

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### HEAD 704 – DRAINAGE

#### Environmental Protection – Sewerage and sewage treatment

#### 329DS – Upgrading of Pillar Point sewage treatment works

Members are invited to recommend to Finance Committee to increase the approved project estimate of **329DS** by \$559.6 million from \$1,360.9 million to \$1,920.5 million in money-of-the-day prices.

### PROBLEM

The approved project estimates (APE) of **329DS** is not sufficient to cover the cost of works under the project.

### PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to increase the APE of **329DS** by \$559.6 million from \$1,360.9 million to \$1,920.5 million in money-of-the-day (MOD) prices.

### PROJECT SCOPE AND NATURE

3. On 3 July 2009, the Finance Committee (FC) approved the upgrading of **329DS** to Category A at an estimated cost of \$1,360.9 million in MOD prices for upgrading the treatment level and capacity of the existing sewage treatment plant at Pillar Point in order to improve the quality of the effluent discharged from the plant and to cater for the projected increase in population in Tuen Mun.

4. The approved scope of **329DS** comprises –
- (a) upgrading of the sewage treatment level of Pillar Point sewage treatment works (PPSTW) from preliminary treatment<sup>1</sup> to chemically enhanced primary treatment<sup>2</sup> (CEPT) with ultraviolet disinfection;
  - (b) expansion of the treatment capacity from 215 000 cubic metres (m<sup>3</sup>) per day to 241 000 m<sup>3</sup> per day;
  - (c) provision of new septic waste reception and treatment facilities to cater for septic waste of 1 200 m<sup>3</sup> per day; and
  - (d) ancillary works.

— A location map of the project is at Enclosure 1. Subject to the approval of the Finance Committee of the proposed increase in the APE, we plan to commence the design and construction works in July 2010 for completion in November 2013.

## JUSTIFICATION

5. We propose to increase the APE of **329DS** by \$559.6 million in MOD prices to cover the higher design and construction cost of the upgrading works and increase in the provision for price adjustment. The justifications for the increase are set out in paragraphs 6 to 10 below.

### Higher design and construction cost of the upgrading works

6. The upgrading of PPSTW will be implemented using a design-build-operate (DBO) contract<sup>3</sup>. Under the DBO arrangement, the contractor will –

- (a) carry out the design and construction works of **329DS**; and
- (b) operate the upgraded PPSTW for 15 years.

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<sup>1</sup> Preliminary treatment includes screening and removal of grits. Solids larger than six millimetres in diameter as well as grit which consists of sands, bone pieces, etc. are removed from the sewage.

<sup>2</sup> Primary treatment includes a preliminary treatment process and a primary sedimentation process for removal of settleable suspended solids from the sewage. For chemically enhanced primary treatment, chemicals are added during the primary sedimentation process to enhance the removal of suspended solids.

<sup>3</sup> Members may wish to refer to LC Paper No. CB(1)1544/09-10(01) for background information on the arrangements for DBO procurement mode.

The tenderers for the DBO contract have to price (a) and (b) separately.

7. When compared with the conventional consultant-design-contractor-build approach, the DBO procurement mode puts the responsibilities of design, construction and operation of the PPSTW into a single party who will be solely responsible for achieving the specified performance standards. It also helps optimise the interfaces among design, construction and operation of the PPSTW at early stages of the project. In developing a plant design that fulfils the specified performance requirements, the contractor will also be free to apply innovative technologies in wastewater treatments for achieving higher cost-effectiveness in subsequent operations. In this regard, the proposed design recommended for this project following a competitive bidding process will adopt an advanced treatment setup to enhance hydraulic efficiencies of the chemical treatment process. Overseas experience has demonstrated that similar designs can operate at a lower cost through optimising the dosage of treatment chemicals. The sludge dewatering process will also be more energy-efficient as compared with a conventional CEPT setup<sup>4</sup>.

8. The proposed design will incur additional capital expenditure for initial setup. The latest estimate for design and construction of the upgrading works is \$1,455.7 million as compared with our original estimate of \$1,052.6 million. Nevertheless, the proposed design will yield significant savings in subsequent operation. The latest estimate for operating the upgraded PPSTW for 15 years is only \$900.0 million as compared with our original estimate of \$1,350.0 million. Hence, the benefits of enhanced operational efficiency (represented by around \$450.0 million of estimated savings during the 15-year operation) should outweigh the need for additional capital cost of \$403.1 million due to increase in estimated cost of the design and construction works. The differences are summarised as follows –

	<b>Item</b>	<b>Original Estimate (\$ million)</b>	<b>Latest Estimate (\$ million)</b>	<b>Difference (\$ million)</b>
(a)	Design and construction of the upgrading works	1,052.6	1,455.7	403.1
(b)	Operation of the upgraded PPSTW for 15 years	1,350.0	900.0	(450.0)
				<b>/Increase .....</b>

<sup>4</sup> This can be achieved through re-circulating the sewage to enhance the chemical flocculation of pollutants. Apart from reducing the dosage of coagulants, the treatment process will consume about 8% less electricity in dewatering the denser raw sludge as compared against the conventional CEPT setup.

### Increase in the provision for price adjustment

9. The payment for the works of **329DS** is subject to contract price fluctuation (CPF)<sup>5</sup>, which will be met from the provision for price adjustment. When FC's approval for the original estimate of **329DS** was sought in July 2009, we derived the provision for price adjustment on the basis of the forecast of trend rate of change in the prices of public sector building and construction output at that time. In March 2010, the Administration has adjusted the projected movement of prices between 2011 and 2013 upwards from 2.0% per annum to 4.0% per annum. The project will also incur larger CPF payments due to increase in the cost of design and construction of the upgrading works. Consequently, we estimate that the CPF payments will be higher than expected.

10. Based on the price adjustment factors adopted in March 2010, we propose to increase the provision for price adjustment of **329DS** by \$156.5 million for meeting the anticipated CPF payments. Please refer to Enclosure 2 for detailed calculations on the proposed increase.

### Review of financial position

11. Having reviewed the financial position of the project, we consider it necessary to increase the APE of **329DS** by \$559.6 million from \$1,360.9 million to \$1,920.5 million in MOD prices to cover the total costs of the design and construction works under the project. A breakdown of the proposed increase of \$559.6 million is as follows –

Factors	Proposed increased amount (\$ million)	% of the total increased amount
<b>Increase due to –</b>		
(a) Higher design and construction cost of the upgrading works	403.1	72
(b) Provision for price adjustment	156.5	28
Total increase	559.6	100

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<sup>5</sup> The CPF system allows for both upward and downward adjustment to contract payments in accordance with movements in the cost of labour and materials in Government civil engineering and building contracts. The CPF payment is calculated based on the difference between the indices of costs of construction labour and materials at the time of tendering and the current values of these indices at the time of payment in accordance with a predetermined relative proportion of each cost index.

A comparison of the cost breakdown of the APE and the latest project estimate of **329DS** is at Enclosure 3.

## FINANCIAL IMPLICATIONS

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

Year	\$ million (MOD)
2010 – 2011	142.4
2011 – 2012	400.8
2012 – 2013	558.7
2013 – 2014	411.4
2014 – 2015	233.4
2015 – 2016	173.8
	<hr/> 1,920.5 <hr/>

13. We estimate that the annual recurrent expenditure arising from **329DS** be revised to \$60.0 million.

14. We took into account recurrent expenditure attributable to sewage charges arising from **329DS** among other projects when determining the prescribed rate of sewage charge for the years 2008-09 to 2017-18 as stipulated in the Sewage Services (Sewage Charge) Regulation (Cap. 463A). We will take into account the recurrent expenditure arising from **329DS** and other projects as attributable to trade effluent surcharges when reviewing the trade effluent surcharge rates in future.

**/PUBLIC .....**

## **PUBLIC CONSULTATION**

15. The proposed increase in the APE does not involve any change in the scope of the project. Therefore, further public consultation is not necessary.

16. We consulted the Legislative Council Panel on Environmental Affairs (the Panel) on 24 May 2010 on the proposed increase in the APE for **329DS**. Members raised no objection to the submission of the proposal to the Public Works Subcommittee and requested the Administration to provide supplementary information on the arrangements under the DBO procurement mode for the project. We submitted a follow-up reply to the Panel on 28 May 2010.

## **ENVIRONMENTAL IMPLICATIONS**

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

## **HERITAGE IMPLICATIONS**

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

## **LAND ACQUISITION**

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

## **BACKGROUND INFORMATION**

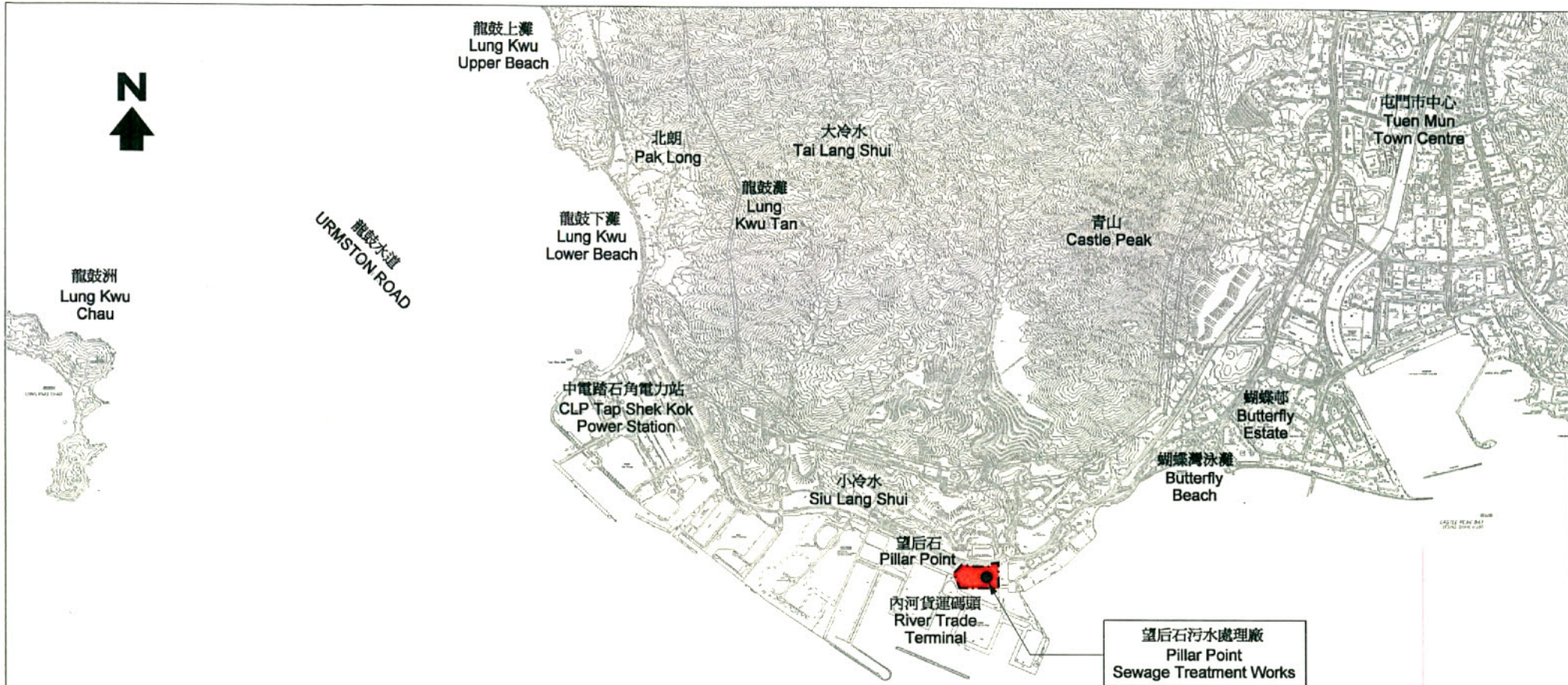
20. On 3 July 2009, the FC approved the upgrading of **329DS** to Category A at an estimated cost of \$1,360.9 million in MOD prices. We invited tenders for the DBO contract from three pre-qualified contractors in February 2009.

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

22. We estimate that the proposed increase in the APE will create about 103 jobs (83 for labourers and another 20 for professional/technical staff) providing a total employment of 3 700 man-months.

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Environment Bureau  
June 2010



位置圖 LOCATION PLAN

圖則名稱 drawing title

工務工程計劃第329DS號  
望后石污水處理廠改善工程  
PWP ITEM NO. 329DS  
UPGRADING OF PILLAR POINT SEWAGE TREATMENT WORKS

繪畫 drawn	ORIGINAL SIGNED	H.K. LAI	日期 date	06-05-2010
核對 checked	ORIGINAL SIGNED	S.K. LEUNG	日期 date	06-05-2010
批核 approved	ORIGINAL SIGNED	T.Y. YUEN	日期 date	06-05-2010

部門 office 淨化海港計劃部  
HARBOUR AREA TREATMENT SCHEME DIVISION

圖則編號 drawing no.	比例 scale
DSS/2010/001	N.T.S.

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DRAINAGE SERVICES DEPARTMENT  
GOVERNMENT OF THE  
HONG KONG  
SPECIAL ADMINISTRATIVE REGION



## 329DS – Upgrading of Pillar Point sewage treatment works

Table 1 – Cash flow and provisions for price adjustment in PWSC(2009-10)59

Year	Original project estimate (\$ million, in September 2008 prices) <b>X</b>	Original price adjustment factors (March 2009)# <b>Y</b>	Approved project estimate (\$ million, in MOD prices) <b>Z</b>	Provision for price adjustment (\$ million) <b>A=Z – X</b>
2009 - 2010	50.3	1.03500	52.1	1.8
2010 - 2011	222.7	1.05570	235.1	12.4
2011 - 2012	328.3	1.07681	353.5	25.2
2012 - 2013	368.1	1.09835	404.3	36.2
2013 - 2014	187.9	1.12032	210.5	22.6
2014 - 2015	91.6	1.15113	105.4	13.8
<b>Total</b>	<b>1,248.9</b>	<b>-</b>	<b>1,360.9</b>	<b>112.0</b>

Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate (PE) and latest adjustment factors

Year	Latest PE (\$ million, in September 2008 prices) <b>a</b>	Latest PE (\$ million, in September 2009 prices) @ <b>b</b>	Latest price adjustment factors (March 2010)## <b>c</b>	Latest PE (\$ million, in MOD prices) <b>d</b>	Latest provision for price adjustment (\$ million) <b>e</b>	Net increase in provision for price adjustment (\$ million) <b>f</b>
2009 - 2010	0.0	0.0^	-	0.0	<b>e = d – a</b>	<b>f = e – A</b>
2010 - 2011	134.0	138.7	1.02700	142.4		
2011 - 2012	363.4	376.2	1.06551	400.8		
2012 - 2013	487.0	504.2	1.10813	558.7		
2013 - 2014	344.8	357.0	1.15246	411.4		
2014 - 2015	188.1	194.7	1.19856	233.4		
2015 - 2016	134.7	139.4	1.24650	173.8		
<b>Total</b>	<b>1,652.0</b>	<b>1,710.2</b>	<b>-</b>	<b>1,920.5</b>	<b>268.5</b>	<b>156.5</b>

**Notes:**

# Price adjustment factors adopted in March 2009 were based on the projected movement of prices for public sector building and construction output at that time, which were assumed to increase by 2.0% per annum over the period from 2009 to 2013; and by 3.0% per annum from 2014 onwards.

@ The latest project estimate (in September 2008 prices) is multiplied by 1.03525 for conversion to September 2009 prices. The figure of 1.03525 represents the changes in price movement for public sector building and construction output between September 2008 and September 2009.

## Price adjustment factors adopted in March 2010 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 3.0% per annum in 2010 and by 4.0% per annum over the period from 2011 to 2016.

^ The actual expenditure in 2009-10 is \$0.0 million.

## Enclosure 3 to PWSC(2010-11)12

### 329DS – Upgrading of Pillar Point sewage treatment works

A comparison of the APE and the latest project estimate is as follows –

	(A)	(B)	(B) – (A)
	<b>Approved Project Estimate</b>	<b>Latest Project Estimate</b>	<b>Difference</b>
	(\$ million)	(\$ million)	(\$ million)
(a) Design and construction of sewage treatment facilities, ultraviolet disinfection facilities and septic waste reception facilities	1,052.6	1,455.7	403.1
(i) civil engineering works	399.1	649.1	250.0
(ii) electrical and mechanical works	653.5	806.6	153.1
(b) Consultants’ fees	8.5	8.5	0.0
(i) contract administration	4.6	4.6	0.0
(ii) management of resident site staff	3.9	3.9	0.0
(c) Remuneration of resident site staff	58.5	58.5	0.0
(d) Environmental mitigation measures	10.3	10.3	0.0
(e) Contingencies	119.0	119.0	0.0
(f) Provision for price adjustment	112.0	268.5	156.5
<b>Total</b>	<b>1,360.9</b>	<b>1,920.5</b>	<b>559.6</b>

2. As regards 1(a) “**Design and construction of sewage treatment facilities, ultraviolet disinfection facilities and septic waste reception facilities**”, the increase of \$403.1 million is due to the higher design and construction cost of the upgrading works.

3. As regards 1(f) “**Provision for price adjustment**”, the increase of \$156.5 million is mainly due to upward adjustment in the projected movement of prices for public sector building and construction output, as well as increase in capital cost of the project.