CHAPTER 7

THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

GENERAL REVENUE ACCOUNT

GOVERNMENT SECRETARIAT

Environment, Transport and Works Bureau

GOVERNMENT DEPARTMENTS

Environmental Protection Department
Housing Department
Food and Environmental Hygiene Department
Lands Department
Government Property Agency
Government Supplies Department
Electrical and Mechanical Services Department

Management of municipal solid waste

Audit Commission
Hong Kong
15 October 2002

MANAGEMENT OF MUNICIPAL SOLID WASTE

Contents

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Summary and key findings

A. **Introduction.** Municipal solid waste includes waste generated by the domestic, commercial and industrial sectors. Over the past eleven years, municipal solid waste disposed of at landfills increased from 2,592,000 tonnes in 1990 to 3,395,000 tonnes in 2001. In 2001, municipal solid waste accounted for 55% of the waste disposed of at landfills. Construction and demolition materials accounted for another 38% of the waste and the remaining 7% was other miscellaneous wastes. In Report No. 38 of the Director of Audit of March 2002, Audit reported on the results of an audit review on the management of construction and demolition materials (para. 1.2).

B. **1998 Waste Reduction Framework Plan.** In 1998, the Government estimated that the three strategic landfills in Hong Kong would be exhausted five years earlier than originally planned, i.e. in 2015 instead of 2020. New landfills are costly to build. Finding suitable sites for new landfills is also difficult given the many competing demands for the limited land resources. In November 1998, the Government launched a Waste Reduction Framework Plan (WRFP) with the objective of extending the useful life of the strategic landfills. The WRFP set out a 10-year implementation programme to minimise the amount of wastes requiring disposal and to increase the rate of waste recycling. The Government expected that the successful implementation of the WRFP would extend the life of the landfills from 2015 to 2019 and reduce the waste management cost by $700 million in 2007 (paras. 1.3 to 1.5).

C. **Audit review.** Audit has conducted a review to examine the progress made by the Government in achieving the interim waste reduction targets set in the WRFP and to identify whether there is room for improvement. The audit findings are summarised in paragraphs D to K below.

D. **Interim waste reduction target not fully met.** The WRFP aimed to limit the quantity of municipal solid waste requiring disposal at landfills to 3,204,000 tonnes in 2001. However, population growth and the increase in per capita generation of municipal solid waste since 1998 have nullified the efforts made in increasing the recycling of municipal solid waste. As a result, the quantity of municipal solid waste disposed of at landfills continued to increase, amounting to 3,395,000 tonnes in 2001. This was 191,000 tonnes (or 6%) above the WRFP's target level. The quantity of municipal solid waste to be disposed of at the landfills is expected to further increase in 2007 because the waste bulk reduction facilities (such as incinerators) are unlikely to be available as originally planned. More time is needed to identify the most suitable technology for the provision of these facilities, and to address public concerns about their location. Audit considers that there is a need for the Government to formulate an action plan to curb the increase in the quantity of municipal solid waste so as to meet the waste reduction target set in the WRFP (paras. 2.9 and 2.10).

E. **Need to improve the waste recovery rate in public housing estates.** To promote waste reduction and recovery at residential premises, the Government has provided one set of three waste separation bins for each block in all public housing estates and in over 800 private housing estates. Through the community-based waste recycling campaigns organised for these estates, significant quantities of recyclable wastes were recovered. However, the rates of waste recovery in the public housing estates were generally lower than those of the private housing estates. The results of an opinion survey and trial schemes in 2000 and 2001 showed that the provision of waste separation bins on a floor-to-floor basis was more effective for increasing the rates of waste recovery in the public housing estates. Audit considers that there is a need to speed up the implementation of the floor-to-floor provision of waste separation facilities in all public housing estates (paras. 3.4 to 3.9 and 3.17).

F. **Need to review the locations of some waste separation bins in public places.** The Government has provided waste separation bins in about 1,000 public places to educate and facilitate the public to participate in waste recovery. The waste collection data showed that the overall average rate of waste recovery per collection location was about 30% of the carrying capacity of the waste separation bins. In particular, there were 92 locations at which the yields of recyclable wastes were frequently below the overall average. While some of the recyclable wastes could have been taken away by scavengers, Audit considers that the departments concerned need to critically examine the suitability of placing waste separation bins at these locations to find out if relocation of the bins or other measures (such as enhanced publicity) are necessary in order to improve the recovery rate (paras. 3.23 and 3.26).

G. **Room for improvement in land allocation for waste recycling industry.** The leasing of land by means of Short Term Tenancy for the waste recycling industry is an important waste reduction measure set out in the WRFP. Experience gained from the leasing of nine sites by Short Term Tenancy since 1998 has shown that there is room for improvement in regulating the use of the leased sites to ensure their efficient and effective use towards meeting the WRFP's waste reduction objectives. In particular, provisions need to be included in future tenancy agreements to ensure that the tenants will use the sites to enhance the rate of recycling of domestic waste as intended by the WRFP and to deliver the throughput stated in their tender submissions when bidding for the allocation of land. Audit considers that there is a need to allocate more sites for carrying out primarily plastics recycling so as to help increase the rate of recycling of plastics in housing estates (paras. 4.18 to 4.21).

H. **Need to promote the use of recycled paper.** As a large user of paper, the Government can help create market demand for recycled paper by committing itself to the use of recycled paper. The increased demand for recycled paper can in turn encourage the recovery of paper waste and reduce the overall cost of its disposal at the landfills. The use of recycled paper in the Government increased from 6% in 1999 to 33% in 2000. However, it dropped to 31% in 2001. Audit considers that there is a need for the Administration to adopt a whole-of-government approach to increasing the use of recycled paper. It should seek to offset the higher cost of using recycled paper through economising on paper consumption and accepting the use of off-white recycled paper (paras. 5.4, 5.11 and 5.12).

I. **Need to reduce paper consumption.** Notwithstanding the adoption of electronic means of communication and a 4% reduction in the number of government staff from 1999 to 2001, paper consumption within the Government grew by 13% over the same period. Audit considers that there is a need for more concerted efforts to economise on the use of paper. Audit notes that some departments have taken the initiative to reduce the printing requirements through providing electronic versions of their publications (such as the e-Gazette). However, based on an audit survey, 57% of the government publications published in 2001-02 did not have electronic versions. There is still scope to further reduce paper consumption through the wider use of electronic versions of publications (paras. 5.7, 5.9, 5.12 and 5.13).

J. **Need to promote the use of retreaded tyres.** Used tyres occupy a large volume of space and pose compaction problems if improperly disposed of at landfills. In June 2002, after a two-year trial scheme, the Government decided to extend the use of retreaded tyres to all of its 1,100 heavy and medium vehicles. However, 5,800 light vehicles of the government fleet have not been covered. Audit considers that there is a need for the Government to further promote the use of retreaded tyres for its light vehicles in order to set an example for the private sector to follow (paras. 5.19 and 5.30).

K. **Need for more action against unlawful dumping of waste tyres.** Over the past five years, the Government spent about $30 million to handle waste tyres unlawfully dumped at refuse collection points and public places. This arrangement is not consistent with the Government's Polluter Pays Principle and the WRFP's objective of encouraging waste producers to reduce waste. Audit considers that there is a need for the Food and Environmental Hygiene Department to step up its enforcement action against those people who unlawfully dump tyres at refuse collection points and public places. In the longer term, the Environmental Protection Department needs to introduce producer responsibility schemes to require the tyre manufacturers and suppliers to take a greater responsibility in the collection and proper disposal of waste tyres (para. 5.31).

L. **Audit recommendations.** Audit has made the following main recommendations that:

(a) the Secretary for the Environment, Transport and Works and the Director of Environmental Protection should make more effort to meet the waste reduction targets set in the WRFP. In particular, they should enhance public education and the Government's publicity work that promote reduction in waste generation in the community, and take positive measures to improve the rates of waste recovery (para. 2.11);

(b) the Director of Housing should expedite action on the full-scale implementation of the floor-to-floor provision of waste separation facilities in public housing estates (para. 3.19(a));

(c) the Director of Food and Environmental Hygiene, together with the Director of Leisure and Cultural Services and the Director of Agriculture, Fisheries and Conservation, should critically examine those collection locations with low yields of recyclable wastes to see if relocation or other measures (such as enhanced publicity) are needed to improve the rate of waste recovery (para. 3.27(a));

(d) the Director of Lands, in consultation with the Director of Environmental Protection, should:

(i) incorporate appropriate regulatory provisions in future tenancy agreements to ensure that the tenants will use the sites to enhance the rate of recycling of domestic waste as intended by the WRFP and to deliver the throughput stated in the tender submissions (para. 4.23(a)); and

(ii) allocate more sites for carrying out primarily plastics recycling (para. 4.23(b));

(e) the Administration should adopt a whole-of-government approach to increasing the use of recycled paper. It should seek to offset the higher cost of using recycled paper through economising on paper consumption and accepting the use of off-white recycled paper (para. 5.14);

(f) the Secretary for the Environment, Transport and Works, in conjunction with the Director of Environmental Protection and the Director of Government Supplies, should:

(i) urge bureaux and departments to set realistic targets for reducing paper consumption and closely monitor their performance against the targets (para. 5.15(a)); and

(ii) urge bureaux and departments concerned to conduct user surveys with a view to ascertaining the extent to which users will accept electronic versions of their publications and introducing electronic versions at an early date so as to reduce the printing requirements (para. 5.15(c));

(g) the Director of Electrical and Mechanical Services and the Director of Environmental Protection should continue to explore the feasibility of extending the use of retreaded tyres to the Government's light vehicle fleet (para. 5.32(a)); and

(h) the Director of Food and Environmental Hygiene should step up enforcement action against people who dispose of large quantities of waste tyres unlawfully at the refuse collection points and public places (para. 5.32(b)).

M. **Response from the Administration.** The Administration has accepted all the audit recommendations.

PART 1: INTRODUCTION

1.1 This PART describes the background to the audit of the Government's management of municipal solid waste.

Background

1.2 Municipal solid waste includes waste generated by the domestic, commercial and industrial sectors. In 2001, municipal solid waste accounted for 55% of all types of waste disposed of at landfills (Note 1). Over the past eleven years, municipal solid waste disposed of at landfills increased from 2,592,000 tonnes in 1990 (by 31%) to 3,395,000 tonnes in 2001.

1998 Waste Reduction Framework Plan

1.3 In 1998, the Government estimated that the three strategic landfills (Note 2) built under the Waste Disposal Plan would be exhausted five years earlier than originally planned, i.e. in 2015 instead of 2020. There are presently three landfills which together occupy 270 hectares of land, cost $6 billion to build and over $400 million a year to operate. It is costly to build new landfills. Finding suitable sites for new landfills is also difficult given the many competing demands for the limited land resources. In November 1998, in view of the fast depletion of the capacity of landfills, the Government launched a Waste Reduction Framework Plan (WRFP) with the following objectives:

(a) to extend the useful life of the strategic landfills;

(b) to minimise the amount of wastes produced that requires disposal;

(c) to increase the rate of waste recycling;

(d) to help conserve the earth's non-renewable resources;

(e) to show to the Administration, commerce, industry and the public the true costs of waste management for a review on how these costs are met; and

(f) to encourage maximum efficiency in waste management operations and minimisation of the costs associated with the collection, treatment and disposal of wastes.

Note 1: *Construction and demolition materials accounted for another 38% while other miscellaneous wastes made up the remaining 7%. In Report No. 38 of the Director of Audit of March 2002, Audit reported on the results of an audit review on the management of construction and demolition materials.*

Note 2: *The three strategic landfills are the South East New Territories landfill, North East New Territories landfill and West New Territories landfill.*

1.4 ***Targets for municipal solid waste reduction.*** In 1998, about 30% of municipal solid waste produced was recovered for recycling and reuse. The remaining 70% was disposed of at landfills. By building on the existing practice, the WRFP aimed to further reduce the projected level of municipal solid waste requiring disposal at landfills by 40% by 2007. The WRFP set out a ten-year implementation programme with interim targets laid down for measuring the progress as shown in Table 1 below.

Table 1

Municipal solid waste reduction targets

	End of initial phase Year 2001	**Intermediate phase Year 2003**	**Intermediate phase Year 2005**	**End of final phase Year 2007**
(a) Projected annual quantities of waste requiring disposal without the WRFP ('000 tonnes)	**3,560**	3,874	4,219	4,571
(b) Waste prevention and reuse per the WRFP ('000 tonnes)	**356**	542	675	914
(c) % of reduction (c) = (b)/(a) × 100%	**10%**	14%	16%	20%
(d) Waste bulk reduction per the WRFP ('000 tonnes)	**0**	0	253	914
(e) % of reduction (e) = (d)/(a) × 100%	**0%**	0%	6%	20%
(f) Projected annual quantities of waste requiring disposal at landfills with the WRFP targets attained (f) = (a) − (b) − (d) ('000 tonnes)	**3,204**	3,332	3,291	2,743

Source: WRFP

1.5 ***Expected benefits.*** **The Government expected that the successful implementation of the WRFP would extend the life of the existing strategic landfills by 4 years from 2015 to 2019.** In financial terms, if the WRFP was not implemented, the quantifiable cost of the

management of municipal solid waste (Note 3) would rise from $2.7 billion in 1998 to over $3.7 billion in 2007. **If the WRFP targets are fully achieved, the quantifiable cost of the management of municipal solid waste would decrease from $3.7 billion to about $3 billion in 2007, i.e. the cost that could be avoided would be $700 million.**

1.6 ***Roles and responsibilities.*** According to the WRFP, the then Planning, Environment and Lands Bureau (now the Environment, Transport and Works Bureau — ETWB) has the leading policy responsibility for waste reduction. All bureaux and departments are also required to participate in government-wide measures to control waste. The departments that have particularly important roles to play are as follows:

(a) ***Environmental Protection Department (EPD).*** The EPD is responsible for advising on waste reduction management and technological developments, and for promoting community participation and public awareness;

(b) ***Housing Department (HD).*** The HD is responsible for promoting residents' participation in waste reduction measures in public housing estates; and

(c) ***Food and Environmental Hygiene Department (FEHD).*** The FEHD is responsible for providing efficient and environmentally sound collection service for waste and recyclable materials separated at source. (Before 2000, such responsibilities were undertaken by the then Urban Services Department and the then Regional Services Department.)

Audit review

1.7 Audit has conducted a review to examine the progress the Government has made in achieving the interim waste reduction targets set in the WRFP and to identify whether there is room for improvement. The audit review focused on the following areas:

(a) the overall progress of implementing the WRFP (see PART 2 below);

(b) the recovery of recyclable wastes in public housing estates, public places and government quarters (see PART 3 below);

(c) the land allocation arrangements for the waste recycling industry (see PART 4 below); and

(d) the government leadership in economising on paper consumption and promoting the use of recycled paper and retreaded tyres (see PART 5 below).

Audit has made a number of recommendations to address the above issues.

Note 3: *According to the WRFP, the full costs and benefits of improving the management of Hong Kong's waste were difficult to forecast accurately because of the large number of stakeholders involved. It was only possible to indicate the likely financial implications of not proceeding with the WRFP.*

PART 2: PROGRESS OF IMPLEMENTING THE WRFP

2.1 According to the WRFP, the year 2001 was the end of the initial phase of implementing the WRFP. This PART examines the progress of implementing the WRFP and the extent of achievement of the interim waste reduction target. The audit has revealed that the waste reduction target set in the WRFP for 2001 was not fully met despite the efforts made in increasing the recycling rates of municipal solid waste since 1998.

Waste reduction action programmes

2.2 In order to achieve the waste reduction targets, the WRFP set out the following waste reduction action programmes:

(a) ***Prevention of waste programme.*** This programme aimed to reduce the amount of municipal solid waste generated at source. It also aimed to increase the amount of waste materials that were recovered, recycled or reused, building on systems which already existed in Hong Kong;

(b) ***Institutional programme.*** This programme involved the establishment of a Waste Reduction Committee and a number of task forces to facilitate and promote waste reduction initiatives in various sectors of the community; and

(c) ***Waste bulk reduction programme.*** Even with effective waste prevention and recycling measures, there would still be considerable amounts of waste that required treatment and disposal. The waste bulk reduction programme would employ two methods, namely waste-to-energy incineration and composting, to reduce the bulk of waste requiring final disposal.

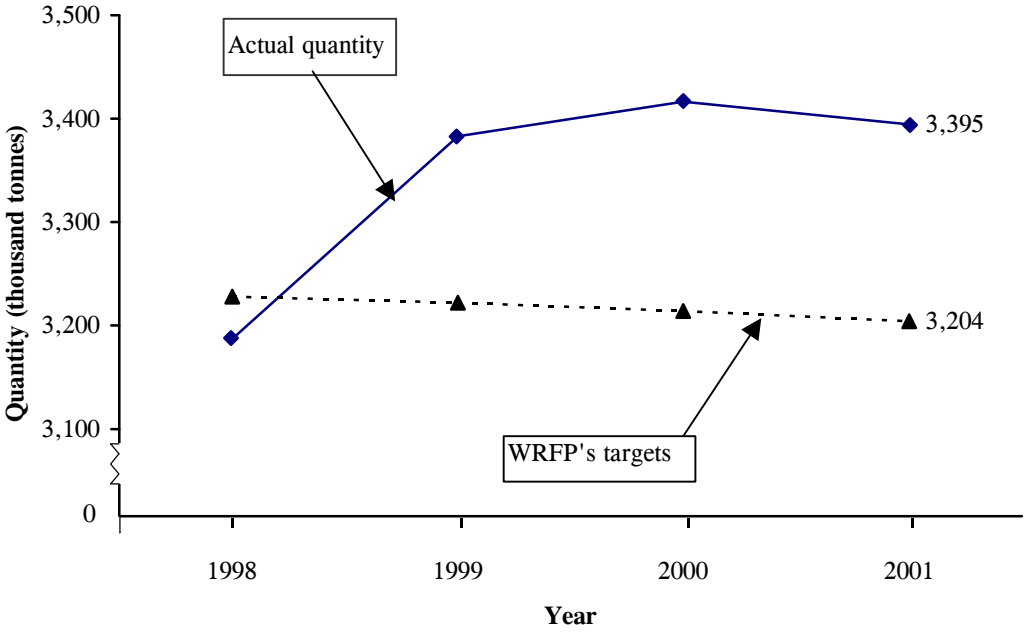
The progress of implementing the waste reduction action programmes is summarised in Appendix A. The impact of these programmes on the quantity of municipal solid waste disposed of and recycled is discussed in paragraphs 2.3 to 2.6 below.

Extent of achievement of waste reduction target

2.3 As shown in Table 1 of paragraph 1.4 above, one of the targets of the WRFP is to limit the annual quantity of municipal solid waste requiring disposal at landfills to 3,204,000 tonnes at the end of the initial phase of implementation in 2001. According to the EPD's data, the actual quantity of municipal solid waste disposed of at the landfills had increased during the period 1998 to 2001 (see Figure 1 below), although the rate of increase somewhat slowed down in 2001. **In 2001, the quantity of municipal solid waste disposed of at landfills was 3,395,000 tonnes, which was 191,000 tonnes (or 6%) above the WRFP's target level of 3,204,000 tonnes. The additional cost of disposing of 191,000 tonnes of municipal solid waste at landfills was $23.9 million ($125 ´ 191,000 tonnes).**

Figure 1

Quantity of municipal solid waste disposed of at landfills



Source: EPD's records

Per capita generation rate of municipal solid waste

2.4 According to the Census and Statistics Department's data, Hong Kong's population grew from 6.58 million in 1998 to 6.76 million in 2001. Population growth is a contributing factor to the increase in municipal solid waste. An analysis of the per capita generation rate of municipal solid waste is in Figure 2 below. It shows that people were disposing of more waste each day. **Over the period 1998 to 2001:**

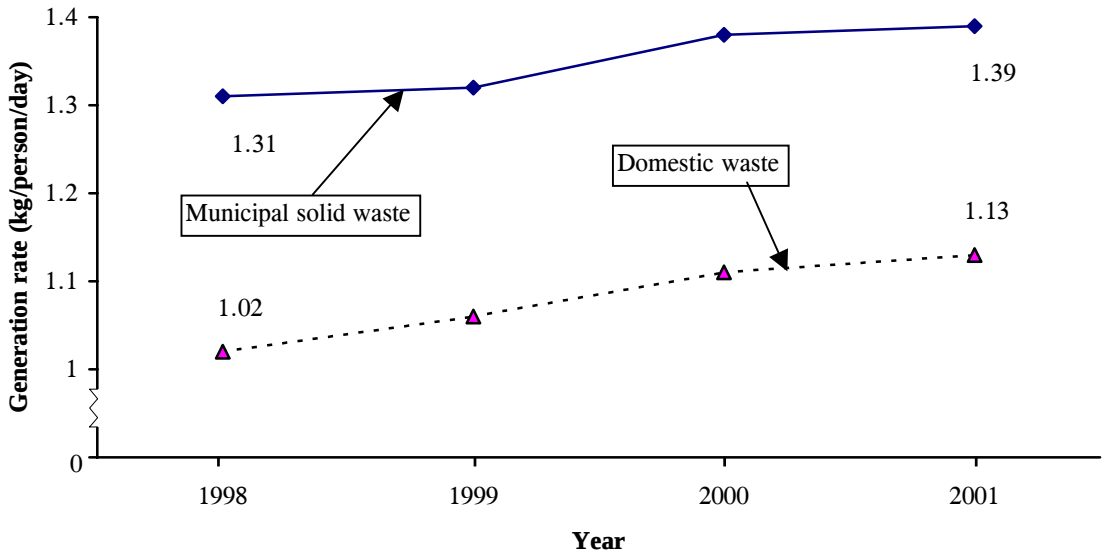
(a) **there was a 6% increase in the waste generation rate, i.e. from 1.31 kilogrammes (kg) per person per day to 1.39 kg per person per day; and**

(b) **about 80% of municipal solid waste came from the domestic sector. The generation rate of domestic waste showed an 11% increase, from 1.02 kg per person per day to 1.13 kg per person per day.**

In 2001, the per capita generation rate of domestic waste in Hong Kong of 1.13 kg per person per day was higher than that of 0.93 kg in Singapore and of 0.94 kg in Taipei (Note 4).

Figure 2

Per capita generation rate of municipal solid waste and domestic waste requiring disposal



Source: EPD's records

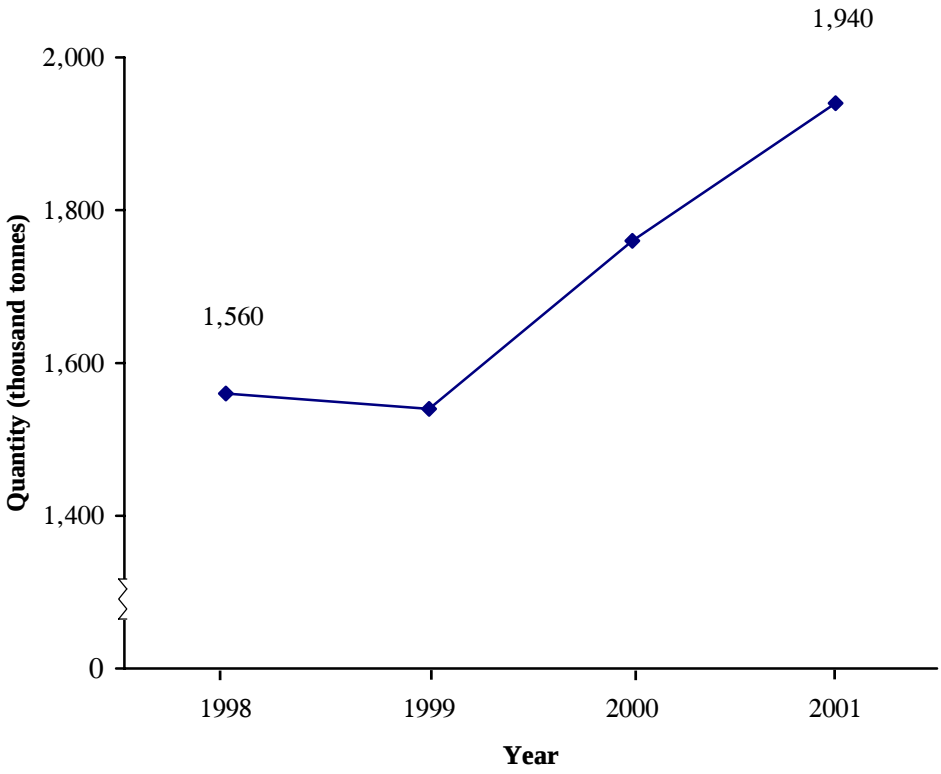
Waste recycling statistics

2.5 Increasing the rate of waste recycling is one of the main objectives of the WRFP. During the period 1998 to 2001, there was a 24% increase in the recycling of municipal solid waste, from 1,560,000 tonnes to 1,940,000 tonnes as shown in Figure 3 below. The recycling of municipal solid waste also brings export earnings for Hong Kong. In 2001, the value of exported recyclable materials was $2.6 billion.

Note 4: *The definition of domestic waste in Singapore is slightly different from that in Hong Kong. In addition to waste collected from residential premises, domestic waste in Singapore also includes waste collected from commercial premises and food markets. In Singapore, 91% of the waste was incinerated while the remaining 9% was disposed of at a landfill. Metal scrap was recovered from the incineration plants for recycling. In Taipei, 55% of the waste collected was incinerated and 45% was disposed of at landfills.*

Figure 3

Quantity of municipal solid waste recycled



Source: EPD's records

2.6 The four major types of materials in municipal solid waste being actively recycled are ferrous metals (iron and steel), paper, plastics and non-ferrous metals (e.g. aluminium). The rates of recycling of these materials are summarised below:

(a) ***Ferrous metals.*** The recycling of ferrous metals increased from 509,000 tonnes in 1998 (by 58%) to 803,000 tonnes in 2001 (see Figure 4 below);

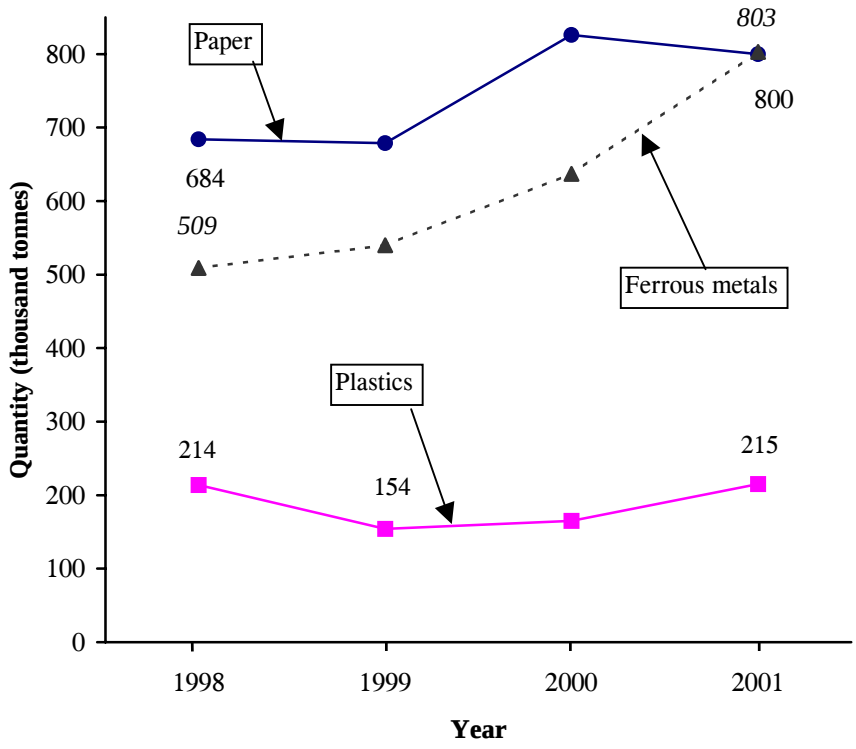
(b) ***Paper.*** The recycling of paper increased from 684,000 tonnes in 1998 (by 17%) to 800,000 tonnes in 2001 (see Figure 4 below);

(c) ***Plastics.*** The recycling of plastics dropped from 214,000 tonnes in 1998 (by 28%) to 154,000 tonnes in 1999, and picked up (by 40%) to 215,000 tonnes in 2001 (see Figure 4 below); and

(d) ***Aluminium.*** The recycling of aluminium showed a continued decline, dropping from 21,000 tonnes in 1998 (by 19%) to 17,000 tonnes in 2001.

Figure 4

Recycling of ferrous metals, paper and plastics



Source: EPD's records

Progress of implementing the waste bulk reduction programme

2.7 The volume of organic waste materials in municipal solid waste can be reduced through composting, which is a form of biological decomposition. Modern waste-to-energy incineration can also be used to burn combustible municipal solid waste to produce energy and reduce the volume of waste requiring disposal at landfills. According to the WRFP, composting facilities for reducing the volume of municipal solid waste were scheduled for commissioning in 2005, to be followed by two waste-to-energy incineration facilities in 2006-07. In mid-2002, the EPD invited tenders for the development of a composting facility in Ngau Tam Mei. However, planning work for the incineration facilities has been slowed down due to objections from environmentalists and opposition from local residents to the possible locations. To address the objections, in April 2002, the Government invited expressions of interest from the local and international waste management industry to provide technologies that would best suit Hong Kong. In early 2002, the Government

informed the Advisory Council on the Environment (ACE — Note 5) that, assuming a decision could be reached on the choice of technologies, such waste bulk reduction facilities would only be commissioned by 2012 at the earliest. In response to ACE Members' concern about the proposed timetable, the Government has undertaken to shorten the implementation timetable where practicable.

Audit observations on the progress of implementing the WRFP

2.8 ***Need for more efforts in waste prevention education and publicity.*** From 1998 to 2001, there was a 6% increase in the per capita generation rate of municipal solid waste. The generation rate of domestic waste increased by 11%, indicating that more efforts in public education and publicity are needed to inculcate the public with the important concept of waste prevention. **The current public education and publicity initiatives (such as Announcements of Public Interest in the local media) are mainly linked to the launching of the waste recycling campaigns and the provision of new waste separation facilities, with the focus on increasing the community's awareness of waste separation and recycling. There is a need to place more emphasis on promoting a culture of waste prevention in future public education and publicity initiatives.**

2.9 ***Interim waste reduction target not fully met.*** According to the WRFP, the Government aimed to limit the quantity of municipal solid waste requiring disposal at landfills to 3,204,000 tonnes in 2001. **However, population growth and the increase in per capita generation of municipal solid waste since 1998 have nullified the efforts made to increase the recycling of municipal solid waste. The quantity of municipal solid waste disposed of at landfills has increased to 3,395,000 tonnes in 2001. This was 191,000 tonnes (or 6%) above the WRFP's target level. There is a need for the Government to make more effort to meet the WRFP's waste reduction target.**

2.10 ***Waste bulk reduction facilities not ready by 2007.*** According to the WRFP, the development of composting facilities and waste bulk reduction facilities (such as incinerators) is expected to reduce the quantity of municipal solid waste to be disposed of at landfills by 914,000 tonnes a year by 2007. However, because of the time needed to identify the most suitable technology to address public concerns, the waste bulk reduction facilities are unlikely to be available until 2012, i.e. some 5 years after 2007. **Without such facilities, the quantity of municipal solid waste requiring disposal at landfills is expected to further increase. The Government needs to formulate an action plan to curb the increase in the quantity of municipal solid waste so as to meet the WRFP's waste reduction target.**

Audit recommendations on the progress of implementing the WRFP

2.11 **Audit has *recommended* that the Secretary for the Environment, Transport and Works and the Director of Environmental Protection should make more effort to meet the**

Note 5: *The ACE is the Government's principal advisory body on matters relating to pollution control, environmental protection and nature conservation. The ACE's chairman and its 22 members are appointed by the Chief Executive and include academics, businessmen, professionals and members of major environmental groups and trade and industry associations. Representatives of the ETWB, the EPD, the Planning Department, the Agriculture, Fisheries and Conservation Department and the Department of Health are in permanent attendance.*

waste reduction targets set in the WRFP (see Table 1 in para. 1.4 above). In particular, they should:

(a) **formulate an action plan to curb the increase in quantity of municipal solid waste requiring disposal at landfills, having regard to:**

(i) **the increase in per capita generation rate of municipal solid waste (see para. 2.8 above); and**

(ii) **the fact that waste bulk reduction facilities (such as incinerators) are unlikely to be available by 2007 (see para. 2.10 above);**

(b) **enhance public education and the Government's publicity work in order to promote the reduction in waste generation in the community (see para. 2.8 above); and**

(c) **take positive measures to improve the rates of waste recovery (see the audit recommendations in PART 3 below).**

Response from the Administration

2.12 The **Secretary for the Environment, Transport and Works** agrees with the audit recommendations and has said that she will continue to explore new measures to promote waste reduction and recycling.

2.13 The **Director of Environmental Protection** has said that:

(a) in September 2001, the Administration recognised the need for additional efforts to tackle the increasing amount of waste generated in the community. Since then, the Administration has developed a list of actions for further improving waste prevention and recovery. Progress has been achieved in the provision of more waste separation bins, trying out of different recyclable waste collection schemes and the launching of a mobile phone battery recycling programme. The ETWB and the EPD are currently working on a trial on dry/wet waste separation system and a producer responsibility scheme for waste tyres. Despite all these efforts, it must be noted that a very significant factor causing increased pressure on the landfills is the wrongful disposal of construction and demolition materials at landfills. In this connection, the ETWB and the EPD are working with other relevant works departments and private sector parties to divert construction and demolition materials away from the landfills as much as possible; and

(b) the EPD will continue to launch publicity and educational programmes regularly to maintain the public awareness so as to increase the quantity of materials recovered and the cost-effectiveness of collection.

PART 3: WASTE SEPARATION AND RECOVERY

3.1 Waste separation at source is an important first step towards achieving the waste recycling objectives set in the WRFP. Without waste separation, useful materials would be mixed with non-recyclable waste, making recycling very difficult and uneconomic. The Government recognises the need to facilitate waste separation by the public and recovery of recyclable materials by the waste recycling industry. This PART examines the Government's efforts in providing waste separation facilities and promoting recovery of recyclable materials. The audit has revealed that there is a need to improve the rate of waste recovery in public housing estates, public places and government quarters.

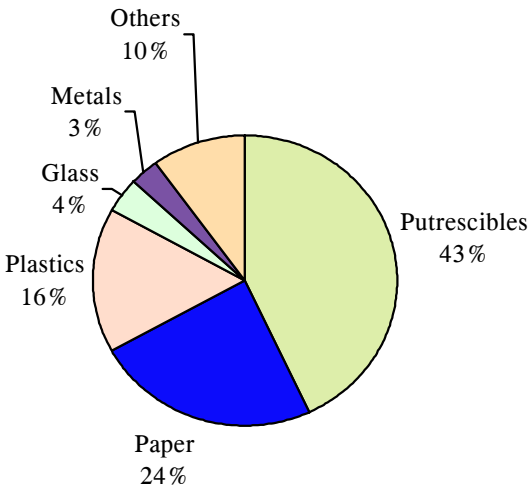
Waste separation facilities and waste recycling programmes

3.2 ***Focus on the domestic sector.*** About 80% of municipal solid waste disposed of at landfills comes from the domestic sector. Domestic waste includes household waste generated from daily activities in residential premises and the waste collected from cleansing of public places by the FEHD. Based on a 1994 survey, only 175,000 tonnes (or 8%) of the domestic waste were recovered. The WRFP considered that emphasis should be placed on improving the recovery rate of waste from the domestic sector.

3.3 ***Composition of domestic waste.*** Based on the EPD's 2001 waste composition survey, the bulk of domestic waste was made up of putrescibles, paper, plastics and metals, as shown in Figure 5 below. According to the WRFP, putrescibles would have to be dealt with under the waste bulk reduction programme (see para. 2.7 above), while paper, plastics and aluminium could be recovered for recycling, making use of the recycling market in Hong Kong.

Figure 5

Composition of domestic waste in 2001



Source: EPD's records

3.4 ***Provision of waste separation bins.*** Since the launch of the WRFP in 1998, the Government has increased the number of waste separation bins (WSB) for paper, aluminium cans and plastic bottles to foster public participation in waste separation. Up to the end of 2001, some 19,510 WSB have been placed in housing estates, public places, schools and government buildings. The distribution of the WSB is summarised in Table 2 below. The Government has planned to add some 8,000 more WSB in various locations in the coming years.

Table 2

Distribution of the WSB as at end of 2001

Venue	Number of WSB	Coverage	Responsible department/ organisation
Housing estates	11,202	All 179 public housing estates and over 800 private estates, covering 68% of the total population	HD and Housing Society for public housing estates (Note 1)
Public places	4,642	About 1,000 public places (such as streets, refuse collection points, bus terminals and public amenity areas)	FEHD, Leisure and Cultural Services Department (LCSD) and Agriculture, Fisheries and Conservation Department (AFCD)
Schools and tertiary institutions	3,072	Over 800 primary and secondary schools and 31 tertiary and vocational institutes	Schools and tertiary institutions (Note 2)
Government office buildings and quarters	594	42 government office buildings and 81 government quarters	Government Property Agency (GPA)
Total	**19,510**		

Source: *ETWB's records*

Note 1: *The EPD liaises with the private housing sector through the Waste Reduction Task Force for Private Housing Sector (see para. 3.6 below). The EPD also operates a hotline service to provide information and technical advice on waste recovery and recycling.*

Note 2: *The Environmental Campaign Committee (see para. 3.5 below) and the EPD support waste recycling schemes in schools and tertiary institutions by providing them with publicity materials, training workshops and the WSB.*

3.5 ***Waste recycling programmes.*** The provision of the WSB in various places does not guarantee that people will use them. Various government departments have been working with the Environmental Campaign Committee (ECC — Note 6) in the past years to organise community-based waste recycling programmes in housing estates (both public and private), schools and at district levels. In May 2002, the Legislative Council approved an additional injection of $100 million into the Environment and Conservation Fund (Note 7). About $60 million (or 60%) of the approved fund of $100 million will be used to finance community-based waste reduction and recovery activities.

Waste recovery in housing estates

3.6 To promote waste reduction and recovery at residential premises, the Waste Reduction Committee set up the Waste Reduction Task Force (WRTF) for the Public Housing Sector in 1997, and the WRTF for the Private Housing Sector in 1999 (Note 8). The two WRTFs have jointly organised five phases of Waste Recycling Campaign with the ECC and property management companies to encourage the participation of the residents of public and private housing estates in waste recovery. Both the number of participating estates and the quantities of waste recovered have increased through the five phases of the Waste Recycling Campaign (detailed results are summarised in Appendix B).

3.7 During the ten-month (Phase V) Waste Recycling Campaign period June 2001 to March 2002, a total of 114.55 million kg of paper, aluminium and plastics were recovered (i.e. 3,068 kg a month per set of WSB — Note 9). This was about 40 times more than the total of 2.81 million kg of paper, aluminium and plastics collected from all other venues provided with WSB

Note 6: *The ECC was formed in 1990 to promote public awareness of environmental protection issues and encourage people to contribute towards a better environment.*

Note 7: *The Environment and Conservation Fund was set up in 1994 to support environmental protection and conservation projects. A Committee appointed by the Chief Executive oversees the management of the Fund. The Government injected $50 million into the Fund in 1994 and another $50 million in 1998.*

Note 8: *The WRTF for the Public Housing Sector is chaired by an Assistant Director of the HD. Its members include representatives from the HD, the Hong Kong Housing Society, the EPD and the FEHD. The WRTF for the Private Housing Sector is chaired by a representative of the property management trade association. Its members include representatives from the EPD, the Hong Kong Housing Society and major property management companies.*

Note 9: *The monthly collection for each set of WSB is calculated as follows:*
Total collection for the 10-month period ¸ 10 months ¸ no. of sets of WSB
= 114.55 million kg ¸ 10 months ¸ 3,734 sets of WSB (i.e. 11,202 WSB per Table 2 ¸ 3)
= 3,068 kg per month.

during the year 2001-02 (i.e. 85 kg a month per set of WSB — Note 10). While waste recovery from housing estates (both public and private) has been making the greatest contribution towards the Government's waste recycling programme for the domestic sector, there is still room for improvement in the waste recovery for public housing estates in general (see paras. 3.8 to 3.11 below), and for plastics in particular (see paras. 3.12 to 3.15 below).

Low rate of waste recovery in public housing estates

3.8 In November 2000, the EPD informed the Waste Reduction Committee that the rates of waste recovery in the domestic sector were 8% to 10%. The results of the Waste Recycling Campaign indicated that the rates of recovery in public housing estates were generally lower than those in the private housing estates, as summarised in Table 3 below. The EPD considered that some recyclable materials in public housing estates could have been taken away by scavengers for sale. These materials would not have been reflected in the reported waste recovery figures of the public housing estates. Nonetheless, the Government was considering different measures to increase the recovery rates.

Table 3

Comparison of rates of waste recovery in public and private housing estates

	Rates of waste recovery (Note)			
Waste Recycling Campaign	**HD estates**	**Hong Kong Housing Society estates**	**Private housing estates**	**Overall**
Phase III (July 1999 – March 2000)	3.6%	4.5%	25.4%	7.5%

Source: EPD's records

Note: The rates of waste recovery were derived from the formula:

$$\frac{\textit{Weight of recyclable waste collected}}{\textit{Total weight of waste generated}} \times 100\%$$

Note 10: *The EPD informed Audit that the lower waste recovery rate of all other venues than that of the housing estates is because people do not usually carry large quantities of recyclable waste outside their homes.*
The monthly collection for each set of WSB is calculated as follows:
Total collection for the 12-month period × 12 months × no. of sets of WSB
= 2.81 million kg × 12 months × 2,769 sets of WSB [i.e. (19,510 - 11,202) WSB per Table 2 × 3]
= 85 kg per month.

Trial schemes of providing the WSB on each floor of public housing estates

3.9 In an opinion survey conducted by the ECC in February 2000, it was found that 50.4% of the respondents who had never or seldom used the WSB considered that the locations of the WSB (i.e. usually one set on the ground floor lobby for each housing block) were inconvenient or too far away. **90.5% of the respondents said that they would participate more in recycling activities if the WSB were placed on each floor of their housing blocks.**

3.10 ***Trial schemes in 2000.*** From August to November 2000, the HD and two environmental groups jointly carried out trial schemes of placing the WSB on each floor of three public housing blocks selected from three public housing estates. **The results of the trial schemes showed that improved accessibility of the WSB was effective for enhancing the rates of waste recovery, which ranged from 17% to 118 times (see Appendix C).** While problems of scavenging activities and noise nuisance were encountered, it was envisaged that they could be resolved through the use of better designed WSB.

3.11 ***Trial scheme from 2001 to 2002.*** In November 2001, in the light of experience of the previous trial schemes, the HD conducted a larger scale trial scheme in all the housing blocks of two public housing estates. The HD used purposely designed WSB. The trial scheme also aimed to identify and sort out management problems which might be encountered. **The HD's trial results again confirmed that the floor-to-floor provision of the WSB was very effective for increasing the rates of waste recovery, which ranged from 50% to 21 times (see Appendix D). In June 2002, the HD decided to extend the trial scheme to six more public housing estates. However, there was no timetable for the full-scale implementation of the floor-to-floor provision of WSB in all public housing estates.**

Low rate of recovery for plastics waste

3.12 The transportation of plastics waste (usually bottles) from points of collection to the recyclers is uneconomic because plastics are bulky. Many estates have experienced difficulties in finding a secured recycling outlet for the recovered plastics. At a meeting in April 2000, the WRTF for the Public Housing Sector highlighted the problems in the collection of plastics waste, as follows:

(a) the recovery results of plastics waste as revealed from the Waste Recycling Campaign Phase III were not satisfactory;

(b) one of the plastics waste recyclers suggested to collect plastics waste only when the estates had accumulated 60 bags of plastics waste, instead of collecting the waste every two weeks. However, the WRTF for the Public Housing Sector considered the suggested collection arrangement unacceptable because there would be storage and hygienic problems; and

(c) the WRTF for the Public Housing Sector also discussed the use of compaction machines to reduce the volume of the plastics waste but considered that there would be problems in manning and operating the machines.

According to the EPD's records, for the year 2000, the rate of recovery of plastics (Note 11) in the public housing estates was only 0.2% as compared with 13.4% for paper and 21% for aluminium.

Trial plastics waste collection scheme

3.13 In April 2001, the EPD introduced a trial scheme which provided plastics waste collection service for the housing estates (both public and private) on a district-wide basis. The trial scheme was intended to help the estates which had difficulties in identifying a reliable collector. The housing estates might participate in the trial scheme on a voluntary basis. The number of participating estates increased from 251 in April 2001 to 296 in July 2002.

3.14 During the first six months of the trial scheme from April to September 2001, only the participating estates on Hong Kong Island showed an increase in the quantities of plastics waste collected. This was because before the trial scheme, estates on Hong Kong Island had great difficulties in arranging proper collection of plastics waste due to their long distance from the recyclers' workshops which were mostly located in the New Territories. In late 2001, the EPD hired new contractors to provide the collection service from October 2001 to March 2002. The quantities of plastics waste collected continued to increase. **In July 2002, an average of 91 kg of plastics were collected from each estate as compared with 34 kg in April 2001.** In view of the increase in the plastics waste collected, the EPD has extended the new contractors' service contracts up to September 2002.

3.15 With the increase in the quantities collected since the launch of the trial scheme, the EPD estimated that the average cost of collecting plastics waste had decreased from $5,700 per tonne in April 2001 to $2,200 per tonne in July 2002.

Audit observations on waste recovery in housing estates

3.16 Among all venues provided with the WSB, the housing sector has been producing very positive results (see para. 3.7 above). **However, there is room for improving the effectiveness of waste recovery in the housing estates because the rates of waste recovery, for public housing estates in general and for plastics in particular, were still at low levels.**

3.17 ***Need to speed up the floor-to-floor provision of waste separation facilities.*** The results of the opinion survey and the trial schemes in the five estates showed that the provision of the WSB on a floor-to-floor basis was an effective measure for increasing the rates of waste recovery in the public housing estates (see paras. 3.9 to 3.11 above). **However, there was still no timetable for the floor-to-floor provision of waste separation facilities in the HD's 159 public housing estates. Audit considers that more expeditious action is required having regard to the fact that the WRFP's waste reduction target of 2001 has already been missed and that there are still more challenging targets ahead.**

Note 11: *In March 2001, the EPD advised the HD that the HD should monitor the waste recovery rates of paper, aluminium and plastics by reference to the quantities of the respective recyclable materials in the waste stream.*

3.18 ***Scope for further improving the cost-effectiveness of the waste collection scheme for plastics.*** The trial scheme launched in April 2001 was intended to help those estates which had difficulties in finding a reliable collector of plastics waste. The scheme had increased the quantities of plastics recovered. The larger quantity of plastics waste recovered had helped lower the cost of collection (see paras. 3.14 and 3.15 above). However, the bulkiness of the plastics waste is still a major factor which affects the cost-effectiveness of the collection process. There is a need to consider practicable means of reducing the bulkiness of the plastics waste in order to improve the cost-effectiveness of its collection.

Audit recommendations on waste recovery in housing estates

3.19 **Audit has *recommended* that:**

(a) **the Director of Housing should expedite action on the full-scale implementation of the floor-to-floor provision of waste separation facilities in public housing estates; and**

(b) **the Director of Environmental Protection should consider practicable means of reducing the bulkiness of the plastics waste in order to improve the cost-effectiveness of its collection.**

Response from the Administration

3.20 The **Secretary for the Environment, Transport and Works** agrees with the audit findings and has said that she will work with the EPD and the HD to implement the audit recommendations.

3.21 The **Director of Housing** has said that the HD will implement the floor-to-floor provision of waste separation facilities by phases, taking into account the following factors:

(a) endorsement and support from the local Estate Management Advisory Committees;

(b) physical site constraints and comments from the Fire Services Department on the means of escape; and

(c) the financial implications of providing waste separation facilities for a total of 1,042 multi-storey public housing blocks in one-go.

The HD has identified six estates for implementation towards the end of 2002 and will choose another twelve estates in the next phase of implementation.

3.22 The **Director of Environmental Protection** agrees with the audit recommendation that volume reduction of plastic bottles will improve the cost-effectiveness of their collection. He has said that:

(a) to address the issue, the Hong Kong Productivity Council, using funding from the Environment and Conservation Fund, has developed a mobile plastic bottle compactor that can reduce the volume of plastic bottles by as much as 80%. This will greatly reduce the transportation cost. There are also private companies which are developing other types of plastic bottle compactors. The EPD is examining the various models and will try them out in a number of community projects; and

(b) the purpose of the trial waste collection scheme for plastics is to ensure that housing estates, which have difficulties in handling their recovered plastics, would not end up disposing of them as garbage. Since the introduction of the scheme, the EPD has focused on the enhancement of the recovery rate and the cost-effectiveness of collection.

Waste recovery in public places

3.23 The FEHD, the LCSD and the AFCD are responsible for the provision and management of the WSB in public places and amenity areas under their purview. The collection of recyclable wastes from public places is coordinated by the FEHD to enhance the cost-effectiveness. In October 2000, the FEHD awarded a two-year service contract (hereinafter referred to as Contract A) for the collection of recyclable wastes from initially 160 public places provided with the WSB. In December 2001, with the provision of additional WSB in 762 new locations, the FEHD awarded another service contract (hereinafter referred to as Contract B) to cover the new locations. Upon the expiry of Contract A in October 2002, Contract B will cover all the collection locations. Contract B also provides recyclable waste collection service to 37 government quarters and premises managed by the GPA. Details of waste recovery in government quarters and selected premises (e.g. border control points) are discussed in paragraphs 3.29 to 3.34 below.

3.24 ***Average yield of recyclable wastes.*** Under the two service contracts, the FEHD requires the contractors to provide collection service on a weekly basis (Note 12) and to submit records showing the quantities of recyclable wastes collected for each location. Based on the collection data, Audit calculated the average yield of recyclable wastes (i.e. paper, aluminium and plastics) collected per collection location (see Table 4 below).

Note 12: *The contractors are required to provide additional collection service when the WSB are 70% full.*

Table 4

Average yield of recyclable wastes per collection location

Period	Average number of collection locations	Average quantity of waste collected	Average quantity of waste collected per location	Average waste collected as % of the carrying capacity of the WSB (Note 3)
	(a)	**(b)** (kg/month)	**(c) = (b)/(a)** (kg/month)	**(d) = (c)/140 ´ 100%**
Year 2001	197 (Note 1)	7,143	36	25.7% (say 26%)
Year 2002 (January to June)	944 (Note 2)	38,704	41	29.3% (say 30%)

Source: Audit's calculation based on the FEHD's records

Note 1: The number of collection locations increased from 165 in January 2001 to 927 in mid-December 2001. The weighted average of 197 locations was used for the analysis.

Note 2: During January to June 2002, the number of collection locations increased from 927 in January 2002 to 948 in February 2002. The weighted average of 944 locations was used for the analysis.

Note 3: The carrying capacity of a set of WSB is 35 kg (i.e. 28 kg of paper, 3 kg of aluminium cans and 4 kg of plastic bottles). As the collection service is provided on a weekly basis, the total carrying capacity of a set of WSB is 140 kg (35 kg ´ 4 weeks) a month.

3.25 ***Audit analysis.*** Further analysis of the recyclable waste collection data (Note 13) showed that some of the collection locations frequently had yields below the overall average of 30% of the carrying capacity of the WSB placed there. During the period from January to June 2002, of the 762 collection locations under Contract B, the WSB at 92 locations had yields below 30% of their carrying capacity in 80% of the weekly collections (Note 14). Nineteen of them even had zero yield for all three types of recyclable wastes in 80% of the weekly collections.

Note 13: *The collection data of Contract B were in electronic form but those of Contract A were only available in manual records. The retrieval and analysis of data from the manual records of Contract A was time consuming. Therefore, within the limited time available, Audit only analysed the collection data of Contract B.*

Note 14: *80% of weekly collections means 21 times out of 26 weekly collections from January to June 2002.*

Audit observations on waste recovery in public places

3.26 The provision of the WSB in public places is an important means of raising the public awareness of waste separation and facilitating the public to participate in waste recovery. In May 2001, in its recommendation to the Chief Secretary's Committee to increase the provision of the WSB, the then Environment and Food Bureau undertook that a review would be carried out if the WSB were not yielding good results. **As shown in Table 4 of paragraph 3.24 above, the average rate of waste recovery per collection location was only 41 kg a month, representing about 30% of the carrying capacity of the WSB. In particular, there were 92 collection locations at which the yields of recyclable wastes were frequently below the overall average of 30%.** Audit understands from the ETWB that some of the recyclable wastes have been taken by scavengers for sale and that the provision of the WSB, especially in public places, is necessary to educate and facilitate the public to participate in waste recovery. Nevertheless, Audit considers that the departments concerned need to critically review the locations of the WSB, particularly for those with low yields, to see if relocation or other measures (such as enhanced publicity) are needed to improve the rate of waste recovery.

Audit recommendations on waste recovery in public places

3.27 **Audit has *recommended* that the Director of Food and Environmental Hygiene, the Director of Leisure and Cultural Services and the Director of Agriculture, Fisheries and Conservation should:**

(a) **critically examine those collection locations with low yields of recyclable wastes to see if relocation or other measures (such as enhanced publicity) are needed to improve the rate of waste recovery; and**

(b) **closely monitor the recyclable waste collection data to keep track of the yield of the WSB under their management.**

Response from the Administration

3.28 The **Secretary for the Environment, Transport and Works,** the **Director of Food and Environmental Hygiene,** the **Director of Leisure and Cultural Services** and the **Director of Agriculture, Fisheries and Conservation** have accepted the audit recommendations.

Waste recovery in government quarters and border control points

3.29 In June 2000, the WRTF for the Government (Note 15) reviewed the waste recovery service within the Government. The WRTF for the Government noted that while the waste paper recovery programme at government quarters had been launched since April 1997, the rate of paper waste recovery in 1999 was at a low level of about 2 kg a month per household. Some government quarters and office buildings frequently visited by the general public were not provided with the WSB. Since then, the GPA had extended the waste recovery service within the Government. The GPA introduced the WSB for paper, aluminium and plastics in 42 government office buildings and 81 government quarters, and stepped up the promotional efforts. Based on the GPA's data, the total quantities of recyclable wastes recovered from the government office buildings increased from 44 tonnes in April 2001 (by 30%) to 57 tonnes in March 2002. However, there is still a need to enhance the waste recovery in government quarters and extend the provision of the WSB at some selected locations such as border control points (see paras. 3.30 to 3.34 below for details).

Low waste recovery rate at government quarters

3.30 In 2001-02, the total quantities of recyclable wastes recovered from government quarters were 511 tonnes. The average rate of waste recovery was about 3.3 kg a month per household, which was higher than 2 kg a month per household recorded in 1999. However, compared with the average rate of waste recovery of 8 kg a month per household for the public and private housing estates under Phase V of the Waste Recycling Campaign (see Appendix B), the rate of waste recovery at government quarters was still at a low level.

Provision of the WSB at border control points

3.31 There are a total of six border control points. Two are located in the Macau Ferry Terminal and the China Ferry Terminal (hereinafter referred to as the port control points) and four in Lo Wu, Lok Ma Chau, Man Kam To and Sha Tau Kok (hereinafter referred to as the land border control points). The border control points are jointly used by a number of departments including the Marine Department (MD), the Immigration Department (Imm D), the Customs and Excise Department and the Hong Kong Police Force. At an interdepartmental meeting held in January 2001, the EPD expressed concern that, while the EPD was working closely with public transport companies on the promotion of waste reduction and separation, there were no WSB at the border control points managed by the Government. In January 2001, the EPD requested the MD to coordinate the provision of the WSB and the collection service of recyclable wastes for the port

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Note 15: *In accordance with the WRFP to develop waste reduction initiatives within the Government, a WRTF was formed in June 1999. The WRTF for the Government was initially chaired by the Director of Government Supplies. Since November 2000, the Deputy Secretary of the ETWB (formerly the Environment and Food Bureau) has taken up the chairmanship. Members of the WRTF for the Government include representatives of the Financial Services and the Treasury Bureau, the Government Supplies Department (GSD), the EPD, the GPA and the FEHD. Other relevant departments would also be invited to provide technical advice on specific issues.*

control points. For the four land border control points, the EPD requested the GPA and the Imm D to coordinate the provision of the WSB and the collection service (Note 16).

3.32 In late 2001, the MD set up the WSB and the collection service at the port control points. For the land border control points, in January 2002, the GPA informed the EPD that the GPA was not the department responsible for the management of the land border control points and it would be inappropriate for the GPA to provide and maintain the WSB. Nevertheless, the GPA would arrange for the collection of recyclable wastes. As at July 2002 (date of completion of audit field work), agreement had not yet been reached among the departments concerned on the responsibility for the provision and management of the WSB.

Audit observations on waste recovery in government quarters and border control points

3.33 ***Low waste recovery rate at government quarters.*** As mentioned in paragraph 3.30 above, while there has been improvement in the rate of waste recovery at government quarters since 1999, continued efforts are needed for further improvement in the rate of waste recovery (currently at 3.3 kg a month per household as compared with 8 kg a month per household in the public and private housing estates). **The occupants in all government quarters should be encouraged to actively take part in the community-based Waste Recycling Campaign.**

3.34 ***Provision of the WSB at border control points.*** The Imm D's statistics showed that in 2000-01, about 101 million passengers travelled through the four land border control points. The land border control points are good locations for setting up the WSB to help increase the rate of waste recycling. **While the need to provide the WSB at the land border control points was identified in January 2001, there had yet been no agreement on which department should be responsible for the provision and management of the WSB.** In Audit's view, the WSB should be provided as soon as possible.

Audit recommendations on waste recovery in government quarters and border control points

3.35 **Audit has *recommended* that:**

Note 16: *In April 2001, the GPA devolved the letting and administration of cleansing contract of the port control points to the MD. However, the GPA continued to be responsible for the management of the cleansing service contract for the land border control points because no agreement on the management responsibility had been reached among the user departments.*

(a) **the Government Property Administrator should, in conjunction with the ECC, encourage the occupants of all government quarters to actively take part in the community-based Waste Recycling Campaign with a view to further improving the rate of waste recovery; and**

(b) **the user departments of the land border control points should urgently sort out the management arrangements for the provision of WSB.**

Response from the Administration

3.36 The **Secretary for the Environment, Transport and Works** agrees with the audit findings and has said that she will work with departments concerned to implement the audit recommendations.

3.37 The **Government Property Administrator** agrees with the audit recommendation as mentioned in paragraph 3.35(a) above. She has said that the size of households and the style of habitation are different in government quarters and in housing estates. Such differences would affect the rate of waste recovery.

3.38 The **Director of Immigration** has said that the Immigration Department is prepared to take a lead in coordinating the urgent provision of WSB at the land border control points.

PART 4: ALLOCATION OF LAND TO THE WASTE RECYCLING INDUSTRY

4.1 The WRFP recognised that there was a need to provide a more viable operating environment for the waste recycling industry in order to meet the objective of increasing the overall rate of recycling. This PART examines the Government's arrangements to assist the waste recycling industry to acquire land for its operations at reasonable prices. The audit has revealed that there is room for improvement in the land allocation arrangements to ensure that the land allocated to the waste recycling industry is put into efficient and effective use to meet the WRFP's waste reduction objectives.

Characteristics of the waste recycling industry in Hong Kong

4.2 According to a consultancy study commissioned by the EPD in 1999, the waste recycling industry in Hong Kong was market-driven and the system of collection of recyclable materials was informal. The local market for recyclable materials was small due to the size of Hong Kong and the relocation of the manufacturing industry across the border. The waste recycling industry was predominantly export-oriented, with the Mainland being the most important export market.

4.3 The characteristics of the local waste recycling industry had implications on the sources of the recyclable materials, the types of materials the industry recovered and the location of its areas of activity within Hong Kong, as summarised below.

(a) ***Focus is on the recovery of commercial and industrial waste.*** The market-driven waste recycling industry was very cautious in choosing recycling materials. The industry preferred homogenous and clean industrial and commercial waste to poorly sorted and contaminated domestic waste. This enabled the industry to obtain higher market value and lower the cost of sorting the materials. Therefore, the waste recycling industry was typically not keen on recovering recyclable materials from domestic waste. The recovery of domestic waste was informal and concentrated on the high value materials (such as aluminium cans). Such informal recovery practices were not capable of achieving a high recycling rate for the domestic waste;

(b) ***Type of materials recovered.*** The most commonly recovered materials were metals and paper. The recovery and recycling of plastics waste were mainly limited to the industrial sector; and

(c) ***Location of activity areas.*** The waste recycling industry was mainly located in industrial, commercial and old residential districts. It was generally less active in areas which were remote or less densely populated, or in newly developed areas where the rent was high or its activities were considered incompatible with neighbouring land uses.

WRFP's recommended action

4.4 ***Focus on domestic waste.*** Based on a 1994 survey conducted by the EPD, 1,367,000 tonnes (or 53%) of the commercial and industrial waste were being recycled while only 175,000 tonnes (or 8%) of the domestic waste were recovered. The WRFP stated that the rate of recycling

of waste in the commercial and industrial sectors was already relatively high by international standard. **The greatest need and opportunities for improvement would be in the domestic sector.**

4.5 ***Land allocation policy as a waste reduction tool.*** The WRFP recognised that the waste recycling industry in Hong Kong was not generally highly profitable. The recyclers were usually located in cheaper and older buildings, often on a short-term basis, or on agricultural land. They were seen as "bad neighbours" due to the unsightly storage of waste materials, noise from compaction and baling, odour from the waste, and litter in the vicinity. The uncertainty of accommodation, together with fluctuations in market prices of the marginally profitable recyclable products, discouraged recyclers from investing in new and more environmentally friendly technology. In turn, this might inhibit increased recycling. The WRFP recommended the following measures to facilitate the waste recycling:

(a) leasing appropriate Short Term Tenancy (STT) sites to the waste recycling industry;

(b) co-locating waste recycling activities at existing and future waste facilities such as refuse transfer stations and strategic landfills;

(c) using restored landfill sites for locating waste recovery and recycling facilities;

(d) publicising the availability of industrial land and premises suitable for the waste recycling industry; and

(e) encouraging suitable waste recyclers (e.g. those with new technologies and significant capital investment) to apply for land managed by the Hong Kong Industrial Estates Corporation.

Allocation of land under STT arrangements

4.6 Since the launch of the WRFP in 1998, nine plots of land, with a total area of 56,780 square metres (m^2), have been leased for waste recovery and/or recycling operation under the STT arrangements (Note 17). The lease terms of the nine STT sites are typically 1 to 3 years, which may be renewed thereafter on a quarterly basis. Details are given in Table 5 below.

Note 17: *Besides the nine STT sites leased under the WRFP's land allocation policy, the Lands Department has also leased 15 other STT sites to the waste recycling industry. 14 of these sites were let under direct grant either to regularise the occupation of land by the waste recycling industry, or to re-provision STT sites affected by development projects. The remaining one site was let under open tender for the purpose of waste recycling only. The lease terms of these sites are mostly 6 months which may be renewable thereafter on a quarterly basis.*

Table 5

STT sites leased to the waste recycling industry under the WRFP

STT site	Area (m^2)	Lease term and renewal	Start date	Annual rental ($)
1. Sheung Shui Area 30A (Note)	16,000	3 years certain and thereafter quarterly	September 1998	642,000
2. Kai Tak Main Fire Station (Note)	15,100	3 years certain and thereafter quarterly	July 1999	10,000
3. Kai Tak Old Fire Station	3,900	1 year certain and thereafter quarterly	July 1999	864,000
4. Dai Kwai Street, Tai Po Industrial Estate	4,980	3 years certain and thereafter quarterly	February 2000	51,000
5. Chong Fu Road, Chai Wan	2,530	1 year certain and thereafter quarterly	May 2000	600,000
6. Yan Yue Wai, Yau Tong	2,100	3 years certain and thereafter quarterly	June 2000	364,000
7. Chi Wa Lane, Sheung Shui	6,770	2 years certain and thereafter quarterly	July 2000	132,000
8. Pai Chong Road, Cheung Chau	340	7 years certain	July 2001	30,000
9. Site B, Dai Kwai Street, Tai Po Industrial Estate	5,060	3 years certain and thereafter quarterly	April 2002	444,000
Total	**56,780**	**(say 5.7 hectares)**		

Source: EPD's records

Note: In July 2002, the Lands Department resumed these sites. In mid-2002, the Lands Department invited tenders for three new STT sites in Tai Po Industrial Estate, Cha Kwo Ling and Kwai Chung.

4.7 ***Financial implications.*** Because of the restrictions on the use of the STT sites (i.e. for waste recycling only) leased under the WRFP land allocation policy, the Lands Department (Lands D) had assessed that the rentals received were less than the market rentals if let for other uses. **Based on the Lands D's information, the rentals forgone in providing the nine STT sites were estimated to be $15 million a year (see Appendix E for details). Therefore, it is necessary to ensure that the STT sites are put into efficient and effective use for meeting the WRFP's waste reduction targets.**

Administrative arrangements

4.8 The Lands D in collaboration with the EPD are responsible for administering STT sites for waste recovery. Their work includes search for sites, invitation of tender, allocation of sites and management of the allocated sites.

4.9 ***Tendering system.*** The Lands D has adopted a two-stage tendering system in the allocation of STT sites. At the first stage of selection, qualified waste recyclers are shortlisted without reference to their tender bids. The second stage of selection follows the Lands D's normal practice of awarding the site to the highest bidder. This two-stage tendering system is essential for meeting the Government's intention of assisting the waste recyclers who otherwise may not be able to compete with bidders from other trades. Through the shortlisting process, the Government can screen out bidders who do not fall into a particular priority group specified in the STT tender notice.

4.10 ***Tenancy requirements.*** To ensure that the tenant of a leased STT site is actually carrying out the intended waste recycling/recovery operation during the tenancy, a Technical Schedule containing the following major specifications is incorporated in the STT agreement:

(a) the tenant has to commence waste recovery and recycling operation within three calendar months after the signing of the STT agreement to the satisfaction of the EPD;

(b) the tenant is only allowed to use the STT site for the recovery and recycling of waste (or particular types of waste if specified) found in municipal solid waste;

(c) the tenant should ensure that a monthly average of not less than 70% (by weight) of the waste recovered or recycled is waste generated in Hong Kong (Note 18); and

(d) the tenant has to submit quarterly reports to the EPD containing the following details:

(i) the quantities of different types of waste collected, processed or recycled each month during the reporting period;

(ii) the sources of the waste;

(iii) the outlets for the collected, processed or recycled waste; and

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Note 18: *In 1999, the Government introduced the requirement that a fixed percentage of the wastes recovered or recycled at the STT sites should be wastes generated in Hong Kong. The percentage was fixed at 30% in 1999 and increased to 70% from 2000 onwards.*

(iv) the proof of the information in (i) to (iii) above which may include transaction records, receipts and delivery notes.

4.11 ***Monitoring procedures.*** The EPD is responsible for monitoring the tenant's compliance with the STT requirements relating to waste recovery and recycling. Apart from vetting the tenants' quarterly reports, the EPD carries out periodical site inspections, and reports any case of non-compliance to the Lands D for follow-up action.

Utilisation of the STT sites

4.12 The Government may specify, in the STT tender notice, the preferred usage of the STT site having regard to the prevailing situation of the local waste recycling industry. For example, in late 1998, a crisis arose in the waste paper recycling trade after the closure of one of the two local waste paper recycling plants. The waste paper recycling trade approached the Government for assistance. In early 1999, the then Planning, Environment and Lands Bureau identified the Kai Tak Main Fire Station site for waste paper storage/processing as a measure to assist the waste paper recycling trade. The types of waste recycling at the nine leased STT sites are tabulated in Table 6 below.

Table 6

Types of waste recycled at the STT sites

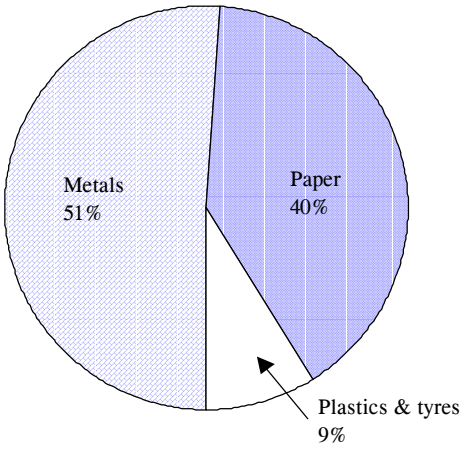
STT site	Waste recycled
1. Sheung Shui Area 30A	Metals (100%)
2. Kai Tak Main Fire Station	Paper (85%) and metals (15%)
3. Kai Tak Old Fire Station	Metals (84%) and paper (16%)
4. Yan Yue Wai, Yau Tong	Metals (100%)
5. Chi Wa Lane, Sheung Shui	Metals (75%) and paper (25%)
6. Dai Kwai Street, Tai Po Industrial Estate	Tyre crumbs (69%) and **plastics (31%)**
7. Chong Fu Road, Chai Wan	Paper (99.9%) and **plastics (0.1%)**
8. Pai Chong Road, Cheung Chau	Site being resumed for re-tendering (see para. 4.14 below)
9. Site B, Dai Kwai Street, Tai Po Industrial Estate	No available data while the recycling operation was being set up in mid-2002. Based on information supplied by the tenant, the site will mainly be used for paper recycling.

Source: EPD's records

4.13 ***Few STT sites for plastics recycling.*** As can be seen from Table 6 above, six out of the nine STT sites were used for paper and/or metal recycling. Only two sites (items 6 and 7 of Table 6 above) were used for plastics recycling because the EPD had specified in the tender notices that plastics recycling was one of the preferred usage. However, even at these two sites, the recycling of plastics only accounted for a small proportion (0.1% and 31%) of their throughput. This shows that, unless special lease conditions are imposed in the tenancy agreement, the market-driven waste recycling industry would not opt to use the STT sites for the less profitable plastics waste recycling operation. In terms of the total leased STT site area of 5.7 hectares, only 9% was used for recycling of plastics and tyres, as shown in Figure 6 below.

Figure 6

Major types of waste recycling operation at leased STT sites under the WRFP



Source: EPD's record

4.14 ***Idle site in Cheung Chau.*** As shown in Table 5 of paragraph 4.6 above, the STT site in Cheung Chau was leased in July 2001 for the recovery/recycling of municipal solid waste. The Technical Schedule of this STT stipulated that the tenant should commence the waste recycling operation within three calendar months after the signing of the STT agreement (i.e. by October 2001). However, up to July 2002 (date of completion of audit field work), the tenant had not yet commenced business despite reminders issued by the EPD in January and April 2002. As of July 2002, the Lands D was taking action to resume the site for re-tendering.

4.15 ***Actual throughput below expectations.*** In the tender submissions for the leased STT sites, the tenderers had to state the estimated quantity of waste to be handled to indicate their capability and potential in making the best use of the site to recover and recycle waste. The tenderer's proposed scale of operation was one of the prime considerations in the first stage tender assessment carried out by the EPD. However, as shown in Table 7 below, all the seven tenants who had commenced operation could not deliver the throughput they stated in the tender submissions. Three of them had throughput less than 50% of the expected throughput stated in the tender submissions.

Table 7

Average monthly throughput of tenants' operation since commencement of recycling up to end of March 2002

	STT site	Throughput stated in tender submission (a) (tonnes per month)	Actual average throughput (b) (tonnes per month)	Percentage (c) = (b)/(a) × 100%
1.	**Kai Tak Old Fire Station**	**1,800**	**274**	**15%**
2.	**Chong Fu Road, Chai Wan**	**3,840**	**1,236**	**32%**
3.	**Sheung Shui Area 30A**	**8,000**	**3,027**	**38%**
4.	Dai Kwai Street, Tai Po Industrial Estate	389	259	67%
5.	Kai Tak Main Fire Station	10,000	6,755	68%
6.	Yan Yue Wai, Yau Tong	5,850	4,541	78%
7.	Chi Wa Lane, Sheung Shui	2,000	1,565	78%

Source: EPD's records

Development of a recovery park

4.16 In a review carried out in mid-2001, the Government considered that the leased STT sites, even with the longest assured term of three years, did not provide adequate incentive for the operators to install new equipment. The scattered sites also did not promote synergy in operations. The sites would be too small to cope if the volume of waste being recovered was to increase significantly. While the WRFP recommended that suitable recyclers should apply for land in industrial estates, most recovery and recycling operations had been excluded from industrial estates because they were not regarded as innovative businesses.

4.17 In 2001, the Government decided to set aside 20 hectares of industrial land in Tuen Mun Area 38 as a recovery park to cater for the long-term land requirements for the recycling activities. As most of the recovered waste is exported to the Pearl River Delta, the site would have its own waterfront access. The planning and development of the recovery park is now in progress. The first phase of the park is expected to be in operation in 2004.

Audit observations on land allocation arrangements for the waste recycling industry

4.18 The leasing of land by appropriate STTs for the waste recycling industry is an important waste reduction measure set out in the WRFP (see para. 4.5 above). Experience from leasing the nine STT sites since 1998 has shown that there is room for improvement in regulating the use of the leased sites to ensure their efficient and effective use towards meeting the WRFP's waste reduction objectives. In Audit's view, there are important lessons for the future leasing of land for the waste recycling industry (see paras. 4.19 to 4.22 below).

4.19 ***Regulatory provisions to ensure recycling of domestic waste.*** The WRFP stated that the rate of recycling of domestic waste was in greatest need of improvement. However, the STT agreements only required that up to 70% of the recycled waste should be generated in Hong Kong. There was no further specification of the proportion of the locally generated waste which should come from the domestic sector. As mentioned in paragraph 4.3(a) above, the market-driven waste recycling industry prefers the cleaner industrial and commercial waste to domestic waste. The EPD informed Audit that their observation showed that domestic waste was recycled at the STT sites. **However, there was inadequate assurance that the STT sites were extensively used to enhance the rate of recycling of domestic waste as intended by the WRFP. This was because the tenants were not contractually bound to recycle domestic waste.**

4.20 ***Measures to increase the rate of recycling of plastics.*** As shown in paragraph 4.13 above, unless special lease conditions are imposed in the STT agreements, the market-driven waste recycling industry would not opt to use the STT sites for recycling plastics, which was less profitable. For the two STT sites for which the EPD had stated that plastics recycling was one of the preferred usage, the recycling of plastics only accounted for 0.1% and 31% respectively of the throughput of the tenants' operation. **This is because there were no provisions in the STT agreements on the required level of recycling of plastics. As shown in paragraph 3.12 above, the rate of recycling of plastics in housing estates needs improvement. In Audit's view, there is a need to allocate more sites for carrying out primarily plastics recycling so as to help increase the rate of recycling.** Moreover, the required level of recycling of plastics should be specified in the tender notices and the tenancy agreements.

4.21 ***Regulatory provisions to ensure the efficient use of the sites***. While the tenant's proposed scale of operation in terms of throughput was one of the considerations in the tender assessment, there was no mechanism to ensure that the tenant would deliver the throughput stated in the tender submission. **As mentioned in paragraph 4.15 above, all the seven tenants who had commenced operation could not deliver the throughput stated in their tender submissions.** Three of them had throughput less than 50% of the stated level notwithstanding the growth in the waste recycling industry (see Figure 3 of para. 2.5 above). The situation calls for further regulatory provisions in the tenancy agreement to discourage tenderers from overstating the

throughput in the tender submissions and to ensure that tenants will make the most efficient use of the sites for waste recycling.

4.22 ***Need for timely action to resume the idle Cheung Chau site.*** According to the STT agreement, the tenant of the Cheung Chau site should have commenced waste recovery and recycling operation by October 2001. **However, the Cheung Chau site had been left idle up to July 2002 before action was taken to resume the site for re-tendering.** While the EPD had reminded the tenant to start the recycling operation in January and April 2002, Audit considers that such efforts should have been made earlier in November 2001 when it was evident that the tenant had failed to comply with the STT requirements. The protracted process of resuming the site has rendered it unavailable for effective use at an earlier date.

Audit recommendations on land allocation arrangements for the waste recycling industry

4.23 **To ensure the most efficient and effective use of the land allocated for waste recycling under the WRFP, Audit has *recommended* that the Director of Lands should, in consultation with the Director of Environmental Protection:**

(a) **incorporate appropriate regulatory provisions in future tenancy agreements so as to ensure that the tenants will use the sites:**

  (i) **to enhance the rate of recycling of domestic waste as intended by the WRFP (see para. 4.19 above); and**

  (ii) **to deliver the throughput stated in the tender submissions (see para. 4.21 above);**

(b) **allocate more sites for carrying out primarily plastics recycling and clearly state the required level of plastics recycling in the tender notices and tenancy agreements (see para. 4.20 above)**; **and**

(c) **take prompt action to terminate the tenancy agreement and resume the site when it is found that the leased site has not been put into effective use (see para. 4.22 above).**

Response from the Administration

4.24 The **Secretary for the Environment, Transport and Works** agrees with the audit findings. She has said that she will work with departments concerned to implement the audit recommendations.

4.25 The **Director of Lands** accepts the audit recommendations. He has said that he will take up the related management and enforcement issues with the EPD with a view to drawing up departmental guidelines for implementing the recommendations.

4.26 The **Director of Environmental Protection** agrees with the audit recommendation that regulatory provisions should be incorporated in land leases to better control how the allocated land should be used to meet the intended purpose of waste recycling. He has said that:

(a) the EPD will work closely with the Lands D with a view to including appropriate lease conditions in future STTs. The lease of the existing STTs is generally too short for the recyclers to build up their business. The EPD is trying to work out with the Lands D for longer STT leases;

(b) the EPD supports the allocation of more land to the recycling trade, in particular to sectors that are operating with low profit margins; and

(c) subject to the Lands D's view, it would be useful to bring in a warning system in all future tenancies so that repeated offenders of lease conditions could be expelled within a reasonable timeframe.

PART 5: GOVERNMENT LEADERSHIP IN WASTE REDUCTION

5.1 The WRFP stated that the Government would take a lead in reducing waste by ensuring that government policies and practices contributed to waste reduction. This PART examines the progress the Government has made in promoting waste reduction among government departments. The audit has revealed that the Government has to take the lead in promoting the use of recycled paper, reducing paper consumption and using retreaded tyres.

Initial areas of work on waste reduction

5.2 At its first meeting held in June 1999, the WRTF for the Government agreed that its initial work would cover the following areas:

(a) ***Consumption.*** The WRTF would consider what actions government departments might take to reduce the rate of consumption of environmentally sensitive products such as paper;

(b) ***Recycling.*** The WRTF would review what products were used in government departments which were capable of being recycled, and the purchase of recycled product such as recycled paper;

(c) ***Packaging.*** The WRTF would probe into requirements for packaging, or the use of materials in packaging, which were considered not environmentally friendly or would present disposal problems; and

(d) ***Environmentally responsible purchasing.*** The WRTF would seek expert advice on the products which would present environmental concerns and discuss how these concerns might be addressed in the tender specifications or tender evaluation processes.

Use of recycled paper

5.3 The GSD purchases about 3,600 tonnes of photocopying paper a year as unallocated stock for use by various departments. In 1999, after a trial period of using recycled photocopying paper, the GSD assessed that there was no discernible functional difference between recycled paper and non-recycled paper, though the cost of the former was some 20% higher than that of the latter. Since September 1999, the GSD has provided recycled photocopying paper in its unallocated stock so that departments may decide on which type of paper to use according to their requirements and available budget.

5.4 In December 1999, the EPD advised the WRTF for the Government that the Government's commitment in using recycled paper was crucial in encouraging the recovery of waste paper. With more waste paper recovered, the Government would benefit from the overall reduction in the cost of disposing of waste paper at landfills. Research conducted by the EPD and the GSD showed that government organisations including those in Japan, the Organisation for Economic Co-operation and Development in Europe, the United Kingdom and the United States of America had committed themselves to using only recycled paper. Since 2000, the WRTF for the Government has considered various measures to increase the use of recycled paper, including:

(a) the setting of a timetable to phase out the use of non-recycled paper;

(b) the supply of only recycled paper to departments unless there are sufficient reasons to justify the use of non-recycled paper; and

(c) the purchase of only recycled paper.

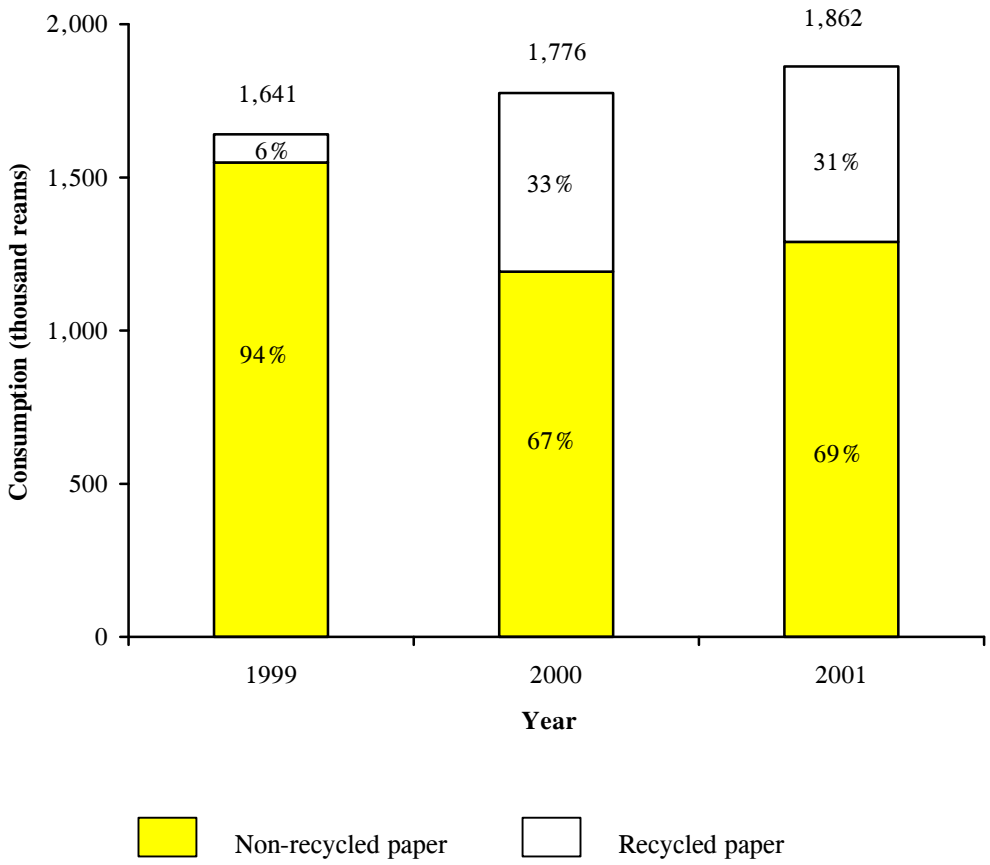
However, there were concerns about the higher cost of using recycled paper. The WRTF for the Government noted that the use of off-white recycled paper could narrow the cost difference, but some departments refused to use such recycled paper because of the yellowish colour. An alternative means to offset the higher cost of using recycled paper was to economise on the use of paper. In May 2001, the then Environment and Food Bureau informed the Chief Secretary's Committee that extending the use of recycled paper would not involve additional cost to the Government as reduced consumption of paper should offset the additional cost incurred in the procurement of recycled paper.

5.5 ***Audit analysis.*** Based on the information provided by the GSD (Note 19), Audit has analysed the extent of the use of recycled paper by the Government as shown in Figure 7 below. The proportion of recycled paper used had increased from 6% in 1999 to 33% in 2000, and dropped slightly to 31% in 2001.

Note 19: *The analysis of paper consumption was based on the quantities of both A3 and A4 size printing and photocopying paper (the major types of paper) issued from the GSD's unallocated stock for bureaux and departments' use. The WRTF for the Government used the same method of analysis.*

Figure 7

Extent of use of recycled and non-recycled paper



Source: *GSD's records*

Note: *One ream of paper has 500 sheets of A3 or A4 paper.*

5.6 Further analysis of the use of recycled paper by individual bureaux and departments showed that:

(a) in 2000, the majority of bureaux and departments (78%) increased the use of recycled paper as compared with 1999. However, in 2001, the majority of bureaux and departments (54%) decreased the use of recycled paper as compared with 2000 (see Appendix F for details); and

(b) the number of bureaux and departments that did not use any recycled paper increased from 11 in 2000 to 14 in 2001.

Paper consumption in the Government

5.7 In 1996, the Government started to develop the Government Communications Network which linked the bureaux of the Government Secretariat with departments for the purposes of information and mail exchange through electronic means. In 2000, all Intranets of government bureaux and departments were linked up to the Network. Notwithstanding the adoption of electronic means of communication and a 4% reduction in the number of government staff (Note 20), paper consumption continued to grow. Paper consumption increased from 1.64 million reams in 1999 by 0.22 million (13%) to 1.86 million reams in 2001 (see Figure 7 of para. 5.5 above). The paper consumption per staff member increased from 8.9 reams in 1999 by 19% to 10.6 reams in 2001.

5.8 Based on the GSD's information, Audit has analysed the paper consumption of 87 bureaux and departments in the three-year period 1999 to 2001. The analysis showed that:

(a) 55 (63%) of them had increased their paper consumption, compared to 32 (37%) which had reduced their paper consumption in the period (Note 21);

(b) of the 55 bureaux and departments which had increased their paper consumption, 35 had an increase which was higher than the government-wide average of 13% (see para. 5.7 above); and

(c) of the 7 major user departments (i.e. those using over 50,000 reams of paper), 5 had an increase in paper consumption over the government–wide average of 13%. None of these five departments had set quantitative targets in their Controlling Officer's Environmental Reports to reduce their paper consumption.

Use of electronic means of publication

5.9 The Printing Department consumes about 8,000 tonnes of printing paper annually. One of the initiatives of the WRTF for the Government is to enhance the use of electronic means of publication as a means of reducing the printing requirements. A successful example is the introduction of e-Gazette in the Internet in December 2000. The number of printed copies of the Gazette had since been reduced from 3,500 copies a week (by 57%) to 1,500 copies a week in January 2002.

Note 20: *The number of government staff was reduced from 183,488 in 1999 by 4% to 175,970 in 2001.*

Note 21: *For the five departments which were established in 2000, their paper consumption of 2000 and 2001 was also used for the analysis.*

Audit survey

5.10 Audit carried out a survey to ascertain the extent to which individual bureaux and departments had used electronic means of publication to reduce their printing requirements. The survey covered publications (Note 22) printed in 2001-02 by the Government Printer (based on the Government Printer's records) and by outside contractors (as advised by the user departments concerned). All 87 bureaux and departments had responded to the survey. The survey results showed that out of the 3,635 publications, 2,075 publications (57%) did not have electronic versions and 1,560 publications (43%) had electronic versions. Further analysis showed that:

(a) of the 2,075 publications without electronic versions, the bureaux/departments concerned for 2,054 (99%) publications had not carried out user surveys on the acceptability of electronic versions. For the remaining 21 publications (1%), the bureaux/departments responsible had performed user surveys or had plans for introducing electronic versions; and

(b) of the publications with electronic versions, 521 were of a recurrent nature (Note 23). Compared with their printing requirements before the introduction of electronic versions, the quantity of the printed copies of 225 (43%) of them had decreased, while that of 167 (32%) had increased. The quantity of the printed copies of the remaining 129 (25%) showed no change.

Audit observations on use of paper

Use of recycled paper

5.11 As a large user of paper, the Government can help create market demand for recycled paper by committing itself to using recycled paper. The increased demand can in turn encourage the recovery of paper waste. **The use of recycled paper in the Government increased from 6% in 1999 to 33% in 2000. However, it dropped to 31% in 2001 because some bureaux and departments had reverted to using more non-recycled paper** (see paras. 5.5 and 5.6 above). The higher cost of recycled paper than non-recycled paper is a constraint in promoting the wider use of recycled paper in the Government. **There is a need to economise on the use of paper in order to offset the higher cost of using recycled paper. There is also a need to promote a behavioural change to accept off-white recycled paper which is less expensive.**

Reduction in paper consumption in the Government

5.12 **Notwithstanding the adoption of electronic means of communication within the Government and a 4% reduction in the number of government staff, there was a 13% growth in paper consumption from 1999 to 2001. During this period, the paper consumption per**

Note 22: *Publications under survey excluded stationery items, standard forms and posters.*

Note 23: *Similar analysis could not be made for the remaining 1,039 publications with electronic versions because they were not of a recurrent nature.*

staff member had grown by 19% (see para. 5.7 above). There is a need to adopt a whole-of-government approach to increasing the use of recycled paper and for more concerted efforts to economise on the use of paper. Audit noted that in June 2002, the WRTF for the Government had decided to ask bureaux and departments to set specific waste reduction targets (including paper consumption) and report performance annually through the Controlling Officer's Environmental Reports. Audit welcomes the efforts made by the WRTF for the Government in this regard. Audit considers that the EPD and the GSD should give assistance and support to bureaux and departments, particularly those large users with large increase in paper consumption (see para. 5.8 above) to help them achieve the targets.

Use of electronic means of publication

5.13 **According to the audit survey, 57% (2,075) of the government publications in 2001-02 did not have electronic versions. This shows that there is scope to further reduce paper consumption through the wider use of electronic means of publication (see para. 5.10 above).** As the bureaux and the departments concerned had not carried out user surveys on most of these publications to ascertain the extent of acceptance of electronic versions in place of the printed copies, Audit considers that they need to perform such surveys. For those publications issued in electronic versions but still having an increase in the quantity of the printed copies, there is a need to carry out reviews to ascertain the reasons for the increase.

Audit recommendations on use of paper

5.14 **Audit has *recommended* that the Administration should adopt a whole-of-government approach to increasing the use of recycled paper. It should seek to offset the higher cost of using recycled paper through:**

On the use of recycled paper

(a) **economising on paper consumption; and**

(b) **accepting the use of off-white recycled paper.**

5.15 **Audit has *recommended* that the Secretary for the Environment, Transport and Works, in conjunction with the Director of Environmental Protection and the Director of Government Supplies, should:**

On reduction of paper consumption

(a) **urge bureaux and departments to set realistic targets for reducing paper consumption and closely monitor their performance against the targets;**

(b) **provide advice and support to bureaux and departments which have had recent increases in paper consumption to help them achieve the paper reduction targets published in the Controlling Officer's Environmental Reports;**

On the use of electronic means of publication

(c) **for those publications without electronic versions, urge the bureaux and departments concerned to conduct user surveys with a view to ascertaining the extent to which users will accept electronic versions and introducing electronic versions at an early date so as to reduce their printing requirements; and**

(d) **remind the bureaux and departments concerned to review and consider to reduce the printing requirements of their publications if the introduction of electronic versions of their publications has not brought about a decrease in the printing requirements.**

Response from the Administration

5.16 The **Director of Environmental Protection** agrees with the audit recommendations as mentioned in paragraphs 5.14 and 5.15 above. He has said that:

(a) the Administration should now adopt a more aggressive policy to persuade all government departments to shift to the use of recycled paper; and

(b) improvement on reduction of paper consumption will be possible only if all government departments pledge to do so with an effective monitoring system in place. The EPD agrees that Controlling Officer's Environmental Reports as well as user surveys for publications are effective channels to pursue these objectives.

5.17 The **Secretary for the Environment, Transport and Works** has said that the ETWB and the EPD have always been urging bureaux/departments to use more recycled paper, reduce paper consumption and adopt other waste reduction measures. However, whether and how bureaux/departments would implement these measures is highly dependent on their budget (in case recycled paper is more expensive), staff preference and operational requirements. Nonetheless, they will continue to provide advice and support to bureaux/departments and work closely with them with a view to further promoting waste reduction and recycling within the Government.

5.18 The **Director of Government Supplies** agrees with the audit recommendations on the use of recycled paper and on reduction of paper consumption as mentioned in paragraphs 5.14 and 5.15(a) and (b) above. She has said that the GSD can assist user bureaux/departments to better monitor their paper consumption by posting the information about their monthly requirements of paper on the Government's website.

Use of retreaded tyres

5.19 Based on the EPD's statistics, about 10,000 tonnes of rubber tyres are disposed of at landfills every year. Rubber tyres occupy a large volume of space and pose compaction problems. Since 1989, the EPD has commissioned a contractor to provide a tyre shredding service in order to minimise the landfill space required for the disposal of waste tyres (see para. 5.26 below for the background of the service).

5.20 According to an EPD consultancy study conducted in 1999, retreading tyres was one of the necessary means of reducing tyre waste. The use of retreaded tyres also saved vehicle owners' money because retreaded tyres were cheaper than new ones (particularly the tyres of heavy vehicles). Heavy vehicle tyres were already routinely retreaded in Hong Kong. This is reflected in the EPD's statistics that the quantity of retreading and other forms of recycling of tyres was about 10,000 tonnes in 2001.

5.21 The Government has a vehicle fleet of about 6,900. The Electrical and Mechanical Services Department (EMSD) is responsible for maintaining about 5,900 government vehicles. The FEHD maintains about 1,000 of its own vehicles, through its workshops, contractors and the EMSD.

EMSD's trial scheme of using retreaded tyres

5.22 In December 1999, the WRTF for the Government agreed that it was worthwhile to start a trial scheme in the Government on the use of retreaded tyres in order to evaluate their suitability. After conducting a site visit to a local tyre retreading company and market research, in May 2000, the EPD, the EMSD and the GSD noted that:

(a) locally, there was good quality service for retreading tyres and the technology had been well established;

(b) one well-established bus company had a long experience of using retreaded tyres for its bus fleet; and

(c) some other countries had been using retreaded tyres for many years. For example, in 1993, the Government of the United States of America issued an Executive Order which mandated the use of retreaded tyres on all government vehicles.

5.23 In July 2000, the EMSD commenced a trial scheme for the use of retreaded tyres in selected heavy and medium government vehicles. The purpose of the trial scheme was to help set up a quality control system to enhance the safe use of retreaded tyres and, if successful, to extend its use to all heavy and medium government vehicles.

5.24 In October 2001, the EMSD reported to the WRTF for the Government that the initial period of the use of retreaded tyres was hindered by abnormal wear on the front axles of some

vehicles. As the problem had been resolved, the EMSD envisaged that the use of retreaded tyres could be more vigorously implemented. In June 2002, after a review of the trial scheme, the WRTF for the Government accepted the EMSD's recommendation of extending the use of retreaded tyres to all heavy and medium government vehicles (about 1,100).

5.25 Audit noted that of the 185 vehicles selected for the trial scheme, only 81 vehicles (i.e. 44%) were fitted with retreaded tyres during the 2-year trial period. This was because the heavy and medium government vehicles had a relatively long tyre replacement cycle and could only be fitted with retreaded tyres when replacements were due.

EPD's tyre shredding service contract

5.26 As mentioned in paragraph 5.19 above, the disposal of waste tyres at the landfills poses particular problems because of the volume and resilient nature of the tyres. In 1989, in order to achieve reduction in the volume of tyres disposed of at the landfills, the EPD commissioned a contractor to provide a tyre shredding service at the Junk Bay landfill. The Government reimbursed the contractor on a monthly basis an operational charge based on the weight of tyres processed. Following the closure of the Junk Bay landfill, in 1993, the EPD relocated the tyre shredding service to the West New Territories landfill.

5.27 The EPD has issued a practice note for the disposal of waste tyres at the landfills. According to the practice note, the disposal of waste tyres at the landfills should fulfil the following conditions:

(a) prior arrangement should be made with the EPD when disposing of large quantities of waste tyres;

(b) waste tyres must be cut into two halves horizontally along the circular plane; and

(c) cut waste tyres should be disposed of along the tipping face of landfills and covered with refuse before compaction.

5.28 Based on the EPD's statistics, of the 9,860 tonnes of waste tyres disposed of at the landfills in 2001, about 6,120 tonnes (62%) were delivered there by private waste collectors. The tyres were cut into two halves in accordance with the EPD's requirements. The remaining 3,740 tonnes (38%) of tyres were delivered to the landfills by the EPD's contractor after shredding. In 2001, the EPD paid the contractor $5.26 million for processing the 3,740 tonnes of tyres.

5.29 Audit analysed the EPD's data of the tyre shredding service for the five years from 1997 to 2001. Audit found that on average, only 550 tonnes (or 15%) of the waste tyres shredded by the EPD's contractor came from the government vehicle fleet. An annual average of 3,220 tonnes (or 85%) of the waste tyres shredded by the EPD's contractor was collected by the FEHD from various refuse collection points and public places. According to the Public Health and Municipal Services Ordinance (Cap. 132), it is unlawful to dispose of large quantities (i.e. more than

100 litres) of trade waste (including tyres) at refuse collection points and public places. Based on the Government's estimated cost of collecting municipal solid waste of $380 per tonne (at 1997-98 price level), the Government spent $1.22 million a year to collect the 3,220 tonnes of tyres unlawfully disposed of at refuse collection points and public places. In addition, the Government spent $4.73 million on shredding the tyres. In total, the Government spent about $6 million a year to collect and shred the tyres before disposal at the landfills. Detailed calculations are given in Appendix G.

Audit observations on use of retreaded tyres

5.30 ***Need for promoting the use of retreaded tyres.*** In June 2002, after a 2-year trial scheme, the Government decided to extend the use of retreaded tyres to all of its 1,100 heavy and medium vehicles (see paras. 5.23 and 5.24 above). Compared with the private sector and some overseas governments which have been using retreaded tyres for over 10 years, the progress made by the Government in using retreated tyres to reduce tyre waste is rather slow. Moreover, 5,800 light vehicles of the government fleet have not been covered. As pointed out in the EPD's 1999 consultancy study, although at that time light vehicles did not use many retreaded tyres in Hong Kong, the practice was common overseas. Light vans and taxis accounted for nearly 80% of the tyre waste. **There is a need for the Government to further promote the use of retreaded tyres for its light vehicles in order to set an example for the private sector to follow.**

5.31 ***Need for more action against unlawful dumping of waste tyres.*** The Government spent about $30 million in the past five years to handle waste tyres unlawfully dumped at refuse collection points and public places. This arrangement is not consistent with the Government's Polluter Pays Principle and the WRFP's objective of encouraging waste producers to reduce waste. According to the EPD's records, there are about 200 garages and tyre dealers who are potential producers of waste tyres but only 29 (Note 24) of them have records of delivery of their cut tyres to the landfills for disposal. There is a need for the FEHD to step up its enforcement action against people who unlawfully dump tyres at the refuse collection points and public places. In the longer term, there is a need for the EPD to introduce producer responsibility schemes (see also para. II(b) of Appendix A) to require the tyre manufacturers and suppliers to take a greater responsibility in the collection and proper disposal of waste tyres.

Audit recommendations on use of retreaded tyres

5.32 **Audit has *recommended* that:**

Note 24: *Five of them are collectors or recyclers. They also provide waste tyres collection service for others.*

(a) **the Director of Electrical and Mechanical Services and the Director of Environmental Protection should continue to explore the feasibility of extending the use of retreaded tyres to the Government's light vehicle fleet (see para. 5.30 above);**

(b) **the Director of Food and Environmental Hygiene should step up enforcement action against people who dispose of large quantities of waste tyres unlawfully at the refuse collection points and public places (see para. 5.31 above); and**

(c) **the Director of Environmental Protection should introduce producer responsibility schemes to require tyre manufacturers and suppliers to take a greater responsibility in the collection and proper disposal of waste tyres (see para. 5.31 above).**

Response from the Administration

5.33 The **Director of Electrical and Mechanical Services** agrees with the audit recommendation as mentioned in paragraph 5.32(a) above. He has said that the EMSD will vigorously explore the feasibility of extending the use of retreaded tyres to the Government's light vehicle fleet. Having regard to the tyre retreading facilities in the current local market, the EMSD is not yet satisfied at this stage that it is absolutely safe to adopt the use of retreaded tyres for the light vehicles. Nevertheless, the EMSD will continue to seek out new techniques in tyre reuse.

5.34 The **Director of Food and Environmental Hygiene** agrees with the audit recommendation as mentioned in paragraph 5.32(b) above.

5.35 The **Director of Environmental Protection** welcomes the audit recommendation as mentioned in paragraph 5.32(c) above that producer responsibility schemes should be introduced to require the tyre manufacturers and suppliers to take a greater responsibility. He has said that a mobile phone battery recovery and recycling programme operated under producer responsibility schemes has already been launched. The EPD has also initiated discussions with tyre producers/importers on the possibility of introducing a similar recycling programme. The EPD is planning to engage a contractor through open tendering to recycle the waste tyres currently collected by the FEHD if this can bring about savings in shredding and disposal cost.

Progress of implementing the waste reduction action programmes

Waste reduction action programmes		Progress
I.	**Prevention of waste programme**	
	(a) Placement of WSB in strategic public locations	Some 19,510 WSB have been placed in public venues (including bus termini, public transport exchanges, MTR/KCR exits, parks, leisure venues, government buildings and country parks), tertiary institutions, schools and public/private housing estates. The Government has planned to add some 8,000 new WSB in the coming years (see PART 3 for audit observations).
	(b) Land allocation	Nine sites have been leased exclusively to the waste recycling industry under STT arrangements since the launch of the WRFP in 1998. Tenders for three new STT sites for waste recycling were invited in mid-2002 (see PART 4 for audit observations). In 2001, the Government decided to set aside 20 hectares of industrial land in Tuen Mun Area 38 as a recovery park to cater for the long-term land requirements for recycling activities. The planning and development of the recovery park is in progress. The first phase of the park is expected to be in operation in 2004.
	(c) Public education and publicity work	The broadcasting of new Announcements of Public Interest in electronic media and TV commercials on waste separation, posting of waste separation message on bus body's side panels began in September 2001 (see PART 2 for audit observations). The EPD has collaborated with the District Councils and community groups in organising waste reduction programmes in various districts, such as setting up mobile recyclable waste collection points, and provision of training to student Environmental Protection Ambassadors.

I. Prevention of waste programme (cont'd)

(c)	Public education and publicity work (cont'd)	The Environment and Conservation Fund has provided funding support for environmental groups and community organisations to implement waste recovery programmes at the district community level. In May 2002, the Finance Committee of the Legislative Council approved an additional capital injection of $100 million into the Fund.
(d)	The EPD's Recycling Helpline	The Helpline has been widely publicized on all publicity materials. A TV commercial was launched in November 2001. The average number of calls has increased more than 10 times to over 100 a day since November 2001.

II. Institutional programme

(a)	Establishment of a Waste Reduction Committee and seven WRTFs	The Waste Reduction Committee continues to promote public and private sector actions to recover waste. The Task Forces continues to work towards the common goal of encouraging waste reduction in their respective sectors.
(b)	Producer responsibility schemes	In November 2001, the EPD held a view-sharing session with business representatives for four waste types (i.e. electrical and electronic appliances including computers, batteries, tyres and beverage containers), environmental groups and academics to seek their support in setting up an extended producer responsibility programme for Hong Kong. In April 2002, a 12-month pilot end-of-life mobile phone battery recovery and recycling programme was launched. The pilot programme is the first recycling programme organised and funded by the industry in Hong Kong through a voluntary producer responsibility scheme.
(c)	Waste reduction in the Government	The development of environmentally responsible purchasing guidelines is in progress. The Government has taken measures to increase the use of recycled paper and extend the use of retreaded tyres to all heavy and medium government vehicles (see PART 5 for audit observations).

II. Institutional programme (cont'd)

(d) "Wastewi$e" Scheme	The Scheme was launched in 1999 to promote and commend waste reduction efforts of the participating organisations. By December 2001, 154 establishments had joined the "Wastewi$e" Scheme. The EPD has awarded three batches of Certificates of "Wastewi$e" Logo to 37 establishments coming from for example, the construction industry, utilities, the manufacturing industry and the Government.

III. Waste bulk reduction programme

(a) Waste-to-energy incineration	Planning work for incineration facilities has been slowed down due to objections from environmentalists and by local residents. To address the objections, in April 2002, the Government issued an invitation for Expressions of Interest from local and international organisations to provide appropriate technologies for the management and treatment of municipal solid waste. It is expected that this will help the Government determine what type of sustainable waste treatment facilities will be the best to acquire for Hong Kong (see PART 2 for audit observations).
(b) Composting	The EPD has tested the domestic and commercial composters. About 20 composters have been put into use in various establishments including 15 housing estates and two government institutions. In mid-2002, the EPD invited tenders for the development of an organic waste composting plant in Ngau Tam Mei.

Appendix B
(para. 3.6 refers)

Results of the Waste Recycling Campaign

		Phase I	**Phase II**	**Phase III**	**Phase IV**	**Phase V**
Duration		**(Mar 1998 - May 1998)**	**(Oct 1998 - Mar 1999)**	**(Jul 1999 - Mar 2000)**	**(Jun 2000 - Mar 2001)**	**(Jun 2001 - Mar 2002)**
Number of Participating estates		41	132	300	716	1,050
(a) Number of households		159,988	458,500	809,064	1,193,155	1,429,016
Recovery per month (kg)	(b) Paper	880,300	1,560,900	5,247,600	8,762,800	10,959,400
	(c) Aluminium	7,000	38,700	76,200	153,700	420,500
	(d) Plastics	–	–	25,600	71,600	75,600
	(e) **Total** = (b)+(c)+(d)	**887,300**	**1,599,600**	**5,349,400**	**8,988,100**	**11,455,500**
(f) Recovery per month per household = (e)/(a) (kg)		5.5	3.5	6.6	7.5	**8.0**

Source: Advisory Council on the Environment Paper 14/2002

Note 1: Plastic bottle recycling was not included in the first two phases of the Waste Recycling Campaign.

Note 2: Phase VI of the Waste Recycling Campaign commenced in April 2002.

Appendix C
(para. 3.10 refers)

Results of the trial schemes of floor-to-floor provision of WSB in selected public housing estates (August to November 2000)

Housing estate	Increase/(decrease) in recovery during the trial period		
	Paper	**Plastics**	**Aluminium**
Long Ping Estate, Yuen Long	77 times	21 times	(47%) (Note)
Choi Wan (I) Estate, Kowloon	17%	118 times	54%
Kwong Tin Estate, Lam Tin	1.6 times	2.8 times	36%

Source: ECC's records

Note: The decrease in the rates of recovery of aluminium was reportedly caused by scavenging activities.

Appendix D
(para. 3.11 refers)

Results of trial scheme of placing WSB on each floor of all blocks of two public housing estates (November 2001 to April 2002)

Housing estate	Increase/(decrease) in recovery during the trial period		
	Paper	**Plastics**	**Aluminium**
Chak On Estate, Cheung Sha Wan	50%	21 times	3.6 times
Chun Shek Estate, Sha Tin	4.2 times	58%	(33%) (Note)

Source: *HD's records*

Note: *The decrease in the rates of recovery of aluminium was reportedly caused by scavenging activities.*

Appendix E
(para. 4.7 refers)

Rentals forgone in providing the nine STT sites for the waste recycling industry

	STT site	Area	Annual rent received	Estimated annual market rent	Rental forgone per year
		(a)	**(b)**	**(c)**	**(d) = (c) - (b)**
		(m^2)	**($'000)**	**($'000)**	**($'000)**
1.	Sheung Shui Area 30A	16,000	642	4,480	3,838
2.	Kai Tak Main Fire Station	15,100	10	4,530	4,520
3.	Kai Tak Old Fire Station	3,900	864	864	0
4.	Dai Kwai Street, Tai Po Industrial Estate	4,980	51	996	945
5.	Chong Fu Road, Chai Wan	2,530	600	1,645	1,045
6.	Yau Yue Wai, Yau Tong	2,100	364	3,696	3,332
7.	Chi Wa Lane, Sheung Shui	6,770	132	1,557	1,425
8.	Pai Chong Road, Cheung Chau	340	30	41	11
9.	Site B, Dai Kwai Street, Tai Po Industrial Estate	5,060	444	759	315
	Total	**56,780**	**3,137**	**18,568**	**15,431**
					say $15 million

Source: Audit's calculation based on the EPD's records and the Lands D's rental assessments

Note: The Lands D advised that, depending on the location, size, site layout, the neighbouring land use and the supply of land available for letting in the district, the STT sites could be alternatively used as workshops, concrete production facility, cargo handling areas or open space.

Appendix F
(para. 5.6(a) refers)

Use of recycled paper from 1999 to 2001

	Between 1999 and 2000		Between 2000 and 2001	
Proportion of recycled paper used over total paper consumption	**Number of bureaux and departments**	**Percentage**	**Number of bureaux and departments**	**Percentage**
(a) Increase during the period	65	78%	30	35%
(b) No change during the period	2	2%	10	11%
(c) Decrease during the period	16	20%	47	54%
Total	**83**	**100%**	**87**	**100%**

Source: Audit's analysis based on the GSD's records

Note: In 2000, five departments were established and one department was dissolved.

Appendix G
(para. 5.29 refers)

Government's cost of handling unlawfully dumped waste tyres from 1997 to 2001

Year	Total quantity of waste tyres shredded	Quantity of unlawfully dumped waste tyres shredded (Note 1)	% of total	Cost of the tyre shredding service contract	Cost of handling unlawfully dumped waste tyres		
					Shredding cost	Collection cost	Total cost
	(a)	(b)	(b)/(a)´ 100% = (c)	(d)	(c) ´ (d) = (e)	(b) ´ $380 per tonne = (f)	(e) + (f) = (g)
	(tonnes)	(tonnes)		($ million)	($ million)	($ million)	($ million)
1997	3,230	2,930	91%	5.02	4.57	1.11	5.68
1998	3,750	3,150	84%	5.95	5.00	1.20	6.20
1999	4,400	3,380	77%	6.49	5.00	1.28	6.28
2000	3,730	3,290	88%	4.97	4.37	1.25	5.62
2001	3,740	3,350	90%	5.26	4.73	1.27	6.00
Total	**18,850**	**16,100**		**27.69**	**23.67**	**6.11**	**29.78**
						say	**$30 million**
Annual Average (Note 2)	**3,770**	**3,220**	**85%**	**5.54**	**4.73**	**1.22**	**5.95**
						say	**$6 million**

Source: *EPD's and FEHD's records*

Note 1: *The FEHD only maintained records of the quantity of its own waste tyres for 2000 and 2001. The quantities of the FEHD's own waste tyres for the years 1997 to 1999 were estimated on the assumption that they made up about 3% of the total quantity of waste tyres delivered for shredding as in the years of 2000 and 2001.*

Note 2: *Annual average quantity of waste tyres from government vehicle fleet*
= total quantity of waste tyres shredded – quantity of unlawfully dumped waste tyres shredded
= 3,770 tonnes – 3,220 tonnes
= 550 tonnes

Appendix H

Acronyms and abbreviations

ACE	Advisory Council on the Environment
AFCD	Agriculture, Fisheries and Conservation Department
ECC	Environmental Campaign Committee
EMSD	Electrical and Mechanical Services Department
EPD	Environmental Protection Department
ETWB	Environment, Transport and Works Bureau
FEHD	Food and Environmental Hygiene Department
GPA	Government Property Agency
GSD	Government Supplies Department
HD	Housing Department
Imm D	Immigration Department
kg	kilogrammes
Lands D	Lands Department
LCSD	Leisure and Cultural Services Department
m^2	square metres
MD	Marine Department
STT	Short Term Tenancy
WRFP	Waste Reduction Framework Plan
WRTF	Waste Reduction Task Force
WSB	Waste separation bins