

**Discussion Paper for Legislative Council
LegCo Panel on Planning, Lands and Works
Meeting on 8 January 2001**

**174WC – Replacement and Rehabilitation of Water Mains,
Stage 1 Phase 2**

Introduction

1. This paper informs Members of the background on the strategy of the stage 1 phase 2 of the replacement and rehabilitation programme of old water mains for solving the problem due to bursts and leaks of these water mains. In February 2001, we will seek PWSC's approval for upgrading part of **174WC** to Category A, entitled "Replacement and rehabilitation of water mains, stage 1 phase 2 – investigation", for engaging engineering consultants to carry out investigations and impact assessments for the works under **174WC**.

Background

2. Hong Kong's fresh water and salt water supplies are provided through a network consisting of approximately 5 700 kilometres of water mains. Most of these water mains are underground. About 45% of the water mains were laid more than 30 years ago as part of the development of urban areas and new towns. They are approaching the end of their useful life and have become increasingly difficult and costly to maintain.

3. At present, Water Supplies Department (WSD) carries out piece-meal and small-scale replacement works for some old water mains on an ad-hoc basis. However, they are experiencing an increasing number of main bursts due to the deteriorating condition of the water mains. From 1994 to 1999, there were about 22 000 pipe failures per year, comprising 1 490 bursts and 20 510 leaks. The number of failures has increased by about 12% to 24 700 in 2000, comprising 1 900 bursts and 22 800 leaks.

4. In view of the considerable length of water mains approaching the end of their service life in the year to come, WSD engaged consultants in February 1996 to carry out an Underground Asset Management Study (UAMS) to develop a comprehensive and cost-effective management plan for the water supplies network. They completed the UAMS at the end of 1997. Taking into account the capital cost of the replacement and rehabilitation works, savings in maintenance costs, the loss of water and social implications of leakage and main bursts, the UAMS recommended the replacement and rehabilitation of some 3 000 kilometres of aged water mains in stages over 20 years to prevent further deterioration of the water supply network.

5. WSD estimates that without implementing the replacement and rehabilitation programme, the number of pipe failures per year will be increased from the 2000 level of 24 700 failures to 40 000 failures in 20 years' time. The corresponding annual loss of fresh water will be increased from 220 million cubic metres to 630 million cubic metres. Upon the completion of the recommended 20-year programme, the number of failures per year and the annual loss of fresh water will be reduced to 15 000 and 180 million cubic meters respectively.

6. In order to tackle the most problematic areas taking into account the disruption of water supply to consumers and traffic congestion during construction, we plan to carry out the replacement and rehabilitation programme in stages. The stage 1 works, comprising 600 kilometres of water mains, mainly covers those water mains, which have been identified as having major burst and leakage problems. To enhance the implementation of the works, we apportion the works into stage 1 phase 1 and stage 1 phase 2. Works under stage 1 phase 1 involve water mains which are more critical to the water supply and distribution network, and which have less potential problems with respect to land and traffic. We accord high priority to these water mains and put forward their improvement immediately after completion of the UAMS to bring about early benefits. We put forward the remaining works for stage 1 under stage 1 phase 2 after completion of further study on the feasibility of the works. As regards the subsequent stages, we will review the supply network and propose the improvement works with a view to completing all the works recommended in the UAMS in 20 years' time.

7. We upgraded the first phase entitled "Replacement and

rehabilitation of water mains, stage 1 phase 1” to Category B in October 1998 as **90WC**. The scope of works under **90WC** comprises the replacement and rehabilitation of approximately 243 kilometres of fresh water mains and 107 kilometres of salt water mains throughout the territory. In May 1999, we consulted the Panel on the project. In November 1999, Finance Committee approved the upgrading of part of **90WC** to Category A for engaging consultants to carry out investigations and impact assessments for the works undertaken by consultants. Finance Committee approved another upgrading of part of **90WC** to Category A in November 2000 for the construction works designed by WSD’s in-house resources.

Scope of Works

8. To take forward the remaining works of the stage 1 programme, we upgraded the works entitled “Replacement and rehabilitation of water mains, stage 1 phase 2” to Category B in September 2000 as **174WC**.

9. The full scope of works under **174WC** comprises the replacement and rehabilitation of approximately 210 kilometres of fresh water mains and 40 kilometres of salt water mains, and the associated valves and fittings throughout the territories as shown in Sketches No. 62000/150/001 and 002 attached. The age distribution of the water mains is shown in **Annex**.

10. The part of **174WC** we now propose to upgrade to Category A is for the investigations and impact assessments for the works. The scope of the proposed consultancy includes –

- (a) site investigations and surveys;
- (b) traffic impact assessments;
- (c) drainage impact assessments;
- (d) environmental reviews; and
- (e) preliminary design of the replacement and rehabilitation works.

Justification

11. In view of the scale and the complexity of the works, the proposed

works demand considerable resources over a relatively short period. Having examined various ways and means of implementing the replacement and rehabilitation programme, we consider that WSD does not have adequate in-house resources to carry out all the works under this phase in addition to the other planned projects. WSD needs to engage engineering consultants to carry out investigations and impact assessments for the proposed replacement and rehabilitation works so as to enable the detailed design to proceed.

Financial Status

12. We estimate the cost of the proposed consultancy for the investigations and impact assessments to be \$22.4 million in MOD prices as follows -

		\$ million	
(a)	Consultants' fees for investigations and impact assessments	8.0	
(b)	Site investigation works	11.2	
(c)	Contingencies	1.9	
	Sub-total	21.1	(at Sept 2000 prices)
(d)	Inflation allowance	1.3	
	Total	22.4	(in MOD prices)

13. Subject to approval, we will phase the expenditure as follows -

Year	\$ million (Sept 2000)	Price adjustment Factor	\$ million (MOD)
2001-2002	2.0	1.02550	2.1
2002-2003	17.2	1.05627	18.2
2003-2004	1.9	1.08795	2.1
	21.1		22.4

14. We derived the MOD estimates on the basis of Government's forecast of trend of labour and construction prices for the period 2000 to 2004. We will invite tender for the proposed consultancy on a lump sum basis. No price adjustment due to inflation will be allowed because of the short duration of

the consultancy.

Public Consultation

15. We will consult the relevant district councils during the consultancy and take into consideration the views expressed in the investigations and impact assessments consultancy of the project.

Programme of Works

16. Upon approval of this part upgrading of **174WC** to Category A by Finance Committee, we will commence the investigations and impact assessments consultancy in August 2001 for completion in September 2002. We will then proceed with the detailed design for the works in end 2002 with a view to commencing the construction works in 2005 for completion in 2008.

Works Bureau
December 2000

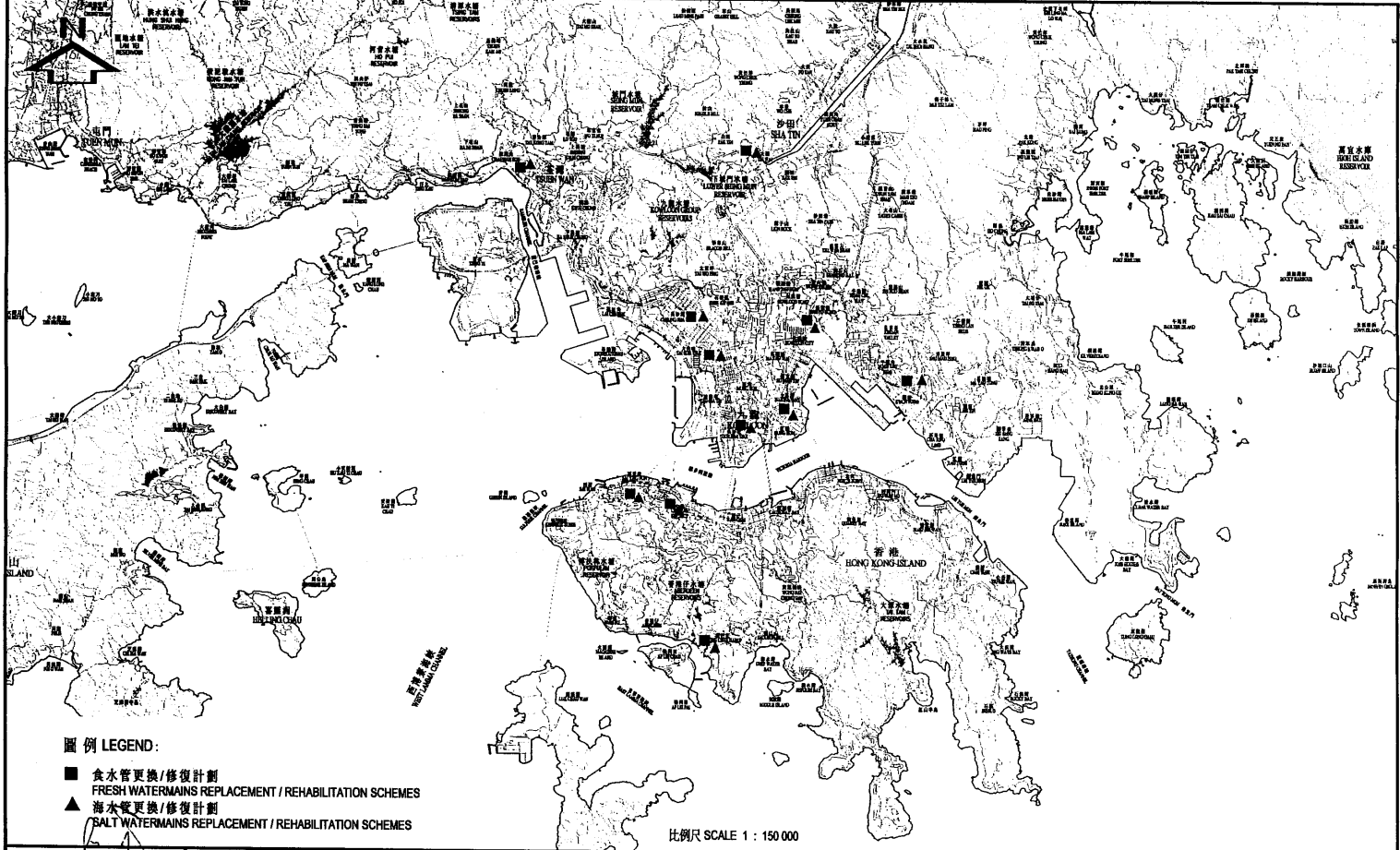
**174WC – Replacement and Rehabilitation of Water Mains,
Stage 1 Phase 2**

Age Distribution of Water Mains to be Replaced/Rehabilitated

Age (year)	Water mains to be replaced/rehabilitated	
	(%)	length (km)
> 50	20	50
30 - 50	52 ⁽¹⁾	130
20 - 30	28 ⁽²⁾	70
Total	100	250

Notes: (1) Predominately galvanised iron pipes.


(2) Predominately galvanised iron pipes or salt water mains.



圖例 LEGEND:

- 食水管更換/修復計劃
FRESH WATERMANS REPLACEMENT / REHABILITATION SCHEMES
- ▲ 海水管更換/修復計劃
SALT WATERMANS REPLACEMENT / REHABILITATION SCHEMES

比例尺 SCALE 1 : 150 000

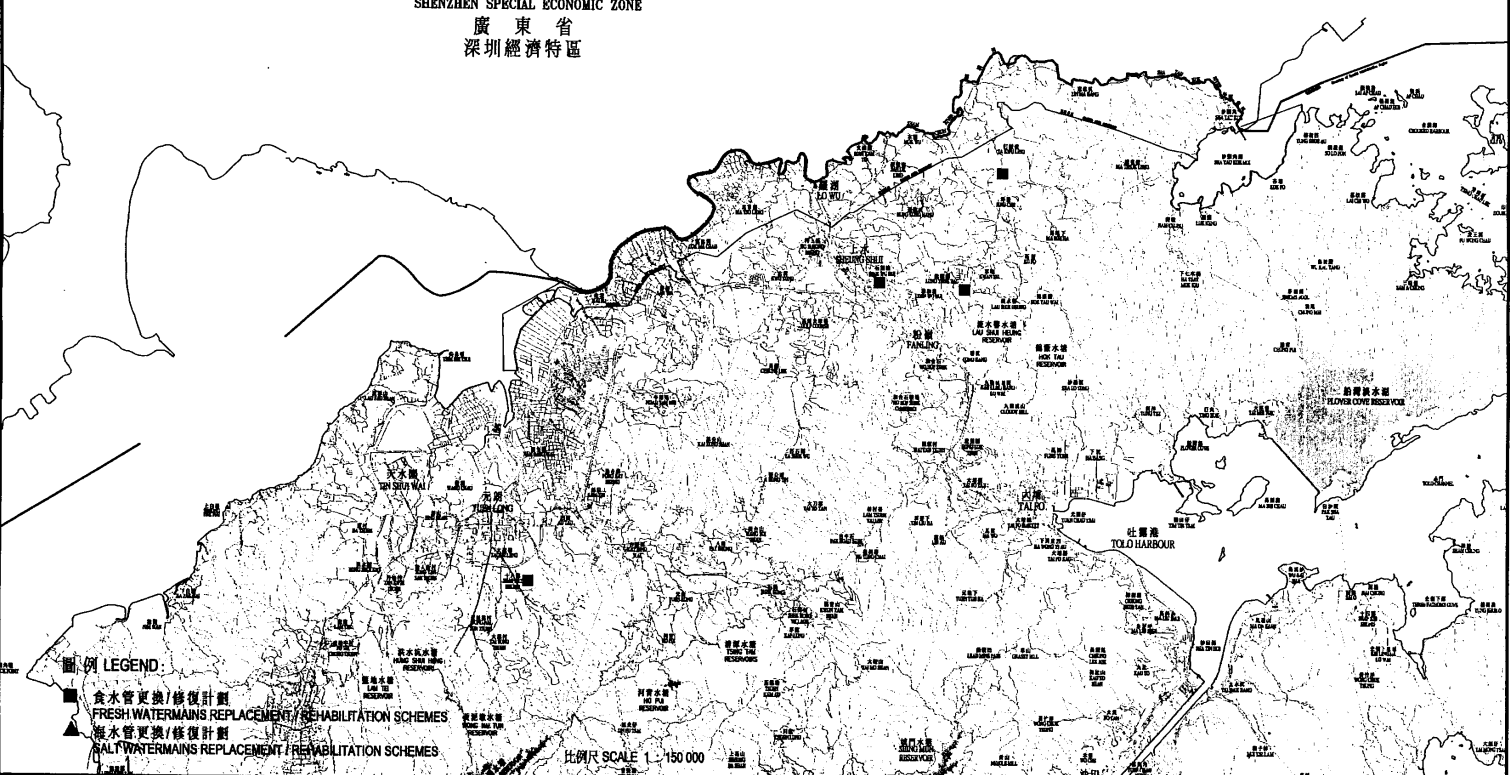
核准 APPROVED

 總工程師/工程管轄 CE/PM
 12/12/2000

工務計劃項目 174WC —— 更換及修復水管工程第1階段第2期
 (圖一)
 P.W.P. NO. 174WC — REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 1 PHASE 2
 (SHEET 1)

 水務署
 WATER SUPPLIES DEPT.
 草圖編號 SKETCH NO. 62000 / 150 / 001



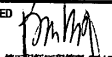
GUANGDONG SHENG
 SHENZHEN SPECIAL ECONOMIC ZONE
 廣東省
 深圳經濟特區




圖例 LEGEND

- 食水管更換/修復計劃
 FRESH WATERMAINS REPLACEMENT / REHABILITATION SCHEMES
- ▲ 海水管更換/修復計劃
 SALT WATERMAINS REPLACEMENT / REHABILITATION SCHEMES

比例尺 SCALE 1 : 150 000

核准 APPROVED

 總工程師/工程經理 CE / PM
 12 / 12 / 2000

工務計劃項目 174WC —— 更換及修復水管工程第1階段第2期
 (圖二)
 P.W.P. NO. 174WC —— REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 1 PHASE 2
 (SHEET 2)

 水務署
 WATER SUPPLIES DEPT.
 草圖編號 SKETCH NO. 62000 / 150 / 002