

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS

Transport – Roads

835TH – Hong Kong–Zhuhai–Macao Bridge preconstruction works

Members are invited to recommend to Finance Committee the upgrading of **835TH** to Category A at an estimated cost of \$46.6 million in money-of-the-day prices for the preconstruction works for the Hong Kong-Zhuhai-Macao Bridge.

PROBLEM

We need to carry out preconstruction works for Hong Kong-Zhuhai-Macao Bridge (HZMB), which includes a physical modelling study with recommendations on the further refinement of the design for HZMB, and works related to the tendering process for the Main Bridge of HZMB, jointly with the governments of Guangdong Province and the Macao Special Administrative Region (SAR).

PROPOSAL

2. The Director of Highways (D of Hy), with the support of the Secretary for Transport and Housing, proposes to upgrade **835TH** to Category A at an estimated cost of \$46.6 million in money-of-the-day (MOD) prices to fund the Hong Kong Special Administrative Region (HKSAR)'s share for the preconstruction works for the HZMB.

/ PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **835TH** comprises –
 - (a) a physical modelling study (inclusive of the associated design refinement for the HZMB) to supplement the topical study on hydrology in the assessment of the impacts of HZMB on the hydrology, flooding and ports in the Pearl River Estuary, and identification of ways to minimize any adverse impact; and
 - (b) works relating to the tendering exercise for the HZMB Main Bridge.

4. We plan to commence the physical modelling and studies in mid 2008 for completion by July 2009.

JUSTIFICATION

5. The governments of Guangdong, the HKSAR and Macao SAR have since 2003 formed an HZMB Advance Work Coordination Group (AWCG) to commence the preparatory work of the HZMB. In 2004, the AWCG commissioned the China Highway Planning and Design Institute (HPDI) to conduct a feasibility study for the HZMB, covering a wide range of topics including navigation clearance, hydrology, environment, traffic, economic benefits and financial viability. A total of eight AWCG meetings and numerous expert group meetings have been held to deliberate on the outcome of the various topical studies. The National Development and Reform Commission (NDRC) also formed HZMB Task Force in 2007 to push forward the project. The Task Force was led by the NDRC, with representatives from the Ministry of Communications, the Hong Kong and Macao Affairs Office, and the governments of HKSAR, Guangdong and Macao SAR as members. At its meeting on 7 January 2007, the Task Force recommended that the Boundary Crossing Facilities (BCF) of each government should be set up within their own respective territories.

6. HPDI has substantially completed the feasibility study for the HZMB.

The Proposed Alignment

7. HPDI recommends that the HZMB should take a bridge-cum-tunnel alignment with an immersed tunnel underneath the main navigation channels near the boundary of the HKSAR, with landings at Gongbei of Zhuhai and A Perola of the Macao SAR at the western bank and at San Shek Wan of Northwest Lantau at the eastern bank. A plan showing the alignment is at the Enclosure.

Financing Arrangement and Economic Benefits

8. As regards the financial arrangement, the feasibility study report points out that in view of the mega size of the whole HZMB project, it is not financially viable to attract private investment. The report recommends that the three governments should be responsible for their associated link roads and BCF within their own territory, and private investment should be invited to undertake the Main Bridge under a franchise for a period of 50 years. It also recommends that the three governments should contribute to part of the construction cost of the Main Bridge, which is proposed to start from the artificial islands off Gongbei of Zhuhai and A Perola of the Macao SAR and extend to the eastern artificial island west of the HKSAR boundary. The split of the contribution should be determined in accordance with the principle of Equalization of Benefit to Cost Ratio¹.

9. At the 8th AWCG Meeting held on 28 February 2008 in Guangzhou, a consensus was reached on the financing arrangement for the HZMB project as follows –

- (a) each of the three governments will be responsible for the construction, operation and maintenance of the BCF and link roads within its own territory;
- (b) the HZMB Main Bridge should start from the artificial islands off Gongbei and Macao to the eastern artificial island west of the HKSAR boundary. It will be a 29.6 kilometre (km) dual three-lane carriageway in the form of a bridge-cum-tunnel structure running across major

/ navigation

¹ Equalization of Benefit to Cost Ratio is an approach to equalise the ratio of the estimated benefit obtained to the estimated cost incurred for a joint investment from different territories with different economic status. Under this principle, the amount of contribution by the three governments to the cost of the HZMB Main Bridge and Link Roads should be apportioned in such a way that the Benefit to Cost Ratio of the three places will be the same.

navigation channels in the Pearl River Estuary with an immersed tunnel of about 6.7 km and the construction cost (excluding financing cost) is estimated to be RMB ¥31 billion (in early 2007 prices);

- (c) the three governments should, if necessary, contribute to the funding gap of the HZMB Main Bridge, and the split of the contribution should be determined in accordance with the principle of Equalization of Benefit to Cost Ratio, with Hong Kong contributing 50.2%, Mainland 35.1% and Macao 14.7%. The exact amount of contribution would depend on the outcome of the tendering exercise and the financing arrangements proposed by the successful bidder; and
- (d) further discussion among the NDRC and the three governments as to the details of the tendering exercise and the content of the tender documents would be necessary.

10. Under this arrangement, the Economic Net Present Value (ENPV)² of the project is about RMB ¥40 billion for an operation period of 20 years. The estimated ENPV for Hong Kong is about RMB ¥23 billion as compared to RMB ¥13 billion for the Mainland and RMB ¥4 billion for Macao. The Economic Internal Rate of Return³ of the project is 8.8% in respect of Hong Kong over a 20-year period, or 12% over a 40-year period.

11. We have engaged a traffic consultant to explore and review possible options for regulating cross-boundary vehicles after the commissioning of the HZMB, and to recommend the preferred arrangement for these vehicles.

12. In order to fast track the project implementation programme, the AWCG has agreed to advance a physical modelling study to assess in more details the impact of the HZMB on the hydrology, flooding and ports in the Pearl River Estuary (PRE) and to fine-tune the design of the HZMB to minimise adverse impacts. /13.

² The Economic Net Present Value (ENPV) is the difference between the discounted present value of economic benefits and the discounted present value of costs.

³ Economic Internal Rate of Return (EIRR) is the discounted rate used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's EIRR, the more desirable it is to undertake the project.

13. The cost of the physical modelling study including the associated design refinement for the HZMB, and tender for the HZMB Main Bridge will be shared by the three governments on an equal basis.

FINANCIAL IMPLICATIONS

14. We estimate the HKSAR's share of the cost of the preconstruction works to be \$46.6 million in MOD prices (see paragraph 15 below), made up as follows–

	\$ million
(a) Physical modelling study	26.9
(i) Physical model to simulate local impacts on ports and navigation in the PRE (such as sedimentation and tidal current impacts) upon construction of artificial islands and bridge substructures	7.2
(ii) Associated mathematical model on impacts	0.7
(iii) Physical model to simulate global impacts on flooding in the PRE (such as impacts due to flow obstructions and sedimentation) upon construction of artificial islands and bridge substructures	11.5
(iv) Associated mathematical models on flooding	3.5
(v) Associated technical studies such as surveying and seabed profiling to collect data to support the modelling study	4.0
	/\$ million

		\$ million	
(b)	Associated design refinement for the HZMB (including refinement in the design of the various elements of the project such as the bridge and immersed tunnel structures, artificial islands, bridge appearance, environmental protection measures and safety aspects etc.)	9.1	
(c)	Works relating to the tender for the HZMB Main Bridge (including issue of tender documents, briefing sessions for potential bidders, assistance with negotiation process)	4.0	
(d)	Contingencies	4.0	
	Sub-total	44.0	(in September 2007 prices)
(e)	Provision for price adjustment	2.6	
	Total	46.6	(in MOD prices)

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

Year	\$ million (Sep 2007)	Price Adjustment Factor	\$ million (MOD)
2008 – 2009	9.0	1.02575	9.2
2009 – 2010	31.0	1.06293	33.0
2010 – 2011	4.0	1.10545	4.4
	44.0		46.6

16. We have derived the MOD estimate 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 2008 to 2011. The three governments will engage consultants to undertake the preconstruction works for the HZMB on a lump-sum basis without provision for price adjustment as the duration of each consultancy will not exceed 12 months.

/17.

17. The proposed preconstruction works for the HZMB will have no recurrent financial implication.

PUBLIC CONSULTATION

18. We briefed the Members of the Legislative Council Panel on Transport (the Panel) on the progress of the HZMB project on 29 September and 24 October 2003. On 25 June 2004, we briefed the Panel on the commissioning of HPDI by the AWCG to conduct the feasibility study for the HZMB and the commissioning of the investigation and preliminary design study for the Hong Kong Link Road (HKLR). We also informed the Panel of the setting up of a Project Office in Guangzhou to monitor the conduct of the feasibility study for the HZMB. On 27 May 2005, we informed Members of the Panel of the latest developments of the HZMB and the various alignment options for the HKLR, and consulted them on the proposed **796TH** “Hong Kong-Zhuhai-Macao Bridge - conceptual design and advance technical studies” (see paragraph 28 below).

19. On 13 October 2003, we briefed the Advisory Council on the Environment (ACE) on the HZMB project, and the choice of location for the landing point and alignments of the HZMB. The ACE supported our proposal to conduct further studies on the proposed landing points and alignments. We consulted the ACE again on 18 April 2005 and the representatives of the World Wide Fund, Friends of the Earth, Green Power, the Conservancy Association, Green Lantau Association, the Living Islands Movements and Save our Shorelines in April 2005 on the landing point of the HZMB and the various alignments of the HKLR. The ACE members and representatives of the green groups gave useful suggestions on the scope of the environmental impact assessment (EIA) study and suggested that close liaison be maintained with the other two governments to facilitate assessment of the cumulative environmental impacts.

20. We consulted the Islands District Council on the alignment options of the HKLR on 2 June 2005 and 17 October 2005 respectively.

21. We consulted the Panel on 25 April 2008 regarding our plan to submit the funding application for the preconstruction works for the HZMB. Upon the request of the Panel, we have also provided supplementary information on the HZMB economic benefits analysis to the Panel for their discussion on 16 May 2008.

ENVIRONMENTAL IMPLICATIONS

22. The proposed preconstruction works for the HZMB will not give rise to any adverse environmental impacts.

23. Regarding the BCF and the associated local link roads connecting the HZMB within the HKSAR boundary, we have commenced the EIA study for the HKLR and will commence the EIA study for the HZMB Hong Kong BCF in mid 2008 to assess and evaluate the environmental acceptability of these projects under the EIA Ordinance (Cap. 499). We will submit the EIA reports to the Director of Environmental Protection under the EIA Ordinance for approval and will follow the statutory procedures of making the EIA reports available for comments by the public and the ACE.

HERITAGE IMPLICATIONS

24. The proposed preconstruction works for the HZMB will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites/buildings, sites of archaeological interests and Government historic sites identified by the Antiquities and Monuments Office within the boundary of HKSAR.

LAND ACQUISITION

25. The proposed preconstruction works for the HZMB do not require any land acquisition.

BACKGROUND INFORMATION

26. In January 2003, D of Hy included an item under **Subhead 6100TX** "Highway works, studies and investigations for items in Category D of the Public Works Programme" to fund HKSAR's share of the cost for the Institute of Comprehensive Transportation (ICT) to conduct a study entitled "Transport Linkage between Hong Kong and Pearl River West" at a cost of \$800,000. The ICT completed the study in July 2003.

27. In March 2004, we included an item under **Subhead 6100TX** at an estimated cost of \$11.0 million to fund HKSAR's share of the cost for the HPDI to conduct the feasibility study for the HZMB. In April 2005, we increased the APE of this item by \$900,000 to \$11.9 million to provide fund for HKSAR's share of the cost for the HPDI to carry out some additional topical studies for the feasibility study. In September 2006, we further increased the APE of this item by \$2.3 million to \$14.2 million to conduct supplementary studies under "separate locations of boundary crossing facilities mode" for completing the feasibility study of the HZMB. Upon substantial completion of the supplementary studies, HPDI finalised the HZMB feasibility study report and submitted it to the AWCG for consideration in January 2008. The report is being revised to take into account further comments of the three governments and also the consensus reached in the 8th AWCG Meeting.

28. In June 2005, we upgraded **796TH** to Category A at an estimated cost of \$26.8 million in MOD prices to provide fund for HKSAR's share of the cost for the conceptual design and advance technical studies for the HZMB. These include the EIA, further site investigation works, the collection of design data on wind speed and sea wave, the compilation of design guidelines, construction specifications, maintenance and operation requirements, acceptance standards as well as the cost estimation for construction works in oceanic condition. The EIA studies for works on land and off-shore are in progress and expected to be complete by the third quarter of 2008. The other advance technical studies are also in good progress and interim reports have been submitted to provide useful information for future tender preparation works.

29. We included **835TH** in Category B in March 2008.

30. The proposed preconstruction works for the HZMB will not directly involve any tree removal or planting proposals.

31. The proposed preconstruction works for the HZMB will be carried out in the Mainland and they will not create any new jobs in the HKSAR.

圖例
LEGEND

港珠澳大橋主體
HONG KONG-ZHUHAI-MACAO BRIDGE
MAIN BRIDGE

— 擬建橋樑
PROPOSED BRIDGE

- - - 擬建隧道
PROPOSED TUNNEL

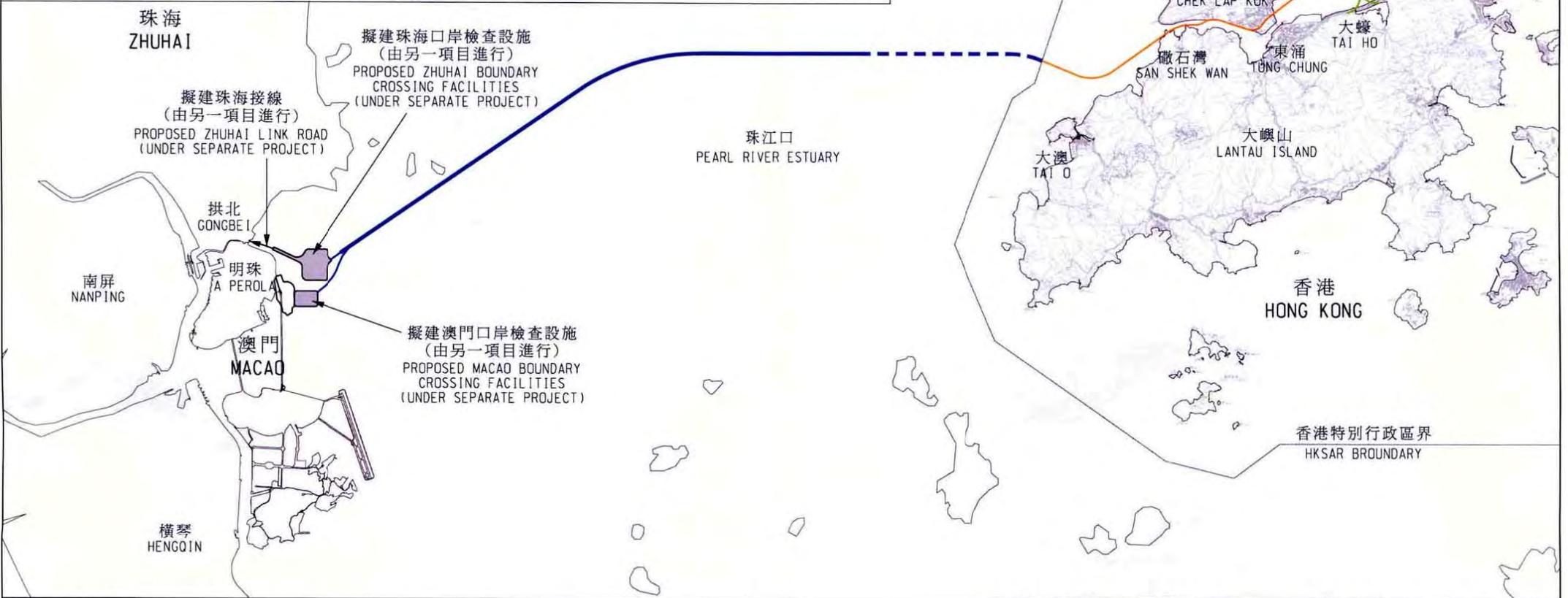
相關香港工程項目
RELATED HONG KONG PROJECTS

— 擬建屯門至赤鱸角連接路及屯門西繞道(示意路線)(工務計劃項目第825TH號)
PROPOSED TUEN MUN-CHEK LAP KOK LINK AND TUEN MUN WESTERN BYPASS (INDICATIVE ALIGNMENT) (PWP ITEM No. 825TH)

— 擬建港珠澳大橋香港接線(示意路線)
PROPOSED HONG KONG-ZHUHAI-MACAO BRIDGE HONG KONG LINK ROAD (INDICATIVE ALIGNMENT)

■ 擬建港珠澳大橋香港口岸(示意位置)(工務計劃項目第834TH號)
PROPOSED HONG KONG-ZHUHAI-MACAO BRIDGE HONG KONG BOUNDARY CROSSING FACILITIES (INDICATIVE LOCATION) (PWP ITEM No. 834TH)

註釋：所有示意路線及位置都可能修改。
NOTES: ALL INDICATIVE ALIGNMENTS / LOCATION ARE SUBJECT TO CHANGE.



圖則名稱 drawing title

工務計劃項目第835TH號 - 港珠澳大橋 - 施工前工作
PWP ITEM No. 835TH - HONG KONG-ZHUHAI-MACAO BRIDGE
- PRECONSTRUCTION WORKS

設計 designed T W L I 03/04/08	SIGNED	繪圖 drawn Y L SHIU 17/04/08	SIGNED	圖則編號 drawing no. H2M6835TH-SP0001	比例 scale 不按比例 N.T.S.
覆核 checked W C LAU 28/04/08	SIGNED	批准 approved H C TAM 28/04/08	SIGNED	© 版權所有 COPYRIGHT RESERVED	
港珠澳大橋香港工程管理局 HONG KONG - ZHUHAI - MACAO BRIDGE HONG KONG PROJECT MANAGEMENT OFFICE				HONG KONG 路政署	