For discussion **PWSC(2008-09)33**
on 18 June 2008

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS
Water Supplies – Combined fresh/salt water supply
186WC – Replacement and rehabilitation of water mains, stage 3

Members are invited to recommend to Finance Committee the upgrading of the remainder of **186WC** to Category A at an estimated cost of $5,550.0 million in money-of-the-day prices for the implementation of the works in stage 3 of the territory-wide water mains replacement and rehabilitation programme.

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.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade the remainder of **186WC** to Category A at an estimated cost of $5,550.0 million in money-of-the-day (MOD) prices for the implementation of the works in stage 3 of the territory-wide water mains replacement and rehabilitation programme (R & R programme).

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PROJECT SCOPE AND NATURE

3. The stage 3 works under **186WC** comprise the replacement and rehabilitation of water mains in various districts throughout the territory as shown in Enclosure 1 and are summarised below –

(a) about 635 kilometres (km) of fresh water mains ranging from 20 to 1 500 millimetres (mm) in diameter including associated service pipes and connections; and

(b) about 165 km of salt water mains ranging from 20 to 1 000 mm in diameter including associated service pipes and connections.

4. We plan to commence the proposed works in August 2008 for completion in December 2013.

JUSTIFICATION

5. Hong Kong's fresh water and salt water supplies are provided through a network of about 7 700 km of water mains. Most of these water mains are underground. A substantial portion of the water mains was laid more than 30 years ago. They are progressively approaching the end of their service life and have become increasingly difficult and costly to maintain. As a result of the ageing problem, we faced an increasing number of main bursts and leakage causing inconvenience to the public and loss of precious water resources. The previous way of carrying out piece-meal and small-scale replacement works was not considered effective. Starting from 2000, we have implemented a comprehensive and cost-effective management plan for the water supply network. This involves the replacement and rehabilitation of some 3 000 km of aged water mains in stages to prevent further deterioration of the water supply network.

6. In view of the large scale of works and the long project duration, the R & R programme is implemented in four stages, within a period of 20 years between 2000 and 2020. Higher priority is given to the replacement and rehabilitation of those water mains that are in more critical conditions to bring about early benefits. In 2005, we decided to advance the target completion of the R & R programme from 2020 to 2015. We will continue reviewing the R & R programme taking into account prevailing constraints with a view to achieving earlier completion.

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7. The proposed stage 3 works under **186WC** will help bring about earlier improvement to the water supply network. Upon completion of the stage 3 works, about 800 km of water mains will be replaced or rehabilitated.

FINANCIAL IMPLICATIONS

8. We estimate the capital cost of the proposed works to be $5,550.0 million in MOD prices (see paragraph 9 below), made up as follows –

			$ million	
(a)	Water mains replacement by		2,745	
	(i) conventional method	2,375		
	(ii) trenchless methods[1]	370		
(b)	Water mains rehabilitation[2] by trenchless methods		1,330	
(c)	Environmental mitigation measures		50	
(d)	Consultants' fees for		350	
	(i) contract administration	6		
	(ii) site supervision	344		
(e)	Contingencies		300	
	Sub-total		4,775	(in September 2007 prices)
(f)	Provision for price adjustment		775	
	Total		5,550	(in MOD prices)

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1 Water mains replacement by trenchless methods refers to the use of pipe jacking, micro-tunnelling or boring techniques to construct underground pipelines without opening up the road surface for the whole length of the pipelines.

2 Rehabilitation methods are generally classified as trenchless methods (sometimes referred to as 'minimum dig' or 'reduced dig' methods). In these techniques, 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 except at the pits.

A breakdown of the estimates for the consultants' fees by man-months is at Enclosure 2.

9. Subject to approval, we will phase the expenditure as follows:

Year	$ million (Sept 2007)	Price adjustment factor	$ million (MOD)
2008 – 2009	39.0	1.02575	40.0
2009 – 2010	824.6	1.06293	876.5
2010 – 2011	947.3	1.10545	1,047.2
2011 – 2012	965.5	1.14967	1,110.0
2012 – 2013	912.8	1.19566	1,091.4
2013 – 2014	496.3	1.24348	617.1
2014 – 2015	484.5	1.29322	626.6
2015 – 2016	105.0	1.34495	141.2
	4,775.0		5,550.0

10. 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 2008 to 2016. We will implement the mainlaying works as re-measurement contracts because the quantities of works are subject to variation during construction to suit the actual underground conditions. The contracts will provide for price adjustment as the contract periods will exceed 21 months.

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

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12. The project by itself would lead to an increase in production cost of water by 2.35% in real terms by 2016[3].

PUBLIC CONSULTATION

13. We consulted the Legislative Council Panel on Development on the proposed works on 27 May 2008. Members raised no objection to the proposed works.

14. We have consulted all District Councils earlier this year on **186WC**. All the District Councils supported the implementation of the works. A table showing details of the consultations is at Enclosure 3. We will implement adequate traffic and environmental mitigation measures under the works contracts to minimise the inconvenience to the public. We will also closely monitor the implementation of these mitigation measures and the interfacing of works, and will consult the relevant District Councils when necessary during the project period.

ENVIRONMENTAL IMPLICATIONS

15. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). The project does not have any long-term environmental impact. Short-term construction impacts will be mitigated through the implementation of standard pollution control measures on abatement of air, noise, water and waste pollutions. We have included about $50 million in September 2007 prices to implement these mitigation measures and will incorporate these requirements into the works contracts for implementation.

16. We have considered the alignments of the proposed water mains in the planning and design stages to reduce the generation of construction waste where possible. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further minimise the generation of construction waste.

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[3] 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 2008 to 2016.

17. We will also require the contractor to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

18. We estimate that the project will generate in total about 1 108 000 tonnes of construction waste. Of these, we will reuse about 602 000 tonnes (about 54.3%) of inert construction waste on site and deliver 492 000 tonnes (about 44.4%) of inert construction waste to public fill reception facilities[4] for subsequent reuse. In addition, we will dispose of 14 000 tonnes (about 1.3%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill sites is estimated to be $15 million for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne at landfills[5]).

HERITAGE IMPLICATIONS

19. The stage 3 works under **186WC** will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interest and Government historic sites identified by the Antiquities and Monuments Office.

TRAFFIC IMPACTS

20. We have carried out traffic impact assessments (TIA) for the proposed works under **186WC**. The cumulative effects of adjacent projects are also covered in the TIA. The TIA have concluded that the proposed works would not cause any significant traffic impact to the surrounding road network. We will implement temporary traffic arrangements to minimise impacts on traffic during construction and will display notice boards on site to explain the reason of

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[4] Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

[5] 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^3), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

temporary traffic arrangements and the expected completion date of the concerned section of works. In addition, we will set up telephone hotlines for public enquiries or complaints. Furthermore, trenchless methods will be used whenever practicable for works along busy roads, e.g. Nathan Road and Queensway.

LAND ACQUISITION

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

BACKGROUND INFORMATION

22. We upgraded **186WC** to Category B in January 2006.

23. In July 2006, we upgraded part of **186WC** to Category A as **187WC** entitled "Replacement and rehabilitation of water mains, stage 3 – investigation and detailed design" for engagement of consultants to carry out the investigation and detailed design of the proposed works. The consultancies commenced in October 2006 for completion in early 2010.

24. We have substantially completed the detailed design of the proposed works under **186WC**.

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

26. We estimate that the proposed works will create about 1 900 jobs (1 540 for labourers and another 360 for professional/technical staff) providing a total employment of 109 100 man-months.

Development Bureau
June 2008

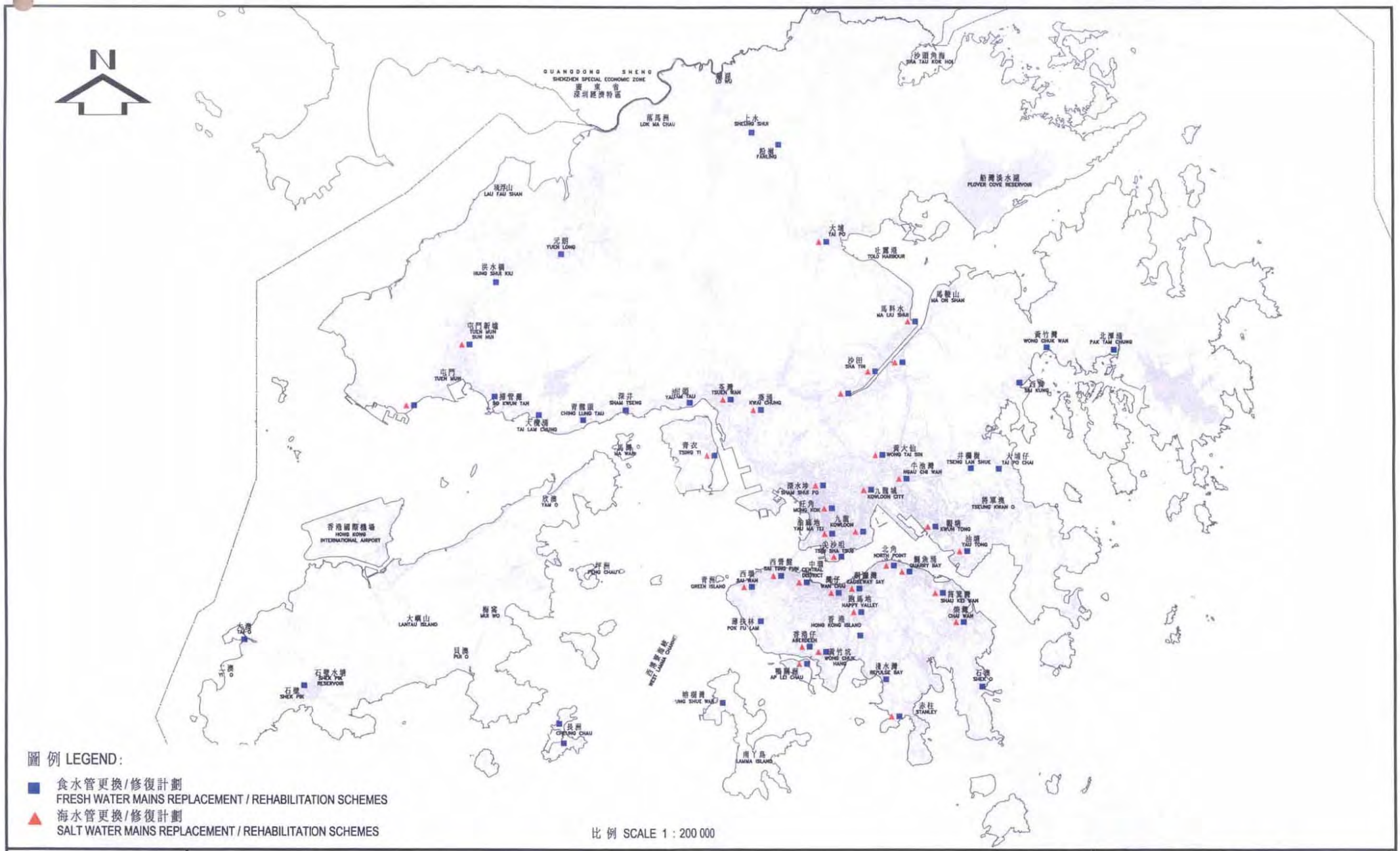

圖 例 LEGEND:

- 食水管更換/修復計劃
  FRESH WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
- 海水管更換/修復計劃
  SALT WATER MAINS REPLACEMENT / REHABILITATION SCHEMES

比 例 SCALE 1 : 200 000

核准 APPROVED

總工程師/工程管理 CE / PM

19/5/2008

工務計劃工程項目第 186WC 號 ------ 更換及修復水管工程第 3 階段
P.W.P. Item no. 186WC ----- Replacement and rehabilitation of water mains, stage 3

（甲級工程）
(CAT 'A' Submission)

水務署
WATER SUPPLIES DEPT.

草圖編號 SKETCH NO. SK 62008 / 055

REF. 62008-055.DWG

附件 1 ENCLOSURE 1

186WC – Replacement and rehabilitation of water mains, stage 3

Breakdown of estimates for consultants' fees:

Consultants' staff costs		**Estimated man-months**	**Average MPS* salary point**	**Multiplier** (Note 1)	**Estimated fee ($million)**
(a) consultants' fees for works in the construction stage (Note 2)		–	–	–	6
(b) site supervision by resident site staff employed by the consultants (Note 3)	Professional	1 690	38	1.6	154
	Technical	6 305	14	1.6	190
		Total consultants' staff cost			**350**

*MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to estimate the cost of resident site staff supplied by the consultants. (As at 1.4.2007, MPS point 38 = $56,945 per month and MPS point 14 = $18,840 per month).

2. The consultants' fees for works in the construction stage are the actual tendered prices provisionally included in the consultancy agreements for the design and construction of the project. The construction phase of the assignments will only be executed subject to Finance Committee's approval to upgrade the proposed works to Category A.

3. We will only know the actual man-months and actual cost after completion of the construction works.

186WC – Replacement and rehabilitation of water mains, stage 3

Consultation with District Councils

District Council	Date of Meeting	Decision
Tai Po District Council Environment, Housing and Works Committee	16 January 2008	Supported
Wan Chai District Council Development, Planning and Transport Committee	14 February 2008	Supported
Wong Tai Sin District Council Traffic and Transport Committee	19 February 2008	Supported
Sai Kung District Council Traffic and Transport Committee	21 February 2008	Supported
Kwai Tsing District Council Traffic and Transport Committee	21 February 2008	Supported
Sha Tin District Council Development and Housing Committee	21 February 2008	Supported
Tsuen Wan District Council Traffic and Transport Committee, and Environmental and Health Affairs Committee	25 February 2008 & 28 February 2008	Supported
Kwun Tong District Council Traffic and Transport Committee	27 February 2008	Supported
Kowloon City District Council Housing and Infrastructure Committee	6 March 2008	Supported
Yau Tsim Mong District Council Traffic and Transport Committee	6 March 2008	Supported
Eastern District Council Planning, Works and Housing Committee	7 March 2008	Supported

186WC – Replacement and rehabilitation of water mains, stage 3

Consultation with District Councils

District Council	Date of Meeting	Decision
Southern District Council District Development and Environment Committee	10 March 2008	Supported
North District Council District Minor Works and Environmental Improvement Committee	17 March 2008	Supported
Yuen Long District Council Town Planning and Development Committee	19 March 2008	Supported
Sham Shui Po District Council Transport and Housing Affairs Committee	27 March 2008	Supported
Tuen Mun District Council Environmental, Hygiene and District Development Committee	28 March 2008	Supported
Islands District Council	14 April 2008	Supported
Central and Western District Council Food, Environment, Hygiene and Works Committee	13 March 2008 & 22 May 2008	Supported