

CHAPTER 6

**Development Bureau
Leisure and Cultural Services Department
Lands Department
Environmental Protection Department**

Government's efforts in enhancing tree safety

**Audit Commission
Hong Kong
30 October 2014**

This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.

Report No. 63 of the Director of Audit contains 10 Chapters which are available on our website at <http://www.aud.gov.hk>

Audit Commission
26th floor, Immigration Tower
7 Gloucester Road
Wan Chai
Hong Kong

Tel : (852) 2829 4210
Fax : (852) 2824 2087
E-mail : enquiry@aud.gov.hk

GOVERNMENT’S EFFORTS IN ENHANCING TREE SAFETY

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GOVERNMENT'S EFFORTS IN ENHANCING TREE SAFETY

Executive Summary

1. **Background.** There are tens of millions of trees in Hong Kong. It is the Government's policy to actively promote greening in order to improve the city's living environment. The Government has all along adopted an "integrated approach" in assigning to relevant departments responsibilities for maintaining vegetation (including trees) on government land. Under this approach, tree maintenance is part and parcel of the duty of the department which uses and manages that particular piece of land or facility. Currently, there are a number of major tree management departments, including the Highways Department (HyD) which manages trees on roadside man-made slopes/retaining walls and expressways, and the Leisure and Cultural Services Department (LCSD) which manages trees in LCSD venues and landscaped areas along public roads other than expressways. The Administration estimated that, as at December 2013, the major tree management departments were maintaining about 1.6 million trees with an annual contract expenditure of \$473 million, and 470 staff were involved in day-to-day tree management on a full-time or part-time basis.

2. **Public concern over tree safety.** In the past few years, there have been a number of tree collapse cases causing deaths or injuries to members of the public. In March 2009, the Chief Secretary for Administration led an inter-departmental Task Force to review tree management issues, particularly public safety aspects. In June 2009, the Task Force published its Report. Pursuant to the recommendations of the Task Force Report, the Development Bureau (DEVB) established the Tree Management Office (TMO) in March 2010. To ensure more effective implementation across departments of the integrated approach to tree management, the TMO acts as a central authority to give policy steer, a focal point of coordination of departmental efforts, and a provider of arboricultural expertise. In May 2014, the Audit Commission (Audit) commenced a review of the Government's efforts in enhancing tree safety.

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Coordinating the work of tree management departments

3. *Delineation of management responsibilities for roadside trees.* Trees at roadside areas pose a particular safety risk to pedestrians and road users. Broadly speaking, apart from expressways (under the purview of the HyD) and country parks (under the purview of the Agricultural, Fisheries and Conservation Department), the LCSD is responsible for roadside trees on landscaped areas, whereas the Lands Department (LandsD) is responsible for roadside trees on unallocated government land not maintained by any other departments. According to a Technical Circular issued in March 2004 by the DEVB, the LandsD carries out maintenance of trees on an ad hoc basis, i.e. mainly when a requirement is identified or a complaint/referral is received (paras. 2.4, 2.15, 2.17 and 2.22).

4. *Disagreements over maintenance responsibilities.* All along, there have been disagreements among departments over the delineation of maintenance responsibilities for roadside trees, particularly regarding whether a tree is within a “landscaped area”. In the LCSD’s view, a landscaped area should be an area with landscape design elements such as roadside planters or tree pits. In the TMO’s view, a landscaped area should be an area with intentional plantings irrespective of whether the plantings are located in planters or tree pits. The disagreements among departments had affected the handling of tree complaints and other tree management work. In 2013, it was agreed that when agreement could not be reached among departments, the TMO would review the case and adjudicate as to which department was responsible for tree management (paras. 2.18 to 2.21).

5. *Roadside tree survey.* In 2011, the DEVB considered that there was a need to enhance tree risk management for roadside trees under the ad hoc maintenance by the LandsD, and to have a general understanding of the quantity and quality of these trees in order to facilitate policy considerations on the maintenance approach. In July 2012, the TMO embarked on a territory-wide roadside tree survey covering public roads/carriageways. As at June 2014, the TMO had substantially completed the fieldwork of the survey. Some 70,000 roadside trees not included in the inventories of any tree management departments were found. As at September 2014, the TMO was working on the delineation of maintenance responsibilities of the surveyed trees, and the review of the policy considerations on the maintenance approach for roadside trees had not been completed (paras. 2.23 to 2.27).

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6. ***Special tree inspection exercise.*** The scope of the TMO's roadside tree survey (see para. 5 above) did not cover village access roads/footpaths in rural areas. In October 2012, a fatal tree collapse case occurred on a village access road in Tai Po. After this case, the LandsD planned to conduct a special tree inspection exercise to identify potentially hazardous trees along village access roads and footpaths on unallocated government land with relatively high pedestrian and/or vehicular flow, and to carry out appropriate remedial works of the trees for public safety. The LandsD started the exercise in December 2013 and expected to complete the exercise in six years (paras. 2.27, 2.38 to 2.40).

7. ***Need to review the ad hoc maintenance approach.*** According to the LandsD, it was first involved in tree maintenance in May 2002 on the understanding that trees not claimed by any other departments on unallocated government land, which were unlikely to be along roadside, would be taken up by the LandsD. It had since then been accepted within the Government that trees put under the LandsD would only be subject to ad hoc rather than regular maintenance. Since the issue of the Technical Circular in March 2004 (see para. 3 above), trees on non-landscaped areas along non-expressway roads and pavements had been put under the LandsD's purview. The 2012 Tai Po tree collapse case (see para. 6 above) highlighted inadequacies in the ad hoc maintenance of roadside trees for ensuring public safety. There is a need for a critical review of the LandsD's ad hoc maintenance approach (paras. 2.43 and 2.44).

Tree risk assessment

8. ***Implementation of the tree risk assessment (TRA).*** The Task Force, making reference to international best practices, recommended new TRA arrangements based on a dual approach comprising two stages (i.e. the area-basis assessment and the tree-basis assessment). In carrying out the area-basis assessment, a tree management department should classify the sites under its purview into three risk zones (i.e. Category I, II and III zones). The purpose is to let the department focus on high-risk sites (i.e. Category I zones). In carrying out the tree-basis assessment of a site, a group inspection (a Form 1 inspection) should be conducted on all trees of the site to identify problematic trees. For the problematic trees identified, if the remedial measures taken on the spot cannot eliminate the risks, detailed inspections (Form 2 inspections) should be conducted on them to identify in detail the risks and the appropriate remedial measures (paras. 3.2 to 3.8).

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9. ***Conduct of Form 1 inspections.*** According to the TMO's guidelines on the dual-approach TRA, to safeguard the quality of a Form 1 inspection, the number of trees to be covered should not be excessive. Audit examined the Form 1 inspections conducted by the HyD and the LCSD in the 2014 TRA, and noted that there were a considerable number of Form 1 inspections which covered a large number (e.g. more than 100) of trees. Audit also noted cases in which problematic trees had not been identified during their Form 1 inspections, but later became the subjects of complaints and found to be hazardous (paras. 3.18 to 3.20).

10. ***Conduct of Form 2 inspections.*** By conducting a Form 2 inspection on a tree, the tree management department can ascertain the detailed conditions of the tree and better identify appropriate remedial measures, including long-term measures (such as pest control and site improvement). Audit noted that, in the 2014 TRA, the number of Form 2 inspections conducted varied widely among the major tree management departments. In particular, the LCSD did not conduct any Form 2 inspections on trees (other than old and valuable trees (OVTs) and stonewall trees) in its 2014 TRA (paras. 3.25 and 3.28).

11. ***Tackling brown root rot (BRR) disease.*** BRR disease on trees is caused by an aggressive fungal pathogen. Trees infected with BRR disease may experience a rapid deterioration of health and structural conditions. There is currently no effective cure to the disease. The TMO has adopted a dual-pronged management strategy for preventing the spread of the disease, comprising precautionary and preventive measures. For infected trees which are not OVTs, they should be removed entirely. For infected OVTs, if they are structurally stable and the infection is at the early stage, they should be quarantined. Audit noted that, as at August 2014, there were 16 non-OVTs with BRR infection pending removal. For some of them, the removal had been outstanding for a long period (paras. 3.52, 3.55 and 3.57).

Management information systems and databases

12. ***Tree Management Information System (TMIS).*** The TMO engaged a contractor to set up the TMIS. The system commenced live run in December 2012. The TMO encountered a number of system development issues. There were gaps between the expected and the actual functions provided. There were also system bugs and instability issues. In particular, most of the tree management departments had not yet transferred their tree data to the system. There were also data inconsistencies between the system and the departmental systems maintained by

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some departments. The TMO was planning to enhance the TMIS (paras. 4.2, 4.3, 4.7 and 4.9).

13. ***Tree Register.*** In July 2010, the TMO set up and published (on its website) a “Tree Register”. The Tree Register includes problematic trees with mitigation measures to be completed and important trees (i.e. OVTs and stonewall trees). The objectives of the Tree Register are to promote community surveillance and to enhance the transparency of the Government’s tree risk management work. Audit noted that there was a tendency for tree management departments not to add problematic trees to the Tree Register. There were also trees with mitigation measures already completed for quite some time (3 to 8 months) but not deleted from the Tree Register (paras. 4.14, 4.15, 4.17 and 4.22).

Training and community involvement

14. ***Training on tree management.*** The TMO used considerable staff resources (both professional and administrative staff) in delivering training courses on tree management. In 2013, the 21 training courses delivered by the TMO took up 35 working days, representing about 14% of the working days in the year. The delivery of training by the TMO will draw on its scarce staff resources, leaving fewer resources available for other important duties. The TMO needs to review its long-term arrangement for delivering tree management training (paras. 5.9, 5.10 and 5.12).

15. ***Community involvement in greening.*** The DEVB oversees community involvement activities on greening. In view of growing public concerns about tree safety, the DEVB needs to further promote community surveillance from a tree safety perspective, particularly relating to roadside trees (paras. 5.18 and 5.23).

Way forward

16. ***Progress made since 2008 in improving tree management.*** The TMO was set up in March 2010 with the main task of minimising the threat of problematic trees to public safety. Notwithstanding the Government’s efforts since the setting up of the TMO, tree collapse incidents have still occurred from time to time, including a few fatal cases. It appears that more needs to be done in further enhancing tree safety (paras. 6.2 and 6.3).

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17. *Addressing safety risks of trees on private land.* The work of the TMO primarily focuses on trees maintained by government departments. For trees on private land, their maintenance responsibilities rest with the private land owners concerned. In August 2014, a tragic tree collapse incident occurred at Mid-levels which involved a tree on private land. This incident has aroused public concerns about safety risks posed by trees on private land. Audit considers that the DEVB needs to critically review whether there is a need for tree legislation to regulate, among other things, the proper maintenance of trees on private land. Meanwhile, effective measures need to be devised to bring forth improvements more readily (paras. 6.6 and 6.10).

Audit recommendations

18. **Audit recommendations are made in the respective sections of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has recommended that the Secretary for Development should:**

Coordinating the work of tree management departments

- (a) **expedite action to review the policy considerations concerning the maintenance approach for roadside trees, and sort out the delineation of maintenance responsibilities of the surveyed trees (para. 2.33(a));**
- (b) **in conjunction with the Director of Lands, consider implementing regular maintenance for trees on unallocated government land, particularly roadside trees, which currently are under ad hoc maintenance (para. 2.46);**

Tree risk assessment

- (c) **provide more guidelines on the appropriate number of trees to be covered by a Form 1 inspection (para. 3.39(b));**
- (d) **provide more guidelines to help tree management departments decide whether and when it is necessary to conduct a Form 2 inspection (para. 3.39(d));**
- (e) **for non-OVTs which have been infected with BRR disease, urge the responsible departments to remove the trees in a timely manner (para. 3.60(a));**

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Management information systems and databases

- (f) take measures to promptly complete the TMIS enhancement project (para. 4.12(a));
- (g) ensure that tree management departments are committed to using the TMIS and avoid data inconsistencies between the TMIS and departmental systems (para. 4.12(c));
- (h) take measures to ensure that the Tree Register provides a complete and up-to-date list of problematic trees with mitigation measures to be completed (para. 4.26(a));

Training and community involvement

- (i) review the long-term arrangement for the TMO to deliver tree management training in a more sustainable manner (para. 5.13);
- (j) make more efforts in promoting community surveillance from a tree safety perspective, particularly relating to roadside trees (para. 5.24);

Way forward

- (k) critically review whether there is a need for legislation for mandatory tree inspection and maintenance of trees on private land by private land owners (para. 6.11(c)); and
- (l) before any new legislation is introduced, take effective measures that can more readily help improve tree safety on private land (para. 6.11(d)).

19. Audit has also *recommended* that the Director of Lands should expedite action to complete the special tree inspection for roadside trees on village access roads and footpaths in rural areas (para. 2.47).

Response from the Administration

20. The Administration agrees with the audit recommendations.

PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines the audit objectives and scope.

Background

1.2 ***Government's greening policy.*** Hong Kong's greenery is much treasured by the community. Around 67% of the territory's total land area is covered by woodland, shrubland and grassland. Green landscape contributes to the quality of the living environment in various ways, including improvement in air quality, lower temperature, visual appeal, etc. It is the Government's policy to actively promote greening in order to improve the city's living environment. The Government strives to uplift the quality of the living environment through active planting, proper maintenance and preservation of trees together with other vegetation (Note 1).

1.3 The Government has estimated that there are tens of millions of trees in Hong Kong. While most of the trees are in the countryside, hundreds of thousands are also found in the built-up areas of all districts. Such green coverage is achieved over the years through careful spatial planning as well as conscious greening efforts. The Government has spent an average of about \$200 million on greening works annually, planting about 10 million new trees, shrubs and seasonal flowers each year.

1.4 ***Integrated approach to tree management.*** Given the large number of trees all over the territory, the Government has all along adopted an "integrated approach" for assigning responsibilities for preserving and maintaining all vegetation on government land to relevant departments. Under this approach, tree maintenance is part and parcel of the duty of the department which uses and manages that particular piece of land or facility. Currently, there are nine major tree management departments, namely:

Note 1: *According to government guidelines, a plant is considered as a tree if its trunk diameter measures 95 millimetres or more at a height of 1.3 metres above the ground.*

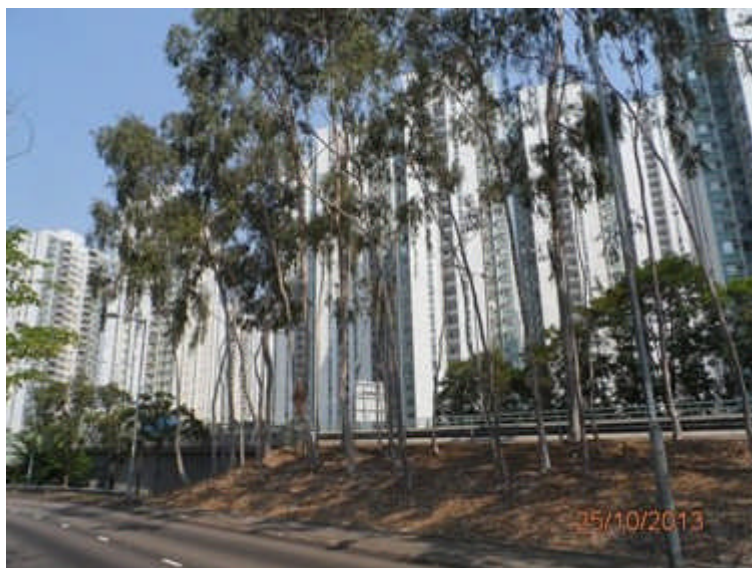
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- (a) Highways Department (HyD) which manages trees on roadside man-made slopes/retaining walls and expressways (see Photograph 1);
- (b) Leisure and Cultural Services Department (LCSD) which manages trees in LCSD venues and landscaped areas along public roads (other than expressways) (see Photograph 2);
- (c) Architectural Services Department (ArchSD) which manages trees on man-made slopes maintained by the Department;
- (d) Housing Department (HD) which manages trees in public housing estates;
- (e) Water Supplies Department (WSD) which manages trees within waterworks facilities;
- (f) Agriculture, Fisheries and Conservation Department (AFCD) which manages trees in country parks;
- (g) Civil Engineering and Development Department (CEDD) which manages trees in works areas during construction;
- (h) Drainage Services Department (DSD) which manages trees within drainage facilities; and
- (i) Lands Department (LandsD) which manages trees on unallocated government land not managed by any other departments. According to existing guidelines, the LandsD maintains such trees on an ad hoc basis (see also para. 2.36).

In response to a question raised by the Legislative Council (LegCo) in examining the 2014-15 Estimates of Expenditure, the Administration informed LegCo, among others, that the eight major tree management departments (excluding the LandsD) were maintaining about 1.6 million trees as at December 2013 (see Appendix A).

Photograph 1

Trees managed by the HyD along an expressway



Source: HyD records

Photograph 2

Trees managed by the LCSD in a park



Source: LCSD records

Public concern over tree safety

1.5 Trees, like other living organisms, have a natural cycle. They grow, age, become weak and die. Their growth is subject to both internal constraints as well as external or environmental factors. In general, as a tree grows older and larger, its growth rate and ability to recover will decline and one day due to internal (e.g. tree diseases) or external (e.g. typhoon, thunderstorm, heavy rain, etc.) reasons, it will die and may collapse. This poses a threat to public safety.

1.6 In the past few years, there have been a number of tree collapse cases causing deaths or injuries to members of the public. In August 2008, a fatal tree collapse case occurred in Stanley where a tall old tree managed by the LCSD fell on a teenage girl, causing great concerns about the public safety aspects of tree management. The Coroner's Court inquiry revealed weaknesses in the LCSD's tree inspection system, including a lack of professional knowledge from management to frontline staff. Details of more recent tree collapse cases are given in paragraph 1.10.

Task Force Review in 2009

1.7 In March 2009, the Chief Secretary for Administration led an inter-departmental Task Force to review tree management issues, particularly the public safety concerns expressed by the Coroner's Court relating to the Stanley tree collapse case. In June 2009, the Task Force published its Report entitled "People, Trees, Harmony". The key conclusions and recommendations of the Report include:

- (a) ***Holistic approach to tree management.*** Although the review emanated from public concern over tree safety, the Task Force recognised that tree safety could not be tackled in isolation through management and maintenance without putting this work in the overall context of the greening and landscape policy. The Government should therefore tackle tree management in a comprehensive and sustainable manner, addressing issues such as appropriate planning, proper identification of planting locations, suitable design and careful selection of species;

- (b) ***Institutional framework.*** The Task Force had reviewed the integrated approach to tree management (see para. 1.4) and considered it to be generally efficient and cost effective. However, there was room for improvement. In order to coordinate better the work of different departments, the Development Bureau (DEVB) should take up the overall policy responsibility for greening, landscape and tree management (see also paras. 1.8 and 1.9);
- (c) ***Tree risk assessment (TRA).*** There was a need to enhance the TRA arrangements to better protect public safety. The Government should adopt new TRA arrangements based on a dual approach (comprising an “area basis” assessment and a “tree basis” assessment — see also paras. 3.2 to 3.8 for details);
- (d) ***Expertise and training.*** Tree management (particularly TRA) was a professional task. The Government should enhance training to ensure that it has adequate quality staff at different levels;
- (e) ***Community involvement and public education.*** Apart from the Government, the community could play a significant role in helping to preserve trees. The Government should strengthen community involvement and public education; and
- (f) ***Tree legislation.*** The Task Force had reviewed the need for a new tree ordinance and considered that there was no need to introduce any legislative change at the moment. Government efforts should instead be channelled to the administrative means proposed to improve coordination, enhance TRA, upgrade expertise and involve the community (see also paras. 6.7 and 6.8).

Setting up of the Tree Management Office

1.8 Pursuant to the recommendations of the Task Force Report, the DEVB has taken up the overall policy responsibility for greening, landscape and tree management. In March 2010, the DEVB established the Greening, Landscape and Tree Management Section (GLTMS). The GLTMS, headed by a Principal Assistant Secretary, is underpinned by the Greening and Landscape Office (GLO) and the Tree Management Office (TMO), which work in close cooperation to promote a

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holistic greening approach. The estimated expenditure for the GLTMS in 2014-15 amounted to \$46.2 million. An organisation chart of the GLTMS is at Appendix B.

1.9 To ensure more effective implementation across departments of the integrated approach to tree management, the TMO acts as a central authority to give policy steer, a focal point of coordination of departmental efforts, and a provider of arboricultural expertise. The key areas of work of the TMO include, among other things:

- (a) enhancing tree risk management;
- (b) raising the professional standard of tree management by, for example, enhancing training for tree management personnel in departments, developing practice guidelines and conducting researches, and setting up an inventory of trees;
- (c) enhancing community involvement and public education; and
- (d) enhancing the tree complaint mechanism and the emergency response system.

The TMO has an establishment of 15 professional and 2 technical staff. Five administrative staff are also shared between the TMO and the GLO.

Recent tree collapse cases

1.10 Since the 2008 Stanley incident (see para. 1.6) and the setting up of the TMO in March 2010 (see para. 1.8), there have been a number of serious tree collapse cases, as follows:

- (a) in June 2010, a tree located along a cycling track in Sha Tin collapsed on a cyclist, causing his death;
- (b) in July 2012, a tall old tree located at Park Lane Shoppers' Boulevard in Tsim Sha Tsui collapsed, causing injuries to five persons;

- (c) in October 2012, a tree located along a rural access road in Tai Po collapsed on a lorry, causing the death of its passenger; and
- (d) in August 2014, a tree located on a private slope at Mid-levels collapsed on a pedestrian, causing her death (see also paras. 6.6 to 6.10).

Audit review

1.11 In May 2014, the Audit Commission (Audit) commenced a review of the Government's efforts in enhancing tree safety. The audit fieldwork was completed in August 2014. The review focused on the improvement measures taken since the setting up of the TMO, covering the following areas:

- (a) coordinating the work of tree management departments (PART 2);
- (b) tree risk assessment (PART 3);
- (c) management information systems and databases (PART 4);
- (d) training and community involvement (PART 5); and
- (e) way forward (PART 6).

Audit has found that there is room for improvement in the above areas and has made recommendations to address the issues.

More recent development

1.12 On 23 September 2014, the Ombudsman announced that her office would conduct a direct investigation into the tree management regime and practices of the TMO and other relevant departments. The Ombudsman's investigation would focus on examining the Government's tree management regime and the relevant legal framework, and the TMO's practices in overseeing and coordinating departments in their management of trees.

Acknowledgement

1.13 Audit would like to acknowledge with gratitude the full cooperation of the staff of the DEVB, the LCSD, the HyD, and the LandsD during the course of the audit review.

PART 2: COORDINATING THE WORK OF TREE MANAGEMENT DEPARTMENTS

2.1 This PART examines the TMO's efforts in coordinating the work of tree management departments. Audit has found room for improvement in the following areas:

- (a) coordinating the work of non-core departments in tree management (paras. 2.2 to 2.14);
- (b) delineation of management responsibilities for roadside trees (paras. 2.15 to 2.34); and
- (c) maintenance of roadside trees on unallocated government land (paras. 2.35 to 2.48).

Coordinating the work of non-core departments in tree management

Integrated approach to tree management

2.2 Over the years, the Government has adopted an "integrated approach" in assigning responsibilities for preserving and maintaining all vegetation (including trees and other plants) on government land among relevant departments. The arrangement is set out in a number of Technical Circulars promulgated by the Works Branch of the DEVB and its predecessor, the then Environment, Transport and Works Bureau (ETWB). As a general guide, under this approach, the demarcation of maintenance responsibilities is based on where trees are located and which departments are responsible to maintain the facilities thereon (e.g. country parks, leisure parks, expressways, public housing, etc.). Tree maintenance is then part and parcel of the daily management duty of the facilities.

2.3 While recognising that the existing integrated approach to tree management to be generally efficient and cost-effective, the Task Force identified a number of inadequacies and recommended the setting up of a new tree office

Coordinating the work of tree management departments

(i.e. the TMO) as the central authority and focal point for coordination to ensure more effective implementation of the integrated approach (see para. 1.7(b)).

2.4 Technical Circular (Works) No. 2/2004 “Maintenance of Vegetation and Hard Landscape Features” (the Technical Circular) issued in March 2004 by the ETWB sets out the demarcation of maintenance responsibilities among government departments for vegetation on government land. It provides the basis for the integrated approach to tree management.

2.5 The TMO is the central coordinating authority for implementing the integrated approach. When the TMO was set up in March 2010, it focused its efforts on the nine major tree management departments (i.e. core departments) which maintained a large number of trees (see Appendix A). Besides the core departments, there were other tree management departments (i.e. non-core departments) that were also responsible for maintaining trees on their allocated land. In its early years, the TMO had close liaison with the core departments and collected from them information about the trees they maintained. However, little information was collected from non-core departments, such as the number of trees they maintained and their arrangements for tree maintenance.

Survey of trees maintained by non-core departments

2.6 In July 2012, the TMO decided to conduct a survey to collect tree-related statistics from all government departments. From their response, 20 non-core departments were identified, with an inventory of some 180,000 trees. The TMO repeated the survey in 2013 and 2014. More non-core departments were added to the list. Appendix C shows the results of the TMO’s surveys conducted in 2012, 2013 and 2014.

2.7 Appendix C shows that, as at 31 March 2014, a total of 27 non-core departments were maintaining some 182,000 trees. Among them, the Environmental Protection Department (EPD) was maintaining the largest number of trees. It had a stock of some 160,000 trees, even more than many of the core departments. Nearly all (158,000 or 99%) of the EPD’s trees were located at restored landfills not accessible to the public. Some of these restored landfills were located in urban areas having an interface with roads and pavements. The trees along the boundary of these restored landfills may pose a safety risk to the public if

they collapse. In fact, in 2013, there was a tree collapse case at a restored landfill in Kwai Chung (see Case 1).

Case 1

Tree collapse incident at a restored landfill managed by the EPD (15 June 2013)

1. The Gin Drinkers Bay Landfill in Kwai Chung was closed in 1979. The LCSD intended to develop it as a park (the Kwai Chung Park) for public use. Because of some development issues, the Park has never been opened (Note) and continues to be managed by the EPD. The Park is on a small hill (with an area of some 29 hectares) surrounded by roads and pedestrian walkways with bus stops. Inside the Park are some 39,000 trees, with many on the slopes of its edges along the roadside (see Figure 1).

Figure 1

Location of tree collapse incident in Kwai Chung Park



Case 1 (Cont'd)

2. On 15 June 2013, during heavy rain, three adjoining tall trees on a slope of the Park fell on the adjacent Kwai Hei Street, hitting a passing car. The car was damaged and the driver was injured and taken to hospital for treatment.

3. The TMO followed up with the EPD for the causes of the tree collapse. The EPD considered that the tree collapse was probably due to sudden strong wind during the continuous rainy days. On request, the EPD submitted to the TMO tree inspection records of the Park completed by its landfill restoration contractor (a waste management company). The TMO considered that the tree inspection conducted on the Park was not up to the acceptable standard. In response, the EPD informed the TMO that the contractor had strengthened the tree inspection of the site and had arranged to prune and remove dead branches or leaning trees when required. At the same time, the EPD was reviewing the tree risk assessment arrangement and asked for information about relevant training courses organised by the TMO.

Audit comments

4. The EPD maintains a large number of trees, mostly at restored landfills. While most of the trees are located in areas not accessible to the public, the 2013 incident revealed the public safety risk of tree collapse at restored landfills, particularly for those trees along the boundary of these sites having an interface with roads and pavements. As a non-core department, the EPD might not be fully aware of its maintenance responsibilities and the requirements for conducting tree risk assessment. There is a need for the TMO to step up efforts to regularly remind non-core departments of their maintenance responsibilities for trees under their purview, and provide necessary advice and assistance to them.

Source: Audit analysis of DEVB records

Note: Issues related to the development of the Kwai Chung Park were reported in paragraphs 2.27 to 2.34 of Chapter 4 of the Director of Audit's Report No. 60 of March 2013.

Coordinating the work of tree management departments

2.8 Besides the large number of trees maintained by the EPD, Audit also noted from the survey results that the number of non-core departments increased from 20 in 2012 to 27 in 2014, indicating that some departments might have not responded to the 2012 survey, or they were not sure whether they were responsible for tree maintenance.

2.9 The current strategy of the TMO in coordinating the work of tree management departments focuses on the core departments. Many administrative measures for tree management apply mainly to the core departments, including:

- (a) having representatives in the committees (Note 2) under the GLTMS;
- (b) submission of TRA progress reports and completed TRA forms for the TMO's checking;
- (c) monitoring of tree complaint cases on a monthly basis;
- (d) incorporation of tree information in the TMO's centralised tree database (see para. 4.3); and
- (e) receiving invitation to training courses on TRA organised by the TMO.

2.10 Owing to the large number of trees (some 180,000) maintained by 27 non-core departments, Audit considers that the TMO needs to refine its strategy for coordinating the work of tree management departments and applying more administrative measures to non-core departments. The TMO's surveys of non-core departments only required them to provide information about the number of trees they maintained, number of trees felled during the year, maintenance expenditure,

Note 2: *The committees are the Steering Committee on Greening, Landscape and Tree Management, the Works and Maintenance Committee on Greening, the Community Involvement Committee on Greening, and the Training Committee on Greening, Landscape and Tree Management.*

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and whether the maintenance work was outsourced. The TMO may consider collecting more information from non-core departments about their tree maintenance arrangements (e.g. compliance with relevant circulars and guidelines, and the use of qualified contractors, etc.) to facilitate the coordination of the work of tree management departments.

Audit recommendations

2.11 Audit has *recommended* that the Secretary for Development should:

- (a) collect more information about the tree maintenance practices of non-core departments, take measures to ensure that they adequately discharge their responsibilities for tree management, and provide necessary advice and assistance to them;**
- (b) step up efforts to regularly remind non-core departments of their maintenance responsibilities for trees under their purview; and**
- (c) consider refining the TMO's strategy for coordinating the work of tree management departments, and applying more administrative measures to non-core departments (particularly those maintaining a large number of trees, e.g. the EPD).**

2.12 Audit has also *recommended* that the Director of Environmental Protection should strengthen the EPD's tree maintenance practices to ensure that all trees under its purview are properly maintained in accordance with the laid-down guidelines.

Response from the Administration

2.13 The Secretary for Development agrees with the audit recommendations in paragraph 2.11.

2.14 The Director of Environmental Protection agrees with the audit recommendation in paragraph 2.12. She has said that the EPD is committed to strengthening its tree maintenance practices to ensure that all trees under its purview are properly maintained in accordance with the laid-down procedures. Proper training will also be provided to staff on tree management so that they could adequately discharge their duties.

Delineation of management responsibilities for roadside trees

2.15 Trees at roadside areas pose a particular safety risk to pedestrians and road users, especially in areas with high pedestrian and/or vehicular flow. In the past, most of the serious cases causing deaths or major injuries to members of the public involved roadside trees (see paras. 1.6 and 1.10).

2.16 When a roadside tree is located on allocated government land, the maintenance responsibility falls on the allocatee department. Nevertheless, many of the roadside trees are found along roads and pavements which are unallocated government land (Note 3). According to the Technical Circular, the maintenance responsibilities of roadside trees on unallocated government land are divided among several departments, as follows:

- (a) the LCSD is responsible for vegetation (including trees and other plants) on landscaped areas along non-expressway public roads outside country parks;
- (b) the AFCD is responsible for vegetation along non-expressway public roads within country parks;

Note 3: *Unallocated government land means government land which has not been allocated by the LandsD to another government bureau or department via a handover record. It signifies the land status rather than management responsibility. Various departments are involved in the management of public roads and pavements which are regarded as unallocated government land, e.g. the LandsD for unlawful occupation by structures, the Food and Environmental Hygiene Department for cleanliness, and the HyD for structural maintenance.*

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- (c) the HyD is responsible for vegetation within the boundary of expressways, and on man-made slopes it maintains. In emergencies where fallen trees, overgrown bushes or grass pose imminent danger to pedestrians or road users, the HyD is responsible for removal of the vegetation; and
- (d) the LandsD is responsible for the ad hoc maintenance of vegetation on unallocated government land not maintained by any other departments.

2.17 Broadly speaking, apart from expressways (under the purview of the HyD) and country parks (under the purview of the AFCD), the LCSD is responsible for roadside trees on landscaped areas, whereas the LandsD is responsible for the ad hoc maintenance of roadside trees on unallocated government land not maintained by any other departments when a complaint or referral is received calling for such maintenance.

Disagreements over maintenance responsibilities for roadside trees

2.18 All along, there have been disagreements among departments over the delineation of maintenance responsibilities for roadside trees, particularly regarding whether a particular tree is within a “landscaped area”, the definition of a landscaped area, and the existence or otherwise of handover records. Such disagreements were often triggered by a tree complaint when the department responsible for maintaining the tree concerned had to be identified. The departments involved would sort out among themselves on a case-by-case basis to identify the responsible party for taking up the tree complaint.

2.19 According to the Technical Circular, a landscaped area refers to an area where planting or hard landscape features have been undertaken to improve the environment. In the LCSD’s view, a landscaped area should be an area with landscape design elements such as roadside planters or tree pits. On the other hand, in the TMO’s view, a landscaped area should be an area with intentional plantings irrespective of whether the plantings are located in planters or tree pits.

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2.20 The disagreements among departments had affected the handling of tree complaints and other tree management work. In a paper submitted to the Works and Maintenance Committee on Greening (WMCG — Note 4) in January 2013, it was stated that:

- (a) though the delineation of responsibilities for tree maintenance was clearly defined in the Technical Circular, there were frequent disputes among government departments;
- (b) this sometimes caused delay in handling tree complaint cases in a timely manner, waste of time and resources by departments in arguing their cases, dissatisfaction of complainants, and more importantly, potential hazards to the public. From the public's perspective, these disputed cases could give an impression that departments were irresponsible and the Government was incompetent in tree management; and
- (c) it was essential that tree-related complaint/enquiry cases should be effectively handled and resolved by the responsible departments so as to mitigate potential hazards posed by trees and enhance public safety.

2.21 From December 2012 to September 2013, three meetings were held among the DEVB, the LCSD and the LandsD to resolve the differences in the interpretation of the definition of a landscaped area for the determination of tree maintenance responsibility. As a result of the meetings, it was agreed that when an agreement could not be reached among departments, the TMO would review the case and adjudicate as to which department was responsible for tree management. Departments aggrieved with the TMO's ruling on tree maintenance responsibilities might appeal. Pending an appeal and consideration by the Appeal Board (Note 5), the department concerned would follow up the case as assigned until such time the appeal result overturns the TMO's ruling. Audit noted that, up to July 2014, the

Note 4: *The WMCG is chaired by the responsible Deputy Secretary (Works) of the DEVB. Its roles, among others, are to oversee the tree management system, and to resolve inter-departmental interface issues arising from greening, landscape and tree management work.*

Note 5: *The Appeal Board is chaired by the responsible Deputy Secretary (Works) of the DEVB. Up to July 2014, no cases had been brought to the attention of the Appeal Board.*

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relevant departments had not yet fully settled their disagreements over the interpretation of the definition of a landscaped area, and there were still dispute cases over maintenance responsibilities for adjudication by the TMO (Note 6).

Roadside tree survey

2.22 Roadside trees are mainly maintained by the LCSD and the LandsD (see para. 2.17). According to its tree inventory, as at May 2014, the LCSD was maintaining about 140,000 trees on roadside landscaped areas. According to the Technical Circular, the LandsD is responsible for carrying out maintenance of roadside trees on an ad hoc basis (see also paras. 2.35 to 2.45 for details), i.e. mainly when a requirement is identified or a complaint/referral is received. In 2010 and 2011, the LandsD expressed concern over the vast area of unallocated government land and the large number of roadside trees involved. Meanwhile, there was also a lack of an inventory of such roadside trees concerning their health and structural conditions, especially for those trees along roadside which were not under regular inspection and maintenance.

2.23 In 2011, the DEVB considered that there was a need to enhance tree risk management, especially for roadside trees on unallocated government land under the ad hoc maintenance by the LandsD. The DEVB decided that it was necessary to have a general understanding of the quantity and quality of these trees in order to facilitate policy considerations on the maintenance approach for roadside trees. In July 2012, the TMO embarked on a territory-wide roadside tree survey covering all the 18 districts in Hong Kong. According to a paper submitted to the Steering Committee on Greening, Landscape and Tree Management in December 2013, the objectives of the roadside tree survey were to:

- (a) build up a database of roadside trees for tree management use;
- (b) identify and delineate maintenance responsibilities of the surveyed trees; and

Note 6: *Since the implementation of the adjudication system in August 2013 and up to June 2014, the TMO had dealt with 39 dispute cases (involving 735 trees), including 4 adjudication cases (involving 21 trees).*

- (c) identify trees with health and/or structural problems and refer them to relevant government departments for mitigation actions.

The survey did not cover roadside trees already included in the tree inventories of the LCSD, the HyD and other tree management departments.

2.24 As at June 2014, the TMO had substantially completed the fieldwork of the roadside tree survey. A total of some 70,000 roadside trees not included in the inventories of any tree management departments were found. During the survey, the TMO also identified 1,339 problematic trees and made referrals to relevant departments for follow-up actions. As at September 2014, the TMO was working on the delineation of maintenance responsibilities of the surveyed trees according to the land status and other relevant factors.

2.25 According to the TMO, as at September 2014, it had completed the initial assessment on the delineation of maintenance responsibilities of the surveyed trees for 5 of the 18 districts, and would come up with the initial assessment for another 6 districts in October 2014. Audit considers that the TMO needs to expedite the delineation of the surveyed trees and agree with the departments concerned on such delineation, so that they can prepare for taking up the maintenance responsibilities, such as including the trees in their tree inventories and making preparation for tree maintenance work.

2.26 The TMO was liaising with relevant departments to seek their agreement on the delineation of maintenance responsibilities. An Appeal Board was also in place for resolving disagreements among departments (see para. 2.21). As the assignment of maintenance responsibilities was still in progress, the collected information was not yet used for tree management work. Moreover, as at September 2014, a review of the policy considerations (see para. 2.23) concerning the ad hoc maintenance approach applicable to the LandsD under the Technical Circular for roadside trees had not been completed (see also paras. 2.42 to 2.45).

Coverage of the roadside tree survey

2.27 Roadside trees on unallocated government land could be found along both public roads/carriageways and village access roads/footpaths. However, Audit noted that the scope of the TMO's roadside tree survey covered only public

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roads/carriageways. Roadside trees along village access roads/footpaths in rural areas were not covered in the survey. Nevertheless, shortly after the commencement of the field work of the TMO's roadside tree survey in July 2012, a fatal tree collapse case occurred on a village access road in October 2012 (see para. 1.10(c)). The incident prompted the LandsD to conduct a special tree inspection to cover roadside trees along village access roads/footpaths (see also para. 2.39). The key objective of the TMO's survey was to build up a database of roadside trees (see para. 2.23(a)). As the scope of this roadside tree survey only covered public roads/carriageways but not village access roads/footpaths, a comprehensive database of roadside trees would not be available.

2.28 Audit also noted that:

- (a) the survey covered roadside areas measuring 5 metres from the road kerb. However, in many locations, the roadside areas might extend beyond 5 metres from the kerb. On the other hand, the special tree inspection started by the LandsD in December 2013 covered roadside areas measuring 10 metres from the road kerb (see para. 2.39(b)). Audit considers that roadside trees (particularly tall trees) located more than 5 metres from the road kerb may pose a threat to pedestrians and road users and need to be included in the survey; and
- (b) for roadside trees on sites not readily accessible (e.g. tall slopes or sites with constraints for access), the survey was conducted in tree groups with inspection performed at a distance (i.e. without close inspection of the individual trees). About 50% of the 70,000 trees surveyed were inspected in tree groups.

2.29 Upon enquiry about the limited scope and coverage of the roadside tree survey, the TMO explained to Audit that:

- (a) the primary objective of the roadside tree survey was to have a general understanding of the quantity and quality of these trees in order to facilitate policy considerations on the maintenance approach for roadside trees (see para. 2.23);

- (b) the TMO considered that the roadside tree survey which was risk-based had achieved its objective as it had formed the basis for the DEVB to develop policy directives; and
- (c) the number of trees beyond 5 metres would be significantly smaller than those within 5 metres given that there were buildings and development in most situations.

Different managers for trees in the same locality

2.30 The delineation of tree maintenance responsibilities under the integrated approach based on the Technical Circular has resulted in a number of departments taking up the maintenance responsibilities for trees in the same locality. Such cases usually involve roadside trees where the LandsD, the LCSD and other departments are responsible for different trees in the same locality. For example, at a roadside area with both a landscaped area and naturally grown trees, the LCSD is responsible for the trees in the landscaped area, while the LandsD is responsible for the remaining trees on an ad hoc basis. Where a roadside man-made slope is involved, the slope maintenance department (e.g. the HyD) is responsible for the trees on the slope. Other departments may also be involved if the roadside area involves allocated government land nearby. Under such circumstances, tree maintenance involving multiple departments may not be cost-effective. There are also increased risks that the trees involved are not taken care of since they may not be easily differentiated from each other in the absence of clear tree labels.

2.31 This issue was discussed at a meeting of the WMCG held in January 2013. The TMO proposed that, for trees in the same locality, the department with the responsibility for the larger portion of trees was encouraged to take up the responsibility for the entire area, with reference to the “lion’s share principle” adopted for slope maintenance. Nevertheless, this approach was not mandatory. Departments were only encouraged to take into account the lion’s share principle in negotiating the delineation of tree maintenance responsibilities for the sake of cost-effectiveness and public interest. It was concluded that the arrangement would only proceed on a case-by-case basis through negotiation and agreement among departments.

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2.32 Audit supports the idea of adopting the lion's share principle in delineating tree management responsibilities to departments involved. However, Audit noted from the TMO's records that, up to July 2014, there had not been any successful cases of applying such principle. It appears that more needs to be done to encourage the adoption of the lion's share principle by the departments that are managing trees.

Audit recommendations

2.33 **Audit has *recommended* that the Secretary for Development should:**

- (a) **having regard to the findings of the roadside tree survey, expedite action to review the policy considerations concerning the maintenance approach for roadside trees (see para. 2.26), and sort out the delineation of maintenance responsibilities of the surveyed trees of the TMO's roadside tree survey so that the departments concerned can promptly take up the maintenance responsibilities; and**
- (b) **step up efforts to further promote the adoption of the lion's share principle by departments for taking up tree management responsibilities, taking due account of cost-effectiveness and public interest.**

Response from the Administration

2.34 The Secretary for Development agrees with the audit recommendations. He has said that the delineation of maintenance responsibilities of roadside trees is on-going. The TMO will delineate the maintenance responsibilities based on the cost-effectiveness, efficiency, expertise, ease of operation, appropriateness and other relevant factors.

Maintenance of roadside trees on unallocated government land

2.35 Roadside trees could be of natural or planted origin. According to the Technical Circular, regular maintenance operations are required for vegetation on

landscaped areas to ensure the healthy establishment and growth of plants, which in general include watering, fertilising, weeding, pruning, mulching, pest control, replacement, etc. as appropriate. The required maintenance operations vary depending on the species, stage of maturity and planting objectives. For natural vegetation on unallocated government land not maintained by any other departments, the LandsD will carry out ad hoc maintenance (e.g. tree felling, trimming and grass cutting) when it receives complaints or referrals, or when its staff come across trees that may have problems during their day-to-day land control duties.

2.36 Ad hoc maintenance by the LandsD as set out in the Technical Circular was one of the inadequacies of the integrated approach identified by the Task Force in 2009 (see para. 1.7(b)). It was noted that the LandsD had no in-house expertise on trees and had to seek professional advice from other departments such as the LCSD and the AFCD, which might lead to a delay on prompt resolution of tree problems. Moreover, unallocated government land totalled about 33,000 hectares (33% of all land in Hong Kong) and there was no detailed record or statistics on the number of trees thereon. While recognising that the LandsD had a grave problem in coping with the work concerned, the Task Force did not propose any changes to such ad hoc maintenance approach. The Task Force suggested the setting up of a new tree unit in the LandsD to enable it to effectively discharge its duties without having to seek expert advice from other departments. The Tree Unit was set up in 2010 with an establishment of 12 staff.

2.37 In 2010 and 2011, the LandsD expressed concern to the DEVB over the adoption of the ad hoc maintenance approach on a large number of roadside trees on unallocated government land under its purview (see para. 2.22). In 2011, the DEVB decided to conduct a roadside tree survey to assess the quantity and quality of these trees in order to facilitate policy considerations (see para. 2.23).

Tree safety in rural areas

2.38 In October 2012 (after the TMO had started its roadside tree survey in July 2012), a fatal tree collapse case caused by a roadside tree occurred in Tai Po (see para. 1.10(c)). Details are given in Case 2.

Case 2

Tree collapse incident at Lam Tsuen Sun Tsuen, Tai Po (11 October 2012)

1. On 11 October 2012, around 10:30 a.m., a heavy branch fell from a Chinese banyan tree at the verge of a slip road linking Lam Tsuen Sun Tsuen to Lam Kam Road in Tai Po. The branch hit a passing lorry and crushed the driver's cabin. The driver was injured and the passenger (a delivery worker) was killed.

2. The collapsed tree was a roadside tree on unallocated land on a village access road. In response to media enquiries, the LandsD confirmed that the collapsed tree was under its ad hoc maintenance. In the absence of any complaint before the incident, LandsD staff had not previously inspected the tree.

3. The TMO investigated the tree collapse case and compiled a report. According to the report, the fallen branch was a heavy lateral limb with sign of decay on its attachment to the main trunk. The weak point at the attachment was considered as the main reason for the branch failure. It was suspected that the lorry might have hit the decayed branch before the collapse. The police made an investigation on this case and submitted the Death Report to the Coroner's Office in April 2013 recommending that no "Death Inquest" was required. On 3 May 2013, the Coroner's Office informed the Police that the Coroner had decided that a Death Inquest was not required.

Audit comments

4. Village access roads in rural areas are usually lined with trees, more often than roads in urban areas. Proper maintenance of roadside trees along rural roads is important for public safety. In accordance with the Technical Circular, roadside trees along rural roads (other than those along footpaths in village environs and access roads maintained by the Home Affairs Department) are under the ad hoc maintenance by the LandsD upon complaint or referral. This tree collapse case highlighted inadequacies in the ad hoc maintenance of roadside trees for ensuring public safety.

Source: DEVB records

Special tree inspection exercise

2.39 After the Tai Po tree collapse case, the LandsD considered that there was growing public concern over tree safety in rural areas. In November 2012, the LandsD planned to conduct a special tree inspection exercise to identify hazardous and potentially hazardous trees along village access roads and footpaths on unallocated government land with relatively high pedestrian and/or vehicular flow in rural areas in the New Territories, and to carry out appropriate remedial works of the trees for public safety. The objectives and scope of the special tree inspection were to:

- (a) complete tree survey along 685 selected village access roads and footpaths, with a total length of about 250 kilometres covering an area of some 5 million square metres;
- (b) survey all trees within 10 metres from both sides of each selected road or footpath (a total of about 150,000 trees); and
- (c) remove trees identified dead, collapsed, with imminent danger or obvious defects posing immediate hazard to the public.

2.40 The LandsD started the special tree inspection in December 2013. The original plan was to complete all the work in three years' time. In March 2014, after completing the preliminary stage of the inspection, the LandsD revised the time schedule to six years in the light of experience and operational circumstances. As at July 2014, the special tree inspection exercise was still in progress.

2.41 Audit noted that the village access roads and footpaths covered by the LandsD's special tree inspection were not included in the scope of the TMO's roadside tree survey (see para. 2.27). Audit also noted the following issues that might hamper the effectiveness of the special tree inspection exercise:

- (a) the inspection was intended to be a one-off exercise. There was no plan to provide any form of regular maintenance for roadside trees along rural roads after completion of the inspection; and

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- (b) the inspection would not generate tree information for compiling a tree database for enhancing management of roadside trees in rural areas.

Need to review the ad hoc maintenance approach

2.42 Trees require proper maintenance to prevent failure incidents which may result in loss of life, injuries, damage to property and obstruction to traffic. Roadside trees pose a particular risk to pedestrians and road users. Currently, the modus operandi as set out in the Technical Circular does not require a regular programme for tree maintenance in respect of those trees on unallocated government land under the purview of the LandsD. The LandsD adopts the ad hoc maintenance approach in accordance with the Technical Circular and looks to its staff to identify trees that may have problems and take follow-up actions when discharging day-to-day functions of land control, and acts on receipt of complaints or referrals. The lack of an inventory of trees on unallocated government land has further hampered the LandsD's efficiency and effectiveness in handling tree complaints and referrals.

2.43 Upon enquiry, in September 2014, the LandsD informed Audit that the LandsD was first involved in tree maintenance in May 2002 and at that time, the LandsD was not required to maintain trees along streets and roads. Instead, the LandsD took up trees not claimed by any other departments on unallocated government land. Given the large but unknown number of such "unclaimed" trees and the resultant strain on the LandsD, and on the understanding that such trees were unlikely to be along roadside, it had since then been accepted within the Government that trees put under the LandsD would only be subject to ad hoc rather than regular maintenance. Since the issue of the Technical Circular in March 2004, trees falling on non-landscaped areas along non-expressway roads and pavements had been put under the LandsD's purview. The LandsD continued to carry out ad hoc maintenance of such trees as spelt out in the Technical Circular.

2.44 The 2012 fatal tree collapse case in Tai Po highlighted inadequacies in the ad hoc maintenance of roadside trees for ensuring public safety. Audit noted that the TMO's roadside tree survey started in July 2012 was intended to provide input for policy considerations concerning the ad hoc maintenance approach (see para. 2.23). There is a need for a critical review of the ad hoc maintenance

approach, taking into account the previous tree collapse cases, as well as the results of the TMO's roadside tree survey and the LandsD's special tree inspection exercise. In Audit's view, it is imperative to implement some form of regular maintenance for roadside trees under the LandsD's purview.

2.45 Besides trees on non-landscaped roadside areas, the LandsD is also responsible for maintaining trees on other unallocated government land, including vacant government land all over the territory pending development, allocation or sale. Under the current arrangement, these trees are also under ad hoc maintenance.

Audit recommendations

2.46 **Audit has *recommended* that the Secretary for Development and the Director of Lands should consider implementing regular maintenance for trees on unallocated government land, particularly roadside trees, which currently are under ad hoc maintenance.**

2.47 **Audit has also *recommended* that the Director of Lands should expedite action to complete the special tree inspection for roadside trees on village access roads and footpaths in rural areas.**

Response from the Administration

2.48 The Secretary for Development and the Director of Lands agree with the audit recommendations.

PART 3: TREE RISK ASSESSMENT

3.1 This PART examines the TMO's implementation of new TRA arrangements and other tree risk management issues relating to old and valuable trees (OVTs) and brown root rot (BRR) disease. Audit has found room for improvement in the following areas:

- (a) implementation of the TRA (paras. 3.2 to 3.42);
- (b) maintenance of OVTs (paras. 3.43 to 3.51); and
- (c) tackling BRR disease (paras. 3.52 to 3.61).

Implementation of the tree risk assessment

3.2 The Task Force, making reference to international best practices, recommended new TRA arrangements based on a dual approach (see para. 1.7(c)). Pursuant to this recommendation, the TMO has issued and updated guidelines on the dual-approach TRA (the TRA Guidelines). The TRA Guidelines provide guidance to tree management departments to implement the dual-approach TRA to achieve the objective of identifying problematic trees in a professional and systematic manner for taking timely remedial measures to protect public safety.

Area-basis assessment

3.3 The dual-approach TRA comprises two stages, namely the area-basis assessment and the tree-basis assessment. In carrying out the area-basis assessment of sites under its purview, a tree management department should classify the sites into three types of risk zones (i.e. Category I, II and III zones — see Table 1) based on the intensity of traffic/pedestrian flow.

Table 1

Categories of tree risk management zones

Category I zone	Target areas are intensively used with high traffic flow and high pedestrian flow, such as public parks, playgrounds, crowded streets, busy carriageways, schools, etc.
Category II zone	Target areas are infrequently used with low traffic flow and low pedestrian flow, such as road verges of limited access, countryside roads, village footpaths, etc.
Category III zone	Target areas are rarely used with very rare public access, such as inaccessible areas, remote countryside slopes, dense woodlands, maintenance access not open for public, etc.

Source: DEVB records

3.4 The objective of the area-basis assessment is to let tree management departments focus on high-risk sites (i.e. Category I zones) so that they can accord priority to these sites for more effective risk management. According to the TRA Guidelines, for Category I zones, the tree-basis assessment has to be carried out at least once a year.

Tree-basis assessment

3.5 The tree-basis assessment of a site comprises a group inspection of all trees of the site, and detailed inspections of particular problematic/important trees. The purpose of a group inspection is to identify problematic trees. According to the TRA Guidelines, the following types of problematic trees have to be identified in a group inspection:

- (a) trees on a complaint list with structural or health problems;
- (b) mature trees belonging to species with brittle wood structure and having unsatisfactory structural or health conditions with failure potential;

- (c) trees with major defects or health problems; and
- (d) trees growing in very stressful site conditions with failure potential.

3.6 In carrying out a group inspection of the trees of a site, visual assessment of the trees is conducted. A “Form 1” is used for recording the results of a group inspection, and a group inspection is referred to as a Form 1 inspection (Note 7).

3.7 For the problematic trees identified in a group inspection, if the remedial measures taken on the spot cannot eliminate the risks, detailed inspections have to be carried out. The purpose of a detailed inspection of a tree is to identify in detail the risks and the appropriate remedial measures. For OVTs and stonewall trees (i.e. important trees), detailed inspections have to be carried out as a rule under the TRA Guidelines.

3.8 In carrying out a detailed inspection of a tree, visual assessment and/or aerial assessment (by climbing up the tree — see Photograph 3) are conducted to assess in detail the general conditions of the tree, the conditions of its parts (i.e. crown, branches, trunk and roots) and the conditions of the site. Appropriate equipment (e.g. tomograph and resistograph — Note 8) may be used to assess the extent of structural problems (see Photograph 4 and Figure 2). A hazard rating from 3 to 12 is assessed based on the failure potential, the size of the tree (or parts of it) and the frequency of targets (i.e. people, properties and human activities)

Note 7: *According to the TRA Guidelines, the inspection officers for Form 1 inspections have to meet the requirements of both training/qualification and working experience (i.e. having attended TRA training courses organised/recognised by the TMO or with valid qualification/certification on arboriculture, and with at least 2 years of working experience in tree management).*

Note 8: *A tomograph is a device used for producing sectional images of a tree to depict internal decay or cavities. A resistograph is a device used for inspecting a tree to ascertain wood density and to detect internal decay or cavities.*

using the area under the tree. A “Form 2” is used for recording the results of a detailed inspection, and a detailed inspection is referred to as a Form 2 inspection (Note 9).

Photograph 3

Aerial assessment on a tree



Source: LCSD records

Photograph 4

Detailed tree assessment using tomograph

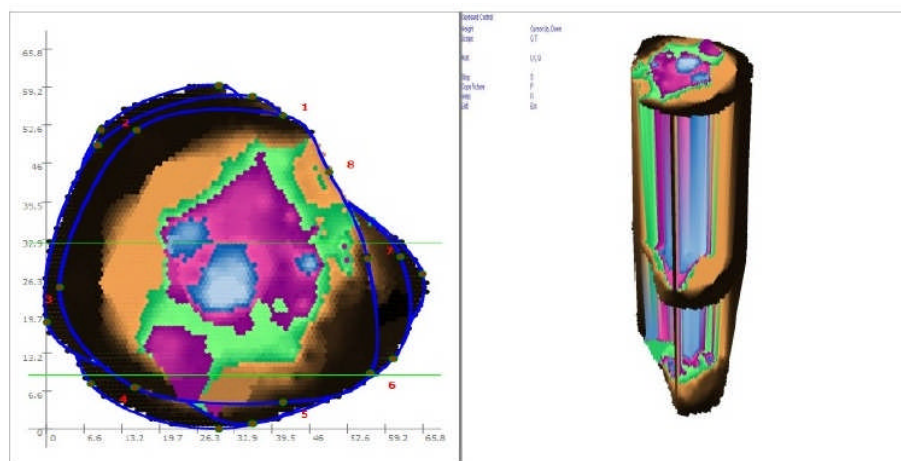


Source: LCSD records

Note 9: *According to the TRA Guidelines, the inspection officers for Form 2 inspections have to meet all the requirements of training, qualification and working experience (i.e. having attended TRA training courses organised/recognised by the TMO, and preferably with valid qualification/certification on arboriculture, and with at least 2 years of working experience in tree management).*

Figure 2

Internal image of the tree produced by tomograph



Source: LCSD records

Remarks: Different colours indicate different wood densities.

Results of annual TRA exercises

3.9 After carrying out the tree-basis assessment, depending on the problems identified, the remedial measures to be taken on problematic trees may include pruning to remove dead and defective branches, controlling pests and diseases, and installing tree support systems. If there are no practical remedial measures, the last resort is to remove hazardous trees to protect public safety.

3.10 Of the nine major tree management departments (see para. 2.5), the LandsD did not implement the TRA (Note 10). For the remaining eight departments (i.e. HyD, LCSD, ArchSD, HD, WSD, AFCD, CEDD and DSD), they implemented the TRA subject to the TMO's monitoring. Table 2 shows, in respect of these eight departments, the number of inspections completed under the annual TRA exercises since 2011.

Note 10: *The LandsD conducted inspections regularly for OVTs and stonewall trees under its management, and on a need basis for some trees (e.g. those under monitoring or complaint).*

Table 2

**Inspections completed under the annual TRA exercises
(2011 to 2014)**

Year	No. of Form 1 inspections completed for tree groups	No. of Form 2 inspections completed for individual trees (Note)	No. of trees with remedial measures taken/to be taken	No. of trees removed
2011	20,062	7,475	Information not available	2,776
2012	22,566	5,772	19,407	3,493
2013	25,320	6,937	21,956	4,851
2014	24,815	6,603	22,021	4,030

Source: DEVB records

Note: The Form 2 inspections included those completed for problematic trees identified during Form 1 inspections and those completed for OVTs and stonewall trees.

Audit examination of the TRA implementation

3.11 Audit examined the TRA implementation by the two major tree management departments, namely the HyD and the LCSD. As at December 2013, the HyD and the LCSD maintained 0.63 million and 0.51 million trees respectively (see Appendix A). The total number of trees (1.14 million) under the purview of these two departments accounted for 72% of the 1.58 million trees under the maintenance of the eight major tree management departments.

3.12 The HyD is responsible for the maintenance of trees located on slopes under its purview and areas within the boundary of expressways. The HyD has outsourced its slope and road maintenance work, including vegetation maintenance, by eight term contracts. The Vegetation Maintenance Team under the Landscape Unit of the HyD (comprising 26 staff) is responsible for overseeing vegetation maintenance by the contractors. Audit selected one contract (i.e. the contract

covering expressways in New Territories East and Hong Kong Island) for reviewing the TRA implementation by the HyD.

3.13 The LCSD is responsible for the maintenance of trees located at its venues (e.g. parks and gardens) and along non-expressway roads. For trees located at LCSD venues, their maintenance is outsourced to horticultural contractors. For trees located along non-expressway roads, their maintenance is by in-house regional tree teams. There are six regional tree teams (Note 11) comprising 33 tree units with 210 staff. Audit selected two regional tree teams (i.e. the Hong Kong West Region and the New Territories East Region Tree Teams) for reviewing the TRA implementation by the LCSD.

3.14 In reviewing the TRA implementation by the TMO and tree management departments, Audit found room for improvement in the following areas:

- (a) timing of the annual TRA exercise (paras. 3.15 and 3.17);
- (b) conduct of Form 1 inspections (paras. 3.18 to 3.23);
- (c) conduct of Form 2 inspections (paras. 3.24 to 3.28);
- (d) TMO's monitoring of the TRA implementation (paras. 3.29 to 3.34); and
- (e) departments' internal checking of tree inspections (paras. 3.35 to 3.38).

Timing of the annual TRA exercise

3.15 The climate of Hong Kong is sub-tropical. The high rainfall and frequent typhoons, coupled with high fungal and pest activities, make the health and structural conditions of trees change rapidly. According to the TRA Guidelines, for Category I zones, the tree-basis assessment has to be carried out at least once a

Note 11: *The six regional tree teams cover the following regions: Hong Kong West, Hong Kong East, Kowloon, New Territories East, New Territories West, and New Territories North.*

year. The TRA yearly exercise is scheduled to commence in the end of the preceding year and to complete by the end of May, before the onset of the wet season.

3.16 Audit considers that there is merit in completing the annual TRA exercise earlier, taking into account the following:

- (a) according to the Hong Kong Observatory, the wet season of Hong Kong starts in April. In recent years, it was not unusual to encounter heavy rains in April or March. For example, a Black Rainstorm Warning was issued on 30 March 2014. Moreover, according to Hong Kong Observatory records, 7 of the 18 Black Rainstorm Warnings ever issued were before the end of May. It is also pertinent to note that, the Geotechnical Engineering Office (which is responsible for slope safety) requires that regular maintenance of slopes should be carried out at least once a year and completed by the end of March before the onset of the wet season; and
- (b) upon the completion of the annual TRA exercise, some tree remedial measures may still be outstanding. For example, upon the completion of the 2013 and 2014 TRA exercises by the end of May, there were respectively 18,795 and 20,975 trees with remedial measures completed, and respectively 2,766 and 794 trees with remedial measures outstanding. Meanwhile, departments were required to put in place temporary measures, e.g. cordoning off the site to safeguard the public. These remedial measures required sufficient time for completion before the onset of the wet season.

3.17 Upon enquiry, the TMO informed Audit in September 2014 that the observation of the growth and response of trees in Spring was essential for the determination of appropriate remedial measures (particularly for deciduous trees) and the control of decaying fungi (which became observable in Spring/early Summer). The current time schedule of the annual TRA exercise had taken into account the physiology of some tree species and the detection of pathogenic fungi on trees. Notwithstanding this, Audit considers that, taking into account the fact that the wet season in Hong Kong starts in early April, there is merit to consider completing the annual TRA exercise earlier than the end of May.

Conduct of Form 1 inspections

3.18 *Number of trees covered by an inspection.* According to the TRA Guidelines, to safeguard the quality of a Form 1 inspection, the number of trees to be covered should not be excessive. Nevertheless, according to the TMO, there is no international standard on the maximum number of trees to be covered by a tree group inspection (i.e. a Form 1 inspection). Hence, there is no such maximum number set in the TRA Guidelines.

3.19 In sample checking the Form 1 inspections conducted by the HyD and the LCSD in the 2014 TRA (see paras. 3.11 to 3.13), Audit analysed the number of trees covered by these inspections, each of which was conducted by an inspector within a day. For the HyD, of the 433 Form 1s examined, 36 (8%) covered more than 100 trees. The number of trees covered by an inspection averaged 36, ranging from 1 to 570. For the LCSD, of the 805 Form 1s examined, 162 (20%) covered more than 100 trees. The number averaged 51, ranging from 1 to 572. Audit considers that, if the number of trees covered by a Form 1 inspection is excessive, individual trees may not be adequately inspected. Trees with less apparent problems or deteriorating health or structural conditions may be overlooked. In this connection, the TMO informed Audit in October 2014 that, generally for slopes, it was not practical to demarcate a densely vegetated slope arbitrarily into smaller groups during inspections.

3.20 Audit selected trees reported in complaints for examining the quality of the latest Form 1 inspections conducted on them before the complaints. The examination covered complaints received by the two LCSD tree teams selected for examination during the 18 months from January 2013 to June 2014. Audit noted the following:

- (a) there were 33 complaints relating to 34 trees. Among the 34 trees, the LCSD found that 27 (79%) trees had health or structural problems. Eventually, 14 of the 27 trees had to be removed; and
- (b) for the 27 problematic trees identified, they had previously been assessed to be in fair conditions by their Form 1 inspections. Regarding the Form 1 inspections for the 27 trees, the number of trees covered by an inspection averaged 84 and ranged from 3 to 203. The effectiveness of these inspections in identifying problematic trees was questionable. Case 3 shows such an example.

Case 3

Problematic trees were not identified by a Form 1 inspection

1. On 20 February 2014, a tree collapse incident occurred in Tai Po, leading to the damage of a lorry nearby. The tree was under the purview of the LCSD. The tree was removed on the same day.
2. According to LCSD records, the collapsed tree had been covered by a Form 1 inspection conducted on 3 July 2013, and had been assessed to be in fair conditions without the need for mitigation measures or monitoring. The inspection had covered a large number (i.e. 195) of trees.
3. In the tree failure report submitted to the TMO on 24 February 2014, the LCSD stated that it was the severe root rot underneath which led to the tree failure, and significant defects above the ground level were not observed. Nevertheless, the TMO expressed concern that there were about 200 trees reported to be in “fair” health and structural conditions at the time of inspection but the tree concerned showed severe root rot and collapsed in about 6 months. The LCSD was advised to perform a thorough inspection on the neighbouring trees of similar species in order to prevent the recurrence of similar incidents.
4. After performing a thorough inspection on the neighbouring trees on 24 February 2014, the LCSD identified six hazardous trees in the vicinity of the collapsed one. In all cases, severe internal decay or large cavities were found which were developed gradually from mechanical or natural wounds. The six hazardous trees were later removed by the LCSD in mid-March 2014.

Audit comments

5. The quality of the Form 1 inspection conducted in July 2013 was questionable since problematic trees could not be identified. One reason might be that the inspection covered a large number of trees and affected adversely the effectiveness of the inspection. There is a need to improve the effectiveness of Form 1 inspections under the TRA by the LCSD. There is also a need to explore the use of better methodology and technology to help enhance the effectiveness of Form 1 inspections.

Source: LCSD records

3.21 Audit considers that the TMO needs to take measures to help tree management departments improve the effectiveness of Form 1 inspections. The TMO also needs to provide more guidelines on the appropriate number of trees to be covered by a Form 1 inspection (e.g. by specifying the maximum number of trees to be covered).

3.22 ***Recording of inspection results.*** According to the TRA Guidelines, the purpose of a Form 1 inspection is to identify problematic trees for taking remedial measures. If the remedial measures taken on the spot (e.g. removal of broken branches) can eliminate the risk of a problematic tree, a Form 2 inspection is not required. Audit considers that, in order to facilitate the monitoring of the quality of a Form 1 inspection, there is a need to properly record:

- (a) the problematic trees identified by the Form 1 inspection but without undergoing Form 2 inspections; and
- (b) the remedial measures taken on these trees.

3.23 Audit examination of the Form 1s prepared by the HyD and the LCSD revealed that the information mentioned in paragraph 3.22(a) and (b) was not recorded on the Form 1s, though it might be recorded in other maintenance records. Audit noted that the TMO had updated the “Guidelines on Photo Taking of Tree Conditions in the Process of Tree Risk Assessment” in March 2014 so that adequate photo records of the tree conditions could be provided in the TRA forms.

Conduct of Form 2 inspections

3.24 According to the TRA Guidelines, the most important functions of the tree-basis assessment are to identify hazardous trees, to inspect them thoroughly by using Form 2, and to identify appropriate remedial measures. A Form 2 inspection nevertheless takes a longer time to complete (as compared with the inspection of a tree during a Form 1 inspection). According to the LCSD, at least 30 minutes are required to complete a Form 2 inspection if only visual assessment is conducted. If aerial assessment and assessment using tomograph/resistograph are conducted, a half-day is required for one tree. The TMO also advised Audit in October 2014 that the actual time required for a Form 2 inspection varied depending on the complexity of the case.

3.25 Table 3 shows, in respect of the eight major tree management departments (excluding the LandsD), the number of Form 2 inspections conducted on problematic trees (other than OVTs and stonewall trees) identified by Form 1 inspections in the 2014 TRA. It can be seen that the number of such Form 2 inspections varied widely among the tree management departments, ranging from 0 to 3,528. In particular, the LCSD and the AFCD conducted no Form 2 inspections on problematic trees identified by Form 1 inspections (though they conducted Form 2 inspections on OVTs and stonewall trees as required by the TRA Guidelines — see para. 3.7)

Table 3

**Form 2 inspections conducted on problematic trees
identified by Form 1 inspections in the 2014 TRA**

Department	Estimated number of trees covered by Form 1 inspections	Number of Form 2 inspections conducted on problematic trees
HyD	630,000	219
LCSD	324,595	0
ArchSD	112,200	2,070
HD	100,000	3,528
WSD	7,100	11
AFCD	36,000	0
CEDD	34,000	99
DSD	14,144	6
Total	1,258,039	5,933

Source: DEVB records

Tree risk assessment

3.26 As shown in Table 3, no Form 2 inspection was conducted by the LCSD on any problematic trees identified in the 2014 TRA. However, for the Form 1 inspections conducted by the two LCSD tree teams selected for examination (see para. 3.19), Audit noted that 21 problematic trees were identified and assessed to be requiring continuous monitoring because defects such as severe dieback, sparse crown and abnormal bark crack were found. However, no Form 2 inspection was conducted on these trees. This is at variance with the TRA Guidelines which stipulate that Form 2 inspections have to be conducted for trees requiring continuous monitoring.

3.27 According to the LCSD, when the tree teams had identified trees that required remedial actions during Form 1 inspections, they would carry out remedial measures as far as practicable. In the context of Form 1 inspections in the 2014 TRA, the LCSD had immediately carried out remedial measures on 2,894 trees and removed 208 trees identified with serious safety issues. With the completion of remedial actions, the LCSD sought to eliminate risks found during Form 1 inspections, rendering Form 2 inspections in these cases unnecessary.

3.28 By conducting a Form 2 inspection, a tree management department can ascertain the detailed conditions of the tree concerned and better identify appropriate remedial measures, including long-term measures (such as pest control and site improvement). Audit considers that the TMO needs to provide more guidelines to help tree management departments decide whether and when it is necessary to conduct a Form 2 inspection, and ensure that tree management departments follow such guidelines.

TMO's monitoring of the TRA implementation

3.29 *Checking of tree inspections.* To monitor the TRA implementation by major tree management departments, the TMO carries out checking of tree inspections conducted by them. This checking comprises desktop review of the forms selected and field inspections of the trees concerned. As at July 2014 (the time of the audit review), the checking of the 2014 TRA had not yet been completed. Regarding the checking of the 2013 TRA, 523 (about 2%) Form 1 inspections and 293 (about 4%) Form 2 inspections were checked. The findings included:

- (a) incomplete information (e.g. anticipated completion dates of remedial measures missing);
- (b) tree species incorrectly identified;
- (c) problematic trees not identified by Form 1 inspections; and
- (d) tree defects not identified by Form 2 inspections.

3.30 Upon checking Form 1 and Form 2 inspections, the TMO will provide comments to the departments concerned and refer cases to them for taking follow-up actions. For the checking of the 2013 TRA, the number of cases referred was 111 for Form 1 inspections and 40 for Form 2 inspections. The percentage of referral (based on the total number of inspections checked) was 21% for Form 1 inspections and 14% for Form 2 inspections.

3.31 *Non-core tree management departments.* As mentioned in paragraph 2.7, there were a total of 27 non-core tree management departments as at 31 March 2014. Some of them in fact have many trees under their purview, notably the EPD. The TRA implementation by these departments is currently not subject to the TMO's monitoring. Audit considers that the TMO needs to monitor the effectiveness of the TRA implementation by non-core tree management departments.

3.32 *Tree patrols.* In 2011, the TMO set up the Central Tree Support Team. The Team currently comprises 13 staff (11 professional and 2 technical staff). Its duties, among others, include the following:

- (a) conducting tree patrols to identify problematic trees, through risk-based site inspections, and refer them to the departments or parties concerned for taking necessary follow-up actions. In conducting tree patrols in 2013-14, the Team identified 618 problematic trees;
- (b) checking tree inspections conducted by tree management departments during annual TRA exercises (see para. 3.29). In checking the 2013 TRA, the Team identified 151 problematic trees;

Tree risk assessment

- (c) taking part in the roadside tree survey (see para. 2.23) which was substantially completed in June 2014 (see para. 2.24). In taking part in the roadside survey in 2013-14, the Team identified 936 problematic trees; and
- (d) inspecting OVTs, trees infected with BRR disease, and trees involved in failure cases.

3.33 According to the TMO, the Team's fieldwork is often multi-purpose, relating to a number of duties. For example, when conducting fieldwork in connection with checking tree inspections conducted by tree management departments, the Team also watches out for problematic trees in the vicinity. There is a planned programme each year for checking tree inspections conducted by tree management departments.

3.34 Audit considers that tree patrols (see para. 3.32(a)) are effective in identifying problematic trees, particularly those not subject to regular inspections (e.g. trees under ad hoc maintenance by the LandsD). With the substantial completion of the roadside tree survey in June 2014 (see para. 3.32(c)), the Central Tree Support Team can focus more on conducting tree patrols which are effective in identifying problematic trees.

Departments' internal checking of tree inspections

3.35 As stipulated in the TRA Guidelines, tree management departments have to carry out internal checking of tree inspections conducted by them. In this connection, the TMO has promulgated guidelines requiring a tree management department to check at least 10% of tree inspections conducted. The checking should comprise desktop checks of the forms randomly selected and field inspections of the trees concerned.

3.36 For the HyD, it has developed internal checking guidelines (based on the TMO's guidelines) that Form 1 inspections should be checked by Assistant Inspectors of Works, and Form 2 inspections should be checked by Landscape Architects of the Vegetation Maintenance Team. Audit examined the HyD's internal checking of tree inspections, and did not identify significant non-compliances.

3.37 For the LCSD, it has developed its own “Horticultural Guidelines” which, among other things, deal with internal checking of tree inspections in accordance with the TMO’s guidelines. As stated in the Horticultural Guidelines, Form 1 inspections are subject to a two-tier checking. The first-tier checking is conducted by Managers/Leisure Managers of respective tree teams/districts/venues, and the second-tier checking is conducted by Chief Leisure Managers of respective regions. Besides, Form 2 inspections are subject to checking by the LCSD Headquarters.

3.38 In examining the LCSD’s internal checking of tree inspections, Audit noted the following non-compliances:

- (a) in the first-tier checking of Form 1 inspections, for one of the two tree teams selected for examination, only desktop checks of the forms selected but no field inspections of the trees concerned were conducted; and
- (b) in the second-tier checking, the forms checked by the Chief Leisure Managers concerned were submitted by the two tree teams, instead of randomly selected from the computer system in accordance with the Horticultural Guidelines. This rendered the checking less effective.

Audit recommendations

3.39 **Audit has *recommended* that the Secretary for Development should:**

Timing of the annual TRA exercise

- (a) **review the time schedule for the annual TRA exercise and consider revising it so that the exercise can be completed earlier, preferably before the onset of the wet season;**

Conduct of Form 1 inspections

- (b) **provide more guidelines on the appropriate number of trees to be covered by a Form 1 inspection (e.g. by specifying the maximum number of trees to be covered);**

- (c) for the problematic trees identified by a Form 1 inspection but without undergoing Form 2 inspections, remind tree management departments to properly record these trees and the remedial measures taken on them;

Conduct of Form 2 inspections

- (d) provide more guidelines to help tree management departments decide whether and when it is necessary to conduct a Form 2 inspection;

TMO's monitoring of the TRA implementation

- (e) consider including non-core tree management departments in the TMO's monitoring of the TRA implementation; and
- (f) consider focusing more of the TMO's efforts on conducting risk-based site inspections for identifying problematic trees.

3.40 Audit has also *recommended* that the Director of Leisure and Cultural Services should:

- (a) take measures to improve the effectiveness of Form 1 inspections (see Case 3 in para. 3.20); and
- (b) rectify the non-compliances with the internal checking requirements relating to tree inspections (see para. 3.38).

Response from the Administration

3.41 The Secretary for Development agrees with the audit recommendations. He has said that the TMO has been inviting non-core departments for audit checking of TRA inspection forms since August 2014. The EPD, the Home Affairs Department and the Food and Environmental Hygiene Department have agreed to submit TRA inspection forms for the TMO's audit. These 3 departments accounted for around 90% of trees maintained by non-core departments. The other 10% will be covered step by step.

3.42 The Director of Leisure and Cultural Services agrees with the audit recommendations. She has said that the LCSD will make every endeavour to address the issues requiring follow-up actions to enhance the standards and overall cost-effectiveness of efforts on tree management. She has also said that:

- (a) in the 2014 TRA, the LCSD has conducted Form 1 inspections on 320,000 trees in Category I zones. Among the 5,800 Form 1s, 70% of them covered less than 200 trees. That said, the LCSD will adhere to new guidelines to be issued by the TMO including the maximum number of trees to be covered by a Form 1 inspection; and
- (b) the LCSD will remind its staff to adhere strictly to:
 - (i) the TRA Guidelines to conduct Form 2 inspections on trees requiring continuous monitoring; and
 - (ii) the internal checking requirements in the LCSD's Horticultural Guidelines.

Maintenance of old and valuable trees

3.43 In February 2003, in response to the concerns of some LegCo Members on the protection of OVTs, the then ETWB asked the LCSD and the AFCD to draw up a register of OVTs (the OVT Register). In September 2004, the ETWB issued Technical Circular (Works) No. 29/2004 on the registration and preservation of OVTs (the OVT Guidelines). According to the OVT Guidelines, trees eligible for inclusion in the OVT Register have to be located on government land within built-up areas or tourist attraction spots in village areas and must satisfy one or more of the following criteria:

- (a) trees of particularly old age (e.g. aged 100 years or above);
- (b) trees of large size (e.g. with a trunk diameter of at least 1 metre);
- (c) trees of precious or rare species;

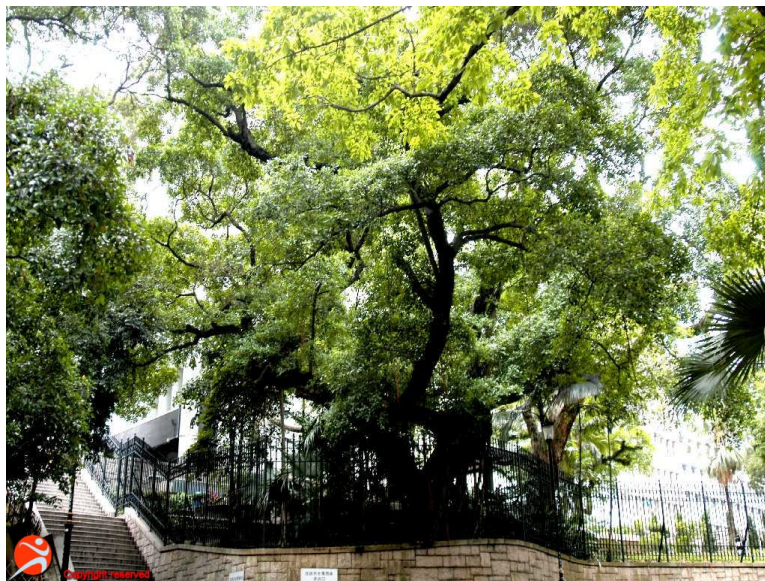
Tree risk assessment

- (d) trees of cultural, historical or memorable significance; or
- (e) trees of outstanding form.

Photograph 5 shows an OVT at the former Central Government Offices.

Photograph 5

An OVT at the former Central Government Offices



Source: LCSD records

3.44 According to the OVT Guidelines, tree management departments have to draw up procedures to identify trees to be nominated for inclusion in the OVT Register. The LCSD or the AFCD will assess nominated trees (Note 12). The LCSD is also responsible for maintaining the Register.

Note 12: *The LCSD is responsible for those nominated trees located on allocated government land and unallocated government land along public roads, while the AFCD is responsible for those located on unallocated government land not along public roads.*

3.45 The Government's policy is to provide priority protection to OVTs. According to the OVT Guidelines:

- (a) departments have to conduct regular inspections on OVTs under their maintenance;
- (b) the LCSD and the AFCD have to conduct regular audit inspections on all OVTs, at least once every year; and
- (c) the removal of an OVT is prohibited. If it is unavoidable, the LandsD's approval is required. The LandsD has to seek the DEVB's endorsement before giving the approval.

3.46 When the OVT Register was set up in September 2004, there were 527 OVTs. Since then, 71 OVTs had been removed due to natural causes or typhoon damage, and 36 new OVTs had been added. As at June 2014, there were 492 OVTs. They were under the maintenance of 16 departments. The majority of OVTs (349 or 71 %) were under the LCSD's maintenance.

3.47 ***Public safety risks posed by OVTs.*** Some OVTs are at the senescence stage. They are weak in terms of growth and recovery and are susceptible to environmental factors such as strong winds and heavy rains as well as pests and diseases. Some recent tree collapse cases, including the fatal incident in Stanley (2008) and the incident at Park Lane Shoppers' Boulevard (2012), involved OVTs. The proper maintenance of OVTs is therefore important not only for their preservation but also for effective tree risk management.

Form 2 inspections of OVTs

3.48 The OVT Guidelines have specified inspection requirements for OVTs (see para. 3.45). Besides, according to the TRA Guidelines, the maintenance department of an OVT will conduct at least one Form 2 inspection on the OVT a year. However, according to the LCSD's Horticultural Guidelines, the LCSD will conduct at least two Form 2 inspections on an OVT under its maintenance a year. There is a difference in the number of Form 2 inspections required to be conducted on an OVT.

Tree risk assessment

3.49 In view of the public safety risks posed by OVTs (see para. 3.47), there is merit in conducting Form 2 inspections of OVTs on a more frequent basis.

Audit recommendation

3.50 Audit has *recommended* that the Secretary for Development should consider standardising the frequency of conducting Form 2 inspections of OVTs to at least twice a year in the TRA Guidelines.

Response from the Administration

3.51 The Secretary for Development agrees with the audit recommendation.

Tackling brown root rot disease

Threat to tree safety posed by the spread of BRR disease

3.52 BRR disease on trees is caused by an aggressive fungal pathogen (*Phellinus noxius*). The symptoms of early stage of BRR infection are not easily observed because the infected area is mostly below ground. Trees infected with BRR disease may experience a rapid deterioration of health and structural conditions. There is currently no effective cure to the disease. In the 2012 tree collapse case at Park Lane Shoppers' Boulevard (see para. 1.10(b)), the OVT concerned was infected with BRR disease. More recently, in the August 2014 tree collapse case at Mid-levels (see para. 1.10(d)), the collapsed tree was also suspected to have been infected with BRR disease.

3.53 BRR disease mainly spreads through root-to-root contact, infected wood debris in soil, and the dissemination of basidiospores from fruiting bodies. In Hong Kong, a number of tree species such as *Bombax ceiba*, *Delonix regia*, and *Ficus microcarpa* have been confirmed to have contracted the disease. Due to the highly pathogenic and infectious nature of *Phellinus noxius*, it is most important to prevent the local spreading of BRR disease in Hong Kong, particularly from a tree risk management point of view.

3.54 In this regard, the TMO has promulgated guidelines on BRR disease (the BRR Guidelines), and has implemented a vigilant surveillance programme. The programme comprises three components, namely: (a) a management strategy for preventing the local spread of BRR disease; (b) a system for reporting suspected cases; and (c) procedures for proper removal of infected trees.

Management strategy for preventing the spread of BRR disease

3.55 The TMO has adopted a dual-pronged management strategy for preventing the spread of BRR disease, comprising precautionary and preventive measures. Precautionary measures include proper tree planting and maintenance practices. Preventive measures include reducing the sources of BRR inoculum and controlling the spread of BRR disease by removing the diseased parts. Preventive measures to be taken on infected trees include the following:

- (a) for infected non-OVTs in Category I risk zones, they should be removed entirely, including stumps, wood debris and associated fine roots in soil medium; and
- (b) for infected OVTs, they should be quarantined to avoid local spreading. The structural stability of an infected OVT should be ascertained by conducting a thorough assessment for follow-up actions as follows:
 - (i) for a structurally stable OVT at the early stage of BRR infection, treatment efforts can still be made by creating a physical barrier (by digging a trench) and using chemicals to retard local spreading. The tree should be closely monitored on at least a quarterly basis and should be placed in the Tree Register (see para. 4.15); and
 - (ii) for a structurally unstable OVT, it should be removed for protecting public safety and preventing the spread of BRR disease.

Dealing with BRR cases

3.56 Starting from 2012, the TMO has integrated the surveillance for BRR cases with the annual TRA exercise. In conducting tree inspections, special attention has to be paid to identifying suspected BRR cases. For suspected BRR cases identified, tree management departments have to report them to the TMO for further verification and recommendation on follow-up actions. Table 4 shows the numbers of cases reported and cases with BRR infection confirmed by the TMO since March 2010 up to 15 August 2014.

Table 4

**BRR cases reported to the TMO
(15 August 2014)**

BRR infection	OVTs (No.)	Non-OVTs (No.)	Total (No.)
Confirmed to be infected (Note)	30 (23)	88 (69)	118 (92)
Confirmed to be not infected	6	12	18
Under investigation	1	4	5
Total	37	104	141

Source: Audit analysis of DEVB records

Note: The figures in brackets represented the number of trees which had already been felled or collapsed.

3.57 Table 4 shows that, of the 88 non-OVTs with BRR infection confirmed, 69 had already been removed and 2 were under trial treatment. For the 17 (88 – 69 – 2) remaining non-OVTs, Audit noted that:

- (a) 16 of them were maintained by government departments. According to the BRR Guidelines, they had to be removed. Some of the cases had been outstanding for a long period (up to 4 months) since confirmation of BRR infection. According to the TMO, in some cases, the departments concerned had experienced difficulties in engaging contractors to remove the infected trees. Also, in some cases, since infection signs were not obvious, the TMO had advised the departments concerned to retain the trees for further observation. Audit considers that, if decisions to remove infected trees have been made, the TMO needs to urge the departments concerned to take actions in a timely manner. Infected trees pending removal should also be included in the Tree Register (see para. 4.14) to enhance transparency and community surveillance; and
- (b) one of them was on private land. The TMO had advised the land owner (via the LandsD) of the BRR infection and the need to take necessary follow-up actions. The TMO had been tracking the case and, as at August 2014, the land owner was arranging to remove the infected tree.

Providing more information on BRR disease

3.58 In dealing with BRR disease, the TMO has commissioned research studies (by local universities) and provided training to government and contractor staff. It has also provided training and produced an education video on the identification, management and control of BRR disease to the general public to promote community surveillance on BRR disease.

3.59 Audit considers that, to promote public awareness and community surveillance, there is a need to provide more information on BRR disease. As shown in Table 4, of the 30 OVTs infected with BRR disease, 7 (30 – 23) had not been removed. Regarding these 7 infected OVTs, the information that they had decay or fungal diseases was disclosed in the Tree Register. The information that they had been infected with BRR disease was however not disclosed in either the Tree Register or the OVT Register.

Audit recommendations

- 3.60 **Audit has *recommended* that the Secretary for Development should:**
- (a) **for non-OVTs infected with BRR disease, urge the responsible departments to remove the trees in a timely manner, in order to remove the threat to public safety and prevent the spread of the disease; and**
 - (b) **provide more information on BRR infection in the Tree Register and the OVT Register for infected OVTs, and in the Tree Register for infected non-OVTs, in order to promote public awareness and community surveillance.**

Response from the Administration

- 3.61 **The Secretary for Development agrees with the audit recommendations.**

PART 4: MANAGEMENT INFORMATION SYSTEMS AND DATABASES

4.1 This PART examines the setting up and the use of tree management systems and databases by the TMO and tree management departments. Audit has found room for improvement in the following areas:

- (a) Tree Management Information System (TMIS) (paras. 4.2 to 4.13);
- (b) Tree Register (paras. 4.14 to 4.27); and
- (c) Tree Failure Database (paras. 4.28 to 4.34).

Tree Management Information System

4.2 The Task Force recommended the adoption of the dual-approach TRA (see para. 1.7(c)). In this connection, the Task Force also recommended setting up a database of problematic and important trees for recording systematically and comprehensively their conditions for appropriate follow-up actions. To take forward this recommendation, the TMO, with the assistance of the Efficiency Unit (EU) as the Project Manager, engaged a contractor to set up the TMIS. The contract was let in November 2011, with a system set-up cost of \$8 million. The objectives of the TMIS are:

- (a) to provide a central database of trees maintained by tree management departments (not limited to problematic and important trees);
- (b) to support the dual-approach TRA, and to facilitate automatic scheduling and management of inspection tasks and follow-up actions;
- (c) to facilitate central monitoring, coordination, data analysis and reporting; and
- (d) to facilitate sharing of information among the TMO and tree management departments.

4.3 In December 2012, the TMIS was formally rolled out. The TMIS comprises the following components:

- (a) a central database of trees maintained by tree management departments. In addition to basic tree data (e.g. species, size, location and responsible department), the database also contains data on activities taken on trees;
- (b) an “activities scheduling and workflow management” component for supporting the daily operation of tree management departments; and
- (c) a “business intelligence and analytics” component for work progress reporting, data analysing, and predictive modelling on tree failure probability.

Problems with the current TMIS

4.4 In using the TMIS, tree management departments expressed concerns about the gaps between the expected and the actual functions provided. Examples of such gaps included:

- (a) arising from the design of the TMIS, area zones (with spatial data) had to be created in the system first before trees located therein could be input to the system. However, the creation of area zones was laborious. This affected tree management departments’ efficiency and willingness in using the TMIS;
- (b) there was a need for a more sophisticated search function (e.g. according to lamp post or slope number);
- (c) there was a need for transferring tree inventories between departments but this function was not provided; and
- (d) many departments outsourced their tree maintenance work and there was a need for contractor staff to have direct access to the system but this access was not provided.

4.5 Furthermore, there were also problems with the setting up of the TMIS. During the three months' nursing period (from December 2012 to March 2013) following the commencement of the live run, the system was unstable and there were many system malfunction incidents. In the event, the nursing period was extended for another three months (from March to June 2013). However, system malfunction incidents still happened and the number of unresolved system bugs started to accumulate. In the circumstances, the TMO and the EU did not have confidence in the contractor in properly maintaining the TMIS. As at September 2014, the TMO was planning to engage another contractor to carry out a project to enhance the TMIS.

4.6 In preparing for the enhancement project, a Business Process Reengineering Study was conducted (by the EU) in June 2014, and a funding application was made to the Office of the Government Chief Information Officer. In September 2014, the funding approval (for \$6.05 million) was granted. The live run of the enhancement project was targeted at November 2015. The scope of the TMIS enhancement project would cover the following areas:

- (a) conversion of data on area zones and trees located therein for a number of tree management departments (e.g. the LCSD, the HyD and the ArchSD) to update the TMIS database. Data conversion was required since the TMIS database was neither complete nor up-to-date;
- (b) expansion of existing functions (e.g. the search function); and
- (c) development of new functions (e.g. the function for transferring tree inventories between departments).

System development issues encountered

4.7 The TMO and the EU encountered system development issues in implementing the TMIS. There were gaps between the expected and the actual functions provided (see para. 4.4), and also system bugs and instability issues (see para. 4.5). The tree management departments also encountered difficulties in transferring tree data to the TMIS. As at May 2014, most of the tree management departments had not yet fully transferred their tree data to the TMIS (see Appendix D).

4.8 Appendix D shows that only three of the eight major tree management departments (i.e. the AFCD, the CEDD and the HD) had fully transferred their tree data to the TMIS. For the other five departments, of the 1.42 million trees maintained by them, only 0.4 million (28%) had their tree data transferred. Some of them had only transferred a small percentage of their tree data. In particular, the HyD had transferred only 0.4% of its tree data to the TMIS. Audit noted that there were problems with data format and creation of area zones. Nevertheless, as the TMIS is intended to be a central database of tree inventory for tree management, monitoring and analysis, it is most important that all tree data of tree management departments should be transferred to the TMIS before it can provide the intended functions.

4.9 Audit also noted that there were data inconsistencies between the TMIS and the departmental systems maintained by some departments (e.g. the LCSD and the HyD). After two rounds of data conversion in March and June 2012, there were still data inconsistencies between the TMIS and the departmental systems. It was because the departments continued to update tree data in their departmental systems after data conversion but without promptly updating the TMIS. A third round of data conversion was planned for in the enhancement project. Data inconsistencies will undermine the effectiveness of the TMIS. Audit considers that effective measures need to be taken to ensure data synchronisation if tree management departments continue to run their departmental systems and the TMIS in parallel (Note 13).

4.10 Besides, Audit also noted that the TMIS could help identify the responsible departments for handling tree complaints, and it was provided with a complaint handling function. However, this function was not put to use. In October 2012, the TMO and the major tree management departments decided that this function would not be used for the time being. The major reason was to avoid duplication in complaint data handling by the TMIS and the complaint handling systems of the departments. Nevertheless, the absence of tree complaint data in the TMIS will undermine its effectiveness in the identification and tracking of problematic trees.

Note 13: *According to the EU, it and the TMO had sought to prevent the further proliferation of departmental systems by requiring that all tree-related system functions should be built on a common platform of the TMIS.*

4.11 Audit considers that the TMO needs to promptly complete the TMIS enhancement project in order to deliver the expected functions and reap the benefits of the TMIS. The TMO also needs to review the system development issues encountered previously and draw lessons therefrom for reference by the enhancement project.

Audit recommendations

4.12 Audit has *recommended* that the Secretary for Development should:

- (a) take measures to promptly complete the TMIS enhancement project in order to deliver the expected functions and reap the benefits of the TMIS;
- (b) review the system development issues encountered previously and draw lessons therefrom for reference by the enhancement project;
- (c) ensure that tree management departments are committed to using the TMIS for keeping complete and up-to-date tree data, and avoid data inconsistencies between the TMIS and departmental systems; and
- (d) review and modify, when appropriate, the complaint handling function of the TMIS with a view to putting it to effective use.

Response from the Administration

4.13 The Secretary for Development agrees with the audit recommendations.

Tree Register

4.14 After the June 2010 fatal tree collapse case in Sha Tin (see para. 1.10(a)), the TMO set up and published (on its website) a “Tree Register” of problematic and important trees in July 2010 (see Figure 3). The objectives of the Tree Register are:

Management information systems and databases

- (a) to promote community surveillance. In view of the large number of trees in the community and the fact that the health and structural conditions of trees change in step with their normal lifecycles as well as changes in their external environment, community surveillance can assist in monitoring the conditions of trees in the community; and
- (b) to enhance the transparency of the Government's tree risk management work.

Figure 3

Tree Register on the TMO's website (www.trees.gov.hk)

位置 Location	樹木品種 Species	樹木狀況 Condition	改善措施 Mitigation Measures	其他 Others	視察部門 Inspection Department 上次檢查日期 Last Inspection Date 樹木登記冊號碼 Tree Register No. [樹木登記冊號碼 Department Reference no.]	相片 Photo	地圖 Location Map
文咸道政府宿舍 Mansfield Road Government Quarters 斜坡編號 11SW-DIFR19 Slope No. 11SW-DIFR19 X-Coord X軸: 834724 Y-Coord Y軸: 814153	<i>A. coccinea confusa</i> 台灣相思	樹冠不平衡 Unbalanced crown 樹皮有裂痕 Abnormal bark crack 根部伸展範圍受限制 Rooting area restricted normal	密切監察樹木狀況 Tree condition under close observation		建築署 Architectural Services Department 18/9/2013 ARCHSD/CW/157 [ASD_11SW-DIFR19_TS000]		
香港公園暨綠地管理處 入口 Hong Kong Park, on the slope adjacent to the entrance of Olympic Square 斜坡編號 11SW-BFR152 Slope No. 11SW-BFR152 X-Coord X軸: 834679.2 Y-Coord Y軸: 815378.3	<i>Brachydictyon agrostoides</i> 昆士蘭瓶子樹	嫩枝枯死(少量) Dieback twigs (small amount) 呈現真菌子實體(少量) Fungal fruiting bodies (small amount) 有枯枝 Dead branches normal	適當修剪樹木枝條 Appropriate Pruning 安裝纜索或支撐物 Cabling / Other Support	古樹名木登記編號: ARCHSD CW48 Old and Valuable Tree registration no. ARCHSD CW48	建築署 Architectural Services Department 15/4/2014 ARCHSD/CW/002 [ASD_11SW-BFR152_TS010]		
11SW-ACR80, 高街面對 柱48560 11SW-ACR80, High Street facing Larp Post 48560 X-Coord X軸: 832996 Y-Coord Y軸: 816233 系統性蟲害維修責任的斜 坡編號 - Sinar No.: 11SW- ACR80	<i>Ficus microcarpa</i> 榕樹(細葉榕)	嫩枝枯死(少量) Dieback twigs (small amount) 樹冠不平衡 Unbalanced crown normal	適當修剪樹木枝條 Appropriate Pruning	石牆樹 Stone wall tree 古樹名木登記編號: HYD CW/3 Old and Valuable Tree registration no. HYD CW/3	路政署 Highways Department 9/12/2013 HYD/CW/138 [hyd_hk_11sw_acr80_0_w4]		
斜坡編號 11SW-BFR241, 香港動植物公園 Slope No. 11SW-BFR241, Hong Kong Zoological and Botanical Gardens X-Coord X軸: 834064 Y-Coord Y軸: 815436 系統性蟲害維修責任的斜 坡編號 - Sinar No.: 11SW- BFR241	<i>Ficus microcarpa</i> 榕樹(細葉榕)	normal	已完成處理風障措施 Completed	古樹名木登記編號: ARCHSD CW/6 Old and Valuable Tree registration no. ARCHSD CW/6	建築署 Architectural Services Department 21/1/2014 ARCHSD/CW/004 [ASD_11SW-BFR241_TS001]		

Source: DEVB records

4.15 According to the TMO's guidelines on the updating of the Tree Register (the Tree Register Guidelines), the Tree Register includes the following three categories of trees:

- (a) problematic trees identified in the TRA which have mitigation measures to be completed;
- (b) problematic trees reported in complaint/referral cases which require continuous monitoring, and problematic trees publicised in the media; and
- (c) important trees which require regular monitoring, including all OVTs and stonewall trees.

4.16 The Tree Register provides relevant information on trees included therein (e.g. location, species, health and structural conditions, mitigation measures, responsible department and date of last inspection). Besides, responsible departments attach standard labels to trees included in the Tree Register. Once the mitigation measures of problematic trees have been completed and the conditions have been assessed to be satisfactory, the trees can be deleted from the Register. Table 5 shows the changes in the number of trees in the Register.

Table 5
Number of trees in the Tree Register
(July 2010 to July 2014)

Tree category	As at July 2010	Trees added	Trees deleted	As at July 2014	Net change	Percentage of net change
	(a)	(b)	(c)	(d) = (a) + (b) – (c)	(e) = (b) – (c)	(f) = [(e)/(a)] × 100%
OVTs	504	20	32	492	-12	-2 %
Stonewall trees (other than OVTs)	398	45	93	350	-48	-12 %
Problematic trees	252	129	273	108	-144	-57 %
Overall	1,154	194	398	950	-204	-18 %

Source: Audit analysis of DEVB records

Additions of trees to the Tree Register

4.17 As shown in Table 5, the number of trees in the Tree Register had dropped by 18% from 1,154 to 950 over four years since it was set up in July 2010. In particular, the number of problematic trees (i.e. other than OVTs and stonewall trees) had decreased by 57% from 252 to 108. Audit noted that there was a tendency for tree management departments not to add trees to the Tree Register (see paras. 4.18 and 4.19).

4.18 ***Problematic trees identified in the TRA.*** According to the Tree Register Guidelines, problematic trees identified in the TRA which have mitigation measures to be completed should be added to the Tree Register. Audit noted that as at the completion of the 2013 TRA (i.e. 31 May 2013), there were 2,719 problematic trees (other than OVTs and stonewall trees) which had undergone Form 2 inspections and had mitigation measures to be completed. However, of these 2,719 trees, only two (0.1%) were added to the Tree Register. According to the TMO, one reason could be that mitigation measures of many of these trees were completed in a short time and they were then not required to be added to the Tree Register.

4.19 ***Problematic trees reported in complaint/referral cases.*** According to the Tree Register Guidelines, problematic trees reported in complaint/referral cases which require continuous monitoring should be added to the Tree Register. However, there were cases in which this guideline was not followed. Case 4 shows an example.

Case 4

A problematic tree requiring continuous monitoring was not added to the Tree Register

1. On 10, 12 and 17 June 2014, the Integrated Call Centre (1823 Hotline) received a total of four complaints (from different complainants) on a tree located at Li Po Lung Path in Kennedy Town. According to the complainants, the tree was in poor conditions and might collapse. The complaints were referred to the responsible department (i.e. the LCSD). According to LCSD records, a Form 1 inspection of the tree was conducted on 20 January 2014. The tree was assessed to be in fair conditions and no Form 2 inspection was conducted.

2. Upon receipt of the complaints, the LCSD inspected the tree and found that it was affected by soil contamination. The LCSD took mitigation measures (i.e. soil improvement and pruning of withered twigs and leaves) on 18 June 2014. In its replies to the complainants, the LCSD stated that it would closely monitor the tree and the last resort would be to remove it if it could not recover.

3. In response to Audit enquiries, in July 2014, the LCSD said that it inspected the tree biweekly and observed that it was recovering gradually. The LCSD also said that a Form 2 inspection had not been conducted and the tree had not been added to the Tree Register.

Audit comments

4. Audit considers that when the problematic tree was assessed in June 2014 to be requiring continuous monitoring (see para. 2 above):

- (a) a Form 2 inspection should have been conducted according to the TRA Guidelines (see paras. 3.7 and 3.8). A Form 2 inspection would help identify the appropriate mitigation measures; and
- (b) the tree should have been added to the Tree Register according to the Tree Register Guidelines (see para. 4.15). If it had been the case, a label would have been attached to the tree (see para. 4.16), and the public would have been aware that mitigation measures were to be completed. It could obviate the need to lodge repeated complaints by members of the public.

Source: LCSD records

4.20 Audit considers that the TMO needs to take measures to ensure that problematic trees identified in the TRA or reported in complaint/referral cases are duly added to the Tree Register (e.g. by regularly reminding tree management departments to follow the Tree Register Guidelines).

Deletions of trees from the Tree Register

4.21 According to the Tree Register Guidelines, when mitigation measures have been completed and conditions have been assessed to be satisfactory, responsible departments have to propose to the TMO to delete the trees concerned from the Tree Register. The TMO will consider the proposals and make the deletions.

4.22 As at 31 July 2014, there were 108 problematic trees in the Tree Register. In examining the Tree Register, Audit noted that for 6 (6%) trees, mitigation measures had been completed and conditions had been assessed to be satisfactory for quite some time already (ranging from 3 to 8 months). These trees should have been deleted from the Tree Register. Audit considers that the TMO needs to take measures to ensure that trees no longer problematic are deleted from the Tree Register in a timely manner.

User-friendliness of the Tree Register and tree labels

4.23 The Tree Register, as it appears on the TMO's website, comprises 18 files of tree records (one file for each of the 18 Districts). Tree records are displayed in alphabetical order by responsible department. The Tree Register is not equipped with a search function (while the OVT Register maintained by the LCSD is so equipped). Hence, searches for trees based on certain criteria (e.g. location, species, and responsible department) cannot be carried out. Audit considers that the TMO needs to enhance the user-friendliness of the Tree Register by equipping it with a search function.

4.24 The standard label attached to a problematic tree included in the Tree Register currently only displays limited information (i.e. Tree Register serial number, species, responsible department and enquiry telephone number). Audit considers that the standard label needs to display more prominently additional

information (e.g. the fact that mitigation measures of the tree are to be completed). The TMO needs to review the content of the standard label to promote community surveillance, and consider putting up a warning sign where necessary.

Review of the Tree Register

4.25 The Tree Register has been operating for four years since July 2010. There is a need for the TMO to conduct a review of the Tree Register to assess whether its objectives have been achieved and to identify areas for improvement.

Audit recommendations

4.26 Audit has *recommended* that the Secretary for Development should:

- (a) take measures to ensure that the Tree Register provides a complete and up-to-date list of problematic trees with mitigation measures to be completed, e.g. by making required additions and deletions to the Register in a timely manner; and
- (b) conduct a review of the Tree Register to assess whether its objectives have been achieved and to identify areas for improvement, including:
 - (i) enhancing the user friendliness of the Tree Register; and
 - (ii) reviewing the content of the standard label attached to a problematic tree included in the Tree Register to see if it is desirable to display additional information more prominently, and consider putting up a warning sign where necessary.

Response from the Administration

4.27 The Secretary for Development agrees with the audit recommendations.

Tree Failure Database

4.28 The TMO, making reference to international practices, set up a centralised Tree Failure Database in July 2010 for internal data collection and analysis. The objective is to collect information of tree failures from tree management departments with a view to analysing systemic issues to help prevent recurrence of similar failures. The information collected will facilitate the Government to better design and plan greening policies and to make tree management strategies more sustainable.

4.29 According to the TMO's guidelines on reporting tree failures (Note 14), tree management departments:

- (a) should use a Tree Failure Report Form to report a tree which:
 - (i) collapsed due to natural causes; or
 - (ii) was removed due to poor health or structural problems; and
- (b) might use a summary form to report a large number of trees which collapsed due to inclement weather (e.g. typhoon and rainstorm).

Building up of the Tree Failure Database

4.30 As at June 2014, the Tree Failure Database recorded 2,034 failure cases, comprising 1,560 (77%) detailed cases reported via the Tree Failure Report Form, and 474 (23%) simplified cases reported via the summary form. Table 6 shows the building up of the Tree Failure Database since it was set up in July 2010.

Note 14: *The guidelines were mentioned in the TMO's progress report submitted to the LegCo Panel on Development in May 2011, and tree failure analysis report submitted to the Expert Panel on Tree Management (see also para. 4.32).*

Table 6

**Building up of the Tree Failure Database
(July 2010 to June 2014)**

Year	Number of cases added
2010 (July to December)	28
2011	65
2012	1,007
2013	847
2014 (up to June)	87
Total	2,034

Source: DEVB records

4.31 Audit noted the following:

- (a) as shown in Table 6, the number of cases added to the Tree Failure Database in a year varied widely. According to the TMO, the weather conditions of a year (e.g. whether there were severe typhoons) had a strong bearing on this number;
- (b) tree management departments generally only reported tree failure cases in which the trees collapsed (partly or wholly) and were then removed. They generally did not report cases in which the trees were removed due to poor health or structural problems. Upon enquiry, the TMO informed Audit that the relevant guidelines had been revised in September 2014 to exclude reporting of trees removed due to poor health or structural problems. This revision was in line with international practices; and

- (c) some departments expressed concerns about the efforts and difficulties in using the Tree Failure Report Form (see para. 4.29(a)) to report tree failures. They also requested a Chinese version of the Report Form for the use by their frontline staff.

Making better use of the Tree Failure Database

4.32 In early 2012, the TMO carried out an analysis on the 77 tree failure cases captured by the Tree Failure Database as at 30 November 2011. The analysis report was discussed by the Expert Panel on Tree Management (EPTM — Note 15) at its meeting held in February 2012. The TMO stated in the report that it would build up the Tree Failure Database so that it was large enough to be statistically significant. The TMO would analyse the data to identify systemic issues in relation to tree failures and share the lessons learnt with tree management departments. Audit considers that the TMO needs to continue to monitor the building up of the Tree Failure Database with a view to making better use of it.

Audit recommendations

4.33 **Audit has *recommended* that the Secretary for Development should:**

- (a) **review the need for modifying the Tree Failure Report Form (e.g. by providing a Chinese version) to facilitate tree management departments to report tree failures; and**
- (b) **continue to monitor the building up of the Tree Failure Database with a view to making better use of it.**

Response from the Administration

4.34 The Secretary for Development agrees with the audit recommendations.

Note 15: *The EPTM is chaired by the Head of the GLTMS and comprises local experts and experts from outside Hong Kong. The role of the EPTM is to advise the Government on policy and operational issues concerning tree management as well as the preservation of individual trees (including OVTs).*

PART 5: TRAINING AND COMMUNITY INVOLVEMENT

5.1 This PART examines the Government's efforts in improving training and community involvement relating to tree management, and suggests measures for improvement.

Training on tree management

Planning of tree management training

5.2 The Task Force Review recognised that tree management (particularly TRA) was a professional task, and training would be essential to ensure that the Government had adequate quality staff at managerial, supervisory and frontline levels to carry out tree management work. The Task Force recommended that a Training Committee should be set up to plan staff training in a comprehensive, strategic and continuing manner.

5.3 In May 2010, the DEVB set up the Training Committee on Greening, Landscape and Tree Management (the Training Committee). The Training Committee oversees the formation and the implementation of a training plan for government staff to facilitate them to discharge greening, landscape and tree management duties professionally. It is chaired by the responsible Deputy Secretary for Development (Works) and comprises 13 members from the GLTMS and tree management departments.

5.4 In 2012, the GLTMS compiled a competence matrix for tree management work, listing out the skill sets required for the three levels of staff (i.e. frontline, supervisory and managerial staff) after consulting tree management departments and taking into account overseas experiences. The competence matrix was endorsed by the Training Committee at its second meeting held in May 2012.

5.5 In 2013, the GLTMS carried out a survey on government staff to ascertain the skill sets already acquired. The survey results were reported to the Training Committee at its third meeting held in March 2014, as follows:

Training and community involvement

- (a) two departments (i.e. the LCSD and the AFCD) carried out tree work mainly by in-house staff, while other departments outsourced tree work. The skill set required for frontline staff was applicable to the LCSD and the AFCD only. The two departments provided in-house training to their frontline staff;
- (b) in general, most of the staff in tree management departments had already acquired the skill sets required for them through training provided or arranged by the Government. There were no significant training gaps but only minor ones; and
- (c) prior to the setting up of the TMO, there were few training courses on tree management. With the setting up of the TMO and new initiatives on tree management, tree management courses had increased substantially in the market.

5.6 At its third meeting, the Training Committee endorsed the tree management training plan for the period 2014 to 2016 prepared by the GLTMS. The training plan consisted of the following major elements:

- (a) the TMO would enhance training programmes in respect of training gaps identified in the 2013 survey (see para. 5.5(b)), e.g. pruning work, site supervision, occupational safety and health, and management of pests and diseases;
- (b) the TMO had coordinated with tertiary education institutions for providing diploma programmes targeted at supervisory and managerial staff. It would continue with such coordination and promote the development of degree programmes; and
- (c) contractors had the responsibility to ensure that their staff were qualified to perform tree management work competently and safely. When relevant training courses were available in the market, contractors should subscribe to them. Nevertheless, given that contractors had to be well versed with the Government's new initiatives, the TMO would make the relevant training available to contractor staff at the initial stage when it was not readily available in the market.

Provision of tree management training by the TMO

5.7 In general, the training provided by the TMO could be categorised as follows:

- (a) training on TRA. This was the core training course provided by the TMO and included the 2-day “Comprehensive Tree Risk Assessment and Management Training Course”;
- (b) training on occupational safety and health in arboriculture;
- (c) training on essential areas of tree management (e.g. tree species identification, and management of pests and diseases); and
- (d) advanced training delivered by external parties. The TMO sponsored government staff to attend this category of training (e.g. diploma courses delivered by tertiary education institutions).

5.8 The training provided by the TMO could also be categorised according to the mode of delivery as follows:

- (a) training delivered by TMO staff. In 2013, there were 21 such courses (e.g. courses on TRA) with 4,383 participants. These courses accounted for the bulk of the training provided by the TMO. According to the TMO, these courses were delivered by TMO staff because they were not currently available in the market; and
- (b) training delivered by external parties. In 2013, there were 11 such courses (e.g. courses on occupational safety and health in arboriculture) with 696 participants.

5.9 Audit noted that the TMO used considerable staff resources (both professional and administrative staff resources) in delivering training courses. In 2013, the 21 training courses delivered by the TMO took up 35 working days, representing 14% of the about 250 working days in that year. Most of the TMO’s professional staff were directly involved in the delivery. Besides, considerable

Training and community involvement

amount of administrative work was also incurred in the delivery (including the recruitment and selection of attendees, class administration, collecting feedback, etc.).

5.10 The TMO is an office with a small establishment (comprising 15 professional and 2 technical staff and 5 administrative staff who are shared with the GLO). The delivery of tree management training by the TMO will draw on the TMO's scarce staff resources, leaving fewer resources available for other important duties, including the formulation of tree management policies and guidelines, and the monitoring of the work of tree management departments (e.g. TRA implementation).

5.11 Audit understands that due to turnover of tree management staff (both government and contractor staff), tree management training needs to be provided regularly. On the other hand, this audit review has highlighted various areas where improvements need to be made regarding tree management in general and enhancing tree safety in particular. The TMO needs to focus its limited staff resources on the core duties and accord priority to matters requiring urgent attention.

5.12 Audit considers that there is a need for the TMO to review the long-term arrangement for it to deliver tree management training. For example, the TMO may consider confining training to areas where it has unique expertise (e.g. the treatment of BRR disease). It may also consider using other alternative modes of delivering training, such as:

- (a) seeking the assistance of the Civil Service Training and Development Institute in delivering training courses, particularly in doing the associated administrative work;
- (b) webcasting the training sessions and uploading the training videos onto its website; and
- (c) engaging training service providers. In engaging service providers for delivering training courses, the TMO can specify the exact requirements regarding course contents, qualifications of trainers, target attendees, etc. to ensure that the planned training objectives are achieved.

Audit recommendation

5.13 Audit has *recommended* that the Secretary for Development should review the long-term arrangement for the TMO to deliver tree management training in a more sustainable manner, including the use of other alternative modes of delivering training.

Response from the Administration

5.14 The Secretary for Development agrees with the audit recommendation.

Community involvement in greening and tree preservation

Government's community involvement activities

5.15 The Task Force considered that the community could play a significant role in helping to preserve trees. The Task Force recommended, among other things, that:

- (a) the Government should strengthen public education on greening and tree preservation. Particularly, the Government should foster an attitude of care for trees across the territory by the community, and appeal to private owners to take proper care of trees within their private lots; and
- (b) the LCSD should expand its Green Volunteer Scheme by inviting prominent figures in the community to participate in the Scheme as Green Ambassadors, and recruiting more Green Volunteers to enhance the surveillance of trees in their respective districts.

5.16 In March 2011, the Government reorganised the Community Involvement Committee on Greening (CICG — then under the purview of the Home Affairs Bureau) and put it under the purview of the DEVB. The CICG advises the Government on matters relating to community involvement activities on greening. It is chaired by the Permanent Secretary for Development (Works) and comprises 8 official and 11 non-official members.

Training and community involvement

5.17 Community involvement activities on greening are organised by the DEVB and other bureaux and departments. In 2013, 61 such activities, with a total of about 1.4 million participants, were organised. Broadly speaking, these activities aim to achieve the following objectives:

- (a) promoting public appreciation of greening and trees;
- (b) enlisting public support in promoting greening and tree management; and
- (c) enhancing knowledge of greening and tree management.

5.18 The DEVB oversees community involvement activities on greening. The GLTMS leads particular initiatives where its professional expertise is required or cross-departmental efforts are involved. The GLTMS also monitors the effectiveness of the Government's community involvement activities on greening. For example, it will conduct a series of surveys to track public views on the Government's greening work (with the first one completed by September 2013), and will compile performance indicators (such as the number of Greening Partners (see para. 5.22) and the number of event participants).

LCSD's Green Volunteer and Green Ambassador Schemes

5.19 In 2003, the LCSD set up the Green Volunteer Scheme to promote community involvement in greening. Under the Scheme, Green Volunteers (GVs) are recruited from the general public on a district basis, and are given basic training on the caring of plants and trees. GV's are invited to serve in carrying out greening activities. As at May 2014, there were 5,100 GV's, of which 950 (19%) were active members.

5.20 In April 2010, the LCSD set up the Green Ambassador Scheme, as recommended by the Task Force. Under the Scheme, local prominent figures are invited to join as Green Ambassadors (GAs) to help promote community involvement in greening and recruit GV's. As at August 2014, there were 355 GAs, most of them were District Council Members.

5.21 Audit reviewed the volunteer services arranged by the LCSD for GVs and noted that they were mainly related to the Hong Kong Flower Show, the North District Flower Bird Insect and Fish Show, community planting days and inspection of OVTs. Broadly speaking, GVs carried out general horticultural activities rather than activities targeted at tree care. In view of growing public concerns about tree safety (particularly relating to roadside trees), the LCSD needs to leverage on these schemes (e.g. by mobilising the large number of GVs for active participation) to better promote tree care in general and community surveillance of roadside trees in particular. Audit noted that the GLTMS would implement an “Adopt a Tree Movement” to promote community surveillance of trees (see also para. 5.22(c)). Audit considers that the LCSD may help better implement the Movement by encouraging the large number of GVs to actively participate in it.

DEVB’s “Be Our Greening Partner” Campaign

5.22 In May 2013, the GLTMS launched the “Be Our Greening Partner” (BOGP) Campaign (see Photograph 6), as a core programme of its community involvement activities. Under the BOGP Campaign, people from all walks of life will be proactively engaged to foster appreciation and care of Hong Kong’s greenery. Regarding the implementation of the Campaign, Audit noted the following:

- (a) the key event in 2013 was the launch of the Greening Partner Charter. The Charter is a list of “good acts” on greening matters that subscribers to it should strive to observe. These good acts include the surveillance and reporting to the Government of problematic trees. As at September 2014, about 560 organisations and 5,800 individuals had subscribed to the Charter and become Greening Partners;
- (b) the key event in 2014 was the “Our Favourite Old and Valuable Trees Contest”. The objective of the contest was to foster community appreciation and care of OVTs; and
- (c) the forthcoming key event would be the “Adopt a Tree Movement”. The objective of the movement was to promote community surveillance of trees.

Photograph 6

**Opening ceremony of the BOGP Campaign
cum Tree Seminar
(May 2013)**



Source: DEVB records

5.23 As can be seen from paragraph 5.22(a) and (b), the BOGP Campaign initially focused on fostering a culture of appreciation and care of Hong Kong's greenery. Audit considers that, in view of growing public concerns about tree safety, the BOGP Campaign needs to further promote community surveillance from a tree safety perspective (particularly relating to roadside trees) in future. In this regard, Audit welcomes the GLTMS's latest initiative to implement the "Adopt a Tree Movement" (see para. 5.22(c)) which may help promote community involvement in enhancing tree safety.

Audit recommendations

5.24 Audit has *recommended* that the Secretary for Development should, in view of growing public concerns about tree safety, make more efforts in promoting community surveillance from a tree safety perspective (particularly relating to roadside trees).

5.25 **Audit has also *recommended* that the Director of Leisure and Cultural Services should:**

- (a) leverage on the LCSD’s Green Volunteer and Green Ambassador Schemes (e.g. by mobilising the large number of GVs for active participation in community involvement activities) to better promote tree care in general and community surveillance of roadside trees in particular; and**
- (b) step up efforts to encourage the large number of GVs to actively participate in the Government’s community involvement activities, including the forthcoming “Adopt a Tree Movement” under the BOGP Campaign implemented by the GLTMS.**

Response from the Administration

5.26 The Secretary for Development agrees with the audit recommendation in paragraph 5.24.

5.27 The Director of Leisure and Cultural Services agrees with the audit recommendations in paragraph 5.25. She has said that the LCSD will:

- (a) explore measures to leverage on its Green Volunteer and Green Ambassador Schemes to better promote tree care and encourage wider participation in tree care and surveillance; and**
- (b) continue to foster collaboration with the GLTMS to disseminate information on community involvement activities to GAs and GVs, including but not limited to the forthcoming “Adopt a Tree Movement”.**

PART 6: WAY FORWARD

6.1 This PART explores the way forward for the Government's efforts in enhancing tree safety.

Progress made since 2008 in improving tree management

6.2 The 2008 tragic tree collapse incident in Stanley has led to drastic changes in the way the Government deals with tree management. In March 2010, the TMO was set up with the main task of minimising the threat of problematic trees to public safety. More than four years after its setting up, the TMO has made progress in improving tree management. In October 2012, the LegCo Panel on Development was informed of the work progress in the implementation of the tree management policy in various areas, including:

- (a) enhancing TRA;
- (b) raising the professional standard of tree management by:
 - (i) building a professional team in the TMO;
 - (ii) enhancing training for tree management personnel in departments;
 - (iii) seeking experts' view;
 - (iv) developing practice guidelines and conducting researches; and
 - (v) setting up an inventory of trees;
- (c) enhancing public education and community involvement;
- (d) enhancing the care of OVTs; and
- (e) enhancing the tree complaint mechanism and the emergency response system.

6.3 Audit welcomes the Government's efforts in enhancing tree safety and the improvements made so far. However, notwithstanding the Government's efforts since the setting up of the TMO, tree collapse incidents have still occurred from time to time, including a few fatal cases (see para. 1.10). It appears that more needs to be done in further enhancing tree safety. Audit considers that the DEVB needs to continue to keep the LegCo Panel on Development informed, on a regular basis, of the progress in the implementation of tree management policy, particularly regarding the Government's efforts in enhancing tree safety.

Areas for improvement

6.4 This audit review has identified a number of areas for improvement relating to the Government's tree management work, including:

- (a) ***Coordinating the work of tree management departments (see PART 2).*** In particular, there are grey areas relating to the delineation of maintenance responsibilities of roadside trees among different tree management departments (see paras. 2.18 to 2.26). The ad hoc maintenance approach adopted by the LandsD under the Technical Circular for trees on unallocated government land, especially those on roadside, poses a threat to public safety (see paras. 2.42 to 2.45). Besides, a strategy for better coordinating the work of non-core tree management departments is needed (see paras. 2.6 to 2.10);
- (b) ***Tree risk assessment (see PART 3).*** In particular, more detailed guidelines are needed to guide tree management departments to conduct TRA inspections effectively to identify problematic trees (see paras. 3.18 to 3.28). Besides, there is a need to standardise the frequency of conducting Form 2 inspections of OVTs. More information on BRR infection needs to be provided for public information;
- (c) ***Management information systems and databases (see PART 4).*** In particular, the centralised TMIS encountered system development issues and an enhancement project is underway (see paras. 4.2 to 4.11). Besides, there is a need to review the Tree Register for promoting community surveillance (see paras. 4.14 to 4.25). There is also a need to monitor the building up of the Tree Failure Database (see paras. 4.28 to 4.32); and

- (d) ***Training and community involvement (see PART 5).*** The TMO needs to review the long-term arrangement for it to deliver tree management training (see paras. 5.7 to 5.12). Besides, the TMO needs to make more efforts in promoting community surveillance from a tree safety perspective (see para. 5.23).

6.5 Audit considers that the DEVB needs to take on board the observations and recommendations in this Audit Report in further strengthening the Government's efforts in enhancing tree safety.

Addressing safety risks of trees on private land

6.6 The work of the TMO primarily focuses on trees maintained by government departments. For trees on private land, their maintenance responsibilities rest with the private land owners concerned. The recent tragic tree collapse incident at Mid-levels involved a tree on private land (see para. 1.10(d)). This incident has aroused public concerns about safety risks posed by trees on private land and the need for legislation for mandatory tree inspection and maintenance by private land owners to address such risks.

6.7 In its Report of June 2009, the Task Force had examined the existing legislation with provisions applicable to tree management and deliberated on whether it was necessary to introduce a new tree ordinance or amend any existing ordinance. The Task Force noted that:

- (a) under common law, the duty of care owed by private land owners would require them to inspect trees on their land to ensure that such trees would not pose a potential danger to people or properties. Failure to discharge such a duty will result in possible liability for negligence and nuisance;
- (b) since the 1970's, the Government had included tree preservation clauses in land leases as a lease condition. According to these clauses, the lessee was required to apply to the LandsD for consent before felling of and interfering with any trees on his lot;

- (c) since the 1980's, the Government had included landscape clauses in land leases to encourage landscaping of private lots and proper management of plants located thereon; and
- (d) for cases of redevelopment requiring planning approval or lease modification, there would be opportunities to impose conditions for tree preservation purposes.

6.8 The Task Force concluded that there was no need to introduce any legislative change at the moment and efforts should instead be channelled to the administrative means proposed to improve coordination, enhance tree risk management, upgrade expertise and involve the community. It would be better to see how the administrative measures work in reality before considering the need for legislative amendments. As stated in the Task Force Report, the Government would keep the matter under review having regard to the operational experience of the new improvement measures.

6.9 Regarding the maintenance of trees on private land, Audit has noted that:

- (a) there is no requirement for private land owners to conduct regular maintenance and inspections on trees on their land, while trees on government land are subject to annual TRA (see para. 3.4) by the respective tree management departments;
- (b) when problematic trees are identified by the Government (e.g. during the TMO's tree patrols) and the situation does not reflect any breaches of the land leases concerned, the Government can only advise the tree owners (normally via the LandsD) to take necessary actions. Currently, there is no legislative backing for taking enforcement actions; and
- (c) only a small percentage of land leases have incorporated the tree preservation clause (see para. 6.7(b)).

Way forward

6.10 In view of the recent incident (see para. 1.10(d)) and public concerns about the safety risks of trees on private land, Audit considers that the DEVB needs to critically review whether there is a need for tree legislation to regulate, among other things, the proper maintenance of trees on private land. However, introducing new legislation is a long-drawn process, requiring substantial time and resource inputs. Meanwhile, there is a need to devise effective measures that can bring forth improvements more readily, including for example:

- (a) placing more emphasis on private trees in community involvement activities on greening (e.g. promoting surveillance of private trees by their owners);
- (b) publicising information and materials that can assist private land owners in maintaining their trees; and
- (c) exploring the feasibility of employing other existing regulatory measures (e.g. the Code of Practice on Building Management and Maintenance issued under the Building Management Ordinance (Cap. 344)) to impose some form of standards and guidelines for compliance by private land owners regarding tree maintenance.

Audit recommendations

6.11 **Audit has *recommended* that the Secretary for Development should:**

- (a) **continue to keep the LegCo Panel on Development informed of the progress in the implementation of tree management policy, particularly regarding the Government's efforts in enhancing tree safety;**
- (b) **take on board the observations and recommendations in this Audit Report in further strengthening the Government's efforts in enhancing tree safety;**
- (c) **critically review whether there is a need for legislation for mandatory tree inspection and maintenance of trees on private land by private land owners; and**

- (d) **before any new legislation is introduced, take effective measures that can more readily help improve tree safety on private land.**

Response from the Administration

6.12 The Secretary for Development agrees with the audit recommendations.

**Trees maintained by major tree management departments
(December 2013)**

Department	Estimated number of trees maintained	Number of staff involved (Note 1)	Estimated contract expenditure in 2013 (Note 2) (\$ million)
HyD	630,000	57	74
LCSD	513,600	222	215
ArchSD	200,000	5	67
HD	100,000	35	24
WSD	49,400	14	5
AFCD	36,000 (Note 3)	87	0
CEDD	27,300	22	10
DSD	24,100	16	5
LandsD	— (Note 4)	12	73
Total	1,580,400	470	473

Source: DEVB records

Remarks: These figures were reported to LegCo in connection with the examination of the 2014-15 Estimates of Expenditure.

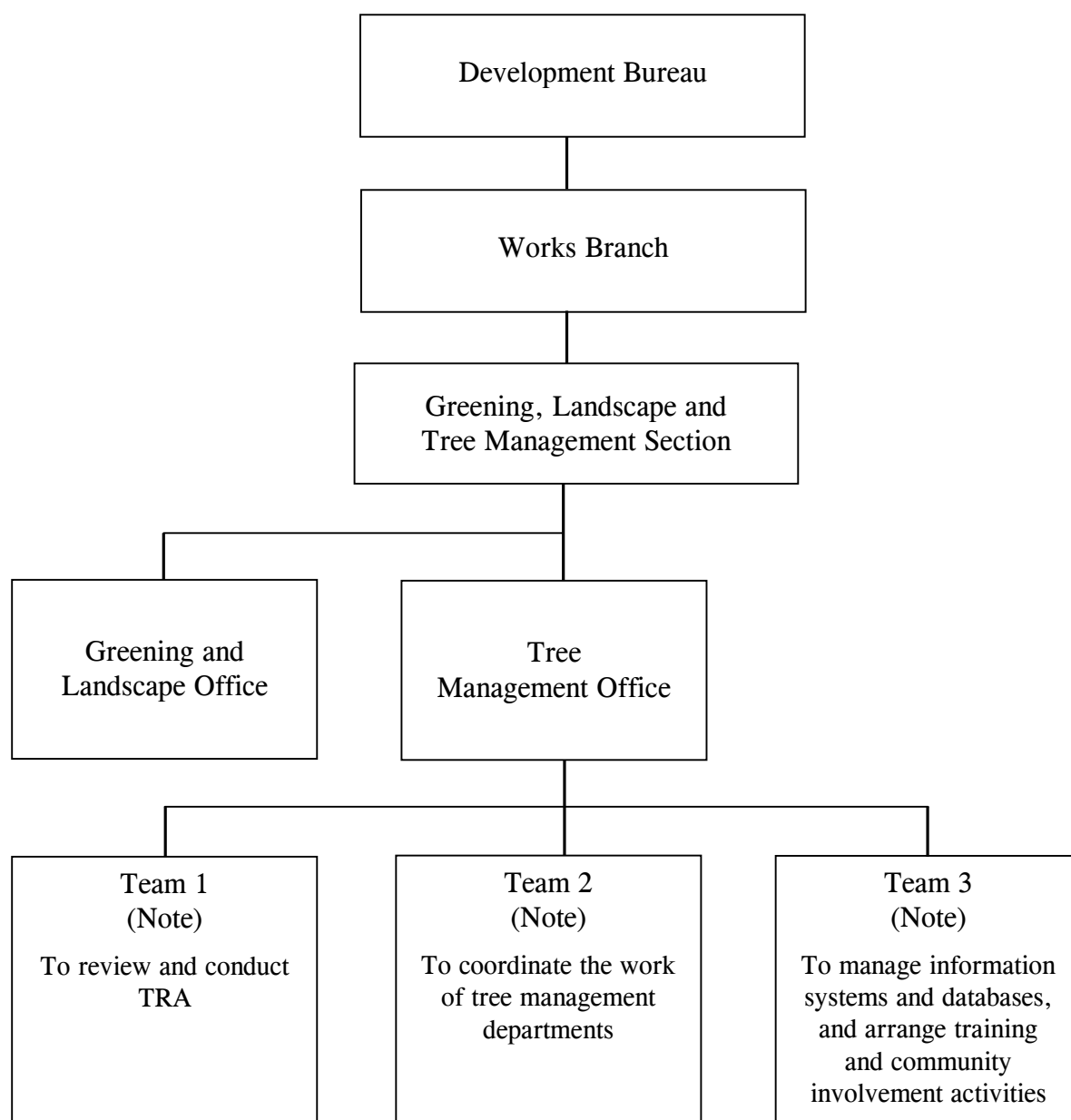
Note 1: These figures included staff involved in day-to-day tree management on a full-time or part-time basis. For the LCSD, the number of staff included full-time staff only.

Note 2: Only the lump-sum figure was reported to LegCo. The contract expenditure for each department was estimated on a pro rata basis by the duration of contract period. Also, some contracts were not solely for tree maintenance. For example, the LCSD hired horticulture contractors for tree maintenance as well as maintenance of other vegetation.

Note 3: There are a large number of trees in country parks which are under the purview of the AFCD. The figure here only included the number of trees in areas with intensive use in country parks (e.g. picnic areas).

Note 4: There are a large number of trees on unallocated government land (including those in the countryside) which are under the purview of the LandsD, but it does not keep an inventory of such trees.

**Greening, Landscape and Tree Management Section
Organisation chart (extract)
(August 2014)**



Source: DEVB records

Note: The three teams also provide support on tree management matters to the respective tree management departments under their purview, and contribute staff resources to form the Central Tree Support Team (see also para. 3.32).

**Number of trees maintained by non-core departments
(2012 to 2014)**

	Department	As at 31 March		
		2012	2013	2014
1	Environmental Protection Department	160,012	160,900	160,147
2	Correctional Services Department	6,083	6,159	6,113
3	Hong Kong Police Force	3,237	3,442	3,513
4	Government Property Agency	4,458	4,430	3,495
5	Fire Services Department	1,860	2,101	2,087
6	Home Affairs Department	1,825	1,675	1,741
7	Education Bureau	8	1,319	1,416
8	Hong Kong Observatory	674	658	658
9	Department of Health	644	634	623
10	Food and Environmental Hygiene Department	1,760	350	503
Sub-total		180,561	181,668	180,296
No. of trees maintained by other departments		1,177	1,379	1,955
Total number of trees		181,738	183,047	182,251
Total number of non-core departments		20	24	27

Source: Audit analysis of DEVB records

**Tree records in the TMIS
(May 2014)**

Department	Estimated number of trees maintained (Note 1)	Number of tree records transferred to the TMIS	Percentage of tree records transferred to the TMIS
AFCD	41,827 (Note 2)	41,827	100%
CEDD	31,416	31,416	100%
HD	93,847	93,847	100%
<i>Sub-total</i>	<i>167,090</i>	<i>167,090</i>	<i>100%</i>
LCSD	513,600	377,255	73%
DSD	24,100	4,541	19%
WSD	49,400	7,497	15%
ArchSD	200,000	8,378	4%
HyD	630,000	2,441	0.4%
<i>Sub-total</i>	<i>1,417,100</i>	<i>400,112</i>	<i>28%</i>
Total	1,584,190	567,202	36%

Source: DEVB records

Note 1: For the AFCD, the CEDD and the HD, the actual numbers of trees maintained as at May 2014 were available upon full transfer of tree records to the TMIS. For other departments, the figures were based on the estimated numbers of trees maintained as at December 2013.

Note 2: There are a large number of trees in country parks which are under the purview of the AFCD. The figure here only included the number of trees in areas with intensive use in country parks (e.g. picnic areas).

Acronyms and abbreviations

AFCD	Agriculture, Fisheries and Conservation Department
ArchSD	Architectural Services Department
Audit	Audit Commission
BOGP	Be Our Greening Partner
BRR	Brown root rot
CEDD	Civil Engineering and Development Department
CICG	Community Involvement Committee on Greening
DEVB	Development Bureau
DSD	Drainage Services Department
EPD	Environmental Protection Department
EPTM	Expert Panel on Tree Management
ETWB	Environment, Transport and Works Bureau
EU	Efficiency Unit
GAs	Green Ambassadors
GLO	Greening and Landscape Office
GLTMS	Greening, Landscape and Tree Management Section
GVs	Green Volunteers
HD	Housing Department
HyD	Highways Department
LandsD	Lands Department
LCSD	Leisure and Cultural Services Department
LegCo	Legislative Council
OVTs	Old and valuable trees
TMIS	Tree Management Information System
TMO	Tree Management Office
TRA	Tree risk assessment
WMCG	Works and Maintenance Committee on Greening
WSD	Water Supplies Department