

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

### **HEAD 709 – WATERWORKS**

#### **Water Supplies – Combined fresh/salt water supply**

#### **174WC – Replacement and rehabilitation of water mains, stage 1 phase 2**

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **174WC**, entitled “Replacement and rehabilitation of water mains, stage 1 phase 2 works in Sha Tin and Tai Wai”, to Category A at an estimated cost of \$38.7 million in money-of-the-day prices; and
- (b) the retention of the remainder of **174WC** in Category B.

### **PROBLEM**

Ageing fresh and salt water mains throughout the territory are prone to frequent bursts and leaks, disrupting water supplies and traffic flow and causing inconvenience to the public. We need to replace and rehabilitate water mains approaching the end of their service life to improve the condition of the water supply network and to maintain an acceptable level of service to consumers.

**/PROPOSAL .....**

## PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade part of **174WC** to Category A at an estimated cost of \$38.7 million in money-of-the-day (MOD) prices for replacing and rehabilitating the aged water mains in Sha Tin and Tai Wai.

## PROJECT SCOPE AND NATURE

3. **174WC** covers the phase 2 of the stage 1 works under Water Supplies Department's territory-wide water mains replacement and rehabilitation programme. It covers approximately 210 kilometres (km) of fresh water mains and 40 km of salt water mains throughout the territory.

4. The part of **174WC** which we now propose to upgrade to Category A comprises the replacement and rehabilitation of –

- (a) about 7 km of fresh water mains ranging from 25 millimetres (mm) to 450 mm in diameter including associated service pipes and connections; and
- (b) about 4 km of salt water mains ranging from 40 mm to 400 mm in diameter including associated service pipes and connections.

\_\_\_\_\_ The locations of the proposed works are at Enclosure 1. Details of typical water  
\_\_\_\_\_ mains replacement and rehabilitation works proposed are at Enclosure 2.

5. We plan to start construction in September 2005 for completion by end 2007.

## JUSTIFICATION

6. Hong Kong's fresh water and salt water supplies are provided through a network consisting of about 7 200 km of water mains. Most of these water mains are underground. About 45% of the water mains were laid more than 30 years ago. They are approaching the end of their service life and have become increasingly difficult and costly to maintain.

7. Since considerable lengths of the existing water mains are approaching the end of their service life, we are experiencing an increasing number of main bursts causing inconvenience to the public. As the previous way of carrying out piecemeal and small scale replacement works was considered not effective, we engaged consultants in February 1996 to carry out an Underground Asset Management Study (the Study) to develop a comprehensive and cost-effective management plan for the water supply network. The Study recommended the replacement and rehabilitation of some 3 000 km of aged water mains in stages to prevent further deterioration of the water supply network.

8. The whole replacement and rehabilitation programme was originally scheduled for completion by 2020. Construction of the stage 1 works<sup>1</sup> commenced in December 2000, and stage 1 (phase 1) will be completed by the end of 2008. To bring about earlier improvement to the supply system and minimise inconvenience to the public due to frequent main bursts, we have advanced the completion of the whole replacement and rehabilitation programme to 2015. We will continue to review the programme taking account of prevailing constraints and the residual service life of the water mains to be replaced, with a view to completing the works within a shorter time frame before 2015.

## FINANCIAL IMPLICATIONS

9. We estimate the cost of the proposed works to be \$38.7 million in MOD prices (see paragraph 10 below), made up as follows –

	<b>\$ million</b>
(a) Water mains replacement by conventional methods	28.6
(b) Water mains rehabilitation by trenchless methods <sup>2</sup>	5.9
(c) Environmental mitigation measures	0.5

/(d) .....

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<sup>1</sup> The stage 1 works include replacement and rehabilitation of the most critical water mains under **90WC** "Replacement and rehabilitation of water mains, stage 1 phase 1" and **174WC** "Replacement and rehabilitation of water mains, stage 1 phase 2".

<sup>2</sup> For trenchless methods (sometimes referred to as 'minimum dig' or 'reduced dig' methods), a new pipe is launched from a 'launching pit' and travels along the existing pipe route to a 'receiving pit' without opening up the road surface for the whole length of the pipe.

		<b>\$ million</b>
(d)	Contingencies	3.5
	Sub-total	38.5
		(in September 2004 prices)
(e)	Provision for price adjustment	0.2
	Total	38.7
		(in MOD prices)

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

Year	\$ million (Sept 2004)	Price adjustment factor	\$ million (MOD)
2005 – 2006	1.8	1.00450	1.8
2006 – 2007	14.7	1.00576	14.8
2007 – 2008	14.5	1.00576	14.6
2008 – 2009	7.5	1.00576	7.5
	38.5		38.7

11. We have derived the MOD estimate on the basis of the 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 2009. We will implement the mainlaying works under a re-measurement contract because the quantities involved may vary with the actual underground conditions. The contract will provide for price adjustment as the contract period will exceed 21 months.

12. The proposed works will not give rise to additional recurrent expenditure.

13. The project by itself would lead to an increase in production cost of water by 0.01% in real terms by 2009<sup>3</sup>.

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<sup>3</sup> The increase in production cost of water is calculated at the present price level and on the assumption that the water demand remains static during the period from 2005 to 2009.

## **PUBLIC CONSULTATION**

14. We consulted the Legislative Council Panel on Planning, Lands and Works on 8 January 2001 regarding implementation of the stage 1 phase 2 works, and received support from Members. We consulted the Panel again by circulation of an information paper in May 2005 on the proposed works seeking part-upgrading to Category A. Members had no objection to the proposal.

15. We consulted the Development and Housing Committee of the Sha Tin District Council on 21 December 2004 on works to be carried out in Sha Tin and Tai Wai. The Committee supported the works. In line with the Committee's advice to enhance public liaison for the works, we will regularly inform the District Council and affected locals of progress.

## **ENVIRONMENTAL IMPLICATIONS**

16. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We carried out a Preliminary Environmental Review in 2000 and concluded that the project would have no long term environmental impact. Short term construction impacts could be mitigated through the implementation of standard pollution control measures. For the proposed works in Sha Tin and Tai Wai, we have included \$500,000 in September 2004 prices for the implementation of these mitigation measures and will incorporate these requirements into the works contracts for implementation.

17. We will require the contractor to submit waste management plans (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reduce, reuse and recycle construction and demolition (C&D) materials, including the allocation of areas for waste segregation. We will require the contractor to carry out on-site sorting of C&D materials to recover the inert portion, reusable and recyclable 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 to 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.

18. We have taken due consideration of the need to minimise C&D materials when planning and designing the alignments of the proposed water mains. To further minimise C&D materials, we will encourage the contractor to

use non-timber formwork and recyclable material for temporary works. We estimate that the project will generate about 8 030 cubic metres (m<sup>3</sup>) of C&D materials. Of these, we will reuse about 5 910 m<sup>3</sup> (73.6%) on site and 2 010 m<sup>3</sup> (25.0%) as fill in public filling areas<sup>4</sup>, and dispose of 110 m<sup>3</sup> (1.4%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$13,750 for this project (based on a notional unit cost<sup>5</sup> of \$125/m<sup>3</sup>).

## TRAFFIC IMPLICATIONS

19. We have carried out a traffic impact assessment (TIA) for the proposed works. The TIA has concluded that the proposed works would not cause unacceptable traffic impact. We will implement temporary traffic arrangements to minimise impacts on traffic during construction. Furthermore, trenchless method will be used to rehabilitate the water mains along busy roads, e.g. Che Kung Miu Road.

## LAND ACQUISITION

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

## BACKGROUND INFORMATION

21. We upgraded **174WC** to Category B in September 2000.

22. In March 2001, we upgraded part of the project to Category A as **178WC** entitled “Replacement and rehabilitation of water mains, stage 1 phase 2 – investigation” for engagement of consultants to carry out site investigations and impact assessments. The consultancy completed in 2003.

23. We have substantially completed the detailed design of the proposed works in Sha Tin and Tai Wai by in-house resources and plan to start the construction works in September 2005 for completion by end 2007.

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<sup>4</sup> 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 and Development.

<sup>5</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 the existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

24. We will continue with the detailed design of the remaining part of **174WC**, which comprises the replacement and rehabilitation of about 66 km of fresh and salt water mains in Hong Kong Island area, about 109 km in Kowloon and about 64 km in the New Territories. We plan to start construction in late 2006 for completion in early 2010.

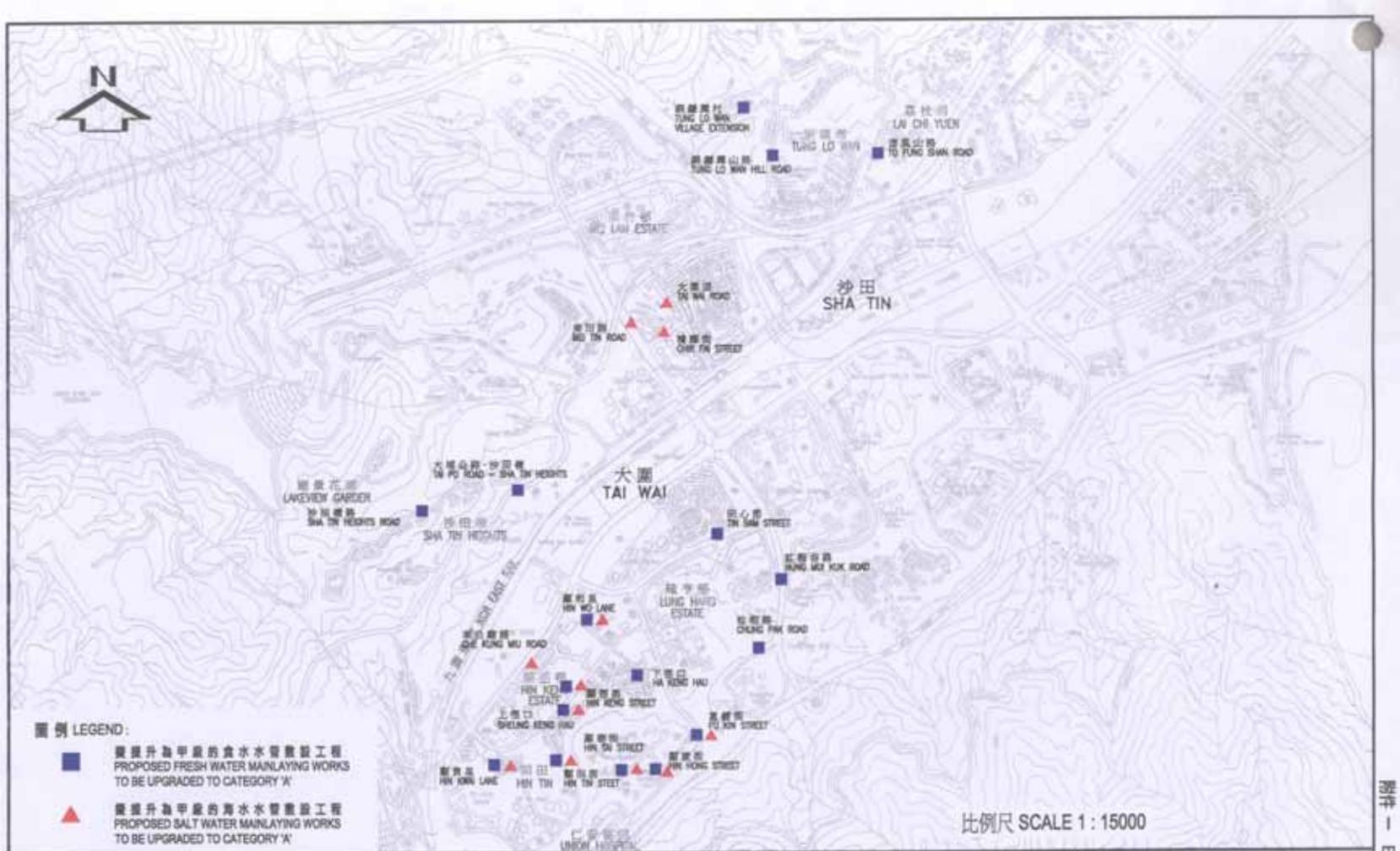
25. We will continue planning and design of the remaining stages 2 to 4 of the replacement and rehabilitation programme with a view to completing the works before 2015.

26. The proposed works will not involve any tree removal or planting proposal.

27. We estimate that the proposed works will create about 30 jobs (26 for labourers and another four for professional/technical staff) providing a total employment of 650 man-months.

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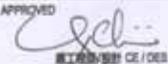
Environment, Transport and Works Bureau  
May 2005



圖例 LEGEND:

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 擬議升為甲級的食水水管敷設工程  
 PROPOSED FRESH WATER MAINLAYING WORKS  
 TO BE UPGRADED TO CATEGORY 'A'
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 擬議升為甲級的海水水管敷設工程  
 PROPOSED SALT WATER MAINLAYING WORKS  
 TO BE UPGRADED TO CATEGORY 'A'

比例尺 SCALE 1 : 15000

核准 APPROVED  
  
 總工程師/設計 CE/DES  
 25 / 4 / 2005

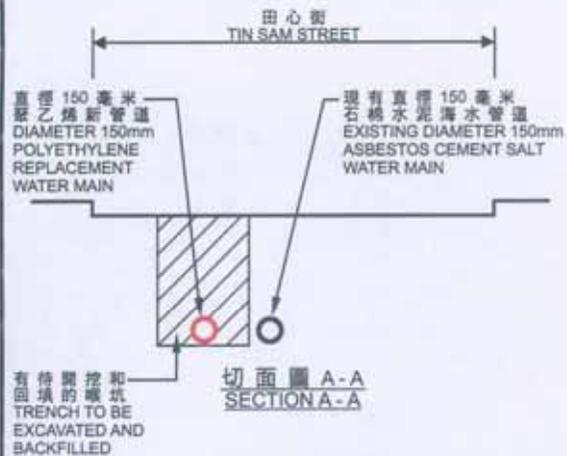
工務計劃項目 174WC — 更換及修復水管工程第 1 階段第 2 期沙田及大圍區工程  
 P.W.P. NO. 174WC — REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 1 PHASE 2  
 (甲級工程)  
 (CAT 'A' Submission)  
 WORKS IN SHA TIN AND TAI WAI

 水務署  
 WATER SUPPLIES DEPT.  
 草圖編號 SKETCH NO. SK 62005 / 012 / 001

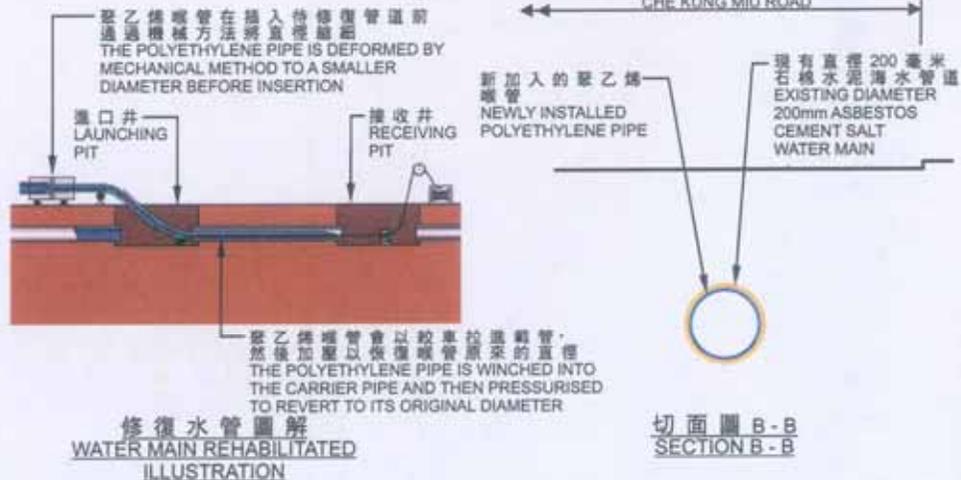
附件 1 ENCLOSURE 1



地盤平面圖 - 更換水管  
SITE PLAN - WATER MAIN REPLACEMENT  
比例尺 SCALE 1 : 2 000



地盤平面圖 - 修復水管  
SITE PLAN - WATER MAIN REHABILITATION  
比例尺 SCALE 1 : 2 000



核准 APPROVED  
  
CEDES  
25 / 4 / 2005

(甲類工程)  
(CAT 'A' Submission)

工務計劃項目 174WC — 更換及修復水管工程第 1 階段第 2 期沙田及大圍區工程  
更換及修復水管範例  
P.W.P. NO. 174WC — REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 1 PHASE 2  
WORKS IN SHATIN AND TAI WAI  
TYPICAL WATER MAIN REPLACEMENT AND REHABILITATION DETAILS

水務署  
WATER SUPPLIES DEPT.  
草圖編號 SK 62005 / 012 / 002  
SKETCH NO.

附件 1  
ENCLOSURE 2