For discussion **PWSC(2002-03)38**
on 5 June 2002

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE
Environmental Protection – Sewerage and sewage treatment
157DS – Yuen Long and Kam Tin sewerage, stage 2
274DS – Yuen Long and Kam Tin sewerage, stage 3

Members are invited to recommend to Finance Committee –

(a) the upgrading of part of **157DS** entitled "Yuen Long and Kam Tin sewerage, stage 2 phases 2 and 4D" and part of **274DS** entitled "Yuen Long and Kam Tin sewerage, stage 3 phase 1" to Category A at an estimated total cost of $169.4 million in money-of-the-day prices; and

(b) the retention of the remainders of **157DS** and **274DS** in Category B.

PROBLEM

The existing sewerage facilities in Yuen Long do not have adequate capacity to cope with the additional sewage flow from new developments in the area. In addition, domestic sewage from unsewered areas in Yuen Long contributes to water pollution in Deep Bay.

PROPOSAL

2. The Director of Drainage Services (D of DS), with the support of the

/the .....

Secretary for the Environment and Food, proposes to upgrade parts of **157DS** and **274DS** to Category A at an estimated total cost of $169.4 million in money-of-the-day (MOD) prices ($109.5 million for **157DS** and $59.9 million for **274DS**) for implementing the Yuen Long and Kam Tin sewerage stage 2 phases 2 and 4D, and stage 3 phase 1 works.

PROJECT SCOPE AND NATURE

3. The parts of **157DS** and **274DS** we now propose to upgrade to Category A cover sewerage works along Yuen Long Highway from Au Tau to Ma Fung Ling Road and at the currently unsewered Tong Yan San Tsuen in Yuen Long. A location plan is at Enclosure 1. The scope of works comprises the following –

Stage 2 phase 2 under 157DS

(a) construction of about 320 metres (m) of trunk sewers, from 700 millimetres (mm) to 900 mm in diameter, along Yuen Long Highway from Kung Um Road to Ma Fung Ling Road;

(b) construction of a sewage pumping station near Tin Liu Tsuen and about 1.83 kilometres (km) of associated twin rising mains of 700 mm in diameter;

Stage 2 phase 4D under 157DS

(c) construction of about 680 m of sewers, from 150 mm to 225 mm in diameter, and associated manholes for Tong Yan San Tsuen;

Stage 3 phase 1 under 274DS

(d) construction of about 610 m of trunk sewers, 900 mm in diameter, along Yuen Long Highway from Au Tau to Kung Um Road; and

(e) construction of a sewage pumping station (Au Tau Pumping Station) near Pok Oi Interchange and about 1.7 km of associated twin rising mains of 500 mm in diameter.

We plan to start the proposed works in October 2002 for completion in May 2006.

/4. .....

4. The remainders of **157DS** and **274DS** comprising sewerage works for nine and 34 villages respectively will be retained in Category B.

JUSTIFICATION

5. At present, the sewage generated from Au Tau area (the Area) with a population of about 14 000 is conveyed to San Wai Sewage Treatment Works (STW) through the trunk sewers along Castle Peak Road. A number of new developments such as Pok Oi Hospital Extension and Kai Tei Development are under construction and two comprehensive developments are under active planning in the Area. We estimate that the projected population of the Area will increase to about 31 000 by 2016. As the existing sewerage along Castle Peak Road does not have adequate capacity to cater for the increasing sewage flow, we propose to construct new trunk sewers along Yuen Long Highway from Au Tau to Kung Um Road under **274DS** and from Kung Um Road to Ma Fung Ling Road under **157DS** to serve the Area. Due to the topography of the Area, we propose to construct two sewage pumping stations and the associated rising mains to uplift the sewage to the proposed trunk sewers for treatment in San Wai STW before being discharged into Urmston Road waters.

6. Tong Yan San Tsuen, with an estimated population of 4 800, is located in the southwest of Yuen Long. At present, domestic sewage from this unsewered village is partially treated in private treatment facilities before being discharged into Deep Bay. Most of these treatment facilities are septic tanks with soakaway systems in village houses. In order to protect the water quality in Deep Bay and as a long-term measure to improve its water quality, we need to construct the proposed sewerage facilities to collect and convey the sewage from Tong Yan San Tsuen to San Wai STW for treatment and disposal.

7. Upon completion of the proposed works, the sewerage system could collect 15 300 m^3 of sewage generated from Au Tau area and Tong Yan San Tsuen each day for proper treatment. Moreover, we would be able to link up the proposed sewers and rising mains works under **157DS** and **274DS** with other sewerage improvement works in Yuen Long for provision of the required sewerage capacity to serve potential developments and the unsewered villages in the southern areas of Yuen Long Highway with a projected population of about 56 200 by 2016.

/8. .....

8. Part of the proposed trunk sewers and rising mains works under **274DS** will fall within the works site of the Director of Territory Development (DTD) for the drainage project **70CD** "Yuen Long Bypass Floodway"[1]. Subject to approval by Finance Committee, DTD's contract under **70CD** will commence in November 2002 for completion in May 2006. To minimise public inconvenience arising from repeated road openings, part of the proposed sewerage works under **274DS** will be incorporated into DTD's drainage project under **70CD.**

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be $169.4 million in MOD prices (see paragraph 10 below), made up as follows –

			$ million	
			157DS	**274DS**
(a)	Sewers		65.0	24.0
	(i) about 1.5 km (**157DS**) and 1.7 km (**274 DS**) of twin rising mains	26.4	14.5	
	(ii) about 0.3 km of twin rising mains by trenchless method[2]	26.6	-	

/(iii).....

---

[1] A related paper, PWSC(2002-03)35, for the upgrading of **70CD** under **Head 707** to Category A is submitted for Members' consideration at this meeting.

[2] Trenchless method refers to the use of micro-tunnelling or boring techniques to construct underground sewers and drain pipes without opening up the road surface. Although the method is about four times more expensive than the conventional open cut method, the former method, if feasible, is preferred for carrying out works at busy road sections since it will greatly reduce the need for road opening thus minimising disruption to traffic during the construction phase.

			$ million		
			157DS	**274DS**	
	(iii) about 0.9 km (**157DS**) and 0.6 km (**274DS**) of gravity sewers	5.6		9.5	
	(iv) about 0.1 km of gravity sewers by trenchless method	6.4		-	
(b)	Sewage pumping station		33.1	29.7	
	(i) civil works	19.2		19.3	
	(ii) Electrical and mechanical works	13.9		10.4	
(c)	Environmental mitigation measures		2.3	1.2	
(d)	Contingencies		11.0	5.9	
	Sub-total		111.4	60.8	(in September 2001 prices)
(e)	Provision for price adjustment		(1.9)	(0.9)	
	Total		109.5	59.9	(in MOD prices)

10. Subject to approval, we will phase the expenditure as follows –

/2002-2003.....

Year	$ million (Sept 2001)		Price adjustment factor	$ million (MOD)	
	157DS	**274DS**		**157DS**	**274DS**
2002 – 2003	4.3	2.4	0.98625	4.2	2.4
2003 – 2004	29.0	8.4	0.98378	28.5	8.3
2004 – 2005	36.7	14.7	0.98378	36.1	14.5
2005 – 2006	28.2	23.2	0.98378	27.7	22.8
2006 – 2007	7.7	9.5	0.98378	7.6	9.3
2007 – 2008	5.5	2.6	0.98378	5.4	2.6
Total	111.4	60.8		109.5	59.9

11. We have derived the MOD estimates on the basis of Government's latest forecast of trend labour and construction prices for the period 2002 to 2008. DTD will tender part of the proposed civil engineering works under **274DS** as a standard re-measurement contract. D of DS will also tender the remaining civil engineering works as a standard re-measurement contract because of the uncertainties of the existence and location of underground utilities such as electricity cables, telephone cables, and water pipes. Both contracts will provide for price adjustments because the contract period will exceed 21 months. We will tender the proposed electrical and mechanical works on a fixed-price lump-sum basis because we can clearly define the scope of works in advance.

12. We estimate the annual recurrent expenditure for operation and maintenance of the proposed works to be $1.6 million for **157DS** and $1.1 million for **274DS**.

/13. .....

13. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works by themselves would lead to an increase in the recurrent cost of providing sewage services by about 0.2%. This will need to be taken into account in determining sewage charges.

PUBLIC CONSULTATION

14. We consulted the Environmental Improvement Committee of the then Yuen Long District Board in March 1994 on the village sewerage works under **157DS**, which include the proposed stage 2 phase 4D works at Tong Yan San Tsuen. Members supported implementation of the proposed works.

15. We consulted the then Yuen Long Provisional District Board in May 1999 on the proposed stage 2 phase 2 works under **157DS** and stage 3 phase 1 works under **274DS**. Members supported implementation of the proposed works.

16. We consulted the Legislative Council Panel on Environmental Affairs on the proposed stage 2 phase 2 works under **157DS** and stage 3 phase 1 works under **274DS** on 26 November 2001. Members noted that we would submit the project proposal to the Public Works Subcommittee for discussion.

17. We gazetted the proposed village sewerage works of **157DS** stage 2 phase 4D under the Water Pollution Control (Sewerage) Regulation (WPC(S)R) on 18 May 2001. We received one objection. The objector was concerned that the development of his land would be affected by the proposed works. Subsequent to our discussion, the objector agreed to withdraw his objection unconditionally. The Director of Environmental Protection (DEP) authorised the proposed works under WPC(S)R on 14 December 2001.

18. We gazetted the proposed sewerage works of **157DS** stage 2 phase 2 under WPC(S)R and the Roads (Works, Use and Compensation) Ordinance (R(WUC)O) on 25 May 2001. We received no objection under R(WUC)O but three under WPC(S)R. The objectors were concerned that the proposed works would affect the development of their lands and would lead to the relocation of a clan grave. Subsequent to our discussion with the objectors, they agreed to withdraw their objections unconditionally. DEP and the Secretary for Transport authorised the proposed works under WPC(S)R and R(WUC)O on 11 January and 22 March 2002 respectively.

/19. .....

19. We gazetted the proposed sewage pumping station and trunk sewers works of **274DS** stage 3 phase 1 under WPC(S)R on 8 December 2000. We received no objection regarding the trunk sewers works but one against the sewage pumping station works. The objector was concerned that the development of her land would be affected by the proposed works. Subsequent to our discussion with the objector, we slightly amended the location of the proposed Au Tau Sewage Pumping Station. As a result, the objector agreed to withdraw her objection unconditionally. The amended sewerage scheme was gazetted on 26 October 2001 and no further objection was received. DEP authorised the proposed sewage pumping station and trunk sewers works on 25 January and 26 April 2002 respectively.

ENVIRONMENTAL IMPLICATIONS

20. Construction of the Yuen Long South Pumping Station under **157DS** and Au Tau Pumping Station under **274DS** constitute Designated Projects under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499). D of DS prepared the Project Profiles for the two projects and applied for permission to apply directly for the Environmental Permits. The Environmental Permits for the construction of the pumping stations were issued on 28 March 2002. D of DS will also apply for the relevant Environmental Permits before operating the pumping stations.

21. The project profiles for the two projects concluded that the construction and operation of the sewerage works would not give rise to insurmountable environmental impacts with the implementation of mitigation measures. The pumping stations will be constructed in totally enclosed structures to mitigate the noise impact. Force ventilation systems fitted with deodouriser will be installed to clean the air during operation of the pumping stations before discharging into open air. For short-term impact during construction, we will 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 dust, and strict control on diversion of sewage flows under the works contracts.

22. We estimate the cost of implementing the environmental mitigation measures to be $3.5 million ($2.3 million for **157DS** and $1.2 million for **274DS**). We have included these in the overall project estimate.

/23. .....

/23. .....

23. At the planning and design stages, we have given due consideration to the need to minimise the generation of construction and demolition (C&D) materials when designing the levels and alignments of the proposed sewers and rising mains. To further minimize the generation of C&D materials, we will encourage contractors to use steel instead of timber for formwork and temporary works. We will require contractors to submit a waste management plan (WMP) for our approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse, and recycle C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of public fill and C&D waste in designated public filling facilities and landfills respectively through a trip-ticket system. We will require contractors to separate public fill from C&D waste for disposal at appropriate facilities. We will record the disposal, reuse, and recycling of C&D materials for monitoring purposes. We estimate that the project will generate about 29 390 m^3 of C&D materials. Of these, we will reuse about 7 530 m^3 (25.6%) on site, 21 610 m^3 (73.5%) as fill in public filling areas[3], and dispose of about 250 m^3 (0.9%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be $31,250 for this project (based on a notional[4] unit cost of $125/$m^3$).

LAND ACQUISITION

24. The proposed works require land resumption of about 0.4 hectares of agricultural land and very minimal building and garden land (about 90 square metres). The land resumption and clearance cost for the project is estimated at $10.6 million and will be charged to **Head 701** – Land Acquisition. All the statutory procedures for resuming the required land have been completed in accordance with WPC(S)R.

/BACKGROUND .....

---

[3] A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering.

[4] This estimate has taken into account the cost for developing, operating, and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at $90/$m^3$), nor the cost to provide new landfills (which are likely to be more expensive) when the existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

BACKGROUND INFORMATION

25. In March 1992, we completed a sewerage master plan for Yuen Long and Kam Tin under **112DS** "Yuen Long and Kam Tin sewerage master plan study – consultants' fees and investigations". In December 1992, we included **157DS** "Yuen Long and Kam Tin sewerage" into Category B for implementation of sewerage works recommended under the sewerage master plan.

26. In May 1993, we upgraded part of **157DS** to Category A as **164DS** "Yuen Long and Kam Tin sewerage, stage 1" for the improvement of existing sewers in Yuen Long and the construction of new sewers along Castle Peak Road. We started the stage 1 works in October 1993 and completed them in February 1996.

27. In May 1995, we upgraded another part of **157DS** to Category A as **194DS "**Yuen Long and Kam Tin sewerage, stage 2 phase 1 – Modification works at Ping Shun Street Pumping Station, rising main to Ha Tsuen Pumping Station and sewers in Tong Yan San Tsuen". We started the works in August 1995 and completed them in October 1998.

28. In October 1995, we sub-divided **157DS** into **157DS** "Yuen Long and Kam Tin sewerage, stage 2" and **274DS** "Yuen Long and Kam Tin sewerage, stage 3".

29. In December 1998 and February 2001, we completed the detailed design of the village sewerage for Sha Chau Lei Tsuen (stage 2 phase 3A) and Tong Yan San Tsuen (stage 2 phase 4A) under **157DS** respectively and included two separate items under block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme" for construction of the proposed village sewerage works. We commenced the stage 2 phase 3A works at Sha Chau Lei Tsuen in May 1999 and completed them in December 2000. In July 2001, we commenced the stage 2 phase 4A works at Tong Yan San Tsuen for completion in March 2003.

30. For the proposed sewerage works under **157DS** and **274DS** we now propose to upgrade to Category A, we completed the detailed design by in-house resources and plan to start the construction works in October 2002 for completion in May 2006. Following completion of the proposed works, DEP will serve

notice to require villagers at Tong Yan San Tsuen to carry out the final house connection works under the Water Pollution Control Ordinance. /31. .....

31. The remaining village sewerage works under **157DS**, covering nine villages (including phases 3B, 3C, 4B, 4C and five other phases), and those under **274DS**, covering 34 villages, are being planned for construction to start in phases in 2003-04 subject to completion of statutory procedures and funding approval.

32. As the majority of the trunk sewers and rising mains works proposed under **157DS** and **274DS** will be constructed outside the boundary of the Yuen Long Highway, there will not be adverse impact on the Highway traffic. For the sewers along Ma Fung Ling Road under **157DS**, we have completed a traffic impact assessment and formulated feasible temporary traffic management schemes for the construction works. During construction, we will maintain road access as far as possible, display notice boards on site to explain the reason for the temporary traffic arrangements and the proposed completion dates of the concerned sections of the works. In addition, telephone hotlines will be set up to answer public enquiries or handle complaints.

33. After the phased completion of the trunk sewers works under **157DS** and **274DS**, we will start the construction of branch sewers for Yuen Long South under **215DS** "Yuen Long and Kam Tin Sewerage and Sewage Disposal", which was included into Category B in 1998. The branch sewers under **215DS** will connect to the trunk sewers constructed under **157DS** and **274DS** and will serve the outskirts of the unsewered villages in Youth Long South. We deployed in-house resources to conduct detailed design of the works under **215DS** and plan to start the construction works in phases from end 2005 for completion in end 2007.

34. For the collection of sewage generated from other unsewered villages in Yuen Long and Kam Tin not covered by the above projects, the Administration plans to commission a study to formulate the implementation strategy in early 2003 for completion in mid 2004. The proposed sewerage works, upon completion, will provide a basic trunk sewerage system for the new and existing developments, including the unsewered villages.

35. We estimate that the project will create some 126 jobs comprising 25 professional/technical staff and 101 labourers, totalling 3 600 man-months.

Environment and Food Bureau
May 2002
(pwsc157ds&274dsfin.doc)