

**For discussion
on 25 June 2003**

PWSC(2003-04)45

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 706 – HIGHWAYS

Transport – Roads

718TH – Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha

Members are invited to recommend to Finance Committee the upgrading of **718TH** to Category A at an estimated cost of \$629.8 million in money-of-the-day prices for improving Tung Chung Road between Lung Tseng Tau and Cheung Sha.

PROBLEM

The section of Tung Chung Road (TCR) between Lung Tseng Tau and Cheung Sha is inadequate to cope with existing and future traffic demands in terms of capacity and safety.

PROPOSAL

2. The Director of Highways, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **718TH** to Category A at an estimated cost of \$629.8 million in money-of-the-day (MOD) prices for the improvement to TCR between Lung Tseng Tau and Cheung Sha.

/PROJECT

PROJECT SCOPE AND NATURE

3. The scope of **718TH** comprises –
- (a) widening and realignment of a 3.6-kilometre (km) section of 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 (TCSS); 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 (E&M) works.

———— A site plan and typical road sections of TCR are at Enclosure 1.

4. We have substantially completed the detailed design and tender documents for the project. We plan to invite tenders in August 2003 and commence construction in December 2003 for completion in September 2006.

JUSTIFICATION

5. The existing TCR is the only vehicular access connecting North and

/South

South Lantau between Tung Chung in the north and Cheung Sha in the south. It is a 3.5-m wide single-lane carriageway with some 40 passing bays for two-way traffic with sharp bends, poor visibility and steep gradients of up to 20% at certain locations. In view of the limited capacity and the substandard condition of the road, we are operating a dual-permit system¹ restricting the number of vehicles using the road.

6. The opening of the North Lantau Highway in 1997 and the Hong Kong International Airport in Chek Lap Kok in 1998 has significantly increased traffic demand between the North and South Lantau and exacerbated the traffic situation on TCR. The road is currently operating beyond its capacity of 100 vehicles per hour (vph), with a volume/capacity (v/c)² ratio of 1.4 during peak hours. The substandard configuration coupled with the busy traffic also affect safety on the road. Between January 1998 and December 2002, there were 163 traffic accidents leading to 123 injuries on TCR, the majority of which occurred between Lung Tseng Tau and Cheung Sha. Rescue and recovery operations for serious traffic accidents on the road are difficult and often require full road closure for two to 12 hours due to jam-packed traffic at both ends of the accident scene. The prolonged road closures caused severe inconvenience to residents of South Lantau.

7. To meet the traffic demand up to 2016 and improve road safety, we propose to upgrade TCR to a single two-lane road of 7.3-m in width for two-way traffic, with footpath alongside. The proposed works involve widening and realignment of the section of TCR between Lung Tseng Tau and Pak Kung Au along its existing alignment, and construction of a new road for the section

/between

¹ The dual-permit system means the TCR Prohibited Zone Permit System and the Lantau Closed Road Permit System. Currently, all vehicles, except franchised buses, Lantau taxis and emergency vehicles, require both permits to travel on the section of TCR between Shek Mun Kap Road and South Lantau Road from 8:00 a.m. to 6:00 p.m. everyday. Vehicles not exceeding 5.5 tonnes but possessing only Lantau Closed Road Permits can travel on that section of TCR outside the above period. Vehicles exceeding 5.5 tonnes are generally banned from using that section of the road.

² 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.

between Pak Kung Au and Cheung Sha to reduce the gradient to within 15%. We will provide passing bays to ensure smooth traffic flow and a roundabout at Cheung Sha to connect TCR with South Lantau Road. The projected v/c ratios of TCR in 2006, 2011 and 2016, with or without the proposed improvement works, are as follows –

| V/C Ratio of TCR | Year | | |
|---|------|------|------|
| | 2006 | 2011 | 2016 |
| Without the proposed improvement works ³ | 1.4 | 1.4 | 1.4 |
| With the proposed improvement works ⁴ | 0.69 | 0.84 | 0.99 |

8. The proposed road works will affect the Lantau North, Lantau South and the proposed Lantau North (Extension) Country Parks. To limit the footprint on the adjoining country parks and minimise the impacts on ecologically sensitive streams, we will construct elevated structures and retaining walls along the TCR.

9. We will also install a TCSS comprising four closed circuit televisions cameras and a set of variable message signs for monitoring and directing traffic flow on TCR.

10. To expedite completion of the road improvement works, we will carry out construction works in different road sections concurrently from 7:00 a.m. to 11:00 p.m. Each section will be opened to traffic upon completion of the works.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the project to be \$629.8 million in MOD prices (see paragraph 12 below), made up as follows –

/(a)

³ Assuming that the dual permit system remains in operation, such that the traffic growth is heavily suppressed.

⁴ Assuming that the TCR Prohibited Zone Permit System will be waived after the commissioning of the upgraded road and the Lantau Closed Road Permit System will remain in operation.

| | \$ million |
|---|-------------------|
| (a) Roads and drainage works | 98.9 |
| (b) Earthworks and retaining walls | 300.9 |
| (c) Elevated highway structures | 114.6 |
| (d) TCSS | 5.8 |
| (e) Landscaping works | 8.2 |
| (f) Consultants' fees | 86.9 |
| (i) construction supervision and contract administration | 10.3 |
| (ii) resident site staff costs | 70.5 |
| (iii) environmental monitoring and audit (EM&A) programme ⁵ | 5.8 |
| (iv) Electrical and Mechanical Services Trading Fund (EMSTF) charges ⁶ | 0.3 |

/(g)

⁵ We will engage consultants to implement an EM&A programme at an estimated cost of \$5.8 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 Fund Ordinance, the EMSTF charges government departments for design and technical consultancy services for 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.

| | | |
|---------------------------------------|--------|-------------------------------|
| (g) Contingencies | 61.5 | |
| | 676.8 | (in September 2002 prices) |
| (h) Provision for price adjustment | (47.0) | |
| | 629.8 | (in MOD prices) |

12. Item 11(a) above includes road pavements, street furniture, traffic signs, road markings, drainage and temporary traffic arrangement measures. Item 11(b) above includes slope cutting, embankment filling and retaining wall works. Item 11(c) above includes bridges and associated foundation works. A breakdown of the estimates for paragraph 11(f) above on consultants' fees is at Enclosure 2.

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

| Year | \$ million (Sep 2002) | Price Adjustment Factor | \$ million (MOD) |
|-------------|--------------------------|-------------------------------|---------------------|
| 2003 – 2004 | 30.0 | 0.94300 | 28.3 |
| 2004 – 2005 | 218.0 | 0.93003 | 202.7 |
| 2005 – 2006 | 233.0 | 0.93003 | 216.7 |
| 2006 – 2007 | 144.0 | 0.93003 | 133.9 |
| 2007 – 2008 | 47.0 | 0.93003 | 43.7 |
| 2008 – 2009 | 4.8 | 0.93003 | 4.5 |
| | 676.8 | | 629.8 |

14. 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

2003 to 2009. We will tender the proposed works under a remeasurement contract because the quantities of foundation and earthworks are subject to variations due to actual ground condition. We will allow for price adjustments in the contract as the construction period will exceed 21 months.

15. At present, the recurrent expenditure for the section of TCR between Lung Tseng Tau and Cheung Sha is \$710,000. We estimate the annual recurrent expenditure arising from the project to be \$3.69 million.

PUBLIC CONSULTATION

16. We consulted the Islands District Council (IDC) on 11 January 2001, 15 October 2001 and 10 June 2002. Members supported the project and urged for its early completion.

17. We consulted the Country and Marine Parks Board (CMPB) on 11 January 2001 and 20 June 2002 and its Country Parks Committee (CPC) on 19 November 2001 and 8 April 2003. The CMPB raised no objection to the proposed improvement works and the proposed working hours for construction from 7:00 a.m. to 11:00 p.m. on weekdays and on Sundays and public holidays, with the condition that the Government should minimise the visual impacts of cut slopes. We have further raised the possibility of 24-hour work and are in further discussion with the CPC on the issue.

18. We consulted the Legislative Council Panel on Transport on 19 January 2001, 25 January 2002 and 23 May 2003. Members supported the project and urged the Administration to complete the improvement works as soon as possible.

19. We gazetted the road scheme for the proposed improvement works to TCR under the Roads (Works, Use and Compensation) Ordinance on 1 November 2002 and received 13 objections. One objector withdrew the objection unconditionally and 12 objections remained unresolved. Details of the unresolved objections are as follows -

/(a)

- (a) five objectors requested the Administration to provide a road link between the North and South Lantau in addition to the existing TCR, to develop a comprehensive road network and to abandon the permit systems restricting the road usage on Lantau Island. Moreover, four of them also requested the Administration to implement the previously proposed road scheme of “Lantau north-south road link between Tai Ho Wan and Mui Wo” (THW-MW) (see paragraph 28 below). We were not able to contact one objector because his contacts were not given. We explained to the remaining four objectors that the THW-MW was shelved due to its unacceptable environmental impacts. We subsequently explored all other possible north-south route options and adopted the currently proposed road scheme which is the most optimal option having regard to the environmental, cost, technical and land implications. The objectors maintained their objections;
- (b) five objectors were concerned about the environmental impacts during the construction and operational phases of the project. Four of them opined that the project was not necessary and suggested the Administration to either improve the existing TCR locally in phases or to improve road safety by strictly enforcing the speed limit and the permit systems. They further questioned whether the improvement works were in conflict with the Government’s planning intention at South Lantau. We explained that we would control the environmental impacts to acceptable limits by implementing environmental mitigation measures and the Environmental Monitoring and Audit (EM&A) programme in accordance with the approved Environmental Impact Assessment (EIA) report. We also explained that the necessity of the project and road widening are in line with the planning

/objectives

objectives for South Lantau. It could not be replaced by localised or gradual improvement through only minor modification works and falling short of an additional lane. We advised them that the Administration had been closely monitoring the traffic situation of the TCR through law enforcement. The objectors maintained their objections;

- (c) one objector objected to blockage of the access to her lot by the proposed roundabout at Cheung Sha. To cater for her request, we revised our design to reconnect the new TCR with an existing track leading to her lot. The objector withdrew her objection subject to the agreed modifications; and
- (d) one objector requested the Administration to provide a footbridge at Pak Kung Au and a through passage of the access track along the catchwater road underneath the new TCR. We explained that the proposed footbridge at Pak Kung Au was not justified on traffic ground. Although we had modified our design to allow the access track running underneath the new TCR, the objector maintained his objection.

20. We will seek the Chief Executive-in-Council's authorisation of the road scheme shortly and we remain hopeful that we would be able to obtain the authorisation before the Finance Committee (FC) meeting in July 2003.

ENVIRONMENTAL IMPLICATIONS

21. The project is a designated project under Schedule 2 of the EIA Ordinance and an environmental permit is required for its construction and operation. The Advisory Committee on the Environment endorsed the EIA report on 17 June 2002 with conditions. The Director of Environmental Protection (DEP) approved the EIA report for the project with conditions under the EIA Ordinance on 4 July 2002. We will obtain the environmental permit before commencement of the construction works on site and will comply with the permit conditions.

22. The main environmental issues identified are water quality, ecology and traffic noise. The key mitigation measures recommended in the EIA include:-

- (a) construction of elevated structures to traverse the key ecologically sensitive streams and retaining walls to minimise the extent of slope cutting. By doing so, we can minimise the footprint of the works and hence the adverse environmental impact, particularly the loss of key habitats such as the Fong Yuen Marsh;
- (b) provision of drainage system to avoid discharge of surface runoff along the carriageway into both the Tung Chung and Cheung Sha Streams and also to water gathering grounds where water is collected and conveyed to reservoirs;
- (c) re-planting 25 hectares of trees to compensate for those felled due to the project works⁷; and
- (d) implementating dust suppression measures and using on-site movable barriers and quiet plants to control dust and noise impacts during construction to within established standards.

23. As regards the noise impact, since the noise levels are not expected to exceed the established criterion in the initial years after completion of the project, we will monitor the noise level and will erect noise barriers when it becomes clear that the noise level is expected to exceed that of the established criterion. DEP has agreed to the proposed arrangement. We will also consult the public on the details of the noise barriers (e.g. design) before their erection and arrange for funding separately.

24. At the planning and design stages, we have considered ways of

/minimising

⁷ Of the existing 9 971 trees within the project site boundary, we will retain 5 621, transplant 15 and fell the remaining 4 335 trees. We will replant about 132 918 trees and shrubs to compensate for the tree loss.

minimising the generation of construction and demolition (C&D) materials. We estimate the project will generate about 289 000 cubic metres (m³) of C&D materials. Of these, we will reuse about 159 000 m³ (55%) on site, about 124 000 m³ (43%) as fill in public filling areas⁸ and dispose of about 6 000 m³ (2%) C&D waste at landfills. The notional cost of accommodating C&D waste at landfill sites is estimated to be \$750,000 for this project (based on a notional⁹ unit cost of \$125/m³).

25. 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 contractors to separate public fill from C&D waste for disposal at appropriate facilities.

LAND ACQUISITION

26. We will resume about 890 square metres of private land for the proposed works. Land acquisition and clearance will not affect any structures and families. We will charge the land acquisition and clearance costs, estimated to be \$2.4 million, to **Head 701** "Land Acquisition" **Subhead 1100CA** "Compensation and ex-gratia allowances in respect of projects in the Public Works Programme".

BACKGROUND INFORMATION

27. In November 1996, we commissioned a feasibility study on the improvement of TCR to a two-lane road with an additional climbing lane at the uphill sections. The study considered two possible improvement schemes. The

/first

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 license 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.

first one was to widen the road along the existing alignment and the second was to improve the road to the current design standard. We presented both schemes to the CPC in March 1997. The CPC expressed concern about the impacts of the works on the affected country parks and requested the Administration to consider other alternative north-south routes.

28. After reviewing the situation, we found that THW-MW would be feasible. We carried out an investigation study for the THW-MW in July 1998 and included the project in Category B as **718TH** “Lantau north-south road link between Tai Ho Wan and Mui Wo” in September 1998. However, DEP took the view that the project would result in adverse environmental impacts and the EIA report could not meet the requirements of the Study Brief and the Technical Memorandum issued under the EIA Ordinance.

29. We then explored all possible Lantau north-south route options thoroughly, including tunnels, but found that they were not viable due to very high capital and maintenance costs, severe environmental impacts or great land resumption problems. On re-examining the option of widening TCR, we found that by adopting a road gradient of less than 15%, providing passing bays instead of climbing lanes, and shifting the road alignment to the eastern side of TCR away from Tung Chung Stream, we would be able to reduce the environmental impacts and encroachment on the country parks. We considered that this improvement scheme of TCR would be the most promising solution.

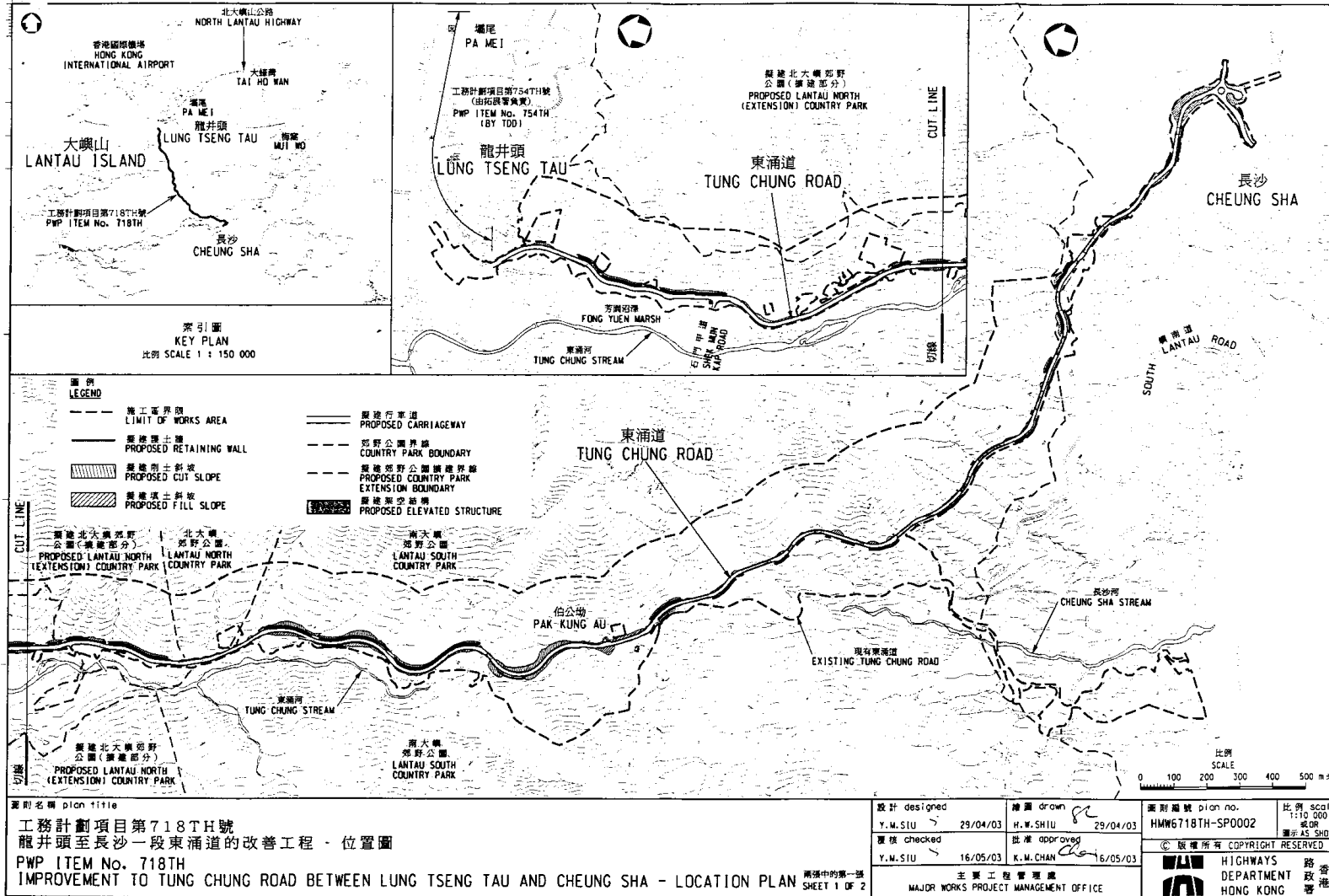
30. In April 2001, we engaged consultants to undertake an investigation and preliminary design (I&PD) of the improvement scheme of TCR at an estimated cost of \$14.6 million in MOD prices under **Subhead 6100TX** “Highway works, studies and investigations for items in Category D of the Public Works Programme”. We completed the I&PD in March 2002. We then retitled **718TH** to “Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha”.

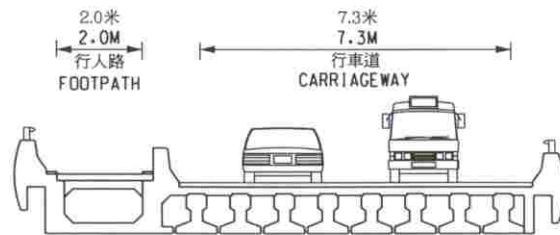
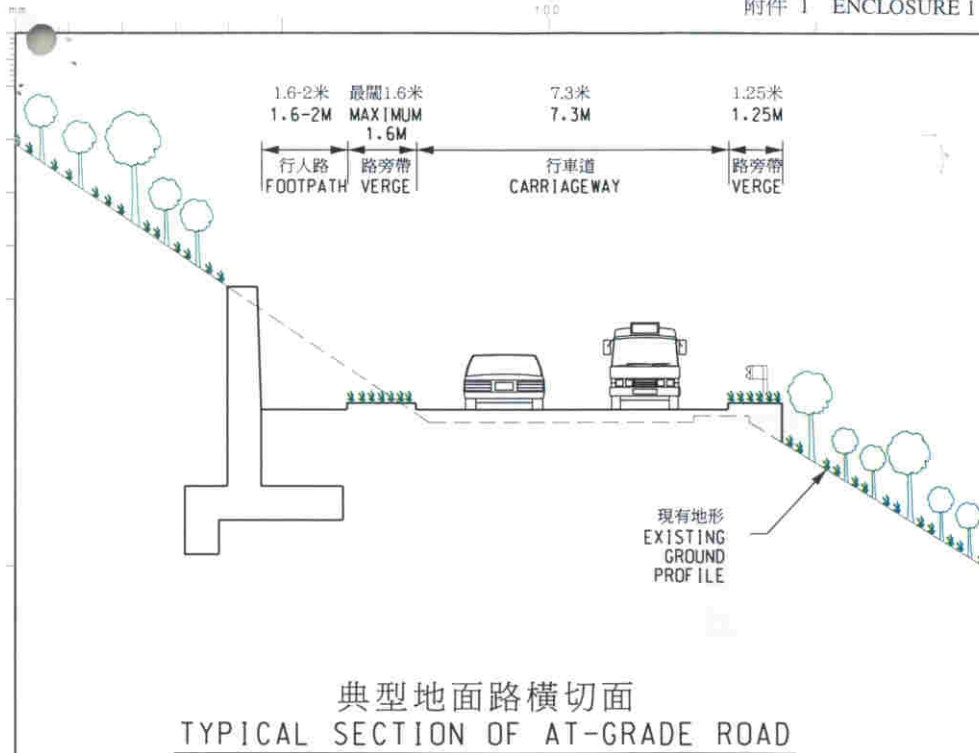
31. We upgraded part of **718TH** to Category A as **783TH** “Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha - detailed design and associated site investigations” at an estimated cost of \$41.1 million in MOD prices in July 2002. We then engaged consultants to undertake the detailed design of the project in late July 2002.

32. As regards the 950-m section of TCR between Pa Mei and Lung Tseng Tau, the Finance Committee approved on 8 March 2002 the upgrading of **754TH** "Widening of Tung Chung Road between Pa Mei and Lung Tseng Tau" to Category A at an estimated cost of \$32 million in MOD prices for the improvement works. The Director of Territory Development commenced the works in May 2002 for completion by the end of year 2003.

33. We estimate that the project will generate 515 jobs comprising 110 professional/technical staff and 405 labourers, totalling 15 550 man-months.

Environment, Transport and Works Bureau
June 2003





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|--|---|--|--|----------------------------|
| 圖則名稱 plan 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-切面 PWP ITEM No. 718TH IMPROVEMENT TO TUNG CHUNG ROAD BETWEEN LUNG TSENG TAU AND CHEUNG SHA - SECTIONS 兩張中的第二張 (SHEET 2 OF 2) | 設計 designed SIGNED Y.M.SIU 29/04/03 | 繪圖 drawn SIGNED W.K.CHIU 29/04/03 | 圖則編號 plan no. HMW6718TH-SP0003A | 比例 scale 不按比例 N.T.S. |
| | 覆核 checked SIGNED Y.M.SIU 16/05/03 | 批准 approved SIGNED K.W.CHAN 16/05/03 | © 版權所有 COPYRIGHT RESERVED  HIGHWAYS DEPARTMENT HONG KONG 路 政 署 香 港 | |

**718TH - Improvement to Tung Chung Road between
Lung Tseng Tau and Cheung Sha**

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 | - | - | - | 6.5 |
| | supervision and contract administration | - | - | - | 3.8 |
| (b) | Resident site staff | 254 | 38 | 1.6 | 23.5 |
| | | 1530 | 14 | 1.6 | 47.0 |
| (c) | EM&A programme | 37 | 38 | 2.0 | 4.3 |
| | | 40 | 14 | 2.0 | 1.5 |
| | | | | Sub-total | 86.6 |
| (d) | EMSTF charges | | | | 0.3 |
| | | | | Total | 86.9 |

* 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 19/2002(HY) titled "Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha – Design and Construction".