

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

345WF – Planning and investigation study of desalination plant at Tseung Kwan O

Members are invited to recommend to Finance Committee the upgrading of **345WF** to Category A at an estimated cost of \$34.3 million in money-of-the-day prices for carrying out the planning and investigation study for the construction of a desalination plant at Tseung Kwan O Area 137.

PROBLEM

Fresh water supply in Hong Kong is subject to uncertainties due to factors such as acute climate changes and low rainfall.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade **345WF** to Category A at an estimated cost of \$34.3 million in money-of-the-day (MOD) prices for carrying out a planning and investigation study (the proposed Study) and the associated site investigation works for the construction of a desalination plant at Tseung Kwan O Area 137 and the associated fresh water transfer facilities¹.

/PROJECT

¹ The associated fresh water transfer facilities comprise a pumping station within the site of the desalination plant and fresh water mains linking the proposed desalination plant and the existing Tseung Kwan O primary fresh water service reservoir at Tsui Lam.

PROJECT SCOPE AND NATURE

3. The scope of **345WF** which we propose to upgrade to Category A comprises –

- (a) a consultancy for conducting the proposed Study, which includes –
 - (i) detailed investigation of the feasibility and cost effectiveness for constructing a desalination plant and the associated fresh water transfer facilities (the proposed works), and preliminary design of the proposed works;
 - (ii) planning and formulation of implementation strategy and programme;
 - (iii) impact assessment on environment, traffic, drainage and other relevant aspects²;
 - (iv) supervision of the site investigation in (b) below; and
- (b) associated site investigation works.

4. We have earmarked a site of about 10 hectares at Tseung Kwan O Area 137 for the construction of a desalination plant with an output capacity of 50 million cubic metres (mcm) per annum, and with provisions for future expansion to 90 mcm per annum. A plan showing the location of the proposed desalination plant and fresh water transfer facilities is at Enclosure 1.

5. Subject to the funding approval of the Finance Committee (FC), we plan to engage consultants to carry out the proposed Study in December 2012 for completion in December 2014.

/JUSTIFICATION

² Impact assessment on other relevant aspects include assessment on natural terrain hazard, landfill gas hazard, hazard on the transportation, use and storage of chlorine, ecological impact and other aspects found necessary during the course of the proposed Study.

JUSTIFICATION

6. Fresh water is a precious resource and its supply is not unlimited. At present, local fresh water collected from natural precipitation only provides on average 20% to 30% of our total demand. To make up the shortfall, fresh water is imported from Dongjiang of Guangdong.

7. In an effort to keep our water demand and supply in balance and minimise the risk of water shortage, we have been implementing various initiatives under the Total Water Management (TWM) Strategy promulgated by the Government in 2008. For example, on water demand management, we have been promoting water conservation through public education, encouraging the use of water saving devices, taking steps to increase the use of sea water for flushing and undertaking preventive measures to reduce water main bursts and leaks. On water supply management, we are exploring the use of reclaimed water³ for flushing and other non-potable use in the north-eastern part of the New Territories where sea water is not supplied for flushing.

8. However, in anticipation of the continued population growth, we estimate that the annual fresh water demand would increase steadily from 923 mcm in 2011 to about 1 100 mcm in 2030. On the other hand, due to climate change, we expect to see more acute fluctuation in rainfall in coming years. In fact, the local rainfall in 2011 was only 1 477 mm, which is about 40% lower than the average annual rainfall of 2 399 mm over the past 30 years from 1981 to 2010. Droughts have been experienced in Guangdong and some other provinces in the Mainland in recent years. Given the fast pace of economic development of other cities in the Guangdong region including Heyuan, Huizhou, Dongguan, Shenzhen and Guangzhou, Hong Kong has to compete with these cities for the scarce fresh water resources of Dongjiang.

9. To better prepare Hong Kong for uncertainties such as acute climate changes and low rainfall, we have been keeping abreast of the latest developments in desalination technology. In the 2011-12 Policy Address, the Chief Executive announced that a detailed planning and investigation study would be conducted to investigate the feasibility and cost effectiveness for the construction of a medium size desalination plant in Tseung Kwan O. Sea water is abundantly available in Hong Kong. Under the TWM Strategy, seawater desalination is considered to be

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³ Reclaimed water is highly treated wastewater which is clear in appearance, odourless and is safe for use.

a promising alternative supply of fresh water to support the sustainable development of Hong Kong. We completed in 2007 a pilot study which confirmed the technical feasibility of desalination using reverse osmosis⁴ technology locally to produce potable water complying with the World Health Organisation guidelines for drinking water quality. We need to carry out the proposed Study so that sea water, as an alternative water source, can be readily tapped in good time when needed.

FINANCIAL IMPLICATIONS

10. We estimate the cost of the proposed Study and the associated site investigation works to be \$34.3 million in MOD prices (please see paragraph 11 below), broken down as follows –

		\$ million
(a)	Consultants' fees for	20.8
	(i) detailed investigation of the feasibility and cost effectiveness and preliminary design of the proposed works	9.4
	(ii) planning and formulation of implementation strategy and programme	2.0
	(iii) impact assessments on environment, traffic, drainage and other relevant aspects	8.7
	(iv) supervision of site investigation works	0.7
(b)	Site investigation works	6.5
(c)	Contingencies	2.7
	Sub-total	30.0
		(in September 2011 prices)
		/(d)

⁴ Reverse osmosis is a process that uses hydraulic pressure to separate relatively pure water from seawater through a semi-permeable membrane.

	\$ million	
(d) Provision for price adjustment	4.3	
Total	34.3	(in MOD prices)

Owing to the lack of in-house resource and expertise, we propose to engage consultants to carry out the proposed Study and supervise the associated site investigation works. A breakdown of the estimates for consultants' fees by man-months is at Enclosure 2.

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

Year	\$ million (Sept 2011)	Price adjustment factor	\$ million (MOD)
2012 – 2013	2.3	1.05325	2.4
2013 – 2014	12.0	1.11118	13.3
2014 – 2015	12.3	1.17229	14.4
2015 – 2016	3.4	1.23677	4.2
	<hr/> 30.0 <hr/>		<hr/> 34.3 <hr/>

12. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2012 to 2016. We will deliver the proposed consultancy under a lump sum contract as the scope of the consultancy can be well defined. The consultancy will provide for price adjustments as the duration will exceed 12 months. We will deliver the site investigation works under re-measurement contracts because the quantities of works involved will vary depending on the actual ground condition. The contracts will provide for price adjustments.

13. The proposed Study and the associated site investigation works will not give rise to any recurrent expenditure.

/14.

14. The proposed Study and the associated site investigation works by itself will lead to an increase in the production cost of water by about 0.01% in real terms by 2016⁵.

PUBLIC CONSULTATION

15. We consulted the Housing and Environmental Hygiene Committee of the Sai Kung District Council on 23 February 2012 on the proposed Study and the associated site investigation works. Members of the Committee supported the proposal.

16. We consulted the Legislative Council Panel on Development (the Panel) on the proposed Study and the associated site investigation works on 17 April 2012. While there were views supporting the proposed Study, some were concerned about the cost effectiveness of adopting desalination technology to provide an alternative fresh water supply, and suggested that Government should step up its efforts to promote water conservation. The Panel had no objection for the Administration to seek support of the Public Works Subcommittee for upgrading the proposed Study and the associated site investigations works to Category A. As regards Members' request for further information on water conservation measures and the latest progress of the Replacement and Rehabilitation Programme of water mains, an information paper was submitted to the Panel on 4 May 2012.

ENVIRONMENTAL IMPLICATIONS

17. The proposed Study and the associated site investigation works are not designated projects under the Environmental Impact Assessment Ordinance (Cap. 499). The proposed Study will not cause any adverse environmental impacts. We will implement suitable mitigation measures to control short-term environmental impacts from the site investigation works.

18. The site investigation works will only generate very little construction waste. We will require the consultants to fully consider measures to be implemented in future construction stage to minimise the generation of construction waste and to reuse/recycle construction waste as much as possible.

/HERITAGE

⁵ 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 2012 to 2016.

HERITAGE IMPLICATIONS

19. The proposed Study and the associated site investigation works 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

20. The proposed Study and the associated site investigation works will not require any land acquisition.

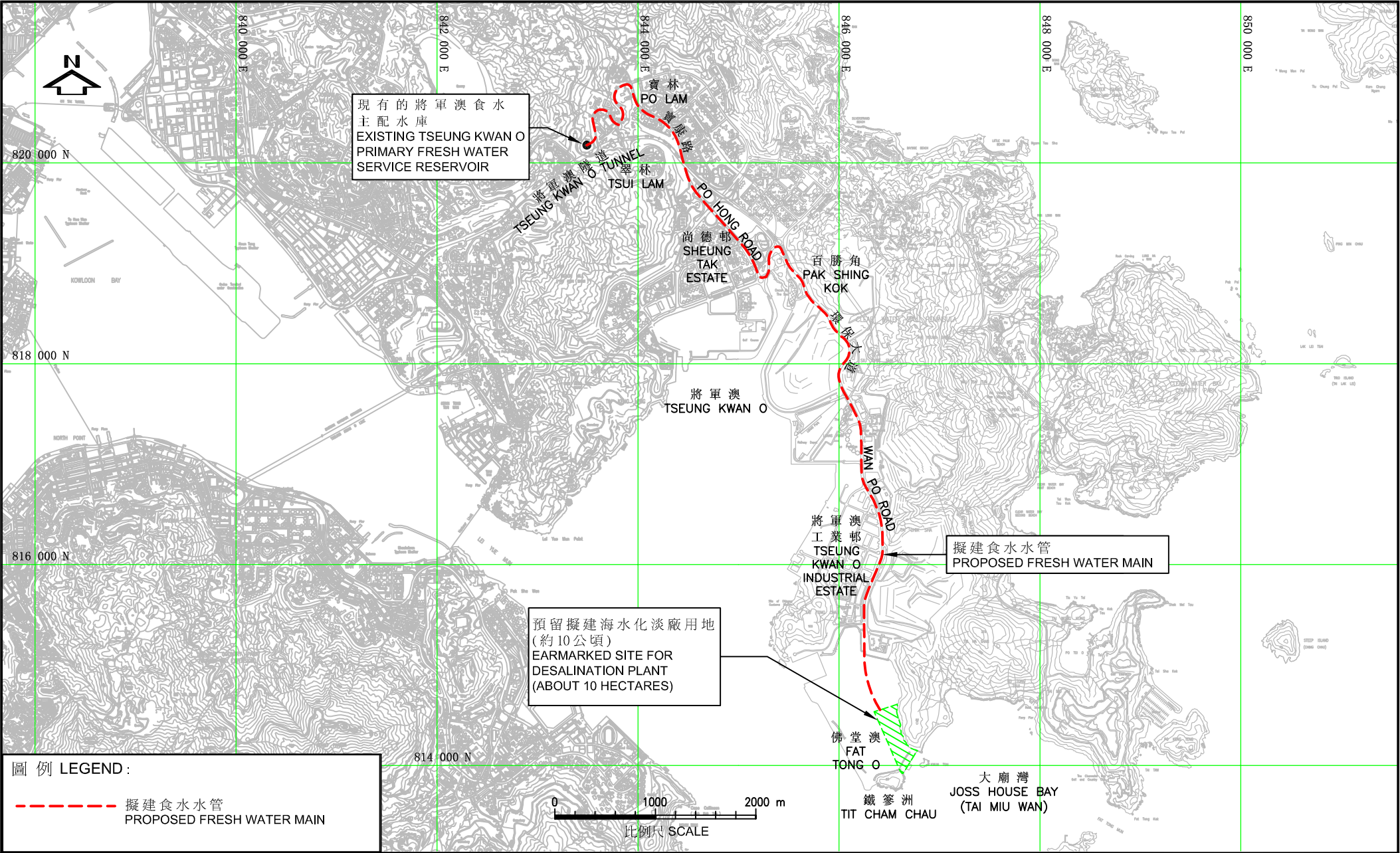
BACKGROUND INFORMATION

21. We included **345WF** in Category B in September 2010.

22. The proposed Study and the associated site investigation works will not involve any tree removal or planting proposal.

23. We estimate that the proposed Study and the associated site investigation works will create about 23 jobs (four for labourer and another 19 for professional/technical staff) providing a total employment of 440 man-months.

Development Bureau
May 2012



圖例 LEGEND:

--- 擬建食水水管
PROPOSED FRESH WATER MAIN

核准 APPROVED

總工程師/顧問工程經理 CE / CM

3 / 4 / 2012

工務計劃項目第 345WF 號 --- 將軍澳海水化淡廠工程策劃及勘查研究

P.W.P. ITEM NO. 345WF --- PLANNING AND INVESTIGATION STUDY OF DESALINATION PLANT AT TSEUNG KWAN O

水務署
WATER SUPPLIES DEPTMENT

草圖編號
SKETCH NO. SK 62011 / 500

Enclosure 2 to PWSC(2012-13)18

345WF – Planning and investigation study of desalination plant at Tseung Kwan O

Breakdown of estimates for consultants' fees (in September 2011 prices)

Consultants' staff costs ^(Note 2)			Estimated man-months	Average MPS* salary point	Multiplier ^(Note 1)	Estimated fee (\$ million)
(a)	Detailed investigation of the feasibility and cost effectiveness and preliminary design of the proposed works	Professional	56	38	2.0	7.0
		Technical	56	14	2.0	2.4
(b)	Planning and formulation of implementation strategy and programme	Professional	12	38	2.0	1.5
		Technical	12	14	2.0	0.5
(c)	Impact assessments on environment, traffic, drainage and other relevant aspects	Professional	52	38	2.0	6.5
		Technical	52	14	2.0	2.2
(d)	Supervision of site investigation works	Professional	2	38	2.0	0.2
		Technical	11	14	2.0	0.5
					Total	20.8

*MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' office. (As at now, MPS point 38 = \$62,410 per month and MPS point 14 = \$21,175 per month).
2. The figures given above are only estimates prepared by the Director of Water Supplies. The actual man-months and fees will only be known after we have selected the consultants through the usual competitive lump sum fee bidding system.