For discussion **PWSC(2002-03)31**
on 22 May 2002

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

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

Members are invited to recommend to Finance Committee the upgrading of **711TH** to Category A at an estimated cost of $7,468.2 million in money-of-the-day prices.

PROBLEM

The existing capacity of Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway will not be able to cope with the growing traffic demand by 2007.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for Transport, proposes to upgrade **711TH** to Category A at an estimated cost of $7,468.2 million in money-of-the-day (MOD) prices for the construction of the remaining works of Route 9 between Tsing Yi and Cheung Sha Wan (Route 9-TYCSW).

PROJECT SCOPE AND NATURE

3. The scope of **711TH** includes –

/(a) .....

(a) construction of a dual three-lane West Tsing Yi Viaduct (WTYV) of about 1.5 kilometres (km) connecting Cheung Tsing Highway at the North West Tsing Yi Interchange with Nam Wan Tunnel (NWT);

(b) construction of a 1.2-km three-lane twin-tube NWT at Tsing Yi;

(c) construction of a dual three-lane East Tsing Yi Viaduct (ETYV) of about 1.1 km connecting NWT with Stonecutters Bridge (SCB) ;

(d) construction of a 1.6-km dual three-lane SCB which is a cable-stayed bridge with a span of about one km connecting ETYV with Ngong Shuen Chau Viaduct (NSCV) and an associated look-out point and exhibition centre (LOP&EC);

(e) slip roads connecting Route 9-TYCSW with the local road network at the future Container Terminal 9 (CT9) in Tsing Yi;

(f) construction of some 260 metres of seven-metre high noise barriers along a slip road to the future CT9 and low noise road surfacing on all the new roads as appropriate; and

(g) associated buildings, traffic control and surveillance system, electrical and mechanical systems, geotechnical, landscape, roads and drainage works.

A site plan and typical sections of the remaining works of Route 9-TYCSW are at Enclosures 1 and 2 respectively.

4. We have substantially completed the detailed design and working drawings for the works of **711TH**. We plan to invite tenders in August 2002 and commence construction works in February 2003 for completion in December 2007.

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JUSTIFICATION

5. Route 9 is a trunk road linking Lantau and Sha Tin via Tsing Yi and West Kowloon. Its main components include the North Lantau Highway and the Lantau Link completed in 1997, Route 9-TYCSW and another section of Route 9 between Cheung Sha Wan and Sha Tin (Route 9-CSWST) which is currently in Category B of the Public Works Programme under **694TH**[1]. After completion of these two sections, Route 9 will provide a direct route between the airport at Chek Lap Kok to North East New Territories. It will also connect the Lantau Link with the West Kowloon Highway at Cheung Sha Wan and provide direct access to the future CT9 and other existing container terminals without going through the Tsing Yi local road network.

6. Geographically, the alignment of Route 9 intersects with that of Route 3 at Tsing Yi and Cheung Sha Wan. Route 3 is a trunk road linking North West New Territories (NWNT) and Hong Kong Island via Tai Lam Tunnel, Tsing Yi, Kwai Chung and West Kowloon. The section of Route 3 serving the Tsing Yi and West Kowloon areas (comprising Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway) has become a fast link between North West Tsing Yi and West Kowloon since its commissioning in 1997. The subsequent opening of the Ting Kau Bridge and Route 3 (Country Park Section) in 1998 has led to further traffic between NWNT and West Kowloon using these three highways/tunnel. Currently, these critical sections of Route 3 are operating near capacity during the morning peak period, with a traffic volume to capacity (V/C) ratio[2] of 0.9. The situation will deteriorate with the accommodation of the planned population in North Lantau and NWNT.

7. The Territory Development Strategic Review of 1996 recommended the phased developments of the Tung Chung/Tai Ho new towns and other developments including those in Yuen Long, Tuen Mun and Tin Shui Wai. Such developments would lead to further growth in traffic demand between NWNT, Lantau and the urban areas in the next decade.

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[1] **694TH** "Route 9 between Cheung Sha Wan and Sha Tin" is in Category B of the Public Works Programme, with an estimated cost of about $6.9 billion in September 2001 prices. Part of the project was partially upgraded to Category A in November 2001 as **670TH** with an approved project estimate of $45.7 million in MOD prices for entrustment of the construction of ten piers of a section of the Che Kung Miu Road Slip Roads to Kowloon-Canton Railway Corporation. A separate submission is made under PWSC(2002-03)30 for upgrading **694TH** to Category A. We plan to commence construction of **694TH** in October 2002 for completion in April 2007.

[2] Volume to capacity (V/C) ratio is an indicator which reflects the performance 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; that above 1.2 indicates more serious congestion with traffic speeds progressively deteriorating with further increase in traffic.

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8. In 2000, we completed a traffic impact assessment study for Route 9-TYCSW. The study confirmed that Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway would all reach saturation by 2007, and would operate beyond capacity by 2011. According to the Strategic Highway Project Review carried out in March 2002, the performance of these highways/tunnel, represented by the projected V/C ratios in critical sections during peak hours, with or without Route 9-TYCSW, are as follows -

Year / Section of Highway	2002	2007		2011		2016	
	Without	Without	With	Without	With	Without	With
Route 3 – section comprising Cheung Tsing Highway, Cheung Tsing Tunnel and Tsing Kwai Highway	0.9	1.0	0.7	1.1	0.8	1.2	0.9
Route 9-TYCSW	-	-	0.6	-	0.7	-	0.8

9. With SCB's prominent location at the entrance to one of the world's busiest container ports and the stunning backdrop of the Hong Kong Island skyline, we consider it worthwhile to provide the public and tourists a vantage point to view the outstanding aesthetic features of the bridge. We therefore propose to provide the LOP&EC for this purpose. Similar look-out point has been provided for Tsing Ma Bridge and from this experience, we believe these facilities could become popular attraction points for both the public and tourists.

FINANCIAL IMPLICATIONS

10. We estimate the cost of this project to be $7,468.2 million in MOD prices, made up as follows –

		$ million
(a)	Roads and drains of about 1.6 km	281.7
(b)	SCB and the associated LOP&EC	3,217.9

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(c)	Elevated highway structures		1,272.4
	(i) East Tsing Yi Viaduct	957.6	
	(ii) West Tsing Yi Viaduct	314.8	
(d)	Nam Wan Tunnel		927.1
(e)	Environmental mitigation measures		10.2
	(i) noise barriers	4.7	
	(ii) low noise road surfacing	5.5	
(f)	Landscaping works		13.2
(g)	Electrical and mechanical works		370.8
(h)	Overseas duty visits[3]		0.3
(i)	Consultants' fees		869.2
	(i) supervision of construction and administration of contract	128.3	
	(ii) site staff costs	696.0	

/(iii) …..

[3] The duty visits are associated with SCB and these duty visits are required to ensure that overseas acceptance tests for some specialised components of the bridge and steel bridge deck fabrication process for this important structure are properly done. The cost is estimated based on eight officers each attending a one-week visit over a span of a four and a half years' construction period. The costs of air passage, subsistence allowances, etc. are subject to the relevant provisions in the Civil Service Regulations.

	(iii)	Environmental monitoring and audit[4] (EM&A) programme	24.9	
	(iv)	Electrical and Mechanical Services Trading Fund (EMSTF) charges	20.0	
(j)	Contingencies		628.5	
		Sub-total	7,591.3	(in September 2001 prices)
(k)	Provision for price adjustment		(123.1)	
		Total:	7,468.2	(in MOD prices)

A breakdown by man-months of the estimates for consultants' fees is at Enclosure 3.

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

Year	$ million (Sep 2001)	Price Adjustment Factor	$ million (MOD)
2003 – 2004	541.0	0.98378	532.2
2004 – 2005	1,311.1	0.98378	1,289.8
2005 – 2006	1,931.2	0.98378	1,899.9
2006 – 2007	2,077.0	0.98378	2,043.3
2007 – 2008	1,346.0	0.98378	1,324.2

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[4] We will engage consultants to implement an environmental monitoring and audit (EM&A) programme for the project at an estimated cost of $24.9 million to ensure timely and effective implementation of the recommended mitigation measures for the project.

2008 – 2009	385.0	0.98378	378.8
	7,591.3		7,468.2

12. We have derived the MOD estimate on the basis of the Government's latest forecast of trend labour and construction prices for the period 2003 to 2009. We will tender the proposed works under standard re-measurement contracts because the works involve extensive foundation and tunnelling works, the quantities of which may vary according to actual ground conditions. The contracts will provide for price adjustments as the construction period will exceed 21 months.

13. We estimate the annual recurrent expenditure arising from the project to be $33.2 million.

PUBLIC CONSULTATION

14. We presented the major findings of the detailed feasibility study for Route 9-TYCSW[5] to the then Sham Shui Po Provisional District Board (SSPPDB) and the then Kwai Tsing Provisional District Board (KTPDB) in June and July 1998 respectively. Both Provisional District Boards recommended the provision of connections between the local road network and Route 9-TYCSW, wherever possible. In response to this suggestion, we have offered to provide additional access ramps between Route 9-TYCSW and the local road networks in the Tsing Yi and Stonecutters Island areas. As a result, traffic in these two areas will have direct access, via Route 9-TYCSW, to and from Kowloon, NWNT and Lantau Island.

15. We consulted the two Provisional District Boards again in August and September 1999 respectively on the refined layout of the Route 9-TYCSW. Both Provisional District Boards supported the project.

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[5] We engaged consultants to undertake a detailed feasibility study and the associated site investigations of the project at an estimated cost of $12 million in MOD prices under **Subhead 6100TX** "Highway works, studies and investigations for items in Category D of the Public Works Programme". The detailed feasibility study was completed in October 1998.

16. We presented to the Kwai Tsing and Sham Shui Po District Councils in March 2002 and April 2002 the latest development of Route 9-TYCSW. Both the District Councils supported the project.

17. We gazetted the road scheme for Route 9-TYCSW under the Roads (Works, Use and Compensation) Ordinance on 20 April 2000. We received one objection from the owner of Tsing Yi Town Lot No.128 on the ground that the construction works might disrupt his operations and the proposed roads would produce adverse visual impact. We clarified with the objector that the construction works, which would be carried out at bridge deck level (about some 40 metres above ground level) and in restricted hours, would not disrupt his operations at ground level. We also demonstrated to the objector through the use of photomontages that the visual impact of the bridge to his property would not be significant. The objector withdrew the objection unconditionally. Accordingly, the Secretary for Transport authorised the road scheme of Route 9-TYCSW under section 11(a) of the Roads (Works, Use and Compensation) Ordinance on 11 September 2000.

18. We consulted the Legislative Council Panel on Transport on 7 May 2001. Panel Members supported the project and requested additional information on the updated cost breakdown, contract packages, traffic forecast and detailed noise assessment of Route 9-TYCSW. Members also requested supplementary information for Route 9-CSWST, including the details of objections received and tolling strategy. We issued a supplementary paper on 31 May 2001 providing the above information.

ENVIRONMENTAL IMPLICATIONS

19. The project is a designated project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance and an Environmental Permit is required for its construction and operation. Upon the endorsement of the Advisory Committee on Environment on 27 September 1999, the Director of Environmental Protection (DEP) approved the EIA report for the project under the EIA Ordinance on 19 October 1999. We then slightly modified the road scheme to take into account the two Provisional District Boards' suggestion to improve the connection arrangement between Route 9-TYCSW and the local road network. DEP approved the supplementary EIA information on the modified scheme on 21 January 2000. DEP issued the Environmental Permit on 28 December 2000.

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20. The EIA report together with the supplementary EIA information concludes that the environmental impacts of the project can be controlled to within the established criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. We shall implement the environmental measures as recommended in the approved EIA report, the approved EM&A Manual, the supplementary EIA information and the Conditions stipulated in the Environmental Permit.

21. The key environmental measures include the provision of low noise road surfacing on all the new roads as appropriate and the installation of seven-metre high noise barriers on a section of a slip road in Tsing Yi for the protection of nearby noise sensitive receivers. These will bring about a reduction of traffic noise by three to five dB(A) at critical locations and will help to contain the noise level to an acceptable standard. An assessment on air quality impact on the surrounding environment due to traffic emissions from Route 9-TYCSW and the surrounding roads also concludes that the Air Quality Objectives as stipulated in the Air Pollution Control Ordinance at existing or planned air sensitive receivers will not be exceeded.

22. During the construction stage, we will control noise, dust and site surface water run-off nuisance through appropriate mitigation measures specified in the works contracts. We will implement an EM&A programme as stipulated in the EM&A Manual during the course of construction and operation to ensure that proactive mitigation measures are in place.

23. We estimate that about 834 300 cubic metres (m^3) of construction and demolition (C&D) materials will be generated by the project. Of these, we will reuse about 141 500 m^3 (17.0%) on site, about 183 000 m^3 (21.9%) for seawall construction in other works projects, about 250 100 m^3 (30.0%) as fill in public filling areas[6], dispose of about 246 200 m^3 (29.5%) to commercial quarries, and about 13 500 m^3 (1.6%) at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be $1.69 million for this project (based on a notional[7] unit cost of $125/$m^3$).

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[6] A public filling area is a designated part of a development project that accepts public fill for reclamation purpose. Disposal of public fill in a public filling area requires a license issued by the Director of Civil Engineering.

24. We shall require the contractors to submit waste management plans (WMPs) for approval. The WMP shall include appropriate mitigation measures such as the identification of a designated area for waste segregation prior to disposal. We shall ensure that the day-to-day operations on site comply with the approved WMP. We shall also require the contractors to use steel instead of timber for formwork and temporary work as far as practicable to further minimise the generation of waste. We shall control the disposal of the C&D materials through a trip-ticket system. We shall record the disposal, reuse and recycling of the C&D materials for monitoring purposes. We will maximize the use of recycled aggregates and rock products in the permanent works.

LAND ACQUISITION

25. We will resume about 1 942.5 square metres (m^2) of private agricultural land in Tsing Yi. We will also require creation of about 583 m^2 of easement and permanent rights and 2 273 m^2 of temporary occupation in Tsing Yi. We will charge the land acquisition and clearance costs, estimated at $19 million in September 2001 prices, to **Head 701** "Land Acquisition" **Subhead 1100CA** "Compensation and ex-gratia allowances in respect of projects in the Public Works Programme".

BACKGROUND INFORMATION

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

27. We upgraded part of **711TH** to Category A as **734TH** "Route 9 between Tsing Yi and Cheung Sha Wan – detailed design and the associated site investigations" in December 1998 with an approved project estimate of $473.5 million in MOD prices. We engaged consultants to undertake the detailed design in February 1999 and March 2001 and employed contractors to carry out site investigation works in June 1999 and September 2001.

28. We upgraded part of **711TH** to Category A as **757TH** "Route 9 between Tsing Yi and Cheung Sha Wan – Ngong Shuen Chau Viaduct and the associated works", in July 2001 with an approved project estimate of $3,650.0 million in MOD prices and appointed a contractor to undertake the construction of NSCV in April 2002 for completion in December 2006.

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29. We have substantially completed the detailed design and working drawings for the remaining part of Route 9-TYCSW. We plan to commence the construction works in February 2003 for completion in December 2007.

30. To minimise disruption to traffic, we will carry out temporary traffic diversion arrangements as and when required. We will consult the relevant District Councils on major temporary traffic diversion arrangements before implementation.

31. We estimate that this project will create some 2 600 jobs comprising 430 professional/technical staff and 2 170 labourers, totalling 112 300 man-months.

Transport Bureau
May 2002

711TH – Route 9 between Tsing Yi and Cheung Sha Wan – remaining works

Breakdown of estimates for consultants' fees (in September 2001 prices)

Consultants' staff costs		**Estimated man-Months**	**Average MPS* salary point**	**Multiplier**	**Estimated fee ($ million)**
(a) Consultants' fees for					
(i) Supervision of construction and administration of contract	Professional	632	38	2.4	91.6
	Technical	784	14	2.4	36.7
(ii) Resident site staff	Professional	4 171	38	1.7	428.2
	Technical	8 074	14	1.7	267.8
(iii) EM&A programme	Professional	72	38	2.4	10.4
	Technical	309	14	2.4	14.5
				Sub-total	849.2
(iv) EMSTF charges					20.0
				Total	869.2

*MPS = Master Pay Scale

Notes

1. A multiplier of 2.4 is applied to the average 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. A multiplier of 1.7 is applied to the average MPS point in the case of resident site staff supplied by the consultants. (As at 1.4.2001, MPS pt. 38 = $60,395 per month, and MPS pt. 14 = $19,510 per month)

2. The consultants' fees for construction stage are estimated and will be controlled in accordance with the terms stipulated in Agreement No. CE 72/98 entitled "Design and Construction Assignments for Route 9 between Tsing Yi and Cheung Sha Wan" and Agreement No. CE 61/2000 entitled "Stonecutters Bridge Design and Construction Assignment". They also include costs to cover those for employing resident site staff and additional consultants for providing specialised management services during the construction stage.

3. 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.