

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 704 - DRAINAGE

Environmental Protection - Sewerage and sewage treatment 209DS - Outlying Islands sewerage, stage 1, phase 1 - consultants' fees and investigations

Members are invited to recommend to Finance Committee to increase the approved project estimate of **209DS** from \$32.0 million by \$12.6 million to \$44.6 million in money-of-the-day prices.

PROBLEM

The original proposal for the Ngong Ping sewerage scheme is not compatible with the latest planning intention of the area and cannot cater for the anticipated increase in sewage demand. Impact assessments, investigation and design work will need to be conducted for the revised proposal. The approved project estimate (APE) of **209DS** is insufficient to cover the cost of undertaking these tasks.

PROPOSAL

2. The Director of Drainage Services (D of DS), with the support of the Secretary for the Environment and Food, proposes to increase the APE of **209DS** from \$32.0 million by \$12.6 million to \$44.6 million in money-of-the-day (MOD) prices to cover the costs of impact assessments, investigation and design work for the revised Ngong Ping sewerage scheme.

/PROJECT

PROJECT SCOPE AND NATURE

3. In October 1995, we included **208DS** “Outlying Islands sewerage, stage 1, phase 1” in Category B of the Public Works Programme (PWP). The original scope of **208DS** consists of the following sewerage improvement works -

- (a) construction of sewers and a sewage treatment plant (STP) at Ngong Ping on Lantau Island;
- (b) upgrading of the existing preliminary STP at Siu Ho Wan on Lantau Island to include chemical treatment¹;
- (c) construction of a pumping station at Peng Chau and a submarine pipeline from Peng Chau to Discovery Bay;
- (d) construction of a STP and a submarine outfall at Yung Shue Wan on Lamma Island;
- (e) construction of a new submarine outfall at Cheung Chau; and
- (f) upgrading of sewage sludge dewatering facilities for the existing STPs at Cheung Chau and Mui Wo.

A location plan showing the proposed works is at Enclosure 1.

4. In April 1996, we upgraded part of **208DS** to Category A as **209DS** with an APE of \$24.0 million in MOD prices. The original scope of **209DS** comprises -

- (a) site investigations at the six locations mentioned in paragraph 3 above;
- (b) environmental impact assessments and preliminary designs at these six locations; and
- (c) detailed design (including preparation of tender documents and assessment of tenders) for the sewerage improvement works at Ngong Ping and Siu Ho Wan.

/5.

¹ Chemicals are added during the chemical treatment process to enhance the removal of suspended solids and pollutants with oxygen demand.

5. In April 1999, the Secretary for the Treasury, acting under delegated authority, extended the scope of **209DS** and increased the APE of **209DS** from \$24.0 million by \$8.0 million² to \$32.0 million in MOD prices to cover -

- (a) additional site investigations, an environmental impact assessment and detailed design for the construction of ultra-violet disinfection facilities at Siu Ho Wan STP; and
- (b) additional site investigations and detailed design for the slope stabilisation works at Yung Shue Wan STP.

6. We propose to further increase the APE of **209DS** to cover an environmental impact assessment, a traffic impact assessment, investigation and design work for a revised Ngong Ping sewerage scheme described in paragraphs 8-9 below. We will commence these tasks for the revised Ngong Ping sewerage scheme in October 2001 for completion in October 2005³.

JUSTIFICATION

7. At present, there are no public sewage collection, treatment and disposal facilities in Ngong Ping. In December 1994, a plan for constructing sewers and a STP at Ngong Ping was formulated under the Outlying Islands Sewerage Master Plan. The impact assessments and investigation work for the Ngong Ping STP commenced in May 1996 and were completed in early 1998. Under the original scheme, the STP will provide treatment for sewage generated by an estimated number of 12 000 visitors per day and 500 residents in Ngong Ping.

8. To increase the range of attractions to enhance Hong Kong's position as the leading tourist destination in Asia, the Administration started to plan for a cable car system linking Tung Chung and Ngong Ping in early 1998. Proceeding with the cable car system requires the following changes to the original design of the Ngong Ping STP -

/(a)

² Secretary for the Treasury has the delegated authority to approve minor variations in scope and to increase the APE of PWP projects by up to \$15 million.

³ Since the Ngong Ping village sewerage scheme would need to go through statutory and land resumption process, the design work can only be finished after these procedures have been completed.

- (a) the treatment capacity of the STP will need to be increased since the proposed cable car system is expected to bring more visitors to Ngong Ping upon its planned commissioning in 2006; and
- (b) the STP will need to be relocated to a new site since the originally proposed location will be incompatible with future land use as it will be in close proximity with core tourist activities around the proposed cable car terminus.

9. Taking into consideration the proposed cable car system and latest developments, the Environmental Protection Department (EPD) conducted a review of the Ngong Ping sewerage scheme in February 1999. We subsequently concluded that the treatment capacity of the STP should be increased to cater for around 49 000 visitors⁴ and that the STP should be relocated from the core tourist and commercial activities at Ngong Ping. The STP will provide tertiary level sewage treatment⁵ with disinfection as originally proposed. However, to protect water quality within the water gathering grounds for Shek Pik Reservoir, the treated effluent from the STP will be conveyed by the proposed fully enclosed pipeline on Ngong Ping Road and Tai O Road to Tai O for disposal to marine waters via an existing culvert⁶. We will also provide a sewerage system in Ngong Ping to collect the sewage generated from the existing and future developments. A location plan showing the original and the revised Ngong Ping sewerage scheme is at Enclosure 2.

10. Since the revised scheme deviates from the original one, we need to seek additional funding to carry out impact assessments, investigation and design work for the revised scheme. Owing to the lack of in-house staff resources and expertise, D of DS proposes to employ consultants to carry out these tasks for the revised Ngong Ping sewerage scheme.

/11.

⁴ The estimate was based on the latest tourist forecasts released by the Hong Kong Tourist Association in February 2001 and the projection methodology given in the Tung Chung Cable Car Feasibility Study Final Report completed by the Mass Transit Railway Corporation in March 1999.

⁵ Under tertiary treatment, sewage is further treated by physical, chemical, biological or a combination of these processes to further reduce the level of Biochemical Oxygen Demand, suspended solids and/or nutrients to protect sensitive receiving waters.

⁶ In arriving at this proposal, EPD had examined the feasibility of other export routes and effluent discharge locations. These included connecting the export pipeline to the sewerage system at Tung Chung and discharging the effluent to the marine waters at Sham Wat Bay. The first option, however, is ruled out because of its adverse environmental impact on environmentally and ecologically sensitive areas within the Country Park areas. The latter option is also not acceptable due to its significant impacts on the existing diverse ecology in Sham Wat, which is a designated archaeological site and is rich in marine and terrestrial habitats.

11. Following a review of the financial position of the project, we consider it necessary to increase the APE of **209DS** from \$32.0 million by \$12.6 million to \$44.6 million in MOD prices in order to cover impact assessments, investigation and design work for the revised Ngong Ping sewerage scheme. A summary of the proposed increase is as follows -

Factor	Increase/ (Decrease) in MOD prices (\$million)	%
(a) Site investigation and surveys	4.3	34.1
(b) Consultants' fees	8.1	64.3
(i) supervision of site investigation	0.6	
(ii) impact assessments	2.5	
(iii) review and design	4.1	
(iv) preparation of tender documents and assessment of tenders	0.9	
(c) Saving due to the deletion of the consultants' fees of Ngong Ping sewerage scheme ⁷	(0.7)	(5.5)
(d) Contingencies	0.9	7.1
Total	12.6	(in MOD prices) 100.0
	12.6	100.0

12. A comparison of the cost breakdowns of the APE and the revised project estimate is at Enclosure 3. A breakdown of the estimates for consultants' fees is at Enclosure 4.

/FINANCIAL

⁷ The saving arises from the reduction of consultancy fees due to termination of the remaining consultancy services for the original Ngong Ping sewerage scheme.

FINANCIAL IMPLICATIONS

13. Subject to approval, we will phase the expenditure as follows -

Year	\$ million (Sept 2000)	Price adjustment factor	\$ million (MOD)
Up to 31 March 2001	22.2 ⁸	1.00000	22.2
2001 - 2002	3.3	0.98000	3.2
2002 - 2003	8.8	0.97976	8.6
2003 - 2004	8.6	0.98759	8.5
2004 - 2005	1.2	0.99549	1.2
2005 - 2006	0.9	1.00346	0.9
	45.0		44.6

14. We have derived the MOD estimates on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2001 to 2006.

15. As the original Ngong Ping sewerage scheme has changed, the findings from the existing consultancy on the impact assessments, investigation and design work on the original Ngong Ping sewerage scheme are no longer applicable. When the Administration started to plan for the cable car system in early 1998, the site investigation, environmental impact assessment and preliminary design had just been completed. From then, all works under the original scheme have been suspended accordingly⁹. So far, \$0.9 million and \$0.2 million have been spent on site investigation and preliminary design/environmental impact assessment respectively for the original scheme. We will employ a consultant through tendering to carry out the proposed works for the revised Ngong Ping sewerage scheme. We will also tender this consultancy as a lump sum contract with provision for price adjustment because the consultancy agreement will exceed 12 months.

/16.

⁸ This is the actual expenditure up to 31 March 2001.

⁹ The termination of the remaining consultancy services for the original Ngong Ping sewerage scheme has resulted in a saving of \$0.7 million.

16. The consultant will in turn appoint contractors for the site investigations and survey works on a re-measurement basis by competitive tendering process. The consultants will supervise the site investigations and survey works.

17. The proposed increase in the APE will not give rise to additional recurrent expenditure.

PUBLIC CONSULTATION

18. We presented the Outlying Islands sewerage stage 1, phase 1 works, including the original Ngong Ping sewerage scheme, to the former Islands District Board on 24 April 1995. The Board supported the implementation of the works. We also presented the revised Ngong Ping sewerage scheme to the Islands District Council on 22 May 2000. The Council supported the revised scheme.

19. We consulted the Legislative Council Panel on Environmental Affairs on the proposal on 8 May 2001. Members raised no objection to the proposal and noted our intention to submit the proposal to the Public Works Subcommittee for consideration in May 2001. At the meeting, Members requested the Administration to provide the following supplementary information –

- (a) the 16 Sewerage Master Plans (SMP) developed by the Administration and their implementation;
- (b) details of the Outlying Islands SMP and its implementation; and
- (c) the Administration's plan to deal with the sewage at Tai O, including that arising from the stilt house areas.

The required information was set out in an information note which was issued to Members of the Legislative Council Panel on Environmental Affairs on 22 May 2001. A copy of the Note is attached at Enclosure 5.

ENVIRONMENTAL IMPLICATIONS

20. The proposed impact assessments and design of the revised Ngong Ping sewerage scheme will not give rise to any adverse environmental implications.

21. The Ngong Ping sewerage scheme is a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO). An environmental permit is required for the project. We will submit an environmental impact assessment (EIA) report to the Director of Environmental Protection in accordance with the requirements under the EIAO, the Technical Memorandum on the EIA process and the study brief.

22. The proposed site investigations of the revised Ngong Ping sewerage scheme will not give rise to any adverse environmental implications as we shall control short-term impacts within established standards and guidelines through the implementation of mitigation measures such as the use of silenced construction plant to reduce noise generation and water-spraying to reduce emission of fugitive dust in the site investigation contracts.

23. The proposed consultancy will generate no construction and demolition (C&D) material while the site investigations involved will only generate a minimal amount. We will fully consider measures to minimise the generation of C&D material and to reuse/recycle C&D material as much as possible in the future implementation of the construction works.

LAND ACQUISITION

24. The proposed impact assessments, investigation and design work for the revised Ngong Ping sewerage scheme do not require any land acquisition.

BACKGROUND INFORMATION

25. We included **208DS** "Outlying Islands sewerage, stage 1, phase 1" in Category B in October 1995 for implementing sewerage improvement works in six locations, namely Cheung Chau, Peng Chau, Mui Wo, Siu Ho Wan, Yung Shue Wan and Ngong Ping.

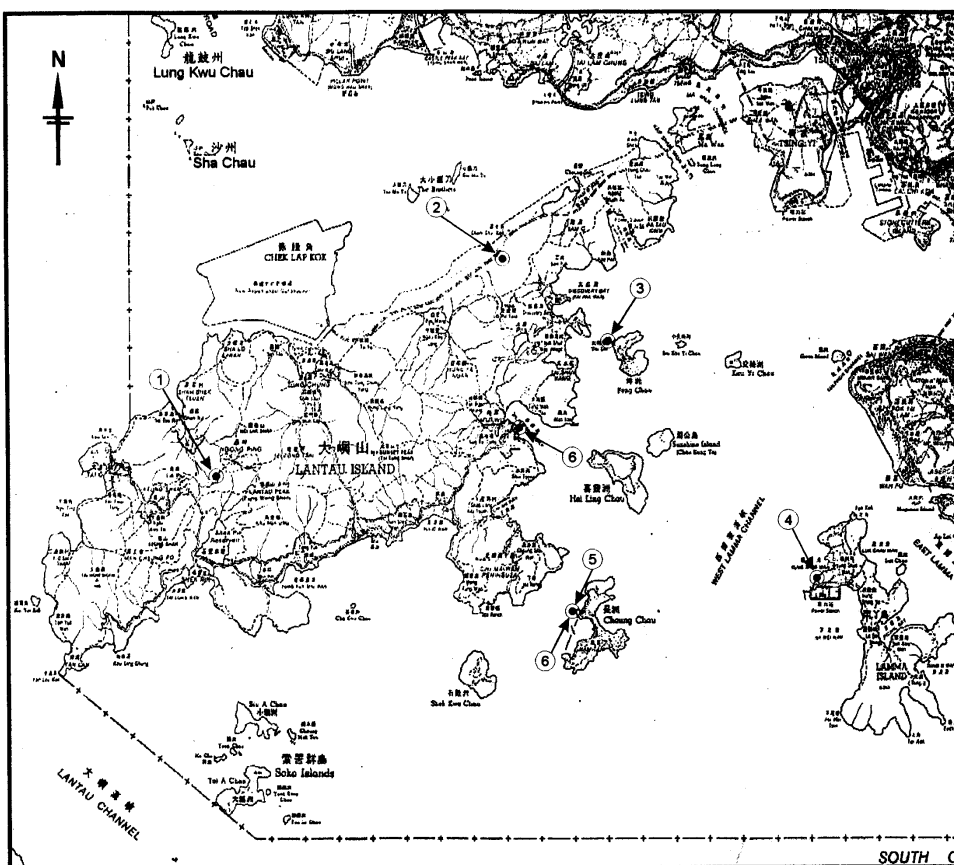
26. In April 1996, Finance Committee approved the upgrading of part of **208DS** to Category A as **209DS** "Outlying Islands sewerage, stage 1, phase 1-consultants' fees and investigations" for employing consultants to carry out impact assessment and investigation work for the Outlying Islands sewerage stage 1 phase 1 works at the six locations. The detailed design of the sewerage works at Ngong Ping and Siu Ho Wan was covered under **209DS**. The APE for **209DS** at the time was \$24.0 million in MOD prices. Those for the other four areas are being done in-house. In early 1998, the consultants completed the impact assessments and investigation works under **209DS**.

27. We plan to start the construction of the proposed works for the revised Ngong Ping sewerage scheme in December 2003 for staged completion in March 2006 for the STP, effluent export pipeline and trunk sewers and in April 2007 for the remaining sewers.

28. We estimate that the revised Ngong Ping sewerage scheme will create some seven new jobs during the consultancy stage. These will comprise four professional/technical staff and three labourers, totalling 320 man-months.

Environment and Food Bureau
May 2001

(PWSC0384fin/WIN17)



**擬建的工程
PROPOSED WORKS**

- ① 昂坪污水系統及污水處理廠
NGONG PING SEWERS AND SEWAGE TREATMENT PLANT
- ② 小墟灣污水處理廠改善工程
SIU HO WAN SEWAGE TREATMENT PLANT UPGRADING
- ③ 坪洲抽水站及海底管道
PENG CHAU PUMPING STATION AND SUBMARINE PIPELINE
- ④ 榕樹灣污水處理廠及海底排放管道
YUNG SHUE WAN SEWAGE TREATMENT PLANT AND SUBMARINE OUTFALL
- ⑤ 長洲新海底排放管道
CHEUNG CHAU NEW SUBMARINE OUTFALL
- ⑥ 長洲及梅窩污水處理廠污泥脫水設備改善工程
UPGRADING OF SEWAGE SLUDGE DEWATERING FACILITIES IN SEWAGE TREATMENT PLANTS AT CHEUNG CHAU AND MUI WO

**圖例
LEGEND :**

● 擬建的工程
PROPOSED WORKS

工務計劃項目第208DS號
PWP ITEM NO. 208DS

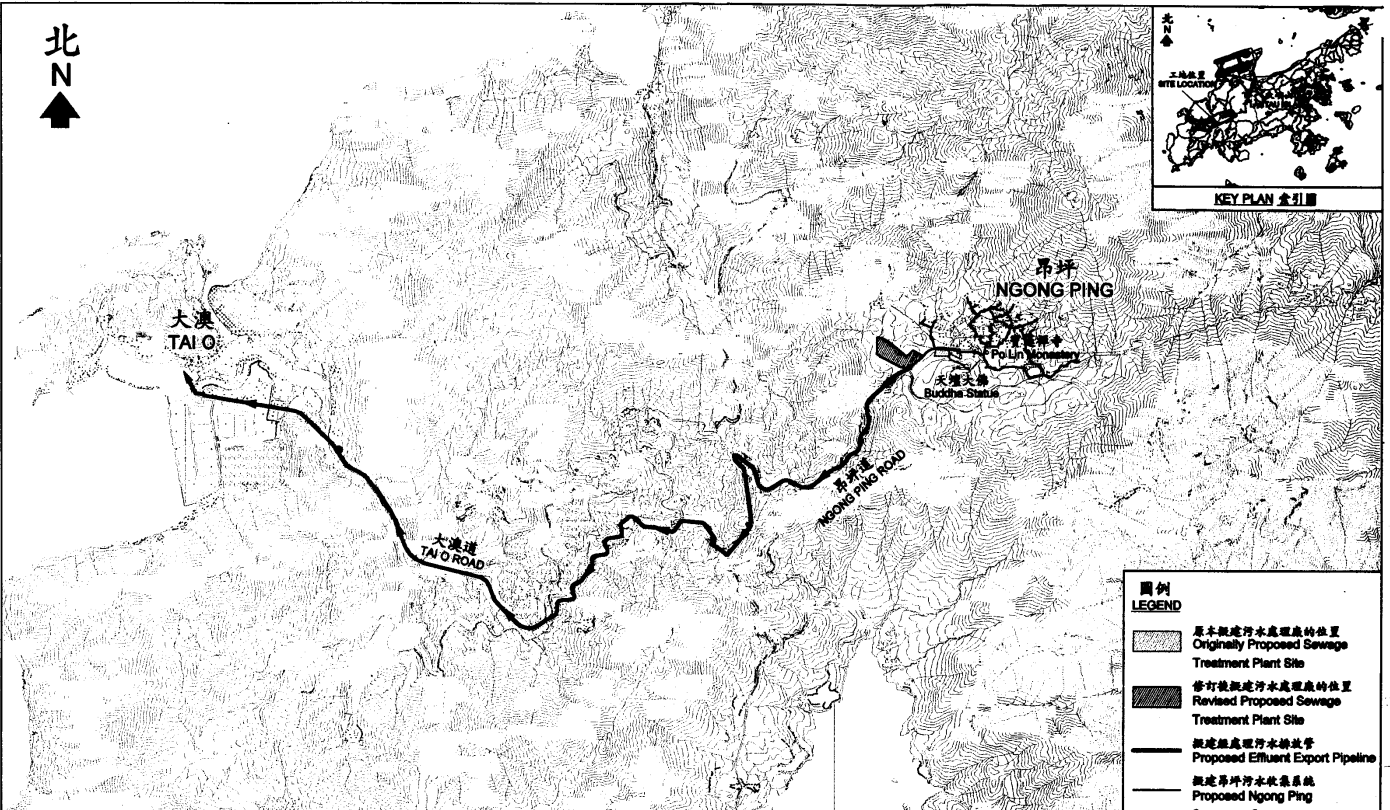
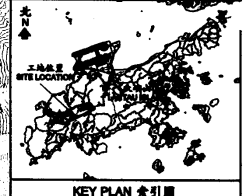
drawing title

**離島污水收集系統第一階段第一期
OUTLYING ISLANDS SEWERAGE STAGE I PHASE I**

drawn	SIGNED C.W. CHAN	date	27.04.2001
approved	SIGNED S.K. WONG	date	27.04.2001
office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

drawing no.	DCM/2001/049	scale	N.T.S.
 香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION			

Enclosure 1 附件 1



圖例 LEGEND

- 原本擬建污水處理廠的位置
Originally Proposed Sewage Treatment Plant Site
- 修訂後擬建污水處理廠的位置
Revised Proposed Sewage Treatment Plant Site
- 擬建處理污水輸放管
Proposed Effluent Export Pipeline
- 擬建昂坪污水收集系統
Proposed Ngong Ping Sewerage System
- 擬建泵房
Proposed Pumping Station

工程計劃項目第209DS/A號
PWP ITEM No. 209DS/A

A	原擬建	Originaly Proposed Sewage Treatment Plant Site Added	新增
編號	日期	描述	日期
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			

修訂的昂坪污水收集系統
REVISED NGONG PING SEWERAGE SCHEME

圖章
DCM/2001/028A
N.T.S.
香港特別行政區政府
SPECIAL ADMINISTRATIVE REGION

Enclosure 2 附件 2

Enclosure 3 to PWSC(2001-02)40

**209DS - Outlying Islands sewerage, stage 1, phase 1 -
consultants' fees and investigations**

A comparison between the approved project estimate and the revised project estimate is as follows -

	Approved Project Estimate (APE) (MOD) \$ million	Revised APE in April 99 (MOD) \$ million	Proposed Revised Estimate (MOD) \$ million	Difference between revised APE in April 99 and proposed revised estimate (MOD) \$ million
(a) Site investigations, other investigations and surveys	4.0	8.5	12.8	4.3
(b) Consultants' fees	18.0	24.8	32.9	8.1
(i) supervision of site investigations	0.4	1.4	2.0	0.6
(ii) impact assessments	4.5	5.5	8.0	2.5
(iii) review and design	11.2	15.6	19.7	4.1
(iv) preparation of tender documents and assessment of tenders	1.9	2.3	3.2	0.9
(c) Saving	-	(4.3)	(5.0)	(0.7)
(i) the actual consultants' fees bid being lower than the original estimate	-	(4.3)	(4.3)	-
(ii) the deletion of the consultants' fees for Ngong Ping sewerage scheme under the original consultancy	-	-	(0.7)	(0.7)
(d) Contingencies	2.0	3.0	3.9	0.9
Total	<u>24.0</u>	<u>32.0</u>	<u>44.6</u>	<u>12.6</u>

2. **As regards (a) (site investigations, other investigations and surveys)**, the increase of \$4.3 million is due to site investigations and surveys for the revised Ngong Ping sewerage scheme.

3. **As regards (b) (consultants' fees)**, of the total net increase of \$8.1 million -

- (a) \$0.6 million is due to supervision of site investigations arising from paragraph 2 above;
- (b) \$2.5 million is due to impact assessments for the revised Ngong Ping sewerage scheme;
- (c) \$4.1 million is due to review and design for the revised Ngong Ping sewerage scheme; and
- (d) \$0.9 million is due to preparation of tender documents and assessment of tenders for the revised Ngong Ping sewerage scheme.

4. **As regards (c) (saving)**, the total net decrease of \$0.7 million is due to saving from the deletion of Ngong Ping sewerage scheme under the original consultancy.

5. **As regards (d) (contingencies)**, we reserve an additional amount of \$0.9 million as contingencies for possible additional impact assessments, investigation and design work for the Ngong Ping sewerage scheme.

Enclosure 4 to PWSC(2001-02)40

209DS - Outlying Islands sewerage, stage 1, phase 1- consultants' fees and investigations

Breakdown of estimates for additional consultants' fees

Consultants' staff costs			Estimated man- months	Average MPS* salary point	Multiplier factor	Estimated fee in Sept 2000 prices (\$ million)	Estimated fee in MOD Prices (\$ million)
(i)	Supervision of site investigations	Professional	2.5	38	2.4	0.35	0.34
		Technical	6.5	14	2.4	0.30	0.29
(ii)	Impact assessments	Professional	12.0	38	2.4	1.66	1.64
		Technical	19.0	14	2.4	0.87	0.86
(iii)	Review and preliminary design	Professional	3.5	38	2.4	0.48	0.48
		Technical	8.0	14	2.4	0.37	0.36
(iv)	Detailed design	Professional	15.0	38	2.4	2.07	2.05
		Technical	26.0	14	2.4	1.19	1.18
(v)	Preparation of tender documents and assessment of tenders	Professional	4.5	38	2.4	0.62	0.61
		Technical	6.5	14	2.4	0.30	0.29
Total additional consultants' staff costs						8.21	8.10
Out-of-pocket expenses							
(i)	Site investigation and surveys						4.3

* MPS = Master Pay Scale

Notes

- (1) A multiplier factor of 2.4 is applied to the average MPS point to arrive at the full staff cost including the consultants' overhead and profit, as the staff will be employed in the consultants' offices (at 1.4.2000, MPS pt. 38 = \$57,525 per month and MPS pt. 14 = \$19,055 per month).

- (2) Out-of-pocket expenses are the actual cost incurred. The consultants are not entitled to any additional payment for overheads or profit in respect of these items.
- (3) The consultants' fees are based on the actual lump sum fees from the consultancy agreement and the estimates prepared by the Director of Drainage Services. We will only know the actual man-months and fees when we employ consultants for the revised Ngong Ping sewerage scheme.

For information

**Legislative Council
Panel on Environmental Affairs**

**Supplementary Note on
Proposed increase in approved project estimate for
209DS – Outlying Islands sewerage, stage 1, phase 1 –
consultants' fees and investigations**

Introduction

In discussing the paper on the proposed increase in approved project estimate for Public Works Programme item **209DS** “Outlying Islands sewerage, stage 1, phase 1 – consultants’ fees and investigations” at the meeting of the Legislative Council Panel on Environmental Affairs on 8 May 2001, Members requested the Administration to provide the following supplementary information –

- (a) the 16 Sewerage Master Plans developed by the Administration and their implementation;
 - (b) details of the Outlying Islands Sewerage Master Plan and its implementation; and
 - (c) the Administration's plan to deal with the sewage at Tai O, including that arising from the stilt house areas.
2. The Administration’s responses are set out below.

The implementation of the 16 Sewerage Master Plans

3. A sewage treatment strategy was put in place in the late 80’s with the objective of safeguarding public health and protecting the ecosystem and the marine environment.

4. The key element of this strategy was to formulate a comprehensive programme for the construction of new sewage infrastructure to match the

development needs of the territory. This comprised the Harbour Area Treatment Scheme, which provides for a sewage collection, treatment and disposal system for the main urban areas situated on both sides of the Harbour, and 16 Sewerage Master Plans (SMPs) at the regional/district level across the territory. The SMPs represented a major capital investment by Government. About \$6.2 billion has already been spent on implementation and another \$10.7 billion is planned to be spent.

5. Studies on all 16 SMPs commenced in 1986 and were completed in 1996. The plans for the expansion and upgrading of the territory's sewerage system are set out in **Annex**. To bring early improvement, we have been implementing the sewerage works identified under the 16 SMPs in phases since 1989. Details of the implementation of the 16 SMPs are as follows:

5.1 Hong Kong Island South SMP

This SMP aims to provide a comprehensive sewage collection, treatment and disposal scheme to meet the demands of developments in the southern part of Hong Kong Island from Shouson Hill to Shek O and to improve the water quality of the bathing beaches in the area. The scope of works included the construction and rehabilitation of 32 kilometres (km) of sewers, 17 pumping stations, the construction of a sewage treatment plant (STP) on reclaimed land in Shek O and an underground sewage treatment plant in a rock cavern in Stanley with a 2.3 km long submarine outfall. All construction works under the SMP were completed in December 1999 at a total cost of \$910 million.

5.2 Chai Wan & Shau Kei Wan SMP

This SMP aims to upgrade the sewerage system in Chai Wan and Shau Kei Wan. The scope of works comprised the upgrading/laying of 1.7 km of sewers. The works were completed in 1997 at a total cost of \$26 million.

5.3 Wan Chai East and North Point SMP

This SMP aims to upgrade the sewerage system in the Wan Chai

East and North Point areas. The scope of works includes the construction/rehabilitation of 5.4 km of trunk sewers, 11.4 km of branch sewers and a new inlet pumping station in the North Point Sewage Screening Plant. The estimated cost is \$1,906 million. About 0.4 km of trunk sewers and 3.1 km of branch sewers have been completed. Works for 3.7 km of trunk sewers and the pumping station will commence in February 2002 for completion by January 2006. The remaining 1.3 km of trunk sewers and 8.3 km of branch sewers works are being designed and construction is scheduled to start in 2003 for completion by December 2006.

5.4 Central, Western and Wan Chai West SMP

This SMP aims to upgrade the sewerage system to meet the demands of developments and to rectify improper sewer connections in the catchment area. The scope of works includes the construction of 5.6 km of trunk sewer, 35 km of reticulation sewers and 2 new pumping stations in Wan Chai and Central. The estimated cost is about \$2,380 million. The trunk sewer, 16 km of reticulation sewers within the upper catchment and the Wan Chai Pumping Station have been completed. The remaining 3.3 km of sewerage works in the upper catchment and the Central Pumping Station are under construction for completion in 2004. 15.7 km of sewerage works in the lower catchment are being designed and are scheduled to start in November 2001 for completion by December 2006.

5.5 Aberdeen, Ap Lei Chau and Pok Fu Lam SMP

This SMP aims to improve the sewerage system in Aberdeen, Ap Lei Chau and Pok Fu Lam in order to provide sufficient capacity to meet development needs. The scope of works comprises the construction of 3.4 km of trunk sewers from Wong Chuk Hang to Aberdeen Sewage Screening Plant (SSP), upgrading the existing Aberdeen SSP, upgrading 15.5 km of branch sewers and rectifying the expedient connections in the catchments. The estimated cost is \$481 million. About 2.6 km of trunk sewers along Aberdeen Praya Road/Wong Chuk Hang Road and 2 km of branch sewers in Ap Lei Chau and Pok Fu Lam have been completed. The remaining 0.8 km of trunk and another 2.5 km of branch sewers will be completed by March

2002. The upgrading of the Aberdeen SSP is in progress and will be completed by July 2002. Upgrading works for the remaining 11 km of branch sewers are scheduled to start in mid 2004 for completion by 2006.

5.6 East Kowloon SMP

This SMP aims to upgrade the sewerage system in San Po Kong, Kowloon Bay and Kwun Tong to meet the demands of developments in the area and to improve the water quality of neighbouring waters. The scope of works comprises upgrading/laying 17.3 km of sewers, construction of 7 dry weather flow interceptors and rectification of expedient connection in industrial areas. The estimated cost is \$855 million. About 95% of the works have already been completed with the remaining works due for completion by October 2001.

5.7 North & South Kowloon SMP

This SMP aims to improve the sewerage system in Tsim Sha Tsui, Hung Hom Bay reclamation, Hung Hom, To Kwa Wan and Wong Tai Sin and to improve the water quality of receiving waters. The stage 1 works, which comprise the laying/upgrading of 11.6 km of sewers, the construction of 2 pumping stations and 8 dry weather flow interceptors, and the expansion of an existing pumping station, have already been substantially completed. The estimated cost of the stage 1 works is \$761 million. The stage 2 works, which are estimated to cost \$233 million, are currently under review taking into account the latest development plans for the area.

5.8 North West Kowloon SMP

This SMP aims to upgrade the sewerage system in Sham Shui Po, Mong Kok and Yau Ma Tei and to improve the water quality of the receiving waters. The scope of works comprises the laying/upgrading of 24.4 km of sewers, construction of 2 pumping stations and 13 dry weather flow interceptors and rectification of expedient connections in the industrial areas. The estimated cost of the SMP is \$1,066 million. About 90% of the works have already

been completed. The remaining works are expected to be completed by mid 2003.

5.9 Tseung Kwan O SMP

This SMP aims to provide sewerage to 9 unsewered villages in the area which are currently using septic tanks for handling sewage. The scope of works includes construction of 5.5 km of sewers and two pumping stations. The project estimate is \$34 million. Detailed design is being carried out. The construction works are scheduled to commence in April 2004 for completion in March 2006.

5.10 Port Shelter SMP

This SMP aims to improve the water quality within the Port Shelter Marine Control Zone by upgrading the sewerage facilities and extending the public sewerage to unsewered areas in the Port Shelter catchment. The project comprises construction of about 64 km of sewers, 23 pumping stations and 13 km rising mains to collect and convey sewage generated from 17 unsewered areas to three nearby sewage treatment facilities for treatment and disposal. The estimated cost of the project is about \$578 million. Provision of sewerage to 4 unsewered areas has been completed. Construction of sewerage in 4 other unsewered areas is in progress and is expected to be completed in 2002. Design of sewerage to the remaining 9 unsewered areas is in progress. The whole project is scheduled to be completed in 2008.

5.11 Tolo Harbour SMP

This SMP aims to improve the water quality in Tolo Harbour by providing public sewerage facilities to unsewered areas in the Tolo Harbour catchment. It comprises construction of public sewers and pumping stations to convey sewage from 169 unsewered areas in Sha Tin and Tai Po via the existing sewerage systems to the Sha Tin and Tai Po STPs. The works were divided into two stages. Stage 1 covers works in 85 unsewered areas while stage 2 covers works in the remaining 84 unsewered areas.

The latest progress of the stage 1 works is as follows –

- (a) provision of public sewerage to 46 unsewered areas has been completed;
- (b) construction of sewerage facilities in 27 unsewered areas will start in September 2001 for completion in April 2004; and
- (c) design of public sewerage facilities in 12 unsewered areas is in progress and construction is scheduled to start in June 2003 for completion in June 2006.

Stage 2 deals with the remaining 84 unsewered areas which are located in relatively-remote locations and generate relatively less volume of pollutants. The Environmental Protection Department (EPD) is currently undertaking a review of the SMP to update the scope and the implementation programme of the works under stage 2 by taking into account latest developments within the catchment and in the light of previous experience gained in implementing the stage 1 works. The stage 2 works are tentatively scheduled to start in 2005/2006 for completion in 2009. The estimated total cost of both the stages 1 and 2 works under the SMP is \$947 million.

5.12 Tsuen Wan, Tsing Yi and Kwai Chung SMP

The main objective of this SMP was to upgrade the sewerage system in Tsuen Wan, Kwai Chung and Tsing Yi to improve the water quality of the neighbouring waters. The works are divided into two parts. The first part includes the upgrading/laying of 14.2 km of sewers, the construction of an industrial wastewater pumping station and the rectification of expedient connections in industrial areas. These works have already been substantially completed at an estimated cost of \$539 million.

Under the second part, a new separate sewerage system will be provided for the collection, treatment and disposal of sewage from Ting Kau, Sham Tseng and Tsing Lung Tau to meet the demands of planned developments in these areas. This proposed sewerage system comprises a STP on reclaimed land, a submarine outfall and some 8 km of trunk sewers together with another 7 km of branch sewers in the nearby villages. Our latest estimate for this proposed

system is some \$750 million. Reclamation works for the site accommodating the STP have been completed and the laying of trunk sewers is in progress. The construction of the STP and the submarine outfall has just commenced and is scheduled for completion in end 2003. The branch sewerage system is being designed and construction will commence in 2003. The whole system is scheduled to be completed in 2005.

5.13 Yuen Long and Kam Tin SMP

This SMP aims to improve the water quality of Deep Bay and the local watercourses by constructing public sewers and pumping stations to collect and convey sewage from unsewered areas in the North West New Territories to the Yuen Long or the San Wai STP for treatment. The works are divided into two parts. Part one included improvement works for about 7 km of sewers in Yuen Long Town and a new sewerage system of about 3 km for diverting some of the sewage flow from Yuen Long STP (which discharges its effluent to Deep Bay) to San Wai STP (which discharges its effluent to Urmston Road), thus reducing the effluent being discharged to Deep Bay. Improvement works for sewers in Yuen Long Town and the trunk sewer for diverting the flow to San Wai have been completed in 1998.

Part two includes the provision of about 50 km of trunk sewers to unsewered areas, construction of public sewerage systems for 43 villages and the expansion and upgrading of the existing San Wai STP to tie in with planned housing developments in the area. Design works for the San Wai STP is in progress and construction is scheduled to start in 2004 for completion in 2008. Construction of public sewers for one of the villages will commence in 2001 whilst works for another 16 villages, as well as 14 km of trunk sewers will commence progressively between 2002 and 2003. Design work for the remaining 36 km of trunk sewer and sewerage works for the 26 villages are on-going and the works will be implemented between 2004 and 2006. The whole of the SMP works is scheduled for completion in 2008. The estimated cost is \$2,835 million.

5.14 North District SMP

This SMP aims to upgrade the existing Shek Wu Hui STP to meet the demands of new developments and to extend the sewerage system to the villages in the catchment area. The scope of works includes upgrading the capacity and treatment level of the existing Shek Wu Hui STP and the construction of some 16 km of trunk sewers, 25 pumping stations and connecting sewers for 74 villages in North District. The estimated cost of the scheme is \$1,100 million. About 3 km of trunk sewers along Sha Tau Kok Road have been completed. The upgrading of the Shek Wu Hui STP and the construction of 2 km of trunk sewers and 2 pumping stations along Castle Peak Road are in progress and will be completed by December 2001. The remaining works are being designed and are scheduled for commencement in stages from 2002 to 2006 for completion from 2004 to 2009.

5.15 Tuen Mun SMP

This SMP aims to provide adequate sewerage facilities to serve the unsewered areas and other developments in Tuen Mun. It comprises the construction of 2.2 km trunk sewers, 6 pumping stations and 2 low-flow interceptors and extending the public sewerage system to 25 villages. The total estimated cost is \$133 million. The construction of Ho Pong Street sewage pumping station, Tuen Mun Road low-flow interceptor, Yung Long – Tuen Mun corridor trunk sewer and Siu Hong Road low-flow interceptor has been completed. The remaining works are currently under review to assess the adequacy of the sewerage infrastructure and to identify additional facilities required to meet the demand for sewage services arising from the projected population and the flat production target.

5.16 Outlying Islands SMP

Please refer to paragraph 7 for details.

6. In the light of new development proposals, revised population forecasts and housing needs, a series of SMP reviews is being conducted. The review for Yuen Long and Kam Tin SMP was completed in January 1999. Reviews for the

North and South Kowloon, East Kowloon, Tuen Mun, Tsing Yi, and the Outlying Islands SMPs were started in 1999 and are expected to be completed by the end of 2001. Reviews for the Hong Kong Island, North District and the Tolo Harbour SMPs commenced in 2000 for completion in 2002. These reviews will identify any new sewerage infrastructure required for inclusion in the Public Works Programme. Their scope will be to meet new demands for sewage services expected to arise up to 2016.

The implementation of Outlying Islands SMP

7. This SMP aims to improve the sewerage facilities on Lantau Island, Lamma Island, Peng Chau and Cheung Chau. The proposed improvement works, to be implemented in 2 stages, will ensure that all sewage generated in the concerned areas would be collected for proper treatment and disposal. Stage 1 of the proposed works is divided into 2 phases for implementation. The total estimated cost for the stage 1 works is \$1,328 million. The stage 2 works are currently being reviewed under the Outlying Islands SMP Stage II Review Study as mentioned in paragraph 6. Details of the stage 1 and stage 2 works are as follows -

Stage	Phase	Scope	Estimated construction cost (\$ million)	Latest construction programme	Progress
1	1A	Upgrading of sewage sludge dewatering facilities at Mui Wo sewage treatment plant	12	6/1998 – 5/2000	Works completed
	1B	Outfall replacement and sewage sludge dewatering facilities upgrading at Cheung Chau sewage treatment plant	99	9/2000 – 1/2003	Construction in progress
	1C	Upgrading of Siu Ho Wan sewage treatment plant to chemical treatment level with disinfection	656	6/2001 – 12/2004	Tender assessment stage
	1D	Yung Shue Wan sewage treatment plant and submarine outfall	125	8/2003 – 8/2006	Design in progress

Stage	Phase	Scope	Estimated construction cost (\$ million)	Latest construction programme	Progress
	1E	Ngong Ping sewage treatment plant, effluent export pipeline and village sewerage	223	12/2003 – 4/2007	Planning stage
	1F	Peng Chau sewage export scheme	60	Under review	Under review
	2	Sewer systems to villages at central Cheung Chau, Peng Chau and Yung Shue Wan, and a sewage treatment plant, submarine outfall and sewer systems to villages at Sok Kwu Wan.	153	11/2002 - 11/2006	Design stage
2	N/A	Trunk sewers and village sewerage systems to serve South Lantau as well as improvements to sewerage systems at Mui Wo, Tai O, Peng Chau, Cheung Chau, Lamma Island, and upgrading of existing sewage treatment works at Tai O.			

Plan to deal with sewage at Tai O, including that arising from the stilt house areas

8. The sewerage requirements for the whole of Tai O, including the stilt house areas, are being investigated under the Outlying Islands SMP Stage II Review Study. In considering the long term solution on the Tai O sewage problem, due consideration will be given to ensure that adequate capacity is allowed for in the proposed sewerage system to serve the stilt house areas. A comprehensive plan and programme for the required upgrading and expansion works of the sewage collection, treatment and disposal facilities will be available upon the completion of the Review study by the end of the year.

9. The preliminary findings of the Review study indicate that the upgrading and expansion works will include -

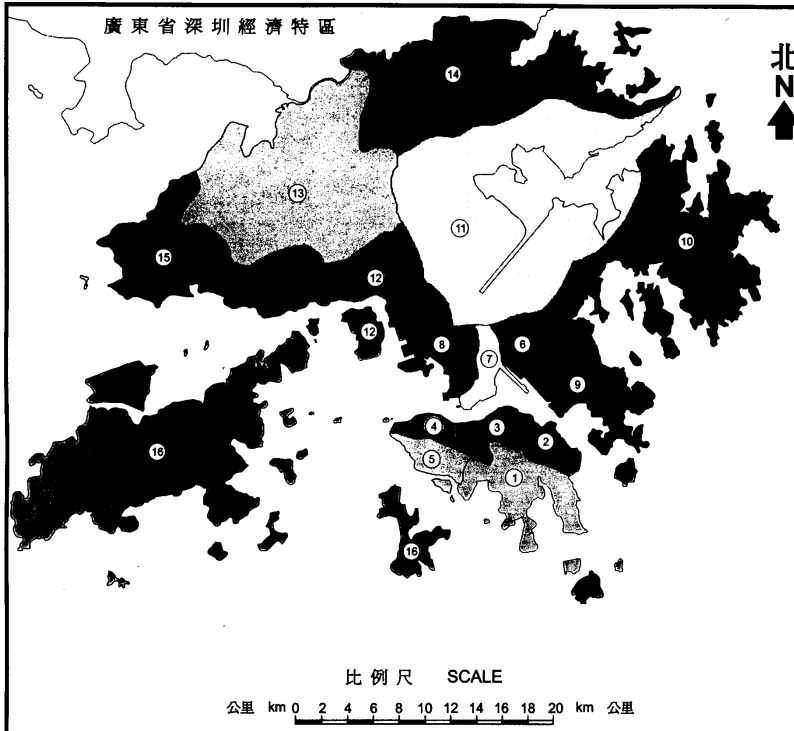
- (i) separating the combined sewers in Tai O town centre;

- (ii) upgrading and expanding the sewerage system to serve the unsewered areas and planned developments; and
- (iii) upgrading and expanding the Tai O Sewage Treatment Works to meet projected demands.

However, while it is feasible to provide sufficient capacity in the sewerage system to cater for the sewage generated from the stilt house areas, sewerage connection from individual houses to the public sewers remains a major problem. Difficulties arising from the haphazard layout, the uncertain structural integrity of the stilt houses and their access walkways, and the poor bearing capacity of the marine mud have to be overcome.

10. Although individual owners are responsible for the sewerage connection from conveying sewage from the stilt houses to the public sewers, Government will continue to play an active role in the provision and the improvement of public facilities and infrastructure in the Tai O area. The Administration is now liaising closely with non-government bodies such as the Hong Kong Institute of Architects, and is facilitating the partnership of these bodies, the local community and other stakeholders in the process with a view to achieving a sustainable community.

Environment and Food Bureau
May 2001



比例尺 SCALE

公里 km 0 2 4 6 8 10 12 14 16 18 20 km 公里

* 由於第二階段工程正進行檢討, 只能提供第一階段的完工日期
* Since the stage 2 works are under review, only the completion date of the stage 1 works is specified

整體計劃地區 MASTER PLAN AREAS	開始日期 START DATE	完工日期 COMP. DATE
1. 港島南 Hong Kong Island South	08/1989	12/1999
2. 柴灣及筲箕灣 Chai Wan & Shau Kei Wan	09/1994	10/1997
3. 灣仔東及北角 Wan Chai East & North Point	07/1995	2006
4. 中區、西區及灣仔西 Central, Western & Wan Chai West	05/1994	2006
5. 香港仔、鴨脷洲及薄扶林 Aberdeen, Ap Lei Chau & Pok Fu Lam	10/1998	2006
6. 東九龍 East Kowloon	04/1990	2001
7. 北九龍及南九龍 North & South Kowloon	02/1994	4/1999 *
8. 西北九龍 North-West Kowloon	12/1992	2003
9. 將軍澳 Tseung Kwan O	03/1998	2006
10. 牛尾海 Port Shelter	11/1993	2008
11. 吐露港 Tolo Harbour	08/1991	2009
12. 荃灣、青衣及葵涌 Tsuen Wan, Tsing Yi & Kwai Chung	11/1994	2005
13. 元朗及錦田 Yuen Long & Kam Tin	10/1993	2008
14. 北區 North District	08/1995	2009
15. 屯門 Tuen Mun	09/1995	2004 *
16. 離島 Outlying Islands	05/1996	2007 *

圖則名稱 drawing title

污水系統整體計劃地區
SEWERAGE MASTER PLAN AREAS

繪畫 drawn SIGNED T.C. CHAN	日期 date 09.05.2001	圖則編號 drawing no. DCM/2001/053	比例 scale AS SHOWN
核對 checked SIGNED C. K. Tiu	日期 date 09.05.2001	保留版權. COPYRIGHT RESERVED	
批核 approved SIGNED Y.T.D. Cheung	日期 date 09.05.2001	香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION	
部門 office 顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION			

附件 Annex