

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 706 – HIGHWAYS

#### Transport – Roads

#### **718TH – Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha**

Members are invited to recommend to Finance Committee to increase the approved project estimate for **718TH** from \$688.5 million by \$143.5 million to \$832.0 million in money-of-the-day prices.

### PROBLEM

The approved project estimate (APE) of **718TH** is not sufficient to cover the cost of works under the project.

### PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, Transport and Works, proposes to increase the APE for **718TH** from \$688.5 million by \$143.5 million to \$832.0 million in money-of-the-day (MOD) prices.

### PROJECT SCOPE AND NATURE

3. The approved scope of **718TH** comprises –

/(a) .....

- (a) widening and realignment of a 3.6-kilometre (km) section of Tung Chung Road (TCR) between Lung Tseng Tau and Pak Kung Au from a single-lane road for two-way traffic to a single two-lane road for two-way traffic, with a footpath having a minimum width of 1.6 metres (m);
- (b) construction of a 2.6-km long single two-lane road between Pak Kung Au and Cheung Sha with a footpath having a minimum width of 1.6 m, including elevated highway structures of a total length of 750 m;
- (c) provision of 21 passing bays/bus lay-bys along TCR;
- (d) provision of a roundabout at Cheung Sha;
- (e) provision of traffic control and surveillance system; and
- (f) associated works including road rehabilitation, drainage, utility, environmental mitigation measures, landscaping, slope stabilisation, traffic aids, road safety enhancement measures, lighting and electrical and mechanical works.

———— A site plan with typical road sections is at **Enclosure 1**.

## **JUSTIFICATION**

4. Following a review of the financial situation, we consider it necessary to increase the APE for **718TH** from \$688.5 million by \$143.5 million to \$832.0 million to cover the additional costs due to the following –

- (a) price fluctuation payments under the contract;
- (b) variations of works to suit the actual site conditions; and
- (c) additional consultants' fees and resident site staff (RSS) costs for the contract.

Details for the increase in costs are set out in paragraphs 5 to 12 below.

**/Price .....**

**Price fluctuation payments under the contract**

5. According to existing government practice, monthly payments to contractors for construction contracts exceeding 21 months are adjusted to cover market fluctuations in labour and material costs. The adjustment mechanism<sup>1</sup> is stipulated in the contract. In the planning stage when the project estimate is prepared, an estimate on the market movements during the construction stage of the project is made using a set of price adjustment factors based on the forecast on inflation for construction works. The MOD project estimate is derived by applying the price adjustment factors to the baseline project estimate.

6. At the time when the project was approved by the Finance Committee on 18 July 2003, the price adjustment factors adopted for the period between 2003-04 to 2008-09 were lower than one, reflecting largely the declining price for labour and materials costs of construction works. As a result, the baseline project estimate was adjusted downward from \$676.8 million by \$47 million to arrive at an MOD estimate of \$629.8 million.

7. An upward adjustment to the project cost (in MOD prices) was required in June 2004 after the tenders were received to cover the substantially higher tender prices attributable to the tenderers being more cautious about the difficult site conditions, the strict environmental measures to be adopted and the tight construction programme of the project. The Finance Committee approved our application to revise the APE upward by \$58.7 million on 11 June 2004. At that time, the Highways Department (HyD) noticed that the prices of construction works were experiencing a slight increase after the economic downturn in early 2003, but the trend was not clear. Notwithstanding this, HyD considered that the contingency provisions in the APE was adequate to cover the price adjustments.

8. The contract was subsequently awarded on 28 June 2004. Contrary to the expectation, there was sharp increase in construction material prices since

/June .....

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<sup>1</sup> The adjustment mechanism is used for all contracts having a construction period exceeding 21 months. The actual monthly payment made to the Contractor is derived by multiplying the value of work done with a 'contract price fluctuation factor' which varies from month to month. The 'contract price fluctuation factor' appropriate to a particular month is determined by –

- (a) the relative proportions of labour and material content contained in a Schedule of Proportions submitted by the Contractor with his tender, which is related to the Contractor's establishment and working methods; and
- (b) the Index Numbers of the Costs of Labour and Materials Used in Public Sector Construction Projects (April 2003 = 100) published by the Census and Statistics Department on a monthly basis.

June 2004, particularly for diesel fuel, steel and cement. It is now estimated that the average inflation for the whole contract works will be about 16.6%. As a result, the overall inflation adjustment for the original contract works will be about \$84.2 million and that for the variations of works as detailed in paragraph 9 below will be about \$5.6 million, resulting in a total anticipated inflation adjustment of \$89.8 million.

### **Variations of works to suit the actual site conditions**

9. The project involves construction of 71 slopes, 51 retaining walls and 15 bridges within a site of 6.2 km in length. During construction, we encountered unexpected difficulties in various areas within the site which could not be identified at the stage of pre-contract site investigation and topographical survey owing to site constraints. In particular, the 3.3 km long new section of road between the Tai Tung Shan Fresh Water Service Reservoir and the catchwater near Cheung Sha lies entirely within the Lantau North and Lantau South Country Parks. Because felling of trees was not permitted, the pre-construction topographical survey for this section had to be carried out under very restrictive conditions. Moreover, the access within the country parks, which allows only one person to pass through, did not permit the use of large-size investigation equipment. Subsequent to the commencement of the construction contract and after clearance of the trees and undergrowth, we find the following changes and additional works necessary –

- (a) additional manholes, drainage pipes and surface channels to suit the actual terrain during the construction of the about 22.3 km drains and watermains under the future carriageway. We found that the quantity of the rocks in trench excavation for the drains and watermains is much more than the contract originally allowed<sup>2</sup>. These result in an estimated increase in cost by \$8.3 million;

/(b) .....

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<sup>2</sup> The contract assumed 252 m<sup>3</sup> of rock to be excavated in trench works for drains and water mains but the actual quantity is now estimated to be about 7 800 m<sup>3</sup>.

- (b) increase in the heights and lengths of some retaining walls to match with the actual topography and geotechnical condition of the slopes because we find the quantity of the rocks encountered in the excavation for the slopes and retaining walls more than that envisaged in the contract<sup>3</sup>. These result in an estimated increase in cost by \$12.9 million; and
- (c) additional work to remove a larger quantity of boulders encountered in the piling works of the elevated highway structure, resulting in an estimated increase in cost by \$8.9 million. The quantity of boulders is much more than originally anticipated<sup>4</sup>.

10. We estimate the cost of the additional works and variations to be about \$30.1 million in total.

### **Additional consultants' fees and RSS costs associated with extended construction period**

11. The TCR improvement works under **718TH** commenced in June 2004 and was originally scheduled for completion in March 2007. The progress of works has not kept pace with the originally envisaged programme due to the difficult site conditions, the difficulties in dealing with unforeseen situations and also to the large amount of earthworks that are particularly susceptible to inclement weather. The year 2005 was one of the wettest in recent years and the total annual rainfall was 45% more than normal<sup>5</sup>. Taking into account the variations of works mentioned in paragraph 9 above, we estimate that the project will be substantially completed in September 2008. Owing to the additional works and the longer construction period, we estimate the consultants' fees for construction supervision and contract administration will be increased by \$2.4 million and the RSS costs will be increased by \$21.2 million.

**/Overall .....**

### **Overall review**

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<sup>3</sup> The contract assumed 37 160m<sup>3</sup> of rock to be removed in constructing the slopes and retaining walls and in forming the road, but the actual quantity is now estimated to be about 45 000 m<sup>3</sup>.

<sup>4</sup> The contract assumed 602 m<sup>3</sup> of boulders to be removed in the piling operation but the actual quantity is now estimated to be about 5 800 m<sup>3</sup>.

<sup>5</sup> Based on the climatological data collected by the Hong Kong Observatory, the total rainfall of year 2005 was 3 214.5 mm while the 1961-1990 climatologically normal annual rainfall is 2 214.3 mm.

12. Upon a review of the financial position of the project, we consider it necessary to increase the APE of **718TH** from \$688.5 million by \$143.5 million to \$832.0 million in MOD prices to meet the additional expenditure required under the project. A breakdown for the proposed increase of \$143.5 million is as follows –

Factors	Proposed increased amount in MOD prices (\$ million)	% of the total increased amount
Additional costs associated with –		
(a) Contract price fluctuation adjustment	89.8	62.6
(b) Variations of works	30.1	21.0
(i) Additional excavation in rock for drainage and watermain trenches and revision of drainage design to suit site condition	8.3	
(ii) Higher and longer retaining walls and additional excavation in rock for retaining walls and slopes	12.9	
(iii) Additional boulder breaking in piling for elevated highway structure	8.9	
(c) Additional consultants' fees and RSS costs	23.6	16.4
Total	143.5	100.0

/A .....

A comparison of the cost breakdowns of the APE and the revised project estimate (in MOD prices) is shown in **Enclosure 2**.

## FINANCIAL IMPLICATIONS

13. Subject to approval, we will revise the phasing of the expenditure as follows –

Year	\$ million (MOD)
Up to 31 March 2006 <sup>6</sup>	165.9
2006 – 2007	156.1
2007 – 2008	250.0
2008 – 2009	180.0
2009 – 2010	70.0
2010 – 2011	10.0
	<hr/> 832.0 <hr/>

14. The proposed increase in the APE will not give rise to additional recurrent expenditure.

## PUBLIC CONSULTATION

15. We consulted the Panel on Transport of the Legislative Council on 15 December 2006. Members did not raise any objection to the proposal.

/ENVIRONMENTAL .....

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<sup>6</sup> This is the actual expenditure up to 31 March 2006.

## ENVIRONMENTAL IMPLICATIONS

16. The proposed increase in the APE will not give rise to any adverse environmental implications. Findings on the environmental issues/impacts covered in the approved Environmental Impact Assessment (EIA) report are still valid for the additional works and the recommended measures and conditions contained in the EIA report and environmental permit are adequate to mitigate any environmental impacts associated with the additional works.

17. During the construction works, we have carried out more detailed survey of trees affected by the project and submitted updated tree felling application with compensatory plan to relevant authorities including the Agriculture, Fisheries and Conservation Department and obtained their approval.<sup>7</sup> The details of the waste management plan for construction and demolition materials in the previous PWSC paper for this project remain unchanged.

## LAND ACQUISITION

18. The proposed increase in the APE does not require any land acquisition.

## BACKGROUND INFORMATION

19. On 18 July 2003, the Finance Committee approved the upgrading of **718TH** to Category A at an estimated cost of \$629.8 million in MOD prices.

20. On 11 June 2004, the Finance Committee approved an increase in the APE of **718TH** from \$629.8 million by \$58.7 million to \$688.5 million in MOD prices prior to the award of the contract to allow for the higher than expected tender price.

/21. ....

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<sup>7</sup> Of the existing 10 393 trees within the project site boundary, we will retain 5 399, transplant ten, and fell 4 984 trees. We will replant about 206 805 trees and shrubs.

21. We estimate that the additional works and consultants' services associated with the increase in the APE will create about 85 jobs (45 for labourers and 40 for professional/technical staff) providing a total employment of 1 400 man-months.

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Environment, Transport and Works Bureau  
January 2007

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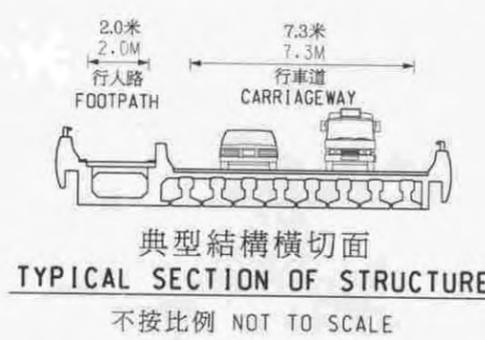
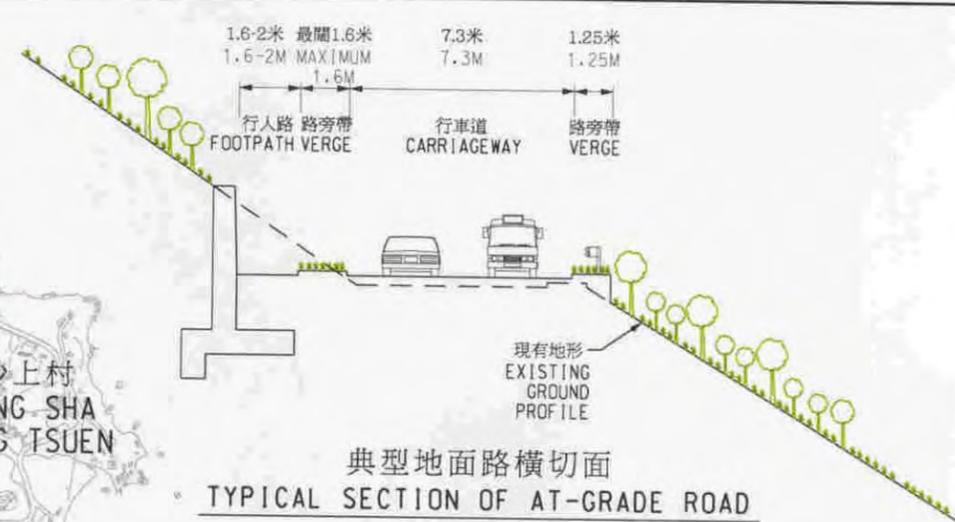
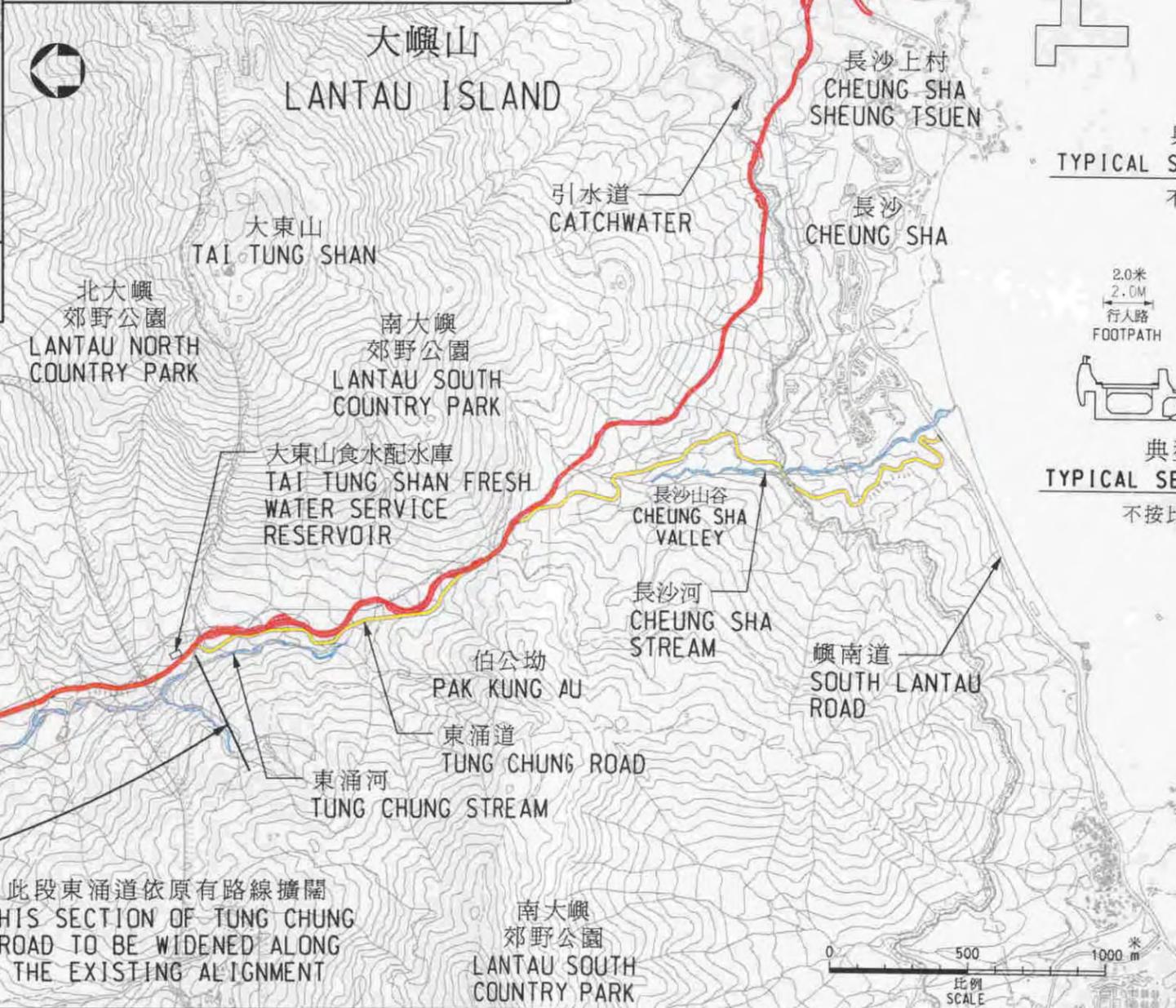
圖例  
LEGEND :

-  擬建的路線  
PROPOSED ROAD ALIGNMENT
-  現有東涌道  
EXISTING TUNG CHUNG ROAD



索引圖 KEY PLAN

不按比例 NOT TO SCALE



ENLARGED COPY



圖則名稱 drawing title

工務計劃項目第718TH號 - 龍井頭至長沙一段東涌道的改善工程  
PWP ITEM No. 718TH - IMPROVEMENT TO TUNG CHUNG ROAD  
BETWEEN LUNG TSENG TAU AND CHEUNG SHA

設計 designed SIGNED Y.M.SIU 03/10/06	繪圖 drawn SIGNED W.L.LAM 03/10/06
覆核 checked SIGNED Y.M.SIU 03/10/06	批准 approved SIGNED K.M.CHAN 03/10/06
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE	

A	05/12/06	MINOR AMENDMENT	SIGNED Y.M.SIU
no.	date	description	initial

圖則編號 drawing no.	比例 scale
HMW6718TH-SP0004-A	1:30000 或圖示 OR AS SHOWN
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ENCLOSURE 1 附件

**Enclosure 2 to PWSC(2006-07)71**

**718TH – Improvement to Tung Chung Road between  
Lung Tseng Tau and Cheung Sha**

A comparison of the APE and the revised project estimate in MOD prices is as follows –

	(i) Approved Project Estimate (\$M)	(ii) Latest Estimate for works completed (\$M)	(iii) Latest Estimate for remaining works (\$M)	(iv) Total Latest Estimate (ii) + (iii) (\$M)	(v) Difference (iv) – (i) (\$M)
(a) Roads and drainage works	119.0	39.1	88.2	127.3	+8.3
(b) Earthworks and retaining walls	248.7	103.3	158.3	261.6	+12.9
(c) Elevated highway structures	166.1	79.2	95.8	175.0	+8.9
(d) Traffic control and surveillance system (TCSS)	4.1	0.0	4.1	4.1	0
(e) Landscaping works	4.5	0.3	4.2	4.5	0
Sub-total	542.4	221.9	350.6	572.5	+30.1
(f) Contract price fluctuation adjustment	0.0	23.7	66.1	89.8	+89.8
(g) Consultants' fees	80.9	49.8	54.7	104.5	+23.6
(i) Construction supervision and contract administration	9.6	8.0	4.0	12.0	+2.4
(ii) Resident Site Staff	65.6	41.4	45.4	86.8	+21.2
(iii) Environmental monitoring and audit programme	5.4	0.4	5.0	5.4	0
(iv) Electrical and Mechanical Services Trading Fund (EMSTF) charges	0.3	0.0	0.3	0.3	0
(h) Additional road safety enhancement measures	8.0	0.0	8.0	8.0	0
(i) Contingencies	57.2	0.0	57.2	57.2	0
<b>Total</b>	<b>688.5</b>	<b>295.4</b>	<b>536.6</b>	<b>832</b>	<b>+143.5</b>

2. As regards **1(a) (Roads and drainage works)**, the total increase of \$8.3 million is due to the higher quantity of rock in trench excavation for the drains and

watermains and the additional manholes, drainage pipes and surface channels to suit the actual terrain.

3. As regards **1(b) (Earthworks and retaining wall works)**, the total increase of \$12.9 million is due to the higher and longer retaining walls required and the unanticipated sub-soil conditions giving rise to higher quantity of rock encountered in the excavation than anticipated.

4. As regards **1(c) (Elevated highway structures)**, the total increase of \$8.9 million is due to the larger quantity of boulders encountered in the piling works than anticipated.

5. As regards **1(f) (Contract price fluctuation adjustment)**, the increase of \$89.8 million is due to the contract price fluctuation adjustment of \$84.2 million for the works under the existing contract and that of \$5.6 million for the additional and variation of works.

6. As regards **1(g) (Consultants' fees)**, the increase of \$23.6 million is due to additional consultants' fees and RSS costs as a result of the additional works and extended construction period.

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