

For discussion
on 4 April 2001

PWSC(2001-02)5

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 704 - DRAINAGE

Environmental Protection - Sewerage and sewage treatment 125DS - Tolo Harbour sewerage of unsewered areas

Members are invited to recommend to Finance Committee -

- (a) the upgrading of part of **125DS** entitled “Tolo Harbour sewerage of unsewered areas, stage 1 phases 1D and 2B” to Category A at an estimated cost of \$170.0 million in money-of-the-day prices; and
- (b) the retention of the remainder of **125DS** in Category B.

PROBLEM

Domestic sewage from unsewered areas in Sha Tin and Tai Po contributes to water pollution in Tolo Harbour.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment and Food, proposes to upgrade part of **125DS** to Category A at an estimated cost of \$170.0 million in money-of-the-day (MOD) prices for implementing necessary sewerage works at 27 unsewered areas in Sha Tin and Tai Po.

/PROJECT

PROJECT SCOPE AND NATURE

3. The part of the project we now propose to upgrade to Category A covers works at 27 unsewered areas, with an estimated population of 15 500, as shown in Enclosure 1. The scope of works comprises the construction of –

- (a) 23 kilometres of sewers, ranging from 150 millimetres to 450 millimetres in diameter;
- (b) six sewage pumping stations in Yung Shue O, Sheung Wo Che, Lok Lo Ha, Sha Lan, Tai Mei Tuk and Tung Tze;
- (c) a communal septic tank system with absorption field in Yung Shue O; and
- (d) six kilometres of footpath and access road for maintenance purposes,

classified as falling within stage 1, phases 1D and 2B of the project.

4. The remainder of **125DS** for retention in Category B comprises –

- (a) detailed design, site investigation and environmental impact assessment (EIA) for stage 2 works; and
- (b) construction of stage 1 phase 2C and stage 2 sewerage works (as detailed in paragraphs 30 to 32).

JUSTIFICATION

5. At present, domestic sewage from unsewered areas in Sha Tin and Tai Po is partially treated by private treatment facilities before being discharged into Tolo Harbour via stormwater drains and streams. Most of these treatment facilities are septic tanks and soakaway systems in village houses. The effectiveness of these facilities in removing pollutants depends on their size¹, whether they are located in areas where the ground conditions are suitable for the soakaway systems to work properly² and whether there is adequate maintenance of the systems. Sewage discharged from unsewered areas is a source of pollution in Tolo Harbour.

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¹ Undersized septic tanks or soakaway systems would affect the pollutant removal efficiency of the system and may even lead to an overflow of effluent.

² Soakaway systems operate by allowing the effluent to percolate through the gravel whereby the pollutants would be removed in a natural manner. However, if the system is located in an area where the underground water table is high, the system cannot function properly.

6. As a long-term measure to address the water pollution problem in the Tolo Harbour catchment, we included **125DS** in the Public Works Programme in August 1990 with a view to providing public sewerage facilities to 169 unsewered areas in the Tolo Harbour catchment. The project includes constructing public sewers and pumping stations to convey sewage flows from these unsewered areas into the existing sewerage systems in Sha Tin and Tai Po and providing new communal septic tanks with absorption field³ in unsewered areas situated in remote locations.

7. Works under **125DS** were divided into two stages. Stage 1 covers works in 85 unsewered areas in Sha Tin and Tai Po which produce large volumes of pollutants. Stage 1 phase 1 comprises four sub-phases (namely 1A, 1B, 1C and 1D) while stage 1 phase 2 includes three sub-phases (namely 2A, 2B and 2C). We have so far completed the works under phases 1A, 1B, 1C and 2A at 46 unsewered areas. Stage 2 covers works in the remaining 84 unsewered areas.

The present project

8. The part of **125DS** which we now propose to upgrade to Category A is the stage 1 phases 1D and 2B works. This comprises the following –

- (a) providing public sewerage facilities to 15 500 people in 27 unsewered areas. Sewers will be constructed up to the lot boundary of individual houses at most of these areas;
- (b) constructing pumping stations in Sheung Wo Che, Lok Lo Ha, Sha Lan, Tai Mei Tuk and Tung Tze to uplift the sewage collected in these areas to existing public sewers. These pumping stations are required as a result of the topography of these areas and the levels of the existing sewers nearby; and
- (c) constructing a new communal septic tank system with an associated pumping station at Yung Shue O to properly treat the sewage on site and discharge the effluent underground through a suitably designed absorption field. Due to the remote and isolated location of Yung Shue O, it would not be cost-effective to extend the public sewerage system to the area. It is considered that building a communal septic tank would be the most appropriate solution, given that a location with suitable ground conditions has been identified to build the septic tanks and absorption field.

/9.

³ An absorption field provides the requisite surface area for proper treatment of septic tank effluent.

9. With the exception of the sewage generated in Yung Shue O which will be treated locally, the sewage collected from the newly-constructed sewerage systems in the 26 unsewered areas will be conveyed to the existing Tai Po and Sha Tin sewage treatment plants for secondary treatment before disposal to Kai Tak Nullah through the existing effluent export system. Upon completion, we will be able to improve the water quality of the Tolo Harbour by preventing about 3 600 cubic metres (m³) of sewage which has not undergone proper treatment from entering Tolo Harbour each day. We plan to start the proposed works in September 2001 for completion in April 2004, followed by minor house connection works.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of the proposed works to be \$170.0 million in MOD prices (see paragraph 11 below), made up as follows –

	\$ million	
(a) Sewers	98.3	
(b) Sewage pumping stations	14.4	
(i) civil works	6.7	
(ii) electrical & mechanical works	7.7	
(c) Communal septic tanks and absorption field	1.2	
(d) Maintenance access	2.8	
(e) Environmental mitigation measures	0.8	
(f) Consultants' fees	1.3	
(g) Resident site staff cost	24.0	
(h) Contingency	14.2	
Sub-total	157.0	(in September 2000 prices)

/(i)

(i) Provision for price adjustment	13.0	
	170.0	(in MOD prices)
Total	170.0	

11. Subject to approval, we will phase the expenditure as follow –

Year	\$ million (Sept 2000)	Price adjustment factor	\$ million (MOD)
2001 - 2002	11.5	1.02550	11.8
2002 - 2003	55.0	1.05627	58.1
2003 - 2004	59.1	1.08795	64.3
2004 - 2005	15.5	1.12059	17.4
2005 - 2006	15.9	1.15421	18.4
	157.0		170.0

12. We have derived the MOD estimate on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2001 to 2006. We will tender the proposed works as a standard remeasurement contract because of the uncertainties of the existence and location of underground utilities such as electric cables, telephone cables, stormwater drains and water pipes. We will allow provision for price adjustments to the tender prices because the contract period will exceed 21 months.

13. We estimate the additional annually recurrent expenditure for maintenance works to be \$3.9 million.

14. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works by itself would lead to an increase in the recurrent cost of providing sewage services by about 0.29%. This will need to be taken into account in determining sewage charges.

/PUBLIC

PUBLIC CONSULTATION

15. We consulted the Health and Environment Committee of the then Sha Tin Provisional District Board on 3 September 1998 and 6 May 1999 on the proposed stage 1 phases 1D and 2B works respectively. We also consulted the Tai Po Provisional District Board on 17 July 1998 and 14 May 1999 on these works respectively. They supported the implementation of the proposed works.

16. We consulted the Legislative Council Panel on Environmental Affairs on the proposed works on 19 March 2001. Members noted our intention to submit the proposal to the Public Works Subcommittee for discussion on 4 April 2001. At the meeting, a Member enquired whether the sewerage system would be extended to Nai Chung and the neighbouring area. Members also expressed concern about the relatively high cost of the stage 2 works (\$40 million for design consultancy and \$395 million for construction). Under the current proposal, the stage 2 works cover 84 unsewered areas including Nai Chung and other unsewered areas along Sai Sha Road. As mentioned in paragraphs 31 to 32 below, we are currently reviewing and updating the scope of the stage 2 works. The aforementioned costs represent our best rough estimates at the moment and will be subject to refinement when we have substantially finalised the updated scope of the stage 2 works around the end of 2001. We will take into account Members' views when finalising the works for stage 2.

ENVIRONMENTAL IMPLICATIONS

17. We completed the EIA in October 1993 and November 1996 under **137DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 1 – consultants' fees and design" and **179DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 2 – consultants' fees and investigations" respectively. The EIA recommends the provision of mitigation devices such as deodorizers and filters for the sewage pumping station. We will install these devices inside the underground pumping stations to control possible odour arising from their operation. For short-term impacts caused by excavation works during construction, we shall control noise, dust and site run-off within established standards and guidelines through implementation of mitigation measures, such as the use of temporary noise barriers and silenced construction plant to reduce noise generation, water-spraying to reduce emission of fugitive dust and strict control on diversion of sewage flows in the works contracts.

18. We estimate the cost of implementing the environmental mitigation measures to be \$0.8 million in September 2000 prices. We have included this in the overall project estimate.

19. We estimate that about 24 900 cubic metres (m³) of construction and demolition (C&D) materials will be generated by the project. Of these, about 15 800m³ (63.5%) will be reused on site, 7 500m³ (30.1 %) will be reused as fill in public filling areas and 1 600m³ (6.4%) will be disposed of at landfills. We have considered in the planning and design stage ways of reducing the generation of C&D materials as far as possible. We shall require the contractor under the contract to submit a waste management plan to the Engineer for approval, with appropriate mitigation measures, including the allocation of an area for waste segregation. We shall ensure that the day-to-day operations on site comply with the waste management plan. We shall require the contractor to implement necessary measures to minimize the generation of C&D materials and to reuse C&D materials as fill material as far as possible. We will control disposal of C&D materials and waste to public filling areas and landfills respectively through a trip-ticket system. We will record the disposal and reuse of C&D materials for monitoring purposes.

LAND ACQUISITION

20. The project requires land acquisition. The land resumption and clearance cost for the project is estimated at \$29 million and will be charged to **Head 701** - Land Acquisition. All the statutory procedures for resuming the required land has been completed in accordance with the Water Pollution Control (Sewerage) Regulation.

BACKGROUND INFORMATION

21. We included **125DS** in Category C in August 1990 for implementing long-term water pollution abatement works at 169 unsewered areas in the Tolo Harbour Catchment. The implementation plan of **125DS** is summarised in Enclosure 2.

Stage 1 phase 1 works

22. In February 1991, we upgraded part of **125DS** to Category A as **137DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 1 – consultants' fees and design" for employing consultants to carry out the detailed design, site investigation and EIA for the stage 1 phase 1 works.

23. The phases 1A, 1B and 1C works were respectively upgraded to Category A as **163DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 1A", **177DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 1B", **284DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 1C" in January 1993, June 1994 and December 1996. Works for these phases were substantially completed.

24. Location plans showing the unsewered areas covered by the stage 1 phase 1 and phase 2 works are at Enclosure 3.

25. The present proposal involves upgrading the stage 1 phase 1D works, alongside the phase 2B works, to Category A. We plan to start the stage 1 phase 1D works in September 2001 for completion in May 2003.

Stage 1 phase 2 works

26. In July 1994, we upgraded part of **125DS** to Category A as **179DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 2 – consultants' fees and investigations" for employing consultants to carry out the detailed design, site investigation and EIA for the stage 1 phase 2 works.

27. The stage 1 phase 2 works were further subdivided into sub-phases (phases 2A, 2B and 2C) of more manageable sizes to facilitate construction and the land resumption process. The phase 2A works were upgraded to Category A as **213DS** "Tolo Harbour sewerage of unsewered areas, stage 1 phase 2A" in April 1997. We started the works in May 1998 and works were completed in March 2001.

28. The present proposal involves upgrading the stage 1 phase 2B works, alongside the phase 1D works, to Category A. We plan to start the stage 1 phase 2B works in November 2001 for completion in April 2004.

29. We estimate that the proposed stage 1 phase 1D and 2B works will create about 200 new jobs during the construction stage. These will comprise 50 professional and technical staff and 150 labourers, totalling 5 500 man-months.

30. Under our current programme, we plan to start works on stage 1 phase 2C in June 2003.

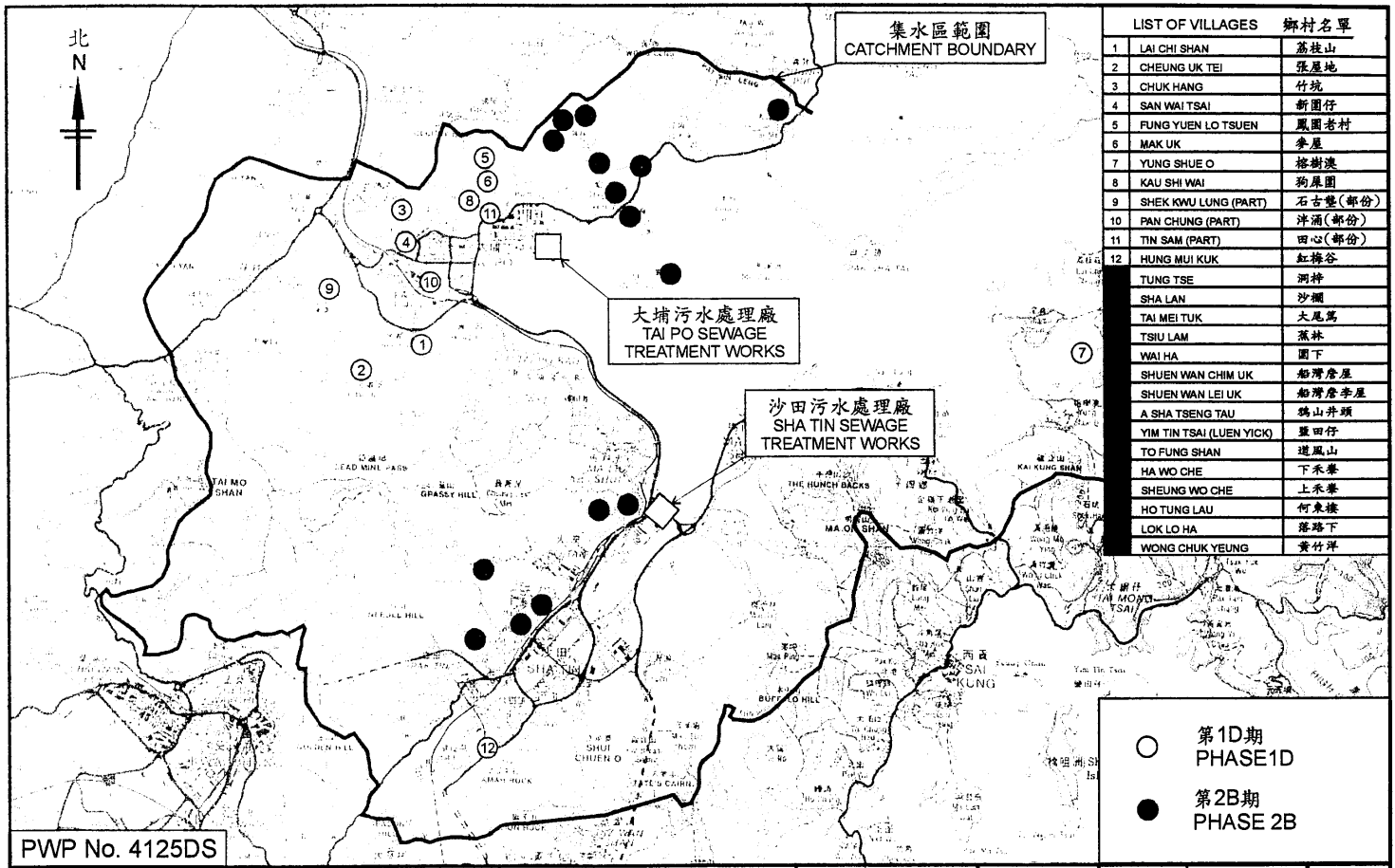
Stage 2 works

31. The original plan for stage 2 works covers 84 unsewered areas which are located in relatively remote locations. We are currently undertaking a Review of North District and Tolo Harbour Sewerage Master Plans (the Review) to update the scope and the implementation programme of the stage 2 works by taking into account latest developments within the catchment and in the light of experience gained in implementing village sewerage schemes under the stage 1 works.

/32.

32. The Review commenced in June 2000 and is expected to be substantially completed by end 2001. Our tentative programme is to commence construction of the stage 2 works in 2005-06 for progressive completion in 2008-09. The Administration will continue to explore whether it would be possible to bring forward the completion of the sewerage projects for the remaining unsewered areas in the Tolo Harbour catchment.

Environment and Food Bureau
April 2001
(PWSC0354rev/WIN16)



集水區範圍
CATCHMENT BOUNDARY

大埔污水處理廠
TAI PO SEWAGE
TREATMENT WORKS

沙田污水處理廠
SHA TIN SEWAGE
TREATMENT WORKS

LIST OF VILLAGES	鄉村名單
1 LAI CHI SHAN	荔枝山
2 CHEUNG UK TEI	張屋地
3 CHUK HANG	竹坑
4 SAN WAI TSAI	新圍仔
5 FUNG YUEN LO TSUEN	鳳園耆村
6 MAK UK	麥屋
7 YUNG SHUE O	榕樹澳
8 KAU SHI WAI	狗屎圍
9 SHEK KWU LUNG (PART)	石古壆(部份)
10 PAN CHUNG (PART)	洋涌(部份)
11 TIN SAM (PART)	田心(部份)
12 HUNG MUI KUK	紅梅谷
TUNG TSE	洞梓
SHA LAN	沙欄
TAI MEI TUK	大尾篤
TSIU LAM	蕉林
WAI HA	圍下
SHUEN WAN CHIM UK	船灣唇屋
SHUEN WAN LEI UK	船灣唇李屋
A SHA TSENG TAU	鴉山井頭
YIM TIN TSAI (LUEN YICK)	豎田仔
TO FUNG SHAN	道風山
HA WO CHE	下禾輦
SHEUNG WO CHE	上禾輦
HO TUNG LAU	何東樓
LOK LO HA	落路下
WONG CHUK YEUNG	黃竹洋

○	第1D期 PHASE 1D
●	第2B期 PHASE 2B

PWP No. 4125DS

drawing title
為吐露港內未有污水設施地區而興建的污水收集系統 -
第1階段第1D期及第2B期工程
TOLO HARBOUR SEWERAGE OF UNSEWERED AREAS -
STAGE 1, PHASES 1D & 2B

drawn <i>G.T.C.</i> T.C. CHAN	date 18-01-2001
approved <i>H.K. TUNG</i> H.K. TUNG	date 18-01-2001
office/ CONSULTANTS MANAGEMENT DIVISION	

drawing no. DCM/2001/008	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	

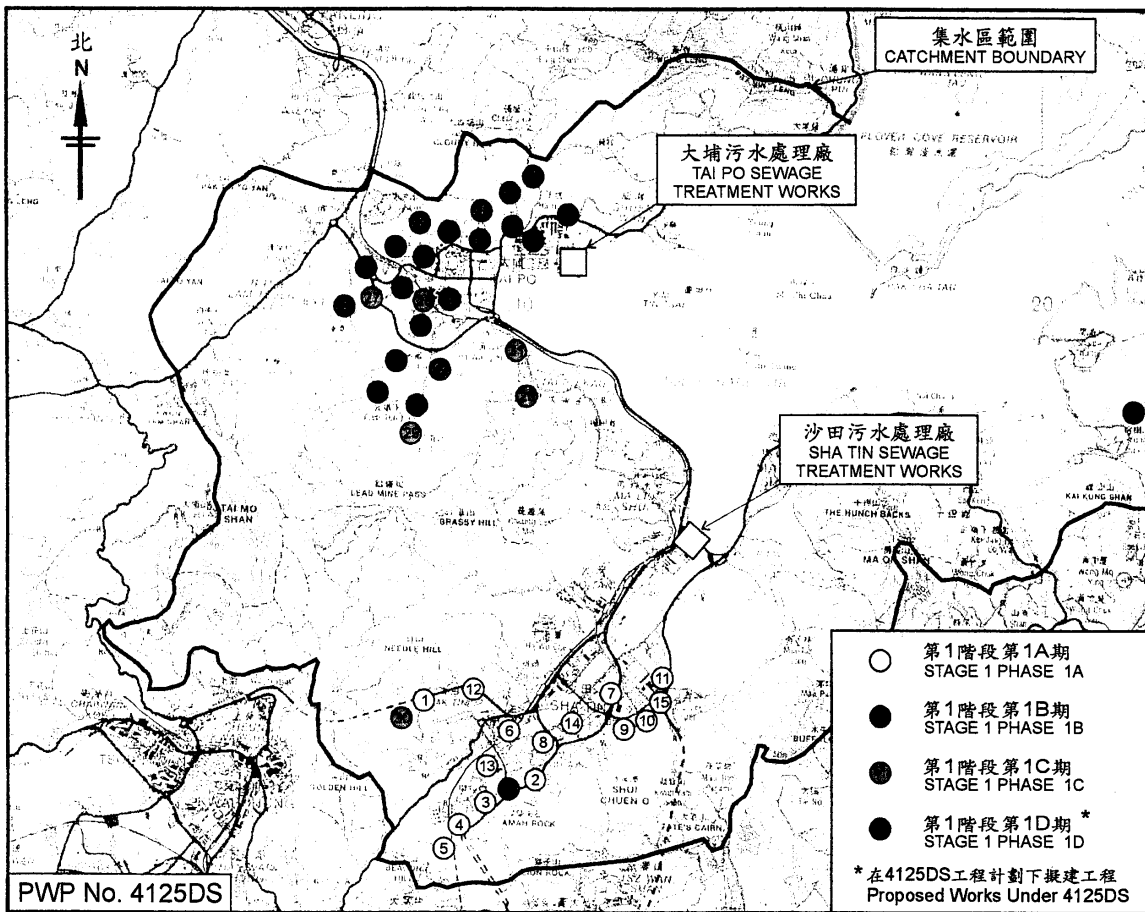
附件 1
Enclosure 1

Enclosure 2 to PWSC(2001-02)5

**125DS – Tolo Harbour sewerage of unsewered areas
Updated cost estimate and implementation plan**

<u>PWP Item No.</u>	<u>Description</u>	<u>No. of unsewered areas</u>	<u>Start Date</u>	<u>Completion Date</u>	<u>Updated Cost Estimate (\$million in Sept 2000 prices)</u>	<u>Estimated Population Served</u>
Stage 1 Phase 1 (covering 43 unsewered areas)						
137DS	Design consultancy		Aug 1991	June 2001	12.5	
163DS	Stage 1 phase 1A	15	Jun 1993	May 1995	56.8	17 300
177DS	Stage 1 phase 1B	10 ¹	Oct 1994	Aug 1998	72.4	8 200
284DS	Stage 1 phase 1C	6 ¹	Jun 1997	Feb 1999	28.6	4 800
*	Stage 1 phase 1D	12 ¹	Sep 2001	May 2003	46.7	3 400
				Subtotal:	217.0	33 700
Stage 1 Phase 2 (covering 42 unsewered areas)						
179DS	Design consultancy		May 1995	Aug 2002	11.6	
213DS	Stage 1 phase 2A	15	May 1998	Mar 2001	83.2	11 800
*	Stage 1 phase 2B	15	Nov 2001	Apr 2004	110.3	12 100
#	Stage 1 phase 2C	12	Jun 2003	Jun 2006	101.5	19 200
				Subtotal:	306.6	43 100
				Total:	523.6	76 800
Stage 2² (covering 84 unsewered areas)						
#	Design consultancy		Dec 2002	Dec 2008	40.0 ³	
#	Construction		2005-2006 ²	2008-2009 ²	395.0 ³	13 000
				Total:	435.0 ³	13 000

- Note: * Part of **125DS** we now propose to upgrade to Category A.
The remainder of **125DS** for retention in Category B.
¹ Some of these areas are parts of individual unsewered villages.
² The number of unsewered areas covered under stage 2 and the programme of works are both under review.
³ The costs represent our best rough estimates at the moment and will be subject to refinement when we have substantially finalised the updated scope of the stage 2 works around the end of 2001.



LIST OF VILLAGES 鄉村名單	
1	HEUNG FAN LIU (EAST) 香粉寮(東)
2	KAN TIN 鵝田
3	HA KENG HAU 下樓口
4	SHEUNG KENG HAU 上樓口
5	HIN TIN 鱸田
6	TAI WAI 大圍
7	SHA TIN WAI 沙田圍
8	SHA TIN TAU 沙田頭
9	TO SHEK 多石
10	CHAP WAI KON 掃梳行
11	NGAU PEI SHA 牛皮沙
12	PAK TIN 白田
13	TIN SAM 田心
14	TSANG TAI UK 曾大屋
15	CHAP WAI KON NEW VILLAGE 掃梳行新村
	YUE KOK 魚角
	NAM HANG 南坑
	YING PUN HA 營盤下
	SHUI WAI 水圍
	KAM SHAN 鑊山
	PAN CHUNG SAN TSUEN 洋涌新村
	SHEUNG WUN YIU 上碗窩
	SAN UK KA (PART) 新屋寮(部份)
	TIN SAM (PART) 田心(部份)
	HA HANG 下坑
	LAI CHI HANG 荔枝坑
	SHEK KWU LUNG (PART) 石古壙(部份)
	PAN CHUNG (PART) 洋涌(部份)
	SAN UK KA (PART) 新屋寮(部份)
	HEUNG FAN LIU (WEST) 香粉寮(西)
	TAI PO KAU 大埔滘
	CHEUNG UK TEI 張屋地
	CHUK HANG 竹坑
	SAN WAI TSAI 新圍仔
	FUNG YUEN LO TSUEN 鳳園老村
	MAK UK 麥屋
	YUNG SHUE O 榕樹澳
	KAU SHI WAI 狗屎圍
	SHEK KWU LUNG (PART) 石古壙(部份)
	PAN CHUNG (PART) 洋涌(部份)
	TIN SAM (PART) 田心(部份)
	HUNG MUI KUK 紅梅谷
	LAI CHI SHAN 荔枝山

PWP No. 4125DS

drawing title

為吐露港內未有污水設施地區而興建的污水收集系統 - 第1階段第1期工程 - 位置圖
TOLO HARBOUR SEWERAGE OF UNSEWERED AREAS - STAGE 1, PHASE 1 - LOCATION PLAN

drawn

C.W. CHAN C.W. CHAN date 12-12-2000

approved *S.K. WONG* S.K. WONG date 01-03-2001

office 顧問工程管理部
 CONSULTANTS MANAGEMENT DIVISION

drawing no.

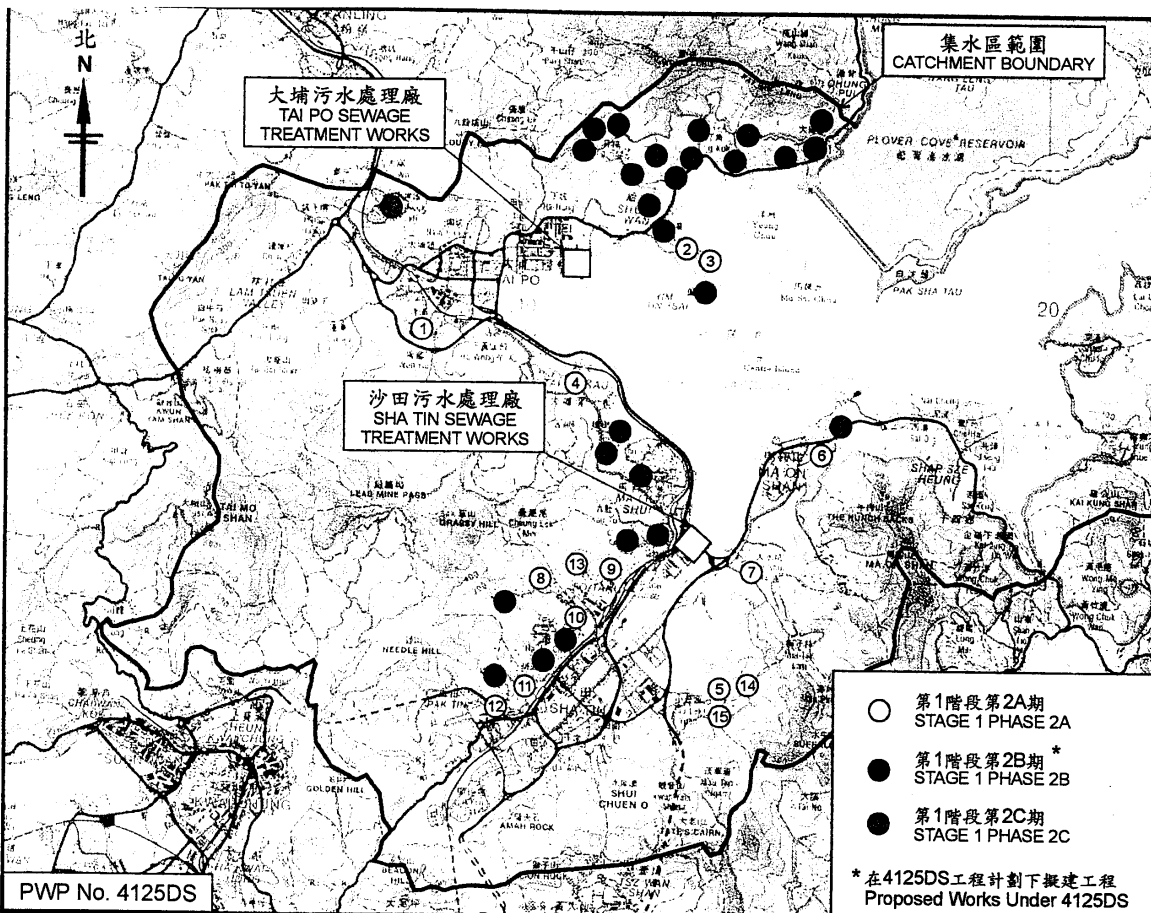
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N.T.S.

香港特別行政區政府渠務署
 DRAINAGE SERVICES DEPARTMENT
 GOVERNMENT OF THE HONG KONG
 SPECIAL ADMINISTRATIVE REGION

附件3 (第1頁)
 Enclosure 3 (Sheet 1)



LIST OF VILLAGES 鄉村名單	
1	TO YUEN TUNG 桃園別
2	HOME FOR THE AGED 東華三院
3	SAM MUN TSAI NEW VILLAGE 三門仔新村
4	TAI PO KAU SAN WAI 大埔滘新圍
5	TAI LAM LIU 大藍樓
6	WU KWAI SHA NEW VILLAGE 烏溪沙新村
7	TAI SHUI HANG 大水坑
8	FO TAN COTTAGE AREA 火炭平房區
9	WU LIU HANG 禾寮坑
10	FO TAN 火炭
11	PAI TAU 排頭
12	TUNG LO WAN 銅鑼灣
13	PAT TSZ WU 披子窩
14	SHEK KWAI LUNG 石古壟
15	WONG NAI TAU 黃泥頭
	TUNG TSE 洞梓
	SHA LAN 沙欄
	TAI MEI TUK 大尾篤
	TSIU LAM 蕉林
	WAI HA 圍下
	SHUEN WAN CHIM UK 船灣唇屋
	SHUEN WAN LEI UK 船灣唇李屋
	A SHA TSENG TAU 鴉山井頭
	YIM TIN TSAI (LUEN YICK) 蓮田仔
	TO FUNG SHAN 蓮風山
	HA WO CHE 下禾輦
	SHEUNG WO CHE 上禾輦
	HO TUNG LAU 何東樓
	LOK LO HA 落路下
	WONG CHUK YEUNG 黃竹洋
	LOTSZ TIN 羅慈田
	LUNG MEI 龍尾
	PO SAM PAI 若心排
	TING KOK 汀角
	WONG CHUK TSUEN 黃竹村
	SAN TAU KOK 磳頭角
	LAI PEK SHAN SAN TSUEN 翠壁山新村
	CHEUNG SHUE TAN 樟樹灘
	TAI PO MEI 大埔尾
	CHEK NAI PING 赤泥坪
	LOK WO SHA 落禾沙
	HONG LOK YUEN 廣樂圍

PWP No. 4125DS

drawing title
 為吐露港內未有污水設施地區而興建的污水收集系統 -
 第1階段第2期工程 - 位置圖
 TOLO HARBOUR SEWERAGE OF UNSEWERED AREAS -
 STAGE 1, PHASE 2 - LOCATION PLAN

○ 第1階段第2A期
 STAGE 1 PHASE 2A
 ● 第1階段第2B期*
 STAGE 1 PHASE 2B
 ● 第1階段第2C期
 STAGE 1 PHASE 2C
 *在4125DS工程計劃下擬建工程
 Proposed Works Under 4125DS

drawn <i>C.W. Chan</i>	date 12-12-2000
approved <i>C.H. Wong</i>	date 01-03-2001
office 顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION	

drawing no. DCM/2000/026	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	

附件3 (第2頁)
Enclosure 3 (Sheet 2)