

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS

Transport – Roads

721TH – Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange

Members are invited to recommend to Finance Committee the upgrading of **721TH** to Category A at an estimated cost of \$931.0 million in money-of-the-day prices for the widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange.

PROBLEM

The capacity of the existing Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange (Yuen Long Highway-LTSPH) is insufficient to cope with the future traffic demand generated from the North West New Territories (NWNT) and the cross-boundary traffic.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **721TH** to Category A at an estimated cost of \$931.0 million in money-of-the-day (MOD) prices for the widening of Yuen Long Highway-LTSPH.

PROJECT SCOPE AND NATURE

3. The scope of **721TH** comprises -

/(a)

- (a) widening of 6.8-kilometre (km) long Yuen Long Highway-LTSPH from a dual two-lane to a dual three-lane carriageway with provision of hard shoulder;
- (b) modification of the existing Tin Shui Wai West Interchange and Tong Yan San Tsuen Interchange and the associated slip roads affected by the proposed road widening;
- (c) extension of existing highway structures affected by the proposed road widening including vehicular bridges, vehicular underpasses, pedestrian subways and culverts;
- (d) installation of 11.6-km long noise barriers ranging from two to 7.3 metres high and provision of noise reducing road surfacing; and
- (e) associated works including road rehabilitation, geotechnical, drainage, lighting, landscaping and a closed circuit television (CCTV) system.

A site plan is at Enclosure 1.

4. We have substantially completed the detailed design and working drawings for the project. We plan to invite tenders in February 2003 and commence construction of **721TH** in August 2003 for completion in December 2005.

JUSTIFICATION

5. The Yuen Long Highway-LTSPH is a 6.8-km long dual two-lane carriageway. It connects Tuen Mun and Yuen Long in the NWNT and forms part of the major road network serving Tin Shui Wai.

6. With the committed and future developments in NWNT, we project that the population in the region will increase from about 1.1 million in 2006 to about 1.4 million in 2016. We also forecast that the daily cross-boundary traffic will grow from 65 100 vehicles in 2006 to 117 300 vehicles in 2016 which would bring about an increase in traffic flow in Yuen Long Highway as some 40% of the

/vehicles

vehicles in the widened Yuen Long Highway will be cross-boundary traffic. In addition, with the proposed construction of the fourth boundary crossing at Deep Bay (i.e. the Shenzhen Western Corridor), we expect further traffic pressure on the Yuen Long Highway from the Shenzhen Western Corridor (SWC)¹ and the Deep Bay Link (DBL)² at the new interchange at Lam Tei. The proposed road widening is necessary to cope with the increasing traffic demand generated from the population growth in the NWNT and the increase in the cross-boundary traffic.

7. At present, the Yuen Long Highway-LTSPH is already operating near its capacity. The projected traffic volume to capacity (V/C)³ ratios during peak hours in 2002, 2006, 2011 and 2016, with and without the proposed road widening, are as follows –

V/C Ratio of the Yuen Long Highway		Year			
		2002	2006	2011	2016
At Shap Pat Heung Interchange	with the proposed road widening works	-	0.81	0.90	1.01
	without the proposed road widening works	0.90	1.21	1.34	1.51
At the new interchange at Lam Tei	with the proposed road widening works	-	0.79	0.86	0.96
	without the proposed road widening works	-	1.18	1.28	1.43

/8.

¹ **759TH** “Shenzhen Western Corridor” was part upgraded to Category A in March 2002 as **772TH** “Shenzhen Western Corridor – detailed design and associated site investigations” at an estimated cost of \$66.1 million in MOD prices. We will make a separate submission at the same meeting under PWSC(2002-03)80 for upgrading **759TH** to Category A for the construction of Shenzhen Western Corridor.

² **736TH** “Deep Bay Link” was part upgraded to Category A in March 2002 as **773TH** “Deep Bay Link – detailed design and associated site investigations” at an estimated cost of \$87.7 million in MOD prices. We will make a separate submission at the same meeting under PWSC(2002-03)80 for upgrading **736TH** to Category A for the construction of Deep Bay Link.

³ 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 deteriorating progressively with further increase in traffic.

8. In order to meet the traffic demand up to 2016, we propose to widen Yuen Long Highway-LTSPH from a dual two-lane to a dual three-lane carriageway. In connection with the road widening, we have to extend the existing highway structures including the vehicular bridges and underpasses, pedestrian subways and culverts.

9. As a result of the road widening works and the anticipated increase in traffic flow, the residents along the widened highway will be exposed to noise levels higher than the standards stipulated in the Hong Kong Planning Standards and Guidelines. We will install noise barriers of 11.6 km in length for the existing and planned developments to mitigate the road traffic noise to within the acceptable levels. A location plan for the proposed noise barriers is at Enclosure 2.

FINANCIAL IMPLICATIONS

10. We estimate the cost of the project to be \$931.0 million in MOD prices (see paragraph 11 below), made up as follows -

	\$ million
(a) Road and drains	273.1
(b) Earthworks and retaining walls	111.0
(c) Structural works	89.7
(d) Noise mitigation measures	304.9
(i) noise barriers	301.0 ⁴
(ii) noise-reducing road surfacing	3.9
(e) Landscaping works	4.4
(f) Consultants' fees	77.9

/(i)

⁴ Out of the estimated cost of \$301.0 million, provisions for noise barriers for existing and planned developments are estimated to be \$280.0 million and \$21.0 million respectively.

		\$ million	
(i)	construction supervision and contract administration	9.2	
(ii)	site staff costs	63.9	
(iii)	environmental monitoring and audit (EM&A) programme ⁵	4.7	
(iv)	Electrical and Mechanical Services Trading Fund (EMSTF) charges ⁶	0.1	
(g)	Contingencies	77.0	
	Sub-total	938.0	(in September 2002 prices)
(h)	Provision for price adjustment	(7.0)	
	Total:	931.0	(in MOD prices)

Paragraph 10(a) above covers road and drainage works including road pavements, street furniture, traffic signs and road marking, profile barriers, sign gantries, drainage, temporary traffic management measures, and contract preliminaries.

/Paragraph

⁵ We will engage consultants to implement an EM&A programme at an estimated cost of \$4.7 million to ensure timely and effective implementation of the recommended mitigation measures for the project.

⁶ Since the establishment on 1 August 1996 under the Trading Funds Ordinance, the EMSTF charges government departments for design and technical consultancy services for electrical and mechanical (E&M) installations provided by the Electrical and Mechanical Services Department (EMSD). The services rendered for this project include checking consultants' submission on all E&M installations and providing technical advice to the Government on all E&M works and their impacts on the project from maintenance and general operation points of view.

Paragraph 10(b) covers slope cutting, embankment filling and retaining wall works. A breakdown of the estimates for paragraph 10(f) above on consultants' fees is at Enclosure 3.

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

Year	\$ million (Sep 2002)	Price Adjustment Factor	\$ million (MOD)
2003 – 2004	54.2	0.99250	53.8
2004 – 2005	324.6	0.99250	322.2
2005 – 2006	455.1	0.99250	451.7
2006 – 2007	69.0	0.99250	68.5
2007 – 2008	12.2	0.99250	12.1
Beyond 2008 ⁷	22.9	0.99250	22.7
	938.0		931.0

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 2008. We will tender the proposed works under two remeasurement contracts because the quantities of foundation and earthworks are subject to variations due to actual ground condition. We will allow for price adjustments in the contracts as the construction period will exceed 21 months.

13. We estimate the annual recurrent expenditure arising from this project to be \$11.8 million.

/PUBLIC

⁷ Expenditure beyond 2008 is for provision of those noise barriers (inclusive of contingencies) which will be phased in to tie in with the planned developments they are intended to serve.

PUBLIC CONSULTATION

14. We consulted the Tuen Mun Rural Committee on 15 July 1999, the Ping Shan Rural Committee on 2 November 1999 and the Shap Pat Heung Rural Committee on 5 November 1999. We also consulted the Yuen Long District Council on 2 February 2000 and Tuen Mun District Council on 7 March 2000. All parties supported the project.

15. We gazetted the proposed road widening works under the Roads (Works, Use and Compensation) Ordinance (RO) in two sections, namely, the section from Tan Kwai Tsuen to Shap Pat Heung Interchange and the section from Lam Tei to Tan Kwai Tsuen. This is due to the close interface of the second section with the proposed DBL at Lam Tei. We gazetted the section from Tan Kwai Tsuen to Shap Pat Heung Interchange on 21 December 2001 and received three objections, two of which remained unresolved. Details of the objections are as follows -

- (a) one objector was concerned about the traffic noise nuisance to Lam Hau Tsuen and the potential hazard of objects falling from Yuen Long Highway. We explained to the objector that we had included a four-metre high noise barrier in our proposed works to mitigate the traffic noise in accordance with the Environmental Impact Assessment (EIA) Study. We agreed to add a four-metre high safety barrier at the road section concerned to barricade errant fall of objects. The objector maintained his objection;
- (b) one objector requested the Administration to shift the widened road away from his ancestor's grave. We revised our design to meet his request. The objector withdrew his objection subject to the agreed modifications; and
- (c) one objector requested the Administration to add a new road to connect Shap Pat Heung Interchange with Tsing Long Highway and make provision for the widened Yuen Long Highway-LTSPH to be easily widened to a dual four-lane carriageway. We explained that the existing Pok Oi Flyover and the Shap Pat Heung Interchange Underpass commissioned

in May 2002 had provided the Yuen Long Highway-LTSPH and Tsing Long Highway a through road connection allowing the traffic to by-pass the roundabouts at Pok Oi Interchange and Shap Pat Heung Interchange. We also explained to the objector that a dual three-lane Yuen Long Highway-LTSPH is adequate to meet the traffic demand up to year 2016. The objector maintained his objection.

16. We gazetted the second section from Lam Tei to Tan Kwai Tsuen together with the DBL project under the RO on 15 March 2002. We received four objections which could not be resolved. All objectors were concerned about the environmental impacts of the project. Two of them specifically requested the Administration to delete the road widening works fronting To Yuen Wai and increase the height of the proposed noise barriers thereat from three to five metres high. We explained to them the need of widening the road section concerned and that the future traffic noise would be reduced to within acceptable levels by installation of the three-metre high noise barrier. However, the objectors maintained their objections.

17. Having considered the unresolved objections and the proposed modifications to the project, the Chief Executive-in-Council authorised the proposed works from Lam Tei to Tan Kwai Tsuen on 26 November 2002 and the proposed works from Tan Kwai Tsuen to Shap Pat Heung Interchange on 17 December 2002.

18. We consulted the LegCo Panel on Transport on 20 December 2002. Members supported the project in general though there were concerns about the provision of noise barriers and some local traffic issues. We issued a supplementary Information Paper on 4 January 2003 providing information to the issues of concern.

ENVIRONMENTAL IMPLICATIONS

19. The project is a designated project under Schedule 2 of the EIA Ordinance (Cap. 499). We completed the EIA study for the project in October 2001. The Advisory Council on the Environment endorsed the EIA report in February 2002. The Director of Environmental Protection (DEP) approved the

/EIA

EIA report on 22 May 2002 and issued the environmental permit on 24 June 2002. The EIA report concluded that the environmental impact of the project can be controlled to within the criteria under the EIA Ordinance and the Technical Memorandum on EIA Process. We shall implement the measures recommended in the approved EIA report and the conditions specified in the environmental permit.

20. The key environmental concerns are traffic noise arising from the operation of the widened highway and tree felling. The EIA Study identified that both the existing and planned developments alongside the widened Yuen Long Highway-LTSPH would be exposed to excessive traffic noise. We will install noise barriers of about 11.6 km in length in order to mitigate the traffic noise arising from the widened highway to within established standards. A package of noise barriers comprising five vertical types from two to six metres high, and two cantilever types of 5.5 metres vertical with 1.5-metre and 2.5-metre bends in 45 degrees was proposed.

21. The noise barriers are of transparent type. Drawings showing the preliminary design of the noise barriers are at Enclosure 4. With these mitigation measures in place, noise exceedance at about 2 300 existing dwellings at Fu Tai Estate, Yuen Long Town Lot 500, Town Park Road South, Tong Yan San Tsuen and Fui Sha Wai and 3 500 planned dwellings would be mitigated to within the statutory levels. The timing of provision of the barriers for the planned developments will phase in with such developments. Including those dwellings which will be indirectly benefitted from these mitigation measures, we estimate that a total of about 16 000 existing dwellings and about 6 450 planned dwellings along the highway corridor will benefit from the provision of the noise barriers. The average cost of providing noise barriers per dwelling is estimated to be about \$13,400. We will consult the District Councils concerned on the design of the barriers.

22. Of the existing 4 900 trees within the project limit, we will retain 380, transplant 100 and fell the remaining 4 420 trees. We will replant approximately 7 800 trees and shrubs to compensate for the tree loss. We shall also implement dust suppression measures, on-site movable barriers and the use of quiet plant to control dust and noise impact during construction to within acceptable standards.

23. At the planning and design stages, we have considered ways of minimising the generation of construction and demolition (C&D) materials. We have minimised the rock generation to 40 000 cubic metres (m³) by shifting the highway alignment away from the existing rock slope. We will reuse the existing concrete profile barriers of some 14.4 km in length. We estimate the project will generate about 59 000 m³ of C&D materials. Of these, we will reuse about 50 000 m³ (85%), about 8 000 m³ (13%) as fill in public filling areas⁸ and dispose of about 1 000 m³ (2%) C&D waste at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$125,000 for this project (based on a notional⁹ unit cost of \$125/m³).

24. We will require the contractor to submit a waste management plan (WMP) for approval. The WMP will include appropriate mitigation measures to avoid, reuse, and recycle the C&D materials. We will require the contractor to ensure that the day-to-day operations on site comply with the approved WMP. We will control the disposal of C&D materials to designated public filling facilities and landfills through a trip-ticket system. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. To further minimise the generation of C&D materials, we will encourage the contractor to use non-timber formwork and recyclable materials for temporary works. We will also maximise the use of recycled aggregates and rock products in the permanent works.

LAND ACQUISITION

25. The proposed works do not require land resumption.

BACKGROUND INFORMATION

26. We upgraded **721TH** to Category B in September 1998.

/27.

⁸ 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 licence issued by the Director of Civil Engineering.

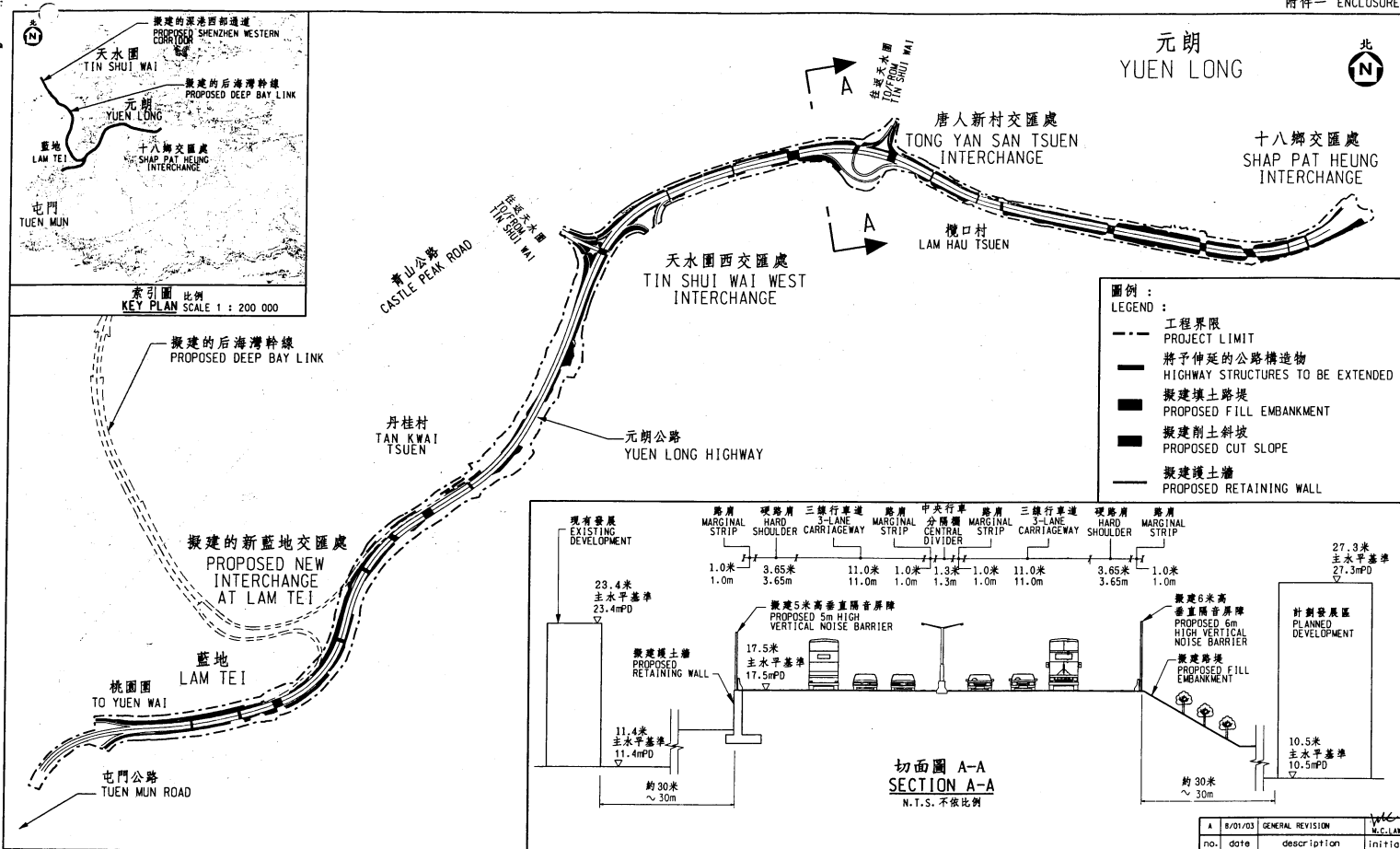
⁹ This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90/m³), nor the cost to provide new landfills (which are likely to be more expensive) when the existing ones are filled. The notional cost estimate is for reference only and does not form part of this project estimate.

27. We upgraded part of **721TH** to Category A as **733TH** “Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange-preliminary design and ground investigations” in November 1998 at an estimated cost of \$29.9 million in MOD prices and engaged consultants in March 1999 to undertake the preliminary design and ground investigation works.

28. We upgraded part of **721TH** to Category A as **747TH** “Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange-detailed design” in April 2000 at an estimated cost of \$18.3 million in MOD prices and engaged consultants to undertake the detailed design in January 2002.

29. We estimate that the project will create some 810 jobs comprising 140 professional/technical staff and 670 labourers, totalling 21 900 man-months.

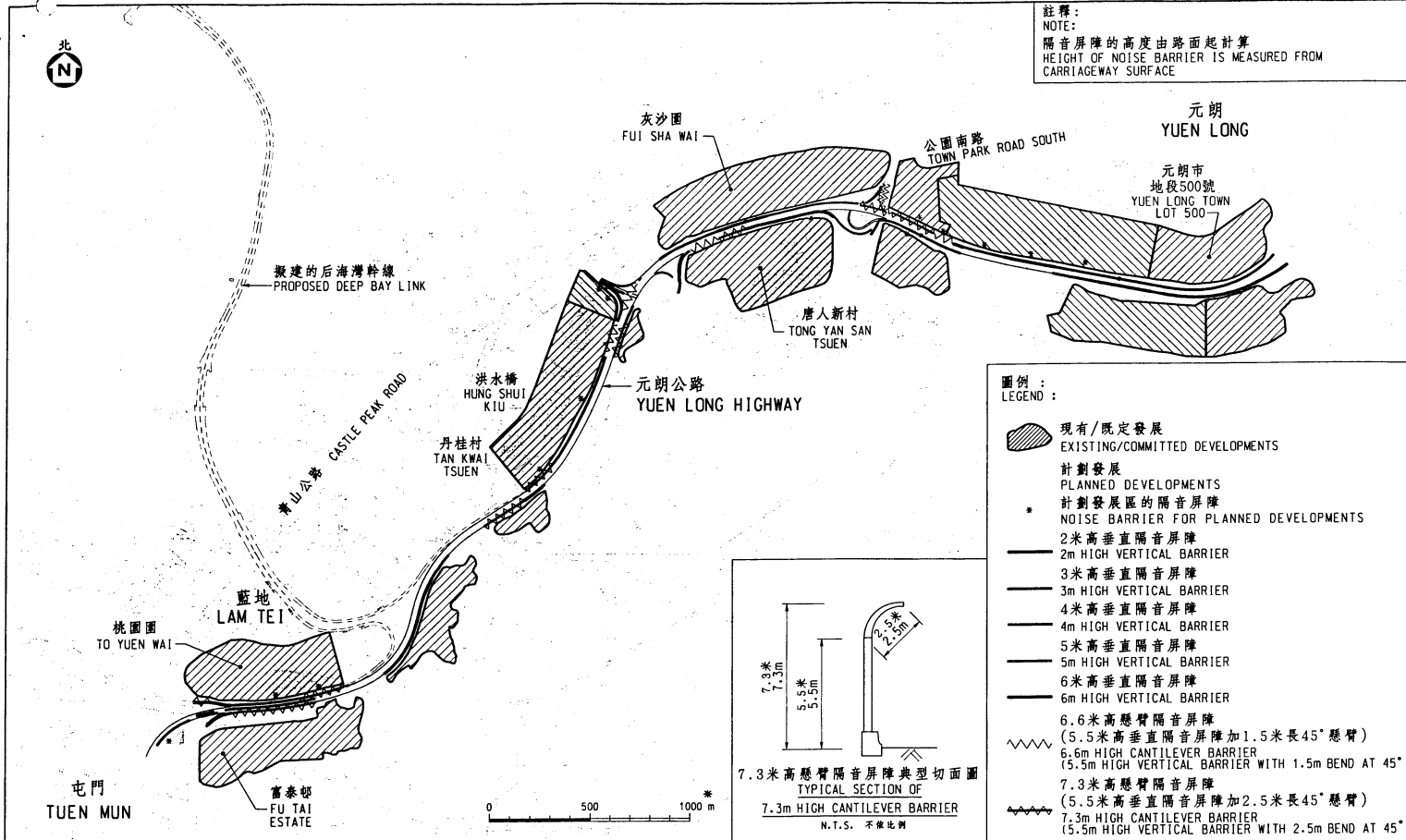
Environment, Transport and Works Bureau
January 2003



圖則名稱 drawing title
 工務計劃項目第721TH號
 元朗公路藍地至十八鄉段擴闊工程 - 工地位置圖
 PWP ITEM NO. 721TH
 WIDENING OF YUEN LONG HIGHWAY BETWEEN LAM TEI AND SHAP PAT HEUNG INTERCHANGE
 - SITE PLAN

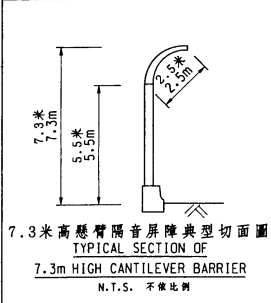
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主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE					

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註釋：
NOTE:
隔音屏障的高度由路面起計算
HEIGHT OF NOISE BARRIER IS MEASURED FROM CARRIAGEWAY SURFACE

- 圖例：
LEGEND :
- 現有/既定發展
EXISTING/COMMITTED DEVELOPMENTS
 - 計劃發展
PLANNED DEVELOPMENTS
 - 計劃發展區的隔音屏障
NOISE BARRIER FOR PLANNED DEVELOPMENTS
 - 2米高垂直隔音屏障
2m HIGH VERTICAL BARRIER
 - 3米高垂直隔音屏障
3m HIGH VERTICAL BARRIER
 - 4米高垂直隔音屏障
4m HIGH VERTICAL BARRIER
 - 5米高垂直隔音屏障
5m HIGH VERTICAL BARRIER
 - 6米高垂直隔音屏障
6m HIGH VERTICAL BARRIER
 - 6.6米高懸臂隔音屏障
(5.5米高垂直隔音屏障加1.5米長45°懸臂)
6.6m HIGH CANTILEVER BARRIER
(5.5m HIGH VERTICAL BARRIER WITH 1.5m BEND AT 45°)
 - 7.3米高懸臂隔音屏障
(5.5米高垂直隔音屏障加2.5米長45°懸臂)
7.3m HIGH CANTILEVER BARRIER
(5.5m HIGH VERTICAL BARRIER WITH 2.5m BEND AT 45°)



圖則名稱 drawing title 工務計劃項目第721TH號 元朗公路藍地至十八鄉段擴闊工程 - 隔音屏障位置圖 PWP ITEM NO. 721TH WIDENING OF YUEN LONG HIGHWAY BETWEEN LAM TEI AND SHAP PAT HEUNG INTERCHANGE - NOISE BARRIER LOCATION PLAN		設計 designed M.C.LAW 8/01/03	繪圖 drawn S.K.TSE 8/01/03	圖則編號 drawing no. MW6721TH-SP0002	比例 scale 1:17,500 或按實地 OR AS SHOWN
校核 checked M.C.LAW 8/01/03		批准 approved W.K.WONG 8/01/03		© 版權所有 COPYRIGHT RESERVED HIGHWAYS DEPARTMENT HONG KONG	
主要工程管理處 MAJOR WORKS PROJECT MANAGEMENT OFFICE			路政署 HONG KONG		

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Enclosure 3 to PWSC(2002-03)81

**721TH - Widening of Yuen Long Highway between
Lam Tei and Shap Pat Heung Interchange**

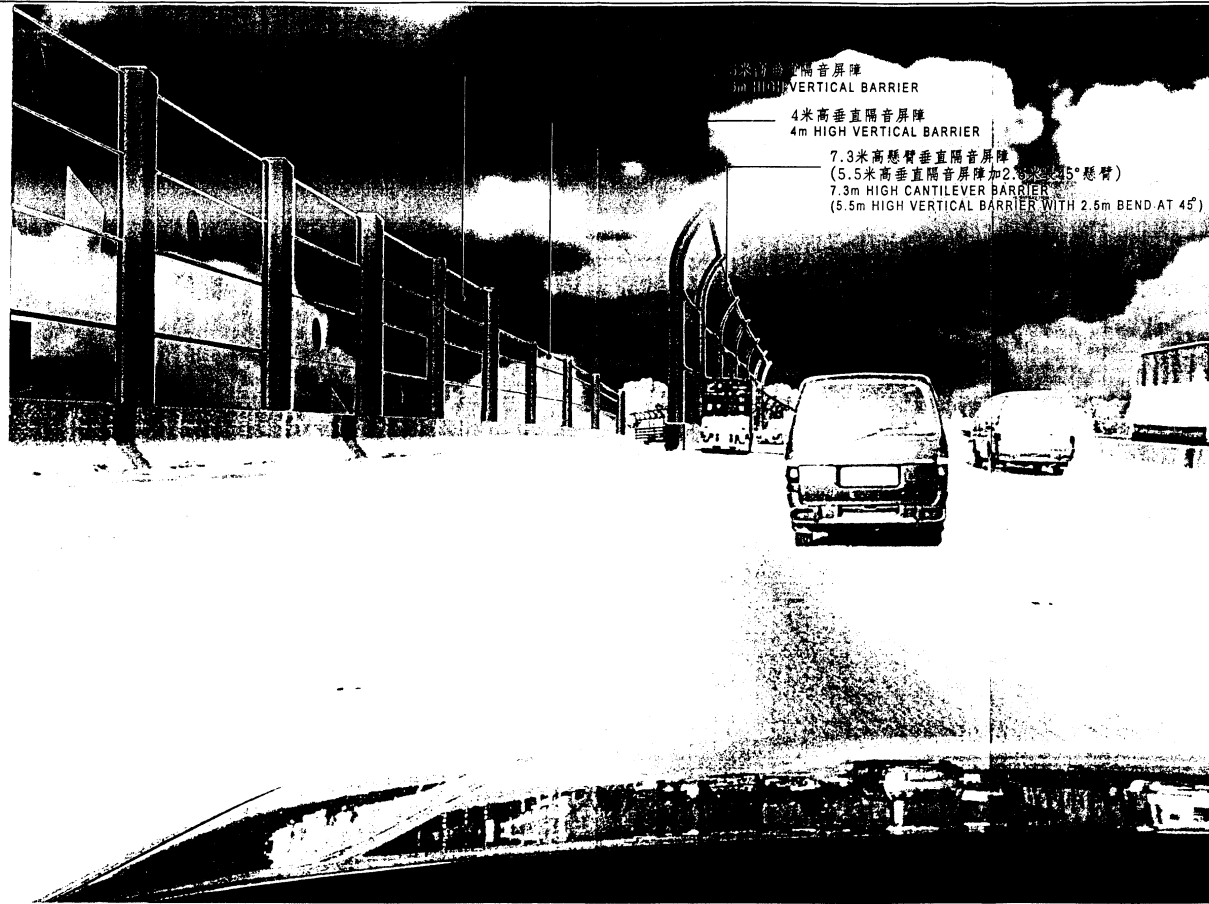
Breakdown of estimates for consultants' fees (in September 2002 prices)

Consultants' staff costs		Estimated man- months	Average MPS* salary point	Multiplier	Estimated fee (\$ million)
(a)	Construction supervision and contract administration				7.2 2.0
(b)	Resident site staff	309 1 153	38 14	1.6 1.6	28.5 35.4
(c)	EM&A programme	17 73	38 14	2.0 2.0	1.9 2.8
				Sub-total	<hr/> 77.8
(d)	EMSTF charges				0.1
				Total	<hr/> 77.9 <hr/>

* MPS = Master Pay Scale

Notes

1. A multiplier of 2.0 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profits as the staff will be employed in the consultants' offices. A multiplier of 1.6 is applied to the average MPS point in case of resident site staff supplied by the consultants. (At 1.10.2002, MPS pt. 38 = \$57,730 per month and MPS pt. 14 = \$19,195 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 37/2000 titled "Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange – Design and Construction".




4米高垂直隔音屏障
4m HIGH VERTICAL BARRIER

7.3米高懸臂垂直隔音屏障
(5.5米高垂直隔音屏障加2.5米45°懸臂)
7.3m HIGH CANTILEVER BARRIER
(5.5m HIGH VERTICAL BARRIER WITH 2.5m BEND AT 45°)

圖則名稱 drawing title
工務計劃項目第721TH號
元朗公路藍地至十八鄉段擴闊工程 - 駕駛者景觀
PWP ITEM NO. 721TH
WIDENING OF YUEN LONG HIGHWAY BETWEEN LAM TEI AND SHAP PAT HEUNG INTERCHANGE
- DRIVER VIEW

設計 designed M.C. LAW 8/01/03	繪圖 drawn S.K. TSE 8/01/03
覆核 checked M.C. LAW 8/01/03	批准 approved W.K. WONG 8/01/03

主要工程管理處
MAJOR WORKS PROJECT MANAGEMENT OFFICE

圖則編號 drawing no. MW6721TH-SP0011	比例 scale AS SHOWN
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