渠務署
Drainage Services Department

Drainage Services Department in Brief 2015 -16

Contents

1. Our Vision, Mission and Values

Vision

To provide world-class wastewater and stormwater drainage services enabling the sustainable development of Hong Kong.

Mission

- Improving drainage services in a cost-effective and environmentally responsible manner
- Enhancing a caring, harmonious, safe and healthy work environment that fosters staff development and a mindset for change
- Strengthening relationships with community, industry and worldwide counterparts

Values

- Customer Satisfaction
- Quality
- Commitment
- Teamwork

2. Organization

2.1 Organization Chart

DSD HEADQUARTERS

Director of Drainage Services

Deputy Director of Drainage Services

- **Assistant Director / Projects and Development**
  - **Projects and Development Branch**
    - Sewerage Projects Division
    - Drainage Projects Division
    - Consultants Management Division
    - Project Management Division
- **Assistant Director / Operations and Maintenance**
  - **Operations and Maintenance Branch**
    - Hong Kong and Islands Division
    - Mainland South Division
    - Mainland North Division
    - Land Drainage Division
- **Assistant Director / Electrical and Mechanical**
  - **Electrical and Mechanical Branch**
    - Sewage Treatment Division 1
    - Sewage Treatment Division 2
    - Electrical and Mechanical Projects Division
- **Assistant Director / Sewage Services**
  - **Sewage Services Branch**
    - Harbour Area Treatment Scheme Division
    - Customer Services and Asset Management Section
    - Operation Section
    - Sewage Revenue Section

2.2 Staff Establishment

Directorate		18
Professional		309
Engineer	241	
Electrical & Mechanical Engineer	45	
Electronics Engineer	2	
Shift Charge Engineer	2	
Quantity Surveyor	1	
Land Surveyor	2	
Landscape Architect	2	
Environmental Protection Officer	2	
Chemist	12	
Technical & Site Supervisory		865
General & Common Grades		526
Model Scale I		195
	Total	**1,913***

*** There is one staff seconded to other department**

3. Financial Data

3.1 Operating Expenditure

(in $M)

Recurrent Expenditure	2013-14	2014-15	2015-16
Personal Emoluments	793.5	839.8	882.3
Personnel Related	16.5	21.5	26.8
Departmental Expenses	1,162.4	1,264.9	1,461.0
Total	1,972.4	2,126.2	2,370.1

3.2 Sewage Services Operating Cost Recovery Rate (1&2)

	2013-14	2014-15	2015-16 (3)
Revenue of Sewage Charge and Trade Effluent Surcharge ($M)	1,097	1,182	1,280
Expenditure (excluding depreciation) of Sewage Charge and Trade Effluent Surcharge ($M)	1,550	1,715	1,881
Operating Cost Recovery Rate (%)	70.8	68.9	68.0

Notes:

1. "Miscellaneous Services" are excluded from the revenues and expenditures in the above table
2. Depreciation is not recovered through the Sewage Charge and Trade Effluent Surcharge at present
3. The 2015-16 figures are provisional and subject to endorsement by the Sewage Services Accounts Committee

3.3 Sewage Charge

Number of Accounts

(in thousand, as at Dec of each year)

	2013	2014	2015
Sewage Charge Account	2,639	2,658	2,684
Trade Effluent Surcharge (TES) Account	23	24	25

27 Categories of TES trade

- Yarn sizing
- Bleaching and dyeing of knitted fabric
- Knit outerwear
- Spinning cotton
- Medicines
- Basic industrial chemicals
- Pulp, paper and paperboard
- Breweries and manufacture of malt liquor
- Cocoa, chocolate and sugar confectionery
- Bakery products
- Vegetable oil, peanut oil, peppermint oil and aniseed oil
- Canning and preserving fruit and vegetables
- Slaughtering, preparing and preserving meat
- Restaurants
- Washing new garments, excluding laundries
- Bleaching and dyeing of woven fabric
- Wearing apparel other than knit outerwear
- Soap and cleaning preparations, perfumes, cosmetics
- Paints, varnishes and lacquers
- Tanneries and leather finishing
- Soft drinks and carbonated waters industries
- Distilling, rectifying and blending spirits
- Vermicelli, noodles, and similar farinaceous products
- Grain mill products
- Canning, preserving and processing of fish and crustaceans
- Dairy products
- Soy and other sauces

Sewage Charge

Effective Period	Sewage Charge ($/m^3 of water supplied)
1.4.1995 – 31.3.2008	1.20
1.4.2008 – 31.3.2009	1.31
1.4.2009 – 31.3.2010	1.43
1.4.2010 – 31.3.2011	1.57
1.4.2011 – 31.3.2012	1.71
1.4.2012 – 31.3.2013	1.87
1.4.2013 – 31.3.2014	2.05
1.4.2014 – 31.3.2015	2.24
1.4.2015 – 31.3.2016	2.44
1.4.2016 – 31.3.2017	2.67
From 1.4.2017 onwards	2.92

3.4 Capital Works Projects

Projects in hand	Sewage Treatment		Flood Prevention		Total	
	No.	Cost ($B)	No.	Cost ($B)	No.	Cost ($B)
Cat. A [(1)]	21	6.54	4	4.51	25	11.05
Cat. B [(2)]	50	57.84	11	7.73	61	65.57
Total	71	64.38	15	12.24	86	76.62

Notes:

1. All Cat. A projects with works/consultancies in progress are given in Money-of-the-Day price
2. All Cat. B projects are given in Sept 2015 price level

4. Work Overview

4.1 Sewage Treatment

Sewage treatment services include operation and maintenance of sewage treatment facilities, upgrading the existing sewerage infrastructures and building new facilities.

Sewerage Master Plan Studies

The regional sewerage infrastructures are mainly proposed under the 16 Sewerage Master Plans (SMPs) and the subsequent 8 SMP Reviews.

Kowloon City No.1 Sewage Pumping Station

Harbour Area Treatment Scheme

Harbour Area Treatment Scheme (HATS) is one of the most important infrastructure projects undertaken by the Government to improve the water quality of Victoria Harbour, and thus enhancing the sustainable development of Hong Kong.

Stonecutters Island Sewage Treatment Works

Harbour Area Treatment Scheme Stage 1

Project Scope:

- Construction of Stonecutters Island Sewage Treatment Works (SCISTW) at a footprint of about 10 hectares and a design treatment capacity of 1.7 million m^3 per day
- Construction of about 23 km long deep tunnel to convey the sewage from Kowloon and the north-eastern part of Hong Kong Island to SCISTW for chemical enhanced primary treatment (CEPT)
- Upgrading of 7 existing Preliminary Treatment Works (PTW) in Tsing Yi, Kwai Chung, To Kwa Wan, Kwun Tong, Tseung Kwan O, Shau Kei Wan and Chai Wan

Commissioning Date: December 2001

Project Cost: About $8.2 B

Information of Sewage Conveyance Tunnel

Tunnel Drive	Length (km)	Diameter (m)	Level (mPD)
Chai Wan to Shau Kei Wan	2.3	1.20	-126 to -121
Shau Kei Wan to Kwun Tung	2.5	1.35	-121 to -76
Tseung Kwan O to Kwun Tong	5.3	1.35 (twin pipes)	-87 to -67
Kwun Tong to To Kwa Wan	3.3	2.82	-143 to -136
To Kwan Wan to Stonecutters Island	5.5	3.54	-136 to -125
Kwai Chung to Tsing Yi	0.8	2.21	-143 to -132
Tsing Yi to Stonecutters Island	3.6	2.36	-132 to -125

Harbour Area Treatment Scheme Stage 2A

Project Scope:

- Construction of about 21 km long deep tunnel to convey the sewage from the northern and south-western parts of Hong Kong Island to SCISTW for CEPT
- Upgrading of 8 existing PTWs in North Point, Wan Chai East, Central, Sandy Bay, Cyber Port, Wah Fu, Aberdeen and Ap Lei Chau
- Enhancing the design treatment capacity of SCISTW to 2.45 million m^3 per day and the addition of disinfection facilities

Commissioning Date: December 2015
Project Cost: About $17.5 B

Information of Sewage Conveyance Tunnel

Tunnel Drive	Length (km)	Size	Level (mPD)
North Point to Stonecutters Island	12	• 7.5-km-long Twin oval tunnels of cross-sectional area 1.7 to 5.6 m^2 each • 4.5-km-long Single circular tunnel of cross-sectional area 7.1 m^2	-163 to -148
Aberdeen to Sai Ying Pun	7.5	Twin oval tunnels of cross-sectional area 1.5 to 2.1 m^2	-123 to -80
Ap Lei Chau to Aberdeen	1.3	Twin circular tunnels of cross-sectional area 0.28 m^2	-100 to 0

Harbour Area Treatment Scheme Stage 2B

HATS Stage 2B involves construction of biological sewage treatment facilities on Stonecutters Island for all HATS flow. It is kept under review taking into account the water quality situation and the latest technological development in biological treatment.

Upgrading of San Wai Sewage Treatment Works

Project Scope:

- Design and construction of CEPT facilities and disinfection facilities in order to upgrade the treatment level of San Wai Sewage Treatment Works
- Uplifting the treatment capacity to 200,000 m^3 per day
- Design and construction of an administration building, a maintenance workshop and access roads
- Landscaping works

Project Progress:

The Design, Build and Operate Contract's tendering exercise is in progress

Project Cost: About $2.57 B (Design and Construction cost, in September 2015 price level)

Anticipated Commencement Date: mid 2016

Anticipated Completion Date: end 2020

Relocation of Sha Tin Sewage Treatment Works to Caverns

Project Scope:

Relocating Sha Tin Sewage Treatment Works (STSTW) to caverns to be constructed in Nui Po Shan across Shing Mun River to release the existing site for beneficial uses.

Project Progress:

Environmental impact assessment has been substantially completed. Ground investigation works and design are in progress, scheduled for completion in phases starting from 2017. Construction will commence progressively afterwards.

Project Estimate:

About $640 million (Investigation and Design cost)
About $25 billion (Construction cost, in September 2015 price level)

Information of Existing STSTW

Footprint: About 28 hectares
Design Treatment Capacity: 340,000 m^3 /day

Sha Tin Sewage Treatment Works

Relocation of Sai Kung Sewage Treatment Works to Caverns (Feasibility Study)

Study Scope:
Including preliminary technical and impact assessments, preparation of outline design, formulation of implementation strategies and programmes as well as carrying out public engagement and consultation activities.

Study Progress:
Anticipated to be completed in 2016 to 2017

Project Estimate:
About $40 M

Information of Existing Sai Kung Sewage Treatment Works

Footprint: About 2.2 hectares
Design Treatment Capacity: 8,000 m^3 /day

Relocation of Sham Tseng Sewage Treatment Works to Caverns (Feasibility Study)

Study Scope:
Including preliminary technical and impact assessments, preparation of outline design, formulation of implementation strategies and programmes as well as carrying out public engagement and consultation activities.

Study Progress:
Anticipated to be completed in 2016 to 2017

Project Estimate:
About $40 M

Information of Existing Sham Tseng Sewage Treatment Works

Footprint: About 1.1 hectares
Design Treatment Capacity: 17,000 m^3 /day

4.2 Flood Prevention

Stormwater drainage services include implementation of flood prevention works and operation and maintenance of stormwater drains and associated facilities.

Drainage Master Plan Studies

DSD has completed 8 Stormwater Drainage Master Plan (DMP) Studies and 3 Drainage Studies. Since 2008, DSD has commenced a series of DMP Review Studies, which are summarized as follows:

Study Area		Status
1	Yuen Long	Completed in 2011
2	North District	
3	Happy Valley	
4	West Kowloon	Completed in 2015
5	East Kowloon	
6	Tai Po	In progress, anticipated to complete in 2016
7	Sha Tin and Sai Kung	
8	North Hong Kong Island	In progress, anticipated to complete in 2017
9	Lantau and Outlying Islands	In progress, anticipated to complete in 2019
10	Tuen Mun, Tsuen Wan and Kwai Tsing	Under planning
11	Tseung Kwan O	
12	South Hong Kong Island	

Elimination of Flooding Blackspots

Since 1995, DSD has eliminated 123 flooding blackspots. There remain 8 flooding blackspots in Hong Kong. The drainage improvement works for 3 of them have been commissioned and their effectiveness is being monitored. Subject to satisfactory performance, these 3 flooding blackspots will be eliminated in due course. The improvement works for 1 flooding blackspot is in progress. For the other 4 flooding blackspots, the first-stage improvement works have been commissioned while the next stage improvement works are under planning and design.

Flooding Blackspots removed in early 2016

- Ping Kong, North District
- Nam Wa Po, Tai Po

Information of the 8 Remaining Flooding Blackspots

Location	Situation
• Ting Kok Road – Shuen Wan Chim Uk to Wong Yue Tan, Tai Po • Tung Tsz Road, Tai Po • Wong Chuk Hang Road J/O Nam Long Shan Road, Southern	Improvement works commissioned and the effectiveness is being monitored
• Morrison Hill Road J/O Lap Tak Lane, Wan Chai	Improvement works are under construction
• Lam Tsuen Valley Basin, Tai Po • Shek Wu Wai, San Tin, Yuen Long • Chatham Road South between Granville Road and Austin Avenue, Yau Tsim Mong • Pok Fu Lam Village, Southern	First stage of improvement works have been commissioned and works for next stage are under planning and design

Flood Prevention Works

Our flood prevention works are summarized as follows:

	Completed	Under planning / design / construction
River Training	About 102 km	About 15 km
Drainage Improvement	About 93 km	About 23 km
Total Project Cost	About $25.1 B	About $12.2 B

Completed Lam Tsuen River

Drainage Tunnels

	Kai Tak Transfer Scheme	Hong Kong West Drainage Tunnel	Lai Chi Kok Drainage Tunnel	Tsuen Wan Drainage Tunnel
Project Cost	About $380 M	About $3.38 B	About $1.67 B	About $1.49 B
Commissioning Date	Dec 2004	Aug 2012	Oct 2012	Mar 2013
Length	1.5 km	10.5 km	3.7 km	5.1 km
Diameter	4.4 m	6.25 m to 7.25 m	4.9 m	6.5 m
Other Features	—	• 34 intake structures • Outfall at Cyberport	• 6 intake structures • 1 stilling basin • Outfall at Stonecutters Island	• 3 intake structures • Outfall at Yau Kom Tau

Stormwater Storage Schemes

	Tai Hang Tung Stormwater Storage Scheme	Sheung Wan Stormwater Storage Scheme	Happy Valley Underground Stormwater Storage Scheme
Project Cost	About $290 M	About $200 M	About $1.07 B
Commissioning Date	2004	2009	Phase 1: Mar 2015 Phase 2: 2017 (anticipated)
Capacity	100,000 m^3	9,380 m^3	Phase 1: 30,000 m^3 Phase 2: 30,000 m^3
Design Pumping Capacity	1.9 m^3/s	6.0 m^3/s	1.5 m^3/s
Plan Area	17,680 m^2	1,580 m^2	24,000 m^2
Average Internal Depth	7.5 m	5.9 m	3 m
Other Features	240 m long overflow weir in total	—	15 nos. of 3 m long movable overflow weir

Improvement Works of Kai Tak River

	Upstream Section	Midstream Section
Project Scope	• Reconstruction and rehabilitation of a section of Kai Tak River of about 600 m long from Po Kong Village Road to Tung Kwong Road • Construction of a box culvert of about 400 m long alongside the Kai Tak River from Wong Tai Sin Police Station to Tung Tai Lane	• Reconstruction and rehabilitation of a section of Kai Tak River of about 500 m long from Tung Kwong Road to Prince Edward Road East
Commencement Date	October 2011	December 2013
Anticipated Completion Date	Part of the works have been commissioned, the remaining works are anticipated to be completed in phases before end 2017	End 2017
Project Cost	About $1.60 B	About $1.24 B

Notes: The construction and upgrading of a downstream section of Kai Tak River of 1.3 km long, being undertaken by CEDD, commenced in January 2013 and is anticipated to be completed in phases from 2016 to 2018 at a project cost of about $2.6 B

Illustration of the completed Kai Tak River

Village Flood Protection Schemes

27 nos. of Village Flood Protection Schemes in operation

District	Village	District	Village
Yuen Long	Kau Hui (Nam Pin Wai)	Kam Tin	Sha Po Tsuen
	Ma Tin Tsuen	Ngau Tam Mei	Po Wai
	Shui Pin Wai		Chuk Yuen Tsuen/ Ha San Wai
	Wang Chau Village	San Tin	Chau Tau
	Shui Pin Tsuen		Mai Po Lo Wai/ Mai Po San Tsuen
	Tai Kiu		San Tin
Tin Shui Wai	Lo Uk Tsuen	Sheung Shui	Sheung Shui Tsuen
	Sik Kong Tsuen		Tai Tau Leng/ Tsung Pak Long
	Sik Kong Wai	Sha Tin	Tsang Tai Uk
	Kiu Tau Wai		Fo Tan
	Ha Mei San Tsuen	Tai Po	Shui Wai
	Sheung Cheung Wai	Tuen Mun	Tsing Chung Koon
	Fung Shui Lane	Lantau Island	Tai O Wing On Street
			Tai O Tai Ping Street

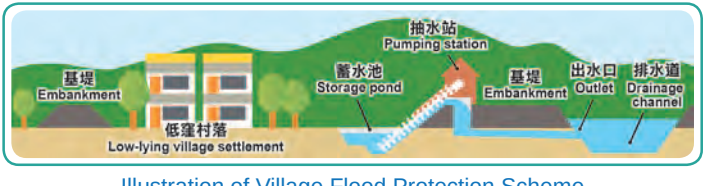

Illustration of Village Flood Protection Scheme

Shenzen River Regulation Project

	Stage I to Stage III	Stage IV
Project Scope	Straightening the Lok Ma Chau bend and the Liu Pok bend, widening and deepening the remaining sectors from Liu Pok bend to the estuary and the section upstream of the Liu Pok bend to the confluence with Ping Yuen River (about 13.5km in total)	Improving the section of Shenzen River between Ping Yuen River and Pak Fu Shan (about 4.5 km) and constructing a flood retention lake of 80,000 m^3
Commencement Date	1997 to 2006	2017 (Anticipated)
Project Cost	About $1.8 B	About $1.0 B

Revitalization of Tsui Ping River

Project Scope:

- Revitalising the existing 1km long nullah alongside King Yip Street, King Yip Lane and Tsui Ping Road into Tsui Ping River with environmental, ecological and landscape upgrading
- Beautifying the adjoining walkways, enhancing connectivity and walkability by means of provision of walkways and landscaped decks beside the river to match with the project theme

Project Progress:

Investigation works commenced in July 2015, targeting for completion in 2017

Project Estimate:

About $1.6 B (Construction cost, in September 2015 price level)

Revitalising Water Bodies
The way forward

- Revitalising water bodies, saving energy and reducing emissions, achieving sustainable development
  - Promoting water-friendly culture and activities
  - Creating green habitats, providing more urban open space, mitigating heat island effect, coping with climate change
  - Adopting highly efficient and space-saving sewage treatment technologies
  - Better utilising caverns to release land resources
  - Increasing the use of reclaimed water and renewable energy
  - Making reference to the concept of "Sponge City" - following the nature with flexibility

IIlustration of the concept of "Sponge City"

5. Useful Data

(as at December 2015)

Sewerage System

• Sewers	1,727km
• Sewage tunnels	42 km

Stormwater Drainage System

• Stormwater drains	2,385 km
• Engineered channels	361km
• Drainage tunnels	21 km
	4,536 km

Staff of DSD Direct Labour Force cleansing the drains

Facilities

Preliminary Treatment Works	21
Primary Treatment Works	2
Chemically Enhanced Primary Treatment (CEPT) Works	4
Major Secondary Treatment Works	6
Minor Secondary Treatment Works	36
Tertiary Treatment Works	1
Total nos. of Sewage Treatment Works	70
Sewage Pumping Stations	230
Stormwater Pumping Stations	36
Total nos. of facilities	336

Volume of Sewage Treated

(in million m^3)

	2013-14	2014-15	2015-16
By Preliminary Treatment	303	228	138
By Primary Treatment	5	5	5
By CEPT	541	606	690
By Secondary Treatment	172	172	174
Total	1,021	1,011	1,007

Notes:

1. Sewerage network in Hong Kong is currently serving 93% of the population
2. The volume of sewage treated by tertiary treatment in 2015-16 is about 0.14 million m^3
3. Daily quantity of sludge generated in 2015-16 is about 1,048 tonnes

Design Treatment Capacity of Major Sewage Treatment Works

Major Sewage Treatment Works	Design Treatment Capacity (m^3/day)
Preliminary Treatment Works	
North West Kowloon Preliminary Treatment Works	406,080
Kwun Tong Preliminary Treatment Works	333,000
Primary Treatment Works	
Cheung Chau Sewage Treatment Works	4,000
Tai O Imhoff Tank	1,200
CEPT Works	
Stonecutters Island Sewage Treatment Works	2,450,000
Pillar Point Sewage Treatment Works	241,000
Siu Ho Wan Sewage Treatment Works	180,000
Secondary Treatment Works	
Sha Tin Sewage Treatment Works	340,000
Tai Po Sewage Treatment Works	100,000
Shek Wu Hui Sewage Treatment Works	93,000
Yuen Long Sewage Treatment Plant	70,000
Stanley Sewage Treatment Works	11,600
Sai Kung Treatment Works	8,000
Tertiary Treatment Work	
Ngong Ping Sewage Treatment Works	2,000

Design Pumping Capacity of Major Pumping Stations

Major Pumping Stations	Design Pumping Capacity (m^3/s)
Sewage Pumping Stations	
Stonecutters Island Main Pumping Station	31.3
Cheung Sha Wan Sewage Pumping Station	14.7
Stormwater Pumping Stations	
San Tin Stormwater Pumping Station	8.0
Chuk Yuen Stormwater Pumping Station	8.0

Application of Renewable Energy

Renewable Energy Systems	Generating Capacity (kW)		
	2013-14	2014-15	2015-16
Combined Heat and Power Generators	3,650	3,650	3,650
Solar Systems	173	179	369 (1)
Dual Fuel Engines	4,400	4,400	4,400
Biogas Boilers	3,793	3,793	3,793
Total	**12,016**	**12,022**	**12,212**

Note:

1. Total generating capacity of solar system increases from 179kW in 2014-15 to 369kW in 2015-16 (i.e. with addition of new 4kW panel at Shatin STW, 11kW panel at Shek Wu Hui STW and 175kW panel at Siu Ho Wan STW)

Rainfall Record in Hong Kong

According to the Statistics of Special Weather Events in the website of Hong Kong Observatory:

Highest Hourly Rainfall	145.5mm	7 Jun 2008
Highest Daily Total Rainfall	534.1mm	19 Jul 1926
Highest Annual Total Rainfall	3343.0mm	Year 1997

Combined heat and power generator at STSTW

6. Public Education

Students or relevant organizations are welcome to visit our sewage treatment and flood prevention facilities through prior application. Please visit the following website for more information:

http://www.dsd.gov.hk/EN/Service_Enquiries/Visit_to_DSD_Facilities/index.html

7. Contact Us

Drainage Hotline:
2300 1110

Sewage Charges Customer Services Enquiries:
2834 9432

General Enquiries:
2877 0660

Website:
http://www.dsd.gov.hk

E-mail:
enquiry@dsd.gov.hk

渠務署
Drainage Services Department

Drainage Services Department in Brief 2015 -16

31/3/2016