

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 - DRAINAGE

Environmental Protection – Sewerage and sewage treatment 61DR – Northeast New Territories village sewerage, phase 2

Members are invited to recommend to Finance Committee the upgrading of the remainder of **61DR** to Category A at an estimated cost of \$107.0 million in money-of-the-day prices.

PROBLEM

Domestic sewage from unsewered areas in the Northeast New Territories (NENT) contributes to water pollution in Deep Bay.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment and Food, proposes to upgrade the remainder of **61DR** to Category A at an estimated cost of \$107.0 million in money-of-the-day (MOD) prices for implementing the NENT village sewerage phase 2 works.

PROJECT SCOPE AND NATURE

3. The remainder of **61DR** we now propose to upgrade to Category A covers works at 16 unsewered areas in the NENT. A location plan is at Enclosure 1. The scope of works comprises the construction of –

- (a) about 13 kilometres (km) of sewers, ranging from 225 millimetres (mm) to 500 mm in diameter, for 16 unsewered areas in the NENT, namely Heung Yuen Wai, Ha Heung Yuen, Tsung Yuen Ha, Chuk Yuen North, Chuk Yuen South, Kaw Liu, Ta Kwu Ling, Kan Tau Wai, Tong Fong, Ping Yeung, Tai Po Tin, Ping Che, Pak Hok Shan, Tai Tong Wu, Leng Tsai, and Hung Leng;
- (b) seven sewage pumping stations with associated rising mains, (three in Ping Yeung, and one each in Chuk Yuen North, Hung Leng, Leng Tsai, and Tai Tong Wu);
- (c) five communal septic tanks and absorption fields¹ (one set each in Heung Yuen Wai, Ha Heung Yuen, Tsung Yuen Ha, Chuk Yuen North, and Chuk Yuen South); and
- (d) an aqua-privy with associated septic tank and absorption field in Fung Wong Wu.

We plan to start the proposed works in July 2002 for completion in December 2004.

JUSTIFICATION

4. At present, domestic sewage from the unsewered areas in the NENT is partially treated by private treatment facilities before discharge into Deep Bay via stormwater drains and streams. Most of these treatment facilities are septic tanks with soakaway systems in village houses. The effectiveness of these facilities in removing pollutants depends on their size², whether they are located in areas where the ground conditions are suitable for the soakaway systems to work properly³, and whether the systems are properly maintained. Sewage discharged from these unsewered areas is a source of pollution in Deep Bay.

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¹ An absorption field provides the requisite surface area for proper treatment of septic tank effluent.

² Undersized septic tanks or soakaway systems would affect the pollutant removal efficiency of a system and may even lead to an overflow of effluent.

³ Soakaway systems operate by allowing the effluent to percolate through the gravel whereby pollutants would be removed in a natural manner. However, if a system is located in an area where the underground water table is high, it cannot function properly.

5. The Administration has been planning to address water pollution problem at the 16 unsewered areas in the NENT and to deal with the leachate⁴ discharged from the NENT Landfill. We included **61DR** in the Public Works Programme in April 1990 for implementation of leachate treatment facilities for the NENT Landfill and village sewerage works for 16 unsewered areas. We completed the leachate treatment facilities in November 1995. As regards the village sewerage works, we planned to implement them in two phases in order to abate water pollution in these areas.

6. In 1993, we upgraded part of **61DR** as **86DR** "NENT landfill village sewerage, phase 1". The phase 1 works were completed in May 1996. We now propose to upgrade the remainder of **61DR** to Category A as the NENT village sewerage phase 2 works.

7. The proposed sewers at the 16 unsewered areas are required to serve an estimated population of 5 500. Due to the topography of Ping Yeung, Chuk Yuen North, Hung Leng, Leng Tsai and Tai Tong Wu, we will have to construct seven sewage pumping stations to uplift the sewage collected from these areas to either the existing public sewers or the proposed communal septic tanks and absorption fields. Since Heung Yuen Wai, Ha Heung Yuen, Tsung Yuen Ha, Chuk Yuen North and Chuk Yuen South are relatively remote and isolated, it would not be cost-effective to extend the public sewerage system to these areas. Taking into account the availability of sufficient space and the suitability of ground conditions, we propose to construct five communal septic tanks and absorption fields in these areas to treat the sewage on site. According to an agreement made with villagers during the consultation on implementation of the NENT Landfill project, Government would construct an aqua privy in Fong Wong Wu for them. The proposed aqua privy was included in the gazette plan in July 2001 which was subsequently authorised under the Water Pollution Control (Sewerage) Regulation in October 2001. We will also construct the associated septic tank and absorption field to treat the sewage from the proposed aqua privy.

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⁴ Leachate is highly polluted underflow discharged from landfill site due to decomposition of waste materials in the landfill.

8. We will provide proper on-site treatment to the sewage collected under the project by means of communal septic tanks and absorption fields or convey the sewage via the existing sewerage system to Shek Wu Hui sewage treatment works for secondary treatment⁵ before discharge into Deep Bay. Upon completion of the works, we will be able to improve the water quality of Deep Bay by providing proper treatment to about 1 700 cubic metres (m³) of sewage per day.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be \$107.0 million in MOD prices (see paragraph 10 below), made up as follows –

	\$ million	
(a) Sewers (including house connection works ⁶)	48.8	
(b) Sewage pumping stations	20.6	
(i) civil works	7.0	
(ii) electrical and mechanical works	13.6	
(c) Communal septic tanks and absorption fields	5.0	
(d) Aqua-privy	0.9	
(e) Environmental mitigation measures	2.6	
(f) Consultants' fees for	18.0	
(i) contract administration	3.9	/(ii)

⁵ Secondary treatment refers to purification of sewage by means of biological treatment processes after the sewage has undergone primary treatment which comprises screening, removal of grit and a sedimentation process. The organic matter in the settled sewage will be decomposed by micro-organisms in the biological treatment process.

⁶ According to an agreement made with villagers during the consultation on implementation of the NENT Landfill project, Government would complete the house connection works (i.e. installing sewer pipes to connect the houses with the public sewer mains) for those houses that already existed before the operation of the landfill. For houses built thereafter, the house owners would have to complete the house connection works themselves upon the request of Environmental Protection Department under the Water Pollution Control Ordinance.

		\$ million	
	(ii) site supervision	14.1	
(g)	Contingencies	10.1	
	Sub-total	106.0	(in September 2001 prices)
(h)	Provision for price adjustment	1.0	
	Total	107.0	(in MOD prices)

A breakdown of the estimates for the consultants' fees by man-months is at Enclosure 2.

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

Year	\$ million (Sept 2001)	Price adjustment factor	\$ million (MOD)
2002-2003	11.0	0.99700	11.0
2003-2004	38.0	1.00398	38.2
2004-2005	37.0	1.01101	37.4
2005-2006	15.0	1.01808	15.3
2006-2007	5.0	1.02521	5.1
	106.0		107.0

11. We have derived the MOD estimate on the basis of Government's latest forecast of trend labour and construction prices for the period 2002 to 2007. We will tender the proposed 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. The contract will provide for price adjustments because the contract period will exceed 21 months.

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12. We estimate the annual recurrent expenditure for maintenance works to be \$2.6 million.

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 0.19%. This will need to be taken into account in determining sewage charges.

PUBLIC CONSULTATION

14. We consulted the District Development and Environmental Improvement Committee of the then Provisional North District Board in September 1998 on the proposed NENT village sewerage phase 2 works under **61DR**. Members supported implementation of the proposed works. Between 1999 and 2001, we consulted representatives of individual villages. They also supported implementation of the proposed works.

15. We consulted the Legislative Council Panel on Environmental Affairs on the proposed works on 26 November 2001. Members noted that we would submit the project proposal to the Public Works Subcommittee for discussion in the 2001-02 LegCo session.

ENVIRONMENTAL IMPLICATIONS

16. We completed an environmental impact assessment (EIA) study on the "NENT Leachate Treatment Phase 1 and Village Sewerage" in July 1992. The EIA concluded that the proposed works would not cause long-term adverse environmental impact. 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 in the works contracts.

17. We estimate the cost of implementing the environmental mitigation measures to be \$2.6 million. We have included this in the overall project estimate.

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18. 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 level and layout of the proposed works. We will require the contractor to submit a waste management plan (WMP) for 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 the contractor 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 purpose. We estimate that the project will generate about 17 800 m³ of C&D materials. Of these, we will reuse about 15 480 m³ (87%) on site, 1 160 m³ (6.5%) as fill in public filling areas⁷, and dispose of 1 160 m³ (6.5%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$145,000 for this project (based on a notional unit cost⁸ of \$125/m³).

LAND ACQUISITION

19. The proposed village sewerage phase 2 works require land acquisition. The land resumption and clearance cost for the project is estimated at \$14.2 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 the Water Pollution Control (Sewerage) Regulation.

BACKGROUND INFORMATION

20. In April 1990, we included **61DR** into Category B for implementation of the proposed leachate treatment facilities for the NENT Landfill and the village sewerage works for 16 unsewered areas.

21. In April 1990, we upgraded part of **61DR** to Category A as **62DR** “NENT landfill leachate treatment phase 1 and village sewerage – consultants’ fees and investigation” for carrying out the site investigation and detailed design for the whole project.

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⁷ 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.

⁸ 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 per/m³), 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.

22. In May 1992, we upgraded part of **61DR** to Category A as **84DR** “NENT leachate treatment works, phase 1” to undertake the construction of the NENT leachate treatment facilities. We started the works in November 1992 and completed them in November 1995.

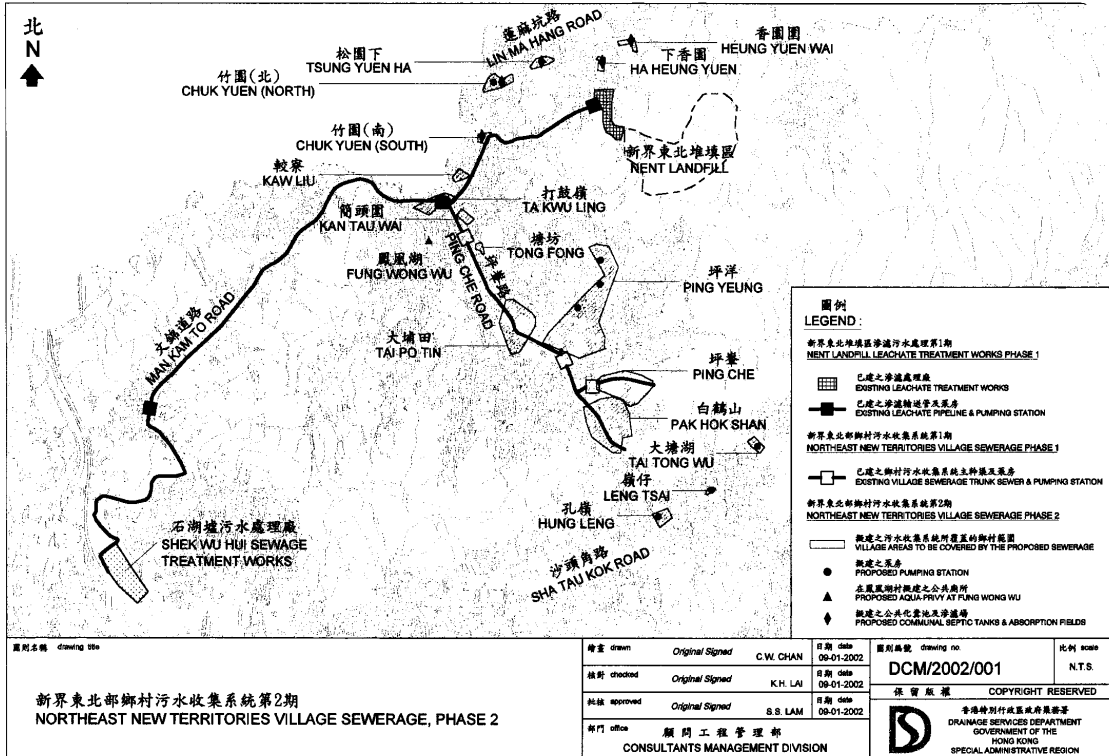
23. In January 1993, we upgraded another part of **61DR** to Category A as **86DR** “NENT landfill village sewerage, phase 1” to undertake the construction of the public sewerage system along Ping Che Road. We started the works in May 1993 and completed them in May 1996.

24. For the proposed village sewerage phase 2 works, we settled all land acquisition issues and obtained authorisation under the Water Pollution Control (Sewerage) Regulation in October 2001. We plan to start the proposed works in July 2002 for completion in December 2004. Following completion of the proposed works, Environmental Protection Department will serve notice to request villagers to carry out the final house connection works under the Water Pollution Control Ordinance.

25. The proposed works mainly involve the construction of sewers and manholes underneath existing alleys inside the villages. Since no major roads will be affected, we expect the traffic impact on existing roads and carriageways to be minimal. Therefore, no traffic impact assessment is necessary.

26. We estimate that the project will create some 84 jobs comprising 24 professional/technical staff and 60 labourers, totalling 2 300 man-months.

Environment and Food Bureau
February 2002



圖則名稱 drawing title

新界東北鄉村污水收集系統第2期
NORTHEAST NEW TERRITORIES VILLAGE SEWERAGE, PHASE 2

繪圖 drawn	Original Signed	C.W. CHAN	日期 date	09-01-2002
核對 checked	Original Signed	K.H. LAI	日期 date	09-01-2002
批准 approved	Original Signed	S.S. LAM	日期 date	09-01-2002
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION			

圖則編號 drawing no.	DCM/2002/001	比例 scale	N.T.S.
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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

61DR – Northeast New Territories village sewerage, phase 2**Breakdown of the consultants' fees**

Consultants' staff costs			Estimated man-months	Average MPS* salary point	Multiplier^(Note 1)	Estimated fee (\$ million)
(a)	Contract administration ^(Note 2)	Professional	21.0	-	-	3.0
		Technical	19.0	-	-	0.9
(b)	Site supervision by resident site staff of the consultants ^(Note 3)	Professional	50.0	38	1.7	5.1
		Technical	270.0	14	1.7	9.0
Total consultants' staff costs						18.0

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.4 is applied to the average MPS point to estimate the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. A multiplier of 1.7 is applied in the case of resident site staff supplied by the consultants. (As at 1.4.2001, MPS pt. 38 = \$60,395 per month and MPS pt. 14 = \$19,510 per month).
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the investigation, design and construction of the project **61DR**.
3. The consultants' staff cost for site supervision is based on estimates prepared by the Director of Drainage Services. We will only know the actual man-months and actual costs after the completion of the construction works.