

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 - WATERWORKS

Water Supplies - Fresh water supplies

247WF – Modernization of mechanical and electrical equipment in Tuen Mun fresh water pumping station

Members are invited to recommend to Finance Committee the upgrading of **247WF** to Category A at an estimated cost of \$29.7 million in money-of-the-day prices for the modernization of the aged mechanical and electrical equipment in Tuen Mun fresh water pumping station.

PROBLEM

Most of the mechanical and electrical equipment in Tuen Mun fresh water pumping station has been in service for about 29 years and is generally in very poor condition and beyond economic repair. There is a pressing need to modernize the aged equipment to ensure the safe, reliable and efficient operation of the pumping station.

PROPOSAL

2. The Director of Water Supplies (DWS), with the support of the Secretary for Works, proposes to upgrade **247WF** to Category A at an estimated cost of \$29.7 million in money-of-the-day (MOD) prices for the modernization of the aged mechanical and electrical equipment in Tuen Mun fresh water pumping station.

/PROJECT

PROJECT SCOPE AND NATURE

3. The full scope of works under **247WF** that we propose to upgrade to Category A comprises –

- (a) the replacement of two electric pumpsets to enhance the total capacity from 41 400 cubic metres (m³) per day to 93 000 m³ per day, and the replacement of lifting facility;
- (b) the decommissioning of two diesel pumpsets with a total capacity of 51 600 m³ per day;
- (c) the replacement of high voltage and low voltage power supply systems;
- (d) the replacement of control and monitoring equipment;
and
- (e) associated civil modification works.

4. We plan to start the proposed works in April 2002 for completion in late 2004. A site plan showing the location of Tuen Mun fresh water pumping station is at the Enclosure.

JUSTIFICATION

5. The existing Tuen Mun fresh water pumping station came into service in 1972. It is equipped with eight pumpsets with a total pumping capacity of 300 000 m³ per day for pumping treated water from Tuen Mun water treatment works to serve the whole of Tuen Mun.

6. We commissioned the use of two electric pumpsets, two diesel pumpsets, the manual overhead travelling crane and the power supply and control equipment at the opening of the pumping station. After 29 years, these equipment and installations are approaching the end of their serviceable life. As a result, maintenance requirement and faults are increasing. In addition, the ageing of the equipment has led to high operating 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.

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7. At present, we use manual control to regulate fresh water inflow to and outflow from the pumping station to meet fluctuation in demand. Timely control of pumpsets is particularly important during an emergency, such as main bursts, when instant response of the pumping station is essential. However, the present manual mode of operation may not always be conducive to an instant response.

8. To ensure the reliability of fresh water supply to Tuen Mun and to enable remote instant control and constant monitoring of the operation of the pumping station at the regional control centre in the Tuen Mun water treatment works, we propose to replace and modernize the aged mechanical and electrical equipment and the associated control and monitoring system as proposed in paragraph 3 above.

9. The other four pumpsets in the pumping station came into service in the 1980s and they are in working order.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of this project to be \$29.7 million in MOD prices (see paragraph 11 below), made up as follows –

| | \$ million | |
|--|-------------------|--|
| (a) Replacement of two electric pumpsets and lifting facility | 5.8 | |
| (b) Decommissioning of two diesel pumpsets | 0.1 | |
| (c) Replacement of high voltage and low voltage power supply systems | 9.9 | |
| (d) Replacement of control and monitoring equipment | 3.2 | |
| (e) Associated civil modification works | 7.4 | |
| (f) Environmental mitigation measures | 0.3 | |
| (g) Contingencies | 2.6 | |
| Sub-total | 29.3 | (in September 2001 prices) /(h) |

| | | |
|------------------------------------|-------------------|-----------------|
| | \$ million | |
| (h) Provision for price adjustment | 0.4 | |
| Total | 29.7 | (in MOD prices) |

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

| Year | \$ million (Sept 2001) | Price adjustment factor | \$ million (MOD) |
|-------------|-----------------------------------|--|-----------------------------|
| 2002 – 2003 | 0.8 | 0.99700 | 0.8 |
| 2003 – 2004 | 4.7 | 1.00398 | 4.7 |
| 2004 – 2005 | 18.0 | 1.01101 | 18.2 |
| 2005 – 2006 | 3.8 | 1.01808 | 3.9 |
| 2006 – 2007 | 2.0 | 1.02521 | 2.1 |
| | 29.3 | | 29.7 |

12. We have derived the MOD estimates on the basis of the Government's latest forecast of trend labour and construction prices for the period 2002 to 2007. We will tender the supply and installation of the mechanical and electrical equipment under a lump sum contract without provision for price adjustment. We will carry out the civil works under a term contract on a remeasurement basis. The term contract will provide for price adjustments because the contract period will exceed 21 months.

13. The savings in recurrent expenditure arising from this project is about \$1.4 million per annum.

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14. This project by itself would lead to a decrease in water charges by 0.02 % in real terms by 2007¹.

PUBLIC CONSULTATION

15. 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

16. DWS completed a Preliminary Environmental Review (PER) of the project in April 2000. The PER concluded that the project would not give rise to long-term environmental impacts. The Director of Environmental Protection vetted the PER and agreed that an Environmental Impact Assessment would not be required. For short-term impacts during construction, standard environmental pollution control measures² would be sufficient to mitigate the impacts. We have included \$0.3 million (in September 2001 prices) in the project estimate for implementing these mitigation measures.

17. We have taken due consideration of the need to minimize the generation of construction and demolition (C&D) materials when designing and planning the proposed modernization works. We estimate that the project will generate about 620 m³ of C&D materials. Of these, about 50 m³ (8.1 %) will be reused on site, 560 m³ (90.3 %) will be reused as fill in public filling areas³ and 10 m³ (1.6 %) will be disposed of at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$1,250 for this project (based on a notional unit cost⁴ of \$125/m³).

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¹ The decrease in water charges is calculated on the assumption that the demand remains static during the period from 2002 to 2007 and the amount of government subsidy to the waterworks operations is to be contained at the present level.

² Standard pollution control measures include wheel washing facilities, desilting traps, the use of silenced plant and other procedures as recommended in the Environmental Protection Department's Recommended Pollution Control Clauses.

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/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.

18. We will require the contractor to implement necessary measures to minimize the generation of C&D materials and to reuse and recycle C&D materials as far as practicable. We will control the disposal of public fill and C&D waste at designated public filling facilities and landfills respectively through a trip-ticket system. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

LAND ACQUISITION

19. The proposed works do not require any land acquisition.

BACKGROUND INFORMATION

20. We upgraded **247WF** to Category B in September 2000.

21. DWS has substantially completed the detailed design for the proposed works using in-house resources.

22. We estimate that the project will create some 11 jobs comprising two professional/technical staff and nine labourers, totalling 320 man-months.

Works Bureau
November 2001

