

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 704 – DRAINAGE

#### Civil Engineering – Drainage and erosion protection

#### 112CD – Drainage improvement in Northern New Territories – package A

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **112CD**, entitled “Drainage improvement for Ma Wat River at Kau Lung Hang”, to Category A at an estimated cost of \$232.6 million in money-of-the-day prices; and
- (b) the retention of the remainder of **112CD** in Category B.

### PROBLEM

Many areas in Tai Po North are susceptible to frequent flooding during heavy rainstorms due to inadequate flood protection at the existing natural streamcourses and the rural drainage systems in the area.

### PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade part of **112CD** to

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Category A at an estimated cost of \$232.6 million in money-of-the-day (MOD) prices for the construction of Ma Wat drainage channel at Kau Lung Hang and two new drainage pipe crossings under the East Rail embankments at Kau Lung Hang and north of Hong Lok Yuen.

### PROJECT SCOPE AND NATURE

3. The part of works which we now propose to upgrade to Category A is phase 1 of **112CD**, comprising –

- (a) construction of about 1.8 kilometres (km) long trapezoidal drainage channel with width ranging from 3 metres (m) to 29 m for Ma Wat River from Jockey Club Road Interchange at Wo Hop Shek to Kau Lung Hang;
- (b) construction of two new drainage pipe crossings under the East Rail embankments at Kau Lung Hang and north of Hong Lok Yuen;
- (c) reprovisioning of an inflatable dam and ancillary control house for water supply;
- (d) diversion of 11 existing watermains of diameter ranging from 0.6 m to 2.3 m; and
- (e) reprovisioning of access roads and two vehicular and pedestrian crossings.

\_\_\_\_\_ A site plan and a typical cross-section of the proposed works are at Enclosure 1.

4. We plan to start the proposed works in June 2005 for completion in November 2008.

### JUSTIFICATION

5. The drainage of some areas in Northern New Territories is by means of natural streamcourses or drains built many years ago to meet the flow requirements and standards at that time. Owing to rapid developments and

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extensive changes in land use in Northern New Territories over the years, more and more natural ground has been paved to become impermeable. Rainwater which would previously dissipate naturally through ground filtration can no longer do so. This has led to a significant increase in surface run-off and overloading of the existing streamcourses and drainage systems. As such, many areas of Northern New Territories are susceptible to flooding during heavy rainstorms.

6. To tackle the flooding problem in Northern New Territories and to meet the community's increased expectation for better flood protection, we have planned and implemented a comprehensive drainage improvement programme in phases starting at the downstream end. Since 1995, we have started training the major downstream rivers including Shenzhen River and River Indus. With the progressive completion of the major river training works, we have reviewed the upstream and local drainage systems in Northern New Territories under **55CD** "Drainage master plan study in Northern New Territories" (the Study).

7. The Study has identified that many areas in Tai Po North including Kau Lung Hang, Nam Wa Po, Yuen Leng, Tai Hang and some low-lying areas north of Hong Lok Yuen are susceptible to flooding during heavy rainstorms mainly due to the inadequate drainage capacity of Ma Wat River. The Study has also revealed that the two existing box culverts crossings under the East Rail embankments at Kau Lung Hang and north of Hong Lok Yuen are inadequate to cope with surface run-off during heavy rainstorms, resulting in flooding in the adjacent low-lying areas. We propose to carry out drainage improvement works mentioned in paragraph 3(a) and (b) above. We also need to divert watermains and reprovide an inflatable dam and the associated water supply facilities, access roads and vehicular and pedestrian crossings affected by the proposed works.

8. Upon completion of the proposed works, Ma Wat River at this locality will be improved to withstand flood events with a return period<sup>1</sup> of one in 50 years.

## FINANCIAL IMPLICATIONS

9. We estimate the capital cost of the proposed works to be \$232.6 million in MOD prices (see paragraph 10 below), made up as follows –

/(a) .....

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<sup>1</sup> "Return period" is the average number of years during which a certain severity of flooding will occur once, statistically. A longer return period means a rarer chance of occurrence of a more severe flooding.

	<b>\$ million</b>	
(a) Construction of a drainage channel	96.2	
(b) Construction of drainage pipe crossings by the trenchless method <sup>2</sup>	35.6	
(c) Reprovisioning of an inflatable dam and the ancillary control house for water supply	9.5	
(d) Diversion of watermains	34.3	
(e) Reprovisioning of access roads and crossings	33.3	
(f) Environmental mitigation measures	3.4	
(g) Consultant's fee <sup>3</sup>	0.9	
(h) Contingencies	21.3	
Sub-total	234.5	(in September 2004 prices)
(i) Provision for price adjustment	(1.9)	
Total	232.6	(in MOD prices)

———— A breakdown of the estimates for consultant's fee is at Enclosure 2.

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<sup>2</sup> Trenchless method refers to the use of boring techniques to construct underground pipes without opening up the railway embankments along the alignment of the pipes. The method would minimise the disturbance of the railway tracks above, thus reducing the risk of disrupting the operation and services of the railway line during the construction phase.

<sup>3</sup> The fee is the Government's share of the total fee for employment of an independent advisor jointly by the Government and the contractor to help resolve and avoid contractual conflicts.

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

Year	\$ million (Sept 2004)	Price adjustment factor	\$ million (MOD)
2005 – 2006	43.3	0.99000	42.9
2006 – 2007	75.0	0.98753	74.1
2007 – 2008	72.9	0.99123	72.3
2008 – 2009	40.5	0.99990	40.5
2009 – 2010	2.8	1.01515	2.8
	234.5		232.6

11. 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 2005 to 2010. We will tender the proposed works under a standard re-measurement contract because of uncertain sub-soil conditions and locations of existing underground utilities, such as gas pipes, electricity cables, telephone cables and water pipes. The contract will provide for price adjustments as the contract period will exceed 21 months.

12. We estimate the annual recurrent expenditure arising from this project to be about \$ 1.1 million.

## **PUBLIC CONSULTATION**

13. We consulted the Tai Po District Council (TPDC) on 16 May 2003. Members supported the implementation of the proposed works. We gazetted the proposed works under the Roads (Works, Use and Compensation) Ordinance on 5 December 2003. Out of a total of 65 objections received under the gazettal, four have been withdrawn unconditionally after our clarification of the proposed works and 61 have remained unresolved despite our meetings with the objectors. On 23 July 2004, we reported progress of the proposed works to the Environment, Housing and Works Committee (the Committee) of TPDC. The Committee was

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also advised that under the prevailing Government policy, all the requests from the objectors for re-housing and compensation would be dealt with accordingly. The Committee then requested the Administration to address their reasonable requests on re-housing and compensation before works start. The Chief Executive in Council authorised the works on 7 December 2004. The Director of Lands and the Director of Housing will initiate the process of re-housing and compensation arrangements.

14. We consulted the Legislative Council Panel on Planning, Lands and Works on the proposed works on 21 December 2004. We also reported the Administration's policy on re-housing and compensation to squatter occupants and progress made in resolving the objections received under the Roads (Works, Use and Compensation) Ordinance upon gazettal of the proposed work. Members generally supported the implementation of the proposed project.

## ENVIRONMENTAL IMPLICATIONS

15. The works proposed to be part-upgraded under **112CD** is not a designated project under the Environmental Impact Assessment Ordinance. We completed an Environmental Study (ES) for the proposed works in 2003. The ES has concluded that with full implementation of the recommended mitigation measures and environmental monitoring and audit programme, the works would not have significant environmental impacts. We would incorporate the ES recommendations into the works contract for implementation. During construction, we will control noise, dust and site run-off through implementation of mitigation measures such as the use of temporary noise barriers and silenced construction plants to reduce noise generation, water-spraying to reduce emission of dust, working in dry environment with bunds and barriers to control water pollution during excavation. The base of Ma Wat drainage channel will all be lined with rocks and gravels with shallow pools formed at places to encourage ecological habitats. We estimate the cost of implementing the environmental mitigation measures to be \$3.4 million. We have included this cost in the overall project estimate.

16. We will require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures like the allocation of an area for waste segregation. We will ensure that the day-to-day operations on site comply with the approved WMP. We will encourage the contractor to use steel instead of timber for formwork and temporary works to reduce the generation of waste. We will require the contractor to implement

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necessary measures to minimise construction and demolition (C&D) materials and to reuse C&D materials as fill material as far as possible. We will control disposal of C&D materials and waste to public filling areas<sup>4</sup> and landfills respectively through a trip-ticket system. We will record the disposal and reuse of C&D materials for monitoring purposes.

17. We estimate that the project will generate about 193 000 cubic metres (m<sup>3</sup>) of C&D materials. Of these, we will reuse about 154 000 m<sup>3</sup> (80%) on site, deliver 8 000 m<sup>3</sup> (4%) at public filling areas and dispose of 31 000 m<sup>3</sup> (16%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$3,875,000 for this project (based on a notional unit cost<sup>5</sup> of \$125/m<sup>3</sup>).

## LAND ACQUISITION

18. We will clear about 11.5 hectares of Government land and resume about 1.7 hectares of private agricultural land. The land acquisition and clearance will affect 81 households involving 156 persons and 51 temporary domestic structures. Of these, 54 households involving 98 persons and 22 temporary domestic structures are residing on Government land, and 27 households involving 58 persons and 29 temporary domestic structures are residing on private agricultural land. Under the existing policy, the Director of Housing will offer eligible families accommodation in public housing. We will charge the land acquisition and clearance costs, estimated to be about \$45 million, (about \$32 million for land resumption and about \$13 million for clearance) to **Head 701 – Land Acquisition**.

## BACKGROUND INFORMATION

19. In October 1999, we completed a comprehensive review of the drainage systems in Northern New Territories under **55CD** “Drainage master plan study in Northern New Territories”. The Study has identified that some of the existing drainage streamcourses and drainage systems are inadequate to meet the required flood protection standard and future development needs.

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<sup>4</sup> A public filling area is a designated part of a development project that accepts public fill for reclamation purposes. Disposal of public fill in a public filling area requires a licence issued by the Director of Civil Engineering and Development.

<sup>5</sup> 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/m<sup>3</sup>), nor the cost to provide new landfills (which are likely to be more expensive) when existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

20. The Study recommends a three-package programme (namely Packages A, B and C) of drainage improvement works to tackle the flooding problems in the areas. Package A covers works in San Tin North, Fanling, Sheung Shui and Tai Po North with higher flooding risks whereas Packages B and C cover other parts of Northern New Territories such as San Tin South, Kwu Tung and Ma Tso Lung.

21. In September 2000, we upgraded Package A drainage improvement works to Category B as **112CD** "Drainage improvement in Northern New Territories – package A". We included **118CD** "Drainage improvement in Northern New Territories – package B" and **119CD** "Drainage improvement in Northern New Territories – package C" in Category B in November 2001.

22. In June 2001, we upgraded part of **112CD** to Category A as **116CD** "Drainage improvement in Northern New Territories – package A – consultants' fees and investigations" for carrying out site investigation, impact assessments and preliminary design for **112CD**. The consultancy commenced in March 2002 and will be completed in mid 2006. We have deployed in-house resources to carry out the detailed design and site supervision of the works.

23. Taking into account the urgency and construction sequences of the proposed works of **112CD**, we propose to carry out the drainage improvement works in three phases. Phase 1 works are the part of **112CD** we now propose to upgrade to Category A.

24. The planning and design of the remainder of **112CD**, i.e. the phases 2 and 3 works, is underway. Phase 2 works comprise the construction of drainage channels upstream of Ma Wat River and phase 3 works involve the upgrading of drains and channels in Fanling, Sheung Shui and San Tin North.

25. The proposed drainage improvement works will involve removal of 1 198 number of trees, including 1 163 trees to be felled and 35 trees to be replanted within the project site. Only two of the trees to be removed are important trees<sup>6</sup>. A

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<sup>6</sup> Important trees include trees on the Register of Old and Valuable Trees, and any other trees which meet one or more of the following criteria –

- (a) trees over 100 years old;
- (b) trees of cultural, historical or memorable significance;
- (c) trees of precious or rare species;
- (d) trees of outstanding form; or
- (e) trees with trunk diameter exceeding one metre (measured at one metre above ground level).

summary of these two trees is provided at Enclosure 3. We will incorporate planting proposal as part of the project, including estimated quantities of 1 366 trees, 2 890 shrubs and 53 000 m<sup>2</sup> of grassed area.

26. We estimate that the proposed works will create about 120 jobs (105 for labourers and another 15 for professional/technical staff) providing a total employment of 3 800 man-months.

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Environment, Transport and Works Bureau  
February 2005



施工界限  
SITE LIMIT

施工界限  
SITE LIMIT

行人路  
FOOTPATH

道路  
ACCESS ROAD

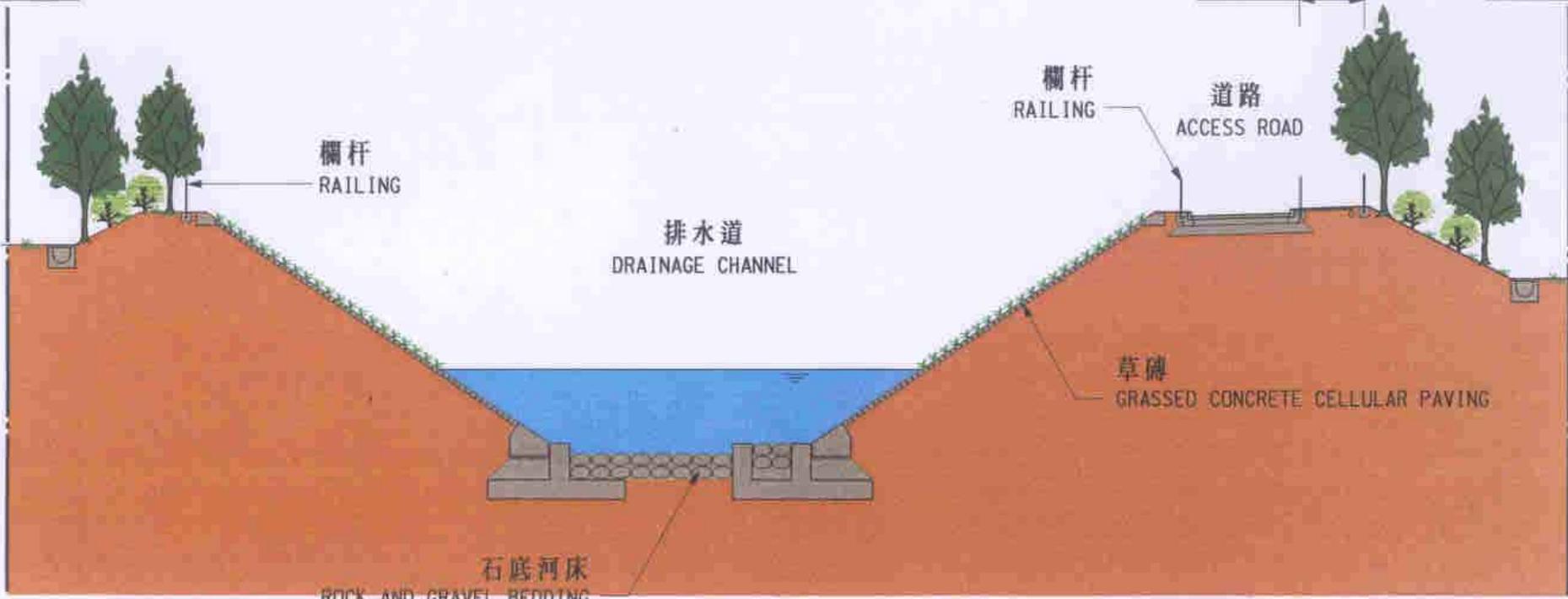
欄杆  
RAILING

欄杆  
RAILING

排水道  
DRAINAGE CHANNEL

草磚  
GRASSED CONCRETE CELLULAR PAVING

石底河床  
ROCK AND GRAVEL BEDDING



圖則名稱 drawing title

麻笏河梯形河道典型切面圖

TYPICAL CROSS-SECTION OF THE PROPOSED TRAPEZOIDAL DRAINAGE CHANNEL AT MA WAT RIVER

繪畫 drawn	SIGNED	C.K. LI	日期 date	12.11.04
核對 checked	SIGNED	S.C. MA	日期 date	15.11.04
批核 approved	SIGNED	C.M. CHUNG	日期 date	14.12.04

部門 office 工程管理部  
PROJECT MANAGEMENT DIVISION

A	1.12.2005	GENERAL REVISION	SIGNED
No.	date	description	initial

圖則編號 drawing no.	比例 scale
SK-T1-04-042A	N.T.S.

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 DRAINAGE SERVICES DEPARTMENT  
 GOVERNMENT OF THE HONG KONG  
 SPECIAL ADMINISTRATIVE REGION

## 112CD – Drainage Improvement in Northern New Territories – Package A

## Breakdown of estimates for consultant's fee

Consultant's fee		Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$million)
Independent advisor (Note 2)	Professional	17	38	2.0	1.8
				<b>Total</b>	<u>1.8</u>
<b>Consultant's fee borne by the Government</b> (Note 3)					<u>0.9</u>

\* MPS = Master Pay Scale

## Notes

1. A multiplier factor of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultant's overheads and profit, as the staff will be employed in the consultant's offices. (As at 1 January 2005, MPS Pt. 38 = \$54,255 per month)
2. We will only know the actual man-months and actual fees after the finalisation of the contract concerned.
3. The consultant's fee is equally shared between the Government and the contractor, i.e. the amount of \$0.9 million would be borne by each side.

**Summary of the two trees with trunk diameter exceeding one metre  
(measured at one metre above ground) to be affected by  
112CD -Drainage Improvement in Northern New Territories – package A**

Tree ref no.	Tree species (Botanical names)	Tree size			Form <sup>(1)</sup> (Good/Fair/Poor)	Survival rate after transplanting (High/Medium/Low)	Amenity value (High/Medium/Low)	Recommendation (Retain/Transplant/Fell)	Remarks
		Overall height (m)	Trunk <sup>(2)</sup> diameter (m)	Average crown spread (m)					
T1	<i>Ficus elastica</i>	12	1.11	8	Poor	Low	Medium	Fell	(i) The tree is located in the middle of the proposed Ma Wat Channel and cannot be retained. (ii) The tree is in fair health condition and in poor form. It is without main trunk. (iii) The survival rate after transplanting would be low and therefore transplantation is not recommended.
T18	<i>Ficus benjamina</i>	10	1.01	6	Good	Low	High	Fell	(i) The tree is located in the middle of the reprovisioned access road and cannot be retained. (ii) The tree is in fair health condition. (iii) The tree survival rate after transplanting would be low and therefore transplantation is not recommended.

<sup>(1)</sup> Form of a tree will take account of the overall tree size, shape, and any special feature.

<sup>(2)</sup> Trunk diameter of a tree refers to its diameter at breast height (i.e. measured at 1 metre above ground level).