For discussion
on 29 January 2003

PWSC(2002-03)85

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 705 - CIVIL ENGINEERING
Environmental Protection – Pollution Control
51DP – Environmental improvement of Shing Mun River

Members are invited to recommend to Finance Committee the upgrading of **51DP**, retitled "Environmental improvement of Shing Mun River – Stage 2", to Category A at an estimated cost of $27.9 million in money-of-the-day prices.

PROBLEM

The sediments on the riverbed of the untreated sections of Shing Mun River (the River) release obnoxious odour and cause environmental problems.

PROPOSAL

2. The Director of Civil Engineering, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **51DP** to Category A at an estimated cost of $27.9 million in money-of-the-day (MOD) prices for implementing the Stage 2 works for environmental improvement of the River.

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PROJECT SCOPE AND NATURE

3. The environmental improvement works for the River are divided into two stages. Focusing on the more-polluted sections of the River, the Stage 1 works were completed in December 2002. Stage 2 relates to the less-polluted sections which remain untreated and the proposed works under **51DP** comprise –

(a) bioremediation[1] of about 19 hectares of polluted riverbed;

(b) dredging of about 110 000 cubic metres (m^3) of riverbed sediments;

(c) improvements to a small portion of the River channel lining and other minor engineering works;

(d) implementation of environmental mitigation measures and environmental monitoring and audit (EM&A) programme for works mentioned in items (a) to (c) above; and

(e) monitoring of sediment and water quality of the River after bioremediation treatments for both Stage 1 and Stage 2 works.

A location plan is at Enclosure. We plan to start the proposed Stage 2 works in April 2003. The works under items (a) to (d) above will be finished by September 2004 and the remaining monitoring work (item (e) above) end by July 2006.

JUSTIFICATION

4. The River was heavily polluted in the 1980s due to rapid increase in population in Sha Tin and indiscriminate discharges from industrial, commercial, livestock and domestic sources in the area. Following declaration of the Tolo Harbour and Channel Water Control Zone under the Water Pollution Control Ordinance in 1987, implementation of the revised Livestock Waste Control Scheme in 1994, and phased provision of sewerage network for unsewered villages in the River catchment under the Tolo Harbour Stage 1 sewerage scheme,

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1 Bioremediation process involves the injection of chemicals (i.e. specially designed oxidants) into the sediments at the riverbed in two treatment applications. Micro-organisms in the River will utilise the chemicals to convert organic matter in the sediments into harmless natural materials such as carbon dioxide and water.

the pollution load discharging into the River has sharply reduced by 94% in 2001 as compared with that in 1987. However, the accumulation of sediments at the riverbed over the past few decades continues to release obnoxious odour. It adversely affects water quality, and suppresses the development of a balanced ecology within the River system. While the Administration would continue to implement sewerage connection programmes to stop at source the discharge of waste water into the River, we need to carry out improvement works in parallel to remove existing pollutants at the riverbed to tackle the odour problem.

5. In 1996, the Director of Environmental Protection (DEP) commissioned a study to formulate the most cost-effective and environmentally-acceptable methods to minimise odour arising from the sediments at the River. The study concluded that a combined strategy of in-situ bioremediation, dredging, and minor engineering works would provide a long-term solution to the problem.

6. Subsequent to completion of detailed design of the improvement works in 2000, we divided project **51DP** "Environmental Improvement of Shing Mun River" into two stages. We completed the Stage 1 works in December 2002. Around 22 hectares of the riverbed have undergone in-situ bioremediation treatments and 160 000 m^3 of sediments have been dredged. Implementation of the Stage 1 works has brought great relief to the odour problem and improved the quality of sediments at the riverbed[2].

7. The present proposal to upgrade **51DP** will tackle the odour problem from the less-polluted sections of the River through the same strategy involving in-situ bioremediation, dredging, and minor engineering works. As part of the Stage 2 works, we will also monitor the sediment and water quality of the River after the bioremediation treatments to assess the long-term effectiveness of both Stages 1 and 2 environmental improvement works.

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[2] Sediment samples collected at the treated sections of the riverbed have turned from blackish and colloidal to brown in colour with the texture of sand grains. The quality of the sediments has also improved. The sediments now allow a more prosperous growth of bacteria for further aerobic decomposition of organic polluting contents.

8. Upon completion of the proposed works, the odour problem at the River will be further alleviated. The quality of the sediments at the riverbed after bioremediation treatments is expected to improve. The treated sediments will form a protective layer on the riverbed to prevent new sediments from turning anaerobic and becoming new sources of the odour problem. These will lead to a healthier ecological system in the River and provide a better environment for local residents as well as visitors when they take part in water sports activities such as rowing and boating.

FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be $27.9 million in MOD prices (see paragraph 10 below), made up as follows –

		$ million	
(a)	Bioremediation	10.0	
(b)	Dredging	6.6	
(c)	Improvements to a small portion of the River channel lining and other minor engineering works	2.9	
(d)	Environmental mitigation measures and EM&A programme	2.7	
(e)	Monitoring of the sediment and water quality after bioremediation treatments for both Stage 1 and Stage 2 works	3.4	
(f)	Contingencies	2.5	
	Sub-total	28.1	(in September 2002 prices)
(g)	Provision for price adjustment	(0.2)	
	Total	27.9	(in MOD prices)

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

Year	$ million (Sept 2002)	Price adjustment factor	$ million (MOD)
2003 – 2004	7.0	0.99250	6.9
2004 – 2005	11.5	0.99250	11.4
2005 – 2006	6.5	0.99250	6.5
2006 – 2007	3.1	0.99250	3.1
	28.1		27.9

11. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 2003 to 2007. We will tender the proposed works under a standard re-measurement contract because the extent of the bioremediation and dredging works may vary according to the actual ground conditions. The contract will provide for price adjustments because the contract period will exceed 21 months.

12. We estimate the annual recurrent expenditure arising from this project to be $1.2 million.

PUBLIC CONSULTATION

13. We consulted the Health and Environment Committee of the Sha Tin District Council in November 2002 on the proposed Stage 2 works and obtained the Committee's support.

14. On 25 November 2002, we informed the Legislative Council Panel on Environmental Affairs of the progress made in the Stage 1 improvement works at the River and consulted Panel Members on the proposed Stage 2 works. Members supported the Stage 2 works in general and noted that we would submit

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the project proposal to the Public Works Subcommittee for consideration. Some Members asked whether the River would be suitable for hosting rowing and boating activities, such as an international rowing competition, upon completion of the works. We advised Members that even though **51DP** mainly aimed to address the odour problem of the sediments, the water quality of the River should be able to support more secondary-contact activities such as rowing and boating upon completion of the improvement works. We have also relayed to the Leisure and Cultural Services Department Members' suggestion of promoting the rowing of sampans in the River.

15. At the Panel meeting, some Members enquired about the sustainability of the improvement works in alleviating odour problem of the River, whether the water quality would be further improved upon completion of the Stage 2 works, and progress of future village sewerage works which would help prevent discharge of sewage into the River. We advised Members that in the light of the recent testing results of sediments collected from the treated sections of the riverbed after the Stage 1 works, we expected that the improvement in the odour of the River should be able to sustain over time. Nevertheless, we would continue to monitor the water and sediment quality after the bioremediation treatments in Stage 2.

16. On the question of water quality, while improving the sediment quality through bioremediation treatments would simultaneously improve the assimilative capacity of the River, the sewerage connection works for the unsewered villages within the River catchment would play a more important role in containing discharge of polluted water at source. The on-going Tolo Harbour Stage 1 sewerage scheme would connect 33 unsewered villages in the River catchment. We have already connected 26 villages so far with the remaining construction works serving seven more villages to be completed by 2004. Upon completion of these sewerage works, we expect the Biochemical Oxygen Demand (BOD) load in the discharge to the River would be reduced further from the current 550 kilograms (kg) per day to 440 kg per day. Subject to outcome of these works, the Administration will review the need for implementation of the Stage 2 sewerage scheme to cater for the remaining unsewered villages within the River catchment. In the meantime, the Food and Environmental Hygiene Department would continue its street-cleansing programme to prevent rubbish and pollutants from being carried into the River and would employ contractors to collect floating refuse. The Environmental Protection Department would also step up enforcement actions to guard against illegal discharge into the River catchment area. We would also work with the local community to protect the water quality of the River. In partnership with the Sha Tin District Council, we

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would continue to promote public awareness in preserving the improved environment in the River. With the joint effort of the Government and members of the community, we expect further improvement to the water quality of the River in future.

ENVIRONMENTAL IMPLICATIONS

17. The project is not designated under the Environmental Impact Assessment Ordinance. We completed an environmental review for **51DP** in 1998. The environmental review concluded and DEP agreed that the proposed works would not have long-term adverse environmental impacts. For short-term water quality impact during the works period, we will implement mitigation measures including the use of closed grab dredgers and silt curtains to mitigate the impact to within established standards and guidelines. We will include in the works contract standard pollution control measures for controlling dust, noise and site run-off during construction. We estimate the cost of implementing the environmental mitigation measures and the EM&A programme to be $2.7 million. We have included this in the overall project estimate.

18. No construction and demolition material will be generated from the proposed works. We will dispose of about 110 000 m^3 of dredged riverbed sediments at the designated mud pit at East Sha Chau in accordance with the established management framework.

LAND ACQUISITION

19. The proposed works do not require land acquisition.

BACKGROUND INFORMATION

20. In January 2001, we upgraded part of **51DP** to Category A as **52DP**, entitled "Environmental improvement of Shing Mun River – Stage 1" at an estimated cost of $70.0 million in MOD prices for implementing environmental improvement works at the more-polluted sections of the River. We started the Stage 1 works in May 2001 and completed them in December 2002.

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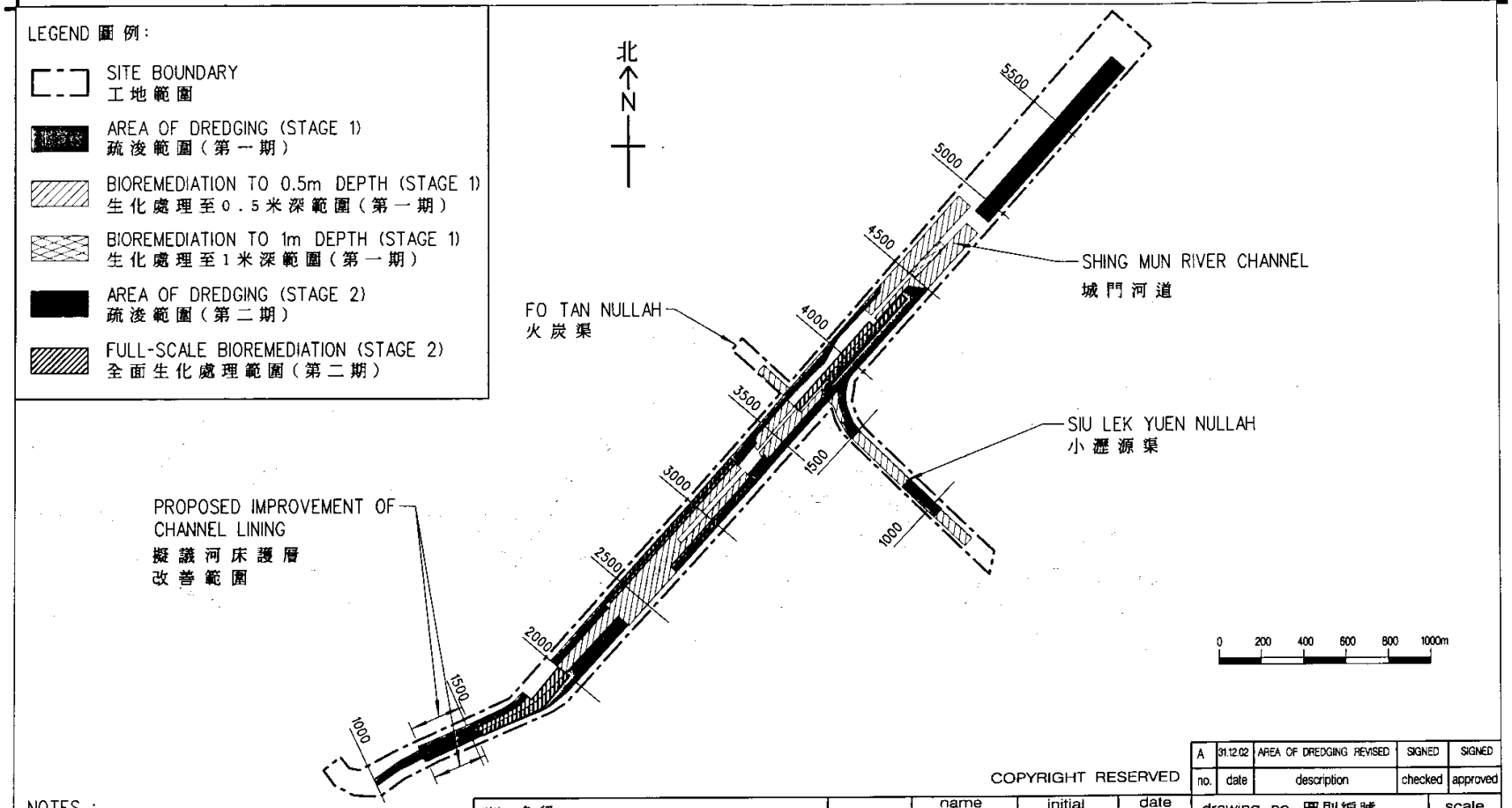
21. The present proposal of upgrading the remainder of **51DP** to Category A is a continuation of the environmental improvement works for the River. We plan to commence the proposed works in April 2003 for completion by July 2006.

22. We estimate that the project will create some 23 jobs, comprising seven professional/technical staff and 16 labourers, totalling 830 man-months.

Environment, Transport and Works Bureau
January 2003

Enclosure 附件



no.	date	description	checked	approved
A	31.12.02	AREA OF DREDGING REVISED	SIGNED	SIGNED

NOTES :

1. APART FROM THE AREA SHOWN FOR DREDGING, DREDGING SHALL ALSO BE CARRIED OUT AT OTHER AREAS DESIGNATED BY ENGINEER PARTICULARLY AT OUTFALLS.
2. ADDITIONAL BIOREMEDIATION, MAINLY SUPPLEMENTARY, SHALL ALSO BE CARRIED OUT AT AREAS DESIGNATED BY ENGINEER AS FROM TIME TO TIME.

title 名稱

PWP ITEM No. 051DP
ENVIRONMENTAL IMPROVEMENT OF SHING MUN RIVER STAGE 2 - IMPROVEMENT REQUIREMENTS
工務計劃項目第051DP號
城門河環境改善工程第二期 - 改善範圍

	name	initial	date
designed	T S TSUI	SIGNED	8-11-02
drawn	K L WONG	SIGNED	8-11-02
checked	K S LI	SIGNED	8-11-02
approved	ANTHONY LOO	SIGNED	8-11-02

office TECHNICAL SERVICES DIVISION 工程技術部
CIVIL ENGINEERING OFFICE 土木工程處

drawing no. 圖則編號
TS 1344A

scale 比例
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CIVIL ENGINEERING DEPARTMENT
HONG KONG 土木工程署

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