

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

255WF – Replacement of mechanical and electrical equipment in Tai Po Tau raw water pumping station

Members are invited to recommend to Finance Committee the upgrading of **255WF** to Category A at an estimated cost of \$52.1 million in money-of-the-day prices for the replacement of the aged mechanical and electrical plant in Tai Po Tau raw water pumping station.

PROBLEM

Most of the mechanical and electrical equipment in Tai Po Tau raw water pumping station has been in service for more than 30 years. Due largely to ageing, they are generally in very poor condition and beyond economic repair.

PROPOSAL

2. The Director of Water Supplies (DWS), with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **255WF** to Category A at an estimated cost of \$52.1 million in money-of-the-day (MOD) prices for the replacement of the aged mechanical and electrical equipment in Tai Po Tau raw water pumping station.

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PROJECT SCOPE AND NATURE

3. The scope of **255WF** comprises –
- (a) replacement of seven electric pumpsets and the associated pipework, valves and accessories;
 - (b) replacement of five bandscreens;
 - (c) replacement of the manual overhead crane at the bandscreen house by an electric one;
 - (d) replacement of high voltage and low voltage power supply systems;
 - (e) replacement of control and monitoring equipment; and
 - (f) civil modification works associated with items (a) to (e) above.
4. We plan to start the proposed works in March 2003 for completion in December 2005. A site plan showing the location of Tai Po Tau raw water pumping station is at the Enclosure.

JUSTIFICATION

5. The Tai Po Tau raw water pumping station came into service in 1969. It is equipped with eleven electric pumpsets with a total pumping capacity of 609 000 cubic metres (m³) per day. It receives raw water from Muk Wu pumping station, Plover Cove reservoir and Lam Tsuen River and pumps it to the water treatment works at Sha Tin, Tai Po Tau, Sheung Shui and Yau Kom Tau for treatment into potable water and supply to Kowloon, Sha Tin, Tai Po, Sheung Shui, Fanling, Tsuen Wan and Tsing Yi areas.

6. We commissioned the use of seven electric pumpsets, five bandscreens, the manual overhead crane, and the power supply and control equipment at the opening of the pumping station. After more than 30 years, these equipment and installations are approaching the end of their serviceable life and are

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currently in very poor condition. The deficiencies of the pumping station have led to high operation and maintenance costs. We expect the situation to deteriorate in the coming years and this will adversely affect the normal operation of the pumping station. Operational efficiency and maintenance cost apart, the continued use of an aged power supply and control equipment can be potentially dangerous because the risk of power failure leading to fire and explosion would increase.

7. At present, we manually control and regulate the inflow and outflow of the pumping station in response to fluctuations in water demand. This mode of operation is slow in response and out-of-date as compared to centralised computer remote control operation commonly used nowadays. It is necessary to replace the existing aged control and monitoring system by an improved Supervisory Control and Data Acquisition (SCADA) system which has remote and automatic control functions for more efficient monitoring.

8. The other four pumpsets in the pumping station came into service in the early 1980s and are in good working condition.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the project to be \$52.1 million in MOD prices (see paragraph 10 below), made up as follows –

	\$ million
(a) Replacement of seven electric pumpsets and the associated pipework, valves and accessories	23.0
(b) Replacement of five bandscreens	7.8
(c) Replacement of manual overhead crane	0.5
(d) Replacement of high voltage and low voltage power supply systems	9.7
(e) Replacement of control and monitoring equipment	4.9

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		\$ million	
(f)	Civil modification works associated with items (a) to (e) above	1.6	
(g)	Environmental mitigation measures	0.1	
(h)	Contingencies	4.8	
	Sub-total	52.4	(in September 2002 prices)
(i)	Provision for price adjustment	(0.3)	
	Total	52.1	(in MOD prices)

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

Year	\$ million (Sept 2002)	Price adjustment factor	\$ million (MOD)
2003 – 2004	0.5	0.99250	0.5
2004 – 2005	14.1	0.99250	14.0
2005 – 2006	31.9	0.99250	31.7
2006 – 2007	5.8	0.99250	5.8
2007 – 2008	0.1	0.99250	0.1
	52.4		52.1

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11. We have derived the MOD estimates on the basis of the Government's latest forecast of trend labour and construction prices for the period 2003 to 2008. We will tender the supply and installation of the mechanical and electrical equipment under a lump sum contract without provision for price adjustment. Since it is difficult to predetermine the precise timing and quantities of the civil works to be ordered, we will carry out these works under a term contract on a re-measurement basis. The term contract will provide for price adjustments because the contract period will exceed 21 months.

12. The saving in recurrent expenditure arising from this project is about \$1.5 million per annum.

13. This project by itself would lead to a decrease in production cost of water¹ by 0.003% in real terms by 2008.

PUBLIC CONSULTATION

14. We consider that public consultation is not necessary as the project only involves replacement and modification of plant and equipment inside an existing pumping station.

ENVIRONMENTAL IMPLICATIONS

15. DWS completed a Preliminary Environmental Review (PER) of the project in January 2000. The Director of Environmental Protection vetted the PER and agreed that the project is not classified as a "Designated Project" under the Environmental Impact Assessment Ordinance.

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¹ The decrease in production cost of water is calculated on the assumption that the demand remains static during the period from 2002 to 2008 and the amount of government subsidy to the waterworks operations is to be contained at the present level.

16. According to the PER, the project will not cause long term environmental impact. During the works period, we will implement standard environmental pollution control measures in relevant works contracts to ensure that potential environmental impacts are controlled to comply with the established standards and guidelines, which include the use of silenced plant, adequate water supply/storage for dust suppression, proper disposal of wastes and other procedures as recommended in the Environmental Protection Department's Recommended Pollution Control Clauses.

17. 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. We estimate that about 300 cubic metres (m³) of C&D materials will be generated by the project. Of these, we will reuse about 240 m³ (80%) on site, 54 m³ (18%) as fill in public filling areas² and dispose of 6 m³ (2%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$750 for this project (based on a notional unit cost³ of \$125/m³). We will require the contractor 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 will ensure that the day-to-day operations on site comply with the waste management plan. We will also record the reuse, recycling and disposal of C&D materials for monitoring purposes.

LAND ACQUISITION

18. The project does not require land acquisition.

BACKGROUND INFORMATION

19. We upgraded **255WF** to Category B in September 2001.

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² 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.

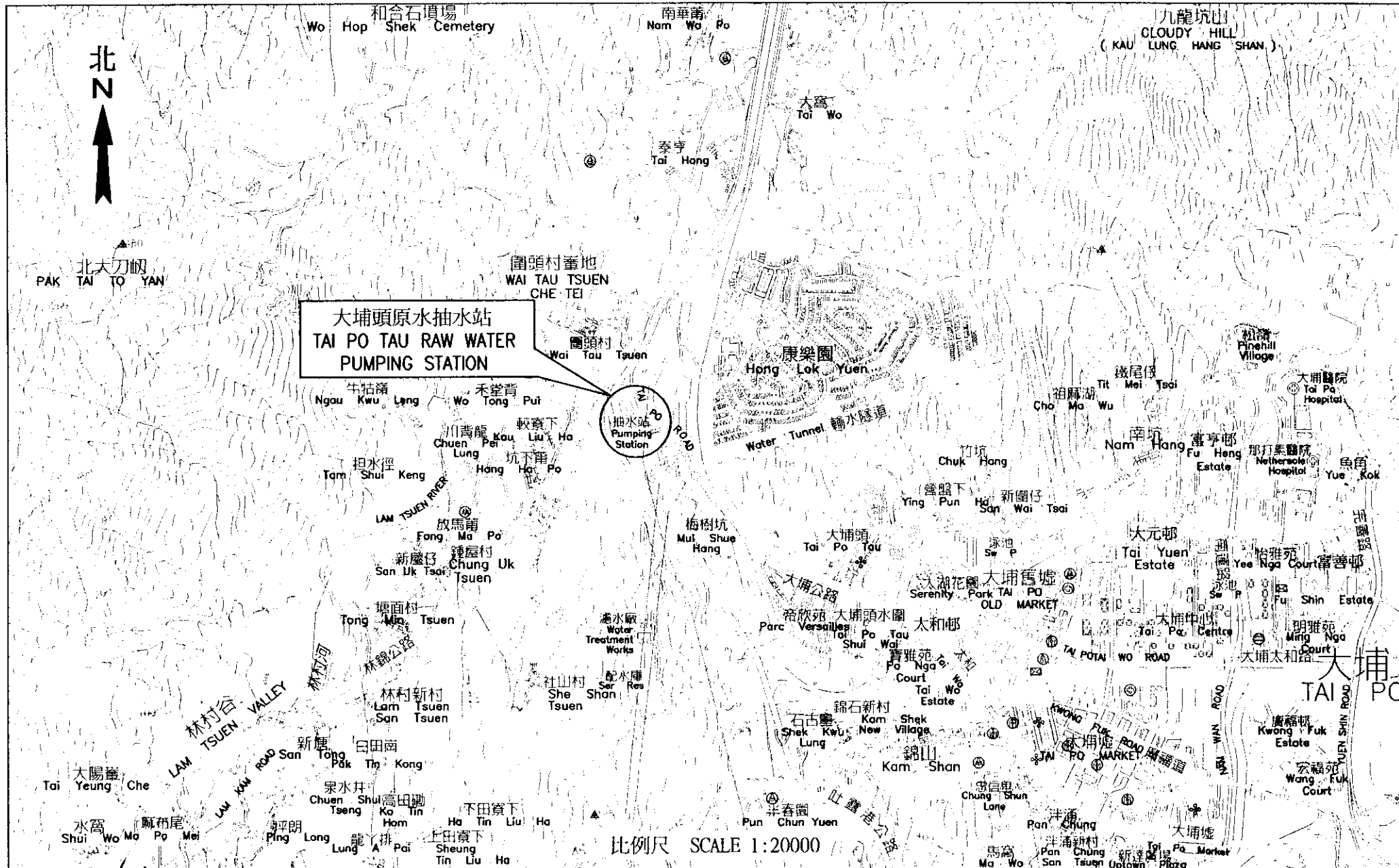
³ This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m³), nor the cost to provide new landfills (which 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.


20. We have substantially completed the detailed design for **255WF** using in-house resources.

21. We estimate that the project will create about six jobs comprising two professional/technical staff and four labourers, totalling 162 man-months.

Environment, Transport and Works Bureau
November 2002

(pWSC255wffin.doc)



核准 APPROVED

 總機電工程師/主任 CEMEP
 28/10/2002

工務計劃項目編號9255WF - 更換大埔頭原水抽水站機電設備
 P.W.P. NO. 9255WF - REPLACEMENT OF MECHANICAL AND ELECTRICAL EQUIPMENT IN
 TAI PO TAU RAW WATER PUMPING STATION

(甲級工程)
 (CAT 'A' SUBMISSION)

 水務署
 WATER SUPPLIES DEPT.
 草圖編號 SKETCH NO. SK70082/064

附件 Enclosure