

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Head 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment

272DS – Port Shelter sewerage, stage 2

273DS – Port Shelter sewerage, stage 3

Members are invited to recommend to Finance Committee –

- (a) the upgrading of part of **272DS** and part of **273DS**, entitled “Sewerage at Clear Water Bay Road, Pik Shui Sun Tsuen and west of Sai Kung town”, to Category A at an estimated cost of \$290.6 million in money-of-the-day prices; and
- (b) the retention of the remainder of **272DS** and **273DS** in Category B.

PROBLEM

Sewage from unsewered areas in the Port Shelter catchment is a source of water pollution to the nearby streams and the receiving waters of Port Shelter.

/PROPOSAL

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for the Environment, proposes to upgrade parts of **272DS** and **273DS** to Category A at an estimated cost of \$290.6 million in money-of-the-day (MOD) prices for implementing sewerage works in the Port Shelter catchment.

PROJECT SCOPE AND NATURE

3. The part of **272DS** that we propose to upgrade to Category A comprises construction of –

- (a) about 9.5 kilometres (km) of sewers ranging from 150 millimetres (mm) to 300 mm in diameter for eight unsewered areas, namely Kap Pin Long, Nam Shan, Pak Kong, San Uk, Sha Kok Mei, Tai Ping Village, Tai Shui Tseng and Wo Tong Kong; and
- (b) ancillary works.

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

4. The part of **273DS** that we propose to upgrade to Category A comprises construction of –

- (a) about 3.3 km of sewers ranging from 150 mm to 300 mm in diameter for three unsewered areas, namely Lung Wo Tsuen, Pik Shui Sun Tsuen and the vicinity of Fei Ngo Shan Road;
- (b) about 3.6 km gravity trunk sewers ranging from 225 mm to 450 mm in diameter along Clear Water Bay Road from Shun Chi Street to Razor Hill Road and around Pik Shui Sun Tsuen;
- (c) one sewage pumping station (SPS) at Pik Shui Sun Tsuen;
- (d) about 900 metres (m) of twin rising mains ranging from 150 mm to 350 mm in diameter –

- (i) at Pik Shui Sun Tsuen in association with construction of the SPS in (c) above;
- (ii) along sections of Clear Water Bay Road near Tseng Lan Shue and Pak Shek Wo; and
- (e) ancillary works.

———— A site plan showing the proposed works is at Enclosure 2.

5. Subject to the funding approval of the Finance Committee, we plan to commence the proposed works in August 2012 for completion in August 2016.

6. We will retain the remainders of **272DS** and **273DS** in Category B, which involve laying of about 30 km and 12 km of sewers respectively in other unsewered areas in the Port Shelter catchment, as well as the construction of associated sewage pumping stations and appropriate treatment facilities. Planning and design of the relevant works are in progress. Funding for the remainders of **272DS** and **273DS** will be sought at a later stage after completion of the planning and design works.

JUSTIFICATION

7. At present, sewage from village areas in the Port Shelter catchment is often treated and disposed of by means of private on-site treatment facilities (such as septic tanks and soakaway (STS) systems). These facilities are however often ineffective in removing pollutants due to their proximity to watercourses¹ or inadequate maintenance². Sewage from these unsewered areas has therefore been identified as a source of water pollution to the receiving waters of Port Shelter.

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¹ STS systems operate by allowing the effluent to percolate through gravels whereby pollutants are removed in a natural manner. However, if a STS system is located in an area where the ground water table is high, such as an area in proximity to watercourses, it will not function properly due to ineffective percolation.

² Inadequate maintenance of STS systems would affect their pollutant removal efficiency and might even lead to overflow of effluent.

8. The aforesaid situation will persist unless sewerage infrastructure is made available to collect and treat sewage from these areas properly. We have formulated as a long-term measure a programme under the Port Shelter Sewerage Master Plan to expand the public sewerage in the Port Shelter catchment. The programme is divided into three stages for implementation. Stage 1 has been completed, whereas stages 2 and 3 are being implemented in phases.

9. We now propose to upgrade parts of **272DS** and **273DS** to Category A for further implementation of the remaining works under stages 2 and 3 of Port Shelter sewerage respectively. Upon completion of the proposed parts of works under **272DS** and **273DS**, sewage collected from the 11 areas to be sewered will be diverted to the Sai Kung sewage treatment works, the Tseung Kwan O preliminary treatment works and the Kwun Tong preliminary treatment works for proper treatment and disposal. This will minimise the release of pollutants into the environment and bring about sustainable improvement to the water quality of Port Shelter.

10. Based on the village properties survey results and the potential village house development information within the 11 unsewered areas obtained in October 2010 and March 2012 respectively, the proposed sewerage facilities for the 11 unsewered areas mentioned in paragraphs 3 and 4 above will be able to serve some 1 950 village houses comprising about 1 690 existing houses, 20 planned houses and 240 potential houses³.

FINANCIAL IMPLICATIONS

11. We estimate the cost of the proposed works to be \$290.6 million in MOD prices (please see paragraph 12 below), broken down as follows –

/(a)

³ The 240 potential village houses are houses that may be developed on vacant lands which are adjacent to the proposed sewer alignment. There is currently no development programme for these houses, which is subject to landowners' will and Lands Department's approval. In the event that some of these potential houses are not built, the abortive cost is not expected to be significant because, according to the designed sewer alignment, the proposed sewers will in any case need to pass through the vacant lands to serve the existing and planned houses.

		\$ million		
		272DS	273DS	Total
(a)	Construction of sewers within villages	66.3	15.3	81.6
(b)	Construction of gravity trunk sewers	–	69.0	69.0
(c)	Construction of rising mains	–	15.7	15.7
(d)	Construction of SPS	–	12.9	12.9
(i)	civil engineering works	–	4.5	
(ii)	electrical and mechanical works	–	8.4	
(e)	Ancillary works	0.2	0.3	0.5
(f)	Environmental mitigation measures	1.7	2.6	4.3
(g)	Consultants' fees for	1.0	2.0	3.0
(i)	contract administration	0.3	0.5	
(ii)	management of resident site staff	0.7	1.0	
(iii)	environmental monitoring and audit	–	0.5	
(h)	Remuneration of resident site staff	11.7	18.6	30.3

/(i)

		\$ million		
		272DS	273DS	Total
(i)	Contingencies	7.8	12.7	20.5
	Sub-total	88.7	149.1	237.8
				(in September 2011 prices)
(j)	Provision for price adjustment	18.4	34.4	52.8
	Total	107.1	183.5	290.6
				(in MOD prices)

A breakdown of the estimates for the consultants' fees and resident site staff costs by man-months is at Enclosure 3.

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

Year	\$ million (Sept 2011)		Price adjustment factor	\$ million (MOD)	
	272DS	273DS		272DS	273DS
2012 – 2013	8.4	12.8	1.05325	8.8	13.5
2013 – 2014	14.2	20.4	1.11118	15.8	22.7
2014 – 2015	20.2	29.5	1.17229	23.7	34.6
2015 – 2016	21.1	31.0	1.23677	26.1	38.3
2016 – 2017	20.1	33.3	1.30479	26.2	43.4
2017 – 2018	4.2	14.2	1.37656	5.8	19.5
2018 – 2019	0.5	7.9	1.45227	0.7	11.5
	88.7	149.1		107.1	183.5

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13. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2012 to 2019. We will deliver the works under two contracts, one for civil engineering works and the other for electrical and mechanical works. We will deliver the civil engineering works under a re-measurement contract because of the uncertain underground conditions that may affect the alignments of the sewers. The contract will provide for price adjustments. We will deliver the electrical and mechanical works under a lump-sum contract as the scope of works can be well defined.

14. We estimate the additional annual recurrent expenditure arising from the proposed works to be \$2.5 million (\$1.1 million for the part of **272DS** and \$1.4 million for the part of **273DS**). The recurrent expenditure attributable to sewage charges has been taken into account in determining the sewage charges for the years 2008-09 to 2017-18 stipulated in the Sewage Services (Sewage Charge) Regulation (Cap. 463A) and the recurrent expenditure attributable to trade effluent surcharges will be taken into account in reviewing the trade effluent surcharge rates in future.

PUBLIC CONSULTATION

15. We consulted the Sai Kung Rural Committee on the proposed works under **272DS** on 26 September 2001 and 25 October 2007. We also consulted the Housing and Environmental Hygiene Committee of the Sai Kung District Council on 15 April 2008. Both committees supported the proposed works under **272DS**.

16. We consulted the Hang Hau Rural Committee on the proposed works under **273DS** on 15 October 2001 and provided the Committee with updated information on the project on 5 September 2007. We also consulted the Housing and Environmental Hygiene Committee of the Sai Kung District Council on 15 April 2008. Both committees supported the proposed works under **273DS**. In addition, we consulted the Environment and Hygiene Committee (EHC) of the Kwun Tong District Council on 8 July 2009. Members of EHC were in general supportive of the proposed works under **273DS**.

17. We gazetted the proposed works under **272DS** in accordance with the Water Pollution Control (Sewerage) Regulation (WPC(S)R) under three schemes between December 2008 and July 2010. No objection was received and all the three schemes were subsequently authorised between May 2009 and November 2010.

18. We gazetted the proposed works under **273DS** in accordance with the WPC(S)R under four schemes between August 2009 and July 2011. For the scheme that covers the proposed gravity trunk sewers and twin rising mains along Clear Water Bay Road (Tseng Lan Shue Section), one objection was received concerning the impact of the proposed works on certain existing installations (including a well, two pump chambers, some chain-link fence and gate) and fruit trees on a piece of land. We have repeatedly explained to the objectors that since the piece of land concerned is located over 50 m from the proposed works area, the proposed works would not pose any adverse impact to the concerned existing installations and fruit trees. The objection nevertheless remained unresolved and the Chief Executive-in-Council authorised the scheme without modification on 13 March 2012. The notice of authorisation was gazetted on 13 April 2012. No objection was received in respect of the other three schemes, and the proposed works were authorised between November 2009 and November 2011.

19. We consulted the Legislative Council Panel on Environmental Affairs on 23 April 2012 on the proposed works. Members raised no objection to the proposed works.

ENVIRONMENTAL IMPLICATIONS

20. The proposed sewerage works at Pik Shui Sun Tsuen under **273DS** constitute a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and an Environmental Permit (EP) is required for its construction and operation. Having regard to the project profile prepared and submitted by the Drainage Services Department (DSD), the Director of Environmental Protection was satisfied that the environmental impacts of the works concerned could meet the requirements of the Technical Memorandum on Environmental Impact Assessment Process. With the consent of the Secretary for the Environment, the permission to apply directly for an EP was granted on 23 November 2011 and the EP was issued on 20 December 2011. DSD shall implement the mitigation measures as set out in the EP and comply with any requirements therein accordingly.

21. As regards the proposed works under **272DS** and other proposed works under **273DS**, they are not designated projects under the EIAO. DSD completed in December 2010 an Environmental Study that covers these sewerage works. The Environmental Study concluded that, with the implementation of appropriate mitigation measures, these sewerage works would not have long-term adverse environmental impacts.

22. For short-term environmental impacts during construction, we will control noise, dust and site run-off to levels within the established standards and guidelines through implementation of environmental mitigation measures, such as the use of silenced construction equipment and noise barriers to reduce noise generation, water-spraying to reduce emission of fugitive dust, and proper treatment of site run-off before discharge. We will also carry out regular site inspections to ensure that these recommended mitigation measures and good site practices will be properly implemented on site. We have included in paragraph 11(f) above sums of \$1.7 million and \$2.6 million (in September 2011 prices) in the project estimates of the proposed works under **272DS** and **273DS** respectively for implementation of the necessary environmental mitigation measures. We have also included in paragraph 11(g)(iii) above a sum of \$0.5 million (in September 2011 prices) in the project estimate of **273DS** for employment of an independent checker to audit the implementation of the mitigation measures required for the sewerage works at Pik Shui Sun Tsuen.

23. At the planning and design stages, we have considered ways to reduce the generation of construction waste where possible. For example, in addition to the need for meeting the hydraulic and traffic requirements, we have designed the alignment of the proposed sewerage works in such a manner that excavation and demolition of existing structures will be minimised. In addition, we will require the contractor to reuse inert construction waste (e.g. excavated soil) on site or in other suitable construction sites as far as possible in order to minimise the disposal of inert construction waste at public fill reception facilities⁴. We will encourage the contractors to maximise the use of recycled or recyclable inert construction waste, as well as the use of non-timber formwork to further reduce the generation of construction waste.

24. At the construction stage, we will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractors to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste at public fill reception facilities and landfills respectively through a trip-ticket system.

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⁴ Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

25. We estimate that the proposed works will generate in total about 85 800 tonnes of construction waste which will be disposed of as shown below –

	272DS	273DS Tonnes	Total
Inert construction waste to be reused on site	42 010	22 640	64 650 (75%)
Inert construction waste to be delivered to public fill reception facilities for subsequent reuse	13 260	7 140	20 400 (24%)
Non-inert construction waste to be disposed of at landfills	500	250	750 (1%)
Total construction waste generated	55 770	30 030	85 800 (100%)

The total costs for accommodating construction waste at public fill reception facilities and landfill sites are estimated to be \$420,000 and \$220,000 for the proposed works under **272DS** and **273DS** respectively (based on a unit cost of \$27 per tonne for disposal at public fill reception facilities and \$125 per tonne⁵ at landfills).

HERITAGE IMPLICATIONS

26. The proposed works under **272DS** and **273DS** 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

⁵ This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at \$90 per m³), nor the cost to provide new landfills (which is likely to be more expensive) when the existing ones are filled.

LAND ACQUISITION

27. We have reviewed the design of the proposed works to minimise the extent of land acquisition. We will resume a total of seven private agricultural lots (about 279 square metres (m²)) for carrying out the proposed works under **272DS**. The land resumption and clearance will not affect any households or domestic structures. We will charge the cost of land resumption and clearance estimated at \$2.44 million to **Head 701 – Land Acquisition**. A breakdown of the land resumption and clearance costs is at Enclosure 4. The proposed works under **273DS** do not require any land acquisition.

BACKGROUND INFORMATION

28. In September 2006, we upgraded **272DS** and **273DS** to Category B for implementation of sewerage works in the Port Shelter catchment recommended under the Port Shelter Sewerage Master Plan study. In August 2007, we engaged consultants to carry out investigation and design for implementing long-term water pollution abatement works in the Port Shelter catchment at an estimated cost of \$7.8 million in MOD prices. We charged this amount to block allocation **Subhead 4100DX** “Drainage works, studies and investigations for items in Category D of the Public Works Programme”. We have substantially completed the detailed design of the proposed works mentioned in paragraphs 3 and 4 above. The consultants are working on the design of the remaining works under **272DS** and **273DS**.

29. Of the 117 trees within the project boundary, 112 trees will be preserved. The proposed works will involve the felling of five trees. All trees to be felled are not important trees⁶. We will incorporate planting proposals as part of the project, including planting of 15 trees.

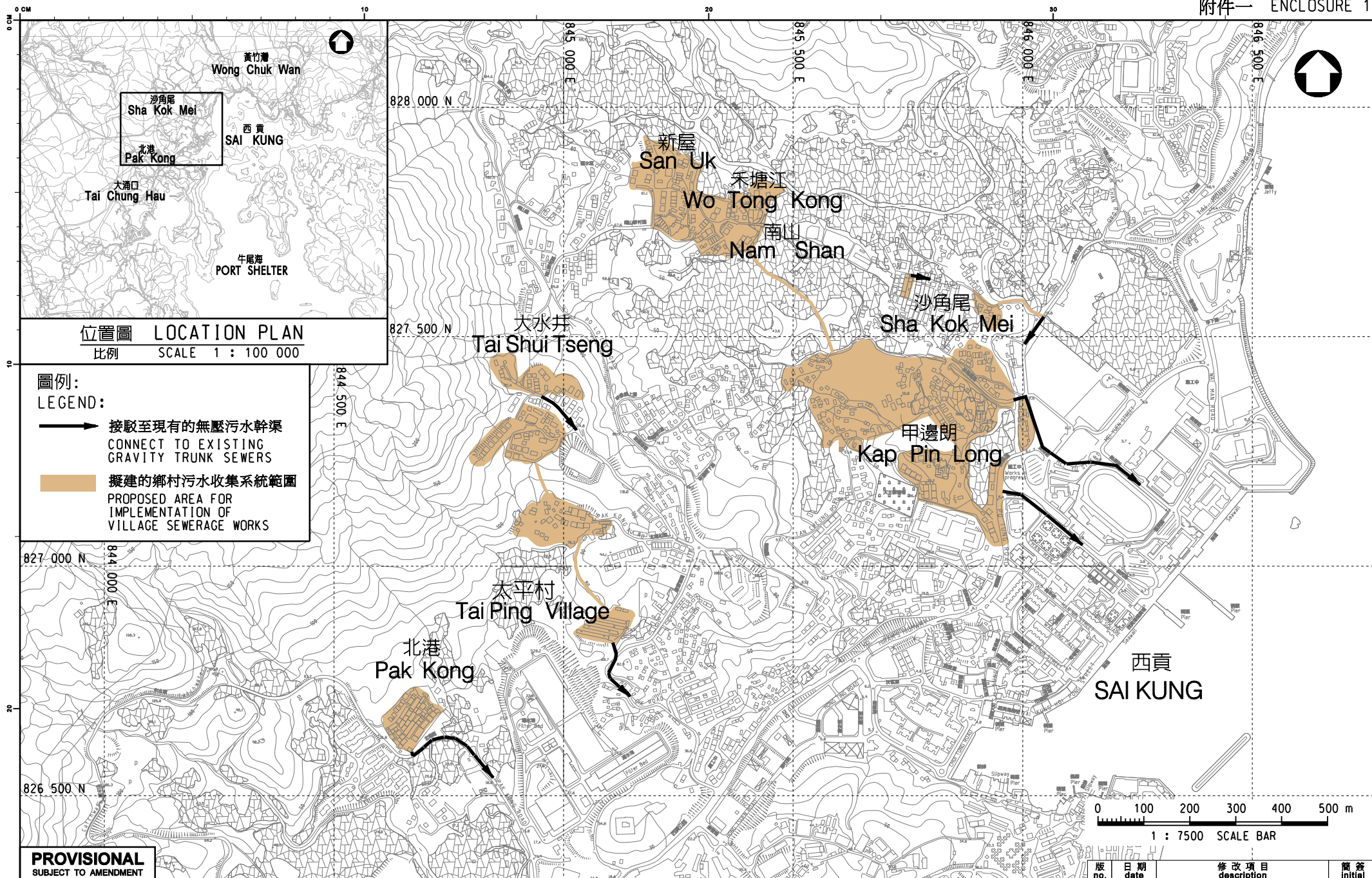
/30.

⁶ “Important trees” refer to trees in the Register of Old and Valuable Trees, or any other trees that meet one or more of the following criteria –

- (a) trees of 100 years old or above;
- (b) trees of cultural, historical or memorable significance e.g. Fung Shui trees, trees as landmark of monastery or heritage monument, and trees in memory of important persons or event;
- (c) trees of precious or rare species;
- (d) trees of outstanding form (taking account of overall tree sizes, shape and any special features) e.g. trees with curtain like aerial roots, trees growing in unusual habitat; or
- (e) trees with trunk diameter equal or exceeding 1.0 m (measured at 1.3 m above ground level), or with height/canopy spread equal or exceeding 25 m.

30. We estimate that the proposed works under **272DS** and **273DS** will create about 39 jobs (32 labourers and another seven for professional/technical staff) and 63 jobs (51 labourers and another 12 for professional/technical staff), providing a total employment of 1 680 and 2 690 man-months respectively.

Environment Bureau
May 2012



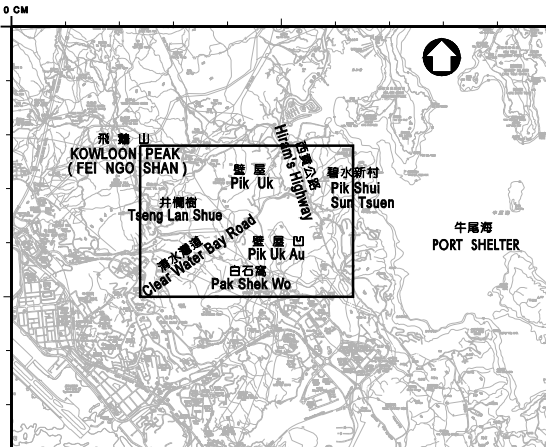
PROVISIONAL
SUBJECT TO AMENDMENT

圖則名稱 drawing title

工務計劃項目第 272DS 號 - 牛尾海污水收集系統第2階段工程
PWP ITEM NO.272DS - PORT SHELTER SEWERAGE, STAGE 2

繪畫 drawn	C. C. CHAN	日期 date	05 MAR 2012
核對 checked	Ir S. P. CHOW	日期 date	05 MAR 2012
批核 approved	Ir C. K. WONG	日期 date	05 MAR 2012
部門 office	污水工程處 SEWERAGE PROJECTS DIVISION		

版 no.	日期 date	修改項目 description	簡簽 initial
1	05 MAR 2012	圖則編號 drawing no.	AS SHOWN
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SPECIAL ADMINISTRATIVE REGION			



- 圖例： LEGEND:
- 接駁至現有的無壓污水幹渠
CONNECT TO EXISTING GRAVITY TRUNK SEWERS
 - 擬建的無壓污水幹渠
PROPOSED GRAVITY TRUNK SEWERS
 - 擬建的雙管壓力污水管
PROPOSED TWIN RISING MAINS
 - 擬建的鄉村污水收集系統範圍
PROPOSED AREA FOR IMPLEMENTATION OF VILLAGE SEWERAGE WORKS
 - 擬建污水泵房
PROPOSED SEWAGE PUMPING STATION



工務計劃項目第 273DS 號 - 牛尾海污水收集系統第3階段工程
PWP ITEM NO.273DS - PORT SHELTER SEWERAGE, STAGE 3

繪畫 drawn	C. C. CHAN	日期 date	20 MAR 2012	修改項目 description	簡簽 initial
核對 checked	Ir S. P. CHOW	日期 date	20 MAR 2012	圖則編號 drawing no.	比例 scale
批核 approved	Ir C. K. WONG	日期 date	20 MAR 2012	DSP/273DS1/11021	AS SHOWN
部門 office 污水工程部		SEWERAGE PROJECTS DIVISION		保留版權 COPYRIGHT RESERVED	
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Enclosure 3 to PWSC(2012-13)13

272DS – Port Shelter sewerage, stage 2

273DS – Port Shelter sewerage, stage 3

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2011 prices)

272DS – Port Shelter sewerage, stage 2

			Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	0.2
		Technical	-	-	-	0.1
					Sub-total	0.3
(b)	Resident site staff costs (Note 3)	Professional	48	38	1.6	4.8
		Technical	225	14	1.6	7.6
					Sub-total	12.4
Comprising –						
(i)	Consultants' fee for management of resident site staff				0.7	
(ii)	Remuneration of resident site staff				11.7	
Total						12.7

* MPS = Master Pay Scale

273DS – Port Shelter sewerage, stage 3

			Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	0.3
		Technical	-	-	-	0.2
					Sub-total	0.5
(b)	Consultants' fees for environmental monitoring and audit	Professional	3	38	1.6	0.3
		Technical	7	14	1.6	0.2
					Sub-total	0.5
(c)	Resident site staff costs (Note 3)	Professional	72	38	1.6	7.2
		Technical	365	14	1.6	12.4
					Sub-total	19.6
Comprising –						
(i)	Consultants' fee for management of resident site staff				1.0	
(ii)	Remuneration of resident site staff				18.6	
Total						20.6

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of resident site staff supplied by the consultants. (As at now, MPS salary point 38 = \$62,410 per month and MPS salary point 14 = \$21,175 per month)
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the investigation, design and construction of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade parts of **272DS** and **273DS** to Category A.
3. The actual man-months and actual costs will only be known after completion of the construction works.

272DS – Port Shelter sewerage, stage 2**273DS – Port Shelter sewerage, stage 3****Breakdown of the land resumption and clearance costs****272DS – Port Shelter sewerage, stage 2**

		\$ million
(I) Estimated resumption cost		1.48
(a)	Agricultural land ex-gratia compensation in Kap Pin Long and Tai Shui Tseng	1.48
	Seven agricultural lots (with a total area of 279.2 m ²) will be resumed	
	279.2m ² x \$5,287.5 per m ² (Zone B) (see Notes 1 and 2)	
(II) Estimated clearance cost		0.74
(a)	Ex-gratia allowance of crop compensation	0.30
(b)	Ex-gratia allowance for farm structures and miscellaneous permanent improvements to farms	0.30
(c)	Ex-gratia allowance for “Tun Fu”	0.14
(III) Contingency payment		0.22
(a)	Contingency on the above costs	0.22
Total costs		2.44

Notes

- There are four ex-gratia compensation zones, namely Zones A, B, C and D, for land resumption in the New Territories as approved by the Executive Council in 1985 and 1996. The boundaries of these zones are shown on the Zonal Plan for Calculation of Compensation Rates. The land to be resumed in the project **272DS** is agricultural land currently within Zone B.
- In accordance with G.N. 2128 dated 16 March 2012 on the revised ex-gratia compensation rates for resumed land, the ex-gratia compensation rate of agricultural land for Zone B is 75% of the Basic Rate at \$655 per square foot (or \$7,050 per m²). Hence the ex-gratia compensation rate used for estimating the resumption cost of the seven lots affected by **272DS** is \$5,287.5 per m².