For discussion **PWSC(98-99)35**
on 11 November 1998

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 - HIGHWAYS
Transport - Roads
711TH - Route 9 between Tsing Yi and Cheung Sha Wan

Members are invited to recommend to Finance Committee -

(a) to upgrade part of **711TH** to Category A, entitled "Route 9 between Tsing Yi and Cheung Sha Wan - detailed design and associated site investigations", at an estimated cost of $473.5 million in money-of-the-day prices; and

(b) to retain the remainder of **711TH** in Category B.

PROBLEM

The existing capacity of the Cheung Tsing Highway, the Cheung Tsing Tunnel and the Tsing Kwai Highway will not be able to cope with the growing traffic demand by 2006.

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PROPOSAL

2. The Director of Highways, with the support of the Secretary for Transport, proposes to upgrade part of **711TH** to Category A at an estimated cost of $473.5 million in money-of-the-day (MOD) prices to employ consultants to undertake the detailed design of the proposed section of Route 9 between Tsing Yi and Cheung Sha Wan, and to carry out the associated site investigations.

PROJECT SCOPE AND NATURE

3. The scope of works of **711TH** includes -

(a) a 1.2 kilometre 3-lane twin-tube Nam Wan Tunnel at Tsing Yi, south of the Cheung Tsing Tunnel;

(b) about 1.5 kilometres of dual 3-lane highway connecting the western end of Nam Wan Tunnel with Cheung Tsing Highway at the North West Tsing Yi Interchange;

(c) about 4.9 kilometres of dual 3-lane highway connecting the eastern end of Nam Wan Tunnel with the West Kowloon Highway and the Lai Wan Interchange, including the Stonecutters Bridge of about 1,000-metres in span and the Ngong Shuen Chau Viaduct connecting the Stonecutters Bridge with the Lai Wan Interchange;

(d) slip roads connecting Route 9 with the local road networks at Container Terminal Number 8 (CT8) and the proposed Container Terminal Number 9 (CT9); and

(e) the associated environmental mitigation measures, traffic control and surveillance system, electrical and mechanical systems, geotechnical, landscape and drainage works.

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4. The part of the project we now propose to upgrade to Category A comprises -

(a) the detailed design of the works described in paragraph 3 above; and

(b) the associated site investigations.

JUSTIFICATION

5. In 1989, we completed a feasibility study for Route 3 as part of the overall planning for the project. This feasibility study identified a pair of alignments for the section of Route 3 between Tsing Yi and West Kowloon. The study recommended that the first alignment, the CRA1 route, should be built first and that the second alignment, the CRA4 route, should be built at a later date to provide a relief route to meet the long term traffic demands. The first alignment has now been built and comprises the present Cheung Tsing Highway, Cheung Tsing Tunnel and the Tsing Kwai Highway of Route 3. The second alignment passes through the south of Tsing Yi Island to reach Cheung Sha Wan via Stonecutters Island and is now being taken forward under **711TH**.

6. In 1994, we completed the Updating of the Second Comprehensive Transport Study (CTS2-Update). The CTS2-Update confirmed the need for the second alignment to be available between 2007 and 2011. In 1996, we completed the Territorial Development Strategy Review (TDSR) which forecasted a further growth in population for strategic growth areas such as the North West New Territories (NWNT) and Lantau. We expect that this higher growth in population will induce a further increase in the traffic demand between NWNT , Lantau and the urban areas and that the completion date for this project may need to be advanced.

7. The first alignment comprising the Cheung Tsing Highway, the Cheung Tsing Tunnel and the Tsing Kwai Highway was commissioned in 1997 and has provided a fast link between North West Tsing Yi and West Kowloon. The subsequent opening of the Ting Kau Bridge and the Route 3 Country Park Section

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in 1998 has attracted more traffic to use the three highways. The current volume to capacity (V/C)[1] ratio during the morning peak hours at critical sections of these highways is 0.93. According to the TDSR, further phased developments of the Tung Chung / Tai Ho new town and other developments including those in Yuen Long, Tuen Mun and Tin Shui Wai will lead to further growth in traffic demand between NWNT, Lantau and the urban areas in the next eight to ten years and that the section of Route 9 between Tsing Yi and Cheung Sha Wan will need to be built.

8. In October 1998, we completed the detailed feasibility study[2] (the Study) for **711TH**. This Study confirmed that the capacity of the existing Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway will be saturated by 2006 as a result of the population growth forecast in the TDSR and the corresponding increase in traffic demand. The forecast peak hour V/C ratios at critical sections of these highways with or without the proposed section of Route 9 are as below -

	with Route 9	**without Route 9**
year 2006	0.91	1.17
year 2011	1.23[3]	1.41

The Study recommended that the proposed section of Route 9 should be in place by 2006 in order to serve as an alternative route between Tsing Yi and West Kowloon, thus providing traffic relief to the existing highways.

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1 The capacity here refers to the design capacity of a road. A V/C ratio equal to or less than 1.0 means that a road has sufficient capacity to cope with the volume of vehicular traffic under consideration and the resultant traffic will flow smoothly. A V/C ratio above 1.0 indicates the onset of congestion; above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increase in traffic.

2 The detailed feasibility study was started in September 1997. We charged the detailed feasibility study and the associated site investigations at a cost of $12 million to Head 706 Subhead **6100TX** - 'Highway works, studies and investigations for items in Category D of the Public Works Programme'

3 This figure assumes that the Route 10 Hong Kong Lantau Link is not in place. With the Hong Kong Lantau Link to divert some traffic between the NWNT and Hong Kong Island, the v/c ratio here will be reduced to 0.89.

9. In addition to the recommendation to complete the construction of this section of Route 9 by 2006, the Study also recommended a direct connection between Route 9 and the future Route 16[4]. This direct linkage will provide an east-west strategic link between the East New Territories and Lantau. Furthermore, the proposed section of Route 9 will link up the future CT9 and the local road network in West Kowloon. According to the lastest programme for CT9 development, the first berth of CT9 is scheduled to be in operation in 2002 and the full commissioning of the terminal will be in 2004. We estimate that after full commissioning, CT9 will generate additional peak hour traffic of 2600 and 2900 Passenger Car Units[5] (PCUs) per hour in 2006 and 2011 respectively. The proposed link between Route 9 and CT9 will divert some 40% of the CT9 related traffic away from the local road network within the Tsing Yi / Kwai Chung areas and the Duplicate Tsing Yi South Bridge, thus providing additional reserve capacities on these roads.

10. We propose to employ consultants to undertake the detailed design of the project and to supervise the associated site investigations as we do not have the necessary in-house resources and expertise.

FINANCIAL IMPLICATIONS

11. We estimate the total cost of this project to be $473.5 million in MOD prices, made up as follows -

		$ million
(a)	Consultants' fees	258.0

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[4] The project **694TH** - 'Route 16 from West Kowloon to Sha Tin' is in Category B of the Public Works Programme with an estimated cost of $7.65 billion at December 1997 prices. Part of the project is now under the detailed design stage. Construction for Route 16 will commence in 2001 for completion in 2004.

[5] Passenger Car Unit (PCU) is a unit for measuring traffic flow in equivalent number of private cars. For example, a PCU value of 1.0 is assigned to private cars, taxis and light goods vehicles. Heavy vehicles such as heavy goods vehicles or buses which usually travel at a lower speed are assigned higher PCU values.

	(i)	review of findings of previous studies, carrying out detailed design and preparation of plans and tender documents	229.0	
	(ii)	supervision of site investigations and wind tunnel tests	9.0	
	(iii)	Electrical and Mechanical Services Trading Fund (EMSTF) charges	20.0	
(b)	Site investigations		80.0	
(c)	Wind tunnel tests[6]		10.0	
(d)	Contingencies		35.0	
		Sub-total	383.0	(at December 1997 prices)
(e)	Inflation allowance		90.5	
		Total	473.5	(in MOD prices)

A breakdown by man-months of the estimate for consultants' fees is at the Enclosure.

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[6] The proposed Route 9 Stonecutters Bridge has a central span of about 1 000 metres and will be subject to strong wind loads. The wind resistance of this type of long span bridge is an important element for consideration in its design. The use of wind tunnel tests is currently the most effective method of analysing the wind loads and aerodynamic effects of long span bridges.

12. Subject to approval, we will phase the expenditure as follows -

Year	$ million (Dec 1997)	Price adjustment factor	$ million (MOD)
1998 - 1999	3.8	1.06000	4.0
1999 - 2000	60.0	1.12890	67.7
2000 - 2001	112.7	1.19663	134.9
2001 - 2002	142.5	1.26843	180.8
2002 - 2003	64.0	1.34454	86.1
	383.0		473.5

13. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 1998 to 2003. We will employ consultants on a lump sum basis with provision for inflation adjustments, as the duration of the detailed design will exceed 12 months. The consultants will supervise the site investigation works under contracts to be awarded through the normal competitive tendering process.

14. The proposed consultancy will not give rise to any annually recurrent financial implications.

PUBLIC CONSULTATION

15. We presented the major findings of the Study to the Sham Shui Po Provisional District Board (SSPPDB) and the Kwai Tsing Provisional District Boards (KTPDB) on 4 June 1998 and 9 July 1998 respectively. Both district boards supported the project. On the request of SSPPDB, we have modified the

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connection between the proposed Route 9 and the southbound carriageway of West Kowloon Highway to avoid encroaching on a site designated to be used as a regional stadium. The SSPPDB also requested for further consultation on the detailed findings of the traffic impact assessment and environmental impact assessment pertaining to the project. The KTPDB requested us to look into further connections between the expressway and the local roads at Cheung Sha Wan. The Board also expressed concern about the impact of additional traffic noise caused by the expressway on local residents and the impact of the nearby oil depots to road users. We will take into account their requests and concerns in the detailed design. We will further consult the two district boards on the detailed road layout of the project, including the traffic and environmental aspects and the risks of the oil depots to road users before gazetting the project under the Roads (Works, Use and Compensation) Ordinance in late 1999.

ENVIRONMENTAL IMPLICATIONS

16. The proposed consultancy and site investigations will not have any adverse environmental implications as we will control short term impacts to within the established standards and guidelines through pollution control clauses in the site investigation contract. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and an environmental permit is required for the construction and operation of the project. We are in the process of finalising the EIA to identify, predict and assess the potential environmental impacts arising from the project. The EIA report will recommend the necessary environmental mitigation measures during the construction and operation phases of the project to control the impacts to within the established standards. We will consult the Advisory Council on the Environment on the environmental aspects of the project. We will review the findings of the EIA at the initial stage of the detailed design consultancy when we have produced the detailed road layout of the project. Subject to the review of the EIA and further consultations required, we will incorporate the recommended mitigation measures in the detailed design. We will submit the EIA report for the Director of Environmental Protection's approval under the EIA Ordinance and obtain an environmental permit prior to construction.

LAND ACQUISITION

17. The proposed detailed design and site investigations do not require any land acquisition.

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BACKGROUND INFORMATION

18. We upgraded **711TH** to Category B in August 1997.

19. We plan to start the detailed design as soon as practicable after funding approval, in any case not later than February 1999. The design will take some 36 months inclusive from start to finish. We aim to complete the design by February 2002. We plan to commence construction in mid 2002 for completion in late 2006.

Transport Bureau
November 1998
(PWSC0030/WIN1)

Enclosure to PWSC(98-99)35

711TH - Route 9 between Tsing Yi and Cheung Sha Wan

Breakdown of estimates for consultants' fees and site investigation costs (at December 1997 prices)

			Estimated man-months	Average MPS* salary point	Multiplier factor	Estimated fee ($ million)
Consultants' staff costs						
(a)	Review (including review of EIA & TIA findings)	Professional	140	40	3.0	24.9
		Technical	140	16	3.0	8.3
(b)	Detailed design	Professional	550	40	3.0	97.7
		Technical	1070	16	3.0	63.7
(c)	Preparation of tender documents	Professional	140	40	3.0	24.9
		Technical	160	16	3.0	9.5
(d)	Supervision of site investigations/wind tunnel tests	Professional	45	40	2.1	5.6
		Technical	81	16	2.1	3.4
(e)	Charges by EMSTF					20.0
			Total consultants' staff costs			258.0
Out-of-pocket expenses						
(a)	Site investigations					80.0
(b)	Wind tunnel tests					10.0
			Total out-of-pocket expenses			90.0

* MPS = Master Pay Scale

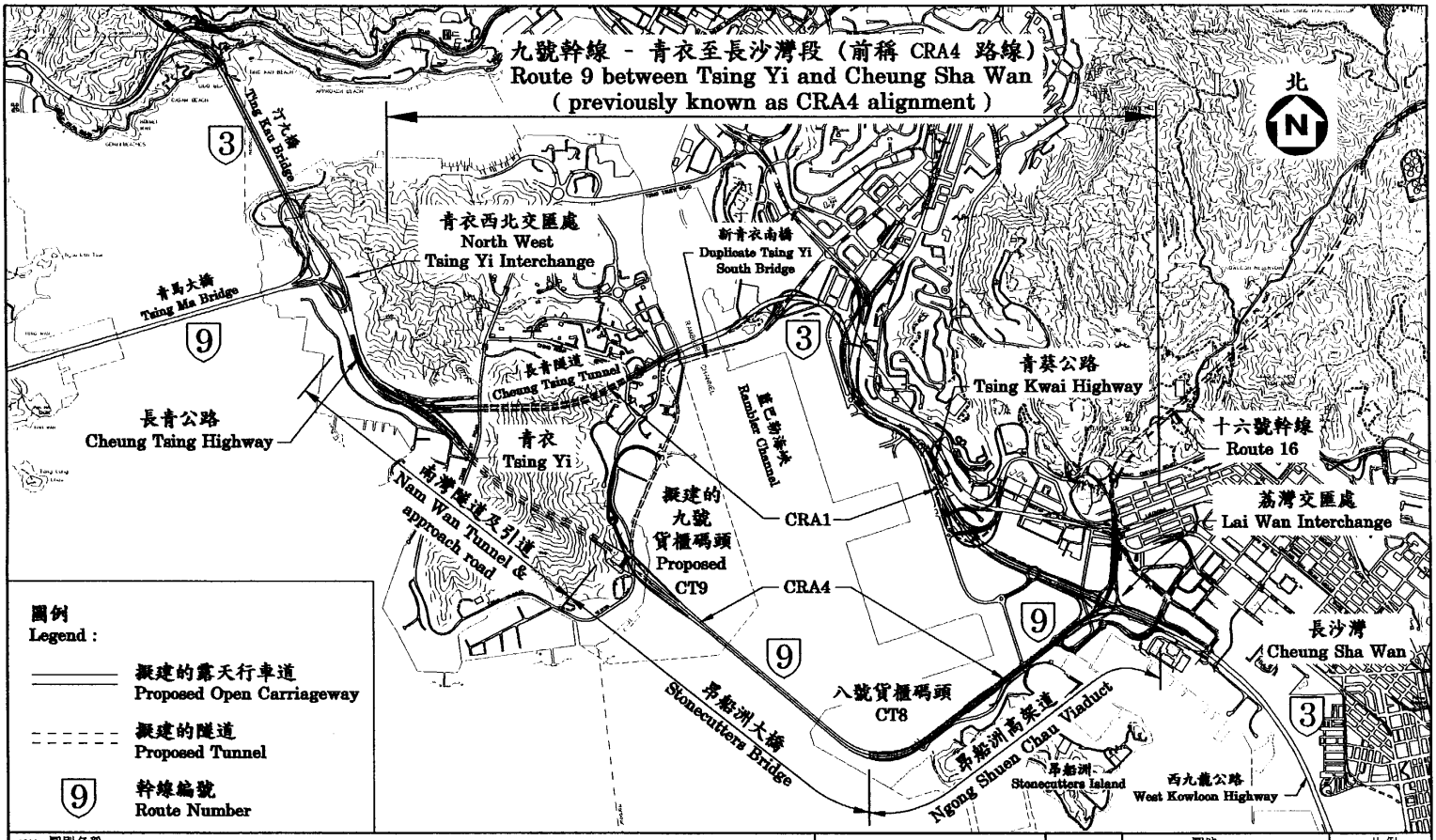
Notes

1. A multiplier factor of 3 is applied to the average Master Pay Scale (MPS) point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. (As at 1.4.97, MPS pt. 40 = $59,210 p.m., and MPS pt. 16 = $19,860 p.m.) A multiplier factor of 2.1 is applied in the case of site staff supplied by the consultants.

2. Out-of-pocket expenses are the actual costs incurred. The consultants are not entitled to any additional payment for overheads or profits in respect of these items.

3. The figures given above are based on estimates prepared by the Director of Highways. We will only know the actual man months and fees when we have selected the consultant through the usual competitive fee bidding system.

4. Since the establishment of the EMSTF on 1 August 1996 under the Trading Fund Ordinance, government departments are charged for design and technical consultancy services for electrical and mechanical (E&M) installations provided by Electrical and Mechanical Services Department (EMSD). The services rendered for this project include checking consultants' submissions on all E&M installations and providing technical advice to Government on all E&M works and their impacts on the project.



title 圖則名稱

九號幹線 - 青衣至長沙灣段
Route 9 between Tsing Yi and Cheung Sha Wan

drawn by: P. S. LAM	date: 14-10-1998	drawing no. 圖號: PMH6711/1PS/003	scale 比例: 不按比例 N. T. S
approved by:	date:		

office 辦事處 主要工程管理處
Major Works
Project Management Office

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