

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment

308DS - Strategic Sewage Disposal Scheme Stage I:

Stonecutters Island sewage treatment works - pumping stations, buildings and site development

Members are invited to recommend to Finance Committee an increase in the approved project estimate of **308DS** from \$97.3 million by \$60.0 million to \$157.3 million in money-of-the-day prices.

PROBLEM

The approved project estimate of **308DS** is insufficient to cover the cost of the works under the project.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment and Food, proposes to increase the approved project estimate of **308DS** from \$97.3 million by \$60.0 million to \$157.3 million in money-of-the-day (MOD) prices. The proposal represents an increase of about 15.5% over the original estimated cost of \$386.0 million for this project (\$288.7 million was spent prior to the closure of the Sewage Services Trading Fund (SSTF)). With the proposed increase in the approved project estimate for **308DS**, our latest estimate for the overall cost of completing SSDS Stage I is \$8,298.6 million, which is below the total approved project estimate of \$8,323.7 million before we sought the approval of Finance Committee to increase the approved project estimate for **320DS** “Strategic Sewage Disposal Scheme Stage I: completion of sewer tunnel system from Kwai Chung to Stonecutters Island” on 15 December 2000.

/PROJECT

PROJECT SCOPE AND NATURE

3. **308DS** comprises construction of the following facilities at the Stonecutters Island Sewage Treatment Works (SCISTW) -

(a) Pumping stations

These include the Stonecutters Island Main Pumping Station (SCIMPS) and the North West Kowloon Pumping Station (NWKPS). The SCIMPS will lift sewage from the sewer tunnel system to the sedimentation tanks at SCISTW whilst the NWKPS will lift sewage from the existing North West Kowloon Preliminary Treatment Works to the sedimentation tanks.

(b) Buildings

These include the Administration Building, the Switchgear Building, four minor buildings for electrical equipment and a gatehouse at the SCISTW.

(c) Site development

This includes the process pipelines, culverts, chambers and service ducts required for various treatment units at SCISTW. It also includes roads and walkways, water supply mains, foul sewers and storm drains, telephone system, site lighting, landscaping and other ancillary site facilities.

----- A layout plan of the project is at Enclosure 1.

4. **308DS** is one of the 19 projects making up the SSDS Stage I programme that was transferred to the Capital Works Reserve Fund in April 1998 after closure of the SSTF. Following the Finance Committee's approval of the increase in the approved project estimate for **320DS** by \$115.0 million on 15 December 2000, the total approved project estimate for the SSDS Stage I programme is at present \$8,438.7 million (this includes \$4,408.9 million spent during the existence of the SSTF).

/JUSTIFICATION

JUSTIFICATION

5. Construction works for this project started in April 1995 and were originally scheduled for completion in May 1997. Final completion of the project was delayed until May 1999. Additional funding is required to meet claims for payments from the contractor due to disruption of the progress of works by the following -

- (a) changes arising from the implementation of recommendations of the International Review Panel (IRP) in 1995;
- (b) forfeiture of the tunnel contracts; and
- (c) interface with an electrical and mechanical (E&M) contract with respect to the construction of the main pumping station at Stonecutters Island.

Details are provided in paragraphs 6 to 15 below.

Changes arising from the implementation of recommendations of the International Review Panel in 1995

6. In July 1994, Government commissioned an IRP to review the proposed options for the further stages of SSDS including the treatment process at SCISTW to be built under Stage I. Originally, a chemically enhanced primary treatment process involving the addition of lime was adopted for SCISTW. In April 1995, the IRP recommended, among other things, that ferric chloride should be used instead of lime in the treatment process. The recommended process was more environmentally friendly and economical as it would reduce the number of sedimentation tanks required, the quantities of chemical to be used and the volume of sludge produced.

7. To implement the IRP's recommendations, we had to revise the design of the Stage I works including the sedimentation tanks, chemical dosing equipment, sludge treatment and disposal facilities. This also led to some modification to the design of site development works under **308DS**. Although the changes and modifications did not result in any delay to the general completion of **308DS**, there was considerable disruption to the contractor's planned activities, requiring re-sequencing of works and provision of additional resources by the contractor. As the contractor was not responsible for these changes, the additional cost associated with the disruption of the works has to be borne by Government.

/Forfeiture

Forfeiture of the tunnel contracts

8. The construction of the sewage tunnel transfer system was originally included in two works contracts covering the eastern and western tunnels. Both contracts were awarded to the same contractor in January 1995. The tunnel contractor unilaterally suspended the works and the two tunnel contracts were eventually forfeited in December 1996.

9. Before works for SCIMPS under **308DS** could be completed, interfacing works involving a connection conduit between the SCIMPS and the sewage tunnel transfer system had to be finished. However, these interfacing works were left unfinished by the tunnel contractor prior to the forfeiture of contracts. To minimize delay, we instructed the contractor of **308DS** to carry out the said interfacing works which were critical to the completion of the project. In addition, as the rock surfaces exposed at the connection conduit were left unprotected by the forfeited tunnel contractor and had become unstable with time, we instructed the tunnel maintenance contractor to complete the protective lining works. These works delayed the completion of the SCIMPS under **308DS** by nine months. As the contractor for **308DS** was not responsible for the delay, the prolongation costs have to be borne by Government under the terms of the contract.

10. We have pursued a claim for losses arising from re-entry of the two tunnel contracts through arbitration. The three arbitration hearings to determine liability have now been concluded. The Government has been successful in relation to all the most significant issues in the dispute. While the contractor has the right of appeal, so far the Government has been successful in resisting the contractor's claim and largely successful in its own counterclaim. On that basis the Government would expect to be able to recover very substantial damages from the first contractor. However, the full amount of the Government's damages claim cannot be assessed until the completion contracts have been completed.

Interface with an E&M contract with respect to the construction of the main pumping station at Stonecutters Island

11. The construction of the SCIMPS, which was critical to the completion of **308DS**, involved two separate contracts – one civil works contract under **308DS** and one E&M works contract for the supply and installation of the E&M equipment funded by **307DS** "Strategic Sewage Disposal Scheme Stage I: pumping stations E&M equipment". There were a lot of interfacing works between these two contracts involving provision of details, access and works
/sequence.

sequence. During construction of the SCIMPS, the E&M contractor had, on various occasions, caused material delays to the civil works contract. In particular, the civil works in the wet well of the SCIMPS were affected by the installation and testing of the penstocks¹ by the E&M contractor. The E&M contract caused a total delay of 15 months to the civil works.

12. Since the contractor for **308DS** was not responsible for the knock-on delays caused by the interfacing E&M contract, the cost arising from the longer construction period have to be borne by the Government. Government is now seeking liquidated damages from the responsible contractor as provided for under the E&M contract.

Proposed increase of approved project estimate for 308DS

13. As a result of these various problems, final completion of the project was delayed until May 1999. In respect of the disruption of the progress of works and the prolongation of the construction period, we have received claims for additional payments from the contractor. The Consulting Engineer is finalizing his assessment of these claims and is expected to certify payment on some of these claims soon. On the other hand, as the actual ground conditions of the building sites were better than expected, there were savings of \$9.5 million in the buildings foundation works which have been used to offset some of the additional costs mentioned in the preceding paragraphs.

14. Following a review of the financial position of the project, we consider it necessary to increase the approved project estimate of **308DS** from \$97.3 million by \$60.0 million to \$157.3 million in MOD prices in order to provide the necessary funding for the finalization of the project and for payment of all claims from contractors in relation to this project.

15. A summary of the proposed increase of \$60.0 million is as follows -

/(a)

¹ A penstock is a mechanical device which is commonly used for isolating or regulating flow in a channel or a chamber for operation and maintenance purposes.

Factor	Increase/ (Decrease) in MOD prices (\$ million)	%
(a) Cost arising from the recommendations of International Review Panel	17.9	29.8
(i) modification works	9.2	
(ii) disruption costs	8.7	
(b) Prolongation costs arising from the forfeited tunnel contracts	16.1	26.8
(c) Prolongation costs for delays caused by an E&M interfacing contract	25.5	42.5
(d) Reduction in cost for completion of buildings works	(9.5)	(15.8)
(e) Contingency	10.0	16.7
Total	60.0	100.0
	in MOD prices	

A comparison of the cost breakdown of the approved project estimate and the revised project estimate is at Enclosure 2.

FINANCIAL IMPLICATIONS

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

/Up

Year	\$ million (Sept 2000)	Price adjustment factor	\$ million (MOD)
Up to 31 March 2000	62.8	-	62.8
2000 - 2001	24.1	1.00000	24.1
2001 - 2002	44.3	1.02550	45.4
2002 - 2003	23.7	1.05627	25.0
	154.9		157.3

17. We have derived the MOD estimate on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2000 to 2003.

18. The proposed increase in the approved project estimate will not give rise to additional recurrent expenditure.

SSDS Stage I

19. Up to end of December 2000, the total expenditure on SSDS Stage I was \$7.1 billion.

20. If the proposed increase in the approved project estimate for **308DS** is approved, the total approved project estimate for SSDS Stage I will be increased to \$8,498.7 million. The latest estimate is that we should be able to complete SSDS Stage I at a cost of \$8,298.6 million. This is due to savings of \$200.1 million in the estimated costs of 13 projects under the SSDS Stage I programme. Details of the latest project estimates of the 19 items, taking into account the proposed increase in the approved project estimate for **308DS**, are shown at Enclosure 3.

/PUBLIC

PUBLIC CONSULTATION

21. The five then District Boards affected by the SSDS Stage I project were consulted in 1994. They supported the project. We have also kept the Legislative Council Panel on Environmental Affairs updated on the progress of the SSDS Stage I project.

22. The LegCo Panel on Environmental Affairs discussed our current proposal on 2 January 2001. Members noted our intention to submit the proposal to the Public Works Subcommittee for discussion on 14 February 2001. Some Members expressed concern about Government's request for additional funding for yet another project item under SSDS Stage I and urged Government to exercise better control on the approved project estimates of projects.

ENVIRONMENTAL IMPLICATIONS

23. The proposed increase in approved project estimate does not have any environmental implications.

LAND ACQUISITION

24. The proposed increase in approved project estimate does not require any land acquisition.

BACKGROUND INFORMATION

SSDS Stage I

25. The SSDS Stage I works comprise upgrading of existing preliminary treatment works; construction of a series of deep sewage collection tunnels to collect sewage from urban Kowloon, Tsing Yi, Kwai Chung, Tseung Kwan O and northeast Hong Kong Island; and construction of a new centralized sewage treatment works at Stonecutters Island to treat the sewage. The treated effluent is discharged via an interim outfall to the more open waters west of Victoria Harbour. The treatment works and the outfall have been operating satisfactorily on a partial load of 300,000m³/day since May 1997.

26. In view of the size and complexity of the civil, electrical and mechanical works involved, the SSDS Stage I works were implemented under 15 construction contracts comprising four advance works contracts and 11 main works contracts. One of these contracts covers the works under **308DS**. These contracts commenced in stages in 1994 and 1995 respectively.

27. The construction of the sewage tunnel transfer system was included in two of the 11 main works contracts. Owing to the unilateral suspension of works in all six sewage tunnels by the first contractor, the two tunnel contracts were forfeited in December 1996. Subsequently, the tunnel completion works were re-let in three separate contracts (two tunnels in each contract) in July 1997 and January 1998.

28. Excavation work on all the SSDS Stage I tunnels has been completed and the permanent tunnel lining works are in steady progress. Based on current progress, we forecast that the full SSDS Stage I will be commissioned in stages in the second half of 2001.

308DS

29. Construction of the pumping stations, buildings and site development of the Stonecutters Island sewage treatment works was originally funded by the SSTF under **014SS** with an approved project estimate of \$386.0 million in MOD prices. As preparation was made to wind up the SSTF, we estimated then that \$288.7 million would have been spent up to 31 March 1998. On the basis of that estimate, Finance Committee approved on 27 February 1998 the creation and direct inclusion of **308DS** "Strategic Sewage Disposal Scheme Stage I: Stonecutters Island sewage treatment works - pumping stations, buildings and site development" in Category A under the Capital Works Reserve Fund (CWRF) with an approved project estimate of \$97.3 million² for completion of the remaining works of **014SS** upon closure of the SSTF.

30. We have substantially completed the works under **308DS**. The proposed increase in approved project estimate will not create further job opportunities.

/Review

² The approved project estimate of **308DS** (\$97.3 million) was established on the basis of our estimated cumulative expenditure under **014SS** of \$288.7 million up to 31 March 1998, leaving an outstanding commitment of \$97.3 million to be funded under the CWRF.

Review

31. In April 2000, an IRP was set up to consider the future development of the sewage treatment system for the main urban area in the light of experience with Stage I of SSDS and developments in technology. The IRP was also asked to give early advice as to whether its likely recommendations might have any bearing on the works underway on Stage I. Amongst other recommendations released on 30 November 2000, the IRP advised that the SSDS Stage I should be completed as soon as possible. The Panel commented that the SCISTW was the world's most efficient Chemical Enhanced Primary Treatment plant and had full confidence that this plant would be capable of successfully treating the full Stage I flow.

Environment and Food Bureau
February 2001

(pwsc0330fin.doc)

**308DS - Strategic Sewage Disposal Scheme Stage I:
Stonecutters Island sewage treatment works - pumping stations,
buildings and site development**

Taking into account the actual expenditure of \$299.8 million under the SSTF, the total approved funds and latest project estimate for **308DS** in MOD prices are \$397.1 million and \$457.1 million respectively. A comparison of the approved project estimate and the revised project estimate is as follows -

	Approved Estimate (MOD) \$ million	Revised Estimate (MOD) \$ million	Changes Proposed (MOD) \$ million
(a) Pumping stations	23.2 [154.2]	64.8 [195.8]	+41.6
(b) Buildings	44.5 [128.0]	35.0 [118.5]	(9.5)
(c) Site development	14.6 [99.9]	32.5 [117.8]	+17.9
(d) Contingencies	15.0 [15.0]	25.0 [25.0]	+10.0
Total	<u>97.3 [397.1]</u>	<u>157.3 [457.1]</u>	<u>+60.0</u>

[] - Total estimate including expenditure already incurred under the SSTF

2. **On pumping stations**, the total increase of \$41.6 million is broken down as follows -

- (a) \$16.1 million is for the prolongation cost arising from delays caused by the forfeited tunnel contract; and
- (b) \$25.5 million is for the prolongation cost arising from delays caused by the E&M contract with respect to the construction of the SCIMPS.

3. **On buildings**, a sum of \$9.5 million previously allowed for the buildings foundation works is no longer required and has been utilised to offset the additional costs for the site development.

4. **On site development**, the total increase of \$17.9 million is broken down as follows -

- (a) \$8.7 million is for the disruption costs arising from the IRP's recommendations in 1995; and
- (b) \$9.2 million is for modification works required for the process pipelines, roadworks and water supply system arising from the IRP's recommendations.

5. **On contingencies**, we retain \$25.0 million to cover possible requirements for settlement of the final account of the completed contract and for resolution of claims from the contractor.

Enclosure 3 to PWSC(2000-01)89

Latest project estimate for the Strategic Sewage Disposal Scheme Stage I

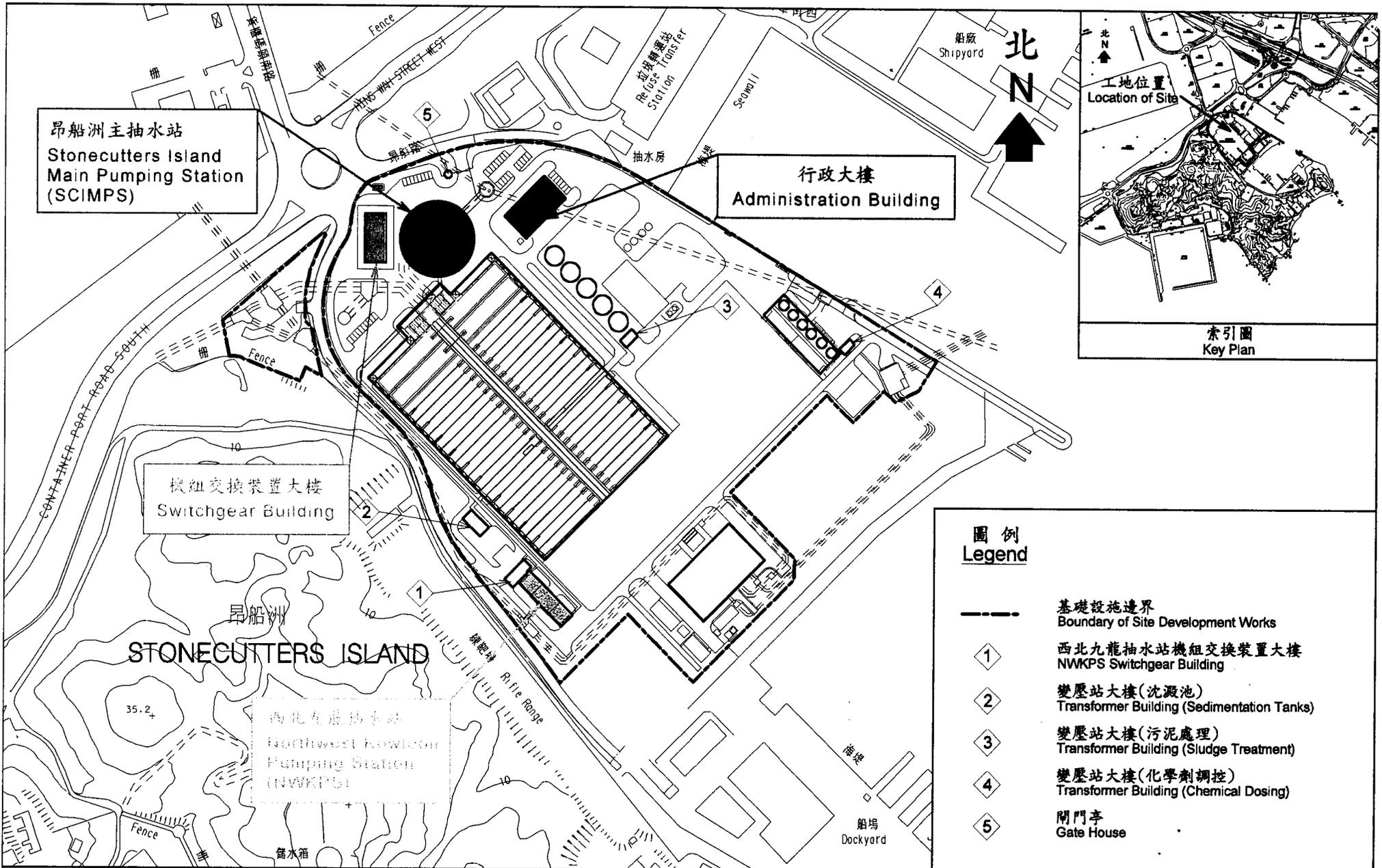
PWP Item No.	Title	Approved project estimate under CWRF (1) (\$ million)	Expenditure under SSTF (2) (\$ million)	Total Approved Funds (1)+(2) (\$ million)	Latest Project Estimate (\$ million)
142DS	Strategic Sewage Disposal Scheme Stage I : Kowloon System - consultants' fees and investigations	130.0	-	130.0	105.0
286DS	Strategic Sewage Disposal Scheme Stage I : completion of sewage tunnel system from Chai Wan and Tseung Kwan O to Kwun Tong and from Kwun Tong to Stonecutters Island	2,000.0	-	2,000.0	2,000.0
287DS	Strategic Sewage Disposal Scheme Stage I : principal collection and treatment system - advance works	31.1	531.3	562.4	555.8
288DS	Strategic Sewage Disposal Scheme Stage I : chemical dosing facilities	39.2	104.1	143.3	132.8
304DS	Strategic Sewage Disposal Scheme Stage I : sewer tunnel system from Chai Wan and Tseung Kwan O to Kwun Tong	36.3	306.1	342.4	306.4

PWP Item No.	Title	Approved project estimate under CWRF (1) (\$ million)	Expenditure under SSTF (2) (\$ million)	Total Approved Funds (1)+(2) (\$ million)	Latest Project Estimate (\$ million)
305DS	Strategic Sewage Disposal Scheme Stage I : Stonecutters Island sewage treatment works - sludge treatment facilities	43.7	231.3	275.0	262.0
306DS	Strategic Sewage Disposal Scheme Stage I : Stonecutters Island sewage treatment works - sedimentation tanks (civil works)	24.5	347.6	372.1	365.1
307DS	Strategic Sewage Disposal Scheme Stage I : pumping stations E&M equipment	214.3	223.1	437.4	424.0
308DS	Strategic Sewage Disposal Scheme Stage I : Stonecutters Island sewage treatment works - pumping stations, buildings and site development	157.3 (Note 5)	299.8	457.1 (Note 5)	457.1
309DS	Strategic Sewage Disposal Scheme Stage I : upgrading existing preliminary treatment works	234.1	607.6	841.7	812.8
310DS	Strategic Sewage Disposal Scheme Stage I : sedimentation tanks E&M equipment	125.1	276.4	401.5	392.0
311DS	Strategic Sewage Disposal Scheme Stage I : sewer tunnel system from Kwun Tong and Kwai Chung to Stonecutters Island	39.4	389.7	429.1	390.0

PWP Item No.	Title	Approved project estimate under CWRF (1) (\$ million)	Expenditure under SSTF (2) (\$ million)	Total Approved Funds (1)+(2) (\$ million)	Latest Project Estimate (\$ million)
312DS	Strategic Sewage Disposal Scheme Stage I : construction supervision of the main works	217.0 (Note 1)	502.0	719.0	719.0
315DS	Strategic Sewage Disposal Scheme Stage I outfall	117.6	445.1	562.7	560.0
316DS	Strategic Sewage Disposal Scheme Stage I : construction of sludge transfer facilities and supply of sludge containers	23.7	28.7	52.4	46.0
A09DS	Strategic Sewage Disposal Scheme Stage I : pilot plant study on chemical dosing and disinfection	2.0	11.5	13.5	11.5
317DS	Strategic Sewage Disposal Scheme Stage I : baseline monitoring and performance verification	27.0	9.8	36.8	36.8
318DS	Strategic Sewage Disposal Scheme Stage I : environmental impact assessment study	24.9 (Note 2)	43.4	68.3	68.3
320DS	Strategic Sewage Disposal Scheme Stage I : completion of sewer tunnel system from Kwai Chung to Stonecutters Island	602.6	51.4	654.0	654.0 (Note 3)
	Total	4,089.8	4,408.9	8,498.7	8,298.6
				(Note 4)	

Notes

1. The original approved project estimate for **312DS** was \$118.2 million by the time of closure of the SSTF in March 1998. On 25 June 1999, the Finance Committee raised this by \$98.8 million, from \$118.2 million to \$217.0 million.
2. The original approved project estimate for **318DS** was \$11.3 million by the time of closure of the SSTF in March 1998. On 20 August 1998, Secretary for the Treasury raised this by \$13.6 million, from \$11.3 million to \$24.9 million.
3. The original approved project estimate for **320DS** was \$487.6 million by the time of closure of the SSTF in March 1998. On 15 December 2000, the Finance Committee raised this from \$487.6 million by \$115.0 million to \$602.6 million.
4. The original overall estimate for the 19 projects was \$8,211.3 million by the time of closure of the SSTF in March 1998. As a result of the increases in the approved project estimate of **312DS, 318DS and 320DS**, the overall approved funding for SSDS Stage I has increased from \$8,211.3 million by \$227.4 million to \$8,438.7 million. Subject to approval for increasing the approved project estimate of **308DS**, the overall approved funding for SSDS Stage I will be increased to \$8,498.7 million.
5. We are seeking approval under this submission to increase the approved project estimate of **308DS** from \$97.3 million by \$60.0 million to \$157.3 million.



圖例
Legend

- 基礎設施邊界
Boundary of Site Development Works
- 1 西北九龍抽水站機組交換裝置大樓
NWKPS Switchgear Building
- 2 變壓站大樓(沈澱池)
Transformer Building (Sedimentation Tanks)
- 3 變壓站大樓(污泥處理)
Transformer Building (Sludge Treatment)
- 4 變壓站大樓(化學劑调控)
Transformer Building (Chemical Dosing)
- 5 閘門亭
Gate House

drawing title
策略性污水排放計劃-第一期工程昂船洲抽水站及相關建築物和基礎設施工程
SSDS STAGE I STONECUTTERS ISLAND STW PUMPING STATIONS, BUILDINGS AND SITE DEVELOPMENT

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date 14 - 12 - 2000
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SSDS DIVISION

drawing no. **DSS/2000/009**
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