

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Combined fresh/salt water supply

182WC – Replacement and rehabilitation of water mains, stage 2

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **182WC**, entitled “Replacement and rehabilitation of water mains, stage 2 – investigation and detailed design”, to Category A at an estimated cost of \$52.9 million in money-of-the-day prices;
- (b) the retention of the remainder of **182WC** 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 (DWS), with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade part of **182WC** to Category A at an estimated cost of \$52.9 million in money-of-the-day (MOD) prices for engaging consultants to carry out investigation and detailed design for the works under **182WC**.

PROJECT SCOPE AND NATURE

3. **182WC** is the stage 2 works under the Water Supplies Department's territory-wide water mains replacement and rehabilitation programme. The full scope of works under **182WC** comprises the replacement and rehabilitation of approximately 670 kilometres (km) of fresh water mains, 80 km of salt water mains and 3 km of raw water mains. Due to insufficient in-house resources, we plan to investigate the site, design and supervise the replacement and rehabilitation of water mains under **182WC** partly by consultants and partly by in-house resources.

4. The part of **182WC** we now propose to upgrade to Category A comprises –

(a) consultancies for the traffic impact assessment, drainage impact assessment, environmental review and detailed design of the replacement and rehabilitation of –

(i) about 580 km of fresh water mains ranging from 15 millimetres (mm) to 1 500 mm in diameter;

(ii) about 70 km of salt water mains ranging from 25 mm to 800 mm in diameter; and

(iii) about 3 km of raw water mains ranging from 1 400 mm to 2 300 mm in diameter; and

(b) site investigation for all the works under **182WC**.

5. We plan to start the proposed consultancies and site investigation works in June 2005 for completion in May 2007. Plans showing the sites of the proposed works under **182WC** and the proposed consultancies in paragraph 4(a) are at Enclosure 1. Details of the typical water mains replacement and rehabilitation works proposed are shown in Enclosure 2.

/JUSTIFICATION

JUSTIFICATION

6. Hong Kong's fresh water and salt water supplies are provided through a network 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. Due to the considerable length of water mains approaching the end of their service life, we are experiencing an increasing number of main bursts causing more and more 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. Construction of the stage 1 works¹ commenced in December 2000, and stage 1 phase 1 will be completed by end 2008. To bring about earlier improvement to the supply system and minimise inconvenience to the public due to frequent main bursts, WSD will actively review the whole replacement and rehabilitation programme on the basis of the proposed consultancies and site investigation works and explore whether the programme can be further compressed and completed before 2015.

9. To meet the compressed programme of replacement and rehabilitation of the ageing water mains, we need to commence site investigation and detailed design of the stage 2 works in June 2005. As there are insufficient in-house staffing resources to carry out all the proposed works under **182WC** in view of the scale and complexity, we propose to engage consultants to carry out the proposed design and supervise site investigations so as to enable the construction works to proceed as scheduled. In-house staffing resources would be used to investigate, design and supervise the replacement and rehabilitation of the remaining ageing water mains under the stage 2 works (about 90 km of fresh water mains ranging from 20 mm to 450 mm in diameter and about 10 km of salt water mains ranging from 25 mm to 150 mm in diameter).

/FINANCIAL

¹ The stage 1 works includes replacement and rehabilitation of the most critical water mains to bring about early benefits, i.e. the works under **90WC** "Replacement and rehabilitation of water mains, stage 1 phase 1" and **174WC** "Replacement and rehabilitation of water mains, stage 1 phase 2".

FINANCIAL IMPLICATIONS

10. We estimate the cost of the proposed consultancies and site investigation works to be \$52.9 million in MOD prices (see paragraph 11 below), made up as follows –

	\$ million	
(a) Consultants' fees	30.8	
(i) design, tender documentation and assessment	22.7	
(ii) traffic impact assessment	1.9	
(iii) drainage impact assessment	0.4	
(iv) environmental review	1.2	
(v) supervision of site investigation works	4.6	
(b) Site investigation works	17.8	
(c) Contingencies	4.9	
	<u>53.5</u>	(in September 2004 prices)
(d) Provision for price adjustment	<u>(0.6)</u>	
	<u>52.9</u>	(in MOD price)

_____ A breakdown of the estimates for the consultant's fees by man-months is at Enclosure 3.

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

Year	\$ million (Sept 2004)	Price adjustment factor	\$ million (MOD)
2005 – 06	15.0	0.99000	14.9
2006 – 07	29.0	0.98753	28.6
2007 – 08	9.5	0.99123	9.4
	53.5		52.9

12. 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 2008. We will tender the proposed consultancies for the site investigations, impact assessments, environmental review and detailed design on a lump sum basis. We will provide for price adjustment in the consultancy agreements as the consultancy period of each agreement exceeds 12 months. The consultants will arrange contractors through competitive tendering process for the site investigations on a re-measurement basis as they cannot determine in advance the exact extent of site investigations.

13. There will be no additional recurrent expenditure arising from the part of **182WC** we now propose to upgrade to Category A as it entails consultancy services and site investigation works only.

PUBLIC CONSULTATION

14. We consulted the LegCo Panel on Planning, Lands and Works on the proposed works under **182WC** on 25 January 2005. Members had no objection to the proposal. In response to some Members' concern in the implementation programme, we undertook to make continual efforts to explore the feasibility to complete the whole replacement and rehabilitation programme within a shorter time frame.

/15.

15. We will consult the relevant District Councils and take their views into consideration at the design stage of **182WC**. We previously consulted all relevant District Councils on **90WC** – “Replacement and rehabilitation of water mains, stage 1 phase 1” and **174WC** – “Replacement and rehabilitation of water mains, stage 1 phase 2”. All of them supported the projects.

ENVIRONMENTAL IMPLICATIONS

16. The proposed consultancies themselves will not have adverse environmental implications. We will look into the environmental implications of the project. If there is any designated project under the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) identified in the consultancies, we undertake to comply with the statutory process under the EIA Ordinance.

17. We will implement environmental pollution control measures to control the environmental impacts of the associated site investigation works. The site investigation works will only generate a minimal amount of construction and demolition (C&D) materials. We will require the consultants to plan and design the works in such a way to minimise, reuse and recycle C&D materials as much as possible at the construction stage.

LAND ACQUISITION

18. The proposed consultancies and site investigation works do not require any land acquisition.

BACKGROUND INFORMATION

19. We upgraded **182WC** to Category B in September 2004.

20. The estimated value of works under **182WC** is \$2.6 billion in September 2004 prices. We plan to commence the investigation and detailed design consultancies in June 2005 for completion by phases in May 2007 with a view to commencing the construction works in January 2007 for completion in 2011.

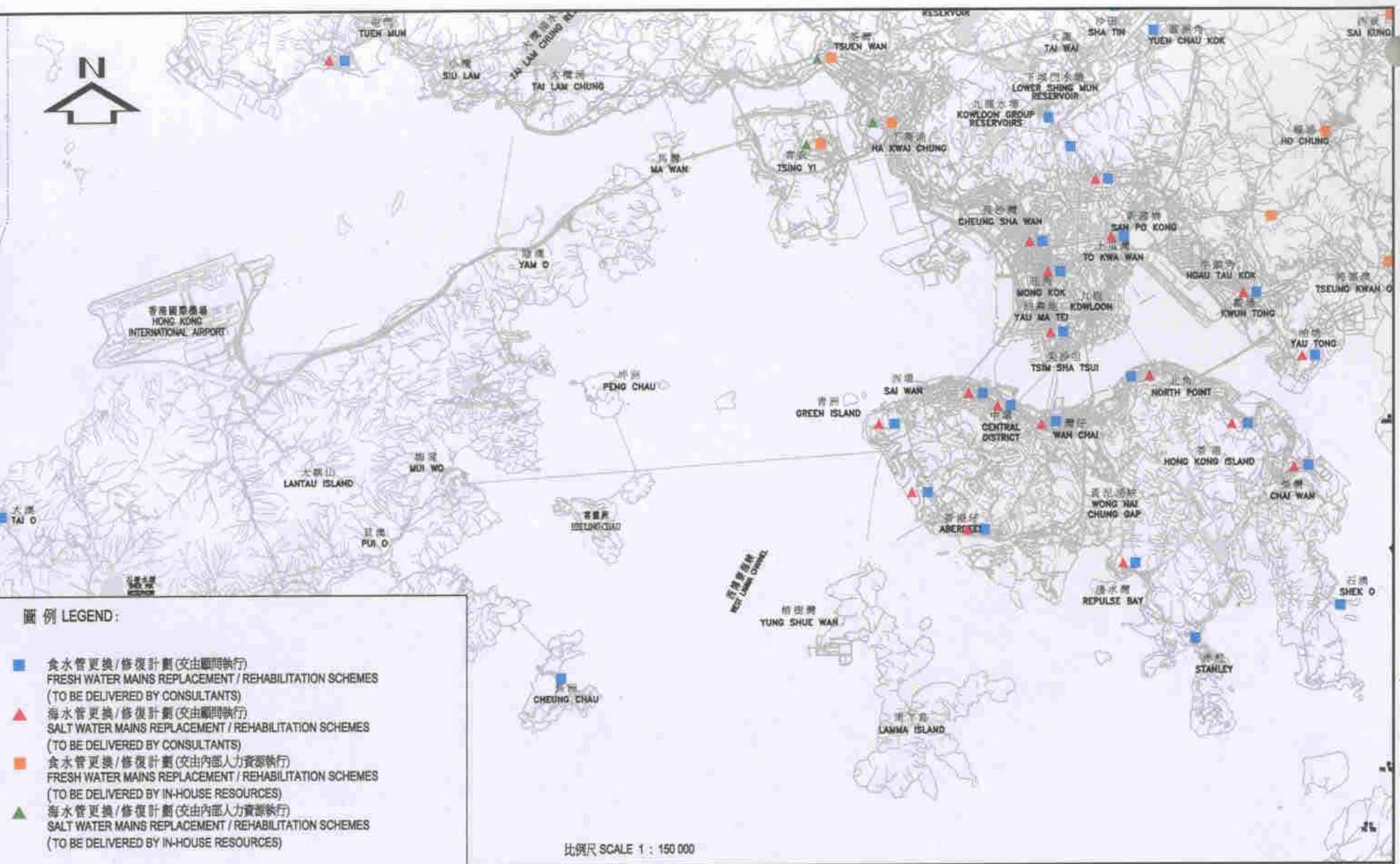
21. We will continue planning the remaining stages 3 and 4 of the improvement works with a view to completing the entire replacement and rehabilitation programme before 2015 making reference to the experience gained in the first two stages.

/22.

22. The proposed site investigation and consultancies will not involve any tree removal or planting proposals.

23. We estimate that the proposed consultancies and site investigation works will create about 62 jobs (15 for labourers and another 47 for professional/technical staff) providing a total employment of 890 man-months.

Environment, Transport and Works Bureau
February 2005



圖例 LEGEND:

- 食水管更換/修復計劃 (交由顧問執行)
FRESH WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY CONSULTANTS)
- ▲ 海水管更換/修復計劃 (交由顧問執行)
SALT WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY CONSULTANTS)
- 食水管更換/修復計劃 (交由內部人力資源執行)
FRESH WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY IN-HOUSE RESOURCES)
- ▲ 海水管更換/修復計劃 (交由內部人力資源執行)
SALT WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY IN-HOUSE RESOURCES)

比例尺 SCALE 1 : 150 000

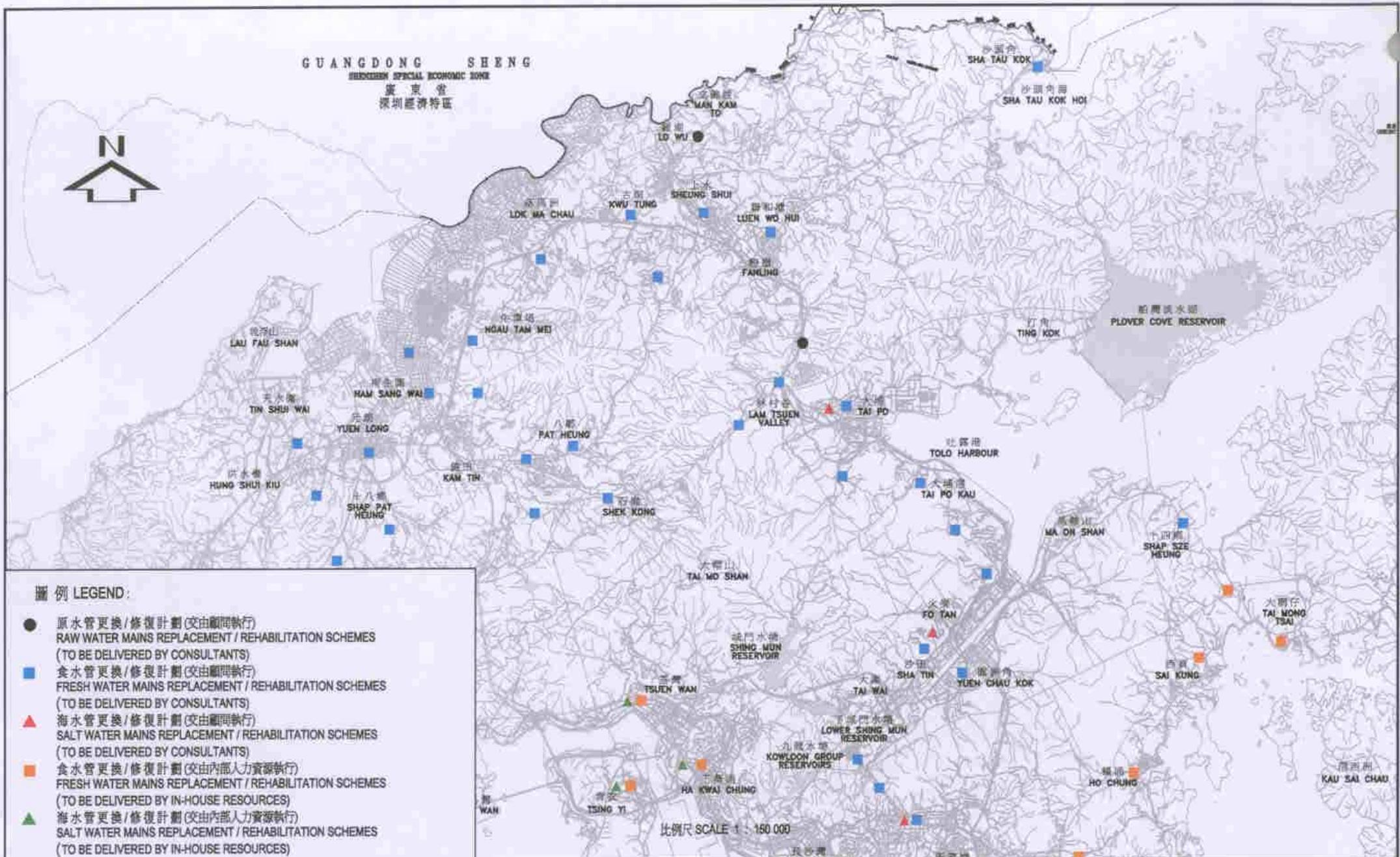
核准 APPROVED

 總工程師/副總工程師 CE/CM
 3 / 2 / 2005

工務計劃項目 182WC —— 更換及修復水管工程第2階段
 (圖一—香港、九龍及離島區)
 P.W.P. NO. 182WC —— REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 2
 (SHEET 1 - HONG KONG, KOWLOON & ISLANDS)

 水務署
 WATER SUPPLIES DEPT.
 草圖編號 SKETCH NO. 62004 / 089 / 001

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



圖例 LEGEND:

- 原水管更換/修復計劃(交由顧問執行)
RAW WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY CONSULTANTS)
- 食水管更換/修復計劃(交由顧問執行)
FRESH WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY CONSULTANTS)
- ▲ 海水管更換/修復計劃(交由顧問執行)
SALT WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY CONSULTANTS)
- 食水管更換/修復計劃(交由內部人力資源執行)
FRESH WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY IN-HOUSE RESOURCES)
- ▲ 海水管更換/修復計劃(交由內部人力資源執行)
SALT WATER MAINS REPLACEMENT / REHABILITATION SCHEMES
(TO BE DELIVERED BY IN-HOUSE RESOURCES)

核准 APPROVED

總工程師/顧問工程經理 CE / CM
3 / 2 / 2005

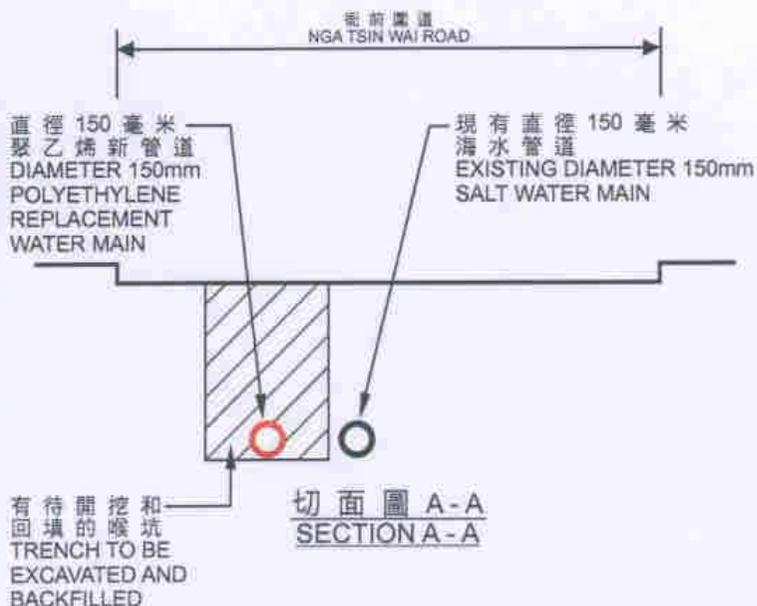
工務計劃項目 182WC — 更換及修復水管工程第 2 階段
(圖二 - 新界區)
P.W.P. NO. 182WC — REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 2
(SHEET 2 - NEW TERRITORIES)

 水務署
WATER SUPPLIES DEPT.
草圖編號 SKETCH NO. SK 62004 / 089 / 002

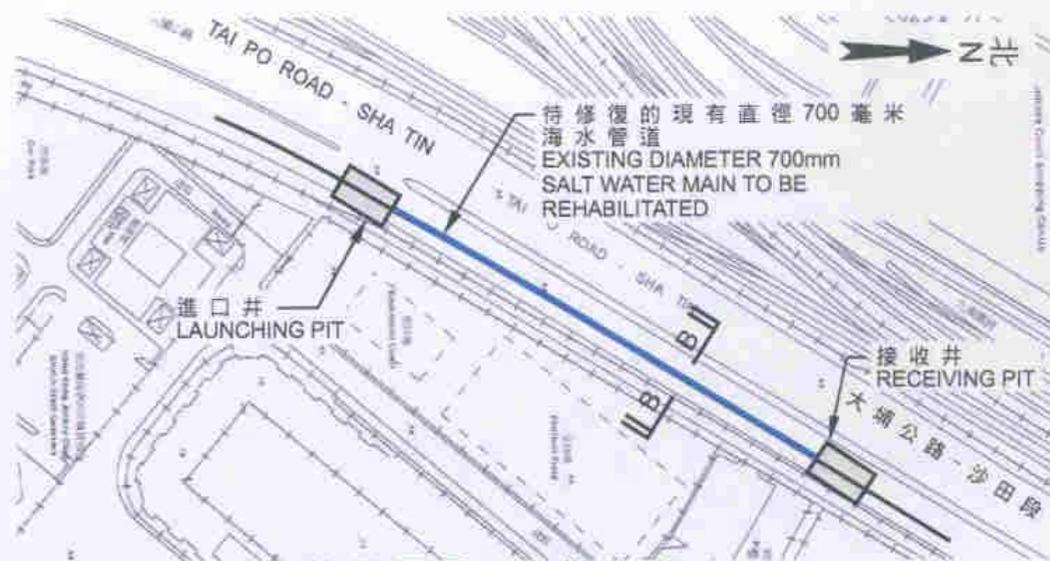
附件一 (第二頁, 共二頁) ENCLOSURE 1 (SHEET 2 OF 2)



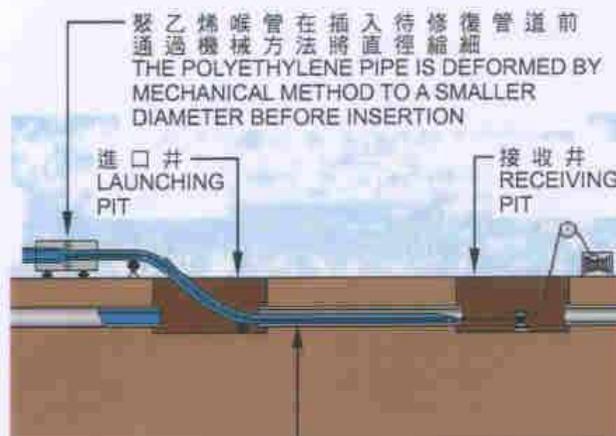
地盤平面圖 - 更換水管
SITE PLAN - WATER MAIN REPLACEMENT
比例尺 SCALE 1:2 000



切面圖 A-A
SECTION A-A

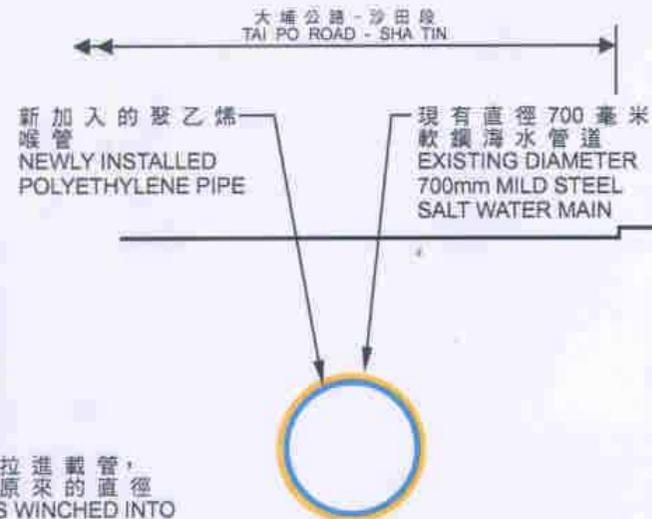


地盤平面圖 - 修復水管
SITE PLAN - WATER MAIN REHABILITATION
比例尺 SCALE 1:2 000



修復水管圖解
WATER MAIN REHABILITATED
ILLUSTRATION

聚乙烯喉管會以絞車拉進載管，然後加壓以恢復喉管原來的直徑
THE POLYETHYLENE PIPE IS WINCHED INTO THE CARRIER PIPE AND THEN PRESSURISED TO REVERT TO ITS ORIGINAL DIAMETER



切面圖 B-B
SECTION B-B

核准 APPROVED

總工程師/顧問工程師

CE/CM

3 / 2 / 2005

(甲級工程)
(CAT 'A' Submission)

工務計劃項目182WC — 更換及修復水管工程第2階段
更換及修復水管範例

P.W.P. NO. 182WC — REPLACEMENT AND REHABILITATION OF WATER MAINS, STAGE 2
TYPICAL WATER MAIN REPLACEMENT AND REHABILITATION DETAILS



水務署
WATER SUPPLIES DEPT.

草圖編號
SKETCH NO. SK 62004 / 090

182WC – Replacement and rehabilitation of water mains, stage 2**Breakdown of estimates for consultant's fees:**

Consultant's staff costs		Estimated man months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a) Design, tender documentation and assessments	Professional	150	38	2.0	16.3
	Technical	177	14	2.0	6.4
(b) Traffic impact assessments	Professional	9	38	2.0	1.0
	Technical	25	14	2.0	0.9
(c) Drainage impact assessments	Professional	2	38	2.0	0.2
	Technical	5	14	2.0	0.2
(d) Environmental reviews	Professional	6	38	2.0	0.7
	Technical	14	14	2.0	0.5
(e) Supervision of site investigation works	Professional	24	38	2.0	2.6
	Technical	56	14	2.0	2.0
Total (Note 2)					30.8

* MPS = Master Pay Scale

Notes

1. A multiplier factor of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultant's office overhead and profit, as the staff will be employed in the consultant's office. (As at 1 January 2005, MPS pt 38 = \$54,255 per month and MPS pt 14 = \$18,010 per month)
2. We will only know the actual man-months and actual fees after we have selected the consultant through the usual competitive lump sum fee bidding system.