

**For Discussion
15 December 2006**

**Legislative Council Panel on Transport
Improvement to Tung Chung Road
between Lung Tseng Tau and Cheung Sha**

PURPOSE

This paper seeks Members' view on the proposal 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 (MOD) prices.

BACKGROUND

2. The approved scope of **718TH** comprises –
 - (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**.

PROBLEM

3. Following a review of the financial situation, it is necessary to increase the approved project estimate (APE) for **718TH** from \$688.5 million by \$143.5 million to \$832.0 million in MOD prices to cover the additional costs arising from 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 4 to 11 below.

Price fluctuation payments under the contract

4. According to existing Government practice, in general, monthly payments to contractors for construction contracts exceeding 21

months are adjusted to cover market fluctuations in labour and material costs. The adjustment mechanism¹ 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.

5. At the time when the project was upgraded to Cat A at the Finance Committee meeting on 18 July 2003, the price adjustment factors adopted for the period between 2003-04 to 2008-09 were less than one, reflecting a period of deflation. As a result, the baseline project estimate was adjusted downward by \$47 million to arrive at an MOD estimate of \$629.8 million.

6. The MOD estimate was adjusted upward 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 inflation after the economic downturn in early 2003, but the trend was not clear. Notwithstanding, HyD considered that the contingencies allowed for in the APE adequate to cover the price adjustments.

7. The contract was subsequently awarded on 28 June 2004. Contrary to the expectation, there was high inflation in construction material prices since June 2004, particularly for diesel fuel, steel and cement. It is

1 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 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.

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 8 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

8. The project involves construction of 71 slopes, 51 retaining walls and 15 bridges within a site of 6.2 km in length. Although we have carried out pre-contract site investigation and a topographical survey, we encountered unexpected difficulties in various areas within the site during construction. 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. The pre-construction topographical survey for this section was carried out under very restrictive conditions because felling of trees was not permitted. Moreover, the narrow access within the country parks cannot cater for the size of certain investigation equipment. Subsequent to the commencement of the construction contract, we find the following unforeseeable changes and additional works necessary after clearance of the trees and undergrowth-

- (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 watermains² is much more than the contract originally allowed. These result in an estimated increase in cost by \$8.3 million;
- (b) increase in the heights and lengths of some retaining walls to match with the actual

² The contract assumed 252 m³ 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 m³.

topography and geotechnical condition of the slopes because we find the quantity of the rocks encountered in the excavation for the slopes and retaining walls³ more than that envisaged in the contract. These result in an estimated increase in cost by \$12.9 million; and

- (c) increase in the quantity of boulders encountered in the piling works⁴ which is much more than originally anticipated, resulting in an estimated increase in cost by \$8.9 million.

9. We estimate the cost of the additional works and variations to be about \$30.1 million in total. The associated inflation adjustment is about \$5.6 million.

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

10. 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 planning and resource incapability of the contractor in dealing with unforeseen situations and 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 normal⁵. Taking into account the variations of works mentioned in paragraph 8 above, we estimate that the road improvement works 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.

³ The contract assumed 37 160m³ 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 m³.

⁴ The contract assumed 602 m³ of boulders to be removed in the piling operation but the actual quantity is now estimated to be about 5 800 m³.

⁵ 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.

Overall review

11. 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 in order to cover the additional costs 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) Higher and longer retaining walls and additional excavation in rock for retaining walls and slopes	12.9	
(ii) Additional boulder breaking in piling for bridges	8.9	
(iii) Additional excavation in rock for drainage and watermain trenches and revision of drainage design to suit site condition	8.3	

Factors	Proposed increased amount in MOD prices (\$ million)	% of the total increased amount
(c) Additional consultants' fees and RSS costs	23.6	16.4
<i>Total</i>	<u>143.5</u>	<u>100.0</u>

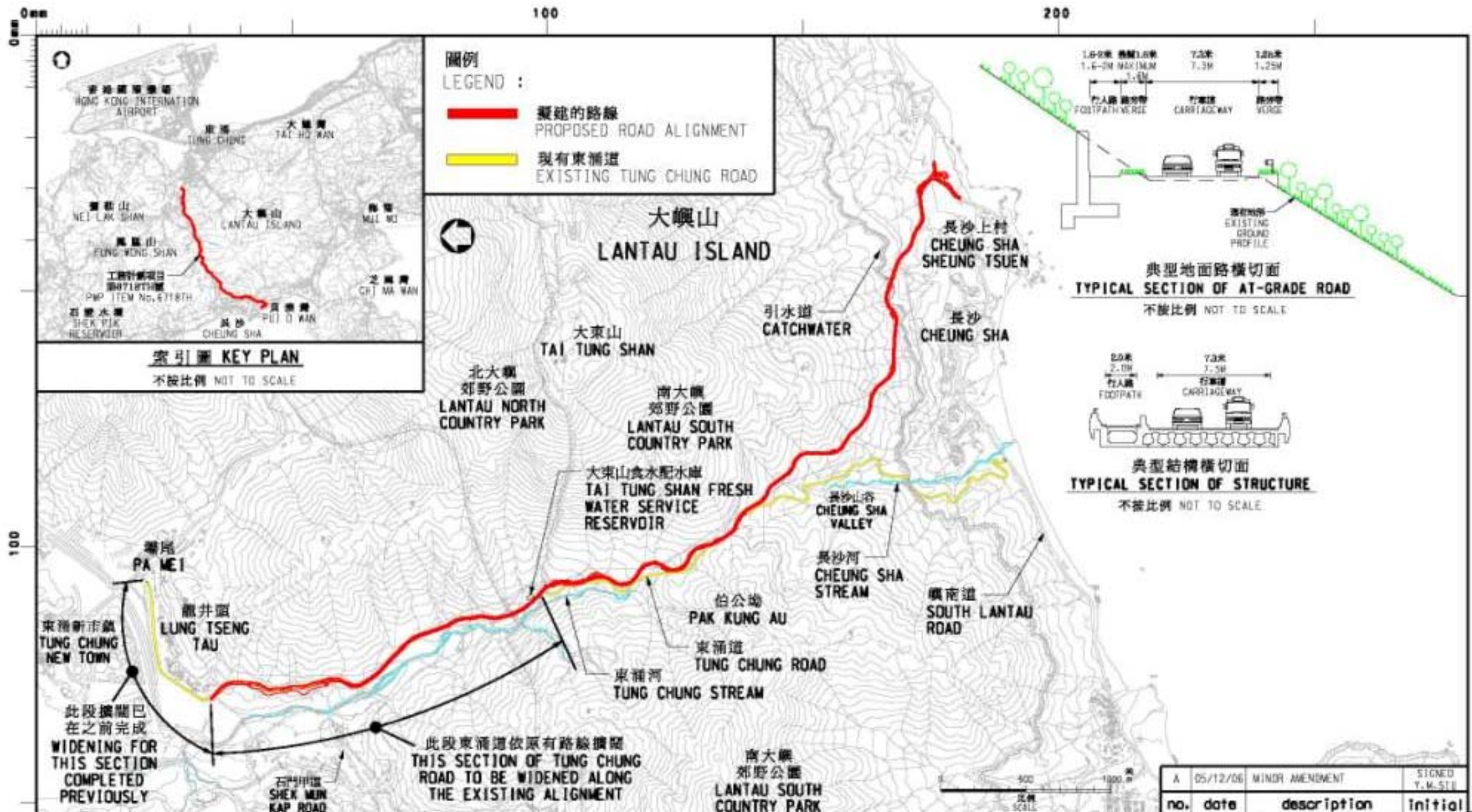
WAY FORWARD

12. We intend to submit the proposal to the Public Works Sub-committee and Finance Committee of the Legislative Council on 3 January 2007 and 26 January 2007 respectively for the increase in APE.

ADVICE SOUGHT

13. Members are invited to comment on this paper.

Environment, Transport and Works Bureau
December 2006



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

典型地面路橫切面
TYPICAL SECTION OF AT-GRADE ROAD
 不按比例 NOT TO SCALE

典型結構橫切面
TYPICAL SECTION OF STRUCTURE
 不按比例 NOT TO SCALE

此段擴闊已
 在之前完成
**WIDENING FOR
 THIS SECTION
 COMPLETED
 PREVIOUSLY**

此段東涌道依原有路線擴闊
**THIS SECTION OF TUNG CHUNG
 ROAD TO BE WIDENED ALONG
 THE EXISTING ALIGNMENT**

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
主要工程管理局 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	ENCLOSURE 1 附件 1
HMW6718TH-SP0004-A		1:30000 或顯示 OR AS SHOWN	
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