

# Environmental Performance Report 2005



- ◆ [Foreword](#)
- ◆ [Vision, Mission & Values](#)
- ◆ [Environmental Policy & Goals](#)
- ◆ [Responsibilities](#)
- ◆ [Environmental Management Profile](#)
- ◆ [Environmental Performance](#)
- ◆ [Facing Challenges](#)
- ◆ [Stakeholder Relations](#)
- ◆ [Achievement of Environmental Targets](#)
- ◆ [Environmental Targets for 2006](#)

## Foreword



DSD contributes a great deal to the environment. We play a vital role in protecting one of Hong Kong's most precious natural resources, its water bodies, from pollution. We also protect people and property

from the damaging effects of flooding. In carrying out these essential functions, we are keenly aware of the impacts that may have on the environment. A tremendous amount of effort has accordingly been put in balancing between the community's expectations for a higher level of sewage treatment and better flood control, and the need to minimise resource consumption and the impacts of our operations on the environment.

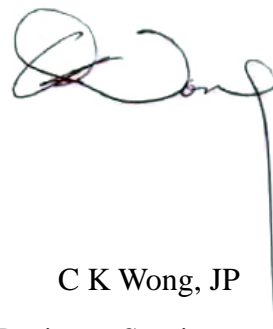
Sewage treatment is a good example of the competing demands we are facing. The community wants better sewage treatment and odour control, but these demands place added pressure on energy and chemical consumption. DSD is mindful of the need to conserve resources and reduce our environmental impacts whenever possible. In widening natural streams for flood prevention purpose, we have incorporated various ecological features, such as planting of vegetation along the floodway and creating wetland, into our works so that the infrastructure would blend in with the environment.

Environmental considerations are also integrated into our management. We have a Green Management Committee chaired by our Deputy Director to oversee environmental performance. We also have 12 Green Action Teams tasked with

promoting good housekeeping practices at divisions and plants, and conducting quarterly Green Surveys in our workplaces. These surveys are useful in promoting waste paper recycling and energy conservation. Most significantly, we are establishing Environmental Management Systems across the whole Department, with the aim of achieving ISO 14001:2004 certification in 2007. This important groundwork will enhance our ability to further identify and manage environmental impacts that arise from delivering our services.

Finally, I would like to mention the involvement of our stakeholders. We are increasingly seeking input from our stakeholders on issues of public concern. Such contacts not only help to clear up misunderstandings about DSD's work, they also produce fruitful results in our project delivery as described in this report and our Annual Report. Greater community interest and involvement in our work will help us achieve our main goal: to build and maintain sustainable sewage services and flood control for Hong Kong.

We welcome feedback from readers on this report and our environmental performance. On balance of environmental protection and communication need, we have produced a limited number of printed copies for distribution. Comments or enquires can be sent to [enquiry@dsd.gov.hk](mailto:enquiry@dsd.gov.hk)

A handwritten signature in black ink, appearing to read 'C K Wong', with a long vertical line extending downwards from the end of the signature.

C K Wong, JP  
Director of Drainage Services



## Vision, Mission & Values

### Our Vision

- To develop and maintain world-class drainage and sewerage systems, and sewage treatment and disposal facilities to keep our community healthy and safe

### Our Values

- Commitment
- Customer Satisfaction
- Professionalism
- Teamwork

### Our Mission

- Improving our drainage and sewerage systems to treat sewage and disposal of rainwater in an environmentally responsible manner
- Delivering efficient, cost-effective and courteous services to the public
- Fostering good working relationships with our clients, consultants and contractors
- Providing a safe, healthy and rewarding working environment for our staff



*One of our major tasks is to protect the water quality of Victoria Harbour. We carry out non-toxic dye tests to trace the effluent from our sewage treatment works and ensure it is discharged properly.*

# Environmental Policy & Goals

## Environmental Policy

We are committed to being environmentally conscious in all our activities and services and endeavour to serve the Hong Kong community with the best of our expertise in safeguarding human health, protecting and preserving natural ecosystems, thus contributing to the sustainable development of Hong Kong.

We aim to continually improve the quality of our services, and to alleviate as far as practicable the impact that our facilities and sewage and drainage systems impose on the environment of Hong Kong. To meet these objectives, we are committed to:

- Adopting state-of-the-art clean technologies and pollution prevention measures;
- Integrating sustainability considerations into the design, construction and operation of our facilities;
- Minimising and mitigating environmental impacts arising from the construction and operation of our facilities;
- Meeting all statutory and regulatory requirements on environmental performance that are applicable to the activities of the department; and
- Devising and conducting internal operations in an environmentally responsible manner.

We ensure that our Environmental Policy is communicated to all staff, our consultants and contractors, and is open to public scrutiny. Our staff are committed to upholding this departmental policy, obtaining the relevant training and deploying the necessary resources to enable its implementation.

## Environmental Goals

Our environmental goals are:

- To provide and operate world-class sewerage/drainage systems and sewage treatment/disposal facilities to fulfil the growing needs of the local community and contribute to the sustainable development of Hong Kong
- To implement sewerage and sewage treatment/disposal programmes in a professional manner, in partnership with other Government establishments including the Environmental Protection Department, and to meet the Water Quality Objectives for Hong Kong waters
- To implement drainage and flood protection programmes in a professional manner to minimise flooding and to provide protection to local inhabitants, properties and the environment.
- To apply the principles of Reduce, Reuse, Recycle and Recover in the consumption of materials and management of wastes and seek continuous improvement in the efficient use of natural resources and energy in all our operations.



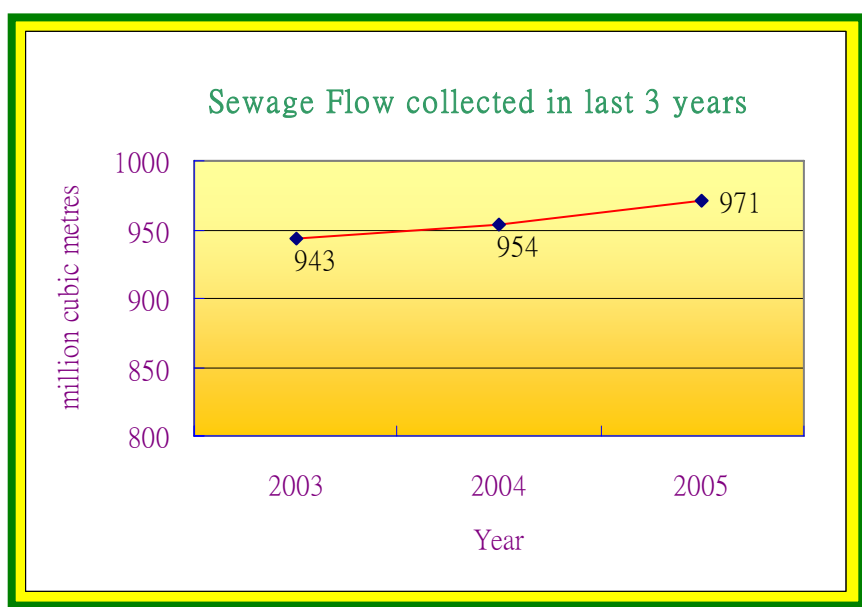
*Our Environmental Policy and Goals are displayed on notice boards at site offices accessible to staff, consultants and contractors.*

## Responsibilities

DSD is responsible for providing and operating Hong Kong's drainage, sewerage and sewage treatment infrastructure. Our work has a direct impact on the local environment and we require our staff, contractors and consultants to take account of and minimise environmental impacts when carrying out their duties.

### Sewage Collection and Treatment

DSD collected and treated 971 million cubic metres of sewage at our facilities in 2005. Sewage loads have increased steadily over the years as a result of population increases, increased water consumption per capita and the expansion of the sewerage network, which now covers 93% of households.



A major focus of our work is improving water quality in Victoria Harbour. Stage 1 of the Harbour Area Treatment Scheme was fully commissioned in 2001, providing Chemically Enhanced Primary Treatment (CEPT) for sewage from 3.5 million people. Stage 2 is being planned to provide disinfection and a higher level of treatment and to widen the catchment area.

Our sewage-related facilities in 2005 included 68 sewage treatment works (STW), including one new STW at Sham Tseng, 199 sewage pumping stations, 43 submarine outfalls, 3 effluent disposal tunnels, and 1,506 kilometres of sewers.



*Chemically enhanced primary treatment has been implemented at the Sham Tseng Sewage Treatment Works.*

## **Flood Prevention**

Flooding is a serious concern in the low-lying areas of the northern New Territories and older urban areas such as Western District. DSD has a massive flood prevention programme underway to train rivers, provide village pumping schemes and undertake urban drainage improvement works.



*The Tai Hang Tung Floodwater Pumping Station has helped to resolve flooding problems in West Kowloon.*

In 2005 we maintained 2,478 km of drainage channels and stormwater drains, and 26 flood pumping schemes.



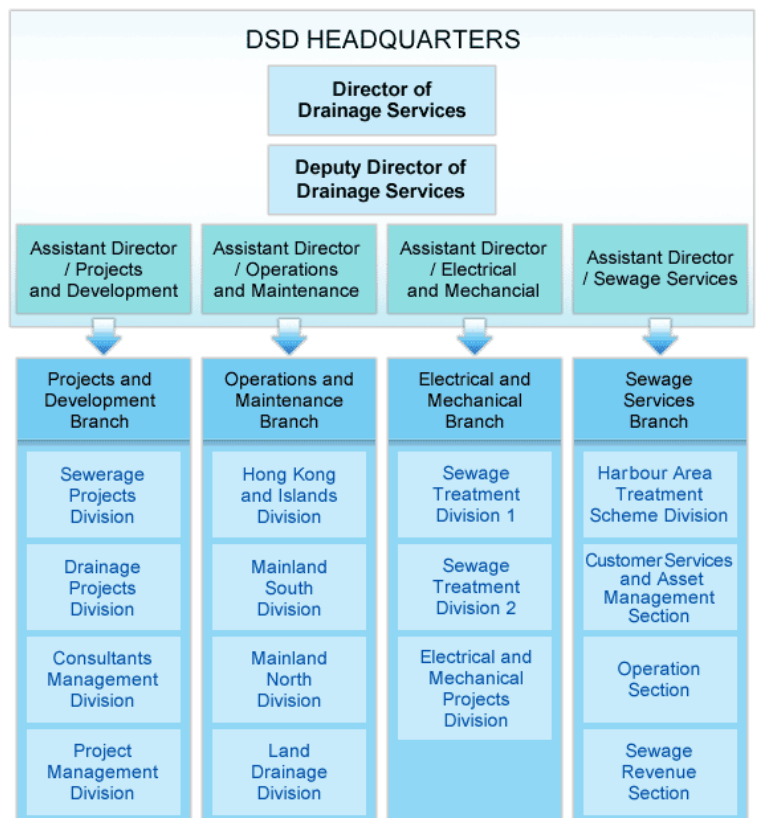
## Environmental Management Profile

DSD is one of eight departments under the Environment, Transport and Works Bureau (ETWB). We employ approximately 2,000 staff, of whom 280 are professional staff, 1,000 are technical and general staff, and 600 frontline staff and direct labours. The department is divided into four branches – Projects and Development, Operations and Maintenance, Electrical and Mechanical, and Sewage Services. Each branch is headed by an Assistant Director. We also oversee 70 contracts related to the construction, operation and maintenance of sewage services and flood prevention facilities.

Two groups deal with environmental management in the department:

### Green Management Committee

This committee formulates and reviews environmental policies, standards and guidelines, monitors our performance on environmental objectives and targets, and introduces measures to raise staff awareness and involvement in environmental issues. The Green Management Committee is chaired by the Deputy Director of Drainage Services.



## Green Action Teams

Twelve Green Action Teams monitor, audit, promote and facilitate green measures, conduct quarterly surveys on resource consumption in offices and provide feedback to the Green Management Committee on the success of green practices. They are based in our headquarters and in divisions of our four branches.



## Environmental Performance

Our performance is ultimately measured by how effectively we collect and treat sewage and control flooding in Hong Kong. DSD is committed to carrying out these duties in an environmentally responsible manner. We aim to optimise resource consumption and minimise environmental impacts while at the same time meet the community's expectations for better sewage treatment and ecologically sensitive flood control.

### [Achievements in Sewage Treatment](#)

### [Resources Consumption for Sewage Treatment](#)

### [Achievements in Flood Control](#)

### [Legal Compliance and Monitoring](#)

### [Green Office](#)

### [Staff Training](#)



## [Achievements in Sewage Treatment](#)

### [Treatment Level](#)

### [Removal of Pollutants](#)

### [Sludge Treatment](#)

We operate 68 sewage treatment works located throughout Hong Kong. The treatment level depends on the waste assimilation capacity of the receiving waters. The key pollutants removed from the sewage include organic materials measured as biochemical oxygen demand (BOD), suspended solids (SS) and nitrogen. The

treatment level and the quality of the effluent including the above parameters have been stipulated in the discharge licenses issued to us by the Environmental Protection Department.

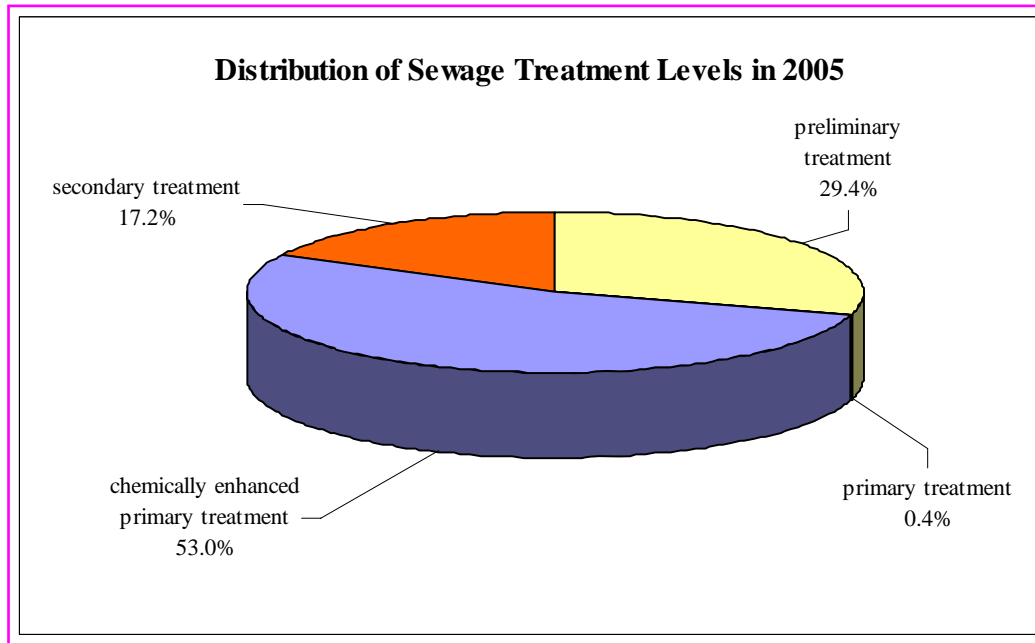
### Treatment Level

30% of sewage receives preliminary or primary treatment, 53% receives chemically enhanced primary treatment and 17% receives secondary treatment. In 2005 the quantity of sewage receiving chemically enhanced primary treatment increased to 515 million cubic metres; as two more sewage treatment works using this process were put into operation at Sham Tseng and Siu Ho Wan. In addition, the quantity of sewage receiving secondary treatment increased to 167 million cubic metres due to an expansion of the catchment area around secondary plants and the opening of 27 new pumping stations leading to those plants.

**Levels of Sewage Treatment 2003-05**

	Preliminary treatment (million m <sup>3</sup> )	Primary treatment (million m <sup>3</sup> )	Chemically enhanced primary treatment (million m <sup>3</sup> )	Secondary treatment (million m <sup>3</sup> )	Total (million m <sup>3</sup> )
2003	275	4	508	156	943
2004	284	4	507	159	954
<b>2005</b>	<b>285</b>	<b>4</b>	<b>515</b>	<b>167</b>	<b>971</b>





### Removal of Pollutants

The amount of pollutants removed fluctuates according to the quality of the incoming sewage and the performance of individual plants. The fluctuation is not directly related to changes in overall flow. In 2005 fluctuations were within the normal range.

### Removal of Pollutants in Sewage Treatment 2003-05

	Biochemical oxygen demand (BOD) removed <i>(for CEPT &amp; secondary treatment)</i>		Suspended solids removed <i>(for CEPT &amp; secondary treatment)</i>		Total nitrogen removed <i>(for secondary treatment)</i>	
	Quantity (tonnes)	Removal Effectiveness	Quantity (tonnes)	Removal Effectiveness	Quantity (tonnes)	Removal Effectiveness
2003	93,654	75.4%	129,563	83.2%	3,770	63.8%
2004	87,910	75.5%	121,003	84.8%	4,889	75.6%
<b>2005</b>	<b>96,761</b>	<b>74.5%</b>	<b>133,131</b>	<b>86.2%</b>	<b>4,734</b>	<b>73.3%</b>

## Sludge Treatment

In 2005 the pollutants we removed from sewage produced 835 tonnes of sludge per day, or about 305,000 tonnes for the year. DSD dewateres the sludge to reduce its volume before sending it off to landfills for disposal. This saves landfill space and helps extend the life-span of our landfills. Other than sludge, screenings and grit are also removed from sewage treatment.

### **Solid Waste Removed from Sewage 2003-05**

	Screenings <i>(cubic metres)</i>	Grit <i>(cubic metres)</i>	Dewatered sludge <i>(tonnes)</i>
2003	20,705	7,078	305,660
2004	19,220	6,738	288,757
<b>2005</b>	<b>18,136</b>	<b>6,557</b>	<b>304,867</b>

## **Resources Consumption for Sewage Treatment**

### Energy

### Chemical Consumption

DSD seeks to strike a balance between growing community demands for better treatment of sewage and odour control, and the higher energy and chemical input needed to meet those demands. In both energy and chemical consumption, our aim is to achieve the most effective and efficient use of resources.

## Energy

DSD is one of the largest consumers of energy in the Government. Our operations are energy-intensive and efforts to reduce consumption have been aggravated by several factors. Increases in sewage flow, commissioning of new facilities, moving to higher levels of treatment and community demands for better odour control have all added to our energy requirements.

In 2005 we introduced many new facilities to upgrade sewage collection and treatment, which accounted for an increase in electricity consumption in our plants. Sewage flow increased by 1.8%, much of it generated in remote areas, and we needed an additional 27 new sewage pumping stations for collection. We also commissioned a new chemically enhanced primary treatment plant at Sham Tseng, upgraded Siu Ho Wan STW to a higher level of treatment to cope with the future flow demands from Tung Chung, and enhanced the nutrient removal process at Shatin STW. In addition, we commissioned deodorising systems at four preliminary treatment works and two sewage pumping stations to control odour.

In addition to electricity, DSD uses diesel fuel for dual fuel engines and standby generators. For dual fuel engines, biogas is mixed with ultra low sulphur diesel with no more than 0.005% by weight of sulphur. The engines generate electricity at Shatin STW and drive air blowers and a water boiler at Tai Po STW. In 2005 diesel consumption at both plants dropped by 4.7% due to an increase in the recovery of biogas for fuel use. (See [Energy from Sludge](#) for information on biogas recovery).

### **Energy Consumption 2003-05**

	Total electricity consumed (million kWh)	Electricity consumed in kWh per cubic metre of treated sewage	Diesel fuel consumed for driving dual fuel engines (m <sup>3</sup> )
2003	231.0	0.245	2,478
2004	210.7	0.221	2,559
<b>2005</b>	<b>221.7</b>	<b>0.228</b>	<b>2,436</b>

See *Green Office* section for further information on office-based power consumption.

#### ***Energy Efficiency Initiatives***

DSD has undertaken a number of initiatives to enhance energy efficiency and counter the growing demands for energy in our work. These include introducing more energy-efficient equipment and practices in our plants (see table). In 2005 these initiatives saved 1.76 million kWh.

We also regularly monitor our consumption. In 2005 we carried out monthly electricity consumption monitoring at 80% of our larger sewage treatment facilities, and we conducted eight energy audits in our two sewage treatment divisions.



## Energy Efficiency Initiatives in our Plants

- Adjusted the pumps' cut-in/cut-out levels at Pak Kok Sewage Pumping Station to reduce energy wastage.
- Completed the replacement of ceramic diffusers by membrane-type fine bubble air diffusers, which are more energy efficient, at Yuen Long Sewage Treatment Work (STW).
- Replaced the existing air blower (400 kW) at Yuen Long STW with more appropriately sized blowers (200 kW) and installed an automatic dissolved oxygen control for aeration tanks to reduce power consumption.
- Replaced the aeration agitator motor at Mui Wo STW with a more energy efficient agitator motor.
- Reduced the air requirement in the sewage treatment process by reducing the sludge age in the oxidation ditch at Mui Wo STW.
- Adjusted the pumping levels and operation pattern of Kam Tin Low Flow Pumping Station to match the bypass channel, thereby reducing pumping frequency and power demand.
- Reduced the frequency of the filter press operation to maximise the use of solar heat and natural evaporation for sludge dewatering at Mui Wo STW.
- Advanced the summer lighting-off time at sewage treatment facilities by 1 hour, from 7am to 6am.
- Replaced 36 fluorescent fittings in Shatin STW with 1500 mm 50W twin tube explosion-proof fittings, which are more energy efficient.
- Replaced existing fluorescent lamps with more energy efficient T-5 lamps with electronic ballasts at Wanchai East Sewage Screening Plant and Tung Chung Sewage Pumping Station.



*Membrane type fine bubble air diffusers, which are more energy efficient, have been adopted at Yuen Long Sewage Treatment Works.*



*Power requirements at Yuen Long Sewage Treatment Works have been reduced by replacing 400 kW air blowers with 200 kW air blowers and installing an automatic dissolved oxygen control for aeration tanks.*



*Power demand at Kam Tin Low Flow Pumping Station has been reduced by adjusting the pumping levels and operation pattern.*

### ***Energy from Sludge***

Anaerobic sludge digestion has been adopted in four major secondary sewage treatment plants. Anaerobic digestion stabilises the sludge, reduces odour and bacteria levels, and decomposes the volatile solids present in the sludge into methane gas, also known as biogas.

In 2005, sludge digestion produced eight million cubic metres of biogas, 80% of which was used for electricity and heat generation for internal consumption within the sewage treatment plants. Additional measures to make full use of the remaining biogas are under planning.



*Biogas has been recovered for electricity and heat generation at Shatin Sewage Treatment Works.*

## Chemical Consumption

Chemicals are an important component of sewage treatment, in particular chemically enhanced primary treatment (CEPT). They are used to treat sewage, dewater sludge and control odours. The use of some chemicals is increasing as sewage flow increases and higher levels of treatment and odour control are required.

Mindful of the escalating demand for chemicals, DSD has sought to limit the increase in consumption. In 2005 our target was to limit overall chemical consumption increase by 6,370 tonnes over 2004, a target we achieved. We reduced consumption in some areas, which countered increases in others, notably polymer and activated carbon. 7.7% more polymer was used than originally targeted for 2005 due to the greater volume of sludge being treated and the varying effectiveness of different types of polymers. We also used an extra 2.2% activated carbon than targeted which was within the acceptable range given the differing operating conditions of plants. In 2006 we will audit chemical consumption in each division to identify areas for further saving.

In general, changes in chemical consumption are not directly proportional to changes in flow rates. The characteristics of the raw sewage and the requirements for odour control are also factors.

*Siu Ho Wan STW was upgraded to chemically enhanced primary treatment in March 2005.*





**Consumption of Major Chemicals 2003-05**

	For CEPT sewage treatment			For sludge dewatering	
	ferric chloride (tonnes)	alum (tonnes)	polymer (tonnes)	ferric chloride (tonnes)	polymer (tonnes)
2003	13,235	86	72	2,912	682
2004	13,154	209	87	2,799	562
<b>2005</b>	<b>12,197</b>	<b>961 (1)</b>	<b>96</b>	<b>3,005</b>	<b>644</b>

(1) Alum consumption rose considerably in 2005, largely because DSD upgraded the treatment level at Siu Ho Wan STW to CEPT and took over the operation of Sham Tseng STW.

**Consumption of Major Chemicals for Odour Control 2004-05**

	ferric chloride (tonnes)	calcium nitrate (tonnes)	activated carbon (tonnes)
2004	2,168	3,503	172
<b>2005</b>	<b>2,035</b>	<b>5,079 (1)</b>	<b>180</b>

(1) Calcium nitrate consumption increased significantly due to odour control requirements for Shatin STW.

## Achievements in Flood Control

Flood control is an essential requirement in Hong Kong, where low-lying areas and older urban areas are prone to severe flooding. The Government has a multi-billion dollar programme to prevent flooding in vulnerable areas. DSD is in charge of this programme, as well as maintaining drains, channels and watercourses.



*Eco-design: vegetation lines the bottom of the Yuen Long Bypass Floodway.*

One area of concern is the environmental impact of flood control, particularly river channel design. Concrete is an effective flood control material but it also affects river life. To address this problem, DSD has issued technical circulars and guidelines on protecting natural rivers and streams during flood prevention works. In 2005 we also invited green groups and academics to workshops to provide input on a new set of environmental guidelines for river channel design, as well as the eco-design features of the Yuen Long Bypass Floodway and the San Tin West Drainage Channel. Further details can be found in our Annual Report.

### Sewer and Drainage Maintenance 2003-05

	Drains, channels and water courses		Sewers	
	Cleansing <i>(kilometres)</i>	Silt removed <i>(cubic metres)</i>	Cleansing <i>(kilometres)</i>	Silt removed <i>(cubic metres)</i>
2003	513	59,946	614	6,351
2004	629	279,909 (1)	627	4,956
<b>2005</b>	<b>556</b>	<b>47,993</b>	<b>630</b>	<b>8,565</b>

*(1) A major operation was undertaken in 2004 to de-silt the Shenzhen River.*



*Shenzhen River.*

## Legal Compliance and Monitoring

DSD operates 68 sewage treatment plants, each with a licence issued under the Water Pollution Control Ordinance. In 2005 we had 12 cases of exceedances, all of which were minor and remedied immediately.

One of our contractors was convicted of an environmental offence in 2005 concerning the Noise Control Ordinance, down from eight convictions in 2004.

To promote responsible behaviour at our sites, DSD launched the “Construction Sites Housekeeping Award Scheme” in January 2004. In addition to routine inspections by our site supervision staff, the management of DSD conducts additional inspections quarterly to assess participating work sites in such areas as cleanliness, hygienic conditions, mosquito control, environmental nuisance control and traffic management. In January 2005 we held a ceremony to award 4 Best Awards and 5 Meritorious Awards. It is hoped the awards scheme will encourage all site staff to keep DSD sites clean, tidy and hygienic.



*A Best Construction Sites Housekeeping Award was awarded to the contractor who managed the upgrading work at the Peng Chau STW. Site staff properly sorted and stockpiled excavated materials, which will be re-used in future backfilling work.*



*A Meritorious Award was awarded to the contractor who was in charge of Wan Chai East & North Point Sewerage. Site staff set up a proper temporary traffic management system during construction work.*



## Green Office

### Green Survey

### Paper Consumption

### Office-based Power Consumption

### Green Survey

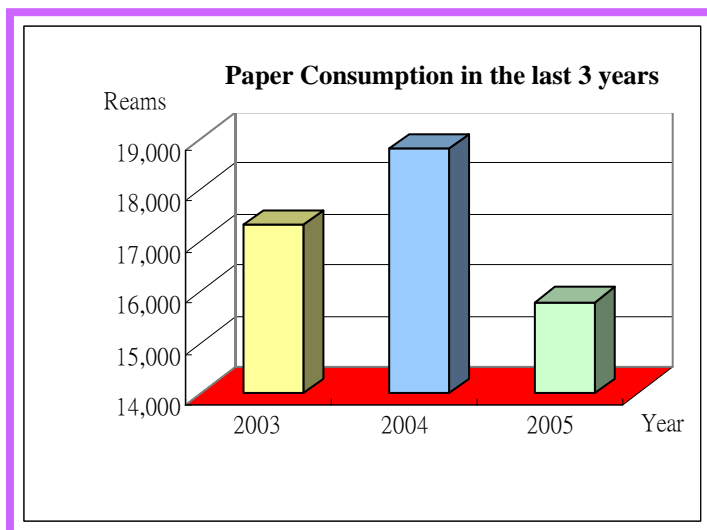
DSD is seeking to reduce paper and office-based electricity consumption (information on power consumption in our plants can be found under [Resources Consumption for Sewage Treatment](#)). In December 2004 we introduced a Green Survey to monitor our performance in recycling waste paper and saving energy across the whole department. The survey is carried out quarterly by our Green Action Teams.

Over the course of 2005, we were able to reduce the number of irregularities recorded by 50%. Irregularities included such things as forgetting to turn off office equipment when not in use and failing to re-use and recycle paper. The most common problem was forgetting to turn off the computer monitor separately. Individuals were informed of non-compliance and reminded to improve their housekeeping practices. Staff in general were also reminded of common mistakes or omissions, to help raise their awareness.

### Paper Consumption

DSD has introduced a number of initiatives to reduce paper consumption. We have procured more network printers that do double-sided printing, ceased the practice of sending hard copies of documents after they have been faxed, increased the use of

electronic communication and encouraged staff to re-use envelopes. We have also set a yearly maximum quota for paper ordering in each division and section. The results have been very satisfactory. In 2005 we



consumed 15,789 reams of paper against a target of 17,000 reams despite increasing workloads generating a lot of demands.

#### **Paper Consumption and Recycling 2003-05**

	Paper consumed (reams)	Paper consumed per staff (reams)	Envelopes consumed (number)	Waste paper collected (1) (kilograms)
2003	17,300	8.9	148,089	9,290
2004	18,810	9.7	97,700	12,360
<b>2005</b>	<b>15,789</b>	<b>7.7</b>	<b>78,407</b>	<b>21,733 (2)</b>

(1) Estimates based on data available for all the offices in Revenue Tower.

(2) In March and April 2005 the Sewage Services Branch moved office, which resulted in a vigorous weeding-out of obsolete forms, publications and other paper materials. Waste paper collection was also boosted by the addition of more recycling programmes in our branches and greater staff awareness of the need to recycle.

Recycled paper is in wide use in our offices. In 2005, 84% of the paper consumed was recycled paper, exceeding our target of 50%. We have also increased publicity on paper recycling and added more waste paper collection boxes in our offices.

#### [Office-based power consumption](#)

Our office air-conditioners are adjusted to 25.5 degrees Celsius in line with all Government offices. The quarterly Green Survey is also helping to promote better energy conservation practices, such as shutting off equipment when not in use.

We have had difficulty in monitoring consumption patterns due to the lack of individual electrical meters. Our Sewage Services Branch had an individual meter when it was located in Guardian House, but in July 2005 the branch moved to Western Magistracy Building where there is no individual meter.

#### [Staff Training](#)

DSD provides on-going training to staff to raise their environmental awareness and competency. In 2005 we conducted 21 training courses on energy saving, environmental compliance and special environmental topics.

## Facing Challenges

Addressing environmental impacts is an on-going process for DSD. Two areas where we face persistent challenges are odour control from sewage collection and treatment, and ecological impacts of flood control work. In both cases we are committed to improving our environmental performance while at the same time providing satisfactory sewage treatment and flood control.

### Odour Control

### Ecological Enhancement

### Odour Control

Stormwater drains and pumping stations can be potential sources of odours if not properly designed and operated. The stormwater drains are meant to carry rainwater but some people illegally discharge their sewage into them. The residue smells and the main solution is to physically remove it. This depends on our cleansing schedule as DSD maintains 2,478 km of drainage channels and stormwater drains. Some nullahs are being decked to reduce the odour nuisance to residents.

Odour from sewage collection is a growing concern. The quantity of sewage is increasing and the detention time in sewers before treatment is getting longer. More pumping stations are needed to deal with the load and some are unavoidably located near residential areas. It may create the source of odour and cause nuisance to residents.

Therefore, we make use of chemicals to control odour from this source.



*A calcium nitrate dosing system at Shatin Main Sewage Pumping Station.*

For example, at Shatin Sewage Treatment Works we are dosing calcium nitrate at the upstream sewage pumping station to prevent odours being generated at the inlet to the treatment works. To reduce costs and recycle waste materials, we have also placed wet tree bark along some channels of the Shatin STW to minimise odours.

### **Ecological Enhancement**

Over the past decade we have moved away from plain concrete channels for major flood control projects and tried to incorporate more environmentally friendly features. These include such things as grasscreting, using unlined channel beds to enable colonisation of flora and fauna, retaining meanders, and creating shallow ponds and wetland habitats. In 2005 DSD developed guidelines to enhance the ecological aspects of man-made flood channels, which are described in our Annual Report.

During the year we also continued our planting programme and our work on fishpond and wetland creation and restoration. From January 2004 to December 2005 we planted 6,993 trees and 286,120 shrubs. We also created or restored 15.9 hectares of fishponds and wetlands.



*This mature camphor tree (Cinnamomum parthenoxylon) was saved during drainage rehabilitation work at the Ping Yuen River. With the support of the Agriculture, Fisheries and Conservation Department and other maintenance parties, a special retaining structure was built at the channel embankment to protect and preserve the tree.*



## Stakeholder Relations

DSD appreciates the need to involve stakeholders and the community in our efforts to improve our environmental performance. In 2005 we invited green groups and academics to provide feedback on draft environmental guidelines for designing river channels. We also carried out a range of outreach and publicity programmes. Internally, we have put a lot of effort into improving environmental awareness among our staff, contractors and project designers.

Other highlights in 2005 included:



*The Chief Executive visited Smithfield Road and Sheung Wan after a flooding incident in June 2005.*

*The Secretary for the Environment, Transport and Works, Dr Sarah Liao visited Sham Tseng villages in January 2005 to inspect drainage and sewerage systems. She was accompanied by DSD officers.*





*Students visited to Hong Kong's first Flood Prevention Information Centre in San Tin.*

- The launch of the Outreach Education Programme to Secondary Schools.
- A publicity campaign on “Safer Living, Reducing Natural Disaster” which ran throughout 2005.
- An exhibition on “Science in Public Service”.

Further details of our engagement with stakeholders can be found in our Annual Report.

## Achievement of Environmental Targets

Targets/measures for 2005	Target Performance	Remarks
<b>A. Resource Conservation</b>		
A1. Energy efficiency in plants		
A1.1 To save 2.85 Million kWh in 2005 and achieve a treatment efficiency of 0.217 kWh/m <sup>3</sup> .	Target not met.	The overall treatment efficiency was 0.228 kWh/m <sup>3</sup> , exceeding the target by about 5%.
A1.2 To carry out 2 Energy Audits for sewage treatment facilities in each sub-division of ST1 and ST2 by end 2005.	Target met.	A total of 8 energy audits were carried out in ST1 & ST2 divisions.
A2 Energy Conservation in DSD offices		
A2.1 To achieve energy saving in building services, namely lighting, air conditioning, and use of office equipment and computers. To reduce power consumption to 95.5% of 2002 levels.	Target met.	Power consumption reduced to 94% of 2002 level.
A3 Paper Conservation		
A3.1 To reduce annual paper consumption in 2005 to 17,000 reams, i.e. 92.5 % of the 2002 level. To launch a quota system on paper procurement. To promote a paperless office.	Target met.	Paper consumption was 15,789 reams, which exceeded the target by 7%.
A4 Consumption of chemicals		
A.4.1 To be mindful of the escalating demand for chemicals for odour control, process modification and additional treatment plant, and limit the increase in chemical consumption to 6,370 tonnes over 2004 levels.	Target partially met.	The overall chemical consumption target was met, but sub-targets on polymer and activated carbon fell short by 7.7% and 2.2% respectively.

A5. Office supplies		
A5.1 To reduce consumption of whole ball pens by 30% over 2004 levels.	Target not met.	We aim to meet the target by the end of 2006.
<b>B. Waste Reduction</b>		
B1 Reduce waste requiring disposal		
B1.1 To reduce waste by strengthening existing waste paper recycling and used toner cartridge recycling. To launch quarterly checks in our offices.	Target met.	The findings of our quarterly Green Surveys show that the number of irregularities in waste recycling is decreasing.
<b>C. Waste Recovery</b>		
C1 Fill gaps in waste recovery		
C1.1 To extend the collection of waste paper and used printer cartridges for recycling to all outlying offices by June 2005.	Target met.	A recycling service for waste paper and toner cartridges has been arranged for all outlying offices.
<b>D. Minimising Impacts on the Environment</b>		
D1 Compliance		
D1.1 To achieve full compliance with the legal environmental requirements at our sewage treatment works and sewer and land drainage systems.	Target not met.	There were 12 non-compliance cases.
D1.2 To closely supervise our work sites aiming for full compliance with both legal and contractual requirements.	Target not met.	There was one environmental related conviction in 2005.

D2 Green Procurement		
D2.1 To ensure recycled paper comprises 50% of DSD's total printing paper consumption. To print newsletters and our annual report on recycled paper.	Target met.	84% of paper consumed was recycled paper.
<b>E. Staff Development</b>		
E1 Raising environmental awareness and competency		
E1.1 To co-ordinate 6 training events on energy saving, environmental compliance knowledge and environmental special topics in 2005.	Target met.	A total of 21 training courses were conducted.
<b>F. Environmental improvement</b>		
F1 Ecological enhancement		
F1.1 Beginning from 2004, to plant a cumulative total of 11,300 trees and 214,000 shrubs.	Target partially met.	A cumulative total of 6,993 trees have been planted (38% below the sub-target). A cumulative total of 286,120 shrubs have been planted (34% above the sub-target).
F1.2 Beginning from 2004, to create/restore a total of 15.4 ha of wetland/fishponds.	Target met.	15.9 ha of wetland/fishponds have been created/restored.



# Environmental Targets for 2006

16 targets have been set for 2006, including 6 new ones (marked with an asterisk \*).

## A. Resource Conservation

### A1 Energy Efficiency in Plants

A1.1 To save 2.1 million kWh of energy in 2006

A1.2 To carry out 2 energy audits for sewage treatment facilities in each sub-division

### A2 Energy Conservation in DSD Offices

A.2.1\* To install timers on 50% of all share-use network printers to save energy and to meet the demand for printing after normal working hours

A.2.2\* To reduce the number of energy conservation non-compliances reported in Green Surveys to 90% of 2005 levels

### A3 Paper Conservation

A3.1 To reduce annual paper consumption to 16,540 reams, i.e. 90% of 2002 levels

### A4 Consumption of Chemicals

A4.1\* To audit chemical consumption in each division to identify areas for further saving

### A5 Office supplies

A5.1 To reduce consumption of whole ball pens by 30% over 2004 levels

## B. Waste Reduction & Recovery

B1.1\* To recycle 70% of printer cartridges consumed in all DSD offices

B1.2\* To recycle 70% of rechargeable batteries consumed in plants

## C. Minimising Impacts on the Environment

### C1 Green Procurement

C1.1 To use recycled paper for up to 70% of DSD's total printing paper consumption

### C2 Compliance

C2.1 To aim at achieving full compliance with legal environmental requirements at our sewage treatment works and sewer and land drainage systems

C2.2 To closely supervise our construction sites aiming at full compliance with legal requirements

## D. Staff Development

D1.1 To organise 6 environmental training events to raise staff's environmental awareness and competency

## E. Environmental Improvement

E1.1 To plant a cumulative total of 35,000 trees and 680,000 shrubs from 2004

E1.2 To create/restore a cumulative total of 38 ha of wetland/fish ponds from 2004

## F. Development of ISO 14001 Environmental Management System

F1.1\* To commence the establishment of Environmental Management Systems for the whole Department in 2006, aiming for ISO 14001:2004 certification in 2007