

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 709 – WATERWORKS

Water Supplies – Fresh water supplies

350WF – Improvement of water supply to Sheung Shui and Fanling

Members are invited to recommend to the Finance Committee the upgrading of **350WF** to Category A at an estimated cost of \$521.3 million in money-of-the-day prices.

PROBLEM

The existing capacity of the fresh water service reservoirs supplying Sheung Shui and Fanling (SSF) areas is inadequate to meet the rising water demand in the areas.

PROPOSAL

2. The Director of Water Supplies, with the support of the Secretary for Development, proposes to upgrade **350WF** to Category A at an estimated cost of \$521.3 million in money-of-the-day (MOD) prices for constructing a new service reservoir and laying associated water mains to improve the water supply to SSF areas.

PROJECT SCOPE AND NATURE

3. The scope of the proposed works comprises –
- (a) construction of a service reservoir at Table Hill with a capacity of 24 000 cubic metres (m³);

/(b)

- (b) laying of two trunk mains of about 1 000 metres (m) in total, with a diameter of 700 and 600 millimetres (mm) connecting respectively the existing Sheung Shui water treatment works and Table Hill fresh water service reservoir with the new service reservoir; and
- (c) laying of about 1 700 m twin distribution mains of 600 mm in diameter connecting the new service reservoir with the existing fresh water distribution network at Tin Ping Road.

4. The layout plan showing the proposed improvement works is at Enclosure 1.

5. Subject to the funding approval of the Finance Committee, we plan to commence the construction of the proposed works in end 2016 for completion in early 2020.

JUSTIFICATION

6. The existing fresh water service reservoirs supplying to SSF supply zone have a total storage capacity of 88 000 m³. In order to cope with the increasing water demand arising from planned new housing developments within the supply zone and to enhance the reliability of water supply to the areas, we propose to construct a new service reservoir of a storage capacity of 24 000 m³ and associated water mains. The total storage capacity of the fresh water service reservoirs within the supply zone will reach 112 000 m³ upon completion of the works and would be able to meet the projected daily demand of 145 000 m³ per day.

7. SSF areas are presently using fresh water for flushing. The proposed service reservoir and twin mains system will be designed with flexibility for conversion in stages to a flushing water system using other flushing medium in the future.

FINANCIAL IMPLICATIONS

8. We estimate the cost of the proposed works to be \$521.3 million in MOD prices (please see paragraph 10 below), broken down as follows –

/(a)

	\$ million
(a) Construction of service reservoir	181.1
(b) Laying of fresh water mains	193.6
(i) conventional method ¹	137.0
(ii) trenchless method ²	56.6
(c) Environmental mitigation measures	4.2
(d) Consultants' fees for advisory services for New Engineering Contract (NEC) ³ Administration	4.9
(e) Contingencies	38.4
	Sub-total <u>422.2</u> (in September 2015 prices)
(f) Provision for price adjustment	<u>99.1</u>
	Total <u>521.3</u> (in MOD prices)

9. While the construction of the proposed works will be supervised by in-house staff, we plan to engage consultants to provide advisory services for NEC administration for the project. A detailed breakdown of the estimate for the consultants' fees by man-months is at Enclosure 2.

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¹ Conventional method refers to laying pipelines in trench. It involves opening up the road surface for laying of pipelines. We estimate that around 87% of the fresh water mains under this project will be laid by conventional method. The actual percentage will depend on the site conditions.

² Trenchless method (sometimes referred to as 'minimum dig' or 'reduced dig' method) refers to the use of pipe jacking, micro-tunnelling or boring techniques to construct underground pipelines without opening up the road surface for laying of pipelines. This method will be employed when the conventional method is not feasible due to site constraints such as presences of river or unfavourable traffic conditions. We estimate that around 13% of the fresh water mains under this project will be laid by trenchless method. The actual percentage will depend on the site conditions.

³ NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

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

Year	\$ million (Sept 2015)	Price adjustment factor	\$ million (MOD)
2016 - 2017	3.8	1.05775	4.0
2017 - 2018	82.3	1.12122	92.3
2018 - 2019	107.7	1.18849	128.0
2019 - 2020	120.2	1.25980	151.4
2020 - 2021	92.3	1.33539	123.3
2021 - 2022	15.9	1.40549	22.3
	422.2		521.3

11. 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 2016 to 2022. We will deliver the proposed works under an NEC form of contract with provision for price adjustment.

12. We estimate the additional annual recurrent expenditure arising from this project to be \$540,000.

13. The project will lead to an increase in the production cost of water by 0.11% in real terms by 2020⁴.

PUBLIC CONSULTATION

14. We consulted the District Minor Works and Environmental Improvement Committee of the North District Council on 14 September 2015. The Committee supported the proposed works.

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⁴ 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 2016 to 2020.

15. We consulted the Legislative Council Panel on Development on 15 March 2016 and Members supported the proposed works.

ENVIRONMENTAL IMPLICATIONS

16. This is not a designated project under the Environmental Impact Assessment Ordinance (Cap 499). We have carried out a Preliminary Environmental Review which concluded that the proposed works would not cause long-term environmental impact. We have included in paragraph 8(c) above a sum of \$4.2 million (in September 2015 prices) in the project estimate for the implementation of standard pollution control measures to mitigate short term environmental impacts during construction. These measures include frequent watering of the site, provision of wheel-washing facilities, covering of materials on trucks and use of silenced construction plant.

17. At the planning and design stages, we have optimised the design and layouts to reduce the generation of construction waste. In addition, we will require the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) 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 facilities⁵. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

18. At the construction stage, we will 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 and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

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⁵ 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.

19. We estimate that the proposed works will generate in total 142 840 tonnes of construction waste. Of these, we will reuse 9 220 tonnes (6%) of inert construction waste on site and deliver 132 750 tonnes (93%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 870 tonnes (1%) of non-inert construction waste at landfills. The total cost for accommodating construction waste at public fill reception facilities and landfill is estimated to be \$3.7 million for this project (based on a unit charge rate of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation).

HERITAGE IMPLICATIONS

20. The proposed works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

21. The proposed works do not involve resumption of private land, but clearance of about 64 900 square metres (m²) Government land is required. We will charge the cost of land clearance estimated at \$0.1 million to **Head 701 – Land Acquisition**. A breakdown of the clearance cost is at Enclosure 3.

TRAFFIC IMPLICATIONS

22. We have carried out a Traffic Impact Assessment (TIA) for the proposed works. The TIA concluded that the construction of the proposed service reservoir and mainlaying works through implementation of appropriate temporary traffic management schemes would not cause any significant impact on the traffic.

BACKGROUND

23. We upgraded **350WF** to Category B in September 2013 and deployed in-house staff for the detailed design works.

/24.

24. In April 2015, we engaged contractors to carry out site investigation and consultants to undertake the traffic impact assessment, plant survey, and advisory services for preparation of NEC for the project at an estimated cost of \$11.1 million. We have charged this amount to block allocation **Subhead 9100WX** “Waterworks, studies and investigations for items in Category D of the Public Works Programme”. We have substantially completed the detailed design of the proposed works.

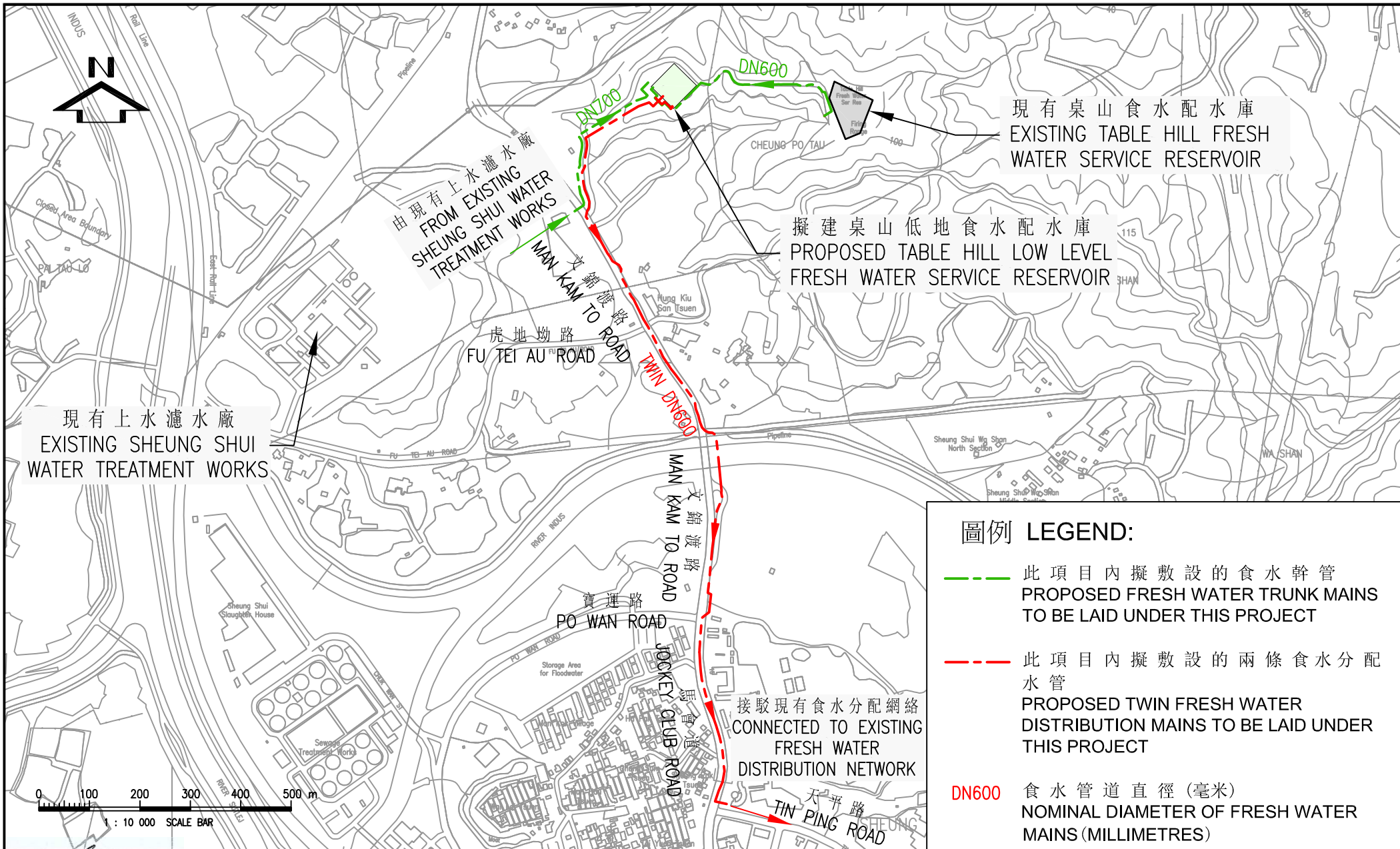
25. Of the 217 trees within the project boundary, 124 trees will be preserved and 93 trees will be felled. All trees to be removed are not important trees⁶. We will incorporate planting proposals as part of the project, including estimated quantities of 93 trees and 3 400 m² of grassed area.

26. We estimate that the proposed works will create 150 jobs (130 for labourers and another 20 for professional or technical staff) providing a total employment of 5 000 man-months.

Development Bureau
April 2016

⁶ “Important trees” refers 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 trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or events;
- (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 or exceeding 1.0 m (measured at 1.3 m above ground level), or with height or canopy spread equal or exceeding 25 m.



核准 APPROVED

[Signature]

總工程師/設計 CE / Des

29/2/2016

工務計劃項目第350WF號 --- 上水及粉嶺供水改善計劃
PWP ITEM NO. 350WF --- Improvement of water supply to Sheung Shui and Fanling

水務署
WATER SUPPLIES DEPARTMENT

草圖編號
SKETCH NO. SK 62015 / 049

附件 1 ENCLOSURE 1

350WF - Improvement of water supply to Sheung Shui and Fanling

Breakdown of the estimates for consultants' fees (in September 2015 prices)

Consultant's staff costs		Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees	20	38	2.0	3.0
	for advisory services for	38	14	2.0	1.9
	NEC administration (Note 2 & 3)				
Total					<hr/> 4.9

*MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS salary point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices (as at now, MPS point 38 = \$74,210 per month and MPS point 14 = \$25,505 per month).
2. The consultants' staff costs for advisory services for NEC administration are based on the estimates prepared by the Director of Water Supplies. The actual man-months and fees will only be known when we have selected the consultants through the usual competitive fee bidding system.
3. WSD will deploy in-house staff to supervise the construction of the proposed works. The fees in (a) above will be used for engaging consultants to provide advisory services for WSD's detailed arrangements for NEC administration.

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Breakdown of the estimated land clearance cost

		\$ million
(I) Estimated clearance cost		0.05
(a) Ex-gratia allowance for crop compensation	0.01	
(b) Ex-gratia allowances for miscellaneous indigenous villager matters	0.04	
(II) Contingency payment		0.01
(a) Contingency on the above costs	0.01	
	Total cost	0.06 (say 0.1)