

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

327WF – Laying of western cross harbour main and associated land mains from West Kowloon to Sai Ying Pun

Members are invited to recommend to Finance Committee the upgrading of **327WF** to Category A at an estimated cost of \$354.5 million in money-of-the-day prices for providing a new cross harbour water main across the western part of the harbour.

PROBLEM

Two groups of the existing cross harbour mains, namely the North Point cross harbour main and the Silver Mine Bay submarine mains, are approaching their design life of 50 years. There is a need to lay a new cross harbour main to ensure security of water supply to Hong Kong Island before these two groups of aged water mains are taken out of service in turn for examination.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade **327WF** to Category A at an estimated cost of \$354.5 million in money-of-the-day (MOD) prices for providing a new cross harbour water main across the western part of the harbour.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of works under **327WF** comprises -
- (a) laying of about 2.1 kilometres (km) of new submarine pipeline of diameter 1 200 millimetres (mm) from West Kowloon to Sai Ying Pun; and
 - (b) laying of about 2.2 km of land mains of diameter 1 200 mm.

— A site plan and a typical section of the proposed submarine pipeline are at Enclosure 1.

4. We plan to commence the proposed works in December 2008 for completion in December 2011.

JUSTIFICATIONS

5. At present, about 90 percent of the fresh water demand for Hong Kong Island is met by supplies conveyed from Kowloon and Lantau Island via four groups of cross harbour mains. They include the Eastern cross harbour main, the Central cross harbour mains, the Silver Mine Bay submarine mains and the North Point cross harbour main. Their respective diameters are 1 400mm, 1 000mm (twin pipes), 750mm (twin pipes) and 1 000mm. They have already been in use for 19, 26, 45 and 46 years respectively. The locations of these four groups of cross harbour mains are also shown in Enclosure 1.

6. The last two groups of the existing cross harbour mains, namely the North Point cross harbour main and the Silver Mine Bay submarine mains, will reach their design life of 50 years by 2012 and 2013 respectively. Together they provide about 32% of the total water supply to Hong Kong Island. There is an increasing risk of major disruption to the fresh water supply to Hong Kong Island as the conditions of these two groups of aged water mains are unknown.

7. At present, Water Supplies Department cannot shut down any one of these two groups of aged water mains to conduct a detailed survey of its existing conditions because during the shut down period any unexpected interruption of supply at the remaining water mains will result in serious disruption of water supply to Hong Kong Island. It is therefore necessary to lay a new cross harbour main to ensure security of water supply before the two groups of aged water mains are taken out of service in turn for examination.

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8. We propose to lay a new cross harbour main of 1 200 mm diameter on the western part of the harbour from West Kowloon to Sai Ying Pun. Upon completion of the proposed new cross harbour main, we will carry out the necessary surveys to ascertain the conditions of the aged water mains and investigate the feasibility of their rehabilitation.

9. West Kowloon and Sai Ying Pun are the preferred landing points of the proposed cross harbour main in light of the existing water supply networks and the land availability on either side of the harbour.

FINANCIAL IMPLICATIONS

10. We estimate the capital cost of the proposed works to be \$354.5 million in MOD prices (see paragraph 11 below), made up as follows –

	\$ million	
(a) Laying of submarine pipeline	183.2	
(i) mainlaying works	84.3	
(ii) dredging and backfilling works	98.9	
(b) Laying of land mains	77.9	
(c) Environmental mitigation measures	8.6	
(d) Consultants' fees	29.9	
(i) contract administration	1.0	
(ii) resident site staff costs	26.8	
(iii) environmental monitoring and audit (EM&A) programme	2.1	
(e) Contingencies	26.5	
	Sub-total	326.1 (in September 2007 prices)
(f) Provision for price adjustment	28.4	
	Total	354.5 (in MOD prices)

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

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

Year	\$ million (Sept 2007)	Price Adjustment Factor	\$ million (MOD)
2008 – 2009	10.7	1.02575	11.0
2009 – 2010	173.4	1.06293	184.3
2010 – 2011	101.3	1.10545	112.0
2011 – 2012	31.9	1.14967	36.7
2012 – 2013	8.8	1.19566	10.5
	326.1		354.5

12. We have derived the MOD estimates 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 2013. We will tender the proposed works on a remeasurement basis because of the extensive underground works which are subject to variation during construction to suit the actual site conditions. Since the contract period will exceed 21 months, we will provide for price adjustments in the contract.

13. We estimate the annual recurrent expenditure arising from the project to be about \$259,000.

14. The project by itself will lead to an increase in the production cost of water by about 0.12% in real terms by 2013¹.

/PUBLIC

1 The increase in the 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 2007 to 2013.

PUBLIC CONSULTATION

15. We consulted the Traffic and Transport Committee (TTC) of Yau Tsim Mong District Council (YTMDC) and the Food, Environment, Hygiene & Works Committee (FEHWC) of the Central and Western District Council (C&WDC) on the proposed works on 6 March 2008 and 13 March 2008 respectively. The YTMDC TTC supported the proposed works. The C&WDC FEHWC supported the proposed works in-principle, and requested the Government to carefully handle any possible adverse traffic and environmental impacts arising from the proposed works. We will implement temporary traffic management schemes and the recommendations of the Environmental Impact Assessment (EIA) study to mitigate the traffic and environmental impacts respectively.

16. We gazetted the proposed works under the Foreshore and Seabed (Reclamations) Ordinance on 8 June 2007 and did not receive any objection during the objection period. The proposed works was subsequently authorised on 24 August 2007.

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

ENVIRONMENTAL IMPLICATIONS

18. The submarine pipeline portion is a designated project under Schedule 2 of the EIA Ordinance (Cap. 499) and an environmental permit (EP) is required for the construction and operation of the proposed submarine pipeline. We have completed an EIA report which concluded that the environmental impacts of the proposed works could be mitigated and controlled to comply with the requirements of the EIA Ordinance. The EIA report was approved by the Director of Environmental Protection and the EP for the proposed works was granted in July 2007. We will implement the recommendations of the EIA study in the construction and operation stages of the project.

19. For short-term impacts during construction, we will control noise, dust and site run-off to levels within established standards and guidelines through the implementation of mitigation measures and good construction practices. We will also conduct a comprehensive environmental monitoring and audit programme during the construction stage to ensure compliance with the EP

/requirements

requirements. We have included a sum of \$8.6 million in September 2007 prices in the project estimate for implementing the environmental mitigation measures.

20. We have considered the alignment of the water main 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 facilities². 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.

21. 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.

22. We estimate that the project will generate in total about 55 830 tonnes of construction waste. Of these, we will reuse about 41 200 tonnes (74%) of inert construction waste on site and deliver 13 510 tonnes (24%) of inert construction waste to public fill reception facilities for subsequent reuse. In addition, we will dispose of 1 120 tonnes (2%) 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 about \$0.5 million for this project (based on a unit cost of \$27/tonne for disposal at public fill reception facilities and \$125/tonne at landfills³).

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² 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.

³ 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 is likely to be more expensive) when the existing ones are filled.

23. We estimate that some 543 000 m³ of marine sediments will be generated from the project. We will follow the recommendations and implement measures of the approved EIA report for handling these sediments with an aim to minimising disruption to the surrounding marine environment. We will dispose of these sediments at the designated facilities within Hong Kong according to the legal requirements.

TRAFFIC IMPLICATIONS

24. We have completed the traffic impact assessment (TIA) for the proposed works. The TIA has concluded that the proposed works will not cause significant traffic impact through implementation of temporary traffic management schemes. At locations where traffic is heavy, we will employ trenchless construction method for the proposed land mains where site conditions permit.

25. We have also carried out a marine traffic impact assessment (MTIA) for the proposed submarine pipeline. The MTIA has concluded that laying of the submarine pipeline will not cause significant impact on marine activities through implementation of mitigation measures. For example, we will require the contractor to carry out the submarine pipeline dredging works in phases and to avoid constructing temporary works around the waters near the landing points concurrently with the dredging works to reduce cumulative impact on marine traffic.

HERITAGE IMPLICATIONS

26. The project 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.

LAND ACQUISITION

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

BACKGROUND INFORMATION

28. We included **327WF** in Category B in October 2004.

29. In February 2006, we engaged consultant to undertake the investigation study for the proposed works at a cost of \$2.8 million in MOD prices. In September 2007, we engaged consultant to undertake the detailed design for the proposed works at a cost of \$1.95 million in MOD prices. We have charged these amounts to block allocation **Subhead 9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme”. The design of the proposed works had been completed by end of May 2008.

30. Of the 30 trees within the project boundary, four trees will be preserved. The proposed works will involve the removal of 26 trees including one tree to be felled and 25 trees to be replanted within the project site. All trees to be removed are not important trees⁴. We have adjusted the alignment of the proposed land mains to keep the felling of trees to a minimum. We will incorporate the planting of five trees as part of the project.

31. We estimate that the proposed works will create about 242 jobs (174 for labourers and another 68 for professional/technical staff) providing a total employment of 6 500 man-months.

Development Bureau
June 2008

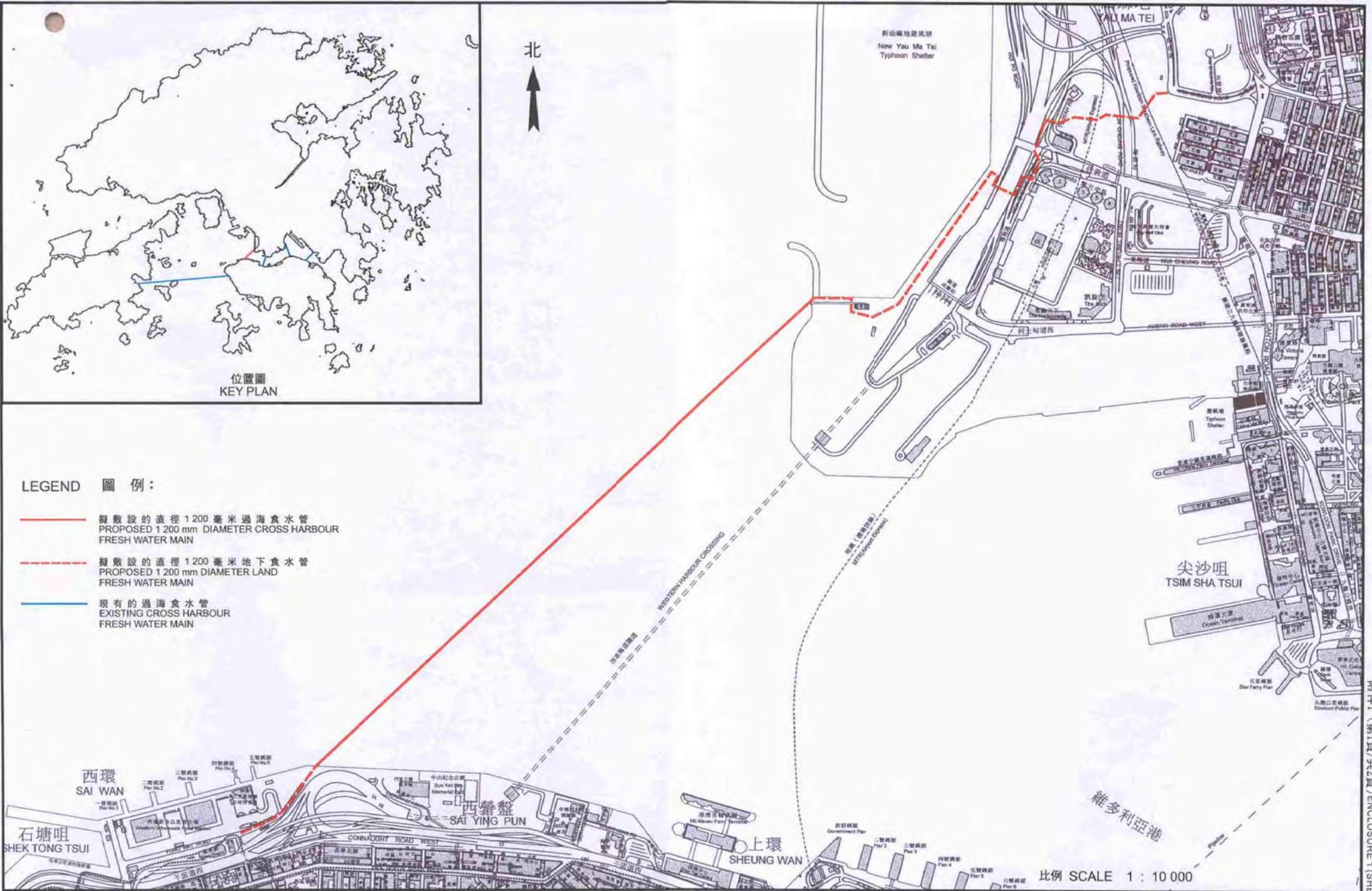
⁴ “Important trees” refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

- (a) trees of 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui tree, tree as landmark of monastery or heritage monument, and trees in memory of an important person or event;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal to or exceeding 1.0 m (measured at 1.3 m above ground level), or with height/canopy spread equal to or exceeding 25 m.



LEGEND 圖例：

- 擬敷設的直徑 1 200 毫米過海食水管
PROPOSED 1 200 mm DIAMETER CROSS HARBOUR FRESH WATER MAIN
- - - 擬敷設的直徑 1 200 毫米地下食水管
PROPOSED 1 200 mm DIAMETER LAND FRESH WATER MAIN
- 現有的過海食水管
EXISTING CROSS HARBOUR FRESH WATER MAIN



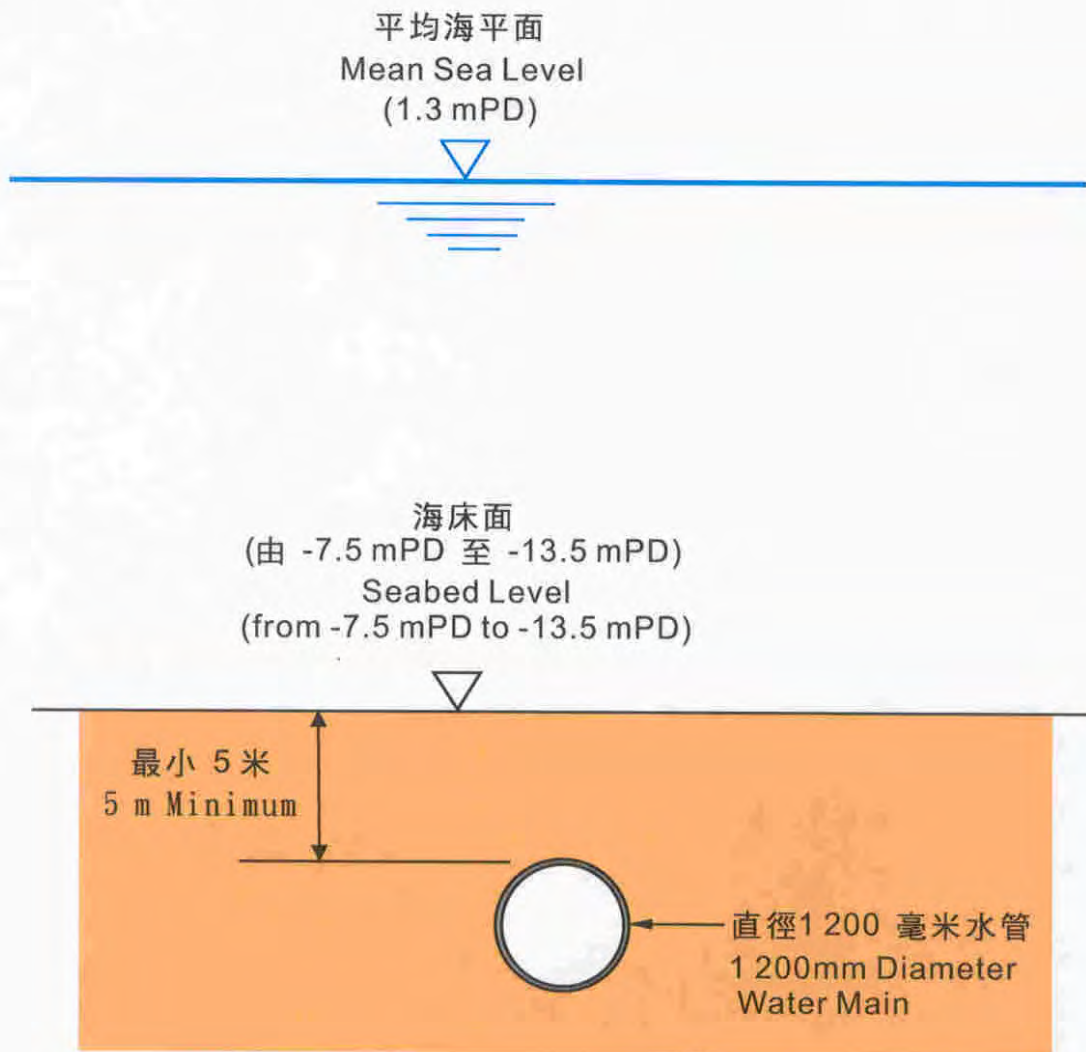
比例 SCALE 1 : 10 000

核准 APPROVED

 總工程師/總務工程經理
 715 2008

工務計劃工程項目第 9327WF 號 — 敷設由西九龍至西營盤之西區過海海底水管及與其相關的地下喉管
 P.W.P. ITEM NO. 9327WF — LAYING OF WESTERN CROSS HARBOUR MAIN AND ASSOCIATED LAND MAINS FROM WEST KOWLOON TO SAI YING PUN

水務署
 WATER SUPPLIES DEPT.
 草圖編號 SKETCH NO. SK 62007 / 180



海底水管的典型切面圖

TYPICAL SECTION OF SUBMARINE PIPELINE

核准 APPROVED
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總工程師/顧問工程管理 CE/CM
19/5/2008

工務計劃工程項目第 9327WF 號 —
敷設由西九龍至西營盤之西區過海海底水管及與其相關的地下喉管
P.W.P. ITEM NO. 9327WF — LAYING OF
WESTERN CROSS HARBOUR MAIN AND ASSOCIATED LAND MAINS
FROM WEST KOWLOON TO SAI YING PUN
(草圖工程)
(CAT 'A' Submission)

 水務署
WATER SUPPLIES DEPT.
草圖編號 SKETCH NO. SK 62008 / 500

Enclosure 2 to PWSC(2008-09)32

**327WF – Laying of western cross harbour main and associated land mains
from West Kowloon to Sai Ying Pun**

Breakdown of the estimate for consultants' fees (in September 2007 prices) –

Consultants' staff costs		Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$million)
(a) Contract administration (Note 2)	Professional	-	-	-	0.7
	Technical	-	-	-	0.3
(b) Resident site staff (Note 3)	Professional	122	38	1.6	11.1
	Technical	520	14	1.6	15.7
(b) EM&A programme	Professional	18	38	1.6	1.6
	Technical	17	14	1.6	0.5
				Total	<u>29.9</u>

*MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS point to arrive at the cost of resident site staff supplied by the consultants (As at 1 April 2007, MPS point 38 = \$56,945 per month and MPS point 14 = \$18,840 per month).
2. The consultants' staff costs for contract administration is calculated in accordance with the existing consultancy agreement for the provision of contract administration for **327WF**. The assignment 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 fees after completion of the works.