## Legislative Council Panel on Transport Subcommittee on Matters Relating to Railways

## Application for Additional Funding for the South Island Line (East) – Essential Public Infrastructure Works

### Purpose

This paper seeks Members' support to increase the approved project estimate ("APE") for **56TR** by \$286.2 million, from the original \$972.0 million to \$1,213.2 million (in money-of-the-day ("MOD") prices).

## Background

2. The scheme of South Island Line (East) ("SIL(E)") consists of a railway line of seven kilometres running from Admiralty to South Horizons with three intermediate stations at Ocean Park, Wong Chuk Hang and Lei Tung Estate. Passengers can interchange at Admiralty Station for the existing Island Line, Tsuen Wan Line and the future Shatin to Central Link. The schematic layout of the SIL(E) is at **Annex 1**.

3. To tie in with the commissioning of the SIL(E), we need to provide a safe, convenient and barrier free access to the SIL(E) stations through enhancement of pedestrian and transport links to the railway line, so that the consequential social and economic benefits of the SIL(E) can be fully realised. The Essential Public Infrastructure Works ("EPIW") (see location plan at **Annex 2**) include:

- (i) construction of a public transport interchange ("PTI") underneath
   Wong Chuk Hang Station; improvement of the road network in the
   vicinity of Ocean Park Station and Wong Chuk Hang Station;
- (ii) modification of a section of Wong Chuk Hang Nullah between Ocean Park Road and Nam Long Shan Road;
- (iii) construction of a covered footbridge connecting Wong Chuk Hang Station to the adjacent industrial area and a covered footbridge linking the western part of Ap Lei Chau Estate to Yi Nam Road near Precious Blood Primary School; and
- (iv) construction of a pedestrian link to Aberdeen Channel Promenade; road improvement works at the road junction of Ap Lei Chau Drive

#### and Ap Lei Chau Bridge Road.

The ensuing paragraphs give a brief account of the scope and function of each of EPIW.

### PTI underneath Wong Chuk Hang Station

4. To facilitate the citizens to use the SIL(E) and other modes of public transport, we have constructed a PTI underneath Wong Chuk Hang Station. The PTI will serve both the local residents in the Wong Chuk Hang area as well as the working population in the Wong Chuk Hang industrial area.

## Improvement of the existing road network in the vicinity of Ocean Park Station and Wong Chuk Hang Station

5. To cope with the anticipated traffic growth in the existing road network in the vicinity of Ocean Park Station and Wong Chuk Hang Station upon the commissioning of the SIL(E), we have widened and/or realigned a number of roads, namely Heung Yip Road, Wong Chuk Hang Road, Ocean Park Road, Nam Long Shan Road, Tong Bin Lane and Police School Road, as well as modified some critical road junctions to increase traffic capacity. The existing footpaths at these roads have also been widened to enhance pedestrian flow and to provide extra space for landscaping works to create a better walking environment for pedestrians.

## Modification of the existing Wong Chuk Hang nullah

6. To provide the necessary space for the construction of the PTI underneath Wong Chuk Hang Station and the widening of Heung Yip Road as mentioned in paragraphs 4 and 5 above, we have widened and modified a section of existing Wong Chuk Hang Nullah alongside Heung Yip Road, which is about 650 metres in length, to a decked structure. This can retain the existing channel and enable the construction of the required transport facilities. This decked structure continues to meet the current stormwater drainage design standard and can help relieve the odour problem brought about by the existing open nullah.

## Covered footbridge link to the Wong Chuk Hang industrial area

7. The covered footbridge provides a direct, safe and convenient connection between Wong Chuk Hang Station and the adjacent industrial area. Lifts have been installed at all the landing areas of the footbridge to provide barrier-free access.

## Covered footbridge link to Ap Lei Chau Estate

8. One of the entrances/exits of South Horizons Station is located at Yi Nam Road, south of Ap Lei Chau Bridge Road. Ap Lei Chau Estate is located on an elevated platform at about seven metres above Yi Nam Road, to the north of Ap Lei Chau Bridge Road. Without the footbridge, the residents of Ap Lei Chau Estate will have to make a detour of about 300 metres to the at-grade crossing near the junction of Ap Lei Chau Bridge Road and Yi Nam Road in order to reach South Horizons Station. This will cause great inconvenience to the residents of Ap Lei Chau Estate, in particular the elderly and the physically disabled.

9. The footbridge provides a direct, safe and convenient connection between Ap Lei Chau Estate and the entrance of South Horizons Station at Yi Nam Road. A lift has been installed at the footbridge to provide a barrier-free access.

## Pedestrian link to Aberdeen Channel Promenade

10. In response to the strong request of the residents of the Southern District, the Tourism Commission carried out beautification works to enhance Aberdeen Channel Promenade, as part of the overall beautification of the Aberdeen area. To facilitate access to the Promenade, we have constructed a pedestrian link to provide a direct access from Wong Chuk Hang Station to the Promenade.

11. In addition to the footbridge across Wong Chuk Hang Nullah, the pedestrian link also includes other facilities, such as a lookout point at the

Promenade waterfront, an open space of about 1,140 square metres<sup>1</sup>, and landscaping works underneath Ap Lei Chau Bridge Road. These facilities are provided in response to the requests of the Southern District Council.

#### Junction improvement at Ap Lei Chau Drive and Ap Lei Chau Bridge Road

12. During the construction of the SIL(E), the road junction of Ap Lei Chau Drive and Ap Lei Chau Bridge Road was closed off temporarily to facilitate the excavation works for the tunnel of the SIL(E). After the completion of the excavation works, widening and improvement works were undertaken at the road junction. The junction improvement enables the road junction to cope with the anticipated traffic growth due to future residential development at Ap Lei Chau Praya Road.

#### **EPIW**

13. In April 2011, the Finance Committee of the Legislative Council approved the upgrading of **56TR** to Category A and named the project as "SIL(E) – EPIW". The estimated cost of the project was \$927 million in MOD prices. The approved scope of **56TR** is at **Annex 3**.

#### **Progress of the Works**

14. The Government entered into an agreement with the MTR Corporation Limited ("MTRCL") in May 2011 to entrust the design and construction of the EPIW to MTRCL, so as to ensure better coordination between the EPIW and SIL(E) project, and to construct them in tandem. The construction of the EPIW and the railway works of SIL(E) commenced in 2011. Each of the EPIW has been gradually completed and opened for public use from January 2015 to August 2016, with a view to tallying the commissioning of the SIL(E).

<sup>&</sup>lt;sup>1</sup> The area of the open space at the side of the pedestrian link to Aberdeen Channel Promenade was 1,140 square metres in the preliminary design. The area is revised to 1 190 square metres in the detailed design.

#### **Justifications for Additional Funding**

15. As mentioned in our previous quarterly reports to the Committee since May 2015, MTRCL estimated that the construction cost of the EPIW of the SIL(E) would exceed the budget. MTRCL had been reviewing the amount of cost overrun and the Highways Department ("HyD") continued to raise questions and requested for further detailed information. On 17 August 2016, the MTRCL informed HyD that the amount of cost overrun would be about \$290 million. Having conducted a detailed review of the financial position and reports of MTRCL, we consider that it is necessary to increase the APE for **56TR** by \$286.2 million (in MOD prices), to cover the expenses arising from the following –

- (i) unfavourable ground conditions;
- (ii) underground utilities being more complicated than expected;
- (iii) change in design to suit the actual site conditions;
- (iv) additional funding provision for price adjustments; and
- (v) adjustment of the on-cost payable to the MTRCL.

Details of the increase in APE are set out in paragraphs 16 to 22 below.

#### (I) Unfavourable ground conditions

16 The unfavourable ground conditions have mainly affected the bulk excavation and pile foundation works for the modification works of the existing Wong Chuk Hang nullah. In preparing the project estimate for **56TR**, we adopted the site investigation information available at that time for the design of the modification works of Wong Chuk Hang Nullah. The then site investigation had been completed by using the commonly adopted method, i.e. collecting underground samples for testing and analysis. However, in order to minimise the impact on the flood control function of the nullah, and to avoid disturbing the intricate underground utilities network and heavy road traffic, the amount and locations of the site investigation works were affected. During the construction stage, the contractor had to implement various stages of temporary traffic management schemes and precautionary measures with a view to carrying out the site investigation at roads and nullah. Unforeseen large boulders and corestones were identified underneath the nullah. As a result, the construction programme had to be modified to allow for the removal of boulders and corestones so that the piles could reach the bedrock stratum.

17. Besides, the bedrock stratum of sufficient bearing capacity for piles was deeper than expected, resulting in longer piles. The progress of the piling works was hampered and behind schedule. As result, the subsequent modification works for Wong Chuk Hang Nullah could not be carried out in a dry season as scheduled. To mitigate the delay, the contractor had adopted hanging falseworks, which were more expansive than traditional scaffoldings so that modification works of the nullah could continue during the wet season without affecting its flood control function. The contractor had employed additional manpower, altered the construction method, and deployed extra machinery and materials to complete the works. The unfavourable ground conditions cause an increase of cost by \$64.5 million.

#### (II) Underground utilities being more complicated than expected

18. During the design of the road network in the vicinity of Ocean Park Station and Wong Chuk Hang Station, MTRCL had collected information from the public utility companies and relevant stakeholders about the existing utilities within the extent of the road works. In parallel, trial trenches/pits were carried out on the footpaths to verify the correctness of the utilities records. Although information collection had been completed before works commencement, the contractor encountered substantial amount of uncharted utilities underneath roads (for instance, Nam Long Shan Road, Heung Yip Road, Ocean Park Road, Police School Road and Wong Chuk Hang Road, etc.) during the road construction. It was necessary for the contractor to liaise, coordinate and obtain the agreements of the public utility companies for the temporary suspension or permanent diversion of some of the public utilities concerned, thereby modifying or lengthening the period of the relevant temporary traffic management schemes. The progress of the works was therefore adversely affected. The design and construction methods were partly modified to mitigate the impact on works arising from the underground utilities. For instance, as regards the drainage works at Nam Long Shan Road, trenchless method instead of the originally planned open cut method was used, so as to minimise the delays to the works due to open cut excavation which required the diversion of public utilities at the busy road. Therefore, the contractor had to employ additional labour, alter the

construction method and deploy extra machinery to complete the works. The cost of the works was increased by \$79.4 million.

### (III) Change in design to suit the actual site conditions

19. During the construction of the EPIW, variations and enhancements to the design and construction method have been made to suit the actual site conditions. A representative case was the enhancement of the fire prevention facilities of the semi-open PTI underneath Wong Chuk Hang Station. During the construction stage, we considered necessary to enhance the fire prevention facilities, including installation of additional fire sprinklers and fire alarms, etc. A number of street lights were also added during the road improvement works in Wong Chuk Hang and Ap Lei Chau areas, with a view to providing better road environment for the public. The cost of the works was increased by \$33.1 million.

## (IV) Additional funding provision for price adjustments

20. When the estimate of the project was prepared in 2011, a provision of \$91.4 million was allowed for price adjustments based on the Government's "price adjustment factors" available at that time and the cash flow pattern. Due to the above factors of cost increase, together with the changes in construction methods and sequences, the cash flow pattern of the EPIW was then different from the originally anticipated and we needed to increase the provision for price adjustments. Based on the latest project estimate, cash flow and the "price adjustment factors" compiled by the Government in September 2016, the provision for price adjustments will increase by \$136.1 million, from 91.4 million to \$227.5 million. Details of the latest cash flow of the project and the latest provision for price adjustment are at **Annex 4**.

#### (IV) Adjustment of the on-cost payable to the MTRCL

21. The on- $\cos^2$  payable to the MTRCL stated in the funding application in 2011 was \$176 million. With the increased construction cost and extended construction period of the EPIW, an additional design and management cost of

 $<sup>^{2}</sup>$  An on-cost is payable to MTRCL for undertaking the technical studies, design and construction supervision of the EPIW.

\$29.1 million for the whole project is required to cover the cost arising from the additional design requirement and management fee for extended period.

### Saving item

### Review of the Contingencies

22. Out of the contingencies (i.e. \$76.0 million) under the original APE, \$56 million has been allocated for the additional costs arising from the above reasons. Although the EPIW items have been completed substantially, we propose to make an additional contingency provision of \$20 million under **56TR** for settling additional payments in case some of the claims from contractors are established.

### **Summary of Financial Position**

23. A breakdown of the proposed cost increase of 286.2 million is as follows –

	Factors	Proposed increased amount/savings (in MOD prices) (\$ million)	Percentage of the total increased amount/savings (%)
	Increase due to –		
(i)	unfavourable ground conditions	64.5	18.8
(ii)	underground utilities being more complicated than expected	79.4	23.2
(iii)	change in design to suit the actual site conditions	33.1	9.7
(iv)	additional funding provision for price adjustments	136.1	39.8
(v)	adjustment of the on-cost	29.1	8.5

payable to the MTRCL

(vi)	total increase (vi) = (i) to (v)	342.2	100
	partly offset by –		
(vii)	drawdown from contingencies	56.0	100
(viii)	proposed total increase (viii) = (vi) - (vii)	286.2	

A comparison of the cost breakdowns of the original APE and the revised project estimate is at **Annex 5**.

### **Financial Implications**

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

	\$ million
Year	(in MOD prices)
Up to 31 March 2017	914.2
2017-2018	95.7
2018-2019	98.9
2019-2020	104.4
Total	1,213.2

25. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

### Next Step

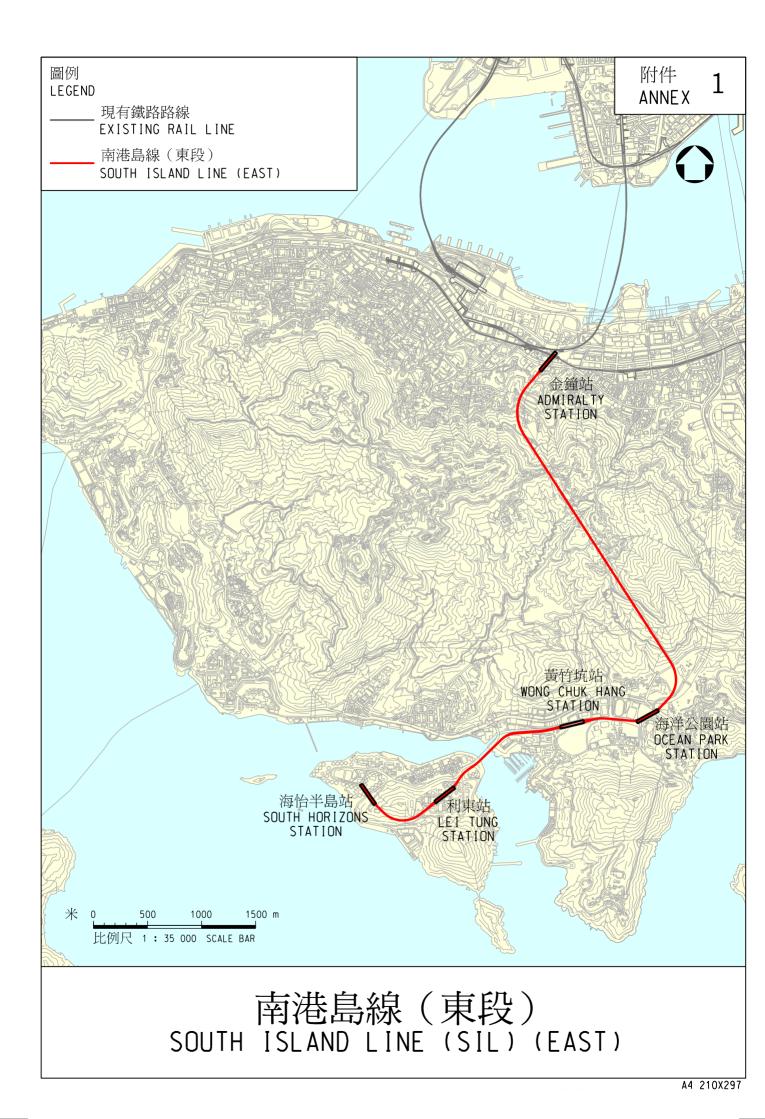
26. We plan to seek the Members' views at the meeting of the Public Works Subcommittee in the first quarter of 2017 and subsequently the funding approval from the Finance Committee.

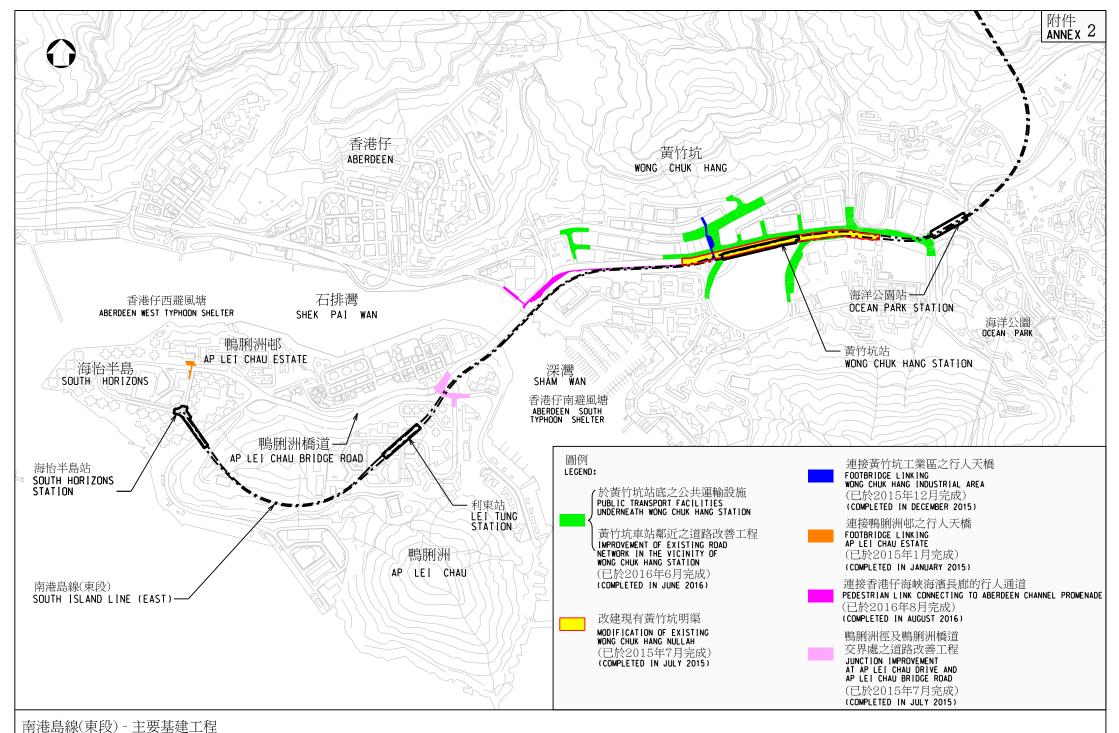
### **Advice Sought**

27. Members are invited to support the proposal to increase the APE for **56TR** by \$286.2 million, from \$927.0 million to \$1,213.2 million.

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Transport and Housing Bureau Highways Department December 2016





SOUTH ISLAND LINE (EAST) - ESSENTIAL PUBLIC INFRASTRUCTURE WORKS

## Annex 3

## South Island Line (East) (SIL(E)) – Essential Public Infrastructure Works (EPIW)

## The Approved Scope of 56TR

In April 2011, the Finance Committee of the Legislative Council approved the upgrading of **56TR** to Category A and named the project as "SIL(E) – EPIW". The approved scope of **56TR** comprises –

### Wong Chuk Hang Station area

- (a) construction of a public transport interchange with floor area of about 2 200 square metres underneath Wong Chuk Hang Station, including
  - (i) a bus bay of 12 metres in length for accommodating eight double-decker buses;
  - (ii) a green minibus (GMB) bay for accommodating four GMBs;
  - (iii) a taxi stand for accommodating six taxis;
  - (iv) a general loading/unloading bay of 30 metres in length; and
  - (v) associated road, drainage, street lighting, electrical and mechanical and landscaping works;
- (b) improvement of the existing road network in the vicinity of Ocean Park Station and Wong Chuk Hang Station, including –
  - (i) widening of a section of Heung Yip Road which is about 650 metres in length from one lane each way to two lanes each way;
  - (ii) realignment of a section of Wong Chuk Hang Road which is about 310 metres in length;
  - (iii) realignment of a section of Ocean Park Road which is about 250 metres in length;
  - (iv) realignment and widening of a section of Nam Long Shan Road which is about 150 metres in length;
  - (v) realignment and widening of a section of Police School Road which is about 200 metres in length;
  - (vi) modification to the road junctions at Heung Yip Road/Ocean Park

Road, Heung Yip Road/Police School Road, Heung Yip Road/Nam Long Shan Road, Wong Chuk Hang Road/Nam Long Shan Road, and Wong Chuk Hang Road/Tong Bin Lane; and

- (vii) associated road, drainage, street lighting, geotechnical, slope and landscape works;
- (c) modification of a section of the existing Wong Chuk Hang Nullah which is about 650 metres in length between Ocean Park Road and Nam Long Shan Road;
- (d) construction of a covered footbridge of about 180 metres in length connecting Wong Chuk Hang Station to the adjacent industrial area, which also includes –
  - (i) a staircase and a lift at Wong Chuk Hang Road adjacent to Regency Centre;
  - (ii) a staircase and a lift at the existing Nam Long Shan Road sitting-out area;
  - (iii) a staircase and a lift adjacent to Nam Long Shan Road Cooked Food Market; and
  - (iv) re-provisioning of the Nam Long Shan Road sitting-out area;

#### South Horizons Station area

- (e) construction of a covered footbridge of about 80 metres<sup>1</sup> in length across South Horizons Drive, linking the western part of Ap Lei Chau Estate to Yi Nam Road near Precious Blood Primary School, which also includes –
  - (i) a staircase and a lift adjacent to Precious Blood Primary School;
  - (ii) re-provisioning of the existing Ap Lei Chau Estate sitting-out area; and
  - (iii) associated road and drainage works;

<sup>&</sup>lt;sup>1</sup> After the detailed design, the length of the covered footbridge link to Ap Lei Chau Estate is revised to 50 metres.

#### Aberdeen Channel waterfront area

- (f) construction of a pedestrian link to Aberdeen Channel Promenade comprising
  - (i) a covered footbridge of about 36 metres in length;
  - (ii) a walkway of about 800 metres in length between Wong Chuk Hang Station and Kwun Hoi Path;
  - (iii) an open space of 1 140 square metres<sup>2</sup> and a lookout point at the Aberdeen Channel waterfront; and
  - (iv) associated drainage and landscaping works; and

#### Lei Tung Station area

(g) road improvement works at the road junction of Ap Lei Chau Drive and Ap Lei Chau Bridge Road.

 $<sup>^{2}</sup>$  After the detailed design, the area of the open space at the side of the pedestrian link to Aberdeen Channel Promenade is revised to 1 190 square metres.

## Annex 4

#### 56TR — South Island Line (East) — Essential Public Infrastructure Works

Year	Year Original Project Estimate (in Sep 2010 prices) (\$ million)		Approved Project Estimate (in MOD prices) (\$ million)	Provision for Price Adjustment (\$ million)	
	X	Y	Z	A=Z-X	
2011-2012	254.8	1.04250	265.6	10.8	
2012-2013	288.3	1.09463	315.6	27.3	
2013-2014	186.6	1.14936	214.5	27.9	
2014-2015	79.7	1.20682	96.2	16.5	
2015-2016	13.2	1.27169	16.8	3.6	
2016-2017	5.0	1.34163	6.7	1.7	
2017-2018	5.0	1.41542	7.1	2.1	
2018-2019	3.0	1.49327	4.5	1.5	
Total	835.6		927.0	91.4	

Table 1 — Cash Flow and Provision of Price Adjustment contained in **PWSC(2010-11)33** 

Note:

# The original price adjustment factor has been derived on the basis of the projected movement of prices for the then public sector building and construction output.

#### 56TR — South Island Line (East) — Essential Public Infrastructure Works

Year	Latest Project Estimate (in Sept 2010 prices) (\$ million)	Latest Project Estimate (in Sep 2016 prices) (\$ million) ^^	Latest Price Adjustment Factor (Sep 2016) ##	Latest Project Estimate (in MOD prices) (\$ million)	Latest Provision for Price Adjustment (\$ million)	Net Increase in Provision for Price Adjustment (\$ million)
	a	b	с	d	e	f
Up to Mar 2016^	712.3	807.6	1.00000	807.6		
2016-2017	78.1	106.6	1.00000	106.6		
2017-2018	66.3	90.5	1.05750	95.7	e=d-a	f=e-A
2018-2019	64.6	88.2	1.12095	98.9		
2019-2020	64.4	87.9	1.18821	104.4		
Total	985.7	1,180.8		1,213.2	227.5	136.1

Table 2 — Revised	Cash Flow and	1 Provision for	Price Adjustr	nent of <b>56TR</b>
Tuble 2 Revised			I Hee Hujusti	

Note:

## The price adjustment factors promulgated in September 2016 were based on the latest movement of prices for public sector building and construction output, which were assumed to increase by 6% per annum from 2017 to 2020.

<sup>^</sup> Up to March 2016, the actual expenditure, after deducting the price adjustment factor, is \$ 712.3 million; the actual expenditure with the price adjustment factor is \$ 807.6 million.

^^ The September 2016 prices are converted by multiplying the latest project estimate (in September 2010 prices) by 1.36537. The figure of 1.36537 represents the changes in price movement for public sector building and construction output between September 2010 and September 2016.

# 56TR— South Island Line (East) (SIL(E)) – Essential Public Infrastructure Works (EPIW)

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

		(A) Approv Project Est (\$ millio	timate	(B Latest P Estim (\$ mill	Project nate	(B) – Differ (\$ mill	ence
(a)	Public transport interchange (PTI) underneath Wong Chuk Hang (WCH) Station		18.7		32.7		14.0
	<ul> <li>(i) road, bus bays, minibus bay, taxi stand, loading/ unloading bays</li> </ul>	5.5		4.7		(0.8)	
	<ul><li>(ii) drainage, street lighting,</li><li>E&amp;M and landscaping works</li></ul>	13.2		28.0		14.8	
(b)	Improvement of the existing road network in the vicinity of WCH station		73.7		112.7		39.0
	(i) junction modification	14.3		42.5		28.2	
	<ul> <li>(ii) road, drainage, street lighting, geotechnical, slope works and landscaping works</li> </ul>	59.4		70.2		10.8	
(c)	Modification of existing WCH nullah		415.8		508.1		92.3
	(i) foundation	100.1		154.5		54.4	
	(ii) decking works	250.8		279.9		29.1	
	(iii) road, drainage and landscaping works	64.9		73.7		8.8	
(d)	Footbridge link to WCH industrial area		69.3		89.8		20.5
	(i) footbridge	50.6		76.7		26.1	
	<ul><li>(ii) road, drainage and landscaping works</li></ul>	18.7		13.1		(5.6)	
(e)	Footbridge link to Ap Lei Chau Estate		16.5		28.6		12.1
	(i) footbridge	14.5		26.5		12.0	
	(ii) drainage and landscaping	2.0		2.1		0.1	
(f)	Pedestrian link		53.0		46.7		(6.3)
	(i) footbridge	5.0		8.2		3.2	

		(A) Approved Project Estimate (\$ million)	(B) Latest Project Estimate (\$ million)	(B) – (A) Difference (\$ million)
(ii) road, dra landscap	inage and ing works	48.0	38.5	(9.5)
	provement at Ap Lei and Ap Lei Chau	5.0	10.4	5.4
(h) On-cost paya	able to MTRCL <sup>1</sup>	107.6	136.7	29.1
(i) Contingencie	es	76.0	20.0	(56.0)
Sub-total		835.6	985.7	150.1
		(in September 2010 prices)	(in September 2010 prices)	
(j) Provision for	r price adjustment	91.4	227.5	136.1
Total		927.0	1,213.2	286.2
		(in MOD prices)	(in MOD prices)	

As regards **item (a) PTI underneath WCH Station**, the increase of \$14.0 million is mainly due to the enhancement of the fire prevention facilities of the PTI.

2. As regards item (b) improvement of the existing road network in the vicinity of WCH station, the increase of \$39.0 million is mainly due to the underground utilities being more complicated than expected.

3. As regards **item (c) modification of existing WCH nullah**, the increase of \$92.3 million is mainly due to the unfavourable ground conditions, and the underground utilities being more complicated than expected.

4. As regards item (d) footbridge link to WCH industrial area; item (e) footbridge link to Ap Lei Chau Estate; item (f) pedestrian link; and item (g) junction improvement at Ap Lei Chau Drive and Ap Lei Chau Bridge Road, the net increase of \$31.7 million is mainly due to design changes to suit site conditions, and the underground utilities being more complicated than expected.

5. As regards **item (h) on-cost payable to MTRCL**, the increase of \$29.1 million is an adjustment to the payment for the MTRCL's services according to the Entrustment Agreement.

<sup>&</sup>lt;sup>1</sup> An on-cost at 16.5% of the project base cost (i.e. items (a) to (g) of above) is payable to MTRCL for undertaking the technical studies, design and construction supervision of the EPIW.

6. As regards **item (i) contingencies**, we drew down \$56.0 million from the contingencies to partly cover the cost increase in the items mentioned above. The remaining sum of \$20.0 million has to be retained as contingencies for settling additional payments in case some of the claims from contractors are established.

7. As regards **item (j) provision for price adjustment**, an increase of \$136.1 million in price adjustment is based on the increase in the latest price adjustment factors promulgated by the Government, as well as the latest anticipated cash flow of the project. Details are given in paragraph 20 of the main paper and **Annex 4**.