

For information

Legislative Council Panel on Development

**76WC – Improvement to Hong Kong
Central mid-level and high level areas water supply – remaining
works**

PURPOSE

This paper provides Members with details on a proposal to increase the approved project estimate of **76WC** from \$229.3 million by \$99.7 million to \$329.0 million in money-of-the-day (MOD) prices.

PROJECT SCOPE

2. The approved scope of works under **76WC** comprises -

Mid-level Area

- (a) construction of the New Hatton Road No. 1 and No. 2 fresh water service reservoirs with storage capacities of 2 500 cubic metres (m³) and 4 500 m³ respectively to replace the existing Hatton Road fresh water service reservoirs;
- (b) uprating of the Hatton Road fresh water service reservoir pump group in the existing Western fresh water and salt water pumping station from 5 530 m³ per day (m³/day) to 7 300 m³/day;
- (c) laying of about 5 400 metres (m) fresh water trunk mains of diameters ranging from 300 millimetres (mm) to 700 mm and about 4 100 m salt water distribution mains of diameters ranging from 200 mm to 450 mm;

High Level Area

- (d) construction of the Peak No. 2 fresh water service reservoir with a storage capacity of 1 750 m³;
- (e) construction of the Kotewall Road fresh water pumping station with an output of 3 300 m³/day;
- (f) relocation of the existing Peak fresh water pumping station with an output of 345 m³/day;
- (g) uprating of the Kotewall Road fresh water service reservoir pump group in the existing Western fresh water and salt water pumping station from 14 500 m³/day to 17 300 m³/day; and
- (h) laying of about 1 600 m fresh water trunk mains of diameters ranging from 200 mm to 700 mm and about 300 m fresh water distribution mains of diameter 200 mm.

———— A site plan showing the proposed works is at Enclosure 1.

3. Construction started in October 2007. The original completion date was scheduled for June 2011. In view of the potential extension of time to be granted for inclement weather and the unforeseen circumstances as detailed in paragraphs 5 and 6 below, the project is anticipated to be completed by September 2012.

JUSTIFICATION

4. Following a review of the financial position of the project, it is found necessary to increase the approved project estimate (APE) of **76WC** from \$229.3 million by **\$99.7 million** to \$329.0 million in MOD prices to cover additional costs arising from the following -

- (a) unforeseen working hour restriction;
- (b) unforeseen ground conditions;
- (c) increase in site supervision costs; and
- (d) increase in provision for price adjustment.

On the other hand, the increases in cost has been partly offset by-

- (e) a net decrease in tender prices upon award of contract; and
- (f) drawing down of the project contingencies.

Details for the increases and offsets in cost are given in paragraphs 5 to 11 below.

Unforeseen Working Hour Restriction

5. In carrying out the mainlaying works in the mid-level area, we encountered unforeseen restriction on working hours which necessitated additional costs. A traffic impact assessment (TIA) was carried out during the design stage of the project for the mainlaying works. The finalised TIA report was completed in October 2006 and circulated to the authorities concerned. No adverse comment was received at that time. The report recommended that mainlaying works at critical road locations should be carried out only during non-peak hours, i.e. during the six hours between 10:00am and 4:00pm of the days which are not public holidays or Sunday. When the mainlaying works in the mid-level area began in April 2008, it then came to light that there were significant problems and difficulties in applying the daily working period of six hours in many of the locations concerned. This was primarily attributed to the increase in other construction activities, the prevailing traffic conditions as well as the heightened public concerns about traffic and road safety in the areas. On further consultation with the authorities concerned, it was found that the daily working period for a significant portion of the mainlaying works, particularly in Conduit Road and Lyttelton Road, would need to be further restricted to a period between 10:00am and 3:00pm, thus requiring additional cost and longer construction period. The total additional payment due to unforeseen working hour restriction is estimated to be **\$29.1 million**.

Unforeseen Ground Conditions

6. When works commenced in early 2008, the existing ground condition of the roads in mid-level area were found to be much congested with utilities than expected which necessitated changes of the water main alignment in many locations. As a result, we need to introduce many more bends and fittings to lay the water mains amid clutter of closely packed pipes and cables and other underground obstructions. Such process inevitably involves the laying of longer pipe lengths and requires additional road opening, excavation, pipe fittings and anchor blocks, thus requiring additional cost and longer construction period. The total additional mainlaying cost resulting from such unexpected difficult ground condition is estimated to be **\$27.8 million**.

7. Unforeseen geological conditions were also encountered during the construction of the Hatton Road No. 1 fresh water service reservoir. A larger amount of boulders than that anticipated in the design stage was found in the course of site formation. Therefore, additional excavation works and slope stabilization works were carried out to cater for the actual site conditions. The total additional payment due to unforeseen geological conditions is estimated to be **\$6.0 million**.

Increase in Site Supervision Costs

8. The original APE covers consultants' staff cost of \$18.2 million for 478 man-months of resident site staff (RSS) to be deployed by consultants for site supervision. Following a review, we anticipate that extra RSS resources is required to cater for the unforeseen difficulties encountered during construction as well as the extended construction time due to inclement weather and circumstances as explained in paragraphs 5 to 7 above. We estimate that the RSS man-months will increase from 478 to 890 man-months and the cost will increase from \$18.2 million by **\$17.3 million** to \$35.5 million.

Increase in Provision for Price Adjustment

9. According to existing Government practice, monthly payments to contractors for construction contracts are adjusted to cover market fluctuation in labour and material costs on the basis of "Index Numbers of the Costs of Labour and Materials used in Public Sector Construction Projects", which are known as Contract Price Fluctuation (CPF) payment. A provision of \$5 million was allowed in the original APE for the price adjustment based on the prevailing price adjustment factors and the project cash flow projected in 2007. However, in the light of the upsurge of the actual CPF during construction, we anticipate the provision for price adjustment will have to be increased from \$5 million by **\$34.6 million** to \$39.6 million. Details are at Enclosure 2.

Offset by Decrease in Tender Prices

10. Compared with the total value of \$184.3 million allowed in the APE for the contract works, the corresponding total value based on the tender prices was calculated to be \$176.8 million, representing a decrease in the overall cost of the contract works by **\$7.5 million**. Thus, the above cost increases can be offset by the same amount.

Offset by Drawing Down from Contingencies

11. The original APE covers a provision of \$20.4 million for contingencies, which is 10% of the estimated works value plus the consultants' fees. As the corresponding remaining expenditure is about \$127.9 million, we propose to revise the provision to \$12.8 million, allowing the difference in contingencies provision of **\$7.6 million** to offset the above cost increases.

Summary of Review Results

12. A comparison of the cost breakdown of the APE and the revised project estimates is at Enclosure 3. The summary below shows the make up of the proposed increase of \$99.7 million, comprising a cost increase of \$114.8 million which is offset by savings of \$15.1 million, as discussed in paragraphs 5 to 11 above –

Factors		Proposed increased amount/saving in MOD prices (\$ million)	% of the total increased amount/ savings
<u>Increase due to–</u>			
(a)	Unforeseen working hours restriction	29.1	25.4
(b)	Unforeseen ground conditions	33.8	29.4
	(i) Mainlaying works	27.8	24.2
	(ii) Site Formation	6.0	5.2
(c)	Site supervision	17.3	15.1
(d)	Increase in provision for price adjustment	34.6	30.1
		<hr/>	<hr/>
(e)	Total cost increase (e = a + b + c + d)	114.8	100.0

Offset by–

(f)	Decrease in tender prices	7.5	49.7
(g)	Drawdown from contingencies	7.6	50.3
		<hr/>	<hr/>
(h)	Total saving (h = f + g)	15.1	100.0
		<hr/>	<hr/>
(i)	Proposed increase (i = e - h)	99.7	
		<hr/>	

FINANCIAL IMPLICATIONS

13. Subject to approval, we will revise the phasing of the expenditure as follows –

Year	\$ million (MOD)
Up to 31 March 2010	194.3
2010 – 2011	52.4
2011 – 2012	40.6
2012 – 2013	26.7
2013 – 2014	15.0
	<hr/>
	329.0
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14. The proposed increase in the APE will not give rise to any additional recurrent expenditure.

PUBLIC CONSULTATION

15. The proposed increase in the APE does not involve any change in the

scope of the project, we consider that further public consultation is not necessary.

ENVIRONMENT IMPLICATION

16. The proposed increase in the APE does not have any environmental implication.

HERITAGE IMPLICATION

17. The proposed increase in the APE does not have any heritage implication.

LAND ACQUISITION

18. The proposed increase in the APE does not require any land acquisition.

BACKGROUND

19. In January 1995, we upgraded part of **76WC** to Category A as **77WC** “Improvement to Hong Kong Central mid-level and high level areas water supply – Stage 1” at an estimated cost of \$20.5 million (in MOD prices) for the construction of the extension of new Albany fresh water pumping station (FWPS) and the laying of salt water mains along Robinson Road. We started the works in November 1995 and completed them in September 1999.

20. In May 2003, we upgraded another part of **76WC** to Category A as **183WC** “Improvement to Hong Kong Central mid-level and high level areas water supply – Stage 2” at an estimated cost of \$70.6 million (in MOD prices) for the construction of Magazine Gap Road No.3 fresh water service reservoir, upgrading of Magazine Gap Road FWPS, Bowen Road FWPS, Severn Road FWPS and the laying of fresh water mains in the Bowen Road group high level supply system. We started the works in August 2003 and completed them in November 2006.

21. In May 2007, the final phase of **76WC** was upgraded to Category A at an estimated cost of \$229.3 million in MOD prices.

22. The proposed increase in the APE will not involve any additional tree removal or planting proposal.

23. The proposed increase in the APE will not create any new jobs.

WAY FORWARD

24. We plan to seek the Public Works Sub-committee's endorsement for increasing the APE of **76WC** from \$229.3 million by \$99.7 million to \$329.0 million in MOD prices in April 2010.

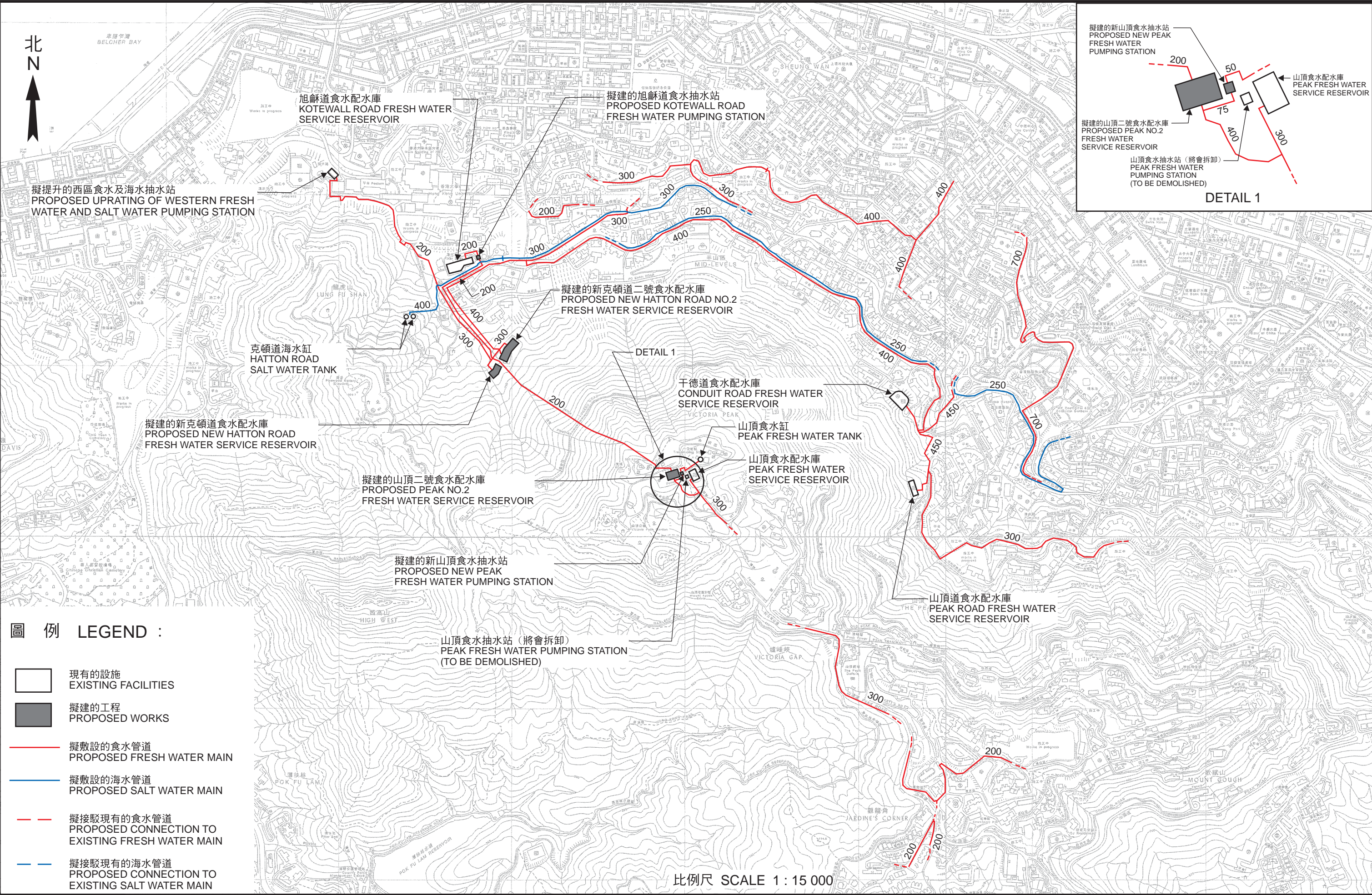
ATTACHMENT

Enclosure 1 – Site Plan No. SK 62009/507

Enclosure 2 – Price Adjustment Calculations

Enclosure 3 – Comparison between original APE and the Revised Project Estimate

Development Bureau
February 2010



核准 APPROVED
總工程師/顧問工程管理 CE / CM
21 / 10 / 2009

工務計劃項目第 76WC 號 — 港島中區半山及高地供水改善計劃 — 餘下工程
P.W.P. Item no. 76WC — Improvement to Hong Kong Central mid level and high level areas water supply — remaining works

水務署
WATER SUPPLIES DEPARTMENT
草圖編號 SK 62009 / 507

76WC – Improvement to Hong Kong Central mid-level and high level areas water supply – remaining works

Table 1 - Cash flow and provisions for price adjustment in original PWSC paper

Year	Original Project Estimate (\$ million in Sep 2006 prices)	Original Price Adjustment Factor #	Approved Project Estimate (\$ million, in MOD prices)	Provision for Price Adjustment (\$ million)
	X	Y	Z	A = Z - X
2007 – 2008	15.0	0.99900	15.0	0.0
2008 – 2009	43.1	1.00649	43.4	0.3
2009 – 2010	50.0	1.01656	50.8	0.8
2010 – 2011	64.2	1.02672	65.9	1.7
2011 – 2012	36.3	1.03699	37.6	1.3
2012 – 2013	15.7	1.05514	16.6	0.9
Total	224.3		229.3	5.0

Table 2 – Revised cash flow and provision for price adjustments due to revised project estimate (PE) and latest adjustment factor

Year	Revised PE (\$ million in Sep 2006 prices)	Revised PE (\$ million in Sep 2009 prices) *	Latest price adjustment factor **	Revised PE (\$ million, in MOD prices)	Revised provision for price adjustment (\$ million)	Net increase in provision for price adjustment (\$ million)
	a	b	c	d	e	f
2007 – 2008	12.2	12.6 ^	1.00000	12.6	e = (d-a)	f = (e-A)
2008 – 2009	77.9	89.1 ^	1.00000	89.1		
2009 – 2010	85.5	92.7 ^^	1.00000	92.7		
2010 – 2011	45.2	51.4	1.02000	52.4		
2011 – 2012	34.3	39.0	1.04040	40.6		
2012 – 2013	22.1	25.1	1.06121	26.6		
2013 – 2014	12.2	13.9	1.08243	15.0		
Total	289.4	323.8		329.0	39.6	34.6

Notes:

Price adjustment factors adopted in March 2007 are based on the projection of prices for public sector building and construction output, and are assumed to decrease by 0.4% per annum in 2006, no adjustment in 2007, to increase by 1.0% per annum over the period from 2008 to 2011 and by 2.0% per annum over the period from 2012 to 2013.

* Revised PE (in September 2006 prices) is multiplied by 1.13665 for conversion to September 2009 prices. The figure of 1.13665 represents the changes in price movement for public sector building and construction output between September 2006 and Sept 2009.

** The price adjustment factors adopted in November 2009 are based on the latest movement of prices for public sector building and construction output which are assumed to increase by 2.0% per annum over the period from 2009 to 2013.

^ \$12.6 million and \$89.1 million for 2007-08 and 2008-09 respectively are actual expenditures.

^^ Revised PE of \$92.7 million in 2009-10 comprises actual expenditure of \$57.9 million for the period from April to November 2009, and revised PE (in September 2009 prices) of \$34.8 million for the period from December 2009 to March 2010, which is derived by multiplying the revised PE of \$30.6 million in September 2006 prices by 1.13665 for conversion to September 2009 prices.

76WC – Improvement to Hong Kong Central mid-level and high level areas water supply – remaining works

Comparison between original APE and the Revised Project Estimate

A comparison between the APE and the revised project estimate in MOD prices is as follows-

	(A) APE (\$ million)	(B) Revised Estimate¹ (\$ million)	(C) Latest Estimate (\$ million)	(C) – (A) Difference (\$ million)
<u>Mid-level Area</u>				
(a) Demolition of existing service reservoirs	1.0	6.8	6.8	5.8
(b) Construction of fresh water service reservoirs	62.9	29.1	35.1	(27.8)
(c) Uprating of Western fresh water and salt water pumping station	3.9	10.6	10.6	6.7
(d) Mainlaying	65.7	64.2	121.1	55.4
<u>High Level Area</u>				
(e) Construction of fresh water service reservoir	12.0	12.9	12.7	0.7
(f) Construction of fresh water pumping station	16.5	29.6	29.2	12.7
(g) Uprating of Western fresh water and salt water pumping station	6.1	8.0	8.0	1.9
(h) Mainlaying	14.0	13.4	14.0	0
<u>General</u>				
(i) Environmental mitigation measures	2.2	2.2	2.2	0
Total value of contract works (sum of items (a) to (i))	184.3	176.8	239.7	
(j) Consultants' fees	19.6	19.6	36.9	17.3

¹ Revised project estimate after the award of the contract.

(i) for contract administration	1.4	1.4	1.4	0
(ii) for site supervision	18.2	18.2	35.5	17.3
(k) Contingencies	20.4	20.4	12.8	(7.6)
Sub-total (sum of items (a) to (k))	224.3	216.8	289.4	65.1
(l) Provision for price adjustment	5.0	5.0	39.6	34.6
Total	229.3	221.8	329.0	99.7

1. As regards item **(a) (Mid-level area - Demolition of existing service reservoirs)**, the increase of \$5.8 million is due to higher-than-expected tender prices.
2. As regards item **(b) (Mid-level area – Construction of fresh water service reservoirs)**, the decrease of \$27.8 million is due to-
 - (i) a decrease of \$33.8 million due to lower-than-expected tender prices, and
 - (ii) an increase of \$6.0 million due to unforeseen ground condition encountered during the construction of the New Hatton Road No. 1 fresh water service reservoir.
3. As regards item **(c) (Mid-level area - Upgrading of Western fresh water and salt water pumping station)**, the increase of \$6.7 million is due to higher-than-expected tender prices.
4. As regards item **(d) (Mid-level area - Mainlaying)**, the increase of \$55.4 million is due to-
 - (i) a decrease of \$1.5 million due to lower-than-expected tender prices,
 - (ii) an increase in construction costs due to unforeseen working hours restriction of \$29.1 million, and
 - (iii) an increase in construction costs due to unforeseen difficult ground conditions of \$27.8 million.
5. As regards item **(e) (High-level area – Construction of fresh water service reservoir)**, the increase of \$0.7 million is due to-
 - (i) an increase of \$0.9 million due to higher-than-expected tender prices, and
 - (ii) a decrease of \$0.2 million due to reduced works quantities on pipe works at Peak No. 2 fresh water service reservoir to suit site conditions.
6. As regards item **(f) (High-level area – Construction of fresh water pumping station)**, the increase of \$12.7 million is due to-

- (i) an increase of \$13.1 million due to higher-than-expected tender prices, and
 - (ii) a decrease of \$0.4 million due to the use of a smaller surge vessel for the Kotewall Road fresh water pumping station.
- 7. As regards item **(g) (High-level area - Uprating of Western fresh water and salt water pumping station)**, the increase of \$1.9 million is due to higher-than-expected tender prices.
- 8. As regards item **(h) (High-level area - Mainlaying)**, there has been no change in the estimate as there was–
 - (i) a decrease of \$0.6 million due to lower-than-expected tender prices; and
 - (ii) an increase of \$0.6 million due to increased works quantities on pipe fittings and road re-instatement for mainlaying works in the high-level area to suit site conditions.
- 9. As regards item **(j) (Consultants' fees)**, the increase of \$17.3 million is due to an increase in site supervision costs.
- 10. As regards item **(k) (Contingencies)**, the decrease of \$7.6 million is due to the drawing down of contingencies.
- 11. As regards item **(l) (Provision for price adjustment)**, the increase of 34.6 million is due to an increase in payment for actual/predicted contract price fluctuation.