Report No. 53 of the Director of Audit — Chapter 10

PROVISION OF A BYPASS IN TUEN MUN WEST

Summary

1. In the Port and Airport Development Strategy issued in 1989, Tuen Mun Area 38 in Tuen Mun West (TMA 38) was identified as a suitable site for a River Trade Terminal (RTT) and a special industries area (SIA). In October 1990, the Civil Engineering and Development Department (CEDD) completed a study of TMA 38. The study recommended the construction of a new bypass connecting TMA 38 with Tuen Mun New Town to meet the traffic demand generated by the RTT and SIA developments. In February 1998, the Finance Committee (FC) of the Legislative Council (LegCo) approved funding of $2,062 million for constructing the new bypass, known as Lung Fu Road after completion.

2. The CEDD carried out the Lung Fu Road project (LFR Project) under two contracts — Contracts A and B. An engineering consultant (the Consultant) was appointed as the Engineer for Contracts A and B. In March 2002, after road works completion, Lung Fu Road was open to traffic. The Audit Commission (Audit) has recently conducted a review to examine the CEDD's management of the LFR Project.

Traffic planning and road utilisation

3. Lung Fu Road was designed to accommodate 2,800 vehicles per hour in each direction and divert traffic from Lung Mun Road, in particular that generated by heavy vehicles. In 1996, the Consultant's traffic-flow forecast for Lung Fu Road assumed that both the RTT and SIA developments would be implemented as planned, and that heavy vehicles would account for 38% of the traffic volume.

4. ***Need to consider different design scenarios for planned development.*** Audit noted that the actual traffic flows of Lung Fu Road were lower than the forecast traffic flows. In 2006, the actual peak flows of 840 vehicles per hour (northbound) and 854 vehicles per hour (southbound) only accounted for 60% and 48% of the forecast traffic flows respectively. Audit noted that the difference between forecast and actual traffic flows might be attributable to changes in planning assumptions and scenarios for the developments in TMA 38, including the change in land use and the higher proportion of heavy vehicles

actually using Lung Fu Road. *Audit has recommended that, in planning road projects in future, the Director of Civil Engineering and Development should, in collaboration with the Commissioner for Transport, consider different possible design scenarios for planned development to cater for likely changes, which may lead to different forecasts on the proportion of heavy vehicles using the road.*

5. ***Need to take into account proportion of heavy vehicles in determining design traffic capacity.*** The design traffic capacity of a road, expressed in number of vehicles, would decrease if there is an increase in the proportion of heavy vehicles using the road. According to the Transport Planning and Design Manual of the Transport Department (TD), the design traffic capacity of a road should be reduced if the proportion of heavy vehicles exceeds 15%. However, despite the fact that 38% of the Lung Fu Road traffic was forecast to be heavy vehicles, the design traffic capacity had not been adjusted in the funding submission to LegCo in February 1998. *Audit has recommended that, in planning road projects in future, the Director of Civil Engineering and Development should, in collaboration with the Commissioner for Transport, take due account of usage by heavy vehicles in reporting to LegCo on the estimation of design traffic capacity of a road.*

Project planning and control of approved project estimate

6. Lung Fu Road was built to meet the traffic demand generated by the RTT and SIA developments in TMA 38. The SIA development would involve land reclamation by two stages. In January 1997, the Administration submitted a funding application to the Public Works Subcommittee (PWSC) of the FC for the Stage 2 reclamation. As there were questions at the PWSC meeting about the demand for special industries, the Administration withdrew the application pending a review of the issue.

7. In February 1998, the Administration informed the then LegCo Panel on Planning, Lands and Works that the LFR Project included slope stabilisation works, which would not only ensure the safety of Lung Fu Road, but would also allow the land nearby to be re-planned for permanent uses.

8. ***Need to provide full and relevant information in funding applications to FC.*** Audit noted that the following information was not provided in the funding submission for the LFR Project: (a) the progress of development of TMA 38, including the withdrawal of funding application for the Stage 2 reclamation in connection with the SIA development; (b) the traffic-flow forecast of Lung Fu Road; and (c) the benefits of the associated slope stabilisation works carried out under the LFR Project. *Audit has recommended that the Secretary for Development should remind works departments to provide the PWSC/FC with full and relevant information in funding applications for road projects in future.*

9. ***Need to monitor the traffic conditions of Lung Fu Road.*** There have been substantial changes in the development of TMA 38 since the commissioning of Lung Fu Road. At present, Lung Fu Road is operating within its design capacity. The future development in Tuen Mun West, including the development of EcoPark, may generate additional traffic for Lung Fu Road. *Audit has recommended that the Director of Civil Engineering and Development should, in collaboration with the Commissioner for Transport, keep in view the development of Tuen Mun West and continue to monitor the traffic conditions of Lung Fu Road.*

10. ***Project estimates in funding submission.*** Audit noted that the contract prices of Contracts A and B were substantially lower than the estimates included in the approved project estimate (APE). The over-estimation of the contract sums amounted to $475 million or 31% of the estimated contract prices. Despite the over-estimation, no action had been taken to reduce the APE to reflect the lower prices of the awarded contracts. *Audit has recommended that the Director of Civil Engineering and Development should: (a) improve the accuracy of the project estimates provided in the funding submission to the FC; and (b) take action to reduce the APE if the awarded contract prices are significantly lower than the estimated ones.*

Provision of a roundabout at Junction A

11. According to the original design, a roundabout was provided at the junction of Lung Fu Road and Lung Mun Road. The roundabout, with a stone embankment at the centre, was constructed under Contract B. Following two serious traffic accidents at the junction after the opening of Lung Fu Road to traffic, road improvement works, including the conversion of the roundabout into a signalised junction, were implemented.

12. ***Need to determine the appropriate type of road junctions.*** At the design stage, the CEDD selected the roundabout as the preferred junction type. After the occurrence of the traffic accidents, investigation by the TD indicated that the site restrictions at this junction would pose a potential hazard to drivers travelling at high speeds. To enhance road safety, the roundabout junction was subsequently converted into a signalised junction. *Audit has recommended that, in implementing road projects in future, the Director of Civil Engineering and Development should, in collaboration with the Commissioner for Transport: (a) determine the appropriate type of a junction at the design stage, taking into account factors including the topographic conditions of the junction, drivers' behaviour, and possible speeding of vehicles; and (b) conduct safety assessments on the road design before the commissioning of a new road.*

Provision of noise enclosures

13. Contract A included the provision of a noise enclosure system along Wong Chu Road, which was the first of its kind constructed in Hong Kong. The contract was completed eleven months after the revised scheduled completion date. Audit noted that there were contractual disputes over the provision of the noise enclosure system. In the event, the CEDD paid a lump sum to Contractor A for the settlement of claims.

14. ***Need to ascertain fire-services requirements of noise enclosures.*** The contract specifications required that acoustic materials of the noise enclosures should be fire-retardant and incombustible, with a fire resistance of one hour. During construction, there were disputes over the fire-resistance requirement of the noise enclosures arising from the ambiguities and inconsistencies in the contract specifications. The CEDD had also not consulted the Fire Services Department about the requirements before the award of contract. *Audit has recommended that, in administering a road project in future, the Director of Civil Engineering and Development should: (a) vigilantly check the tender documents and contract specifications adopting innovative designs or new construction materials; (b) critically assess the fire-services requirements of construction materials; and (c) consult the relevant departments on the fire-services requirements of construction materials before incorporating them into the tender documents*.

15. ***Need to ensure market availability of proprietary products.*** In early 1997, during the drafting of the contract specifications for the noise enclosures, enquiries were made with local suppliers on the different materials required for the noise enclosures, including those for the transparent reflective glass panels. At that time, the one-hour fire-resistance requirement for the transparent panels had not yet been incorporated into the specifications. In early 1998, the draft specifications were revised to include the requirement. However, there was no documentary evidence on enquiries made with the suppliers on the supply of such materials in the light of the change in the requirement. *Audit has recommended that, in administering a road project in future, the Director of Civil Engineering and Development should conduct market research to ascertain the supply of new construction materials before incorporating them into the tender documents*.

Construction of Viaduct A

16. Contract A included the construction of a 900-metre long viaduct from Tuen Mun Area 19 to the interchange at Lung Mun Road/Wong Chu Road. The original design of the viaduct structure, using a precast beams approach, would require less temporary support works and cause the least disruption to traffic, and would enable fast-track

construction to meet the tight programme. During the tendering of Contract A, the CEDD received an alternative design proposal from a tenderer, who was later awarded the contract. While the adoption of the alternative design using a cast-in-situ approach would achieve savings, there was a risk of project slippage because a longer time might be required for completing the viaduct.

17. ***Need to critically assess risks of project slippage.*** Audit noted that the risk of project slippage was not explicitly explained in the tender report submitted to the Central Tender Board. As it transpired, the detailed design of the viaduct was approved eight months after the award of Contract A, and the viaduct works were completed 207 days after the scheduled completion date. *Audit has recommended that, in considering an alternative design for a time-critical project in future, the Director of Civil Engineering and Development should: (a) critically assess the risks of project slippage as a result of using the alternative design; and (b) include the risk assessment of project slippage in the tender report submitted to the Central Tender Board.*

Response from the Administration

18. The Administration agrees with the audit recommendations.

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