For discussion **PWSC(2010-11)13**
on 9 June 2010

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE
Environmental Protection – Sewerage and sewage treatment
372DS – Rehabilitation and construction of trunk sewers underneath Shing Mun River Channel

Members are invited to recommend to Finance Committee the upgrading of **372DS** to Category A at an estimated cost of $140.0 million in money-of-the-day prices for the implementation of sewerage works underneath Shing Mun River Channel in Sha Tin.

PROBLEM

An existing trunk sewer with a diameter of 2 050 millimetres (mm) underneath Shing Mun River Channel (SMRC) has shown signs of deterioration due to ageing and needs to be dealt with urgently.

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade **372DS** to Category A at an estimated cost of $140.0 million in money-of-the-day (MOD) prices for implementing the sewerage works underneath SMRC in Sha Tin.

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PROJECT SCOPE AND NATURE

3. The scope of works under **372DS** comprises –

(a) construction of about 250 metres (m) of a twin pipe trunk sewer underneath SMRC with a diameter of 1 500 mm for each pipe;

(b) subsequent rehabilitation of about 250 m of an existing gravity trunk sewer underneath SMRC with a diameter of 2 050 mm; and

(c) ancillary works.

A location plan showing the proposed works is at Enclosure 1.

4. Subject to the approval of the Finance Committee, we plan to commence construction of the twin pipe trunk sewer in December 2010 for completion in December 2013. Rehabilitation of the existing trunk sewer will commence soon after full commissioning of its duplicate for completion in November 2015.

JUSTIFICATION

5. At present, the sewage collected from the south-eastern part of Sha Tin[1] is conveyed across the river channel to the Sha Tin sewage treatment works via a trunk sewer near Sha Tin Road. The trunk sewer, with a diameter of 2 050 mm, has been in continuous service for decades since it was laid underneath the river channel during the development of Sha Tin New Town in the late 1970s. It is being fully utilised as a result of significant population growth in the region.

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[1] The areas covered include A Kung Kok, Shek Mun, Siu Lek Yuen, Yuen Chau Kok, Sha Tin Wai and Tai Wai with a population of around 300 000.

6. Closing down the trunk sewer for routine inspection and rehabilitation is currently impractical as it is the only sewer conveying sewage collected from the south-eastern part of Sha Tin across the SMRC to Sha Tin sewage treatment works and is in full flow condition round the clock. Recent inspections of the sewerage in Sha Tin District nevertheless indicate early signs of structural deterioration in many sewers laid in around the same period[2]. It is therefore likely that the trunk sewer underneath SMRC is also in a deteriorating condition with a growing risk of structural failure unless intensive rehabilitation works are carried out. Given the vast volume of sewage handled by the trunk sewer, measure applicable in other cases (such as temporary diversion of the sewage flow from a trunk sewer to adjacent sewers so as to allow comprehensive structural integrity check and rehabilitation works to be carried out for the trunk sewer) is considered technically infeasible.

7. We therefore propose to provide a duplicate trunk sewer to permanently overcome the technical constraints identified above. The proposed duplicate trunk sewer will be aligned in parallel to the existing trunk sewer and laid underneath SMRC using trenchless construction method[3]. It will adopt twin pipe configuration for more flexible operation to accommodate routine inspection and maintenance works of either pipe during low flow period. We will commence rehabilitation of the existing trunk sewer soon after full commissioning of its duplicate, which will receive all the diverted sewage flows throughout the rehabilitation.

8. Upon installation of the duplicate sewer and rehabilitation of the existing sewer by November 2015, it will become technically feasible to operate both trunk sewers independently for performing routine inspection, maintenance and emergency repairs whenever necessary. This will prolong the service lives of both trunk sewers and safeguard the overall reliability of the sewerage system.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be $140.0 million in MOD prices (please see paragraph 10 below), broken down as follows –

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[2] In some cases, we have to replace the sewers, or provide duplicate sewers to enable rehabilitation works to be carried out for the existing trunk sewers.

[3] The main benefit of using trenchless method is that there will be no excavation and backfilling of the river bed. Interferences with the water quality and public enjoyment of SMRC (including water sports) during the construction stage will be minimised.

		$ million	
(a)	Construction of new trunk sewer	63.0	
(b)	Rehabilitation of existing trunk sewer	33.0	
(c)	Ancillary works	7.0	
(d)	Environmental mitigation measures	6.0	
(e)	Contingencies	11.0	
	Sub-total	120.0	(in September 2009 prices)
(f)	Provision for price adjustment	20.0	
	Total	140.0	(in MOD prices)

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

Year	**$ million (Sept 2009)**	**Price adjustment factor**	**$ million (MOD)**
2010 – 2011	3.0	1.02700	3.1
2011 – 2012	20.0	1.06551	21.3
2012 – 2013	25.0	1.10813	27.7
2013 – 2014	22.0	1.15246	25.4
2014 – 2015	20.0	1.19856	24.0
2015 – 2016	15.0	1.24650	18.7
2016 – 2017	8.0	1.29636	10.4
2017 – 2018	7.0	1.34821	9.4
	120.0		140.0

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11. We have derived the MOD estimate on the basis of the Government's latest forecasts of the trend rate of change in the prices of public sector building and construction output for the period from 2010 to 2018. We will implement the proposed trunk sewers and rehabilitation works under two civil engineering works contracts. We will tender the works as re-measurement contracts because of the uncertainties of underground utilities and the conditions of existing trunk sewer and hence the volume of works to be involved. The contracts will provide for price adjustment.

12. We estimate the additional annual recurrent expenditure arising from the proposed works to be $58,000. Based on the current level of expenditure on operation and day-to-day maintenance of sewerage facilities, the proposed works will lead to an immaterial increase in the recurrent cost of providing sewage services. Nevertheless, the additional recurrent expenditure will be taken into consideration when determining the sewage charges in future.

PUBLIC CONSULTATION

13. We consulted the Development and Housing Committee of Sha Tin District Council on 29 October 2009. The Committee supported the proposed works.

14. We consulted the Legislative Council Panel on Environmental Affairs on 24 May 2010 on the proposed works. Members raised no objection to our plan to submit the proposal to the Public Works Subcommittee.

ENVIRONMENTAL IMPLICATIONS

15. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499). We completed a Preliminary Environmental Review (PER) for the construction of the proposed trunk sewers and ancillary works in February 2009. The PER concluded that there is no insurmountable environmental impacts and the project has very little potential for giving rise to adverse environmental impacts.

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16. For short-term impacts during construction, we will control noise, dust and site run-off to levels to within established standards and guidelines through implementation of mitigation measures, such as temporary noise barriers and quieter construction plant to reduce noise generation, water-spraying to reduce dust emission, and strict control over diversion of site run-off. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good site practices are properly implemented. We have included in paragraph 9(d) a sum of $6.0 million (in September 2009 prices) in the project estimate for implementation of the environmental mitigation measures.

17. We have considered in the planning and design stages ways to reduce the generation of construction waste where possible, including adoption of trenchless construction method to minimise the extent of excavation and to avoid as far as practicable demolition of existing structures. 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 at public fill reception facilities[4]. 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.

18. 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 at public fill reception facilities and landfills respectively through a trip-ticket system.

19. We estimate that the project will generate in total about 11 255 tonnes of construction waste. Of these, we will reuse about 6 700 tonnes (59.5%) on site and deliver 4 480 tonnes (39.8%) of inert construction waste to public fill reception facilities for subsequent reuse. We will dispose of the remaining 75 tonnes (0.7%) of non-inert construction waste at landfills. The total cost for

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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.

accommodating construction waste at public fill reception facilities and landfill sites is estimated to be about $130,000 for this project (based on a unit cost of $27 per tonne for disposal at public fill reception facilities and $125 per tonne[5] at landfills.)

HERITAGE IMPLICATIONS

20. The proposed 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

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

BACKGROUND INFORMATION

22. The sewerage network in Sha Tin has been developed since the 1970s. Sewage generated from the south-eastern part of Sha Tin area is conveyed to the Sha Tin sewage pumping station via the 2 050-mm diameter trunk sewer underneath SMRC for pumping to the Sha Tin sewage treatment works for treatment and discharge. This river-crossing trunk sewer serves a population of about 300 000, almost half of the total population of Sha Tin.

23. In April 2008, we commissioned a consultancy study to investigate the feasibility of providing additional trunk sewers underneath SMRC with a view to enhancing the overall reliability of the sewerage system in Sha Tin. Detailed design of the proposed works then commenced in October 2009 upon the upgrading of **372DS** to Category B. The total estimated cost of the consultancy is $1.8 million in MOD prices. We charged the amount to block allocation **Subhead 4100DX** "Drainage works, studies and investigations for items in Category D of the Public Works Programme". We have substantially completed the detailed design of the proposed works.

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[5] The estimate has taken into account the cost of 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 per m^3), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

24. We will deploy in-house resources to supervise the proposed works.

25. Of the 143 trees within the project boundary, 137 trees will be preserved. The proposed works will involve felling of six trees. All trees to be removed are not important trees[6]. We will incorporate a proposal of planting 22 trees as part of the project.

26. We estimate that the proposed works will create about 75 jobs (65 for labourers and another ten for professional/technical staff) providing a total employment of 2 100 man-months.

Environment Bureau
June 2010

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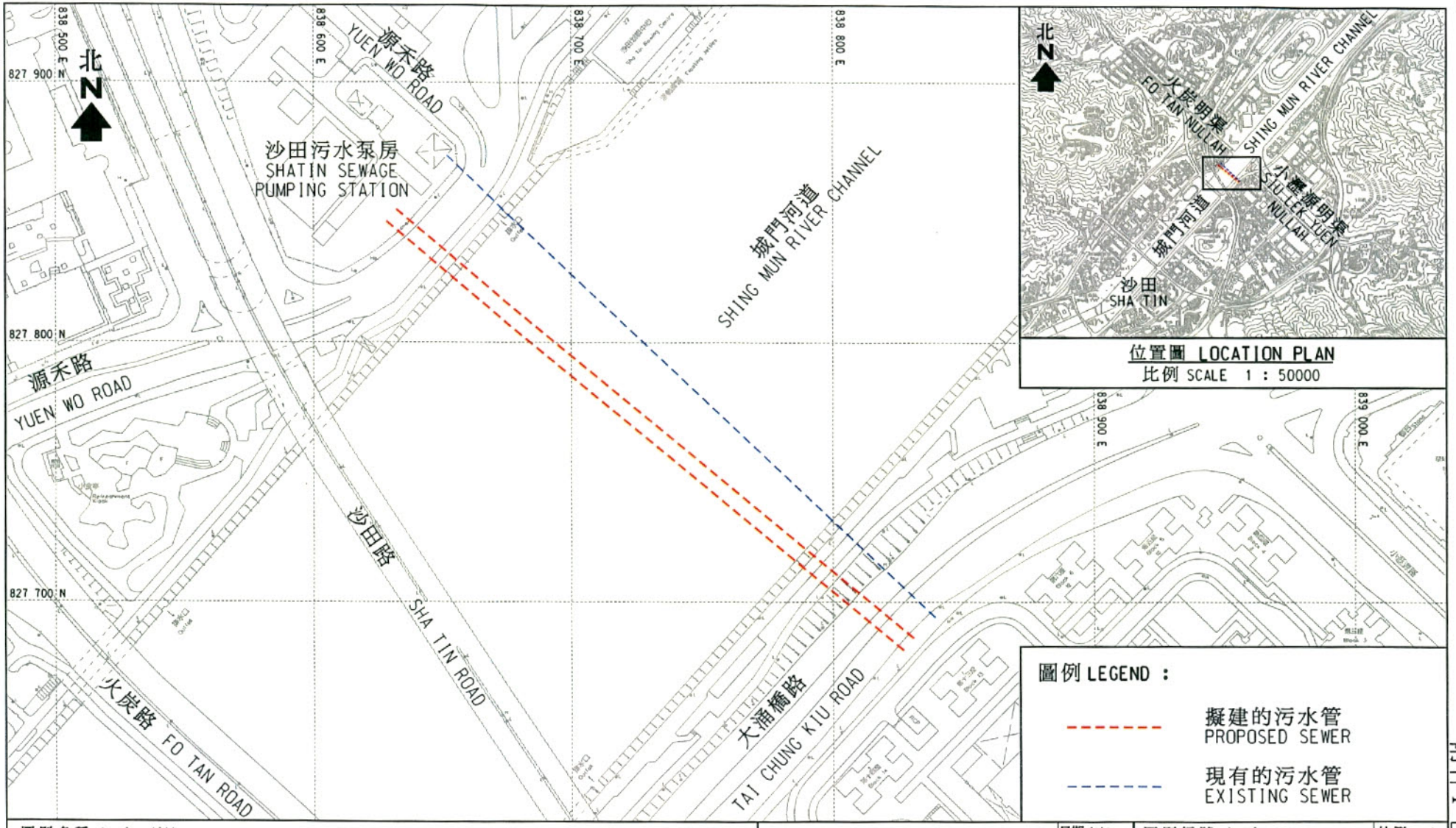
[6] "Important trees" refer to trees on the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –
(a) trees of 100 years old or above;
(b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of an important person or event;
(c) trees of precious or rare species;
(d) trees of outstanding form (taking account of overall tree size, 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/canopy spread equal or exceeding 25 m.



圖則名稱 drawing title

工務工程計劃編號372DS
在城門河道底下修復及建造污水幹渠
PWP ITEM NO. 372DS
REHABILITATION AND CONSTRUCTION OF TRUNK SEWERS UNDERNEATH SHING MUN RIVER CHANNEL

繪畫 drawn	W. Y. HUI	日期 date 25 FEB 2010
核對 checked	F. C. LUI	日期 date 26 FEB 2010
批核 approved	S. S. LAM	日期 date 26 FEB 2010

部門 office 顧問工程管理部
CONSULTANTS MANAGEMENT DIVISION

圖則編號 drawing no. DCM/2010/005

比例 scale 1 : 2000 OR AS SHOWN

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

A4 297x210

附件1 ENCLOSURE 1