

Detailed Vegetation Survey Report

IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS

(Rev. 3)

DETAILED VEGETATION SURVEY REPORT

FOR

IN-SITU REPROVISIONING OF SHA TIN WATER TREATMENT WORKS – SOUTH WORKS





	Name	Signature
Prepared by	Mr. W. L. Liu, Vincent (Ecologist)	
Checked & Reviewed by	Mr. C. H. Leung, Jacky	
Approved & Certified by	Ir. Dr. C.K. Lam, Gabriel Environmental Team Leader (ETL)	
Verified & Confirmed by	Mr. Y. W. Fung Independent Environmental Checker (IEC)	

TABLE OF CONTENTS

1. INTRODUCTION.....	1
2. FIELD SURVEY METHODOLOGY.....	2
3. CONFIRMING AND UPDATING THE NUMBER, LOCATION AND HEALTH CONDITION OF THE FLORA SPECIES OF CONSERVATION IMPORTANT.....	3
4. PREPARING A PLAN ILLUSTRATING THE LOCATION OF AFFECTED INDIVIDUAL WITH CONSERVATION INTEREST / IMPORTANT IN ACCORDANCE TO THE FINDING OF VEGETATION SURVEY.....	5
5. IDENTIFYING THE SUITABLE RECEPTOR SITES WITHIN COMPENSATORY WOODLAND AREA.....	5
6. RECOMMENDING AN IMPLEMENTATION PROGRAMME AND METHODOLOGY OF TRANSPLANTING.....	6
7. RECOMMENDING A POST-TRANSPLANTATION MONITORING AND MAINTENANCE PROGRAMME... 	9
8. SUMMARY.....	9

LIST OF APPENDICES

Appendix A	The Curriculum Vitae of the Qualified Ecologist
Appendix B	Information for Trees with Conservation Interest / Important
Appendix C	Photos for Flora Species with Conservation Interest / Important
Appendix D	District Lands Office's Approval on Tree Felling for the Project
Appendix E	Photos of Receptor Site at the Enhanced Compensatory Woodland Area

LIST OF FIGURES

Figure 1	Location Plan for Flora with Conservation Interest / Important
Figure 2	Transplantation Plan
Figure 3	Location of Works Areas of the Project and Habitat at the Enhanced Compensatory Woodland Area
Figure 4	Stage Digging

1. INTRODUCTION

1.1. BACKGROUND

- 1.1.1. Pursuant to the Environmental Impact Assessment (EIA) Ordinance, the Director of Environmental Protection (DEP) granted the Environmental Permit (No. EP- 494/2015) to the Water Supplies Department (WSD) to construct and operate the designated project for 'In-situ Re-provisioning of Sha Tin Water Treatment Works - South Works' (The Project).
- 1.1.2. Upon the requirement of the Environmental Permit, a qualified Ecologist was commissioned to prepare a detailed vegetation survey report to present the baseline vegetation condition for flora species with conservation interest/important, transplanting and monitoring programme for the Project and submit to the DEP for approval no later than one month prior to commencement of site clearance works.
- 1.1.3. An EIA Report (Register No. AEIAR-187/2015) was approved by the DEP in January 2015. As recommended in the approved EIA Report, approximately 0.69 ha of secondary woodland would be affected due to cut-back of the existing engineered slope located to the west of the existing clarifiers for re-provisioning of chemical house to Water Treatment Works Logistics Centre and Construction of new access roads for both construction and normal operation of the plant. Within the affected secondary woodland, 6 flora species of conservation importance were identified in the woodland habitat including Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*), Hairy-fruited Ormosia (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*) were identified in the approved EIA Report. Among them, Hairy-fruited Ormosia (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*) were recorded about 300 m away from the project site in the approved EIA Report.
- 1.1.4. Upon the requirement of the Environmental Permit (EP), detailed vegetation survey with an aim at locating, updating the existing condition and propose transplanting programme for the flora with conservation interest/important was carried out in November 2015.

1.2. OBJECTIVE OF DETAILED VEGETATION SURVEY

- 1.2.1. The objective of this survey is to minimize the potential impact to flora species with conservation interest/important within affected secondary woodland.
- 1.2.2. This vegetation survey report forms the basis to guide the implementation of the proposed mitigation as recommended in the approved EIA Report to transplant flora species with conservation interest/important and propose monitoring programme to ensure the general health condition and survival rate of the transplanted plants. As stipulated in Clause No. 2.4 of the EP, the detailed vegetation survey report shall include:

- i. Confirming and updating the number, location and health condition of the flora species of conservation important;
- ii. Preparing a plan illustrating the location of affected individual with conservation interest/important in accordance to the finding of vegetation survey;
- iii. Identifying the suitable receptor sites within compensatory woodland area;
- iv. Recommending an implementation programme and methodology of transplanting; and
- v. Recommending a post-transplantation monitoring and maintenance programme.

1.3. PERSONNEL

The preparation of this detailed vegetation survey report, in accordance with Condition 2.4 of the EP, has been carried out by a qualified ecologist who has more than 7 years of experience in vegetation survey and woodland monitoring. The qualifications of the qualified ecologists have been certified by Environmental Team (ET) Leader and verified by the Independent Environmental Checker as conforming to the information and recommendations contained in the approved EIA Report. The curriculum vitae of the qualified ecologist is in Appendix A.

2. FIELD SURVEY METHODOLOGY

- 2.1.1. A detailed vegetation survey is conducted by actively searching for flora species of conservation interest/important such as Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*), Hong Kong Eagleø Claw (*Artabotrys hongkongensis*), Hairy-fruited Ormosia (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*).
- 2.1.2. From this vegetation survey, all 6 flora species of conservation interest/important identified in the approved EIA Report are found, whereas 4 of them within the project boundary and 2 of them outside the project boundary.
- 2.1.3. The number and condition of flora species of conservation interest/important identified are recorded. The locations of the identified individuals of important flora species are marked on map. Should other flora species of conservation interest/important be encountered during the detailed vegetation survey, their number, locations and condition are also recorded.

3. CONFIRMING AND UPDATING THE NUMBER, LOCATION AND HEALTH CONDITION OF THE FLORA SPECIES OF CONSERVATION IMPORTANT

- 3.1.1. In the detailed vegetation survey, 4 flora species [i.e. Ailanthus (*Ailanthus fordii*), Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*), Hong Kong Eagleø Claw (*Artabotrys hongkongensis*)] with conservation interest/important were

recorded within project boundary. These findings are in line with the ones mentioned in Section 1.1.3. The locations of these flora species are shown in Figure 1a-1d. Detailed information for trees with conservation interest/important was shown in Appendix B. Their photographs are shown in Appendix C. Hairy-fruited *Ormosia* (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*) were found outside the project boundary. These findings are in line with the ones mentioned in Section 1.1.3. Since they were found about 300 m outside the project boundary and will not be disturbed, no mitigation measures such as transplantation and protection works will be proposed.

Lamb of Tartary (Cibotium barometz)

- 3.1.2. There were 5 colonies of Lamb of Tartary (*Cibotium barometz*) found within the secondary woodland near proposed Water Treatment Works Logistics Centre. Lamb of Tartary (*Cibotium barometz*) contains many stems growing together, and it is therefore difficult to differentiate if these stems are all from different individuals. In estimation, all 5 colonies of Lamb of Tartary (*Cibotium barometz*) would contain 20-30 individuals of Lamb of Tartary (*Cibotium barometz*).

Hong Kong Eagle's Claw (Artabotrys hongkongensis)

- 3.1.3. 1 individual of Hong Kong Eagle's Claw (*Artabotrys hongkongensis*), which is a climber, was found within the secondary woodland near proposed Water Treatment Works Logistics Centre. Several branches were observed growing from a recorded Hong Kong Eagle's Claw (*Artabotrys hongkongensis*).

Ailanthus (Ailanthus fordii)

- 3.1.4. 1 no. *Ailanthus* (*Ailanthus fordii*) tree was found within the secondary woodland near proposed Water Treatment Works Logistics Centre.

Incense Tree (Aquilaria sinensis)

- 3.1.5. 21 individuals of Incense Tree (*Aquilaria sinensis*) within the secondary woodland near the proposed Water Treatment Works Logistic Centre were found. In accordance with site observations, 17 out of 21 individuals of Incense Tree (*Aquilaria sinensis*) had been removed/cut down by suspected agarwood harvester while 2 out of 21 individuals of Incense Tree (i.e. TA179 & TA493) were found with poor growing form.
- 3.1.6. Comparisons on the findings from this detailed vegetation survey and the approved EIA Report are summarised in Table 1.

Table 1: Differences in the Findings between this Detailed Vegetation Survey and the Approved EIA Report

	Flora Species	Findings in this Detailed Vegetation Survey	Findings in the Approved EIA Report
Within the Project Boundary	Lamb of Tartary (<i>Cibotium barometz</i>)	5*	Several small population
	Hong Kong Eagleø Claw (<i>Artabotrys hongkongensis</i>)	1*	No quantity mentioned
	Ailanthus (<i>Ailanthus fordii</i>)	1*	1
	Incense Tree (<i>Aquilaria sinensis</i>)	21**	21
Outside the Project Boundary	Hairy-fruited Ormosia (<i>Ormosia pachycarpa</i>)	1***	No quantity mentioned
	Hong Kong Pavetta (<i>Pavetta hongkongensis</i>)	1***	No quantity mentioned

* Flora species will be transplanted

** 17 individuals had been removed / cut down by suspected agarwood harvester; 2 individuals were found with poor growing form; 2 individuals will be transplanted.

*** Flora species are approx. 300-350 m away from the site boundary and will not be disturbed.

PROTECTION OF RECORDED FLORA SPECIES WITH CONSERVATION INTEREST/IMPORTANT

3.1.7. 19 numbers of Incense Tree (*Aquilaria sinensis*) are observed either removed/cut down by suspected agarwood harvester (17 nos.) or with poor growing form (2 nos.) (Please refer to Photos in Appendix C). These trees are considered with low transplantation survival rate and are not suitable for transplantation. 2 numbers (i.e. TA326 and TA327) of Incense Tree (*Aquilaria sinensis*) are with fair growing form but observed with open wound on their tree trunk and growing on slope which will slightly reduce its transplantation survival rate. Nevertheless, transplantation with great care and preparing with larger root ball would be helpful in preserving TA326 and TA327. 1 individual of each Hairy-fruited Ormosia (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*) were recorded about 300 meter away from the project site boundary and will not be disturbed, and hence, no transplantation or protection works was proposed.

3.1.8. To sum up, 2 numbers of Incense Tree (*Aquilaria sinensis*), 5 colonies of Lamb of Tartary (*Cibotium barometz*), 1 individual of Hong Kong Eagleø Claw (*Artabotrys hongkongensis*) and 1 number of Ailanthus (*Ailanthus fordii*) tree observed with fair condition are recommended to be transplanted.

4. PREPARING A PLAN ILLUSTRATING THE LOCATION OF AFFECTED INDIVIDUAL WITH CONSERVATION INTEREST / IMPORTANT IN ACCORDANCE TO THE FINDING OF VEGETATION SURVEY

Location plans illustrating the location of affected flora with conservation interest/important were shown in Figures 1a-1d.

5. IDENTIFYING THE SUITABLE RECEPTOR SITES WITHIN COMPENSATORY WOODLAND AREA

5.1.1. A Woodland Compensation Plan has been submitted to the DEP under EP Condition 2.5 in parallel with this submission. The size of compensatory woodland area within existing Sha Tin Water Treatment Works (STWTW) has been enhanced with additional size to provide larger woodland area for better compensation [re: Section 2.1.1 of the submitted Woodland Compensation Plan]. 2 receptor sites for the transplantation would be located at Sha Tin South Fresh Water Service Reservoir (STSFWSR) and within STWTW, with proposed locations shown in Figures 2a and 2b respectively.

5.1.2. 2 numbers of Incense Tree (*Aquilaria sinensis*) and 1 number of Ailanthus (*Ailanthus fordii*) tree will be transplanted to the enhanced compensatory woodland area within existing STWTW. This enhanced area is a flat land, with the shortest distance to the transplanting trees and adjacent to access road. As such, this enhanced compensatory woodland area is a suitable location for transplanting Incense trees and Ailanthus tree in term of planting and transportation. The enhanced compensatory woodland area like the other two compensatory woodland areas within STWTW falls within the Project's works areas as shown in Figure 3 (extracted from Figure 8.3 of the approved EIA Report). The existing vegetation within the enhanced compensatory woodland area will be affected by the construction of temporary access road to facilitate the transportation works for the cut-back of the existing engineered slope and the construction of the Water Treatment Works Logistics Centre as mentioned in Section 8.6.1 of the approved EIA Report. Upon completion of the above mentioned works, the affected area for construction of temporary access road together with the other two locations will turn into the compensatory woodland area within STWTW. The habitat at the enhanced compensatory woodland area is shown in Figure 3 and the impacts to plantation had been mentioned in the Section 8.7.4 of the approved EIA Report that *“The Project would unavoidably require removal of the existing vegetation in secondary woodland, plantation and developed area habitats. Vegetation cover in the plantation and developed area is low and the affected vegetation is confined to common and amenity planting”*. Furthermore, the overall impact evaluation of plantation had been summarized in Table 8.19 of the approved EIA Report and it was concluded that the overall impact was low. Besides, the numbers of trees/vegetation to be affected within the enhanced compensatory woodland area had been taken into account in the approved EIA Report. Approval on tree felling within the enhanced compensatory woodland area has also been granted by the District Lands Office in July 2015. The approval letter together with the submitted tree survey plans is in Appendix D. The Incense trees and Ailanthus tree will be transplanted directly to the receptor site upon the completion of the construction works at the enhanced compensatory woodland area. The photos of receptor site at the enhanced compensatory woodland area are shown in Appendix E. All other climber and ferns including Lamb of Tartary (*Cibotium barometz*) and Hong

Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the woodland compensation area of STSFWSR.

6. RECOMMENDING AN IMPLEMENTATION PROGRAMME AND METHODOLOGY OF TRANSPLANTING

METHODOLOGY OF TRANSPLANTING

CLIMBER/FERNS

- Step 1. Remove all concrete from the receptor site;
- Step 2. Plough the receptor site for improving soil texture;
- Step 3. Locate the plant individual in accordance to the finding of vegetation survey;
- Step 4. Dig out plants with its root ball with about 1 metre in diameter, should be done carefully to avoid damaging plant;
- Step 5. To bag the plant ball with plastic sheet or bag to avoid plant dry up;
- Step 6. Planting holes should be prepared at receptor site before planting. Planting hole for the climber/ferns should be two to three times the width of the root ball, sloping down to about the width of the root ball at the base. The hole should never be deeper than the root ball; and
- Step 7. To plant the plants to the prepared planting hole.

TREES

- Step 1. Crown cleaning for the transplanting trees will be conducted before transplanting;
- Step 2. Unhealthy, damaged diseased, dead and cross branches of the transplanting trees will be removed so as to minimise susceptibility to pests and diseases;
- Step 3. Root pruning will be performed at 4 stages about 3 months before transplantation. A small trench adjacent to trees at a distance smaller than radius of the final root ball will be dug. These trees will then produce many new roots from these cut, producing a more densely rooted ball which will increase the survival rate after transplantation. Sufficient temporal supporting should be installed to prevent tree failure during root pruning period. The 4 stages are described below for illustration. The stage digging is shown in Figure 4:
 - (a) 1st stage ó Dig a trench on the outside of the marked circumference in only two opposing segments;
 - (b) 2nd stage ó After a period of 1 month since the 1st root pruning, dig a trench on the outside of the marked circumference in the adjacent two opposing segments;
 - (c) 3rd stage ó After another period of 1 month since the 2nd root pruning, dig a trench on the outside of the marked circumference, in the remaining two opposing segments; and
 - (d) 4th stage ó After a further period of 1 month since the 3rd root pruning,

prepare the root ball and cut the underside of the root ball, followed by uplifting and transplanting.

- Step 4. The planting hole on new position for transplantation should be prepared before the tree is moved, so that the tree can be repositioned within three hours of lifting. Ideally, the planting hole for the tree should be 2 to 3 times the width of the root ball at the surface, sloping down to about the width of the root ball at the base. The hole should never be deeper than the root ball;
- Step 5. The diameter of the root ball should be a minimum of ten times of trunk diameter (measured 12 inches above the root crown). In general, root ball depth should be in a range from 0.7 m to 1 m. The first cuts around the perimeter of the root ball should be made with sharp spade, cuts must be clean to avoid tearing or breaking the roots. The shaping and final cuts should then be done by hand;
- Step 6. Once the root ball has been dug to the desired depth, it can be shaped. The ball should taper on sides, slanting inward toward the base;
- Step 7. Precautions against desiccation can include hessian wrapping and these should be applied before transplanting operations begin;
- Step 8. The rootball should be kept intact with all soil. The rootball and tree should be kept moist at all times by watering; until the uplifted tree is transplanted in its new location;
- Step 9. Before moving the tree, the root ball should be properly wrapped for lifting;
- Step 10. The whole tree should be lifted in vertical position, using a large trunk-mounted crane if necessary, and moved to its new position within 3 hours. The new planting position should be prepared as for any new tree, using fertilizer in the backfill material and soil conditioner if necessary. All root ball supporting materials should be removed from the planting hole prior to final back filling. The tree should be orientated to best suit the new position and thoroughly watered in;
- Step 11. The tree should be firmly secured using sturdy bamboo tripod arrangement (with poles of a minimum diameter of 75 mm). Ties should be adjustable and should include wrapping to prevent chafing;
- Step 12. Backfill the hole with soil mix which will be applied by the contractor;
- Step 13. Water thoroughly and slowly after backfilling. The remaining soil is sometimes mounded into a dike or berm beyond the outer edge of the root ball to collect water over the root zone; and
- Step 14. Clear any debris from the planting site. If the sites are amidst construction activities, the transplanted trees should be protected with robust fencing.

POST-TRANSPLANTATION MAINTENANCE

6.1.1. Watering:

- Month 1: twice per day during dry weather condition;
- Month 2: daily watering during dry weather condition;
- Month 3 - 4: twice per week during dry weather condition; and
- Month 5 - 12: weekly watering during dry weather condition.

6.1.2. General maintenance practice (monthly)

- Check and control pests;
- Check and control exotic plants;
- Adding soil to compensate soil erosion by rain and run off; and
- Provide fertilizer, if necessary (Fertilizing will be carried out in Spring and late of Summer)

IMPLEMENTATION PROGRAMME

	Approx. 3 months before the commencement of site clearance	Approx. 2 weeks before the commencement of site clearance	Approx. 1 weeks before the commencement of site clearance
Climber/Ferns			
Receptor site preparation work		✓	
Transplantation work (Steps 1- 7)			✓
Trees			
Transplantation preparation work (Steps 1 - 9)	✓		
Transplantation work (Steps 10 - 14)			✓

7. RECOMMENDING A POST-TRANSPLANTATION MONITORING AND MAINTENANCE PROGRAMME

Monitoring of transplanted flora will be conducted after the transplantation. The monitoring will be conducted at twice per month during the first year and once per month during the course of planting works of the woodland compensation area. The parameters to be monitoring will include the health condition and survival rate of the transplanted flora. Any observations and recommendations will be reported in monthly EM&A reports.

8. SUMMARY

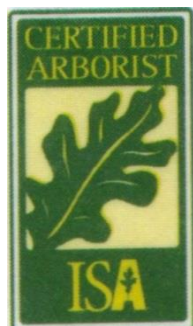
- 8.1.1. Detailed vegetation survey was conducted in November 2015. 4 flora species of conservation interest/important such as Incense Tree (*Aquilaria sinensis*), Lamb of Tartary (*Cibotium barometz*), Ailanthus (*Ailanthus fordii*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) were found within the site boundary while 2 flora species of conservation interest/important such as Ormosia (*Ormosia pachycarpa*) and Hong Kong Pavetta (*Pavetta hongkongensis*) were found far away from the site boundary. No other flora species of conservation interest/important was identified.
- 8.1.2. 21 numbers of Incense Tree (*Aquilaria sinensis*) were found within the site in which 17 of them were found removed/cut down by suspected agarwood harvester, 2 of them were growing with poor form which considering with low transplantation survival rate. Thus, only 2 numbers of Incense Tree (*Aquilaria sinensis*) are recommended to be transplanted. In addition, 5 colonies of Lamb of Tartary (*Cibotium barometz*), 1 individual of Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) and 1 number of Ailanthus (*Ailanthus fordii*) observed with good condition are recommended to be transplanted.
- 8.1.3. 2 numbers of Incense Tree (*Aquilaria sinensis*) and 1 number of Ailanthus (*Ailanthus fordii*) trees will be transplanted within existing STWTW. All other climber/ferns including Lamb of Tartary (*Cibotium barometz*) and Hong Kong Eagle's Claw (*Artabotrys hongkongensis*) will be transplanted to the woodland compensation area of STSFWSR.
- 8.1.4. With implementation of proposed methodology and post-transplantation maintenance, the impact on the transplanting plants will be reduced.

Appendix A

The Curriculum Vitae of the Qualified Ecologist

CURRICULUM VITAE

Personal Details



Surname : Liu

First Name : Wing-Lok, Vincent

National : Chinese

Current Position: Senior ecology consultant/Certified Arborist - China Hong Kong Ecology Consultants Co..

Education, Membership and Professional Qualifications

B.Sc Biology, The Chinese University of Hong Kong , 1998

Certified Arborist of the International Society of Arboriculture, 2009- 2015

Key Qualifications

Mr. Vincent Liu is an ecology consultant with over 16 years in the field. Mr. Vincent Liu was trained in the Biology department of The Chinese University of Hong Kong. He joined China-Hong Kong Ecology Consultants Co in 1998 and he involved over 150 environmental projects which required ecological surveys, monitoring or impact assessment for various habitats including rivers, streams. Mr. Liu has undertaken over 150 tree survey and vegetation survey projects in Hong Kong and the region. The projects he took responsibilities covered with terrestrial and aquatic ecology, marine, wetland ecology and various tree survey/assessment in Hong Kong and Macau. Currently, he is working on several woodland monitoring and ecological projects including tree survey for Shenzhen River Regulation project; woodland monitoring for construction sites of Housing Department. Mr. Liu was a certified Arborist by International Society of Arboriculture in 2009. Recent years, Mr. Liu working on Tree Risk Assessment for construction sites of Housing Department of HKSAR.

Experience Records (Selected projects)

1998-present: Ecology Consultant – China- Hong Kong Ecology Consultants Co.

Selected projects

Contract No. SS D502. Design and Construction of Kwun Tong Staff Quarter (KTSQ) BEAM Plus SA 5-Ecological Site Appraisal Report including **vegetation survey**. Client: Meinhardt, 2016.

Kwun Tong site: BEAM Plus SA 5-Ecological Site Appraisal Report including **vegetation survey**. Client: Aurecom, 2015.

Property Development at Lot No. 2640 in D.D. No. 92, Castle Peak Road, Kwun Tung, New Territories BEAM Plus SA 5-Ecological Site Appraisal Report including **vegetation survey**. Client: Meinhardt Infrastructure & Environment Ltd. 2015.

Tseung Kwan O Building site: BEAM Plus SA 5-Ecological Site Appraisal Report including **vegetation survey**. Client: Environs, 2014.

Architectural Services Department's Consultancy Agreement No. 9AA 115 for Provision of Columbarium at Wo Hop Shek Cemetery & Phase I. Responsible for ecological consultancy services including eco-assessment and **woodland survey**. Client: DLN, 2013-2018.

Construction of Public Housing at Sha Tin Area 4C: Appointed as Independent Tree Specialist responsible for tree risk assessment, **woodland monitoring and management**. Client: Housing Authority HKSAR/ Hsin Chong Construction Co. Ltd., 2011.

Construction of public house at Shek Kei Mei phase 5: responsible for tree risk assessment, **woodland monitoring and management**. Client: Housing Authority / Shui On Construction. March to May 2011.

Construction of Public Rental Housing at Shek Kip Mei Estate Phase 5, Contract No. 20080071: Assisting Independent Tree Specialist dealing with **woodland monitoring and management**. Client: Housing Authority HKSAR/ Shui On Construction Ltd., 2009 & 2012.

Construction of Public Rental Housing at Tuen Mun Area 18, Contract No. 20100020: Assisting Independent Tree Specialist dealing with **woodland monitoring and management**. Client: Housing Authority HKSAR / Shui On Construction Ltd., 2010 & 2013.

Agreement No_ CE 65_2013 (EP) : Post-Construction Ecological Monitoring of River Improvement Works in Upper Lam Tsuen River She Shan River and Upper Tai Po River & Investigation. **Responsible for woodland monitoring the establishment of vegetation.** Client: Allied Environmental Consultants Ltd, July 2014 & present.

Agreement No. CE16/2012 (CE) Engineering Feasibility Study for Kong Nga Po - Feasibility Study: Ecological field survey and reporting. Conducting full scale of ecological surveys including habitat, flora and fauna **including vegetation and woodland survey.** Client: CEDD/Mott MacDonald, 2013.

Agreement No. LD01/2012 Eco-hydraulics Study on Green Channels & Stage 1 Provision of Services of Ecological Field Survey. Conducting full scale of ecological surveys including habitat, flora and fauna for 12 drainage channels **including vegetation and woodland survey.** Client: DSD/Mott MacDonald, 2012-2013.

Contract No. SPW 03/2012 Ecological Survey for Relocation of Sha Tin Sewage Treatment Works to Caverns & Feasibility Study. Conducting full scale of ecological surveys including habitat, flora and fauna of terrestrial **including vegetation survey** and marine environment (benthic survey, scuba diving coral survey and intertidal survey). Client: DSD, 2012-2013.

Agreement No. DP/01/2010 Services as Independent Environmental Checker for Drainage Improvement Works in Shatin and Tai Po: Responsible for ecology aspects for **transplanted projected plants and post transplantation monitoring**, ecological mitigation wetland, ecological monitoring in areas under Contract 1 & 2. 2011 & 2013. Client: DSD / Environ Hong Kong Ltd.

Drainage Improvement Works at Ngong Ping, Lantau, conducting ecological baseline surveys **including woodland survey** in wet season 2011 and undertaken ecological impact assessment for the project. Client: DSD / Meinhardt, 2011-2012.

Project Contract No. HK1100393 Application Of Lease Modification / Land Exchange Various Sections of Lot 723 in DD 137Lung Kwu Tan, Tuen Mun: Ecological Survey **including vegetation survey** and Impact Assessment. Client: supporting leading consultant Environs, 2011.

Contract 823B & Shek Kong Stabling Sidings & Emergency Rescue Siding 香港高鐵-河道生態專案: Sub-Contract for Provision of Consultancy Services for Stream Habitat Restoration Works (M50/153), provision of wetland construction specialist and wetland plant botanist for the project. **Duty for post planting and woodland monitoring works.** Client: MTR / Maeda & China State Construction JV, 2011-2016.

Drainage Improvement in Northern New Territories & Package C (Remaining Works) Ecological Survey for Drainage Channel TKL05. Conduct ecological baseline surveys on habitat, **vegetation survey**, fauna including aquatic fauna, amphibians, butterfly, odonates, mammals, 2011. Client: DSD / Meinhardt.

Construction of Secondary Boundary Fence (SBF) and New Sections of Primary Boundary Fence and Boundary Patrol Road: EM & A, responsible for preparing landscape plan for Lok Ma Chau Section. Responsible for **preparing woodland compensation planting plan**. Client: Architect Department / AEC; 2010-2011.

Kai Tak Nullah and Sha Tin Waste Water Treatment Plant: Plant trial. Responsible as independent ecologist for **post-planting monitoring** and arborist consulting in supporting of contractor, 2010-2011. Client: DSD / Lam Construction.


Contract No. DC/2007/06 River Improvement Works in Upper Lam Tsuen River, She Shan River and Upper Tai Po River. Employed by Contractor (Chiu Hing Construction & Transportation Co. Ltd.) as ecology specialist responsible for conducting ecological baseline survey (flora and fauna), impact monitoring, mitigation, post construction monitoring (early months in 2014), **woodland monitoring the establishment of vegetation including trees and shrubs** and as well as capture surveys. Client: DSD / Chiu Hing Construction, 2007-2014.

Contract No. DC/2006/09: Drainage Improvement Works in Kau Lung Hang, Yuen Leng, Nam Wa Po and Tai Hang Areas and Construction of Ping Kong Drainage Channels. Employed by Contractor (Chiu Hing Construction & Transportation Co. Ltd.) as ecology specialist responsible for conducting ecological baseline survey, impact monitoring, fish relocation operation, **vegetation survey** and mitigation/post monitoring. Client: DSD / Chiu Hing Construction, 2007-2013.

Drainage improvement in Sai Kung River, Ho Chung River and Pak Kong River. Ecological monitoring including **vegetation survey**. 2007- 2010. Client: DSD / Sunkee Construction.

Appendix B. Information for Trees with Conservation Interest / Important

Tree No.	Common name	Species	Height (m)	DBH (mm)	Spread (m)	Condition (F, P, G)	Form (F, P, G)	Amenity Value (H, M, L)	Survival of Transplantation (H, M, L)	Estimate Root Ball Size (Diameter in m)	Proposed Treatment	Remark
TA127	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA129	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA154	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA179	Incense Tree	<i>Aquilaria sinensis</i>	6	180	2	F	P	L	L	--	Fell	Serious leaning
TA180	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA181	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA211	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA215	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA217	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA227	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA232	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA260	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA267	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA326	Incense Tree	<i>Aquilaria sinensis</i>	9	346	5	F	F	L	L to M	~4	Transplant	Wounded on trunk
TA327	Incense Tree	<i>Aquilaria sinensis</i>	6	160	3	F	F	L	L to M	~2	Transplant	Wounded at trunk basal area
TA328	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester


Water Supplies Department
In-situ Re-provisioning of Sha Tin Water Treatment Works & South Works
Detailed Vegetation Survey Report

Tree No.	Common name	Species	Height (m)	DBH (mm)	Spread (m)	Condition (F, P, G)	Form (F, P, G)	Amenity Value (H, M, L)	Survival of Transplantation (H, M, L)	Estimate Root Ball Size (Diameter in m)	Proposed Treatment	Remark
TA481	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA493	Incense Tree	<i>Aquilaria sinensis</i>	2	95	1	P	P	L	L	--	Fell	Wounded at trunk basal area, Serious leaning
TA498	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA500	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Removed/Cut down by suspected agarwood harvester
TA572	Ailanthus	<i>Ailanthus fordii</i>	9	174	4	F	F	L	L to M	~1.7	Transplant	Co-dominant stems, vines, crossed stems
TB103	Incense Tree	<i>Aquilaria sinensis</i>	--	--	--	--	--	--	--	--	Fell	Cut down by suspected agarwood harvester

Remark:

"F" - Fair

"H" - High

"P" - Poor

"M" - Medium

"G" - Good

"L" - Low

"DBH" - Diameter at Breast Height

Appendix C

Photos for Flora with Conservation Interest / Important



Photo 1. TA127 Incense Tree (*Aquilaria sinensis*)



Photo 2. TA129 Incense Tree (*Aquilaria sinensis*)



Photo 3. TA154 Incense Tree (*Aquilaria sinensis*)



Photo 4. TA179 Incense Tree (*Aquilaria sinensis*)

 <p>14.12.2015</p>	 <p>14.12.2015</p>
<p>Photo 5. TA179 Incense Tree (<i>Aquilaria sinensis</i>)</p>	<p>Photo 6. Open wound on TA179 Incense Tree (<i>Aquilaria sinensis</i>)</p>
 <p>14.12.2015</p>	 <p>14.12.2015</p>
<p>Photo 7. Open wound on TA179 Incense Tree (<i>Aquilaria sinensis</i>)</p>	<p>Photo 8. TA180 Incense Tree (<i>Aquilaria sinensis</i>)</p>



Photo 9. TA181 was removed including basal part by agarwood harvester
Incense Tree (*Aquilaria sinensis*)



Photo 10. TA211
Incense Tree (*Aquilaria sinensis*)



Photo 11. TA215 Incense Tree (*Aquilaria sinensis*)



Photo 12. TA217 Incense Tree (*Aquilaria sinensis*)



Photo 13. TA227 Incense Tree (*Aquilaria sinensis*)



Photo 14. TA232 Incense Tree (*Aquilaria sinensis*)



Photo 15. TA260 Incense Tree (*Aquilaria sinensis*)



Photo 16. TA267 Incense Tree (*Aquilaria sinensis*)

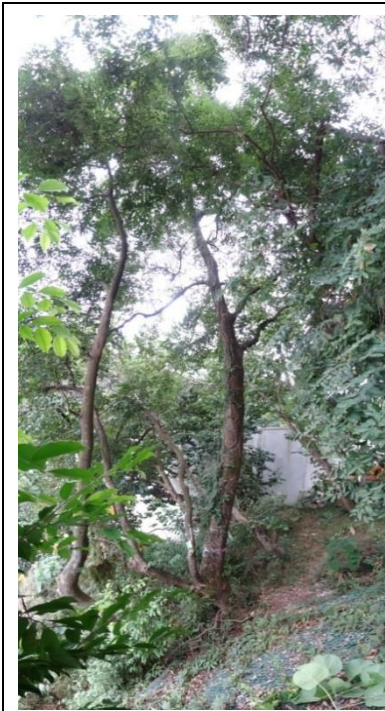


Photo 18. TA326 Incense Tree (*Aquilaria sinensis*)
 *Tree to be Transplanted



Photo 19. TA326 Incense Tree (*Aquilaria sinensis*)
 *Tree to be Transplanted



Photo 20. TA327 Incense Tree (*Aquilaria sinensis*)
 *Tree to be Transplanted



Photo 21. TA327 Incense Tree (*Aquilaria sinensis*)
 *Tree to be Transplanted



Photo 22. TA328 Incense Tree (*Aquilaria sinensis*)



Photo 23. TA481 Incense Tree (*Aquilaria sinensis*)



Photo 24. TA493 Incense Tree (*Aquilaria sinensis*)



Photo 25. Open wound at the basal of TA493 Incense Tree (*Aquilaria sinensis*)



Photo 26. TA498 Incense Tree (*Aquilaria sinensis*)



Photo 27. TA500 Incense Tree (*Aquilaria sinensis*)



Photo 28. TB103 Incense Tree (*Aquilaria sinensis*)



Photo 29. TA572 Ailanthus (*Ailanthus fordii*)
*Tree to be Transplanted



Photo 29. Colony of Lamb of Tartary (*Cibotium barometz*) *Shrub to be Transplanted



Photo 30. Colony of Lamb of Tartary (*Cibotium barometz*) *Shrub to be Transplanted



Photo 31. Colony of Lamb of Tartary (*Cibotium barometz*) *Shrub to be Transplanted



Photo 32. Colony of Lamb of Tartary (*Cibotium barometz*) *Shrub to be Transplanted



Photo 33. Colony of Lamb of Tartary (*Cibotium barometz*) *Shrub to be Transplanted



Photo 34. Hong Kong Eagleø Claw (*Artabotrys hongkongensis*) *Shrub to be Transplanted



Photo 35. Hairy-fruited Ormosia (*Ormosia pachycarpa*) *Outside project site boundary



Photo 36. Hong Kong Pavetta (*Pavetta hongkongensis*) *Outside project site boundary

Appendix D

District Lands Office's Approval on Tree Felling for this Project

21-JUL-2015 16:42 LANDS DEPT

+852 3104 1211 P.001/001

Please quote our reference in your reply

MEMO

URGENT BY FAX



From District Lands Officer, Sha Tin
Ref. (15) in L/M(1) in LD DLO/ST 66/L58
Tel. 2158 4750
Fax No. 2602 4093
Email sesstnw@landsd.gov.hk
Date 21 July 2015

To CE/PM, WSD
(Attn.: Mr. Leonard K LAM)
Your Ref. (51) in WSD 4996/R/4/3/3 Pt.1
dated 16.12.2014
Fax No. 2586 1696
Total Pages _____

Tree Felling, Transplanting and Planting Application
In-situ Re-provisioning of Sha Tin Water Treatment Works – South Works
Permanent Government Land Allocation No. ST-365

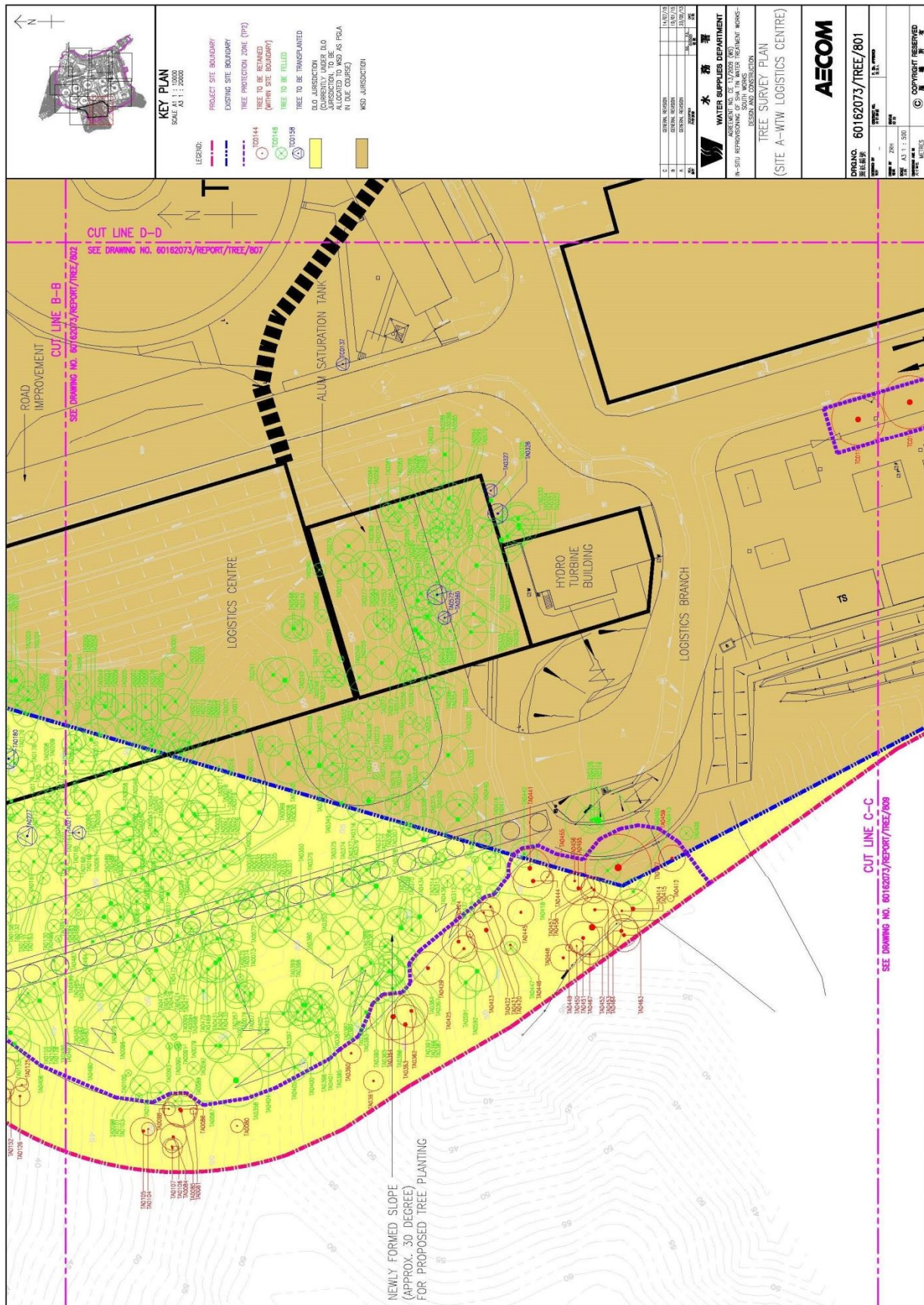
I refer to your MUR and the supplementary information provided in your email of 16 July 2015.

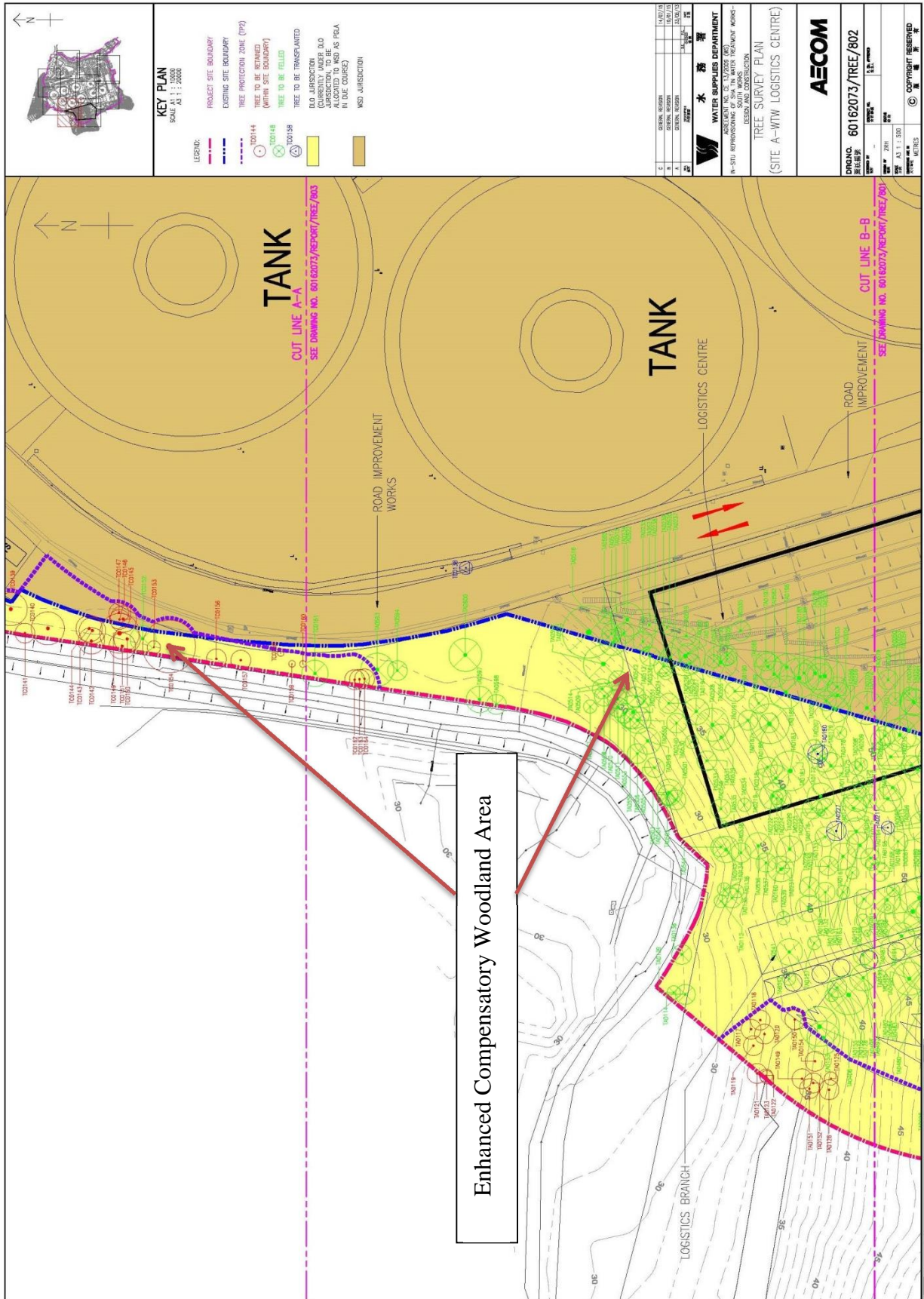
2. Approval is hereby given under Engineering Condition No. (12) of the Permanent Government Land Allocation No. ST-365 for the removal of 678 trees (i.e. 647 existing trees and 31 dead trees), transplanting of 39 existing trees and planting of 731 compensatory trees as shown on Tree Survey Plans and Compensatory Planting Plans of your email dated 16 July 2015.

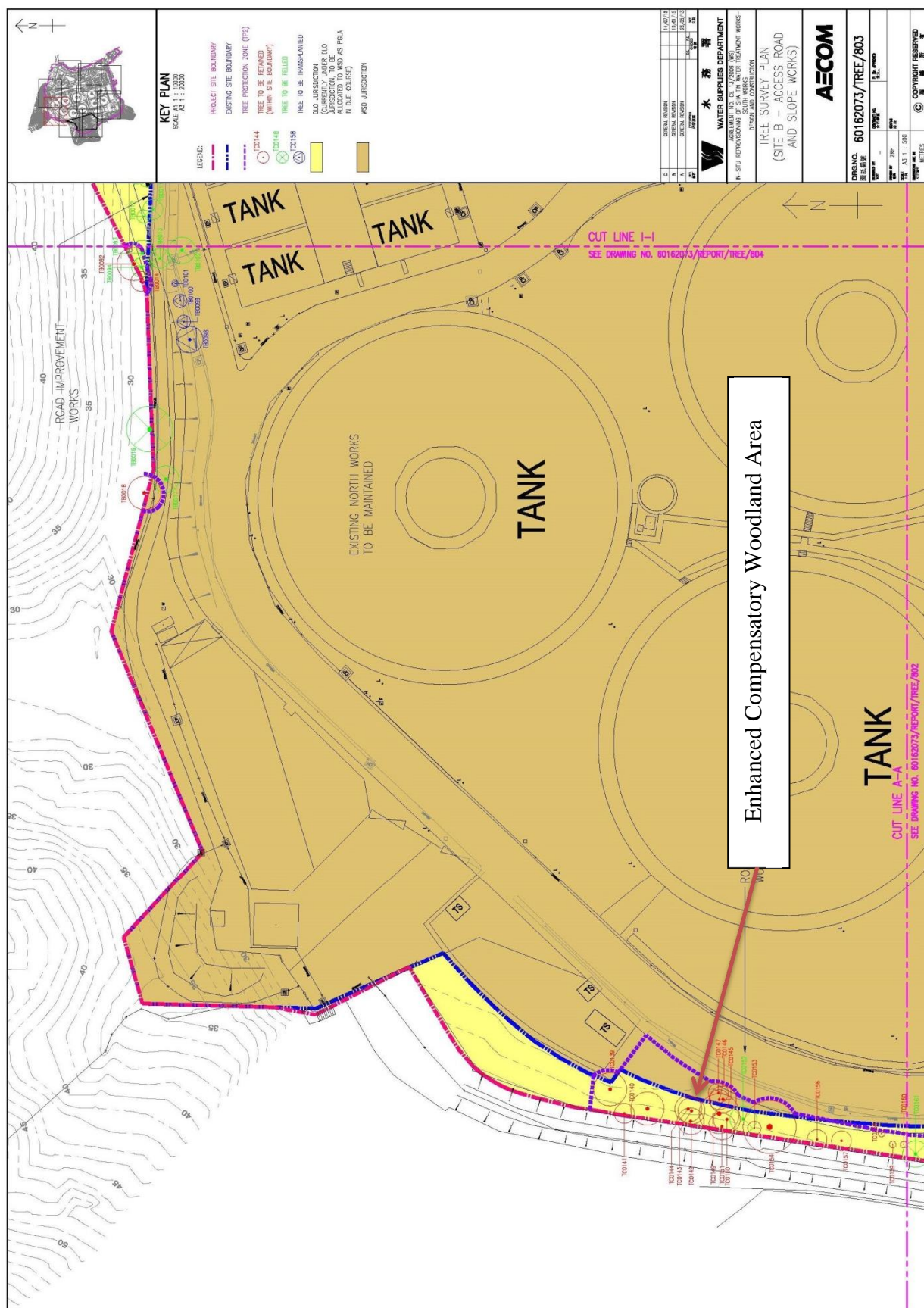
3. As advised by Tree Preservation Board, the tree planting plan should meet the requirements stipulated in TMO's prevalent tree planting guidelines.

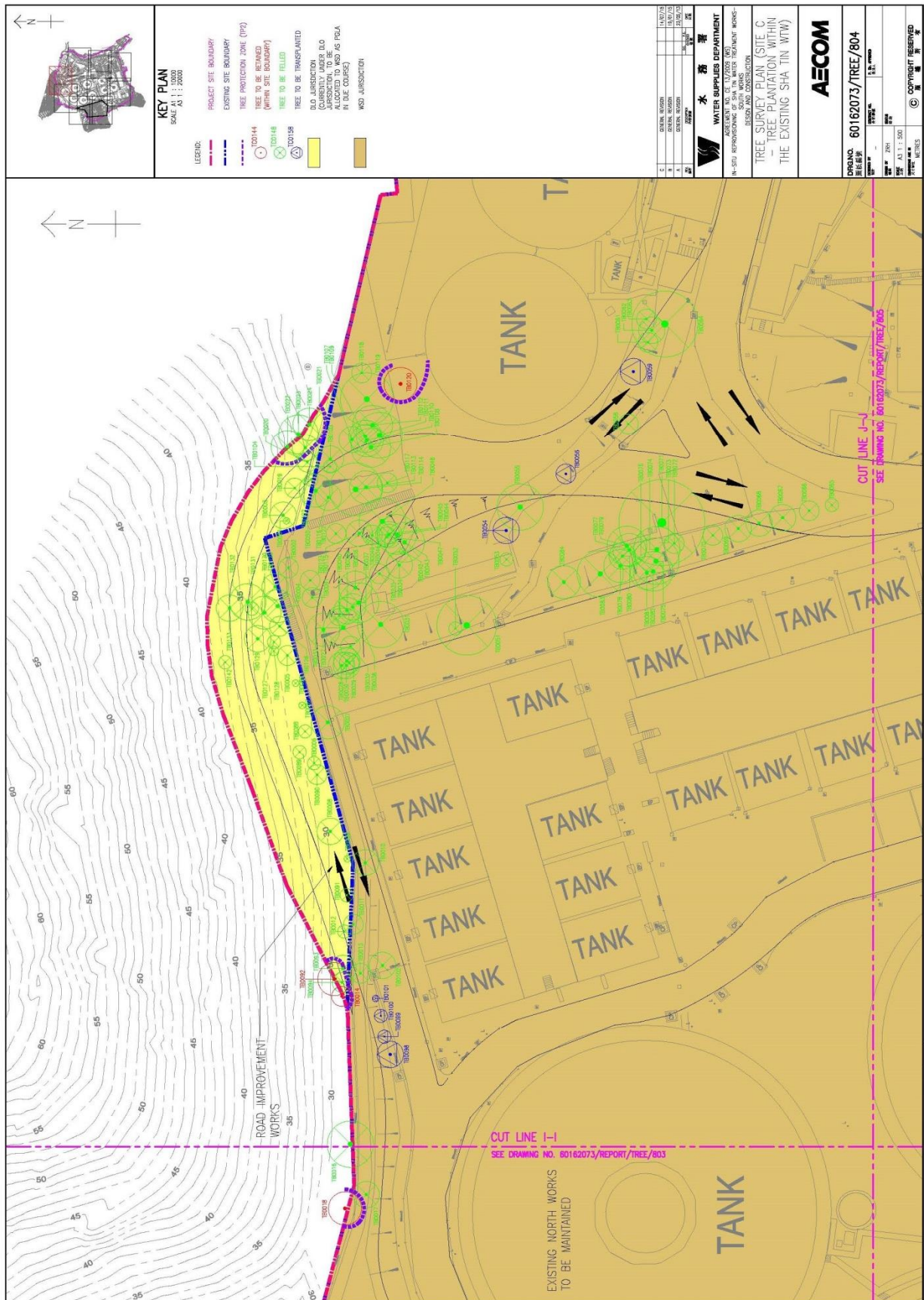
(Miss Karen POON)
for District Lands Officer, Sha Tin

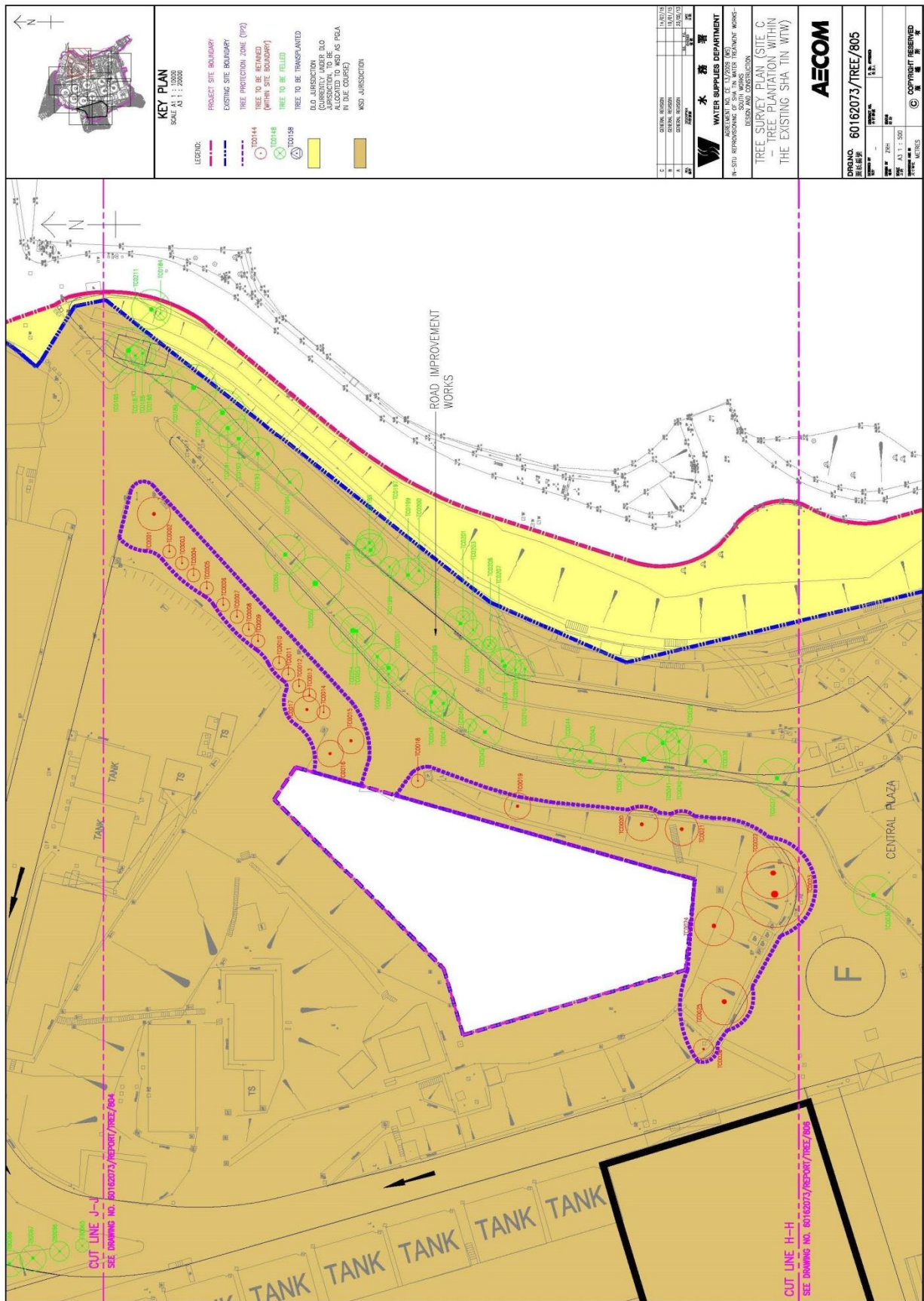
c.c. LD DLO/ST 1/62

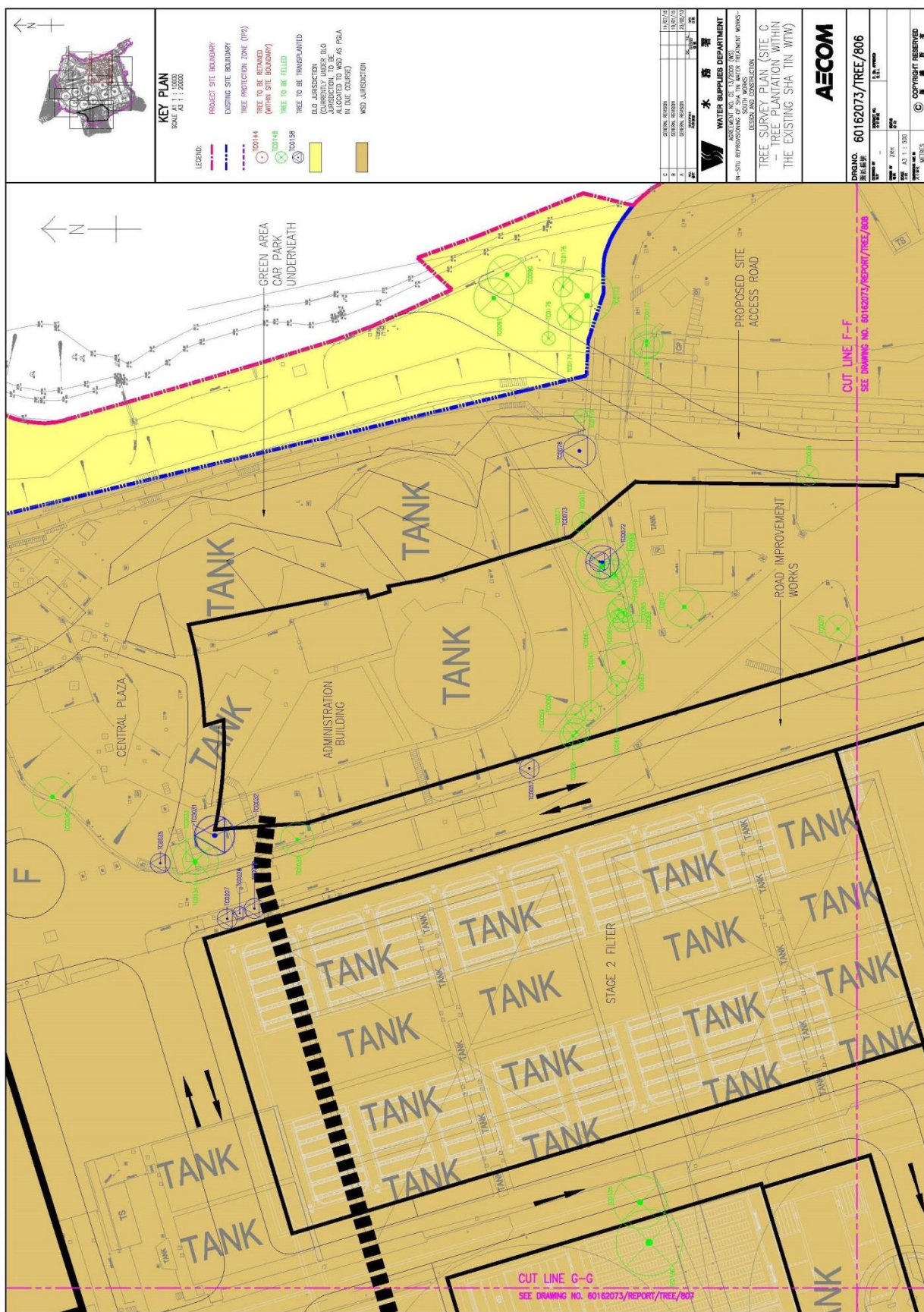


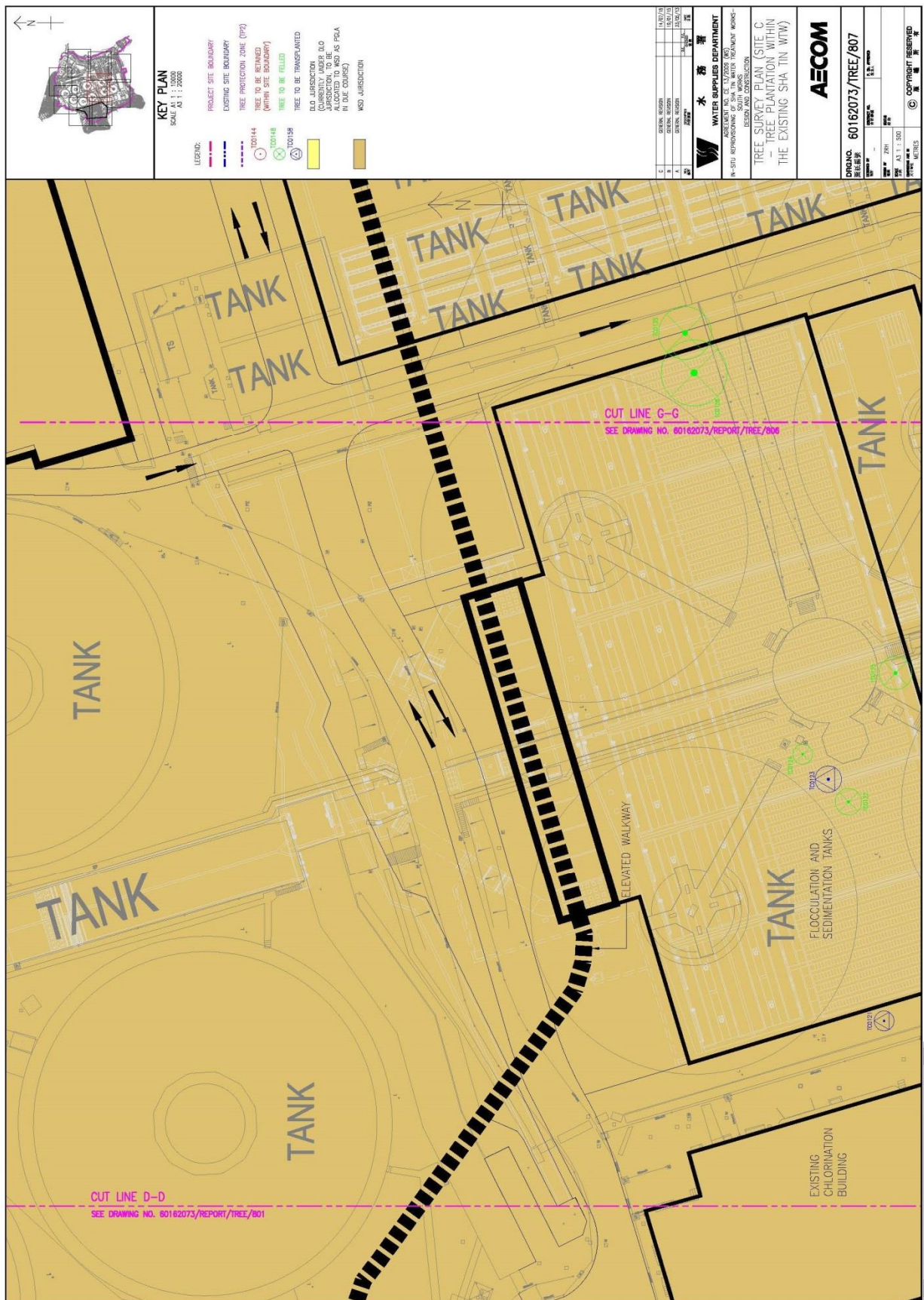




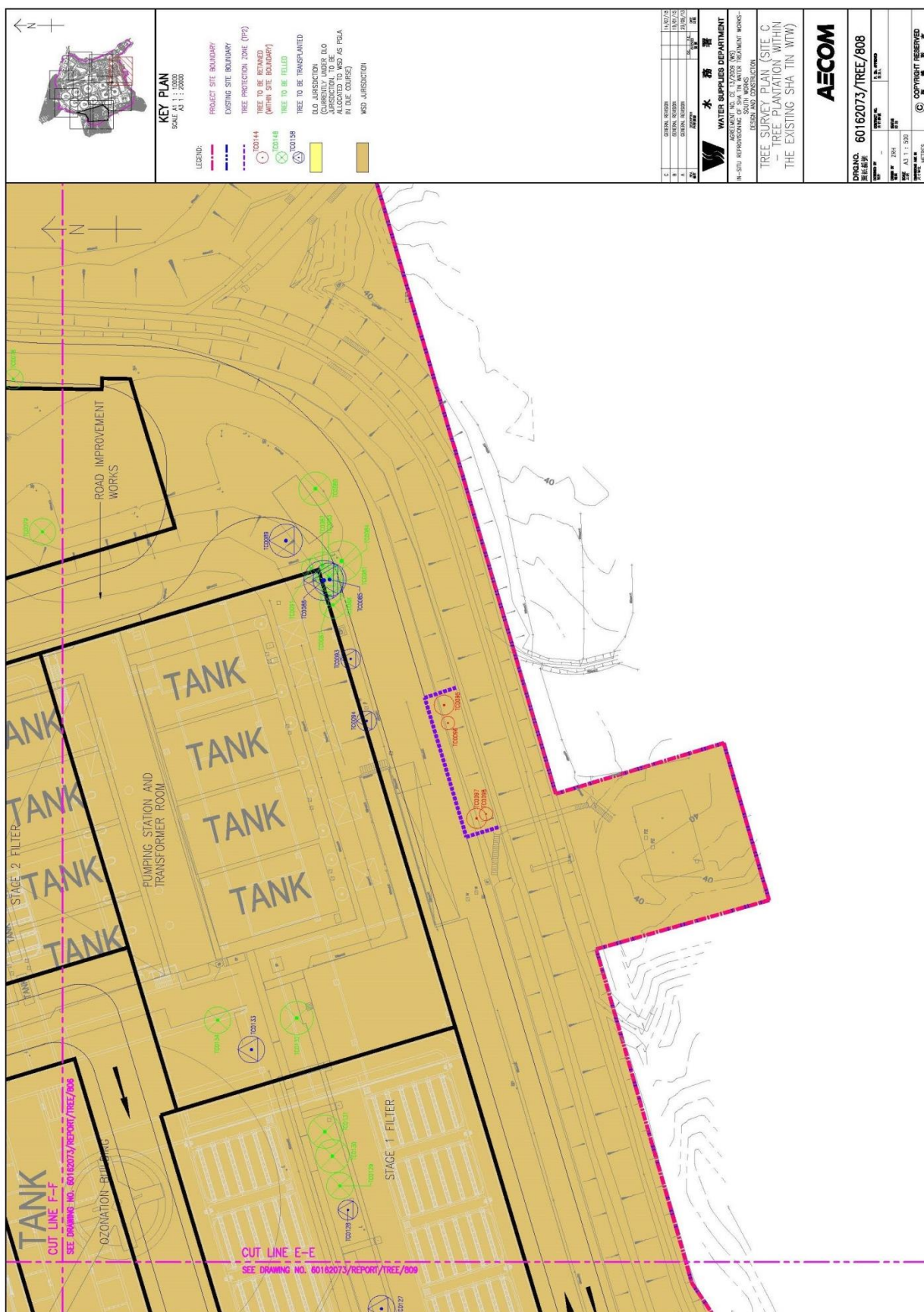


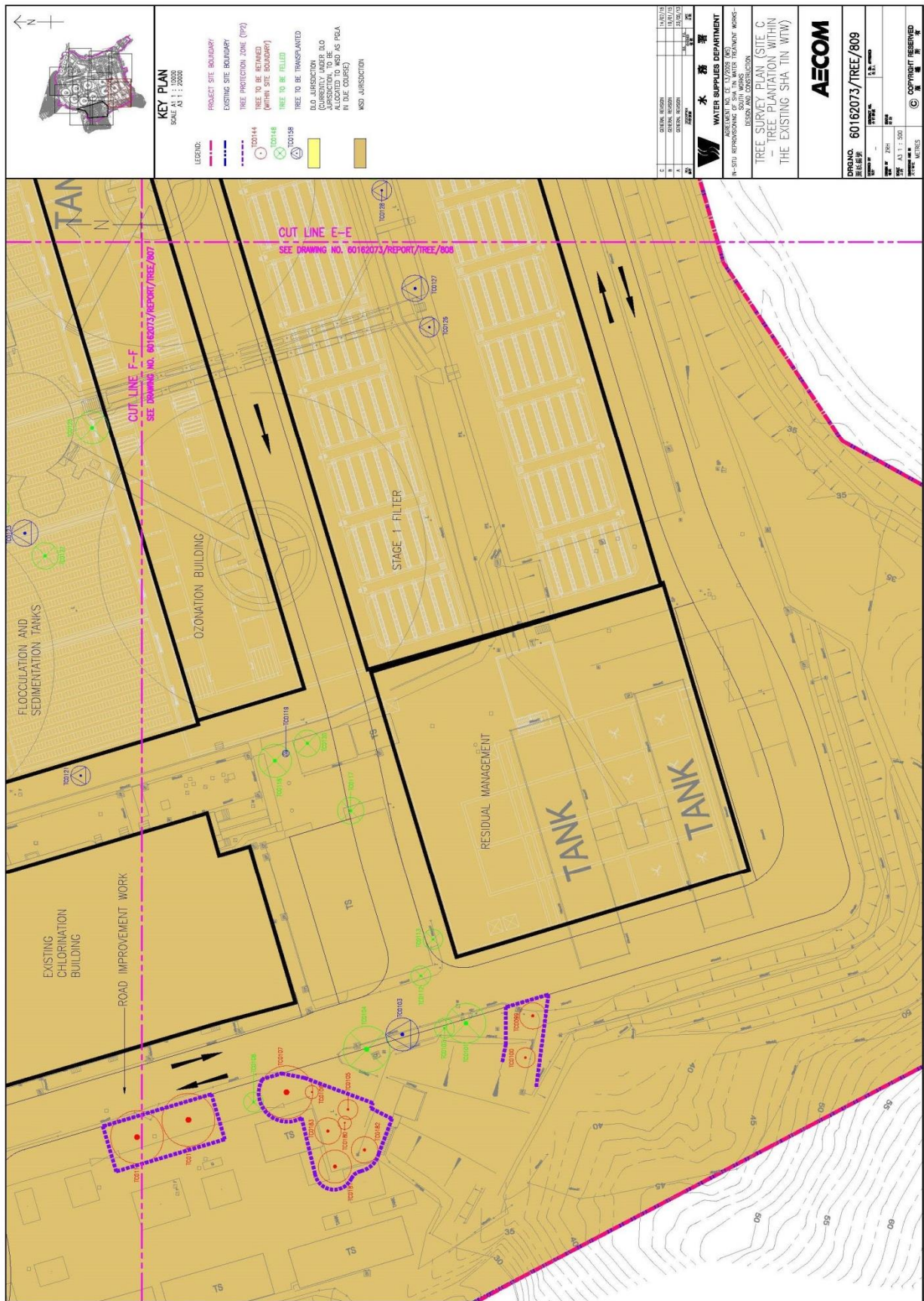






Water Supplies Department
 In-situ Reprovisioning of Sha Tin Water Treatment Works & South Works
 Detailed Vegetation Survey Report





Appendix E

Photos of Receptor Site at the Enhanced Compensatory Woodland Area

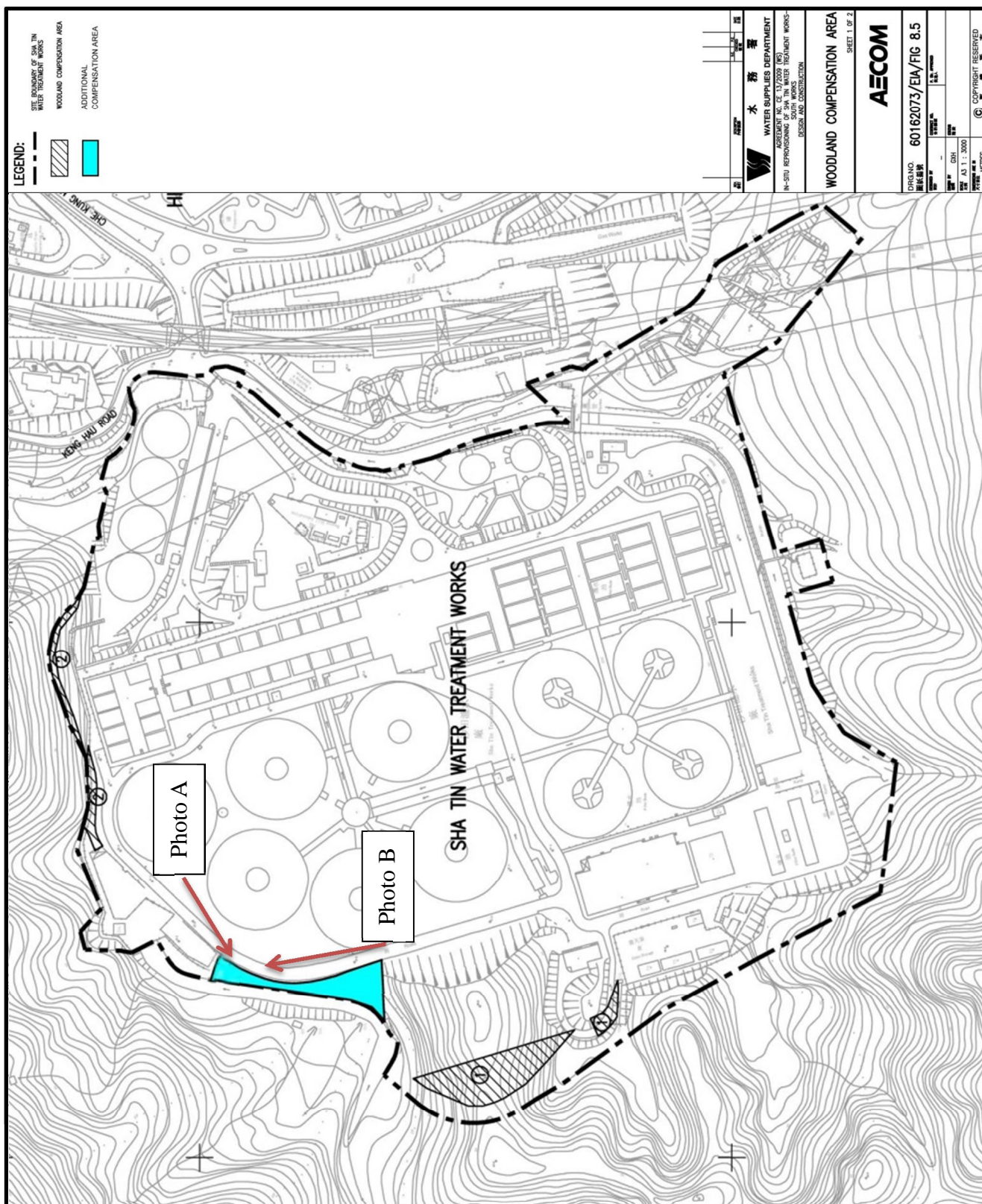




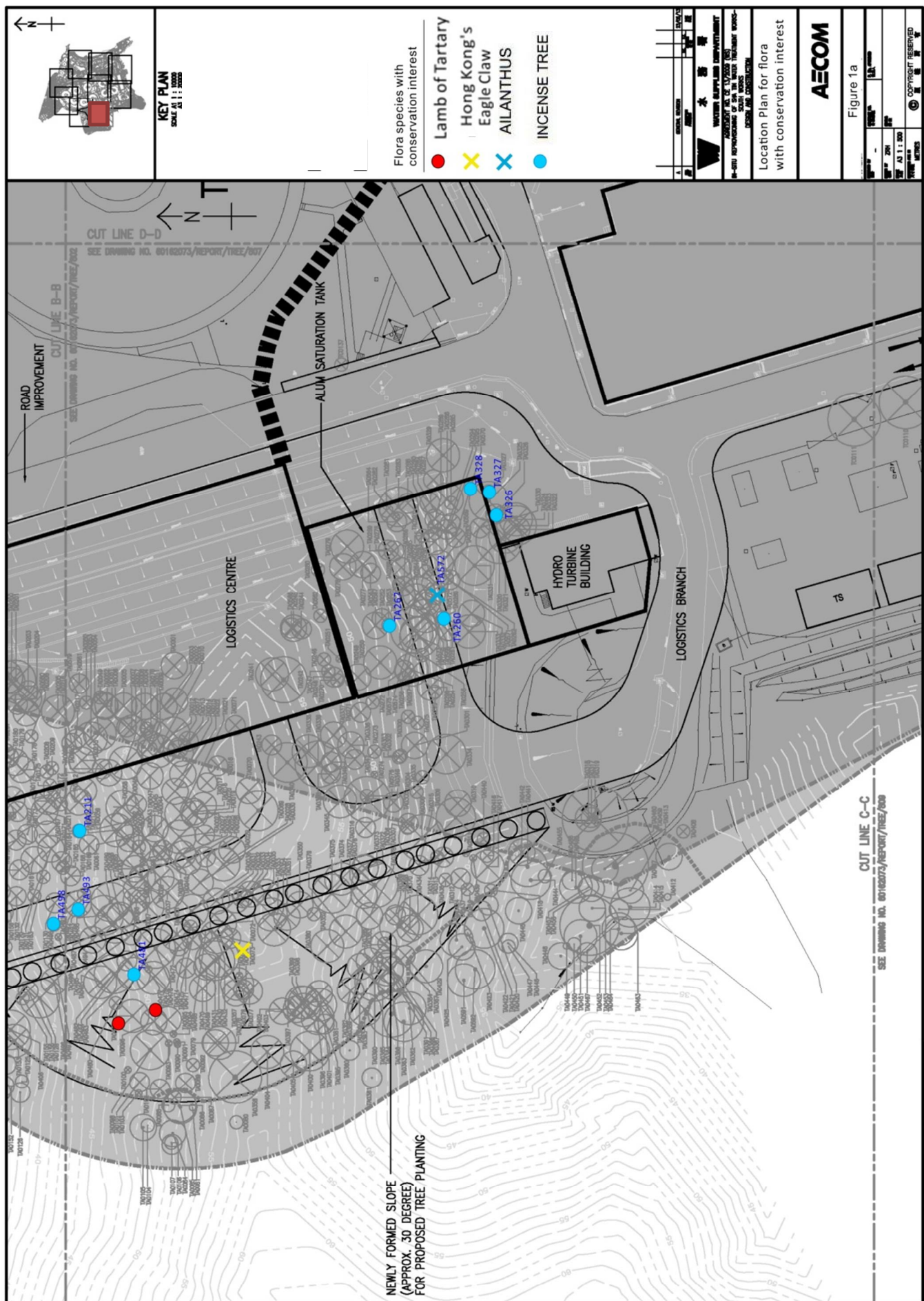
Photo A

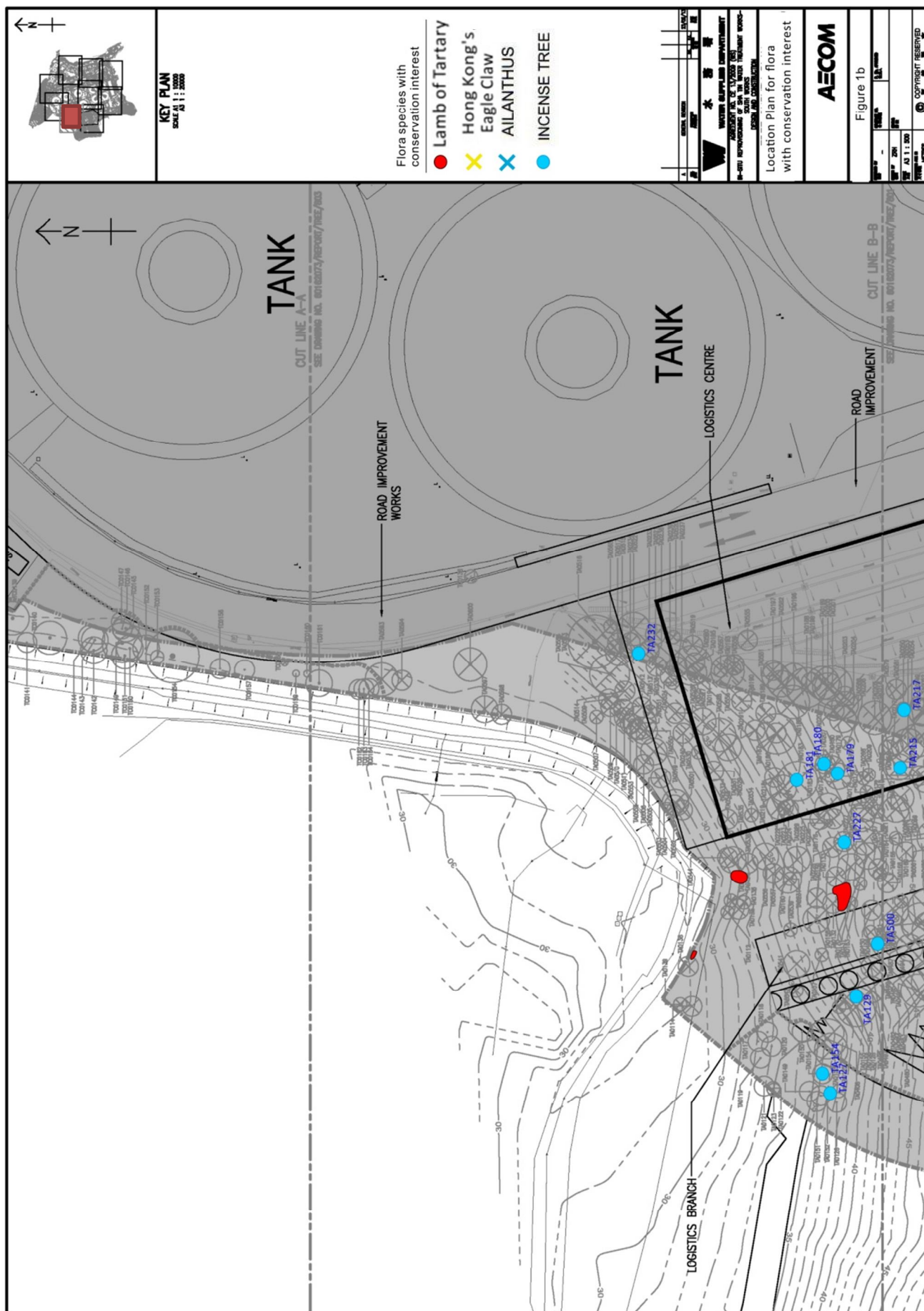


Photo B

Figure 1

Location Plan for Flora with Conservation Interest / Important





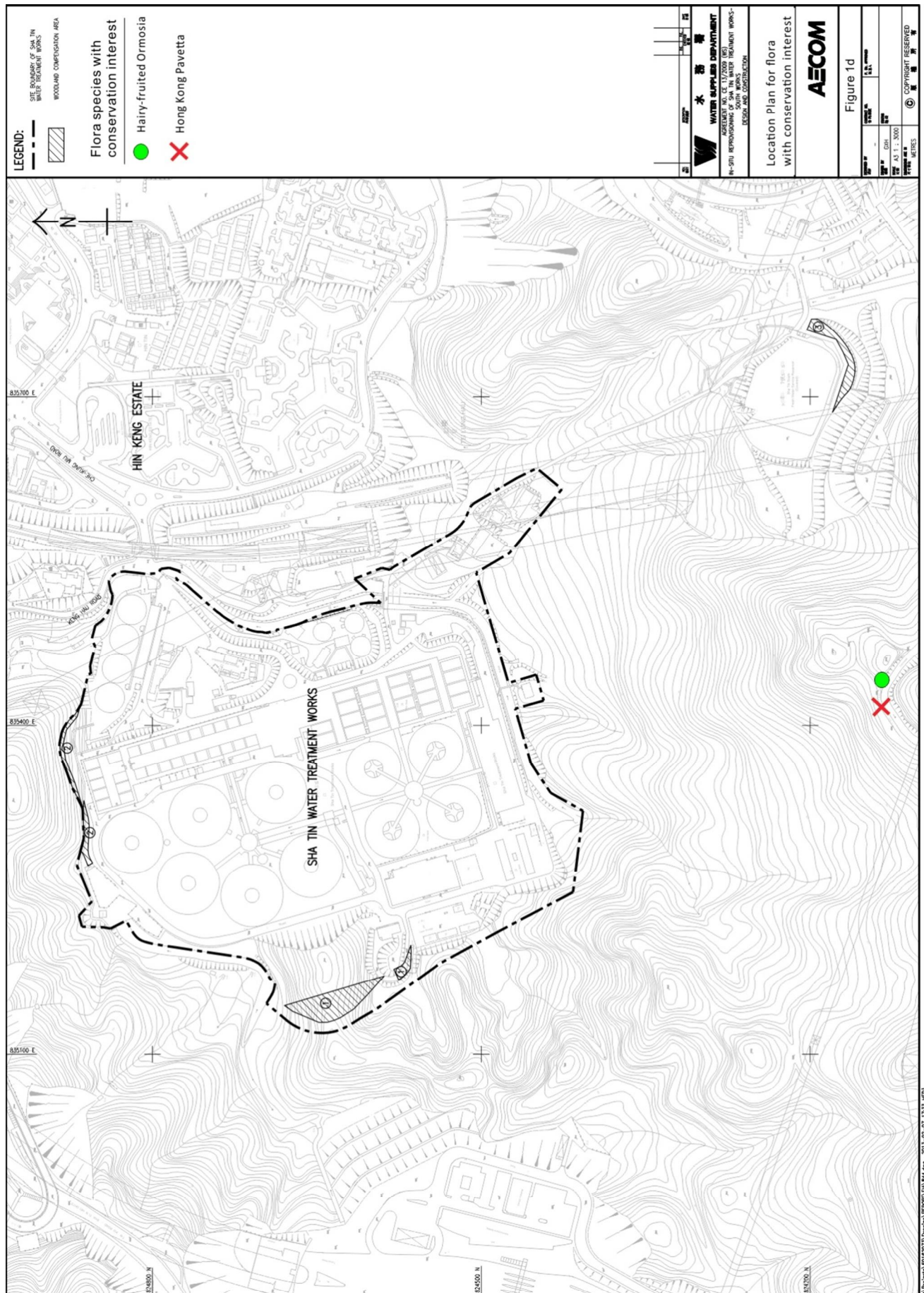
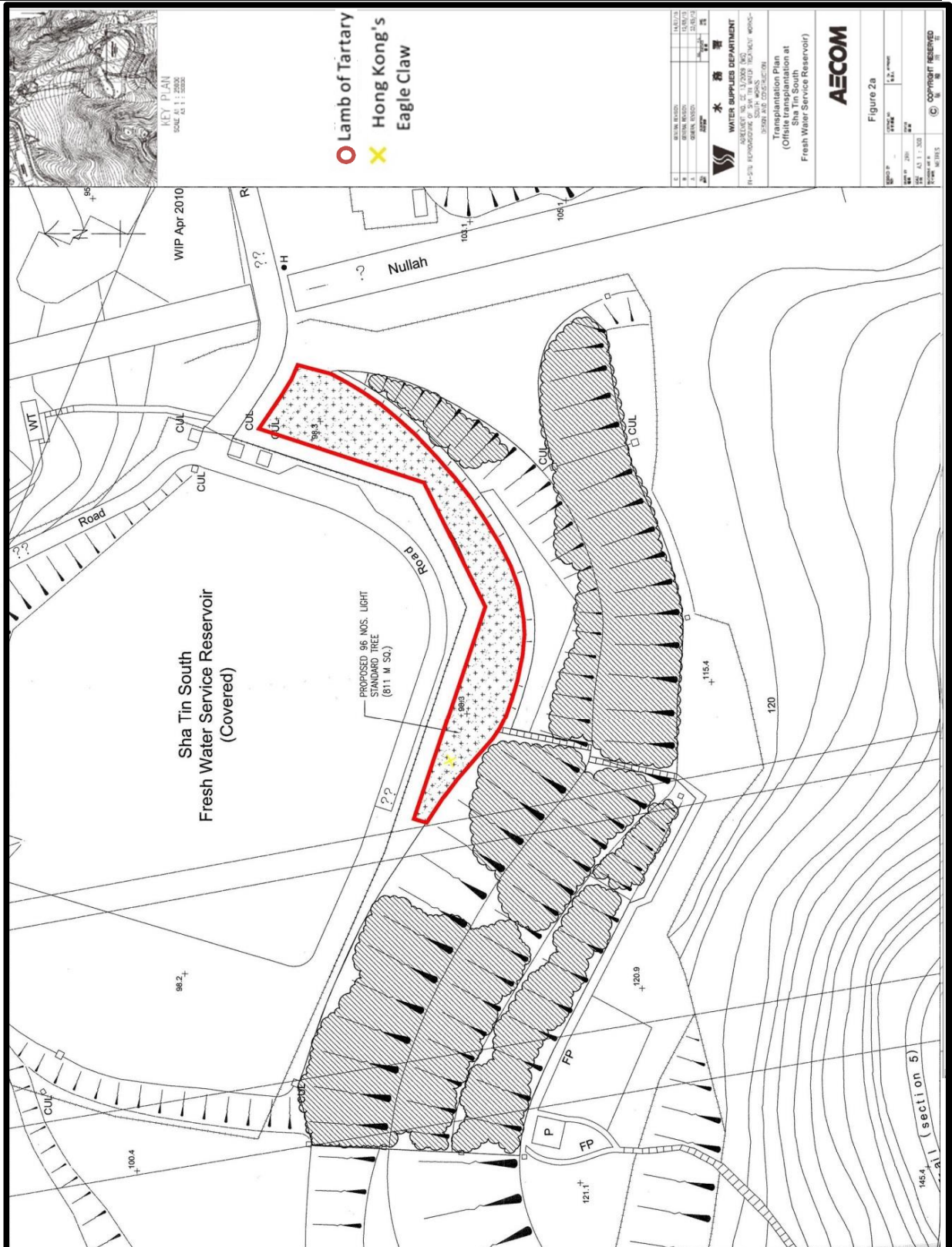


Figure 2

Transplantation Plan



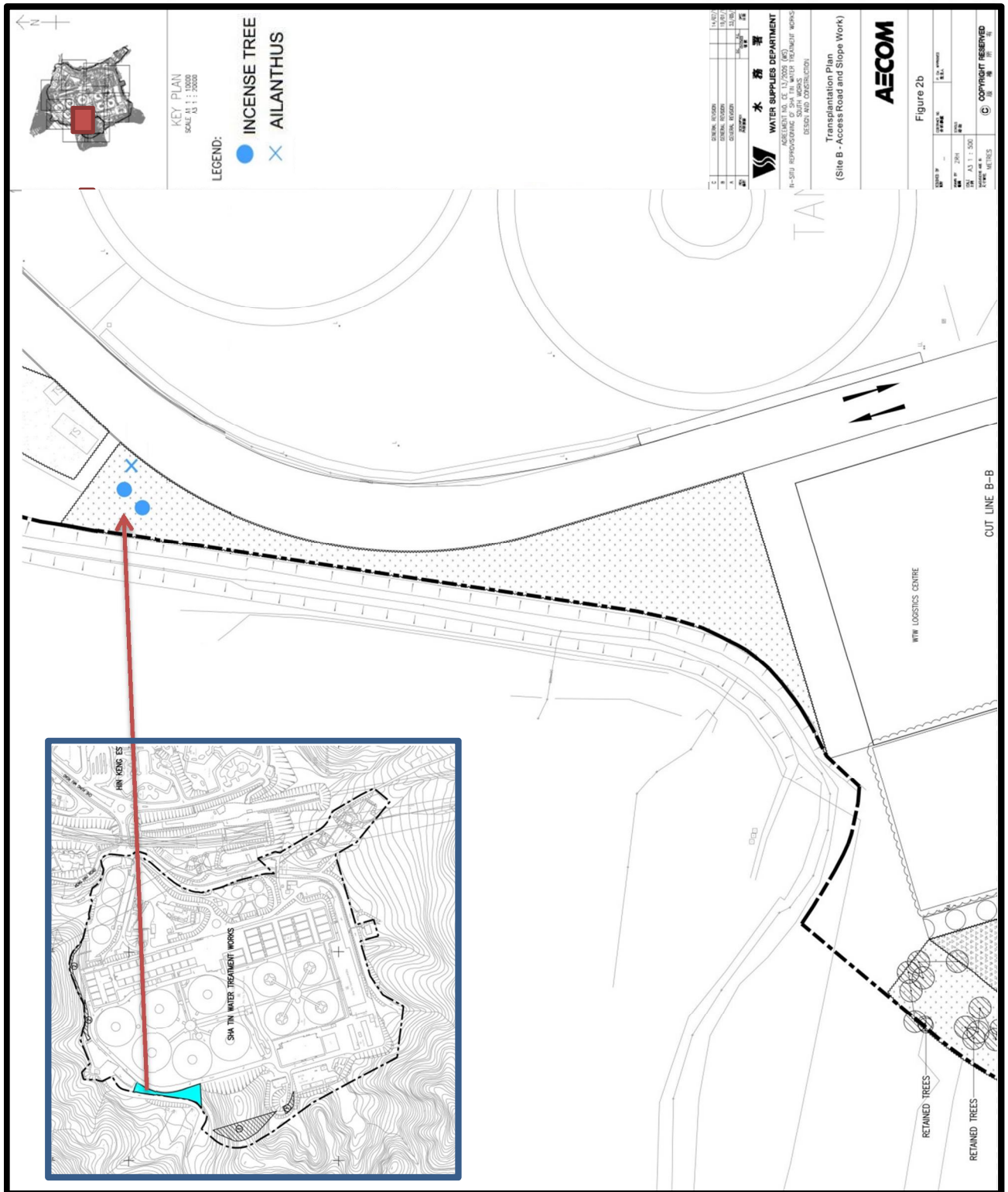


Figure 3

Location of Works Areas of the Project & Habitat at the
Enhanced Compensatory Woodland Area

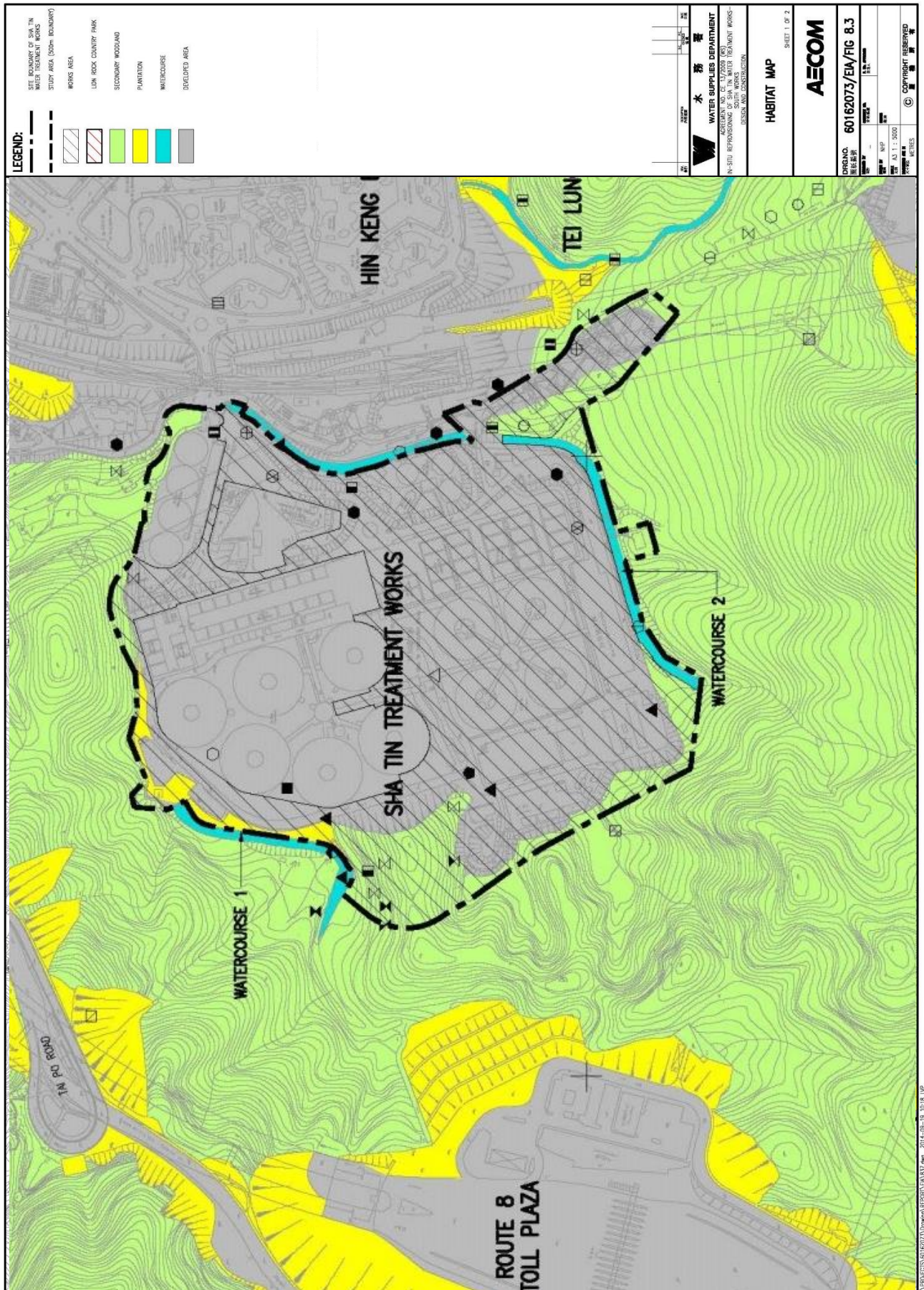
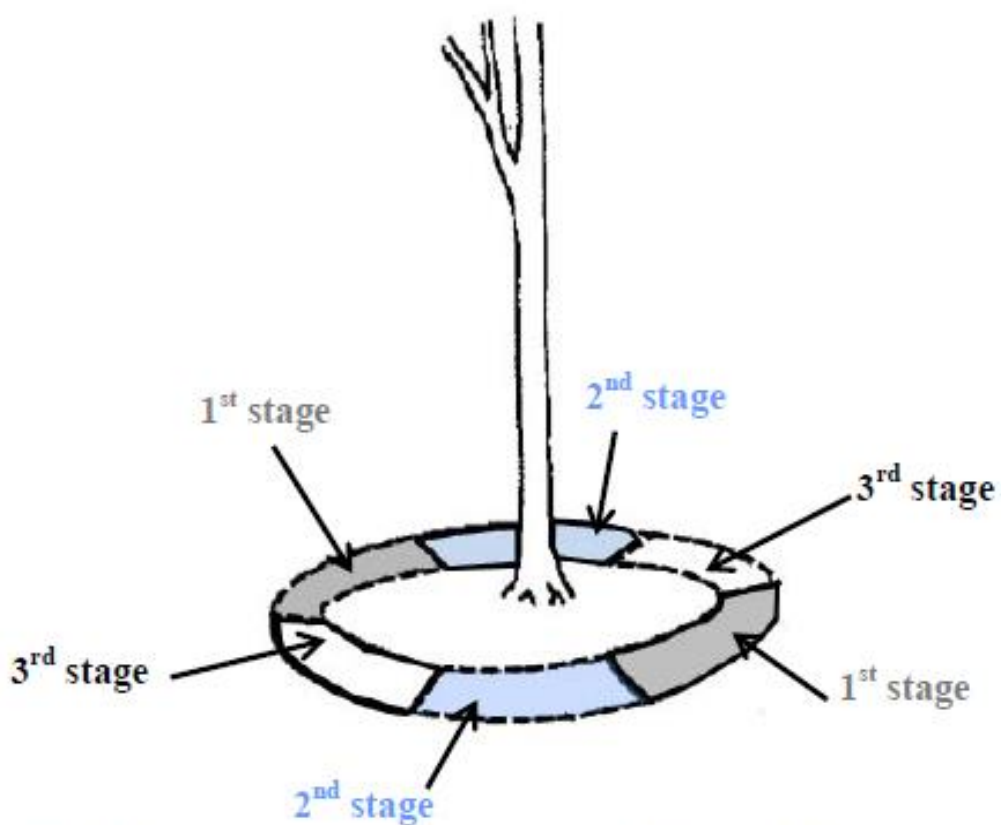


Figure 4

Stage Digging



The 4th stage in preparing the root ball by cutting its underside