

For discussion
on 15 January 2003

PWSC(2002-03)83

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 - WATERWORKS

Water Supplies – Fresh water supplies

323WF – Provision of water supply to Ngong Ping

Members are invited to recommend to Finance Committee the upgrading of **323WF** to Category A at an estimated cost of \$72.5 million in money-of-the-day prices for the provision of water supply to Ngong Ping.

PROBLEM

The existing water supply facilities serving Ngong Ping on Lantau Island will not be able to cope with the anticipated increase in water demand arising from the planned tourism and recreation developments in the area by 2005.

PROPOSAL

2. The Director of Water Supplies (DWS), with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **323WF** to Category A at an estimated cost of \$72.5 million in money-of-the-day (MOD) prices for the provision of water supply to support new tourism and recreation developments at Ngong Ping.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **323WF** comprises –
- (a) construction of Shek Mun Kap fresh water pump house with an output capacity of 1 800 cubic metres (m³) per day;
 - (b) construction of Ngong Ping fresh water tank with a storage capacity of 1 000m³;
 - (c) procurement and installation of pump sets and associated equipment;
 - (d) laying of about 0.8 kilometre (km) of fresh water trunk mains of 250 millimetres (mm) in diameter from the existing trunk mains at Tung Chung Road to the proposed Shek Mun Kap fresh water pump house;
 - (e) laying of about 3.2 km of fresh water trunk mains of 200 mm in diameter from the proposed Shek Mun Kap fresh water pump house to the proposed Ngong Ping fresh water tank;
 - (f) laying of about 1.6 km of fresh water distribution mains ranging from 150 to 300 mm in diameter in Ngong Ping area; and
 - (g) construction of a flushing and other non-potable supply system at Ngong Ping (the flushing supply system).

4. We plan to commence the construction of the waterworks in June 2003 for completion in mid-2005. A site plan showing the scope of works is at Enclosure 1.

JUSTIFICATION

5. To increase the range of tourist attractions to enhance Hong Kong's position as a leading tourist destination in Asia, the Administration and the MTR Corporation Limited (MTRCL) entered into a provisional agreement in July 2002 to develop a cable car system linking Tung Chung and Ngong Ping on Lantau

/ Island

Island for operation by August 2005. The future cable car ride will substantially increase patronage to Ngong Ping, and provide opportunities to develop the area into Northwest Lantau's hub of tourism and recreation. To cope with these developments, the Administration plans to upgrade the public facilities at Ngong Ping for completion in August 2005.

6. We project that tourist activities arising from the planned developments in Ngong Ping will generate a daily fresh water demand of about 1 200m³ by 2016. To meet this new demand, we need to provide the water supply facilities and flushing supply system at Ngong Ping as described in paragraph 3 above. The proposed flushing supply system will also help conserve environment of the Ngong Ping area by recycling the treated sewage effluent from the Ngong Ping sewage treatment plant (STP), which will be constructed by the Director of Drainage Services (D of DS) under **208DS**¹ "Outlying Islands sewerage stage 1 phase 1 – Ngong Ping sewage treatment works and sewerage".

7. Implementation of the proposed fresh water distribution mains and flushing supply system located along and adjacent to Ngong Ping Road will have interfaces with the sewerage works under **208DS**. To eliminate interface problems, we plan to entrust these waterworks to D of DS forming part of the sewerage works contract under **208DS**.

8. The proposed fresh water distribution mains and flushing supply system between the future cable car terminal and Po Lin Monastery fall within the works boundary of **389RO**² "Enhancement of public facilities at Ngong Ping" to be implemented by the Director of Territory Development (DTD). To avoid interface problems which may arise from two contractors working on the same site, DWS will entrust the mainlaying works to MTRCL through DTD for implementation in conjunction with the works for **389RO**. MTRCL, the successful proponent of the cable car project, will be constructing the cable car terminal and its tourist corridor at Ngong Ping at the same time.

/FINANCIAL

¹ A related paper for the upgrading of **208DS** under **Head 704** to Category A is scheduled for submission to PWSC for Members' consideration in April 2003.

² A related paper for the upgrading of **389RO** under **Head 707** to Category A is scheduled for submission to PWSC for Members' consideration at the end of 2003. The scope of **389RO** includes construction of a landscaped piazza, a stormwater drainage system and a public toilet in Ngong Ping area.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be \$72.5 million in MOD prices (see paragraph 10 below), made up as follows –

	\$ million
(a) Construction of Shek Mun Kap fresh water pump house	13.5
(i) civil works	8.2
(ii) mechanical and electrical works	5.3
(b) Construction of Ngong Ping fresh water tank	8.4
(i) civil works	7.2
(ii) mechanical and electrical works	1.2
(c) Laying of fresh water trunk and distribution mains	38.5
(i) works to be carried out by DWS	34.1
(ii) works to be entrusted to D of DS	0.6
(iii) works to be entrusted to MTRCL through DTD	3.8
(d) Construction of a flushing and other non-potable supply system at Ngong Ping	4.1
(i) works to be entrusted to D of DS	2.9
(ii) works to be entrusted to MTRCL through DTD	1.2
(e) Consultants' fees for works entrusted to D of DS (see paragraph 7 above)	0.5
(i) contract administration	0.2
(ii) site supervision	0.3

		\$ million	
(f)	On-cost charged for works to be entrusted to MTRCL through DTD ³ (see paragraph 8 above)	0.8	
(g)	Environmental mitigation measures	0.6	
(h)	Contingencies	6.6	
	Sub-total	73.0	(in September 2002 prices)
(i)	Provision for price adjustment	(0.5)	
	Total	72.5	(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 2002)	Price adjustment factor	\$ million (MOD)
2003 – 2004	8.0	0.99250	7.9
2004 – 2005	46.0	0.99250	45.7
2005 – 2006	13.1	0.99250	13.0
2006 – 2007	4.8	0.99250	4.8
2007 – 2008	1.1	0.99250	1.1
	73.0		72.5

/11

³ A 16.5% on-cost for detailed design, contract administrative and supervision works is assumed. This is based on the normal on-cost rate applied to works MTRCL undertakes for the Government on an entrustment basis.

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 civil works related to the proposed fresh water supply facilities and majority of the fresh water mainlaying works under a re-measurement contract because the quantities of works are subject to variation during construction to suit site conditions. We will incorporate the proposed flushing supply system along Ngong Ping Road into D of DS's sewerage works contract on a re-measurement basis. Both the civil and mainlaying works contract and the sewerage works contract will provide for price adjustments because the contract periods will exceed 21 months. DTD will establish arrangements for all water mains in Ngong Ping that fall within the boundary of **389RO** to be incorporated into the works contract envisaged to be entrusted to MTRCL.

12. We estimate the annually recurrent expenditure arising from this project to be about \$1,887,000.

13. The project by itself would lead to an increase in production cost of water by 0.05% in real terms by 2008⁴.

PUBLIC CONSULTATION

14. We consulted the Islands District Council on the proposed fresh waterworks facilities and the flushing supply system on 12 August 2002 and on 16 December 2002 respectively. The Council supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

15. DWS completed a Preliminary Environmental Review (PER) for **323WF** in April 2001. The PER concluded that the project would not have any long-term adverse environmental impacts. The Director of Environmental Protection vetted the PER and agreed that an Environmental Impact Assessment (EIA) would not be required for the fresh water supply facilities of the project.

16. Reusing the treated effluent from Ngong Ping STP in the flushing supply system is a designated project under the EIA Ordinance (Cap. 499) and an

/environmental

⁴ The increase in production cost of water is calculated on the assumption that the demand remains static during the period from 2003 to 2008 and the amount of government subsidy to the waterworks operations is to be contained at the present level.

environmental permit is required for the construction and operation of this part of the project. Whilst the proposal is expected to have environmental benefits in minimising both wastewater discharge and water consumption, the flushing supply system will only be implemented after going through the due EIA process and upon the issuance of the necessary environmental permit. We will implement the project and any necessary mitigation measures in accordance with the requirements of the permit.

17. During construction, we will control noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of mitigation measures in the relevant contracts. These include provision of wheel washing facilities, de-silting traps, and the use of silenced plants. We have included \$0.6 million in MOD prices for implementing these mitigation measures in the project estimate and will incorporate these requirements into the works contracts for implementation.

18. We have given due consideration to the need to minimise the generation of construction and demolition (C&D) materials in designing the levels and alignments of the proposed water mains and the layouts of the proposed pump house and tank. To further minimise the generation of C&D materials, we will encourage the contractors to use steel instead of timber in formwork and temporary works. We estimate that about 6 000 m³ of C&D materials will be generated by the project. Of these, we will reuse about 3 100 m³ (51.7%) on site, 2 800 m³ (46.7%) as fill in public filling areas⁵ and dispose of 100 m³ (1.6%) 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 cost⁶ of \$125/m³).

19. We will require the contractors to submit waste management plans (WMP) with appropriate mitigation measures for approval. The WMP will include the allocation of areas for waste segregation on site to facilitate reuse or recycling of C&D materials. We will ensure that the day-to-day operations on site comply with the approved WMP. We will implement a trip-ticket system to control the proper disposal of C&D materials and will record the reuse, recycling and disposal of C&D materials for monitoring purposes.

/LAND

⁵ 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.

⁶ 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.

LAND ACQUISITION

20. The proposed works do not require land acquisition.

BACKGROUND INFORMATION

21. We upgraded **323WF** to Category B in July 2001.

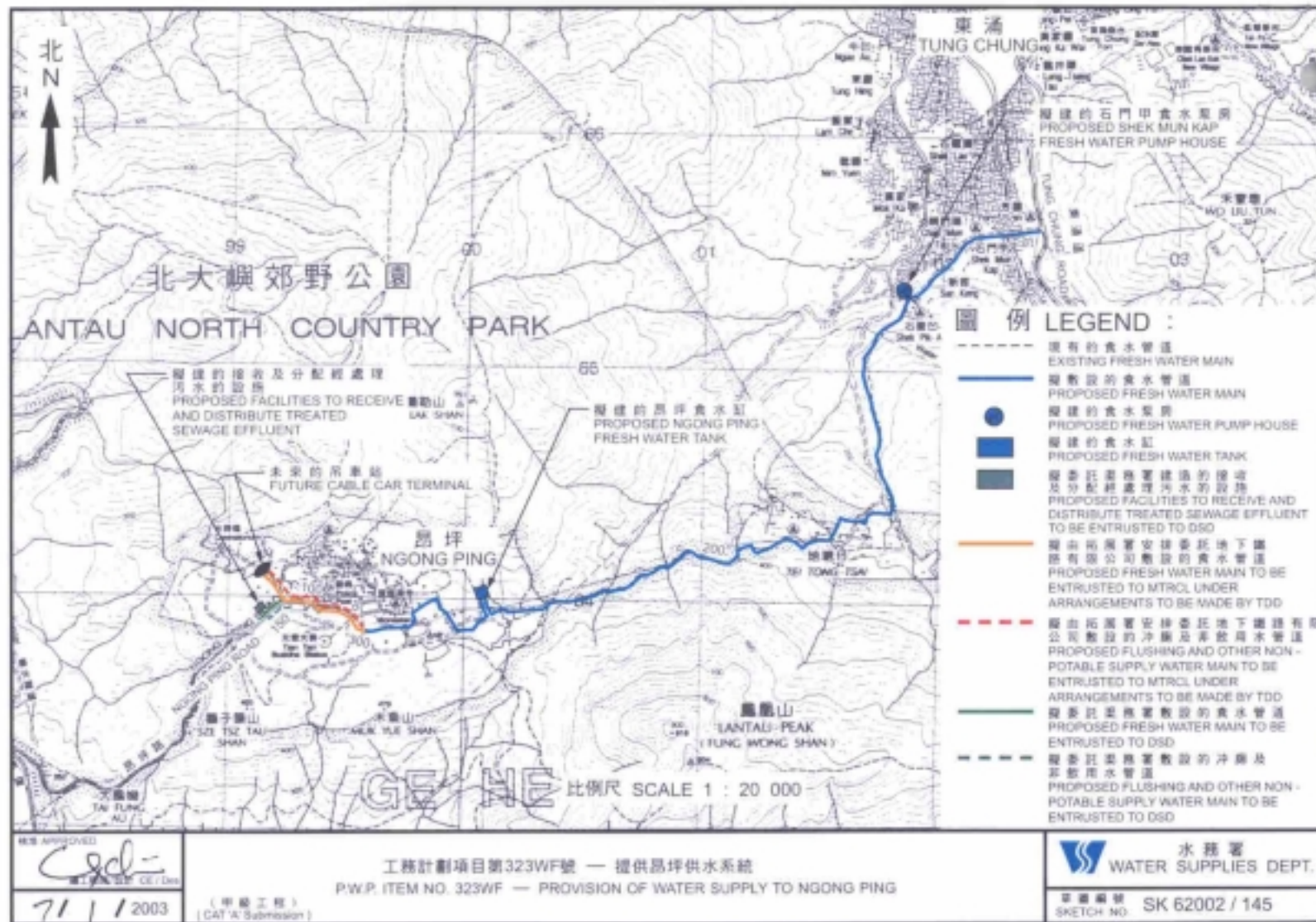
22. We have substantially completed the detailed design for the proposed fresh water supply facilities using in-house staff resources.

23. The detailed design for the flushing supply system is completed by D of DS' consultants at a cost of \$0.8 million charged to the block allocation **Subhead 9100WX** "Waterworks, studies and investigations for items in Category D of the Public Works Programme".

24. We estimate that the proposed works will create 45 new jobs comprising nine professional/technical staff and 36 labourers, totalling 1 053 man-months.

Environment, Transport and Works Bureau
January 2003

(PWSC-323WF)



323WF - Provision of water supply to Ngong Ping**Breakdown of estimates for the consultants' fees**

Consultants' staff costs			Estimated man- months	Average MPS* salary point	Multiplier	Estimated fee (\$ million)
(a)	Contract administration	Professional	1.1	38	2.0	0.13
		Technical	0.6	14	2.0	0.02
(b)	Site supervision by resident site staff employed by the consultants	Professional	1.9	38	1.6	0.18
		Technical	5.7	14	1.6	0.18
Total consultants' staff costs						0.51

* MPS = Master Pay Scale

Notes

- The above figures are based on estimates prepared by the Director of Drainage Services. The consultancy works for this project will be included as part of Consultancy Agreement No. CE29/2001 "Outlying Islands Sewerage Stage 1 Phase 1 - Ngong Ping Sewage Treatment Works and Sewerage: Design and Construction Consultancy Assignment" under 208DS. The actual consultants' fees will be known after the finalisation of the account of the works contract.
- A multiplier factor of 2.0 is applied to the average MPS point to estimate the full cost including the consultants' overheads and profit, as the staff will be employed in the consultant's offices. A multiplier factor of 1.6 is applied to the average MPS point in the case of resident staff supplied by the consultants. (As at 1.10.2002, MPS pt. 38 = \$57,730 per month and MPS pt. 14 = \$19,195 per month).