For discussion
on 24 May 2010

Legislative Council
Panel on Environmental Affairs

329DS – Upgrading of Pillar Point sewage treatment works

PURPOSE

This paper seeks Members' support for our proposal to increase the approved project estimate (APE) of **329DS** by $559.6 million from $1,360.9 million to $1,920.5 million in money-of-the-day (MOD) prices.

BACKGROUND

2. We need to upgrade the treatment level of Pillar Point sewage treatment works (STW) to reduce the pollution load to our north-western waters. The treatment capacity of the STW also requires expansion to cope with the forecast increase in sewage flow from Tuen Mun area. In 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. The approved scope of works under **329DS** comprises –

(*a*) upgrading of the sewage treatment level from preliminary treatment to chemically enhanced primary treatment[1] (CEPT) with ultraviolet disinfection;

(*b*) expansion of the treatment capacity from 215 000 cubic metres (m^3) per day to 241 000 m^3 per day;

(*c*) provision of new septic waste reception and treatment facilities to cater for septic waste of 1 200 m^3 per day; and

(*d*) ancillary works.

A location plan of the project is at **Enclosure 1**.

[1] Preliminary treatment includes screening and removal of grits. Solids larger than 6 millimetres in diameter as well as grit which consist of sands, bone pieces, etc. are removed from the sewage. Primary treatment includes a primary sedimentation process for removal of settleable suspended solids from the sewage after preliminary treatment. For CEPT, chemicals are added during the primary sedimentation process to enhance the removal of suspended solids.

3. We consulted the Panel on Environmental Affairs in October 2008 on the upgrading of **329DS** to Category A prior to seeking FC's approval. Members did not raise objection to the proposal. Please refer to LC Paper No. CB(1)88/08-09(05) for details.

LATEST POSITION

4. The Drainage Services Department (DSD) has completed the evaluation of tenders and plans to commence the project as soon as possible. Having reviewed the financial position of the project, we propose to increase the APE of **329DS** before awarding the contract to the recommended tenderer. The justifications are set out in paragraphs 5 to 9 below.

JUSTIFICATIONS

Higher cost of design and construction of the upgrading works

5. The upgrading of Pillar Point STW will be implemented using one design-build-operate (DBO) contract[2]. Under the DBO arrangement, the contractor will (*a*) carry out the design and construction works of **329DS** and (*b*) operate the upgraded STW for 15 years. The tenderers for the DBO contract have to price (*a*) and (*b*) separately.

6. When compared with the consultant-design-contractor-build approach (i.e. the conventional implementation arrangement for works projects), the DBO procurement mode puts the responsibilities of design, construction and operation of the STW 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 STW at early stages of the project. Specifically, in developing a plant design that fulfils the specified performance requirements, the contractor may apply innovative technologies in wastewater treatments where appropriate for achieving higher cost-effectiveness in subsequent operations. In this regard, the proposed design 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

[2] 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.

optimising the dosage of treatment chemicals. The sludge dewatering process will also be more energy-efficient as compared with a conventional CEPT setup[3].

7. 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 STW 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 –

	Item	Original Estimate ($ million)	Latest Estimate ($ million)	Difference ($ million)
(a)	Design and construction of the upgrading works	1,052.6	1,455.7	403.1
(b)	Operation of the upgraded STW for 15 years	1,350.0	900.0	(450.0)

Increase in the provision for price adjustment

8. The payment for the works of **329DS** is subject to contract price fluctuations (CPF)[4], which will be met from the provision for price adjustment. When FC's approval for the original estimate of **329DS** was sought in June 2009, we derived the provision for price adjustment on the basis of the forecast of trend rate of change in the prices of public

[3] 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 setup.

[4] 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.

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.

9. 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.

FINANCIAL IMPLICATIONS

10. Having reviewed the financial position of the project, we propose to increase the APE of **329DS** by $559.6 million, i.e. from $1,360.9 million to $1,920.5 million in MOD prices for meeting the required expenditure of the project. Cost breakdowns of the proposed increase are as follows –

	Factors	Increase in estimate ($ million)
	Increase due to –	
(*a*)	Higher cost of design and construction of the upgrading works	403.1
(*b*)	Additional provision for price adjustment	156.5
	Total	**559.6**

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

11. We estimate that the annual recurrent expenditure arising from **329DS** will decrease by $30.0 million, i.e. from $90.0 million to $60.0 million.

IMPLEMENTATION PLAN

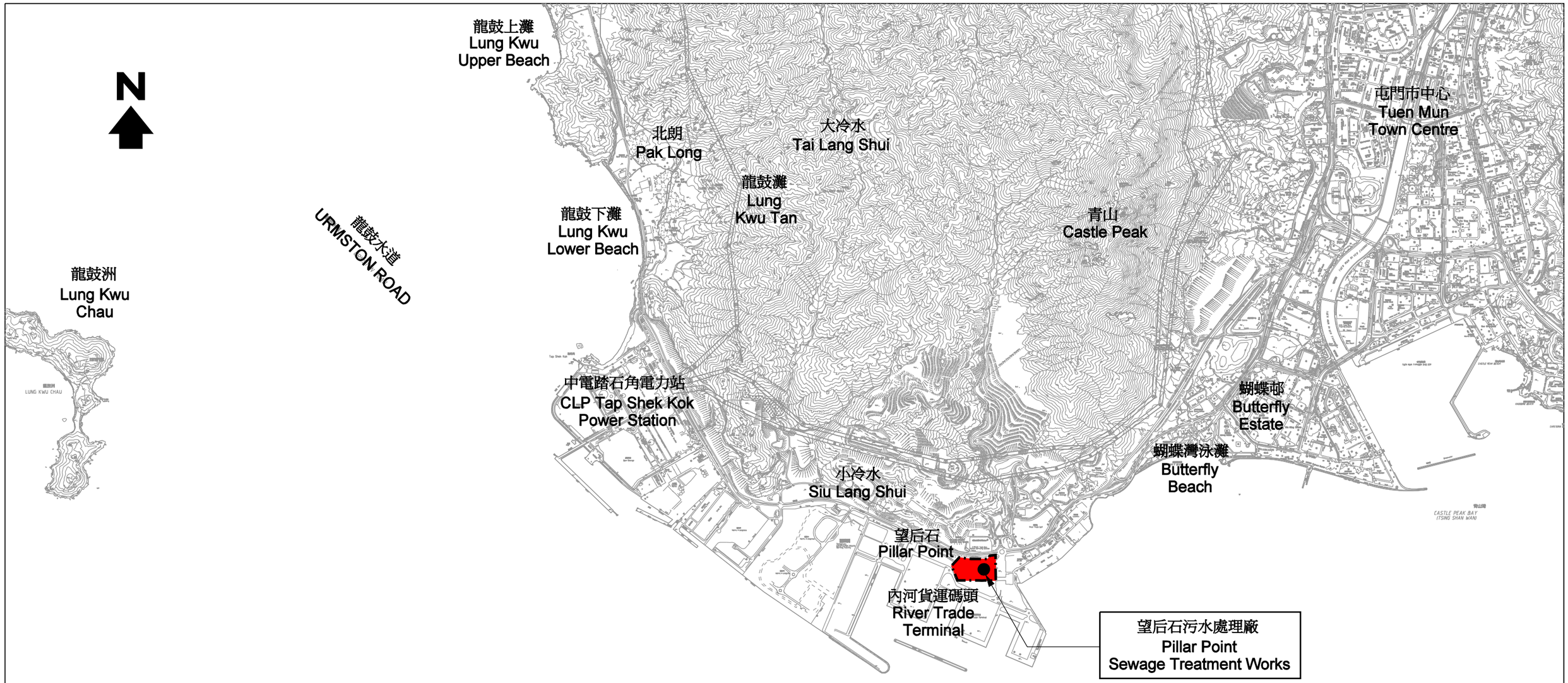
12. Subject to funding approval by the FC, we plan to start the

DBO contract in July 2010 for completion in November 2013.

ADVICE SOUGHT

13. Members are invited to support our proposal for increasing the APE of **329DS** by $559.6 million from $1,360.9 million to $1,920.5 million in MOD prices. Subject to Members' advice, we plan to submit the proposal for consideration by the Public Works Subcommittee in June 2010 and seek FC's approval in July 2010.

Environmental Protection Department
Drainage Services Department
May 2010



位置圖 LOCATION PLAN

圖則名稱 drawing title		繪畫 drawn	日期 date	圖則編號 drawing no.	比例 scale
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		*ORIGINAL SIGNED* H.K. LAI	06-05-2010	DSS/2010/001	N.T.S.
		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			

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
SPECIAL ADMINISTRATIVE REGION

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附件一 ENCLOSURE 1

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) *X*	Original price adjustment factor (March 2009)[#] *Y*	Approved project estimate ($ million, in MOD prices) *Z*	Provision for price adjustment ($ million) *A = Z – X*
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
Total	**1,248.9**	**–**	**1,360.9**	**112.0**

[#] 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 8.0% per annum in 2008; by 2.0% per annum over the period from 2009 to 2013; and by 3.0% per annum from 2014 onwards.

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

Year	Latest project estimate ($ million, in September 2008 prices) *a*	Latest project estimate ($ million, in September 2009 prices)[@] *b*	Latest price adjustment factor (March 2010)[##] *c*	Latest project estimate ($ million, in MOD prices) *d*	Latest provision for price adjustment ($ million) *e*	Net increase in provision for price adjustment ($ million) *f*
2009 – 2010	0.0	0.0[^]	–	0.0		
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	$e = d - a$	$f = e - A$
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		
Total	**1,652.0**	**1,710.2**	**–**	**1,920.5**	**268.5**	**156.5**

[@] 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.

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

	(*A*) Approved Project Estimate	(*B*) Latest Project Estimate	(*B*) – (*A*) Difference
	$ 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**
Total	**1,360.9**	**1,920.5**	**559.6**

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 cost of design and construction 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.
