

## **ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE**

### **HEAD 706 – HIGHWAYS**

#### **Transport – Railways**

#### **53TR – Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link – construction of railway works**

Members are invited to recommend to the Finance Committee that the approved project estimate of **53TR** be increased by \$15,387.5 million from \$55,017.5 million to \$70,405 million in money-of-the-day prices.

### **PROBLEM**

The approved project estimate (APE) of **53TR** is not sufficient to cover the cost of works under the project.

### **PROPOSAL**

2. The Director of Highways, with the support of the Secretary for Transport and Housing, proposes to increase the APE of **53TR** by \$15,387.5 million from \$55,017.5 million to \$70,405 million in money-of-the-day (MOD) prices.

## PROJECT SCOPE AND NATURE

3. In January 2010, the Finance Committee (FC) of the Legislative Council (LegCo) approved the upgrading of **53TR** to Category (Cat) A at an estimated cost of \$55,017.5 million in MOD prices. The approved project scope of **53TR** comprises –

- (a) construction of the railway works for the Hong Kong section of the Guangzhou – Shenzhen – Hong Kong Express Rail Link (XRL), which include –
  - (i) railway facilities at the West Kowloon Terminus (WKT), including station concourse, passenger waiting areas, platforms, control and signal systems, etc.;
  - (ii) approximately 26 kilometre long tunnel from WKT to the boundary at Huanggang;
  - (iii) a below-ground emergency rescue siding and at-grade stabling sidings in Shek Kong with necessary facilities to provide emergency rescue, passenger evacuation, as well as maintenance of rolling stock and infrastructure; and
  - (iv) eight ventilation buildings, one emergency access point and the associated ventilation shafts and adits or accesses for the tunnel;
- (b) procurement of rolling stock, railway systems, as well as safety, operation and maintenance equipment; and
- (c) fees for consultants appointed by the Government for monitoring and vetting the work of the MTR Corporation Limited (MTRCL) relating to the railway works under the XRL.

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A plan showing the alignment of the XRL is at Enclosure 1.

4. We propose to expand the approved scope of **53TR** to include other consultancy services for the Project, such as litigation services for handling the MTRCL culpability issues and financial consultancy to vet MTRCL's proposal on the service concession<sup>1</sup>. On the other hand, Day 2 Works and the related Project Management Cost (PMC) will be taken out from the scope of **53TR** (see paragraph 35 below).

## ENTRUSTMENT TO THE MTRCL

5. The construction of XRL project includes both railway and non-railway works<sup>2</sup>. The APE for the construction of the entire XRL project is \$66,817.5 million in MOD prices.

6. On 22 April 2008, the Executive Council decided that the XRL would be undertaken under the concession approach<sup>3</sup>. Thereafter, the Government and the MTRCL entered into an Entrustment Agreement for entrusting the construction, testing and commissioning of the XRL<sup>4</sup> to the latter at a Project Control Total (PCT) of \$65,000 million in MOD prices. The remaining fund of \$1,817.5 million, which is under the management of the Highways Department (HyD) under the APEs of **53TR** and **57TR**, is the budget for the construction and provision of government facilities or equipment, consultancy for monitoring and verification (M&V) services, etc. As set out in PWSC(2009-10)68 and PWSC(2009-10)69, the original target commissioning date of the XRL project was 2015.

/ **PROGRESS** .....

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<sup>1</sup> After review, it is considered that vetting of MTRCL's future proposal on the service concession will require expertise of external financial consultant, which cannot be provided in-house.

<sup>2</sup> In January 2010, FC approved the upgrading of **53TR** – Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link – construction of railway works and **57TR** – Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link – construction of non-railway works to Cat A at an estimated cost of \$55,017.5 million (in MOD prices) and \$11,800 million (in MOD prices) respectively.

<sup>3</sup> Under the concession approach, the construction of the XRL will be funded by the Government under the Public Works Programme. The MTRCL has been entrusted with the design, construction, testing and commissioning of the XRL. Upon completion of the railway, MTRCL would be granted a service concession for the operation, and the Government would receive service concession payment.

<sup>4</sup> In July 2008, the FC approved a sum of \$2,782.6 million (in MOD prices) for the design and site investigation of the project, which has been entrusted to MTRCL for implementation.

## PROGRESS OF THE PROJECT

7. The MTRCL first notified the Government in April 2014 that the commissioning target of the XRL project would be delayed. It confirmed in May 2014 that the XRL project would only be commissioned by end 2017. In August 2014, the MTRCL announced that its revised Cost to Complete (CTC) for the XRL project would be \$71.52 billion. Based on the information provided by the MTRCL at that time, HyD, with the assistance of its M&V consultant, completed an assessment on MTRCL's revised CTC and urged the MTRCL, in November 2014, to review again the revised CTC in the light of HyD's review findings and the reports of the MTRCL's Independent Board Committee.

8. On 30 June 2015, the MTRCL notified the Government of its latest review results regarding the revised Programme to Complete (PTC) and revised CTC of the XRL project. The commissioning target of the XRL was delayed further to the third quarter of 2018, including a six-month contingency period. The MTRCL advised that the CTC would have to be revised to \$85.3 billion, including a sum of \$2.1 billion for contingency.

9. As at the end of September 2015, the XRL project was 73.7% completed. The overall tunnel excavation was 99% completed with about 430 metres remaining. Installation works were under way for the rail tracks, overhead lines, signaling systems and telecommunications systems inside the tunnels. The WKT was then 57% completed. Blasting at the platform level of the WKT northern area was making good progress. The overall excavation of the WKT was then 95% completed, whilst 63% of the concrete structure had been cast and 32% of the roof structure erected at the WKT.

## JUSTIFICATION

10. The Government has grave concern about the severe delay and cost overrun of the XRL project. HyD, assisted by its M&V consultant, has critically scrutinised the latest revised CTC submitted by the MTRCL and the impact on the financial position of the **53TR** and **57TR**.



11. Following the assessment by HyD and its M&V consultant and subsequent discussions with the MTRCL, the Government (on the advice of its M&V Consultant) has agreed that the net adjustment to the revised CTC should be \$880 million, bringing down the revised CTC submitted by the MTRCL on 30 June 2015 from \$85.3 billion to \$84.42 billion. On the other hand, the Government costs will also have to be increased from \$1,817.5 million by \$182.5 million to \$2,000 million cover additional costs including M&V consultancy services and other studies due to the delayed completion. On this basis, it will be necessary to increase the APE of **53TR** by \$15,387.5 million from \$55,017.5 million to \$70,405 million (in MOD prices). Based on MTRCL's advice, as supplemented by the verification of HyD and its M&V Consultant, the additional costs arise mainly from the followings –

- (a) unfavourable ground conditions,
- (b) disruption due to other causes,
- (c) changes in design to suit actual site conditions and various unforeseen circumstances,
- (d) price escalations,
- (e) additional PMC and insurance,
- (f) contingency for the remaining works, and
- (g) additional government cost.

12. Details of the proposed increase in the APE of **53TR** are elaborated in paragraphs 13 to 34 below. A separate funding application for \$4,215 million will be made for **57TR** vide PWSC(2015-16)51.

**(a) Unfavourable ground conditions**

13. Unfavourable ground conditions are the primary cause of progress delay and cost overrun for major infrastructure projects like the XRL project. It has affected the whole spectrum of works, including diaphragm wall construction and open excavation at WKT, construction of Approach Tunnels north to WKT, Tunnel Boring Machine (TBM) tunnelling and drill-and-blast tunnelling.

14. WKT is a huge underground railway terminus. Its construction started with the diaphragm wall works and subsequent bulk excavation, followed by the concreting of the underground station box and erection of the steel roof. The completion of diaphragm walls, which was one of the first major works undertaken at the WKT, was delayed for more than a year because of the discovery of extensive utilities and unfavourable ground conditions including uncharted large boulders, corestones and uneven bedrock. Time was taken to decommission, slew or divert utilities, involving substantial interface with the utility companies. The total volume of the diaphragm wall socketed inside the bedrock also had to be increased by about 400 cubic metres (m<sup>3</sup>), i.e. more than four times of the planned volume, due to unfavourable ground conditions. Further, the unfavourable ground conditions have caused excessive movement on the diaphragm walls, necessitating additional grouting works to strengthen the soil and prevent further movement. Such additional works have delayed the excavation works thereafter.

15. The unfavourable ground conditions have also delayed the progress of excavation of the Approach Tunnel Areas north to the WKT. The delay in the construction of diaphragm walls at WKT and excavation at Approach Tunnel Areas had a knock-on effect on the progress of the subsequent and adjacent works at WKT, which were implemented under tightly interfaced contracts. The award of the contract for the main station works of WKT was delayed by **over ten months**.

16. The commencement of excavation at WKT was delayed by the unfavourable ground conditions. The high underground rock stratum necessitated the excavation of about 102 000 m<sup>3</sup> of rock mass, which was about the volume of 40 Olympic-sized swimming pools. Coupled with other site constraints, there was an **eight months** overall programme delay in the excavation of WKT despite mobilisation of additional excavation plants and change of excavation method, causing a knock-on delay of the subsequent structural and concreting works of the terminus structure.

17. At the urban tunnel section, the progress of the TBM tunnelling works was affected by the discovery of uncharted H-piles and steel pieces along the alignment. Instead of pulling out some of these piles and steel pieces from the ground surface which would affect the existing busy traffic, much grouting and engineering works were done to remove these piles and steel pieces before the TBM works could proceed, thus affecting the tunnelling works progress by about **seven months**.

18. The progress of the rural tunnel section was affected by the high underground water table and unfavourable ground conditions. Large volume of groundwater ingress was recorded in the drill-and-blast tunnel section. Additional grouting works were required to control the groundwater ingress and strengthen the soil around the tunnel. The progress of the drill-and-blast works was therefore affected.

19. The above unfavourable ground conditions have contributed to a cost increase of **\$3,647 million**, which is about **22.8%** of the proposed increase.

**(b) Disruption due to other causes**

20. The XRL project is implemented by 42 major contracts. Knock-on delay would be resulted in case of delay in other interfacing contracts. For example, the delay in the construction of diaphragm walls at Jordan Road had caused a knock-on delay in handing over of the site nearby for the excavation and construction of the terminus structure under another contract. The productivity of the latter was hindered by the limited working area available and the contractor submitted claims for associated disruption.

21. For the cross-boundary tunnel section, the tunnels were constructed by two TBM drives launching from Shenzhen to Hong Kong. Only upon reaching the boundary would the TBM tunnelling works come under the management and supervision of the Hong Kong contractor. Because of the complex geology and construction difficulties encountered in Shenzhen, the TBMs only arrived at the Hong Kong boundary over **14 months** later than scheduled. As a result, the outturn cost of remaining section of the tunnels on Hong Kong side was increased due to prolongation and associated disruption. The tunnelling works were also delayed due to frequent repair and maintenance of the TBMs required, which were further complicated by the presence of fishponds at Mai Po above the proposed tunnel.

22. Due to the slippage of the progress in the civil contracts, the progress of the electrical and mechanical (E&M) works was delayed and constrained by limited and fragmented work sites available to the E&M contractors from the civil contractors, which was different from the original plan. Furthermore, the contractors were required to complete their works under a tight programme to achieve the revised PTC. The contractors had to deploy additional labour and plants to complete the works.

/ 23. ....

23. We estimate that the disruption due to other causes has led to an additional cost of **\$3,561 million**, which is about **22.3%** of the proposed increase.

**(c) Changes in design to suit actual site conditions and various unforeseen circumstances**

24. It is common and often unavoidable for a major infrastructure project to have variations and enhancements in construction methodologies during the construction stage to suit the actual site conditions and various unforeseen circumstances, thereby necessitating design changes. The XRL project is no exception.

25. The WKT will encroach into the underground area of the West Kowloon Culture District (WKCD). The structure of WKT will integrate and have direct interfaces with the WKCD facilities. Since the design of WKCD facilities was only completed in 2012 after the commencement of the construction of WKT structure in early 2011, changes to the design of WKT were required to accommodate the requirements of WKCD.

26. Further, it was recorded that more than 350 Engineer Instructions, including more than 13 000 revised drawings and 1 590 Requests for Information have been issued by the MTRCL. The significant number of changes has caused disruption of works and delay to the overall progress.

27. There had also been commercial disputes, which were now resolved, between the main contractor and subcontractor of the WKT on the steel roof erection works which caused significant delays to the preparation of the drawings of the structural steelworks. This has subsequently affected the progress of both the fabrication and erection of the temporary and permanent steelworks.

28. For the rural tunnel section, the design of the drill-and-blast tunnel was revised to cater for the high underground water table and large volume of groundwater ingress encountered during construction.

29. Based on the factors mentioned in paragraphs 24 - 28 above, we estimate that the changes in design have contributed to an increase of **\$1,591 million**, which accounts for about **10%** of the proposed increase.

/ (d) .....

**(d) Price escalations**

30. For the XRL project, in 32 of the 42 major contracts awarded by the MTRCL, the contractors are required to price in the expected price fluctuation within the respective contract periods when bidding for the contracts, while the remaining contracts are subject to price fluctuation. Due to the delayed completion of the XRL project, it is necessary to allow for inflationary adjustment for the extended periods, irrespective of the forms of contracts. It was assessed that a provision of about **\$3,096 million**, contributing about **19.4%** of the proposed total increase, would need to be reserved in **53TR** to cater for these price escalation claims.

**(e) Additional PMC and insurance**

31. MTRCL's PMC for the XRL project includes staff and corporate costs for the project team and project headquarters team, as well as other support services for the teams. The project team is responsible for project planning and management, and supervision of construction activities. The project headquarters team provides support for project control, planning and programming, procurement, and contract administration, etc., while support services cover human resources, legal services, public relations, finance and information technology, etc. With the extended construction period of the XRL project, an additional PMC of \$1,790 million for the project is required in this connection. The additional PMC cost under **53TR** is **\$1,445 million**, contributing about **9.1%** of the proposed increase.

32. An additional insurance of **\$739 million** for **53TR** is required for increased insurance coverage due to extended construction period and increase cost of works. It contributes to about **4.6%** of the proposed increase.

**(f) Contingency for the remaining works**

33. The contingency under the original APE (i.e. \$4,463.2 million) had been committed to cater for the additional costs arising from the above reasons. In the light of continuous challenges and risks which may arise as a result of past or future risks, an additional contingency provision of **\$1,786 million** would be required under **53TR** for the remaining works under XRL project to provide further allowance for claims upon substantiation, and allowance for uncertainty associated with the current heated construction market with high cost escalation. It contributes to about **11.2%** of the proposed increase.

/ (g) .....

**(g) Additional government cost**

34. The increase in government costs is to cover the expanded scope of works for the M&V consultancy services and other studies over the extended construction period, namely the litigation services for handling the MTRCL culpability issues, financial consultancy to vet MTRCL's proposal on the service concession and other studies. The additional cost under **53TR** is **\$102.5 million**, contributing about **0.6%** of the proposed increase.

**SAVINGS BY REMOVAL OF DAY 2 WORKS AND ASSOICATED PMC**

35. The WKT is designed with 15 tracks with nine tracks for long haul and six for short haul trains. Based on the patronage forecast, it is anticipated that only ten tracks, i.e. six long haul and four short haul tracks, will be required when the XRL begins commissioning in 2018. Depending on patronage growth, the remaining five tracks ("Day 2 Works") may be opened at a later stage. After careful deliberation, the Government decided to defer the completion of Day 2 Works. We will monitor the patronage growth after commissioning of the XRL and keep under review the programme of Day 2 Works. The deferral of Day 2 Works would avoid incurring unnecessary maintenance cost for platforms and tracks which might not be required during the initial years. The cost of the Day 2 Works, amounting to \$544 million, as well as a sum of \$36 million originally required for meeting the PMC associated with Day 2 Works will be deducted from the current PCT. The total cost-saving for taking out Day 2 Works is **\$580 million**. The final additional PMC is therefore reduced from \$1,790 million by \$36 million to \$1,754 million.

**OTHER OPTIONS**

36. There are some suggestions to suspend or even terminate the XRL contracts at this stage. The consequences of such a scenario, if materialised, are grave and must not be under-estimated.

**Temporary suspension/termination of project**

37. As explained in the LegCo paper CB(4)280/15-16(02) and supplementary information paper CB(4)333/15-16(02) submitted to the Subcommittee on Matters Relating to Railways (RSC) of the LegCo on 30 November and 11 December respectively this year, if the XRL contracts were suspended or even terminated, additional expenditure would be incurred to the project including costs for –

/ (a) .....

- (a) settlement of contractors' claims;
- (b) upkeep of essential staff and plants on site as well as arranging regular maintenance and inspection for the unfinished works during suspension period;
- (c) securing and protecting the unfinished works, tunnel and works sites, upkeep of the temporary traffic management scheme and monitoring of ground water to address safety concerns; and
- (d) termination of all employment contracts, cancelling works subcontracts, compensation of rental agreements and demobilisation of plants.

38. If the application for additional funding for the XRL project cannot be approved by FC by end February 2016, as a responsible project manager, the MTRCL may need to issue a suspension notice to its contractors in order to keep the total cost (including suspension costs) within the amount allocated by the Government, i.e. \$65 billion. The MTRCL assessed that the suspension cost would be about **\$233 million per month**. If so, with each month passing from end-February 2016, instead of spending money on constructing the XRL, the money would be spent on suspension-related items. The XRL contracts between MTRCL and the contractors allow for a suspension period of a maximum of 180 days (about six months). If the XRL contracts are subsequently terminated after the 180 days of suspension, there will be another lump-sum cost to terminate, including settlement of historical claims and costs of protecting the works at about **\$3.4 billion**. The total additional cost incurred above could therefore be in the region of **\$4.8 billion (i.e. \$233 million x 6 months + \$3.4 billion)**. The M&V Consultant advises the HyD that this estimation of additional cost incurred is reasonable. MTRCL also points out that should the works be suspended or terminated, the contractors may take a different view as to their entitlements for the cost of works completed, which would lead to a lot of disputes and a higher additional cost to the XRL project. The M&V Consultant concurs with this view.

/ Resumption .....

**Resumption after termination**

39. If the existing XRL contracts were terminated, it might take two to three years before the contracts could be resumed because new tenders would have to be invited to engage new contractors to finish the remaining works. During the interim, it might be sufficient to provide minimum protection to the unfinished works. Under this scenario, the MTRCL (assuming that the Corporation will remain as the Project Manager) would need to arrange new contractors to proceed with the outstanding works. The construction costs may further escalate due to possible increase in labour and material costs. Furthermore, due to increase in difficulty and risk to the new contractors to work on the unfinished works, the returned tender price would very likely be much higher. Together with the additional costs for design review, project management, insurance and maintenance of the existing works during the waiting period, the M&V Consultant estimates, as a ballpark figure, that the resumption cost until completion of the project could be up to \$28.2 billion. Together with the cost for suspension/termination of \$4.8 billion, the cost estimated to be incurred under this scenario is about **\$33 billion**. In other words, **by then, it will cost \$93.2 billion (i.e. \$65 billion (which includes the cost for suspension/termination of \$4.8 billion) + \$28.2 billion) to complete the XRL projects.**

**Abandonment of XRL project**

40. The scenario depicted in paragraph 39 above assumes that the XRL project would eventually be resumed within two to three years after suspension and termination of existing XRL contracts. Hence, only minimum amount of protection such as temporary stabilisation would be provided to the unfinished works. Part of the works will still rest on temporary support, and temporary roads would be maintained at their current status and would not be reinstated immediately.



41. However, if the XRL project were abandoned, the Entrustment Cost of **\$65 billion** would **all be wasted**. On top of that, the Government would still need to complete most of the remaining works, including the remaining short section of railway tunnel, most of the civil and structural works at WKT (including excavation works, structural columns, slabs within the Terminus and the rooftop) and the permanent road network around WKT (including the road tunnel at Lin Cheung Road and Austin Road and the road network around Jordan Road) in order to ensure that the safety of the public would not be compromised and the public would not suffer from long-term traffic inconvenience. A very rough estimate by the M&V Consultant is that the cost for completing these essential works would be no less than **\$10.6 billion**. Furthermore, the Government would need to continue maintaining these works until there is a new initiative for their use. Rough estimates of the maintenance cost could be as much as **\$0.1 billion** per year. Separate approval from LegCo would have to be sought for the above additional amounts of money. Together with the loss of Entrustment Cost of \$65 billion (which includes the cost for suspension/termination of \$4.8 billion), the total cost estimated to be incurred under this scenario is at least **\$75.6 billion**.

## **LIABILITIES**

42. The Government deeply regrets the severe delay in, and the substantial cost overrun of, the XRL project. As the Government has publicly committed, we will ascertain the liabilities of the parties concerned and reserve all rights to pursue the warranties and obligations from MTRCL regarding project implementation, works delay and project cost overrun. The process of establishing a case against any particular party, including MTRCL or its agents, is likely to be protracted. In the meantime, we must not lose sight of the fact that the XRL is a major transport infrastructure which will bring significant benefits to Hong Kong. It is imperative for us to provide timely funding to complete the rest of the XRL project.

/ SUMMARY .....

**SUMMARY OF FINANCIAL POSITION**

43. A breakdown of the proposed increase of \$15,387.5 million is as follows –

<b>Factors</b>	<b>Proposed increased amount/savings in MOD prices (\$ million)</b>	<b>Percentage of the total increased amount/savings (%)</b>
Increase due to –		
(a) unfavourable ground conditions	3,647.0	22.8
(b) disruption due to other causes	3,561.0	22.3
(c) changes in design to suit actual site conditions and various unforeseen circumstances	1,591.0	10.0
(d) price escalations	3,096.0	19.4
(e) additional PMC and insurance	2,184.0	13.7
(f) further contingency for the remaining works	1,786.0	11.2
(g) additional government cost	102.5	0.6
(h) Total increase (h) = (a) to (g)	<u>15,967.5</u>	<u>100.0</u>
Partly Offset by –		
(i) Removal of Day 2 Works and associated PMC	(580.0)	
(j) Proposed increase (j) = (h) - (i)	<u>15,387.5</u>	

\_\_\_\_\_ A comparison of the cost breakdown of the original APE and the latest project estimate of **53TR** is at Enclosure 2.

/ **FINANCIAL** .....

**FINANCIAL IMPLICATIONS**

44. Subject to funding approval, we will revise the phased expenditure as follows –

<b>Year</b>	<b>\$ million (in MOD prices)</b>
Up to 31 March 2015	43,245.8
2015 – 16	6,117.0
2016 – 17	5,654.7
2017 – 18	5,400.0
2018 – 19	5,300.0
2019 – 20	3,750.0
2020 – 21	937.5
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	70,405.0
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45. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

**PUBLIC CONSULTATION**

46. We consulted the RSC of the LegCo on the proposed increase in APE for the **53TR** and **57TR** on 4 December 2015 and 14 December 2015. Members supported submitting the funding proposal to the PWSC for examination.

**ENVIRONMENTAL IMPLICATIONS**

47. The proposed increase in the APE will not have any environmental implications.

**ENERGY CONSERVATION MEASURES**

48. The proposed increase in the APE will not lead to any energy conservation measures.

/ **HERITAGE** .....

**HERITAGE IMPLICATIONS**

49. The proposed increase in the APE will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

**LAND ACQUISITION**

50. The proposed increase in the APE will not require any land acquisition or clearance.

**BACKGROUND INFORMATION**

51. The FC approved the upgrading of **53TR** to Cat A in January 2010 at an estimated cost of \$55,017.5 million in MOD prices. We have kept the LegCo informed of the progress of the XRL project, including delays and the reasons for these, delay recovery measures undertaken, as well as cost implications.

52. The proposed increase in the APE will not involve any additional tree removal.

53. The proposed changes in scope under **53TR** will create about 55 jobs for professional/technical staff providing a total employment of 1 700 man-months.

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- 圖例**  
LEGEND
- + - 特別行政區界  
BOUNDARY OF SPECIAL ADMINISTRATIVE REGION
  - 現有鐵路路線  
EXISTING RAIL LINE
  - 擬建廣深港高速鐵路香港段  
PROPOSED HONG KONG SECTION OF THE GUANGZHOU-SHENZHEN-HONG KONG EXPRESS RAIL LINK
  - - - 擬建廣深港高速鐵路內地段  
PROPOSED MAINLAND SECTION OF THE GUANGZHOU-SHENZHEN-HONG KONG EXPRESS RAIL LINK
  - 通風大樓  
VENTILATION BUILDING (VB)
  - 大江埔緊急救援入口  
TAI KONG PO EMERGENCY ASSESS POINT

<p>圖則名稱 drawing title</p> <p>工務計劃項目第53TR號 廣深港高速鐵路香港段 — 鐵路建造工程 香港段位置圖 PWP ITEM NO. 53TR HONG KONG SECTION OF GUANGZHOU-SHENZHEN-HONG KONG EXPRESS RAIL LINK – CONSTRUCTION OF RAILWAY WORKS LOCATION PLAN OF HONG KONG SECTION</p>	<p>設計 designed K. K. LEI 23/11/09</p> <p>繪圖 drawn Y. L. MA 23/11/09</p> <p>核對 checked K. K. LEI 23/11/09</p> <p>核准 approved C. W. YUNG 23/11/09</p> <p>總工程師 CHIEF ENGINEER</p> <p>日期 DATE</p>	<p>圖號 drawing no. HRWXRL002-SP0009</p> <p>版權所有 COPYRIGHT RESERVED</p> <p>鐵路拓展處 RAILWAY DEVELOPMENT OFFICE</p> <p>路政署 HIGHWAYS DEPARTMENT</p>
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**53TR - Hong Kong Section of Guangzhou – Shenzhen –  
Hong Kong Express Rail Link – Construction of Railway Works**

**Comparison between Approved Project Estimate and the latest project estimate**

	(A) Approved Project Estimate (\$ million)	(B) Latest Project Estimate (\$ million)	(B) – (A) Difference (\$ million)
(a) Construction of railway works	46,660.0	63,177.2	16,517.2
(i) civil works for	33,799.2	47,467.5	13,668.3
— terminus	10,116.1	17,482.4	7,366.3
— tunnel and associated structures	20,305.0	25,515.7	5,210.7
— emergency rescue siding and stabling sidings	3,378.1	4,469.4	1,091.3
(ii) architectural works	2,033.1	2,755.4	722.3
(iii) building services	2,675.1	3,793.6	1,118.5
(iv) railway electrical and mechanical works	6,114.2	6,874.6	760.4
(v) rolling stock	2,038.4	2,286.1	247.7
(b) PMC payable to the MTRCL for planning, management and supervision of the project, covering overheads and management expenses of the MTRCL	3,600.0	5,045.0	1,445.0
(c) Fees for consultants appointed by the Government for monitoring and vetting MTRCL's work including cost of the project, the financial consultancy studies and other studies as well as litigation services for handling MTRCL culpability issues, together with the associated contingency	294.3	396.8	102.5
(d) Contingencies	4,463.2	0.0	(4,463.2)
(e) Contingencies for remaining works	0.0	1,786.0	1,786.0
Total	55,017.5	70,405.0	15,387.5
	(in MOD prices)	(in MOD prices)	

The total difference of \$16,517.2 million of construction of railway works is attributed to (i) unfavourable ground conditions of \$3,647 million, (ii) disruption due to other causes of \$3,561 million, (iii) changes in design to suit actual site conditions and various unforeseen circumstances of \$1,591 million, (iv) price escalation of \$3,096 million, (v) additional insurance of \$739 million, plus (vii) the consumption of the original contingency amount of \$4,463.2 million. It also nets off the \$580 million saved by removal of Day 2 Works.

2. The reasons of the cost difference between the latest project estimate and the APE for each major section of the works are elaborated in the paragraphs below.

3. As regards **items (a)(i) (civil works for terminus, tunnel and associated structures, emergency rescue siding and stabling sidings)**, the increase in estimate of \$13,668.3 million is mainly for –

- (a) the additional works due to unfavourable ground conditions encountered, including the discovery of extensive utilities and unforeseen ground conditions including uncharted large boulders, corestones and uneven bedrock at WKT and Approach Tunnels; inflow of groundwater at the unforeseen high rate at Ngau Tam Mei shaft and Ngau Tam Mei to Tai Kong Po Tunnels and etc.;
- (b) disruption caused by others, including the knock-on delay on the structure works due to the foundation works and the associated delay mitigation works;
- (c) changes in design to suit actual site conditions and various unforeseen events, for example, the design of the drill-and-blast tunnel (rural section) was revised to cater for the high underground water table and large volume of groundwater ingress encountered during construction; and
- (d) additional allowance for price escalations over the extended construction period.

4. As regards **items (a)(ii), (a)(iii) and (a)(iv) (architectural works, building services, railway electrical and mechanical works)**, the increase in estimate of \$2,601.2 million is mainly for –

- (a) the additional cost contract prolongation, extended warranty, temporary storage and fragmented working schedule due to the disruption caused by the delay in civil contracts; and
- (b) additional allowance for price escalations over the extended construction period.

5. As regards **item (a)(v) (rolling stock)**, the increase in estimate of \$247.7 million is mainly for –

- (a) the additional contract prolongation, extended warranty and temporary storage for the manufactured rolling stock due to the delay in civil contracts; and
- (b) additional allowance for price escalations over the delayed procurement programme.

6. As regards **item (b) (PMC payable to the MTRCL for planning, management and supervision of the project, covering overheads and management expenses of the MTRCL)**, the increase in estimate of \$1,445.0 million is mainly to cover the additional expenses on the staff, accommodation and corporate costs for the MTRCL project team and project headquarters team, as well as other support services for the extended construction period.

7. As regards **item (c) (Fees for consultants appointed by the Government for monitoring and vetting MTRCL's work including cost of the project, the financial consultancy studies and other studies as well as litigation services for handling MTRCL culpability issues, together with the associated contingency)**, the increase in estimate of \$102.5 million is mainly to cover the increase in expense for the M&V consultancy services and other studies over the extended construction period. Allowance for litigation support to handle the liability issues of the MTRCL is also included

8. **Item (d) (contingencies)** under APE has been committed to offset the increase in the cost of Item (a). Based on the proposal of MTRCL, **Item (e) (further contingencies for remaining works)** of \$1,786.0 million is needed for the additional cost certainty in light of continuous challenges and risk which may arise as a result of past or future risk events. It mostly covers further allowance for contractors' claims which may increase on receipt of further substantiations from the contractors, and allowance for uncertainty associated with the current heated construction market with high cost escalation.