

## **ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE**

### **HEAD 704 - DRAINAGE**

#### **Environmental Protection – Sewerage and sewage treatment**

#### **229DS – North District and Tolo Harbour sewerage, sewage treatment and disposal – high priority works – expansion of Shek Wu Hui sewage treatment works and Ting Kok Road pumping station No. 5**

Members are invited to recommend to Finance Committee the upgrading of **229DS** to Category A at an estimated cost of \$283.1 million in money-of-the-day prices for the expansion of Shek Wu Hui sewage treatment works and Ting Kok Road pumping station No. 5.

### **PROBLEM**

Shek Wu Hui sewage treatment works (SWHSTW) and Ting Kok Road pumping station (TKRPS) No. 5 are unable to cope with the forecast increase in sewage flow from Sheung Shui, Fanling and Tai Po areas.

### **PROPOSAL**

2. The Director of Drainage Services, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **229DS** to Category A at an estimated cost of \$283.1 million in money-of-the-day (MOD) prices for the expansion of SWHSTW and TKRPS No. 5.

**/PROJECT .....**

## PROJECT SCOPE AND NATURE

3. The scope of the proposed works comprises –
- (a) Shek Wu Hui sewage treatment works
    - (i) construction of one bioreactor and the associated facilities;
    - (ii) construction of an air blower house;
    - (iii) construction of two final sedimentation tanks;
    - (iv) expansion of existing sludge treatment facilities; and
    - (v) ancillary works including power supply systems, instrumentation and control equipment, pipeworks, deodorisation facilities, building services installations, fire services installations, lifting appliances, cabling works and road works.
  - (b) Ting Kok Road pumping station No. 5
    - (i) reconstruction of a sewage pumping station and construction of about 350 metres (m) twin rising mains; and
    - (ii) construction of about 300 m gravity sewers of 600 millimetres (mm) diameter and ancillary works.

———— The site plans are at Enclosure 1.

4. We plan to start construction in October 2005 for completion in February 2009.

## JUSTIFICATION

5. The existing SWHSTW is a secondary treatment plant serving the Sheung Shui and Fanling areas, with a design capacity of 80 000 cubic metres (m<sup>3</sup>)

/per .....

per day. Treated effluent from SWHSTW is discharged into River Indus and eventually into Deep Bay. Due to continuing developments and expansion of the sewerage networks in Sheung Shui and Fanling in recent years, the flow to SWHSTW is approaching the design capacity. To cope with the projected increase arising from potential developments based on the current committed land use and to protect water quality in the receiving water bodies, we propose to construct the additional treatment facilities in paragraph 3(a) to increase the treatment capacity of SWHSTW to 93 000 m<sup>3</sup> per day.

6. The existing TKRPS No. 5 conveys the sewage collected from developments along Ting Kok Road between Tai Po Industrial Estate and Tai Mei Tuk to the Tai Po sewage treatment works. It has a design flow capacity of about 2 900 m<sup>3</sup> per day. Due to continuous development along Ting Kok Road and the expansion of sewerage networks in that area in recent years, the flow to TKRPS No. 5 is approaching the design capacity. To cope with the projected increase arising from potential developments based on the current committed land use, we propose to reconstruct TKRPS No. 5 to increase the flow capacity of the pumping station to 11 500 m<sup>3</sup> per day.

7. The Director of Drainage Services will deploy in-house staff to supervise the construction works. Specialist consultants will be employed to conduct environmental monitoring and audit.

## FINANCIAL IMPLICATIONS

8. We estimate the capital cost of the proposed works to be \$283.1 million in MOD prices (see paragraph 9 below), made up as follows –

	<b>\$ million</b>
(a) Shek Wu Hui sewage treatment works	191.5
(i) bioreactor and associated facilities	64.8
(ii) air blower house	28.9

/(iii) .....

	<b>\$ million</b>	
(iii) final sedimentation tanks	33.9	
(iv) sludge treatment facilities	31.8	
(v) ancillary works	32.1	
(b) Ting Kok Road Pumping Station No. 5	47.5	
(i) pumping station and rising mains	31.4	
(ii) gravity sewers and ancillary works	16.1	
(c) Environmental mitigation measures	10.1	
(d) Environmental monitoring and audit	6.8	
(i) consultants' fees	4.7	
(ii) investigation and surveys	2.1	
(e) Contingencies	25.0	
Sub-total	280.9	(in September 2004 prices)
(f) Provision for price adjustment	2.2	
Total	283.1	(in MOD prices)

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

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

Year	\$ million (Sept 2004)	Price adjustment factor	\$ million (MOD)
2005 – 2006	9.6	1.00450	9.6
2006 – 2007	45.1	1.00576	45.4
2007 – 2008	88.0	1.00576	88.5
2008 – 2009	86.9	1.00576	87.4
2009 – 2010	26.9	1.00953	27.2
2010 – 2011	24.4	1.02593	25.0
	280.9		283.1

10. We have derived the MOD estimates on the basis of Government's latest forecast of trend rate of change in the prices of public sector building and construction output for the period from 2005 to 2011. We will implement the works under three contracts: a civil works contract and two electrical and mechanical (E&M) works contracts. We will tender the civil works on a re-measurement basis because of uncertain ground conditions. The civil contract will provide for price adjustments because the contract period will exceed 21 months. We will tender the two E&M contracts for the supply and installation of E&M equipment for the proposed works on a lump-sum basis without any price adjustment.

11. We estimate the annual recurrent expenditure arising from the proposed works to be about \$5.3 million.

12. Based on the current level of expenditure on operation and maintenance of sewerage facilities, the proposed works themselves will lead to an increase in the recurrent cost of providing sewage services by about 0.32%, which will need to be taken into account in determining future sewage charges.

/PUBLIC .....

## **PUBLIC CONSULTATION**

13. We consulted the District Development and Environmental Improvement Committee of the North District Council on the proposed expansion of SWHSTW on 19 July 2004. Members supported the proposed works. We also consulted the Environment, Housing and Works Committee of the Tai Po District Council on the proposed reconstruction of the TKRPS No. 5 on 12 November 2004. Members supported the proposed works.

14. We consulted the Legislative Council Panel on Environmental Affairs on the project on 24 March 2005. Members supported the implementation of the proposed works.

## **ENVIRONMENTAL IMPLICATIONS**

15. Reconstruction of TKRPS No. 5 is a designated project under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499), and expansion of SWHSTW constitutes a material change to an exempted designated project under the Ordinance. The projects require environmental permits under the Ordinance for construction and operation. With regard to the project profiles of the projects, the Director of Environmental Protection (DEP) is satisfied that the environmental impact of the projects and the mitigation measures meet the requirements of the Technical Memorandum on the EIA process. DEP granted permission for applying directly environmental permits for the TKRPS No. 5 and expansion of the SWHSTW on 25 February 2005 and 12 May 2005 respectively.

16. We will implement the mitigation measures set out in the project profiles and as required by the DEP. During the construction stage, we will incorporate pollution control measures in the works contracts to control noise, dust and site run-off. As the TKRPS No. 5 is located adjacent to the Shuen Wan landfill, we will incorporate precautionary measures to prevent landfill gas hazard and monitor landfill gas to ensure the safety of the construction works. For long term impacts, we will carry out key mitigation measures including the installation of deodorisation facilities at both SWHSTW and TKRPS No. 5. We will conduct environmental monitoring and auditing to ascertain the effectiveness of the mitigation measures. We have included \$10.1 million in September 2004 prices in the overall project estimate for implementation of the environmental mitigation measures.

17. We have considered ways of minimising construction and demolition (C&D) materials and maximising recycling C&D materials as far as possible. We will require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate waste mitigation measures to avoid, reduce, reuse and recycle C&D materials, including the allocation of an area for waste segregation. We will ensure that the day-to-day operations on site comply with the approved WMP. We will require the contractor to reuse the excavated material as filling material on site or on other construction sites as far as possible to minimise the disposal of public fill to public fill facilities. To further minimise C&D materials, we will encourage the contractor to use non-timber formwork and recyclable material for temporary works. We will control the disposal of public fill and C&D waste to 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 purposes. We will also give suitable training and instructions to site staff to increase their awareness of waste management issues and the need to minimise waste generation.

18. We estimate that the project will generate about 37 650 cubic metres (m<sup>3</sup>) of C&D materials. Of these, we will reuse about 4 000 m<sup>3</sup> (10.6%) on site and 33 550 m<sup>3</sup> (89.1%) as fill in public filling areas<sup>1</sup>, and dispose of 100 m<sup>3</sup> (0.3%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$12,500 for this project (based on a notional unit cost<sup>2</sup> of \$125/m<sup>3</sup>).

## LAND ACQUISITION

19. The project does not require any land resumption.

**/BACKGROUND .....**

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<sup>1</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purpose. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering and Development.

<sup>2</sup> 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<sup>3</sup>), nor the cost to provide new landfills (which are likely to be more expensive) when existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

**BACKGROUND INFORMATION**

20. In November 2003, we upgraded **229DS** “North District and Tolo Harbour sewerage, sewage treatment and disposal – high priority works – expansion of SWHSTW and TKRPS No. 5” to Category B. We completed the detailed design using in-house staff resources.

21. The proposed project will involve the removal of 141 common trees including about 129 trees to be felled and 12 trees to be replanted within the project site. All trees to be removed are not important trees<sup>3</sup>. We will incorporate the planting proposal as part of the project, including an estimated quantity of 155 trees.

22. We estimate that the proposed works will create about 130 jobs (113 for labourers and another 17 for professional/technical staff) providing a total employment of 4 100 man-months.


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Environment, Transport and Works Bureau  
May 2005

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
<sup>3</sup> Important trees include trees on the Register of Old and Valuable Trees, and any other trees which meet one or more of the following criteria –

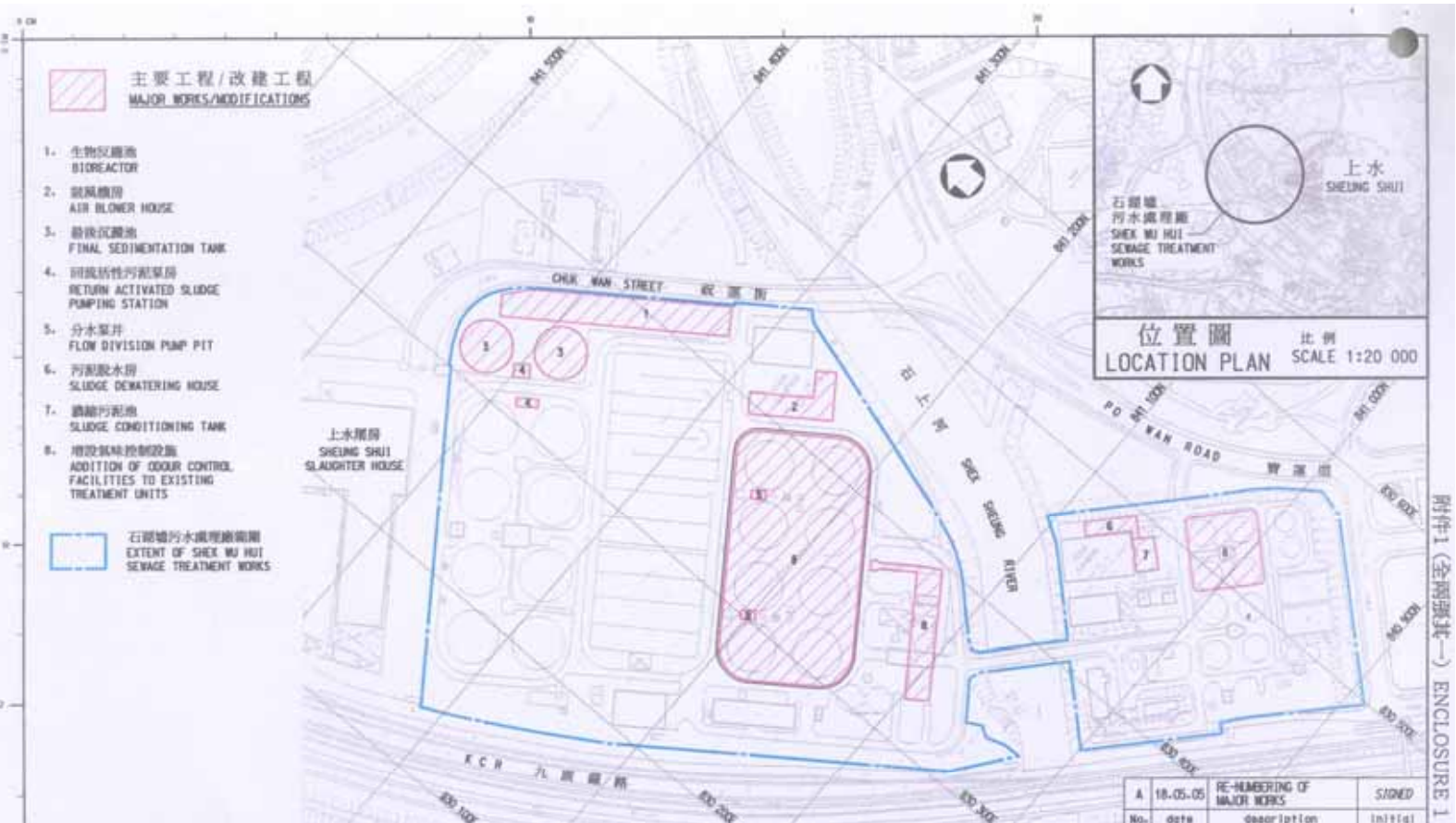
- (a) trees over 100 years old;
- (b) trees of cultural, historical or memorable significance;
- (c) trees of precious or rare species;
- (d) trees of outstanding form; or
- (e) trees with trunk diameter exceeding one metre (measured at one metre above ground level).



 主要工程/改建工程  
MAJOR WORKS/MODIFICATIONS

1. 生物反應池  
BIOREACTOR
2. 鼓風機房  
AIR BLOWER HOUSE
3. 最終沉澱池  
FINAL SEDIMENTATION TANK
4. 回流活性污泥泵房  
RETURN ACTIVATED SLUDGE PUMPING STATION
5. 分水窰井  
FLOW DIVISION PUMP PIT
6. 污泥脫水房  
SLUDGE DEWATERING HOUSE
7. 濃縮污泥池  
SLUDGE CONDITIONING TANK
8. 增設臭味控制設施  
ADDITION OF ODOR CONTROL FACILITIES TO EXISTING TREATMENT UNITS

 石湖墟污水處理廠範圍  
EXTENT OF SHEK WU HUI SEWAGE TREATMENT WORKS



位置圖  
LOCATION PLAN  
比例 SCALE 1:20 000

圖名名稱 drawing title  
**工務工程計劃第229DS號石湖墟污水處理廠擴建工程**  
PWP ITEM NO.229DS EXPANSION OF SHEK WU HUI SEWAGE TREATMENT WORKS

繪畫 drawn	SIGNED	W H TSUI	日期 date	28.04.05
核對 checked	SIGNED	S C CHIU	日期 date	28.04.05
批核 approved	SIGNED	P K CHAN	日期 date	28.04.05
部門 office <b>污水工程部</b>				
<b>SEWERAGE PROJECTS DIVISION</b>				

A	18.05.05	RE-MEMBERING OF MAJOR WORKS	SIGNED
No.	date	description	initial

圖號圖號 drawing no.  
**DDN/229DS/3869A**  
比例 scale  
N.T.S.

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DRAINAGE SERVICES DEPARTMENT  
GOVERNMENT OF THE HONG KONG  
SPECIAL ADMINISTRATIVE REGION



**圖例 LEGEND**

--- 擬建雙管污水渠  
 --- PROPOSED TWIN RISING MAINS  
 — 擬建污水渠  
 — PROPOSED GRAVITY SEWERS

No.	date	DRG. TITLE	REVISED	SIGNED
1	23.05.05			

圖則名稱 drawing title  
 工務工程計劃第229DS號  
 汀角路第6號泵房擴建工程  
 PWP ITEM NO. 229DS  
 EXPANSION OF TING KOK ROAD  
 PUMPING STATION No. 5

繪畫 drawn SIGNED W. H. TSUI  
 日期 date 28.04.05  
 核對 checked SIGNED S. C. LAU  
 日期 date 28.04.05  
 批核 approved SIGNED P. K. CHAN  
 日期 date 28.04.05  
 部門 office 污水工程處  
 SEWERAGE PROJECTS DIVISION

圖則編號 drawing no. DDN/229DS/1871A  
 比例 scale N.T.S.  
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 DRAINAGE SERVICES DEPARTMENT  
 GOVERNMENT OF THE  
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File Name: \\fs01\proj\proj\229ds\1871a\1871a.dwg  
 Date: 28/04/05  
 User: wtsui  
 Plot Date: 28/04/05  
 Plot Time: 11:05:00  
 Plot Scale: 1:1  
 Plot Device: HP DesignJet 5000

**Enclosure 2 to PWSC(2004-05)14**

**229DS – North District and Tolo Harbour sewerage, sewage treatment and disposal – high priority works – expansion of Shek Wu Hui sewage treatment works and Ting Kok Road pumping station No. 5**

**Breakdown of estimates for consultants' costs**

<b>Consultants' staff costs</b>			<b>Estimated man- months</b>	<b>Average MPS* salary point</b>	<b>Multiplier (Note 1)</b>	<b>Estimated fee (\$ million)</b>
<b>Environmental monitoring and audit</b> (Note 2)						
(a)	Environmental checking during construction	Professional	15.0	38	2.0	1.6
		Technical	30.0	14	2.0	1.1
(b)	Odour monitoring	Professional	5.5	38	2.0	0.6
		Technical	18.0	14	2.0	0.6
(c)	Landfill gas monitoring during construction	Professional	3.5	38	2.0	0.4
		Technical	10.0	14	2.0	0.4
<b>Total consultants' staff costs</b>						<b>4.7</b>

\*MPS = Master Pay Scale

**Notes**

1. A multiplier factor of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultant's overheads and profit, as the staff will be employed in the consultant's offices. (At 1 January 2005, MPS Pt. 38 = \$54,255 per month and MPS Pt. 14 = \$18,010 per month).
2. The consultants' staff costs include supervision of investigation works and environmental monitoring works. We will only know the actual man months and actual fees when we have selected the consultant through the usual competitive lump sum fee bid system.