment works shall be carried out as stated in this Section AN2.9.

(3) All necessary measures shall be taken to ensure that grass, trees and other plants become established and to keep the landscape softworks neat and tidy and free of litter and rubbish.

(4) The Contractor shall report to the Engineer before and after carrying out any Establishment Works. Reports shall be submitted in duplicate on forms provided by the Contractor and of a style approved by the Engineer.

(5) The Contractor shall submit a programme to the Engineer for approval before the commencement of Establishment Works. The programme shall include all the items of operations as defined below. Other than the items of mulching, pruning and fertilising, the Contractor shall propose in the programme the number of operations for the other items to be carried out during the Establishment Period. Once the programme is approved, the Contractor shall carry out all the operations unless subsequently instructed otherwise by the Engineer.

Inspection of establishment works AN2.9.02

An inspection of landscape softworks and establishment works shall be carried out jointly by the Contractor and the Engineer at monthly intervals to determine the establishment works which are required. The Engineer shall instruct the Contractor to carry out establishment works which in the opinion of the Engineer are necessary; the work instructed shall be completed within 14 days of the date of the Engineer's instruction.

Replacement of plants and grass AN2.9.03

(1) Plants that in the opinion of the Engineer are dead, dying, not conforming to the original specification or otherwise unsatisfactory shall be replaced. Replacement planting shall be carried out in season as stated in Clause AN2.1.08, except as stated in Clause AN2.1.09, unless otherwise agreed by the Engineer, using plant material of a similar size to that already established. Measures shall be taken to ensure satisfactory establishment of the replacement plants before the end of the period for establishment works.

(2) At least 98% cover of the grass area shall be maintained throughout the period for establishment works and the grass shall provide effective cover of 100% of the area at the end of the period for establishment works. The grass shall be healthy, vigorous and free of perennial and other weeds. Areas that in the opinion of the Engineer are unsatisfactory shall be re-turfed or sprigged as stated in Section AN2.8. Measures shall be taken to ensure satisfactory establishment of the replacement grass or turf before the end of the period for establishment works.

Repair of damage by vandalism AN2.9.04

(1) Within the same day of discovery of the damage by vandalism, the Contractor shall notify the Engineer in writing of the vandalism.

(2) Within two days of discovery of the damage by vandalism, the Contractor shall provide the Engineer with a report comprising information to prove that the damage was caused by circumstances beyond his control and also the following information of the damage:

(a) Location of the damage,

(b) Nature of the damage,

(c) Photographic records of the damage, and

(d) Proposed works of repair of damage.

(3) Within five days of submission of the report required in sub-clause (2) of this Clause unless otherwise agreed by the Engineer, the Contractor shall complete the works of repair of damage proposed in the report and clearance of the Site of all damaged plants that have been replaced and all other debris, and shall provide the Engineer with a report including photographic records showing the completion.

(4) Apart from the works of repair completed under sub-clause (3) of this Clause, the Contractor shall complete any other works of repair that are considered necessary by the Engineer within three days of the Engineer's instruction or other time duration as agreed by the Engineer.

Repair of damage by Tropical Cyclone or Adverse Weather AN2.9.05

(1) Within 48 hours of a Tropical Cyclone or other adverse weather conditions being over, the Contractor shall carry out the following:

(a) Complete firming up and tightening of stakes, tie and guys to secure all dislodged plants, and replanting of all blown-over plants, and

(b) Provide the Engineer with a report comprising the following information of all plants that have been damaged by the adverse weather, including those being blown over, dead, dying or having structural damage:

(i) locations of the damaged plants,

(ii) nature of the damage,

(iii) photographic records of the damage,

(iv) photographic records showing completion of the work of repair required in sub-clause (1)(a) of this Clause, and

(v) other proposed works of repair of damage that will be carried out, including plant surgery to remove and treat the damaged parts and replacement of plants that are dead, dying or having irreparable damage.

(2) Within five days of submission of the report required in sub-clause (1)(b) of this Clause unless otherwise agreed by the Engineer, the Contractor shall complete other works of repair of damage proposed in the report and clearance of the Site of all damaged plants that have been replaced and all other debris, and shall provide the Engineer with a report including photographic records showing the completion.

(3) Apart from the works of repair completed under sub-clauses (1) and (2) of this Clause, the Contractor shall complete any other works of repair that are considered necessary by the Engineer within three days of the Engineer's instruction or other time duration as agreed by the Engineer.

Security and adjustment of stakes, ties and guys AN2.9.06

(1) The Contractor shall be responsible for the security and, where necessary, adjustment of the stakes, ties and guys throughout the period for Establishment Works, for the healthy growth of the plants. The Contractor shall carry out an inspection of stakes, ties and guys each month for this purpose.

(2) Any broken, damaged or unsatisfactory stakes, ties and guys shall be replaced. Any ties which are causing chafing or abrasion of the plant shall be appropriately slackened. Any ties which are loosened shall be appropriately tightened. Guying turnbuckles shall be adjusted as necessary to ensure guys are taut. The Contractor shall carry out an inspection of the stakes, ties and guys each month for this purpose. The Contractor shall carry out the necessary replacement or adjustment within two days of identification or the Engineer's instruction or any other period as agreed by the Engineer.

(3) The Contractor shall remove stakes, ties and guys at the end of the period for Establishment Works when the plant root systems has sufficiently developed to support the plants, unless otherwise instructed by the Engineer.

Firming up plants AN2.9.07

(1) Plants which become loose as a result of wind rock or other causes shall be firmed up.

(2) The Contractor shall inspect the Site regularly for this purpose and after each storm or adverse weather occurrence, to assess damage, which shall be reported to the Engineer. Any damaged branches shall be carefully pruned.

Irrigation AN2.9.08

(1) The Contractor shall provide irrigation to promote healthy growth of all plants. The irrigation water shall be of a quality and standard suitable for both plant material and for handling by workers.

(2) If a permanent irrigation system is proposed, the irrigation system shall be in full working order prior to any planting works.

(3) In the event that the permanent irrigation system is not fully operational during or after planting works, the Contractor shall provide temporary watering to promote healthy growth of plants until such time as the irrigation system is fully operational.

(4) Plants reaching permanent wilting point shall be watered immediately.

Weeding AN2.9.09

(1) All grassed and planted areas shall be kept free of weeds throughout the period for establishment works. Any unwanted plant found within the Site is considered a weed and shall be removed by the Contractor once it is identified or when instructed by the Engineer throughout the period for establishment works.

(2) Weeding shall be carried out by hand or by mechanical methods agreed by the Engineer in such a manner that damage to the grass and planted areas will not be caused. The Contractor shall not use chemicals or fire for weeding operation, unless otherwise instructed or approved by the Engineer. All weeds, litter and other rubbish resulting from the weeding operation shall be disposed of from the Site by the Contractor. Any ground cover plants, herbaceous plants, climbers, mulch or soil disturbed or removed during the weeding operation shall be replaced.

(3) Planted areas in bare ground shall be weeded to remove all unwanted vegetative growth including aerial parts and roots, over the complete area. Planted areas other than in bare ground shall be weeded to remove all competing and overhanging vegetative growth within 300mm radius of the base of each plant by cutting the growth down to not more than 50mm above soil level. All areas shall be kept in a weed/grass free and tidy condition.

(4) When the use of herbicide is approved by the Engineer, the Contractor shall comply with the following requirements in applying the herbicide:

(a) The herbicide shall be of proprietary type approved by the Agriculture, Fisheries and Conservation Department and the Certificate of Approval shall be submitted to the Engineer,

(b) Application of herbicide shall not commence without the Engineer's approval to the type of herbicide to be used, and

(c) Application of herbicide shall be in strict accordance with the manufacturer's recommendations.

Pruning AN2.9.10

(1) Prune shrubs, ground cover and climbers to encourage bushy growth, improve flowering and remove dead damaged branches and dead flower heads at the appropriate time of the year depending on species or as instructed by the Engineer. An inspection of pruning requirements shall be made at monthly intervals.

(2) The Contractor shall not carry out pruning to any trees without the prior approval from the Engineer, unless the pruning work is required under the Contract or is directed by the Engineer. The Contractor shall notify the Engineer of any trees whose branches interfere with the Works and thus require pruning

(3) The Contractor shall provide all necessary tools and equipment for the pruning works, to comply with the following:

(a) All necessary physical support and all necessary safety precautions shall be provided to protect the people engaged in the pruning work as well as the people and property in the vicinity, and

(b) Cut limbs shall not be left in the crown of a tree upon completion of pruning, at times when the tree will be left unattended, or at the end of the workday.

(4) The Contractor shall carry out pruning works in accordance with good horticultural practice and recommendations of the reference documents listed in Clause AN2.1.10, including BS 3998 : Recommendations for Tree Work, the "General Guidelines on Tree Pruning" issued by Development Bureau, the "Arborists' Certification Study Guide" and "Best Management Practices - Tree Pruning" issued by International Society of Arboriculture, and comply with the following pruning standards:

(a) Pruning and removal of branches shall be done using sharp, clean implements to give a single flat, sloping face.

(b) Thinning cuts instead of heading cuts shall be used,

(c) Pruning cut shall be made just above and sloping away from an outward facing healthy bud.

(d) Branch bark ridge shall not be damaged, branch collar shall not be cut off, and no flush cut shall be made,

(e) No topping (cutting off all branches to the same height) or lion-tailing of the tree shall be made in any circumstances,

(f) No more than 25% of the live foliage of a single limb on mature trees shall be removed,

(g) The total extent of crown thinning should be minimised and in any case, no more than 25% of the total tree live foliage on mature trees shall be removed,

(h) At least 50% of the foliage shall be evenly distributed in the lower 66% of the canopy on mature trees after pruning,

(i) Cuts shall be neatly made so that there is no splintering or tearing of bark and no snags or stumps are left behind,

(j) Any branch larger than 25mm diameter shall be removed in stages using a three-cut method as follows:

(i) the first cut shall be an undercut made approximately one-third to halfway through the branch at 300mm to 400mm from the branch union,

(ii) the second cut shall be made from the above at 50 to 75mm out past the first cut, removing the branch but preventing the weight of the branch from tearing the bark below the branch collar,

(iii) the third cut shall be a final cut just outside the branch collar without injuring the branch collar and branch bark ridge, and

(k) Ragged, rough edges of bark or wood shall be trimmed cleanly from around wounds with a sharp knife to the minimum extent necessary in order to hasten wound closure, and twigs less than 15mm diameter shall be cut with sharp secateurs.

(5) All cuts shall be made to avoid splintering or tearing of bark that would catch water and encourage rot, and any cracks, cavities or rotten wood shall be cut back with a clean, sharp implement to remove the dead, damaged and decayed tissue without damaging the living tissue.

(6) Unless otherwise instructed by the Engineer, any cuts or wounds shall be left uncovered and no wound dressing shall be applied.

(7) Any material pruned from the trees shall be removed from the Site as soon as possible, and any areas affected by the pruning work shall be reinstated.

Grass cutting AN2.9.11

(1) Grassed areas shall be cut by manual or mechanical methods agreed by the Engineer and in a manner that does not cause pulling of roots or damage to planting in or near the grassed area. All cuttings shall be raked off and disposed of within 24 hours after cutting.

(2) Category 1 grass shall be as stated in the Contract and shall be reduced by cutting to a height of 50mm when it reaches 100mm high.

(3) Category 2 grass shall be as stated in the Contract and shall be reduced by cutting to a height of 100mm when it reaches 300mm high.

(4) Category 3 grass cutting shall be cutting of areas of grass seeding stated in the Contract to be subsequently maintained as mown grass.

(5) Grassed areas shall be weed free in accordance with Clause AN2.9.09 before any grass cutting is carried out.

Litter collection AN2.9.12

All litter exposed by grass cutting shall be gathered up and disposed of within 24 hours. Any other litter within the grassed or planted areas shall also be removed by the Contractor once it is identified or when instructed by the Engineer throughout the period for establishment works. Litter removal shall be completed within seven days of inspection or instruction.

Post-planting fertilizer AN2.9.13

Post-planting fertilizer shall be applied not less than 100 days, and not more than 300 days, after grassing or planting. The fertilizer shall be applied at a rate of:

(a) 200 g per semi-mature tree, extra heavy standard tree, heavy standard tree, large conifer and large palm,

(b) 100 g per standard tree, light standard tree, small conifer, multi-stem palm, and medium palm,

(c) 50 g per whip tree, seedling tree, bamboo, small palm, large and small shrub, ground cover, herbaceous plant and climber,

(d) 100 g/sq m for grassed area formed by turfing or sprigging, and

(e) 40g/ sq m for grass on slopes and grass grown by hydroseeding or broadcast seeding.

Control of pests, fungi and disease AN2.9.14

(1) The Contractor shall use integrated pest management techniques to control pests.

(2) The Contractor shall take all necessary precautionary measures to protect the plants from pest, fungal and disease attack and all necessary control measures to eradicate pests, fungi and disease from the infected and/or infested plants.

(3) The Contractor shall regularly check for any pest, fungal and disease attack, particularly during known periods of activity.

(4) The Contractor shall report to the Engineer any such occurrence and shall carry out remedial eradication.

(5) If the Contractor considers that it is necessary to use of chemical insecticide or fungicide, he shall obtain prior written approval of the Engineer. Chemical insecticide or fungicide shall be used in accordance with the manufacturer's instructions. Use of sprays is to be with care and with due regard to the safety and convenience of the general public and in accordance with AFCD guidelines. Spraying shall be carefully controlled to avoid unnecessary dispersion.

(6) If termite infestation is found, the Contractor shall employ a termite specialist at his own cost to propose and implement remedial action to the satisfaction of the Engineer.

(7) The Contractor shall comply with the following requirements in applying the pest, fungal and disease control measures:

(a) Environmentally friendly measures shall be adopted,

(b) All pesticides, insecticides, fungicides and chemicals to be used shall be proprietary products registered in Hong Kong,

(c) Safety precautions as the manufacturer's instruction shall be strictly followed in using pesticides, insecticides, fungicides and chemicals so as to avoid causing danger or harm to the public and the environment, and

(d) Plant parts pruned from diseased plants shall not be stockpiled anywhere on the Site and shall be disposed of from the Site.

Forking over AN2.9.15

Surfaces of bare ground which in the opinion of the Engineer are subject to surface panning or compaction of the soil shall be forked over in such a manner that roots are not disturbed and plants are not loosened; plants which are disturbed or loosened shall be firmed up and well watered immediately.

Mulching AN2.9.16

(1) All mulch which is disturbed by replacement planting, weeding or watering shall be made good. Additional mulching over areas of forking over and over areas disturbed by others shall be carried out if instructed by the Engineer.

(2) During the Establishment Period, the Contractor shall carry out three applications of mulch each to a thickness necessary to bring the total depth

of mulch of 75mm unless otherwise specified after the application. The final mulching operation is to be carried out in the last month of the Establishment Period.

(3) Mulching to ground cover areas shall not be undertaken once ground cover plants have successfully established and there are no bare areas of soil.

Completion of work AN2.9.17 Immediately before the end of the period for establishment works:

(a) All tree and shrub planting shall be free of weeds,

(b) All planted and grassed areas shall be free of litter,

(c) All replacement planting and patching up of grass shall be completed,

(d) All guys, stakes and ties shall be secure,

(e) All grassed areas shall be cut and the edges trimmed, and

(f) All temporary fencing shall be removed by the Contractor at the end of the Establishment Period unless otherwise directed by the Engineer.

AN2.10 TESTING : GRASS COVER BY SPRIGGING

Testing : grass cover AN2.10.01 (1) Tests shall be carried out to determine the grass cover by sprigging. The tests shall be carried out 100 days after grassing and at the end of the period for establishment works. The grass shall be cut to a height of 300mm if necessary over the parts of the area to be tested.

(2) The number of tests shall be as instructed by the Engineer.

(3) Testing to determine the grass cover will be carried out by the Engineer.

(4) Tests shall be carried out at locations, which in the opinion of the Engineer are representative of the grassed area as a whole. At each test location an approximately square area of $10m^2$ shall be marked.

(5) The percentage of bare ground other than rock and other hard material in each $10m^2$ test area shall be measured.

Compliance criteria: grass cover AN2.10.02 At least 95% of each test area shall be covered with grass.

AN2.11 TREE TRANSPLANTING

General AN2.11.01 (1) For the purpose of this Clause, palms and conifers are also considered as trees.

(2) Existing trees, which the Contract requires to transplant, are indicated in the Existing Tree Schedule. Existing trees to be transplanted shall be clearly marked as specified in PS Section AN1.

(3) Pre-determined receptor sites shall receive existing trees to be transplanted. These receptor sites, and the final locations of each transplanted tree, are indicated on the Contract Drawings for reference only. The Contractor shall agree the precise final locations of trees with the Engineer and relevant Government departments before commencement of tree transportation works.

(a) These receptor sites are within the maintenance jurisdictions of the various Government departments listed in the Tree Schedule. The Contractor shall give clear and advance notification to these Government departments, and make all necessary arrangements with these Government departments, prior to delivering the transplanted trees to these receptor sites.

(b) If the designated receptor sites are not ready to receive transplanted trees at a time when the trees must be removed from the Site; the Contractor shall, subject to the approval of relevant authorities, temporarily transplant the trees to the temporary holding nursery where they shall be maintained in an acceptable healthy and vigorous condition until such time as the receptor sites are available and prepared to receive the trees. The Contractor shall submit detailed proposals of all works involving transplanting to the temporary holding nursery, together with a programme of transplanting works to the designated receptor sites, for the Engineer's approval.

(4) Trees shall be maintained and established immediately after transplanting to their receptor sites in accordance with Section AN2.9, and establishment works shall continue for a period of minimum twelve (12) months or as specified in the Contract. Such establishment works shall include all measures necessary to establish and maintain all plants in an acceptable vigorous and healthy growing condition.

Safety AN2.11.02 (1) The Contractor shall take all precautions necessary to protect the people engaged in the tree transplanting work as well as the people and property in the vicinity,

(2) The Contractor shall take all precautions necessary to ensure that no damage is done to the trees during, lifting, transportation, and any other stages of the transplanting process.

Method Statement and programme AN2.11.03 Before commencing any work to the trees on the Site, the Contractor shall submit and obtain approval from the Engineer a detailed method statement and programme for transplanting the existing trees, outlining the method, sequencing, timing of operations, and the location and type of machinery to be used for the following operations:

(a) Protection before lifting and transplanting,

(b) Root pruning, including the rootball size, and the number of stages, the operations involved in each stage, and the period between each stage of root pruning,

(c) Crown pruning,

(d) Excavating trenches for rootball preparation,

(e) Design and construction of rootball boxes,

(f) Design and construction of supporting measures,

(g) Attaching lifting gear to the trees,

(h) Protection during transit,

(i) Temporary holding nursery, if required,

(j) Lifting,

(k) Transportation to new location, including routing,

(l) Preparation of receptor site,

(m) Placement, backfilling, mulching and securing at receptor site,

(n) Backfilling and making good the donor site,

(o) Schedule of establishment works during the period for establishment works.

Crown Pruning AN2.11.04

(1) Crown pruning shall be carried out, as proposed in the Contractor's method statement and approved by the Engineer, at the programme times to reduce the tree mass to balance that of the reduced root mass as a result of root pruning. Crown pruning should be carried out in stages to reflect the stages of root pruning.

(2) Crown pruning shall produce a well-shaped and well-balanced form. Dead, decayed, dying, diseased, infected, broken, crossed, competing and dangerous branches shall be removed as priority. Foliage reduction shall be kept to a minimum where possible and in any case shall not exceed 25% of the original crown density without prior written permission of the Engineer.

(3) Crown pruning shall achieve foliage reduction by means of branch pruning and or leaf picking, and shall be categorised as follows:

(a) Hard Prune. This shall include removal of a substantial number of branches up to 200mm in diameter. The objectives for hard pruning may include removal of hazardous or structurally undesirable branches. Hard pruning shall not be permitted solely to facilitate ease of transplantation. The final shape of the reduced crown shall be even and balanced and provide the basis for the growth of a well shaped new crown. The central main leader of the tree shall not be pruned or interfered without prior written permission from the Engineer. Hard pruning shall not be permitted except as directed by the Engineer.

(b) Light Prune. This shall include the removal of a few branches up to 75mm in diameter with the extent not to exceed 25% of the original tree crown size. The central main leader of the tree shall not be pruned or interfered with.

(c) Thin Crown. This shall include the picking of leaves of the crown with the extent not to exceed 25% of the original tree crown size and leaf density. This minimum-impact approach will prevent loss of the original tree form.

(4) Pruning shall be undertaken in accordance with Clause AN2.9.10.

Root pruning and under-cutting AN2.11.05

(1) The Contractor shall allow the tree transplanting works in his programme of Works in such a way that the root pruning to the approved size of rootball shall commence as early as possible so as to ensure maximum fibrous root growth before the transplanting operations.

(2) Root cutting shall be done in three stages. Each stage to be directed by the Engineer.

(a) The first stage shall involve cutting two parallel straight trenches on opposite sides of the proposed rootball.

(b) The second stage involves cutting two parallel straight trenches on the remaining opposite sides of the proposed rootball.

(c) The last stage is the cutting of the underside of the rootball and the uplifting of the tree. Roots shall be cut free from the ground, not pulled, using a suitable implement to give a clean cut.

(3) The period between each root cutting stage shall be as follows, unless otherwise directed by the Engineer :

(a) Group A Trees = 0 days (trees may be root-cut and uplifted in same day),

(b) Group B Trees = 30 days,

(c) Group C Trees = 45 days.

(d) Group D Trees = 60 days,

(e) Group E Trees = 75 days,

(f) Group F Trees = 90 days.

(g) Group G Trees = 120 days,

(h) Group H Trees = 150 days, and

(i) Group I Trees = 180 days.

(4) In the case of unplanned tree transplanting, as described in Clause AN1.4.03, the Contractor shall submit a proposal, with justification, for the root cutting period for each unplanned tree to be transplanted, in accordance with one of the Groups listed in sub-clause (3) of this clause. No root cutting works shall proceed until the proposal is approved by the Engineer.

(5) The Contractor shall give two days notice of his intention to carry out root pruning operations. All root pruning operations shall be carried out in the presence of the Engineer.

(6) All cutting works shall be carried out in accordance with Section AN1.5.

Rootball Size AN2.11.06

(1) The dimensions of the rootball of trees to be transplanted shall be determined by the Contractor so as to ensure survival of the plant.

(2) As a minimum, the rootball diameter shall be at least 8 times the tree stem diameter, or 67% of the tree crown diameter, whichever is less.

(3) The rootball area shall be marked out and approved by the Engineer prior to trench excavation.

(4) The rootball depth shall normally be in the following range:

(i)	Trees with DBH less than 150mm	800mm
(ii)	Trees with DBH of 150-299mm	1000mm
(iii)	Trees with DBH of 300-499mm	1200mm
(iv)	Trees with DBH of 500mm or more	1500mm

(5) For trees with roots surrounded by hard material, e.g. planter wall, the hard material shall be demolished, if permitted by the Engineer, to allow for more roots to be preserved. The Contractor shall exercise the greatest care when

removing the hard material to preserve as many roots as possible.

(6) The rootball of trees surrounded by irregularly-shaped hard materials may be asymmetrical in order to ensure that the maximum volume of roots is preserved during transplanting.

(7) For trees with DBH less than 300mm, the rootball shall be firmed wrapped with hessian burlap and on the outside with sturdy wire mesh to ensure that the soil is kept in full contact around the root system at all times.

(8) Trees with DBH of 300mm or larger shall be transplanted using a rootball box.

Rootball Box AN2.11.07

(1) Rootball box shall be constructed of sturdy materials and shall be capable of holding the entire weight of the tree without support. Anchors shall be fixed into the box to allow for guying of the rootball. Handles or ringlets shall be fixed on the upper side, or outside, of the box to permit lifting of the tree, by the rootball box, from the ground.

(2) Rootball box shall have drain holes at its bottom to allow for free-drainage of the rootball soil.

(3) Rootball box shall be constructed of independent panels with joints capable of being assembled together, *in situ*, around the rootball, while maintaining structural integrity. The panel which forms the bottom of the box shall be slid in and out of the bottom of the box through glides along the bottom of the side panels, as required before uplifting and after transplanting.

(4) Rootball box shall be constructed with an internal dimension 150mm larger than the rootball size in each horizontal direction, and be equal in depth as the rootball.

(5) The Contractor shall submit a proposal of the rootball box, and obtain the approval of the Engineer, prior to their use on Site.

(6) During the first and second stages of root cutting, as outlined in sub-clauses AN2.11.05(2)(a) and (b), a side panel of the rootball box shall be inserted within each trench and be supported 150mm away from the edge of the rootball. The 150mm gap left between the rootball box and rootball soil shall be backfilled with good quality soil from the ground in the vicinity of the tree (so as to match the soil within the rootball), which shall be mixed with slow release fertiliser and root activator in accordance with Clause AN2.11.10, and covered with 50mm deep mulch of soil conditioner. Soil shall be placed in maximum 300mm deep layers and each layer shall be firmly heeled in. Sufficient water shall be applied to assist in the settling of backfilled material.

(7) The bottom of the rootball box shall be slid into place following the final excavation as outlined under Clause AN2.11.08(5) and root cutting as outlined under Clause AN2.11.05(2)(c).

Trenches AN2.11.08

(1) The width of the trenches shall be determined by the Contractor. They shall be at least 300mm and of sufficient width to allow for all necessary root cutting operations, and, if applicable, the placement of a side panel of the rootball box at 150mm away from the cut face of the rootball. The lengths of trenches shall be at least 300mm longer than the approved rootball size in both directions.

(2) The depth of the trenches shall be 150mm deeper than the approved rootball depth.

(3) All trenches shall be backfilled following completion of the root cutting operations and insertion of the rootball box, if applicable, in accordance with Clause AN2.11.07(6). No holes shall be left open to attract the danger of accidental falling-in of persons using the adjacent areas.

(4) Trenches shall be re-opened as necessary to permit the next stage of root cutting and, if applicable, the assembly of the rootball box joints.

(5) Trenches shall be further enlarged as necessary to permit the excavation of the underside of rootball. Excavation and root cutting of the underside of the rootball shall progress from the outside inward, and from the bottom upward. No excavation or loosening of the soil within the approved size of the rootball shall be permitted.

Uplifting AN2.11.09

(1) Uplifting shall be performed immediately after the third stage root cutting and, for trees of 300mm DBH or greater, after the complete assembly of the rootball box including its bottom panel.

(2) Trees with ball and burlap shall have their rootball tied with stainless steel chain net with wooden spacer for uplifting.

(3) Trees with rootball box shall be uplifted by the rootball box only.

(4) The lifting chains and harnesses shall be only be anchored to either the rootball box or the steel chain net wrapping around the rootball for the ball and burlap method.

(5) The use of any above-ground portion of the tree, including it trunk, as a point of uplift will cause trunk or branch breakage and the stripping of bark, and is not permitted.

(6) Plants shall be lifted carefully to avoid damage to any portion of the tree. For trees with rootball box, the rootball shall be firmly resting within the rootball box and tied to the rootball box with guy wires attached to fixed anchors within the rootball box.

(7) The upper part of the lifting cable shall be spread out by frame spacer to prevent the cable from touching the stem and branch at the time of lifting. Guying rope shall be tied to the lifting cable to stabilise the tree at the time of lifting.

(8) The tree stem and main branches shall be protected during uplifting by burlap wrapping.

(9) Trees may be leaf-picked prior to transplanting in order to reduce transpiration. Such leaf picking shall be carried out only upon prior written approval of the Engineer, and according to Clause AN2.11.04(3)(c).

(10) Immediately prior to lifting record photographs shall be taken and the tree shall be tagged to note the tree's natural angle of growth and compass orientation, so that this may be replicated at either the receptor site or temporary holding nursery, as appropriate.

Root Activator AN2.11.10

Root activator shall be applied after the first stage and second stage root cutting, and at regular intervals during the maintenance operations, according to the manufacturer's instruction.

Timing AN2.11.11

(1) Transplanting operations shall be timed so as to enable transplanting of the trees direct to the areas of proposed planting, either in the final receptor site

or the temporary holding nursery. No lifting and transplanting operations shall commence until either the receptor sites or the holding nursery, as appropriate, are fully prepared as specified.

(2) Lifting and transplanting operations shall be carried out only following a period of consistent rainfall which has thoroughly watered the trees to the satisfaction of the Engineer or following a thorough watering of the trees by the Contractor at a rate agreed by the Engineer.

(3) Any tree lifted must be transplanted and watered on the same day.

Watering of Transplanted Trees AN2.11.12

(1) Watering of the rootball and trenches, during stages of root cutting and before uplift from the ground, shall be carried out daily during the dry season; and in any case regularly to ensure that trees that have been root pruned or crown pruned do not dry out and suffer irreparable damage. The contractor shall submit proposed frequency of watering during stages of root cutting as part of his detailed method statements and programme for the Engineer's approval.

(2) Immediately after transplanting, the bases of all trees are to be well watered, using enough water to thoroughly soak the rootball to field capacity. Trees should be watered during evenings and early mornings only.

(3) Watering shall be more frequent during the first three months of the Establishment Period.

(4) Watering shall be carried out daily during the dry season, generally September to April. Watering shall be undertaken to field capacity.

(5) Watering shall be carried out as required during the wet season.

(6) Watering shall be done after checking soil water content, so as to avoid potential water-logging damage to roots.

(7) Evergreen trees with large canopies and girth of 2000mm or greater shall have mist system irrigation installed within the canopy head. The contractor shall submit a proposed system of mist irrigation as part of his detailed method statement.

Protection During Transit AN2.11.13

(1) Trees shall be transported in open top containers suitable for the tree size. Care shall be taken in packing trees to prevent over-heating with resultant loss of foliage.

(2) Tree stems and main branches shall be protected during transit by burlap wrapping.

(3) Tree crowns and rootballs shall be protected during transit against excessive sunlight, wind, drought, mechanical damage, smoke, artificial heat and other damage.

(4) Damaged plant material may be rejected by the Engineer. Damaged material which is not so rejected shall be carefully pruned using sharp clean implements to give a single flat sloping face cut.

Transportation of Very Large Transplanted Trees AN2.11.14

(1) Transportation of very large transplanted trees on public roads shall be undertaken during the hours from 8pm to 5am unless agreed otherwise by the Engineer, Transport Department and Police.

(2) The Contractor shall be responsible for obtaining all necessary approvals from relevant authorities for his temporary traffic management schemes and shall employ qualified traffic consultant to make submissions to relevant authorities.

Planting in Holding Nursery AN2.11.15

(1) When the receptor site is not available at the time of the tree transplanting, trees shall be planted in a temporary holding nursery until such time as the permanent receptor site is available and prepared to receive the trees.

(2) Trees with ball and burlap shall be planted with burlap in place, in an upright position, exactly as per their original growing angle and compass orientation, allowing adequate space for growth, and guyed and staked securely to avoid damage to the tree stems and rootballs, all to the satisfaction of the Engineer.

(3) Trees with rootball boxes shall be kept in their rootball boxes and shall be placed on flat level ground in an upright position, exactly as per their original growing angle and compass orientation, allowing adequate space for growth, and guyed securely to avoid movement of the rootball box and tree, all to the satisfaction of the Engineer.

(4) Immediately following planting or placing the plants shall be watered thoroughly to ensure a thorough soaking of the roots to field capacity.

Planting Direct to Receptor Site AN2.11.16

(1) Plants transplanted direct to the permanent receptor site are to be planted in accordance with PS Section AN2 unless otherwise specified. The receptor site shall be prepared in advance of the uplifting and transplanting of the tree.

(2) Tree pits shall be of a saucer shape with flat centre and slightly sloping sides. The flat bottom centre shall be as wide as the rootball, and each sloping edge shall be as wide as the rootball width, or 1000mm, whichever is smaller, on all sides.

(3) Tree pit bases shall be broken up and loosened to a depth of 300mm.

(4) Trees shall be planted in upright position exactly as per their original growing angle and compass orientation, as recorded in accordance with Clause AN2.11.09(10).

(5) Trees shall be secured in position either by guys and stakes or by underground guying, as appropriate, all as described in Section AN2.7, and to the approval of the Engineer.

(6) Immediately following planting, a soil saucer of 150mm depth shall be formed on the soil surface around the edge of the rootball circumference to permit rain or irrigation water to be retained and slowly infiltrate into the rootball perimeter. Immediately thereafter, the trees shall be watered in accordance with Clause AN2.11.12(2).

Planting to Receptor Site outside Works Boundary AN2.11.17

Where trees are to be transplanted to sites outside the Works boundary that are within the maintenance jurisdictions of the various Government departments, the Contractor shall agree the precise final location with the relevant Government departments, and give clear and advance notification to these Government departments, and make all necessary arrangements with these Government departments, prior to delivering the transplanted trees to these receptor sites.

Maintenance Works to Transplanted Trees in Temporary AN2.11.18

(1) Trees shall be treated with maintenance works immediately after transplanting to the temporary holding nursery, until such time as the tree is transplanted to the permanent receptor site. Such maintenance works shall include all measures necessary to maintain the trees in an acceptable vigorous and healthy growing condition. Maintenance operations as

Holding Nursery		stipulated under Section AN2.9 shall be required during the entire period the trees are maintained in the temporary holding nursery. The maintenance works shall be carried out in accordance with the requirements in Section AN2.9 unless otherwise proposed in the Contractor's method statement and approved by the Engineer. (2) One application of fertiliser shall be made in early Spring (March) and September each year, or as directed by the Engineer.
Establishment Works to Transplanted Trees in Receptor Site	AN2.11.19	(1) Trees shall be treated with establishment works immediately after transplanting to their final receptor site, for a period of 12 months. Such establishment works shall include all measures necessary to establish and maintain the trees in an acceptable vigorous and healthy growing condition. Establishment operations as stipulated under Section AN2.9 shall be required during the Construction Period and Establishment Period. The establishment works shall be carried out in accordance with the requirements in Section AN2.9 unless otherwise proposed in the Contractor's method statement and approved by the Engineer. (2) One application of fertiliser shall be made in early Spring (March) and September each year, or as directed by the Engineer.
Cordon Zone for Transplanted Trees	AN2.11.20	(1) Where specified on the drawings or instructed by the Engineer, very large solitary transplanted trees or groups of transplanted trees shall have a Cordon Zone created around them to protect them. (2) The Cordon Zone shall be delimited by a 2000mm high chain-link fence with a pad-locked gate, and access to it shall be restricted to workers involved in tree work. (3) No construction worker shall enter the Cordon Zone. No construction equipment or materials should breach the Cordon Zone. No artificial heat or fumes shall impinge into the Cordon Zone. No lifted materials shall sail above the Cordon Zone. (4) The base of the chain link fence shall be sealed by a waterproof rim such as sand bag at least 300mm tall to prevent the entry of contaminated construction water and other effluent into the Cordon Zone.
Monitoring of Transplanted Trees	AN2.11.21	(1) The performance of the transplanted trees shall be monitored by the Contractor throughout the root preparation period, maintenance period in holding nursery and establishment period in receptor site on a monthly basis by recording the following data in report format: (a) tree growth condition with reference to trunk, branches, foliage, soil and root, (b) any arboricultural problems and associated remedial measures. (c) Photographic record at stages listed in sub-clause (4) of the clause. (2) Any construction activities that may impact the trees negatively shall be reported well in advance to the Engineer for planning of preventive tree work to avoid possible damage. (3) The contractor shall report to the management office before and after carrying out each day's maintenance works on the transplanted trees and a countersigned record log book of the work carried out shall be kept at the site office and made available for inspection. All non-routine tree problems are to be promptly reported to the Engineer. (4) The Contractor shall submit a record photographic report of each of the following stages: (a) Before commencement, showing the existing growth angle and compass orientation of the tree, so that this may be replicated after transplanting. (b) After any crown pruning / thinning. (c) The rootball trenches after each stage of root cutting and before backfilling, showing clearly all major roots that had been cut. (d) Forming of the root ball (and rootball box if applicable). (e) The rootballs of all trees after lifting from ground. (f) Excavating tree pit at holding nursery (if applicable). (g) Transit to holding nursery (if applicable). (h) After planting at holding nursery (if applicable). (i) Monthly record photo during maintenance period in holding nursery (if applicable). (j) Excavating tree pit at receptor site. (k) Transit to receptor location. (l) After transplanting into receptor sites and after guying and staking are installed. (m) Monthly record photo during 12 months establishment period.
Replacement of Dead or Damaged Trees	AN2.11.22	(1) The contractor shall be responsible for the removal and replacement at his own cost of any transplanted tree which dies during the contract, or is seen to be dying at the end of the establishment period, which is, in the opinion of the Engineer, as a result of his poor workmanship, poor quality materials, neglect, or failure to comply with any obligation expressed or implied under the Contract. (2) The Contractor shall provide replacement planting of new trees of the same species and of similar size and form as the dead or damaged ones before the death or damage or provide other alternative replacement planting as agreed by the Engineer. (3) The Contractor shall complete the replacement planting within 28 days of the Engineer's instruction or other time duration as agreed by the Engineer.
Handover of Transplanted Trees	AN2.11.23	At the end of the Establishment Period, the Contractor shall be responsible for the handover of the transplanted trees to the relevant Government departments, and shall arrange all necessary handover inspections with the Government departments.

AN3 NURSERY WORKS

AN3.1 GENERAL

General requirements AN3.1.01 The works and materials specified in Clauses AN3.1.04 to AN3.1.06 shall comply with the sections stated, unless otherwise stated in this Section.

Specialist Contractor AN2.1.02 If the Contractor is not included in the "List of Approved Suppliers of Materials and Specialist Contractors for Public Works" under the category of "Landscaping: Class I - General Landscape Work", he shall enter into a written sub-contract with a specialist contractor to carry out the landscape softworks.

Photographic Record AN3.1.03 The Contractor shall make a photographic record of the nursery site at the time of site possession so that the site can be returned to its former condition at the end of the contract.

Site Clearance AN3.1.04

(4) Site clearance shall comply with PS Section AN1. During site clearance, where appropriate and as required by the Engineer, any existing topsoil shall be stripped and stockpiled by a method agreed by the Engineer and in an area designated or agreed by the Engineer.

(5) Concrete hard standing shall not be broken out unless by prior written approval from the Engineer. Any hard standing so broken out shall be reinstated at the decommissioning of the Nursery to a standard to match the original hard standing.

Tree and Vegetation Protection AN3.1.05 All clearance of existing vegetation, tree felling, pruning, transplanting required for the creation of the Nursery shall be undertaken by a specialist landscape contractor in accordance with PS Section AN1. In addition to the general requirements of the Contract the Contractor shall demonstrate that the proposed specialist landscape sub-contractor has sufficient experience and skilled labour to undertake the tree work specified.

Soft Landscape Works AN3.1.06 All soft landscape works shall comply with PS Section AN2.

Environmental Sustainability AN3.1.07 The use of organic, eco-friendly and environmentally sustainable products is required for all plant procurement and nursery works.

Integrated Pest Management AN3.1.08 An Integrated Pest Management strategy that minimizes the use and dependence on chemicals shall be adopted.

Use of Inorganic Chemicals AN3.1.09 Inorganic chemicals shall not be used for the nursery works unless approved by the Engineer. Inorganic chemicals shall be used, stored, mixed and applied in accordance with the manufacturer's recommendations. Containers for inorganic chemicals shall be disposed of off Site by methods approved by the Engineer.

Government Approvals AN3.1.10 The Contractor shall obtain all necessary import licences, and Government approvals for the nursery works and the establishment, operation and decommissioning of the nursery.

AN3.2 GLOSSARY

Nursery Works AN3.2.01 Nursery works are all the works undertaken in the establishment, operation, management, administration and decommissioning of the Nursery.

Temporary Holding Nursery (THN) AN3.2.02

(6) The Temporary Holding Nursery (THN) is an on-site nursery established and operated by the Contractor for the sole purpose of undertaking the Contract works.

(7) The purpose of the THN is to provide a facility to hold transplanted trees and maintain them in a healthy and vigorous condition until such time as their receptor sites and available and prepared to receive them.

(8) The THN shall be subdivided between separate site locations as indicated in the Contract drawings, and any additional locations provided by the Contractor at his own expense.

(9) The THN shall be decommissioned by the Contractor at the end of the Contract.

(10) Under no circumstances shall the THN be used by the Contractor for any purpose other than described or implied under the Contract.

AN3.3 MATERIALS

Building Materials AN3.3.01 All building materials used in the construction of buildings, offices, stores in the THN shall be fit for purpose in creating a safe and comfortable environment for users.

Soft Landscape Materials AN3.3.02 Soft landscape materials shall comply with the specification in Section AN2.3 as a minimum requirement.

General Plant Quality Standards AN3.3.03

(11) The following standards are applicable:

(n) BS 3936 – Part 1 : Nursery Stock, Tree and Shrubs;

(o) BS 3998 : Recommendations for Tree Work

(p) BS 4043:1989 : Transplanting

(q) BS 4428 : General Landscape Operations.

(r) BS 5837 : Guide for trees in relation to construction

(s) American National Standards Institute ANSI Z60.1- American Standard for Nursery Stock

(12) Plants shall be free of pests and disease including viruses, nematodes, non-symbiotic fungi, phytophera, scale, mealy bug, red spider, aphis, white fly and thrips.

(13) Plants shall be free of mechanical, physical or insect damage including leaf burn, chewing insect, stem marks.

(14) Plants shall be healthy and showing consistent vigour during the growth period.

(15) Plants shall be well hardened off with consistent even growth typical of the species.

(16) Plants shall be correctly and clearly labelled with tree identification number.

AN3.4 TEMPORARY HOLDING NURSERY WORKS

General AN3.4.01 The Contractor shall establish, operate and decommission an on-site Temporary Holding Nursery (THN) for the sole purposes of the Contract.

THN Location and Size AN3.4.02

(17) The THN shall be located in one or both of the following sites indicated in the contract drawings:

(t) So Kun Wat (2.13 ha)

(u) Siu Lang Shui (1.03 ha)

(18) The Contractor shall be deemed to have inspected the nursery site(s) at tender stage and determined that the sites are sufficient for the purpose of the THN. If the Contractor deems that additional site(s) are required he shall provide these at his own expense.

Purpose AN3.4.03 The purpose of the THN is to provide a facility to hold transplanted trees in a healthy and vigorous condition until such time as their receptor sites are available and prepared to receive them.

THN Duration AN3.4.04 The THN shall be temporary and shall remain operational until the date of transplanting the final transplanted tree to its permanent receptor location.

THN Design AN3.4.05

(19) The Contractor shall design the THN to satisfy the purpose of the THN and requirements of the Contract. Within two weeks of the commencement of the Contract, the Contractor shall submit the detailed design for the THN for review and approval by the Engineer.

(20) The Contractor shall provide a THN layout design which retains flexibility over the Contract duration and permits the efficient and wise temporary holding of stock within the spatial limitations of the available site(s).

(21) As a minimum requirement, the THN shall include the following:

(v) Site clearance and formation of the land to suit the purpose of the THN.

(w) Site office and administration facilities, including meeting room, washroom, toilet, first aid facilities, etc.

(x) Covered plant, equipment and materials storage.

(y) Dangerous goods store.

(z) Hard stand holding areas for transplanted trees in rootball boxes, with slight falls to surface channels / soakaways to prevent water ponding. Sloping sites shall be terraced as necessary to create these flat level areas.

(aa) Soft ground holding areas for transplanted trees in ball and burlap that are flat and level with slight falls to drainage channels / soakaways to prevent water-logging of soils and surface water ponding. Sloping sites shall be terraced as necessary to create these flat level areas.

(bb) Hard stand areas for plant delivery / collection without interference with other nursery operations.

(cc) Security perimeter fence and gate facility.

(dd) Rubbish collection point.

(ee) Composting facility.

(ff) Comprehensive irrigation system.

(gg) Illumination that provides a safe working environment and avoids light pollution and energy wastage.

(hh) An anchoring / support system for trees that is able to withstand wind forces as approved by the Engineer.

(ii) All services and utilities required for nursery construction, operation and decommission.

Growing Medium in THN AN3.4.06

(22) The Contractor shall provide a suitable growing medium for the healthy and vigorous growth of all plants held within the THN. If necessary, imported soiling materials including completely decomposed granite, subsoil, topsoil, and / or soil-mix shall be used to augment the existing soil condition to create the suitable growing medium during the holding period.

(23) The Contractor shall be deemed to have inspected the nursery site(s) at tender stage and determined and allowed for the soil remedial measures required to create a suitable growing medium for healthy and vigorous plant growth during the holding period.

(24) All imported soiling materials shall be as specified in Section AN2.3.

(25) Soiling materials delivered and installed in the THN shall be tested for N.P.K. value, organic matter content, Cation Exchange Capacity ratio, organic carbon, pH value, physical content of sand, silt and clay, and water content. Soil testing shall be arranged by the Contractor and carried out by an approved reputable firm or institute at the contractor's cost, and the report shall be submitted to the Engineer for approval.

THN Operation & Maintenance Manual AN3.4.07

(26) Within four weeks of the commencement of the Contract the Contractor shall submit a comprehensive THN Operations and Maintenance Manual which shall address how the plants will be maintained in a healthy and vigorous condition during the holding period, including a description of the following:

(jj) Layout Plans of the THN facilities including entrance point, gates and fencing, internal roads, hard standings and soft ground areas, gravel areas, buildings, stores, covered areas, water tanks, irrigation layout and pumps, lighting and drainage.

(kk) Soiling strategy to provide a suitable growing medium for plants planted into the ground, with specific reference to any remedial treatments to the existing site condition necessary to create the appropriate growing medium for healthy and vigorous plant growth during the holding period.

(ll) Integrated pest management strategy using organic products that do not conflict with the EP and other environmental and drainage regulations and requirements.

(mm) Fertilizing Strategy - including fertilizer descriptions, application rates and programmes. Inorganic fertilizers shall not be used without prior written approval of the Engineer. It is strongly preferred that organic fertilizer is used in preference to inorganic fertilizer. However, use of inorganic fertilizer may be accepted by the Engineer if suitable justification is provided by the Contractor.

(nn) General Tree Maintenance Strategy - including crown thinning, root pruning, staking and tying, watering, weeding, litter removal, etc.

(oo) Equipment inventory, equipment maintenance procedures and manufacturers' maintenance manuals.

(pp) Personnel.

(27) Three bound copies of the manual in A4 format and scanned copy PDF shall be submitted to the Engineer.

THN Security and access AN3.4.08

(28) The THN shall have 24 hour security executed by security guard(s) who shall be housed in an office cabin near the THN entrance, and who shall be responsible for recording weather conditions, visitors, delivery / collection and vehicle registration for reporting procedures.

(29) The THN shall be enclosed by hoarding and / or a secure chain link fence in accordance with MTRCL Site Regulations and approved by the Engineer.

THN Infrastructure AN3.4.09

(30) The following infrastructure shall be provided by the Employer:

(qq) (no infrastructure shall be supplied by the Employer)

(31) All other necessary infrastructure shall be supplied and maintained with necessary permits by the Contractor including but not limited to:

(rr) electricity supply;

(ss) potable water supply;

(tt) flushing water supply;

(uu) irrigation water supply;

(vv) Telephone lines and modem;

(ww) Sewage, storm water and general drainage.

(32) The Contractor shall be responsible for the upkeep and maintenance of the THN infrastructure and utilities for the duration of the Contract. The Contractor shall be responsible to pay all utility charges imposed by utility companies for the construction, operation and decommissioning of the THN.

(33) The Contractor shall immediately advise the Engineer of any difficulty experienced in providing the necessary infrastructure for the establishment and operation of the THN.

THN Sign Boards AN3.4.10

(34) The Contractor shall provide prominent attractive signboards written in both English and Chinese at suitable visible locations proposed by the Contractor and approved by the Engineer. Nursery Sign Boards shall be prepared for each separate nursery site.

(35) They shall be sign written by a skilled sign writer to show the details described in the Contract plus any other relevant details to the approval of the Engineer. Signage graphics shall be in accordance with MTRCL brand logo and graphic design style, which shall be provided by the Engineer upon request.

(36) Under no circumstances, shall sub-contractors' or suppliers' name-boards be fixed on hoardings or elsewhere on the site. The Contractor is responsible for obtaining all necessary approvals for the erection of these notice boards. They shall be well maintained during the period of operation of the THN.

(37) Upon decommissioning of the THN, the signboards and supports shall be dismantled.

Irrigation System AN3.4.11

(38) The Contractor shall provide an irrigation system for the adequate servicing of the THN and to promote healthy and vigorous growth of the plants. This irrigation water shall be of a quality and standard suitable for both plant material and for handling by nursery workers.

(39) An intelligent irrigation system is required that will avoid excess water use and avoid discharge from the THN into surrounding areas, rivers or streams.

(40) Within four weeks of commencement of the Contract, the Contractor shall submit the irrigation design of the THN for review and approval by the Engineer.

Weed Suppressant Membrane AN3.4.12

All soft ground tree and plant holding areas in the THN shall be covered with a geo-textile / weed suppressant membrane to discourage weed growth and enable the efficient removal of debris.

Plant Organisation AN3.4.13

(41) Transplanted trees shall be stored in the nursery in a neat, tidy, well organised manner, with trees grouped together according to a system to be agreed by the Engineer, for ease of inspection and approval, and for ease of extraction of the trees at the appropriate time without interference with other trees.

(42) Transplanted trees shall be clearly labelled with their tree ID number.

(43) Transplanted trees in rootball boxes shall be stored on hard standing areas and transplanted trees not in rootball boxes shall be stored in soft ground areas with weed suppressant membrane as per Clause AN3.4.12.

(44) Trees shall be spaced to allow for their healthy and vigorous growth, and the anticipated increased spread of their crowns based on their planned duration in the THN.

(45) Trees shall be spaced to allow for their extraction by heavy lifting equipment without interference with adjacent trees.

Plant Maintenance AN3.4.14

Plants shall be treated with maintenance works immediately after locating to the THN, until such time as they are removed to their permanent receptor site(s). Such maintenance works shall include all measures necessary to maintain the plants in an acceptable vigorous and healthy growing condition. Establishment operations as stipulated under Section AN2.9 shall be required during the entire period the plants are maintained in the THN. The maintenance works shall be carried out in accordance with the requirements in Section AN2.9 unless otherwise proposed in the Contractor's Nursery Operation and Maintenance Manual and approved by the Engineer.

Root Pruning of Trees in Ball and Burlap AN3.4.15

Trees in ball and burlap shall be root pruned at regular intervals to maintain the feeding roots at the perimeter of the rootball for the duration of the trees' stay in the nursery. The frequency of the root pruning exercise shall be proposed by the Contractor in his Nursery Operation and Maintenance Manual (Clause AN3.4.07) for approval by the Engineer.

Integrated Pest management AN3.4.16

(46) The Contractor shall use integrated pest management techniques to control pests.

(47) The Contractor shall take all necessary precautionary measures to protect the plants from pest, fungal and disease attack and all necessary control

measures to eradicate pests, fungi and disease from the infected and/or infested plants.

(48) The Contractor shall regularly check for any insect attraction or fungal infestation particularly during periods of known activity.

(49) The Contractor shall report to the Engineer any such occurrence and shall carry out remedial eradication.

(50) If the Contractor considers that it is necessary to use of chemical insecticide or fungicide, he shall obtain prior written approval of the Engineer. Chemical insecticide or fungicide shall be used in accordance with the manufacturer's instructions. Use of sprays is to be with care and with due regard to the safety and convenience of the general public and in accordance with AFCD guidelines. Spraying shall be carefully controlled to avoid unnecessary dispersion.

(51) If termite infestation is found, the Contractor shall employ a termite specialist at his own cost to propose and implement remedial action to the satisfaction of the Engineer.

(52) The Contractor shall comply with the following requirements in applying the pest, fungal and disease control measures:

(xx) Environmentally friendly measures shall be adopted,

(yy) All pesticides, insecticides, fungicides and chemicals to be used shall be proprietary products registered in Hong Kong,

(zz) Safety precautions as the manufacturer's instruction shall be strictly followed in using pesticides, insecticides, fungicides and chemicals so as to avoid causing danger or harm to the public and the environment, and

(aaa) Plant parts pruned from diseased plants shall not be stockpiled anywhere on the Site and shall be disposed of from the Site.

Daily Record	AN3.4.17	The Contractor shall keep a daily log book record of the work carried out which shall be available for inspection by the Engineer at the THN office. Failure to adequately maintain the work log book will result in a reduced certified payment on that part of work considered to be unsatisfactory or in-complete.
Record Photos	AN3.4.18	Monthly record photos shall be taken of all plants in the THN, and submitted to the Engineer in report format.
Decommissioning of THN	AN3.4.19	(53) The THN shall be decommissioned at the vacation dates of the nursery sites as stipulated in the contract to enable the Employer to handover the land back to Government. (54) Decommissioning of the THN shall entail the removal of all superstructure, substructure, fencing, signage and utilities from the site, and a levelling / grading of the area to reinstate the site condition and levels that existed prior to the construction of the THN, except as stated in sub-clauses (3) and (4) of this clause. (55) Any concrete hard standing that was broken out shall be reinstated to a standard to match the original hard standing, unless prior written permission is granted by the Engineer not to reinstate it. (56) Topsoil or soil-mix that was imported for the creation of the nursery may not be retained on site after decommissioning, unless prior written permission is granted by the Engineer, in which case it shall be spread evenly over the site or as directed by the Engineer. (57) The site shall be left in a vacant, clean and tidy state.
THN Compliance with Environmental Permit and Government Regulations	AN3.4.20	(58) The Contractor shall be liable for all THN daily activities which must conform to requirements (if any) in the Environmental Permit (EP) as revised/ issued throughout the duration of the Contract. (59) Any costs or penalties imposed by Government due to the Contractor's non-compliance with the Environmental permit (EP) or any other Government regulation will be borne by the Contractor.

ANNEX 1
Tree Protection Drawings

TP001 Temporary Protective Fencing to Preserved Tree (Individual Tree)

TP002 Temporary Protective Fencing to Preserved Tree (Group of Trees)

TP003 Temporary Protective Armouring to Preserved Tree

TP004 Temporary Protective Mulching to Preserved Tree

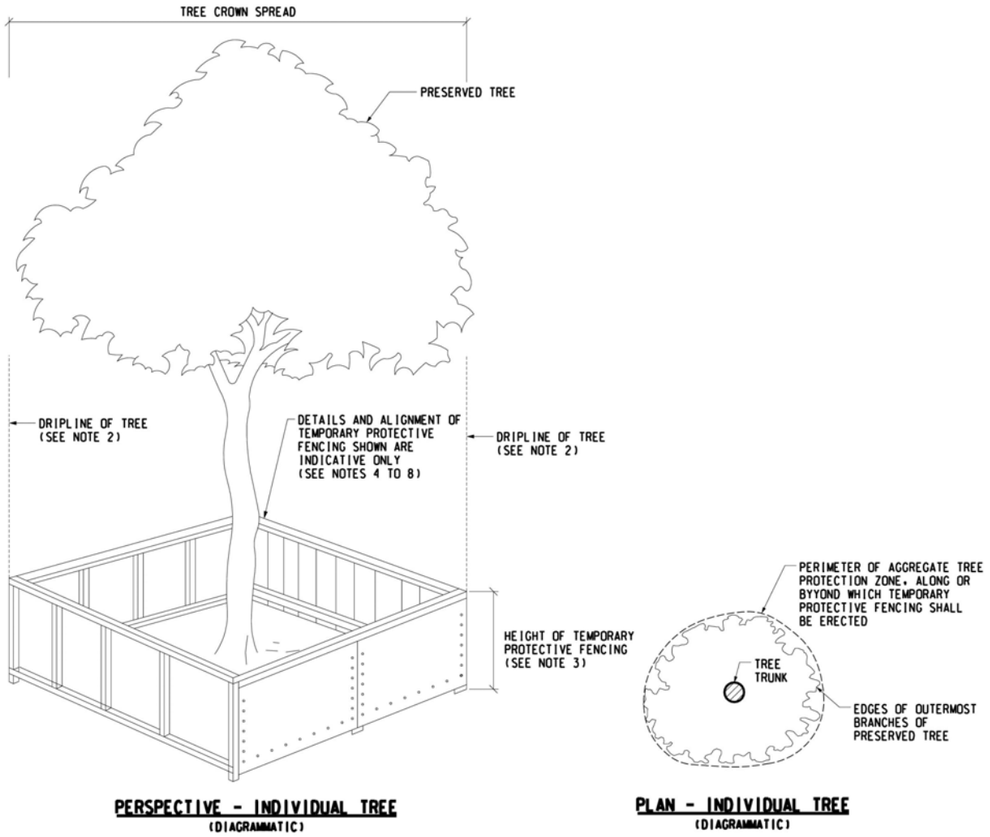
TP005 Measure to Accommodate Reduction in Ground Level around Preserved Tree

TP006 Measure to Accommodate Minor to Moderate Rise in Ground Level around Preserved Tree

TP007 Measure to Accommodate Major Rise in Ground Level around Preserved Tree

TP008 Trenching and Tunnelling adjacent to Preserved Tree

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE / TREE GROUP EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE / TREE GROUP DEFINING THE PERIMETER OF THE TREE PROTECTION ZONE / AGGREGATE TREE PROTECTION ZONE.
3. HEIGHT OF TEMPORARY PROTECTIVE FENCING SHALL BE 1500 MINIMUM. BUT THE REQUIRED HEIGHT SHALL BE DETERMINED BY THE ENGINEER WHEN APPROVING THE CONSTRUCTION DETAILS OF THE FENCING AS REFERRRED TO IN NOTE 8.
4. TEMPORARY PROTECTIVE FENCING SHALL BE STRONG AND APPROPRIATE FOR RESISTING THE IMPACTS OF CONSTRUCTION ACTIVITIES ON THE SITE. IT SHALL BE MADE OF ROBUST MATERIALS AND SHALL COMPRISE A VERTICAL AND HORIZONTAL SCAFFOLDING FRAMEWORK WELL BRACED AND SUPPORTING CLEFT WOODEN PALETTE FENCING OR CHAN LINK FENCING / WOODEN BOARD FENCING OR STEEL SHEET FENCING OR OTHER FENCING AS APPROVED BY THE ENGINEER ONLY IN EXCEPTIONAL CIRCUMSTANCES SHALL PLASTIC WEBBING BE CONSIDERED.
5. THE ALIGNMENT OF TEMPORARY PROTECTIVE FENCING CAN BE IN CIRCULAR, SQUARE, RECTANGULAR OR ANY OTHER SHAPE SO LONG AS THE FENCING DOES NOT ENCROACH INTO THE TREE PROTECTION ZONE.
6. A LOCKABLE GATE SHALL BE PROVIDED TO THE TEMPORARY PROTECTIVE FENCING TO ALLOW ENTRY FOR CARRYING OUT THE NECESSARY ARBORICULTURAL WORKS OR MAINTENANCE WORKS TO THE TREE OR ANY OTHER APPROVED WORKS WITHIN THE TREE PROTECTION ZONE.
7. WARNING NOTICE GUARDING AGAINST UNAUTHORISED OPERATIONS WITHIN FENCED AREA SHALL BE ERECTED ON THE TEMPORARY PROTECTIVE FENCING.
8. THE CONTRACTOR SHALL SUBMIT THE CONSTRUCTION DETAILS OF THE TEMPORARY PROTECTIVE FENCING TO THE ENGINEER FOR APPROVAL PRIOR TO ERECTION OF THE FENCING.

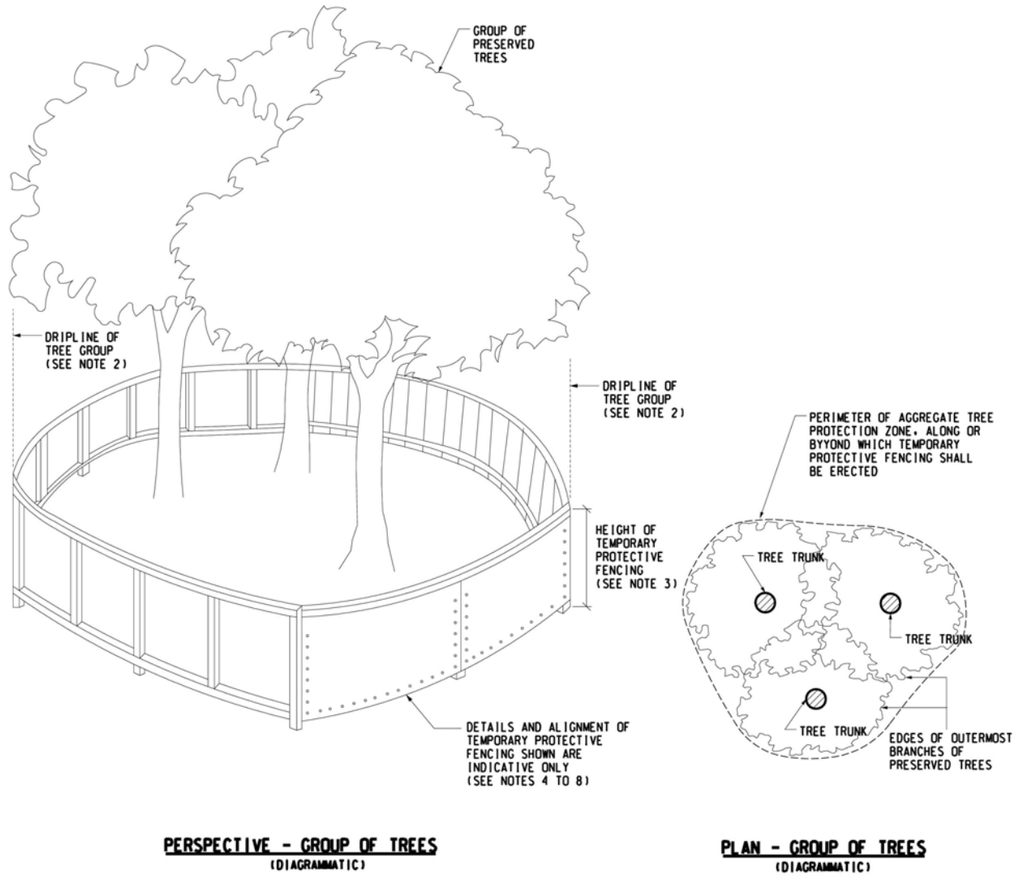


PERSPECTIVE - INDIVIDUAL TREE
(DIAGRAMMATIC)

PLAN - INDIVIDUAL TREE
(DIAGRAMMATIC)

TP001 - TEMPORARY PROTECTIVE FENCING TO PRESERVED TREE (INDIVIDUAL TREE)

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE / TREE GROUP EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE / TREE GROUP DEFINING THE PERIMETER OF THE TREE PROTECTION ZONE / AGGREGATE TREE PROTECTION ZONE.
3. HEIGHT OF TEMPORARY PROTECTIVE FENCING SHALL BE 1500 MINIMUM. BUT THE REQUIRED HEIGHT SHALL BE DETERMINED BY THE ENGINEER WHEN APPROVING THE CONSTRUCTION DETAILS OF THE FENCING AS REFERRRED TO IN NOTE 8.
4. TEMPORARY PROTECTIVE FENCING SHALL BE STRONG AND APPROPRIATE FOR RESISTING THE IMPACTS OF CONSTRUCTION ACTIVITIES ON THE SITE. IT SHALL BE MADE OF ROBUST MATERIALS AND SHALL COMPRISE A VERTICAL AND HORIZONTAL SCAFFOLDING FRAMEWORK WELL BRACED AND SUPPORTING CLEFT WOODEN PALETTE FENCING OR CHAN LINK FENCING / WOODEN BOARD FENCING OR STEEL SHEET FENCING OR OTHER FENCING AS APPROVED BY THE ENGINEER ONLY IN EXCEPTIONAL CIRCUMSTANCES SHALL PLASTIC WEBBING BE CONSIDERED.
5. THE ALIGNMENT OF TEMPORARY PROTECTIVE FENCING CAN BE IN CIRCULAR, SQUARE, RECTANGULAR OR ANY OTHER SHAPE SO LONG AS THE FENCING DOES NOT ENCROACH INTO THE TREE PROTECTION ZONE.
6. A LOCKABLE GATE SHALL BE PROVIDED TO THE TEMPORARY PROTECTIVE FENCING TO ALLOW ENTRY FOR CARRYING OUT THE NECESSARY ARBORICULTURAL WORKS OR MAINTENANCE WORKS TO THE TREE OR ANY OTHER APPROVED WORKS WITHIN THE TREE PROTECTION ZONE.
7. WARNING NOTICE GUARDING AGAINST UNAUTHORISED OPERATIONS WITHIN FENCED AREA SHALL BE ERECTED ON THE TEMPORARY PROTECTIVE FENCING.
8. THE CONTRACTOR SHALL SUBMIT THE CONSTRUCTION DETAILS OF THE TEMPORARY PROTECTIVE FENCING TO THE ENGINEER FOR APPROVAL PRIOR TO ERECTION OF THE FENCING.

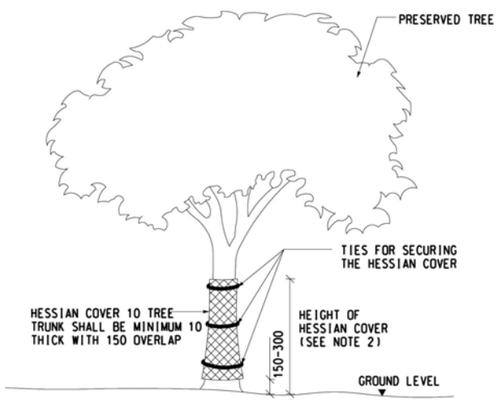


PERSPECTIVE - GROUP OF TREES
(DIAGRAMMATIC)

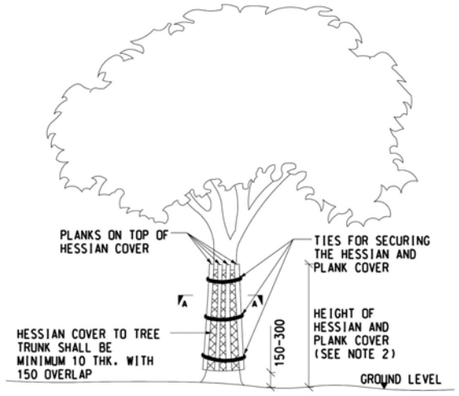
PLAN - GROUP OF TREES
(DIAGRAMMATIC)

TP002 - TEMPORARY PROTECTIVE FENCING TO PRESERVED TREE (GROUP OF TREES)

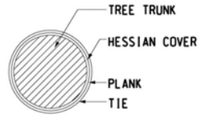
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. HEIGHT OF *HESSIAN COVER / HESSIAN AND PLANK COVER TO THE TRUNK SHALL BE 1500 MIN. BUT THE REQUIRED HEIGHT FOR DIFFERENT INDIVIDUAL TREES SHALL BE DETERMINED BY THE ENGINEER ON SITE.



TEMPORARY PROTECTIVE HESSIAN ARMOURING TO PRESERVED TREE
(DIAGRAMMATIC)



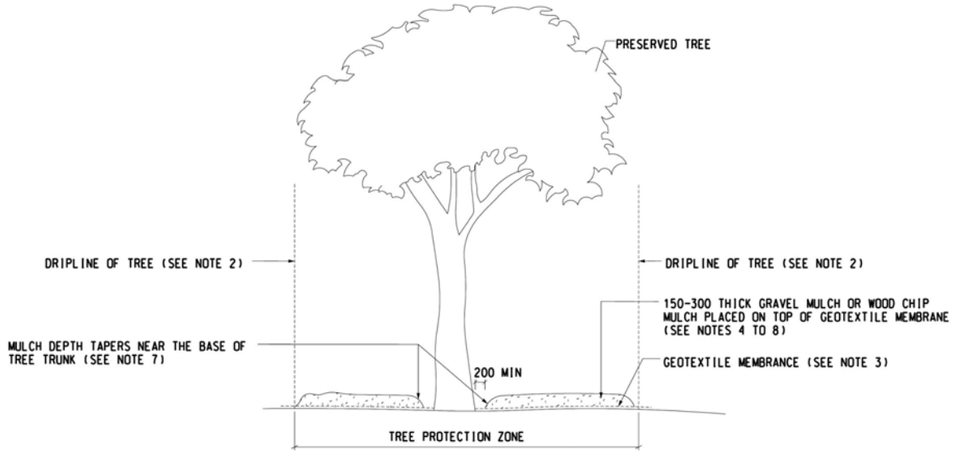
TEMPORARY PROTECTIVE HESSIAN AND PLANK ARMOURING TO PRESERVED TREE
(DIAGRAMMATIC)



SECTION A-A

TP003 - TEMPORARY PROTECTIVE ARMOURING TO PRESERVED TREE (HESSIAN AND PLANK)

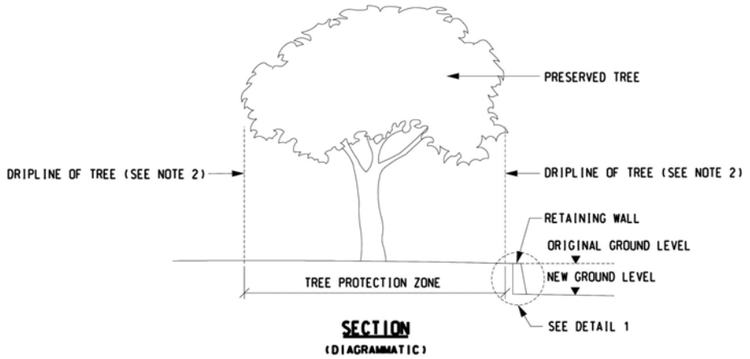
NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE / TREE GROUP EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE / TREE GROUP DEFINING THE PERIMETER OF THE TREE PROTECTION ZONE / AGGREGATE TREE PROTECTION ZONE.
3. THE GROUND BENEATH THE CEDTEXTILE MEMBRANE WITHIN THE TREE PROTECTION ZONE SHALL BE LEFT UNDISTUBRED BUT THE DEBRIS AND THE EXISTING UNDERGROWTH ON THE GROUND SHALL BE CLEARED PRIOR TO APPLYING THE GEOTEXTILE MEMBRANE. THE ENGINEER AGREEMENT SHALL BE OBTAINED PRIOR TO CLEARANCE OF THE EXISTING UNDERGROWTH.
4. WHERE GRAVEL MULCH IS USED THE NOMINAL SIZE OF GRAVEL SHALL BE OF 20 DIAMETER AND THE GRAVEL SHALL BE OF INERT. LIME-FREE MATERIALS WITH NO FINES.
5. WHERE WOOD CHIP MULCH IS USED, THE NOMINAL PARTICLE SIZE SHALL BE IN THE RANGE 2MM TO 20MM AND THE WOOD CHIPS SHALL BE FREE FROM PERNICIOUS WEEDS, CHEMICAL CONTAMINATION, RUBBISH AND OTHER DELETERIOUS MATERIAL.
6. TEMPORARY PROTECTIVE MULCHING SHALL BE INSPECIED AT MONTHLY INTERVALS AND IF NECESSARY SHALL BE REPLENISHED TO THE SPECIFIED THICKNESS.
7. WHERE IN ADDITION TO PREDESTRIAN LOADS, THE PASSAGE OR PARKING OF VEHICLES OR THE OPERATION OF EQUIPMENT OR MACHINERY WITHIN THE TREE PROTECTION ZONE HAS BEEN AGREED BY THE ENGINEER DOUBLE OVERLAPPING THICK METAL SHEETS SHALL BE LAID ON TOP OF THE TEMPORARY PROTECTIVE MULCHING TO PROVIDE ADDITIONAL PROTECTION FROM SOIL COMPACTION.
8. MULCH SHALL BE KEPT AWAY FROM THE BASE OF TREE TRUNK TO PREVENT ROOT COLLAR ROT.
9. WHERE THE PRESERVED TREE IS ON SLOPING GROUND, 300 HIGH TIMBER EDGE SHALL BE PEGGED ON DOWNSLOPE SIDE OF THE TREE PROTECTION ZONE TO HOLD THIS MULCH.



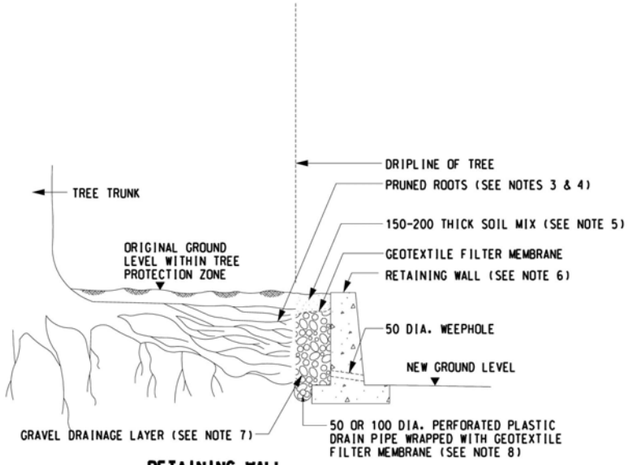
TEMPORARY PROTECTIVE MULCHING TO PRESERVED TREE
(DIAGRAMMATIC)

TP004 - TEMPORARY PROTECTIVE MULCHING TO PRESERVED TREE

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE DEFINING THE PERIMETER OF THE TREE PROTECTION ZONE.
3. THE FOLLOWING PROCEDURES SHALL BE FOLLOWED IN ROOT PRUNING TO AVOID TEARING AND SHREDDING OF THE ROOTS BY GRADING EQUIPMENT:
   I) BEFORE GRADING, TRENCH AROUND THE TREE AT LEAST 200 BEYOND THE PERIMETER OF THE TREE PROTECTION ZONE WITH A BLACKHOE.
   II) CAREFULLY FORK THE SOIL AWAY FROM THE ROOTS USING HAND HELD TOOLS UP TO THE EDGE DEFINED BY THE PERIMETER OF THE TREE PROTECTION ZONE AND
   III) PRUNE THE ROOTS USING HAND HELD TOOLS UP TO THE EDGE DEFINED BY THE PERMETER OF THE TREE PROTECTION ZONE.
4. THE FOLLOWING PROCEDURES SHALL BE FOLLOWED IMMEDIATELY AFTER ROOT PRUNING UNTIL BACKFILLING IS COMPLETE TO PREVENT THE CUT AND EXPOSED ROOTS FROM DRYING OUT:
   I) HANG THICK HESSIAN OR OTHER POROUS ABSORBENT FABRIC FROM THE TOP OF THE CUT SURFACE OVER THE EXPOSED ROOTS AND SOIL AND
   II) MIST THE HESSIAN OR FABRIC IN A FREQUENCY THAT KEEPS THE ROOTS AND SOIL AT THE CUT SURFACE MOIST ALL THE TIME
5. SLOW RELEASE FERTILIZER SHALL BE INCORPORATED INTO THE SOIL MIX AT A RATE OF 500 G / M 37/64 OR AT A RATE AS DIRECTED BY THE ENGINEER.
6. THE ALIGNMENT OF THE RETAINING WALL MAY VARY TO ACCOMMODATE THE ROOTS THAT ARE TO BE RETAINED.
7. THE NOMINAL SIZE OF GRAVEL SHALL BE OF 20 DIAMETER AND THE GRAVEL SHALL BE OF INERT, LIVE-FREE MATERIALS WITH NO FINES.
8. THE DRAIN PIPE SHALL BE CONNECTED TO A SUITABLE NEARBY DRAINACE OUTLET SUCH AS SURFACE CHANNEL OR STORM WATER DRAIN AS AGREED BY THE ENGINEER.



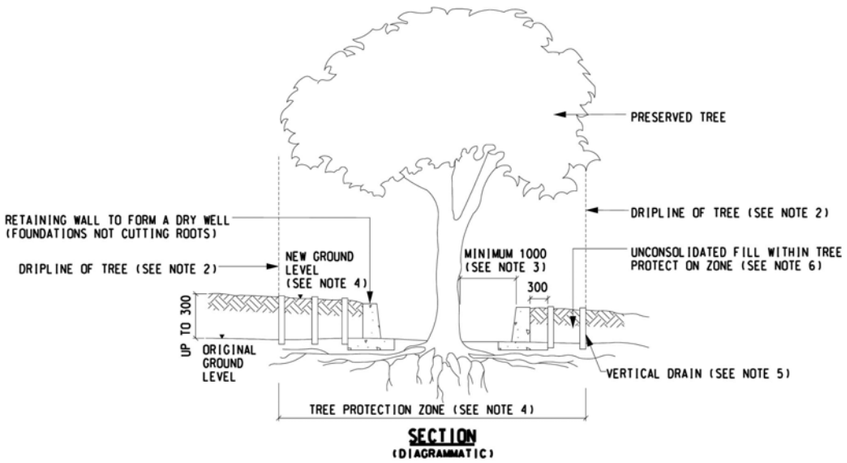
SECTION
(DIAGRAMMATIC)



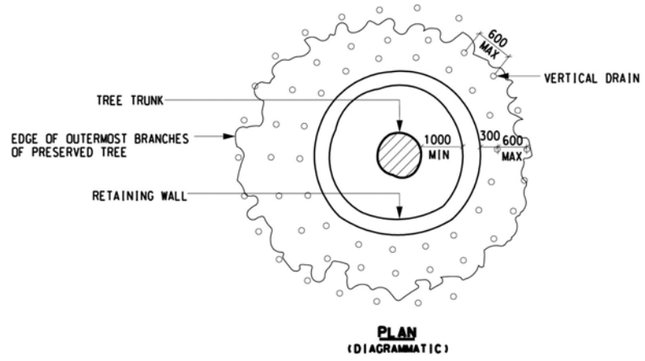
RETAINING WALL NEAR TREE PROTECTION ZONE
(DIAGRAMMATIC)

TP005 - MEASURE TO ACCOMODATE REDUCTION IN GROUND LEVEL AROUND PRESERVED TREE

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE. DEFINING THE PERIMETER OF THE TREE PROTECTION ZONE.
3. UNDER NO CIRCUMSTANCES SHALL THE FILL BE PLACED AGAINST THE TREE TRUNK WHERE ONLY PART OF THE DRY WELL IS FORMED SUCH THAT PART OF THE AREA NEXT TO THE TRUNK BASE IS CONNECTED TO THE ADJACENT PAVING AREA AT THE ORIGINAL GROUND LEVEL THE AREA NEXT TO THE TRUNK BASE SHALL BE COVERED WITH OPEN JOINT PAVING OR LOOSE COBBLES.
4. GRADING WITHIN THE TREE PROTECTION ZONE SHALL DRAIN AWAY FROM THE TREE TRUNK WHERE THE TREE IS ON SLOPING GROUND A SOIL BERM SHALL BE FORMED BETWEEN THE RETAINING WALL OF THE DRY WELL AND THE PERIMETER OF THE TREE PROTECTION ZONE ON THE UPSLOPE SIDE OF THE WELL TO DIRECT EXCESSIVE WATER FROM ENTERING THE WELL.
5. THE VERTICAL DRAINS SHALL BE 50 OR 100 DIAMETER PERFORATED PLASTIC DRAIN PIPES WRAPPED WITH GEOTEXTILE FILTER MEMBRANCE. THE OPENINGS OF THE DRAINS TO THE AIR SHALL BE COVERED WITH A TIGHTLY FITTED GRATE OR THE DRAINS SHALL BE FILLED WITH COARSE GRAVEL OF INERT, LIME FREE MATERIALS WITH NO FINES. FOR SAFETY EXCLUSION OF ANIMALS, AND TO ALLOW AIR AND WATER MOVEMENT THE VERTICAL DRAINS SHALL BE PLACED IN 600 MAXIMUM HORIZONTAL SPACING WITHIN THE TREE PROTECTION ZONE AND SHALL EXTEND AT LEAST TO THE DRIPLINE OF THE TREE.
6. THE SOIL FOR FILLING WITHIN THE TREE PROTECTION ZONE SHALL BE OF A COARSER TEXTURE THAT THE UNDERLYING SOIL BELOW THE ORIGINAL GROUND LEVEL.
7. THE DETAILS OF THE RETAINING WALL FOUNDATION SHOWN ARE INDICATIVE ONLY. TO MINIMIZE ROOT DAMAGE, EXCAVATION FOR FOUNDATION SHALL BE CARRIED OUT BY HAND AND SLAB FOUNDATION SHALL BE AVOIDED. WHERE DISCONTINUOUS FOUNDATION IS USED, THE LOCATION OF THE FOUNDATION SHALL BE AGREED BY THE *ARCHITECT / ENGINEERING / SUPERVISING OFFICER.



SECTION
(DIAGRAMMATIC)

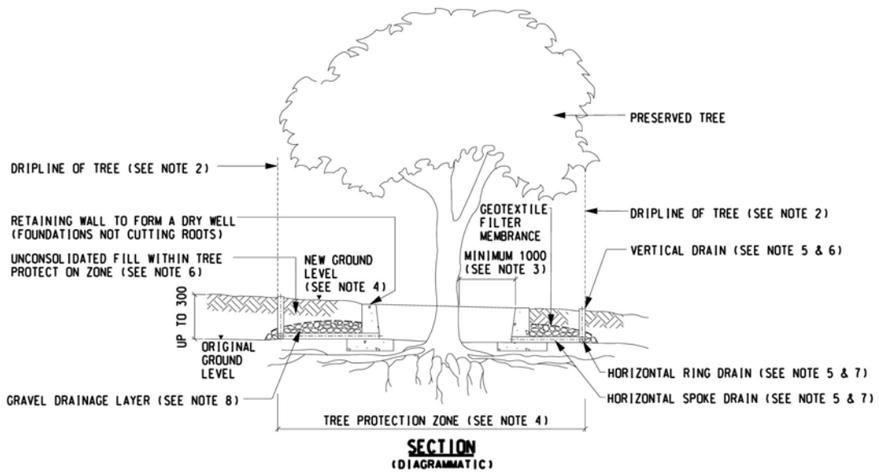


PLAN
(DIAGRAMMATIC)

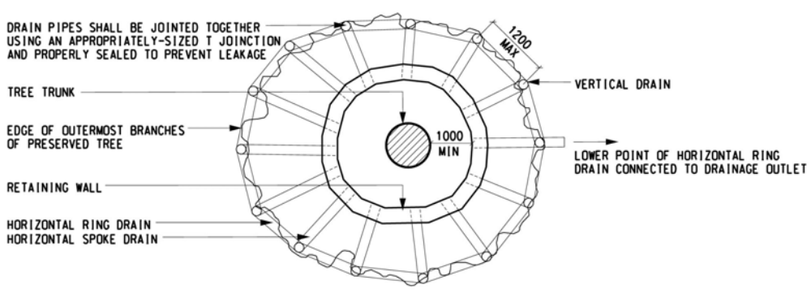
TP006 - MEASURES TO ACCOMMODATE MINOR TO MODERATE RISE (UP TO 300mm) IN GROUND LEVEL AROUND PRESERVED TREE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. DRIPLINE OF TREE EXTENDS TO THE OUTERMOST BRANCHES OF THE TREE. DEFINING THE PERIMETER OTHE TREE PROTECTION ZONE.
3. UNDER NO CIRCUMSTANCES SHALL THE FILL BE PLACED AGAINST THE TREE TRUNK WHERE ONLY PART OF THE DRY WELL IS FORMED SUCH THAT PART OF THE AREA NEXT TO THE TRUNK BASE IS CONNECTED TO THE ADJACENT PAVING AREA AT THE ORIGINAL GROUND LEVEL THE AREA NEXT TO THE TRUNK BASE SHALL BE COVERED WITH OPEN JOINT PAVING OR LOOSE COBBLES.
4. GRADING WITHIN THE TREE PROTECTION ZONE SHALL DRAIN AWAY FROM THE TREE TRUNK WHERE THE TREE IS ON SLOPING GROUND A SOIL BERM SHALL BE FORMED BETWEEN THE RETAINING WALL OF THE DRY WELL AND THE PERIMETER OF THE TREE PROTECTION ZONE ON THE UPSLOPE SIDE OF THE WELL TO DIRECT EXCESSIVE WATER FROM ENTERING THE WELL.
5. BOTH VERTICAL DRAINS AND HORIZONTAL DRAINS SHALL BE 100 DIAMETER PERFORATED PLASTIC DRAIN PIPES WRAPPED WITH GEOTEXTILE FILTER MEMBRANE. HORIZONTAL DRAINS SHALL HAVE NON-PERFORATED INVERT TO HELP DIRECTION OF WATER TO THE DRAINAGE OUTLET. THE OPENING OF THE VERTICAL DRAINS TO THE AIR SHALL BE COVERED WITH A TIGHTLY-FITTED GRATE OR THE DRAINS SHALL BE FILLED WITH COARSE GRAVEL OF INERT. LIME-FREE MATERIALS WITH NO FINES. FOR SAFETY. EXCLUSION OF ANIMALS. AND TO ALLOW AIR AND WATER MOVEMENT.
6. THE VERTICAL DRAINS SHALL BE PLACED IN 1200 MAXIMUM HORIZONTAL SPACING ALONG THE PERIMETER OF THE TREE PROTECTION ZONE.
7. THE HORIZONTAL SPOKE DRAINS SHALL DRAIN TOWARDS THE HORIZONTAL RING DRAIN. THE LOWEST POINT OF THE HORIZONTAL RING DRAIN SHALL BE CONNECTED TO A SUITABLE NEARBY DRAINAGE OUTLET SUCH AS SURFACE CHANNEL OR STORM WATER DRAIN AS AGREED BY THE *ARCHITECT / ENGINEER / SUPERVISING OFFICER.
8. THE GRAVEL DRAINAGE LAYER IS NOT REQUIRED IF THE RISE IN GROUND LEVEL IS NOT MORE THAN 450. WHERE THE DRAINAGE LAYER IS REQUIRED. THE NOMINAL SIZE OF GRAVEL SHALL BE OF 20 DIAMETER AND THE GRAVEL SHALL BE OF INERT. LIME-FREE MATERIALS WITH NO FINES.
9. THE CAP OF FILL ABOVE THE GRAVEL DRAINAGE LAYER. IF PRESENT. SHALL BE 300 THICK.
10. THE FILL SHALL BE CAREFULLY ADDED TO BUILD THE NEW GROUND LEVEL. SO THAT THE INTEGRITY OF THE DRAIN SYSTEM SURROUNDING THE DRY WELL IS MAINTAINED. THE SOIL FOR FILLING WITHIN THE TREE PROTECTION ZONE SHALL BE OF A COARSE TEXTURE THAN THE UNDERLYING SOIL BELOW THE ORIGINAL GROUND LEVEL.
11. THE DETAILS OF THE RETAINING WALL FOUNDATION SHOWN ARE INDICATIVE ONLY. TO MINIMIZE ROOT DAMAGE. EXCAVATION FOR FOUNDATION SHALL BE CARRIED OUT BY HAND AND SLAB FOUNDATION SHALL BE AVOIDED. WHERE DISCONTINUOUS FOUNDATION IS USED. THE LOCATION OF THE FOUNDATION SHALL BE AGREED BY THE *ARCHITECT / ENGINEER / SUPERVISING OFFICER.



SECTION
(DIAGRAMMATIC)

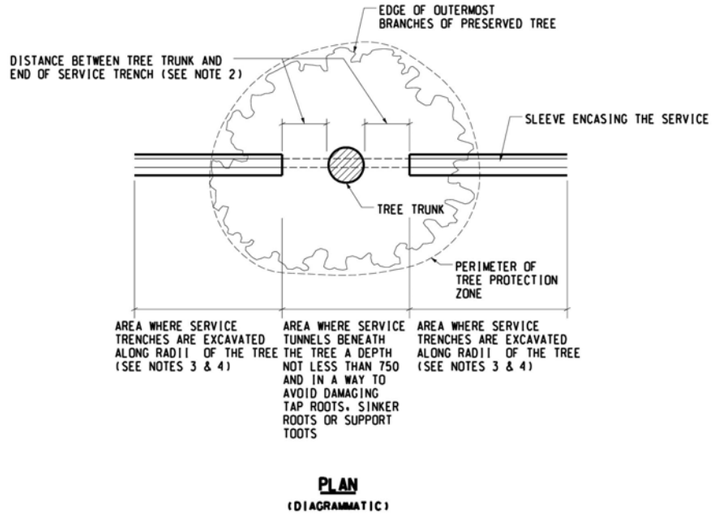


PLAN
(DIAGRAMMATIC)

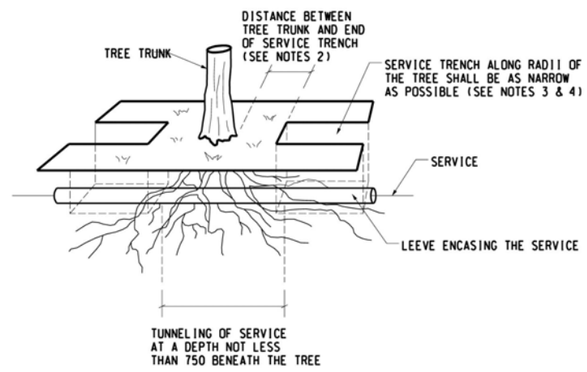
TP007 - MEASURES TO ACCOMMODATE MAJOR RISE (>300mm) IN GROUND LEVEL AROUND PRESERVED TREE

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. THE SERVICE TRENCH SHALL BE EXCAVATED DIRECTLY TOWARDS THE TREE ALONG A RADIUS TO AT LEAST 100 FROM THE TRUNK OR TO A DISTANCE WHERE ROOTS LARGER THAN 25 DIAMETER ARE ENCOUNTERED. WHICHEVER DISTANCE IS FARTHER AWAY FROM THE TRUNK.
3. THE SERVICE TRENCH WITHIN TREE PROTECTION ZONE SHALL BE EXCAVATED USING HAND-HELD TOOLS.
4. ANY ROOT CUTTING DURING TRENCH EXCAVATION WITHIN TREE PROTECTION ZONE SHALL BE CARRIED OUT USING HAND-HELD TOOLS. AND THE FOLLOWING PROCEDURES SHALL BE FOLLOWED IMMEDIATELY AFTER ROOT PRUNING UNTIL BACKFILLING IS COMPLETE TO PREVENT THE CUT AND EXPOSED ROOTS FROM DRYING OUT:
   I) HANG THICK HESSIAN OR OTHER POROUS ABSORBENT FABRIC FROM THE TOP OF THE CUT SURFACE OVER THE EXPOSED ROOTS AND SOIL AND
   II) MIST THE HESSIAN OR FABRIC IN A FREQUENCY THAT KEEPS THE ROOTS AND SOIL AT THE CUT SURFACE MOIST ALL THE TIME



PLAN
(DIAGRAMMATIC)



PERSPECTIVE
(DIAGRAMMATIC)

TP008 - TRENCHING AND TUNNELING ADJACENT TO PRESERVED TREE

Appendix VI

Tree Photographs

TREE SURVEY PHOTOGRAPHS



PHOTOGRAPH No. 1



PHOTOGRAPH No. 5



PHOTOGRAPH No. 4



PHOTOGRAPH No. 3



PHOTOGRAPH No. 2

PHOTOGRAPH No. 6



PHOTOGRAPH No. 7



PHOTOGRAPH No. 8



PHOTOGRAPH No. 9



EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT
TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/202

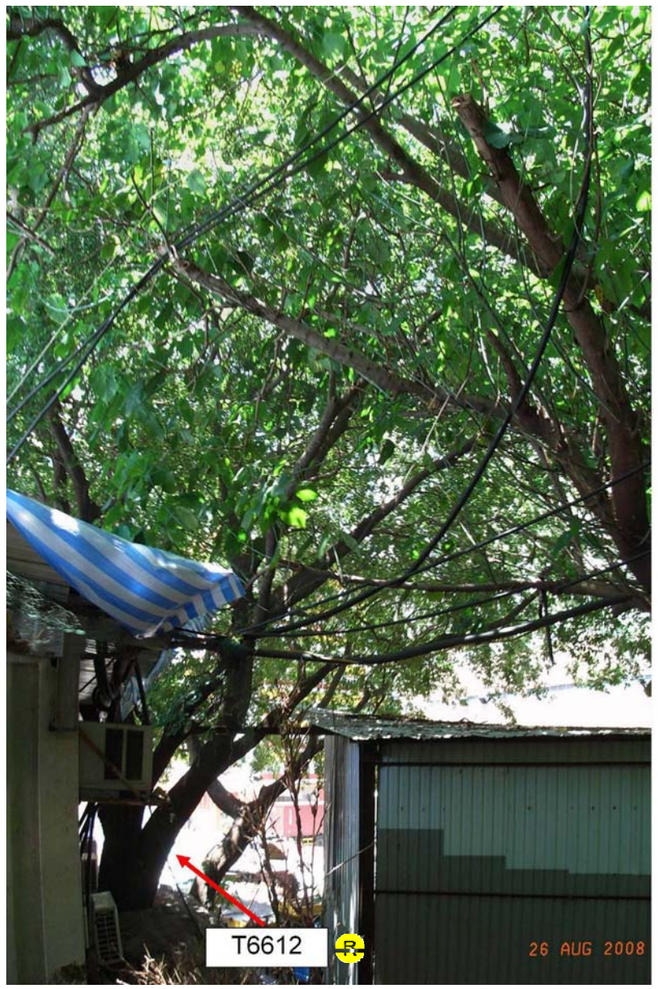
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PHOTOGRAPH No. 11



PHOTOGRAPH No. 12



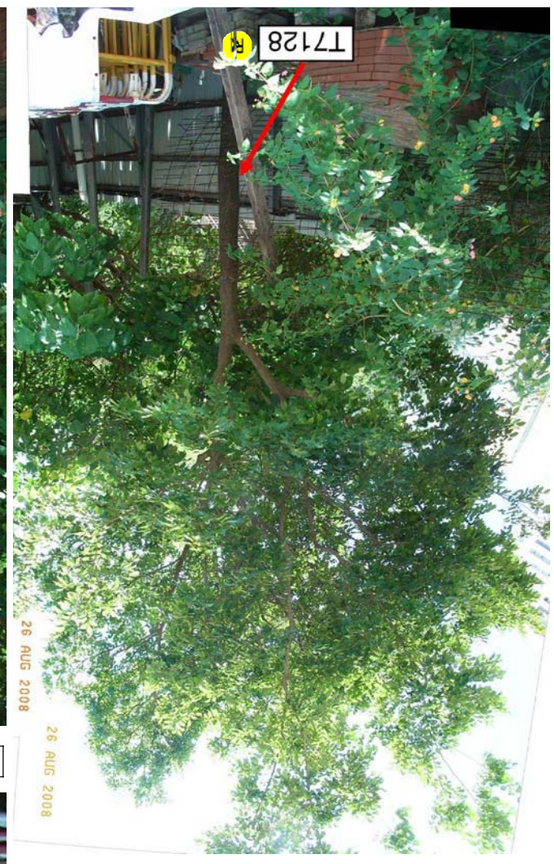
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EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT
TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/202

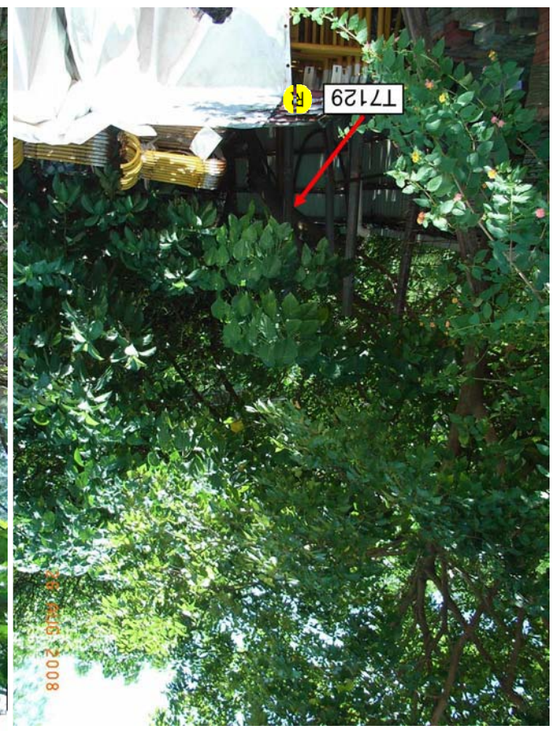
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PHOTOGRAPH No. 15



PHOTOGRAPH No. 16



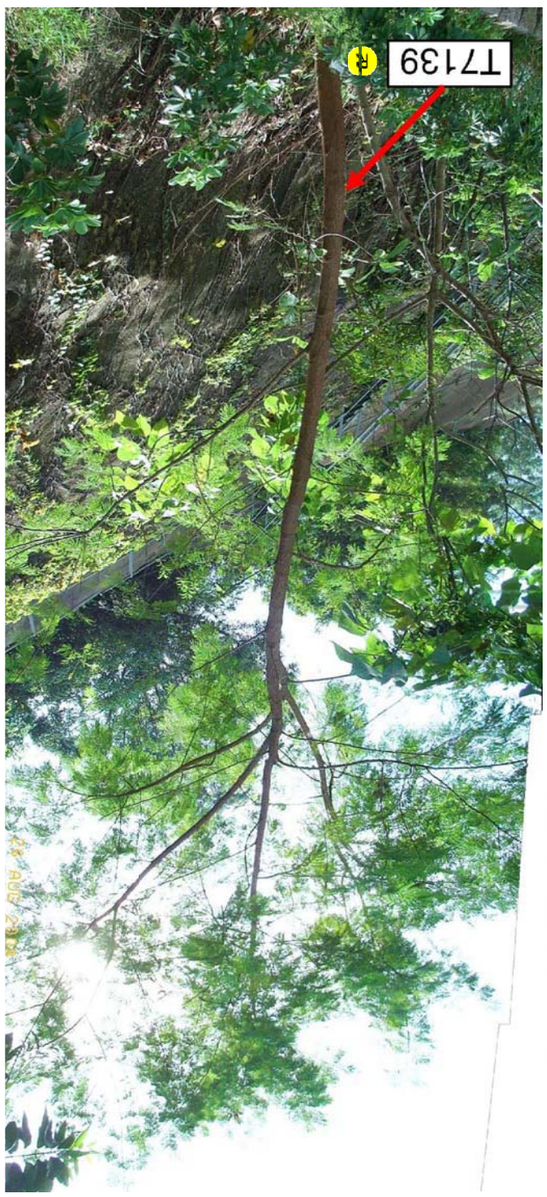
PHOTOGRAPH No. 17



PHOTOGRAPH No. 18



PHOTOGRAPH No. 19



EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT

TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/202



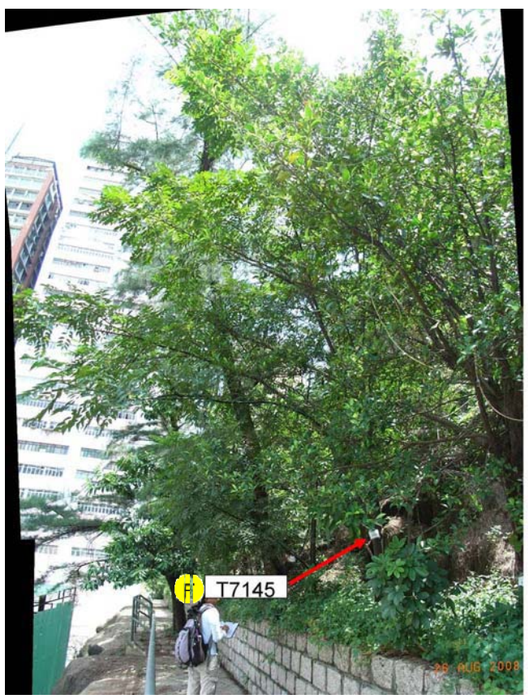
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PHOTOGRAPH No. 23

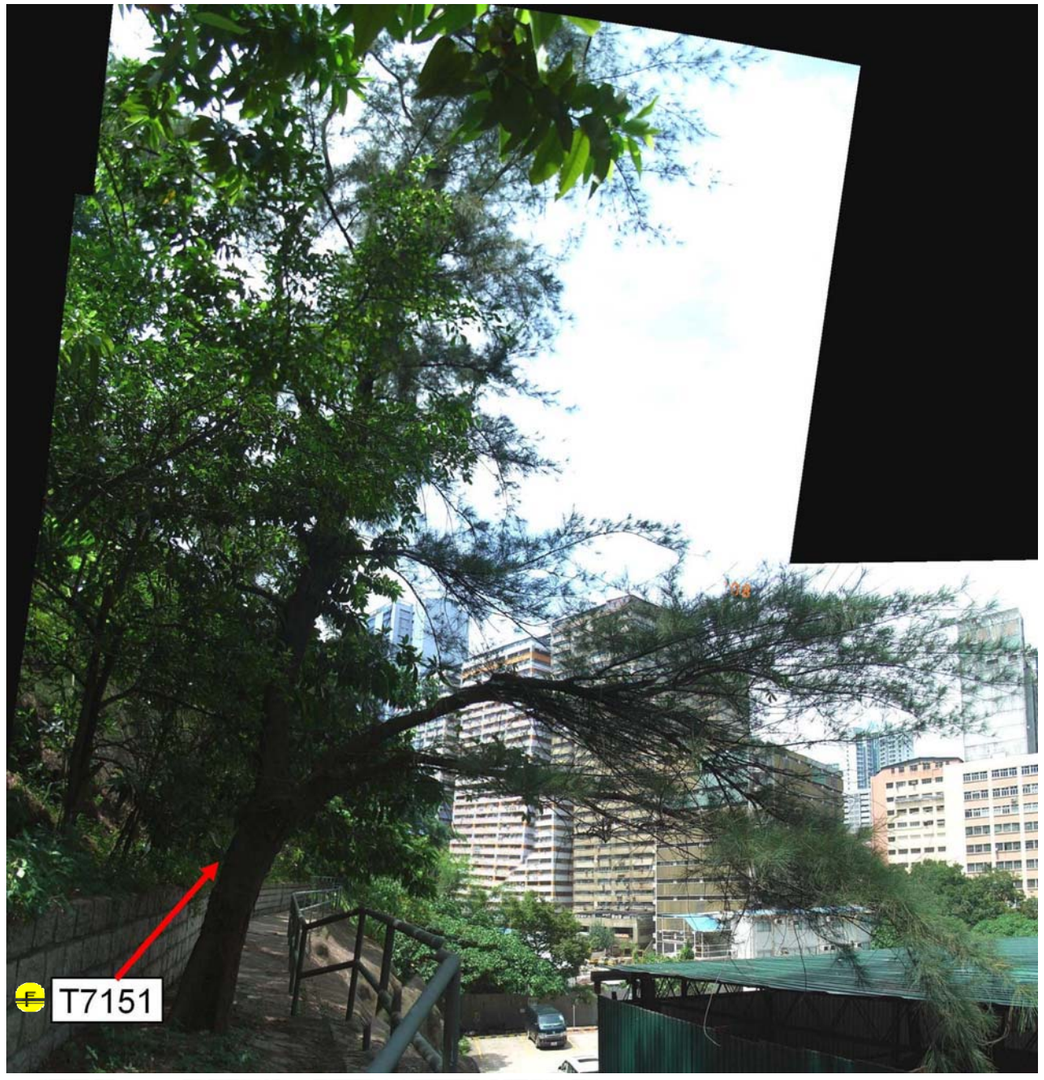


PHOTOGRAPH No. 22



PHOTOGRAPH No. 20

PHOTOGRAPH No. 24



PHOTOGRAPH No. 25



PHOTOGRAPH No. 26



PHOTOGRAPH No. 27



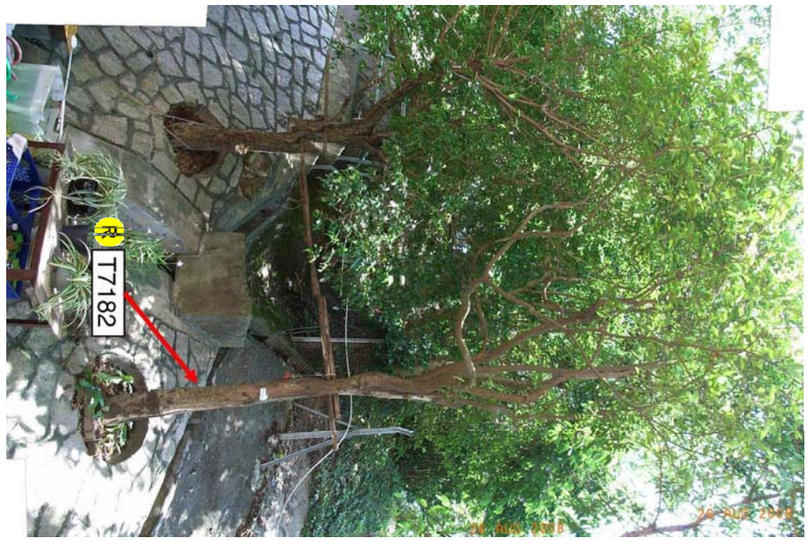
EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT
TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/202

PHOTOGRAPH No. 30



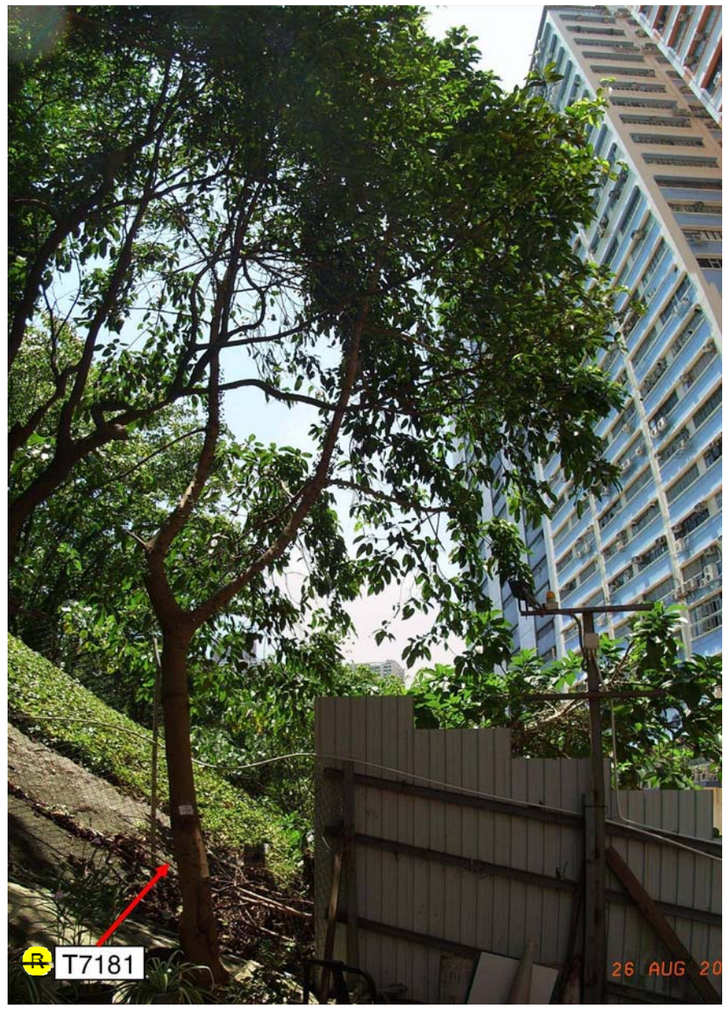
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PHOTOGRAPH No. 32



PHOTOGRAPH No. 31

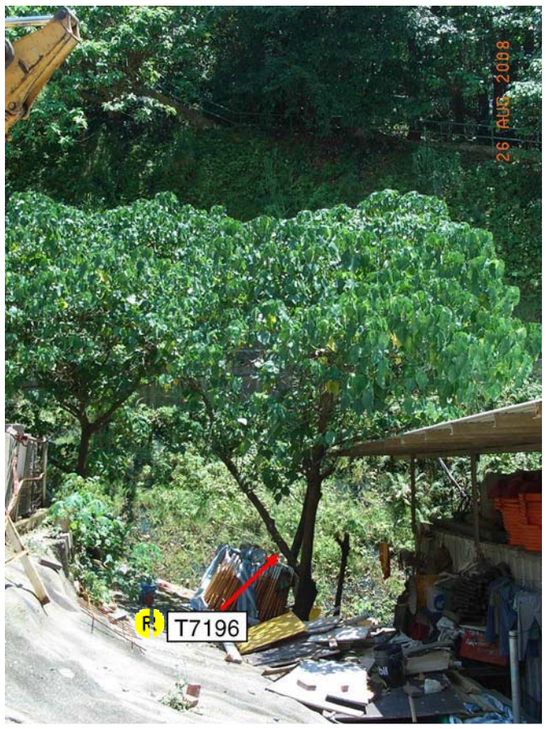


PHOTOGRAPH No. 28



EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT
TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/202



PHOTOGRAPH No. 35

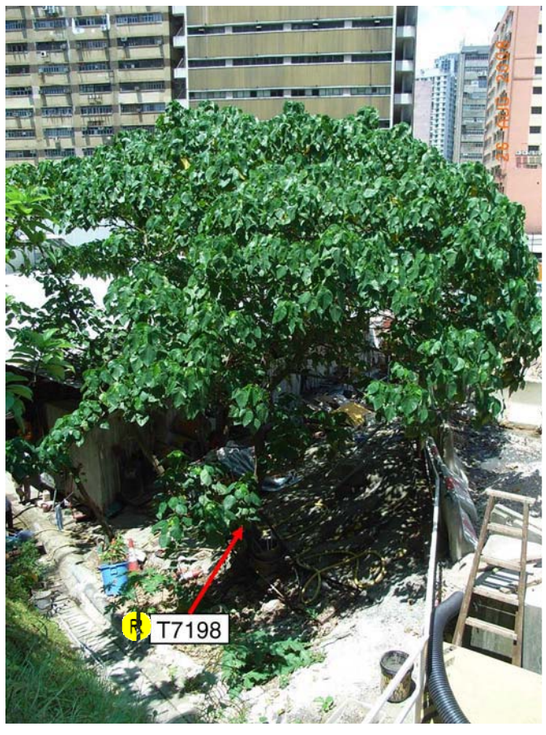


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PHOTOGRAPH No.

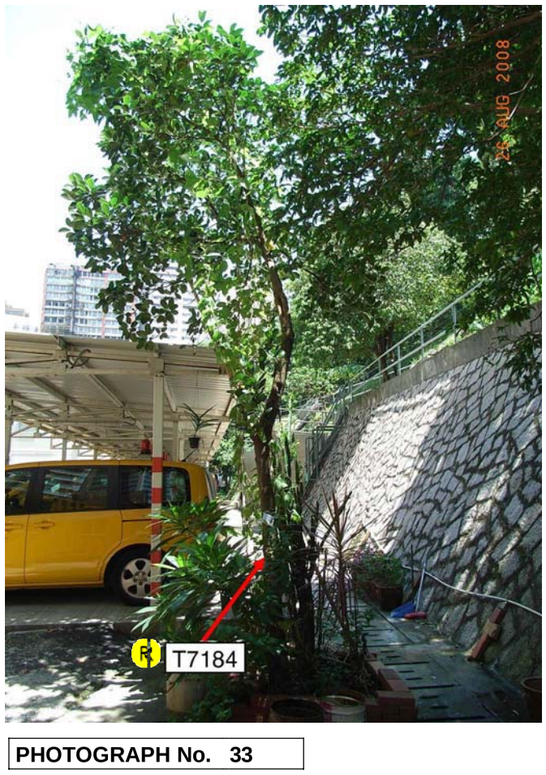


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PHOTOGRAPH No. 37

PHOTOGRAPH No.



PHOTOGRAPH No. 33



PHOTOGRAPH No. 36

PHOTOGRAPH No.

EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT

C8001/T/XRL/URB/C04/203

TREE SURVEY PHOTOGRAPHS



PHOTOGRAPH No. 3



PHOTOGRAPH No. 8



PHOTOGRAPH No. 2



PHOTOGRAPH No. 5



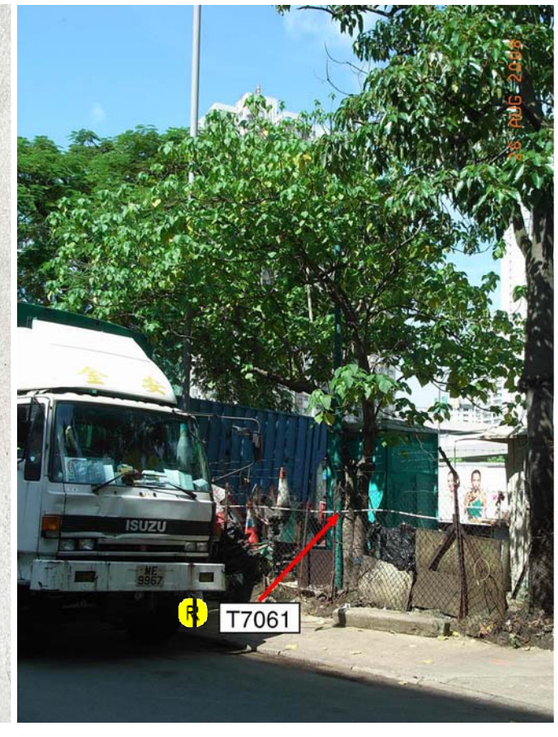
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PHOTOGRAPH No. 1



PHOTOGRAPH No. 4



PHOTOGRAPH No. 6



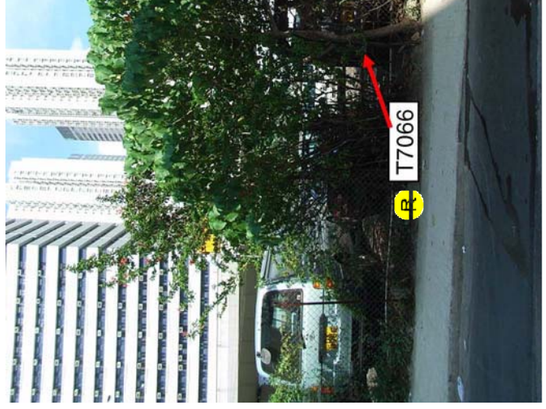
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PHOTOGRAPH No. 13



PHOTOGRAPH No. 16



PHOTOGRAPH No. 12



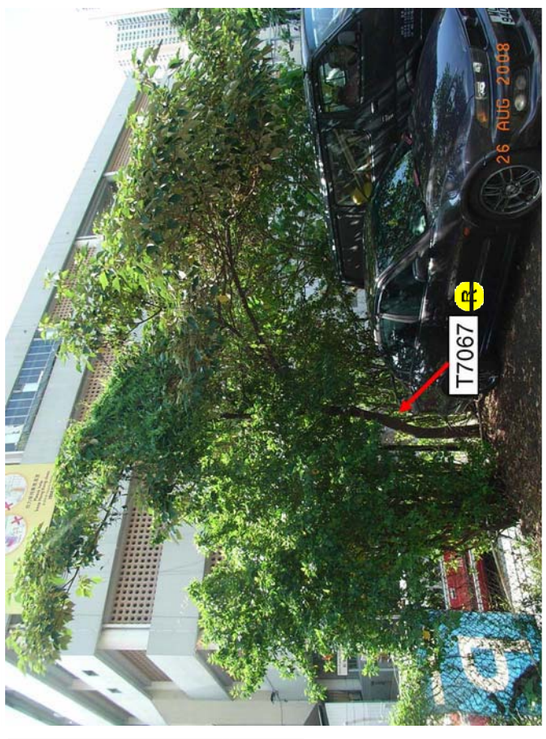
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PHOTOGRAPH No. 9



PHOTOGRAPH No. 11



PHOTOGRAPH No. 14



PHOTOGRAPH No. 19

PHOTOGRAPH No.

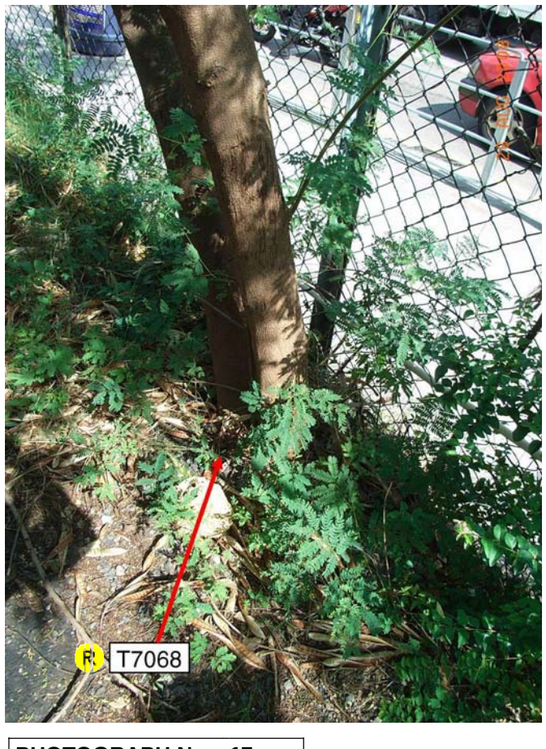
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PHOTOGRAPH No.

PHOTOGRAPH No.



PHOTOGRAPH No. 17



PHOTOGRAPH No. 20

PHOTOGRAPH No.

EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT

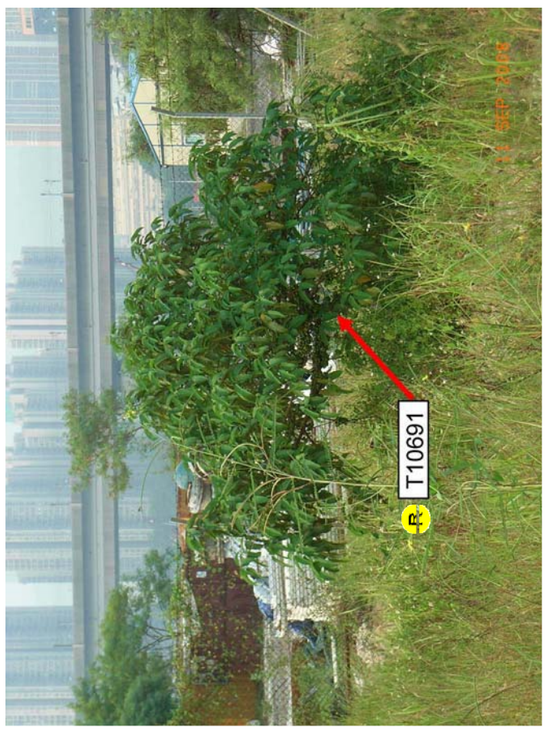
TREE SURVEY PHOTOGRAPHS

C8001/T/XRL/URB/C04/204



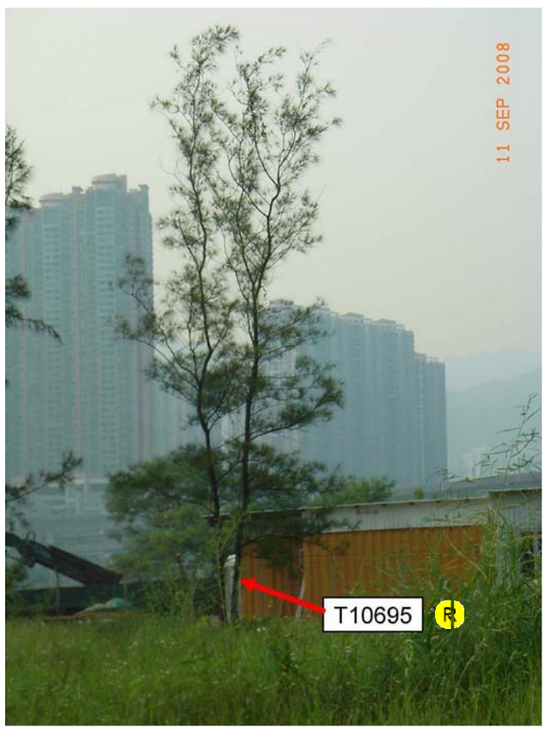
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PHOTOGRAPH No. 3



PHOTOGRAPH No. 5

PHOTOGRAPH No. 6

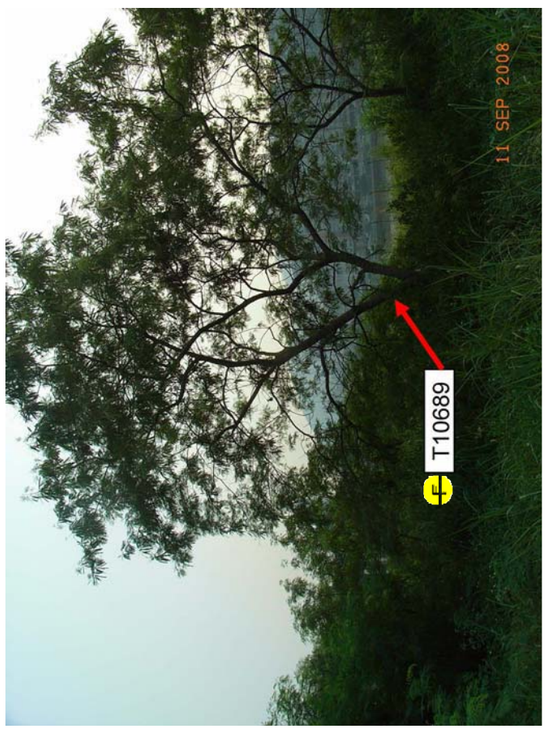


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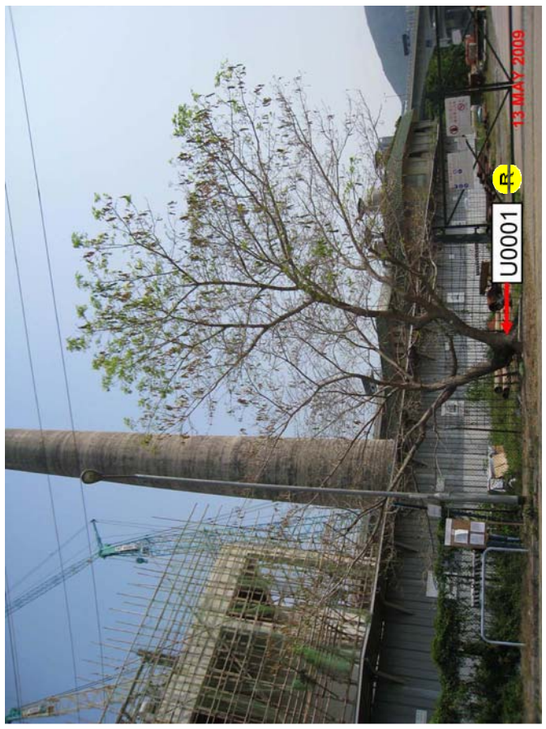
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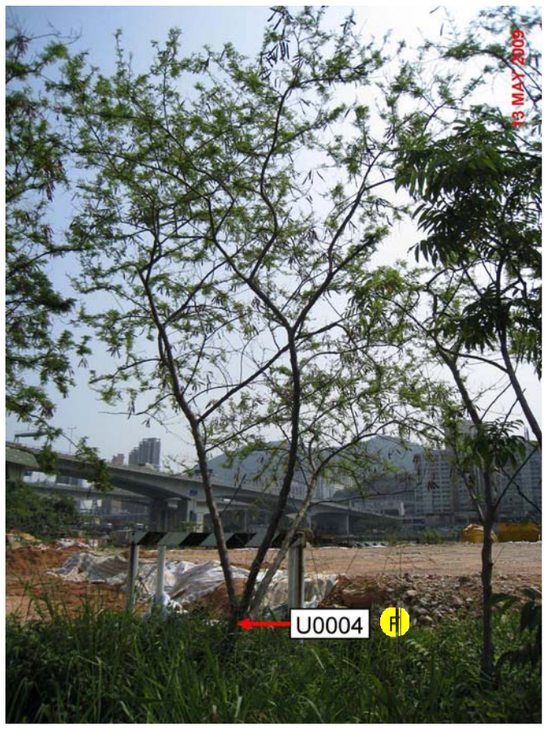
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PHOTOGRAPH No. 12



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PHOTOGRAPH No. 17



PHOTOGRAPH No. 11



PHOTOGRAPH No. 14



PHOTOGRAPH No. 15



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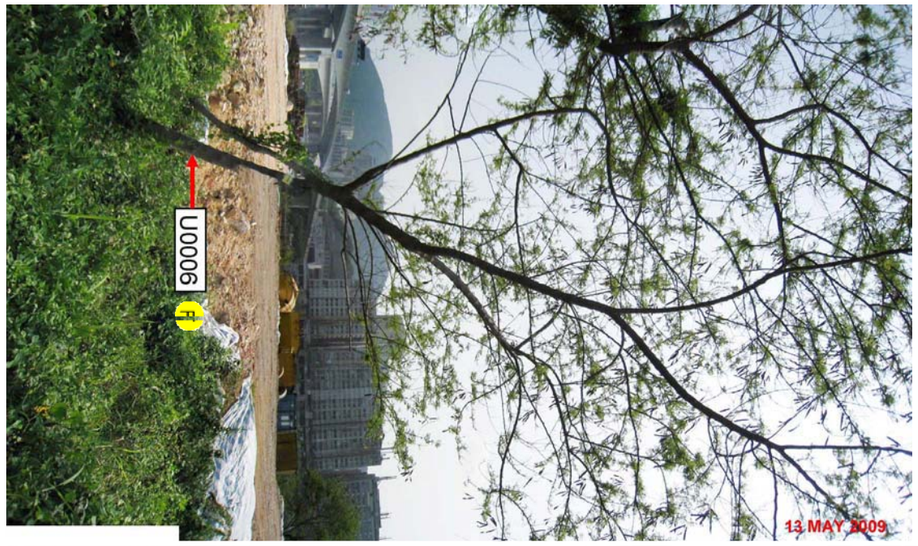


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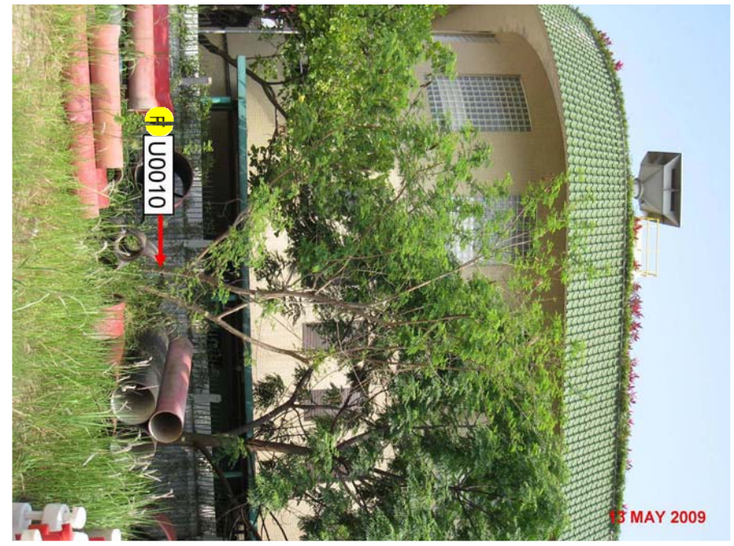
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PHOTOGRAPH No. 20



PHOTOGRAPH No. 21



PHOTOGRAPH No. 22



PHOTOGRAPH No. 23



PHOTOGRAPH No.

EXPRESS RAIL LINK (XRL) CONSULTANCY AGREEMENT NO. C8001 - TRA-3: WORKS IN KWAI TSING DISTRICT
TREE SURVEY PHOTOGRAPHS