

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 704 – DRAINAGE

Environmental Protection – Sewerage and sewage treatment

399DS – Relocation of Sha Tin Sewage Treatment Works to caverns

Members are invited to recommend to the Finance Committee –

- (a) the upgrading of part of **399DS**, entitled “Relocation of Sha Tin Sewage Treatment Works to caverns – site preparation and access tunnel construction” to Category A at an estimated cost of \$2,077.5 million in money-of-the-day (MOD) prices; and
- (b) the retention of the remainder of **399DS** in Category B.

PROBLEM

We need to carry out the first stage of the construction works for the relocation of Sha Tin Sewage Treatment Works (STSTW) to caverns (the Project) in order to improve the environment of the existing STSTW site and its surroundings and to release the existing site for housing and other beneficial uses.

/PROPOSAL

PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for Development, proposes to upgrade part of **399DS** to Category A at an estimated cost of \$2,077.5 million in MOD prices, for the construction of the first stage of the Project.

PROJECT SCOPE AND NATURE

3. The part of **399DS** which we propose to upgrade to Category A, (Stage 1 Works), comprises –

- (a) site preparation works at the main access tunnel portal area, including construction of the relevant retaining structures;
- (b) construction of about 350 metres (m) of the main access tunnel leading to the proposed cavern complex at Nui Po Shan¹;
- (c) construction of about 500 m of the access road leading to the proposed ventilation shaft²; and
- (d) ancillary works³.

4. A layout plan of the proposed Stage 1 Works is at Enclosure 1.

5. Subject to the funding approval of the Finance Committee (FC), we plan to commence the proposed Stage 1 Works in the first quarter of 2019 for completion in the fourth quarter of 2022.

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¹ The proposed cavern complex at Nui Po Shan will be constructed under the remainder of **399DS**.

² The proposed ventilation shaft will be constructed under the remainder of **399DS**.

³ Including diversion of utilities, geotechnical works, removal and preservation of trees, improvement works at Mui Tsz Lam Road and provision of temporary traffic arrangement.

6. We will retain the remainder of **399DS** in Category B, which comprises construction of the cavern complex at Nui Po Shan and the remaining access tunnels and portals; construction of the relocated STSTW and the associated facilities; decommissioning and demolition of the existing STSTW; and associated works⁴. Funding for the remainder of **399DS** will be sought at a later stage after completion of detailed design for different stages of works.

7. A layout plan of the remainder of **399DS** is at Enclosure 2.

JUSTIFICATION

8. There is a pressing need to optimise the supply of land for various uses by sustainable and innovative approaches to support social and economic development. It is the established policy of the Government to adopt a multi-pronged approach to expand land resources. One practicable approach is rock cavern development, which is a viable source of long-term land supply. In 2011, the Civil Engineering and Development Department (CEDD) completed a study on “Enhanced Use of Underground Space in Hong Kong”. Amongst other findings, the study has broadly demonstrated that relocation of the existing STSTW to caverns is technically feasible and financially viable.

9. Releasing of about 28 hectare of land after relocating the existing STSTW to caverns brings multifold benefits to the communities of Sha Tin and Ma On Shan Districts as a whole. On one hand, the environment of the existing STSTW site and its surroundings will be greatly improved. Comparing to the existing open-plant arrangement, the odour management of the proposed relocated STSTW in caverns, with caverns as natural barrier, can be efficiently enhanced so as to minimise the odour impact on the surrounding communities. On the other hand, developing the vacated site for residential and other beneficial uses will benefit the community by meeting the public’s needs⁵.

10. The 2017 (October) Policy Agenda announced that the Government would strive to complete the site investigation, detailed impact assessments and detailed design for the relocation of STSTW to caverns as soon as possible for early commencement of cavern construction works, provisioning of the relocated STSTW in caverns and onward demolition of the existing STSTW.

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⁴ Including environmental mitigation works, road works, traffic diversion, utilities diversion, etc. that are incidental to the Project.

⁵ The future land uses of the existing STSTW site to be vacated will be separately considered under a planning and engineering study focusing on the planning and development of the vacated site, in which appropriate development and land uses schemes will be formulated for further consultation with the public and stakeholders.

11. The future cavern complex for the relocated STSTW will be the largest of its type ever built in Hong Kong. It needs to be implemented in stages. Tentatively, the Project will be implemented in 5 stages, namely –

- (a) site preparation and access tunnel construction (Stage 1 Works) (i.e. the part seeking upgrading in this submission);
- (b) main caverns construction;
- (c) sewage treatment facilities installation;
- (d) modification and construction of upstream sewerage and pumping stations; and
- (e) decommission and demolition of existing STSTW.

12. It is anticipated that the construction period of the Project would last for more than 10 years. In order to derive a more reliable project cost estimate for prudent project administration and financial management over a long construction period, we propose to implement the Stage 1 Works first, and seek funding for the remaining works at a later stage.

FINANCIAL IMPLICATIONS

13. We estimate the cost of the proposed Stage 1 Works to be \$2,077.5 million in MOD prices (please see paragraph 15 below), broken down as follows –

		\$ million (in MOD prices)
(a)	Site preparation works	742.6
	(i) Retaining structures	680.2
	(ii) Slope works	62.4
(b)	Construction of main access tunnel	566.9
	(i) Excavation	359.2
	(ii) Tunnel related structures	207.7
(c)	Construction of access road	134.7
	(i) Retaining structures	86.9
	(ii) Slope works	24.8
	(iii) Bridges	12.9
	(iv) Road works	10.1

/(d)

		\$ million (in MOD prices)
(d)	Ancillary works	180.5
(e)	Environmental mitigation measures	28.9
(f)	Consultants' fees for	39.4
	(i) contract administration	33.9
	(ii) management of resident site staff (RSS)	5.5
(g)	Remuneration of RSS	203.1
(h)	Contingencies	181.4
	Total	<u>2,077.5</u>

14. We propose to engage consultants to undertake contract administration and site supervision of the Stage 1 works. A detailed breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Enclosure 3.

15. Subject to funding approval, we plan to phase the expenditure as follows –

Year	\$ million (MOD)
2018 – 2019	10.0
2019 – 2020	451.7
2020 – 2021	614.2
2021 – 2022	444.4
2022 – 2023	142.6
2023 – 2024	161.1
2024 – 2025	158.8
2025 – 2026	<u>94.7</u>
	<u>2,077.5</u>

16. 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 2018 to 2026. We will deliver the proposed works under a New Engineering Contract (NEC)⁶ form of contract with provision for price adjustment.

17. We estimate the additional annual recurrent expenditure arising from the Stage 1 Works to be \$3 million. Based on the current level of expenditure on operation and day-to-day maintenance of sewerage facilities, the proposed Stage 1 Works will lead to an increase in recurrent cost of providing sewage services by about 0.13% which will be taken into consideration when determining the sewage charge and trade effluent surcharge rates in future.

PUBLIC CONSULTATION

18. We conducted a three-stage Public Engagement (PE) exercise in the planning and design stage to seek views from the public and the relevant stakeholders with a view to building consensus on the Project. The Stage 1 PE was conducted from November 2012 to March 2013 to share the overseas experience of cavern sewage treatment works and to collect public opinions on the Project. The Stage 2 PE was conducted from July to October 2013 to respond to the public concerns received from Stage 1 PE with the support from various preliminary technical assessments. The Stage 3 PE was conducted from December 2015 to May 2016 to disseminate the results of detailed technical assessments with recommended mitigation measures, including environmental impact assessment, traffic impact assessment, etc., to the public. During the PE exercises, we carried out a wide range of activities, including media briefings, roving exhibitions, visits to the Stanley cavern sewage treatment works, focus group meetings with professional and environmental concern groups, community group meetings, public forum, etc. According to the results of the PE, it was generally agreed that the Project could benefit the community and enhance the environment in Sha Tin as a whole, especially in the aspects of odour control and visual impact.

19. We consulted the Health and Environment Committee of Sha Tin District Council (STDC) on the Project on 11 January 2018. The Committee generally supported the implementation of the Project.

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⁶ NEC is a suite of contracts developed by the Institution of Civil Engineers, United Kingdom. It is a contract form that emphasises cooperation, mutual trust and collaborative risk management between contracting parties.

20. We gazetted the proposed improvement works at Mui Tsz Lam Road under Roads (Works, Use and Compensation) Ordinance (Cap. 370) on 22 December 2017. One objection was received during the statutory objection period, and was resolved satisfactorily. The proposed improvement works at Mui Tsz Lam Road were authorised on 29 March 2018.

21. We consulted the Legislative Council Panel on Development on 27 March 2018 on the proposed Stage 1 Works and Members generally supported the proposed works, with a few technical enquiries. Supplementary information was provided to the Panel on 18 May 2018 to address such enquiries.

ENVIRONMENTAL IMPLICATIONS

22. The Project is a designated project under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499) and an environmental permit (EP) is required for the construction and operation of the project. The Environmental Protection Department approved the Environmental Impact Assessment (EIA) Report for the Project under EIAO in November 2016, and issued an EP for the construction and operation of the Project in March 2017. The EIA Report concludes that the environmental impact of the Project can be controlled to within the criteria under EIAO and the Technical Memorandum on EIA Process. We will implement the environmental mitigation measures and environmental monitoring and audit (EM&A) programme recommended in the approved EIA Report, and comply with relevant conditions under the EP and other statutory requirements for environmental protection. We have included in paragraph 13(e) a sum of \$28.9 million (in MOD prices) in the project estimate for implementation of the necessary environmental mitigation measures and the implementation of the EM&A programme.

23. For short-term environmental impacts during construction of the proposed Stage 1 Works, the recommended mitigation measures mainly include adoption of quiet powered mechanical equipment and temporary noise barriers to minimise construction noise impact, regular water spraying for dust control, and setting up of community liaison groups to maintain close communication with the community and concern groups.

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24. At the planning and design stages for the proposed Stage 1 Works, we have considered all the proposed works and construction sequences associated with the proposed Stage 1 Works to reduce the generation of construction waste where possible. In addition, we will request the contractor to reuse inert construction waste (e.g. demolished concrete and excavated soil and rock) on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities (PFRF)⁷. We will encourage the contractor to maximise the use of recycled or recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

25. At the construction stage for the proposed Stage 1 Works, we will request the contractor 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 request the contractor to separate the inert portion from non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert and non-inert construction waste at PFRF and landfills respectively through a trip-ticket system.

26. We estimate that the proposed Stage 1 Works will generate 642 600 tonnes of construction waste. Of these, we will reuse 13 100 tonnes (2%) on site and 199 600 tonnes (31.1%) on other construction site(s), deliver 418 000 tonnes (65%) of inert construction waste to PFRF for subsequent reuse and 11 900 tonnes (1.9%) of non-inert construction waste at landfill sites for disposal. The total cost for disposal of construction waste at PFRF and landfills is estimated to be \$32.1 million for the proposed Stage 1 Works (based on a unit charge rate of \$71 per tonne for disposal at PFRF and \$200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

27. The proposed Stage 1 Works will not affect any heritage site, i.e. all declared monuments, proposed monuments, graded historic sites or buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

/LAND

⁷ PFRF are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap 354N). Disposal of inert construction waste in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

LAND ACQUISITION

28. The proposed Stage 1 Works does not involve resumption of private land.

TRAFFIC IMPLICATIONS

29. We have conducted a traffic impact assessment (TIA) for the Project, covering the traffic impact during both construction and operation phases. According to the findings of the assessment, with the implementation of appropriate temporary traffic arrangement (TTA), the construction works will not cause significant impact on the traffic network in all areas concerned. The traffic impact during operation phase, after completion of the Project, has also been assessed and found to be insignificant.

30. We will consult STDC prior to the implementation of any major TTA for the Project. At the construction stage, we will establish a traffic management liaison group and closely liaise with the Hong Kong Police Force, the Transport Department and other government departments concerned to discuss, scrutinize and review the proposed TTA with a view to minimising the traffic impact arising from the construction works.

BACKGROUND

31. In May 2012, FC approved upgrading **379DS** “Feasibility study on relocation of STSTW to caverns” to Category A with an approved project estimate of \$57.9 million in MOD prices for carrying out the feasibility study (FS). The FS commenced in May 2012 for completion in May 2014. The main tasks under the FS were completed in end 2013.

32. We upgraded **399DS** to Category B in September 2013.

33. In July 2014, FC approved the upgrading of part of **399DS** to Category A as **407DS** “Relocation of STSTW to caverns – consultants’ fees and investigation” at an approved project estimate of \$637.7 million in MOD prices for carrying out site investigation, surveys, impact assessments and detailed design study for the Project.

34. In September 2014, we engaged consultants to undertake various impact assessments including EIA, TIA, etc. and detailed design for the Project. We also engaged contractors to carry out ground investigation for the Project. The ground investigation works have been substantially completed.

35. We have substantially completed the detailed design of the proposed Stage 1 Works.

36. Of the 2 193 trees within the project boundary of the Project, 230 trees will be preserved. The Project will involve the removal of 1 963 trees⁸, including 1 904 trees to be felled and 59 trees to be transplanted elsewhere. All the affected trees are not important trees⁹. We will incorporate planting proposals as part of the Project, including estimated quantities of 333 trees and about 2 962 square metres of mix planting (including planting about 3 554 whip trees).

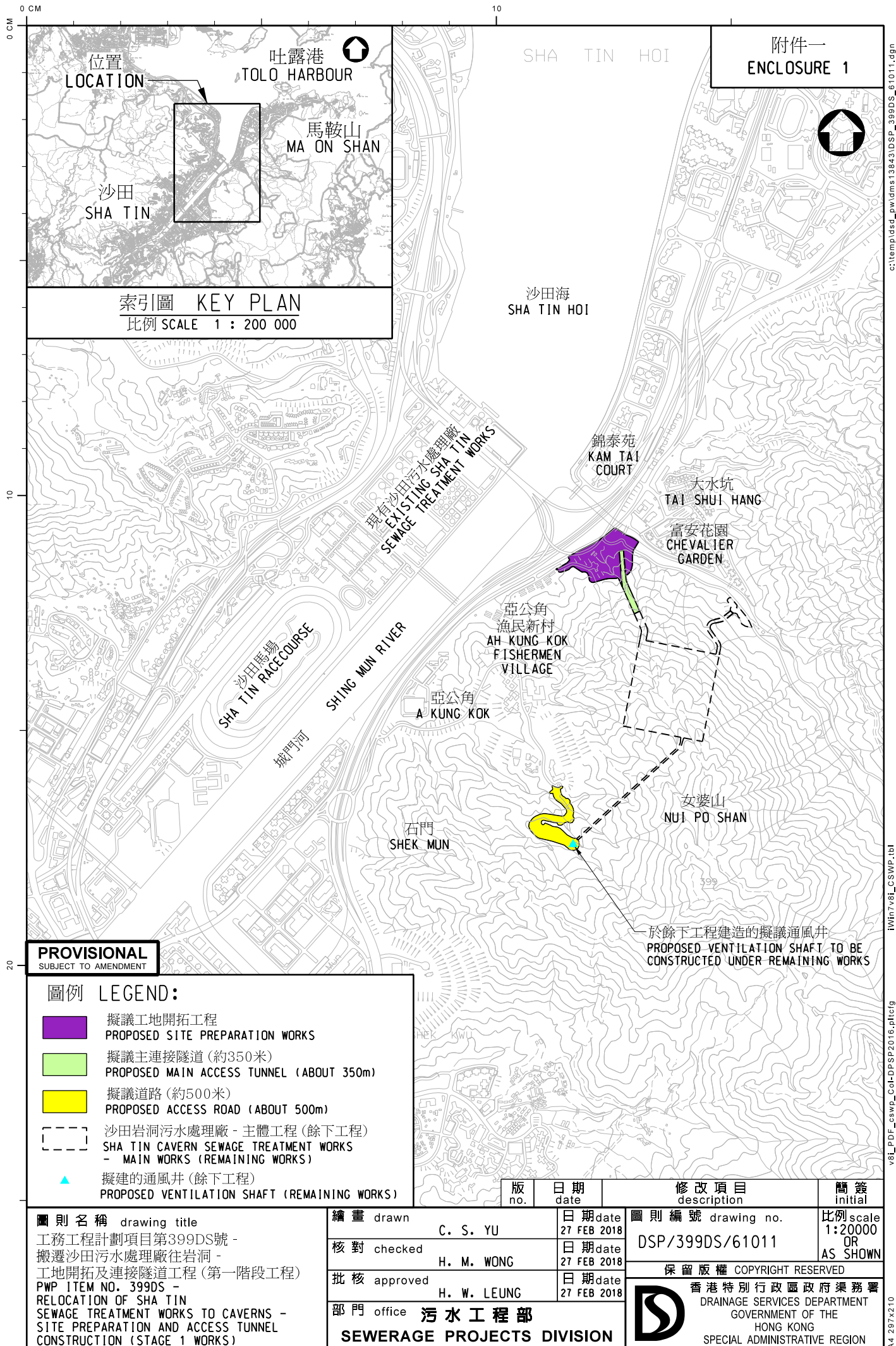
37. We estimate that the proposed Stage 1 works will create about 540 jobs (430 for labourers and 110 for professional or technical staff) providing a total employment of 23 000 man-months.

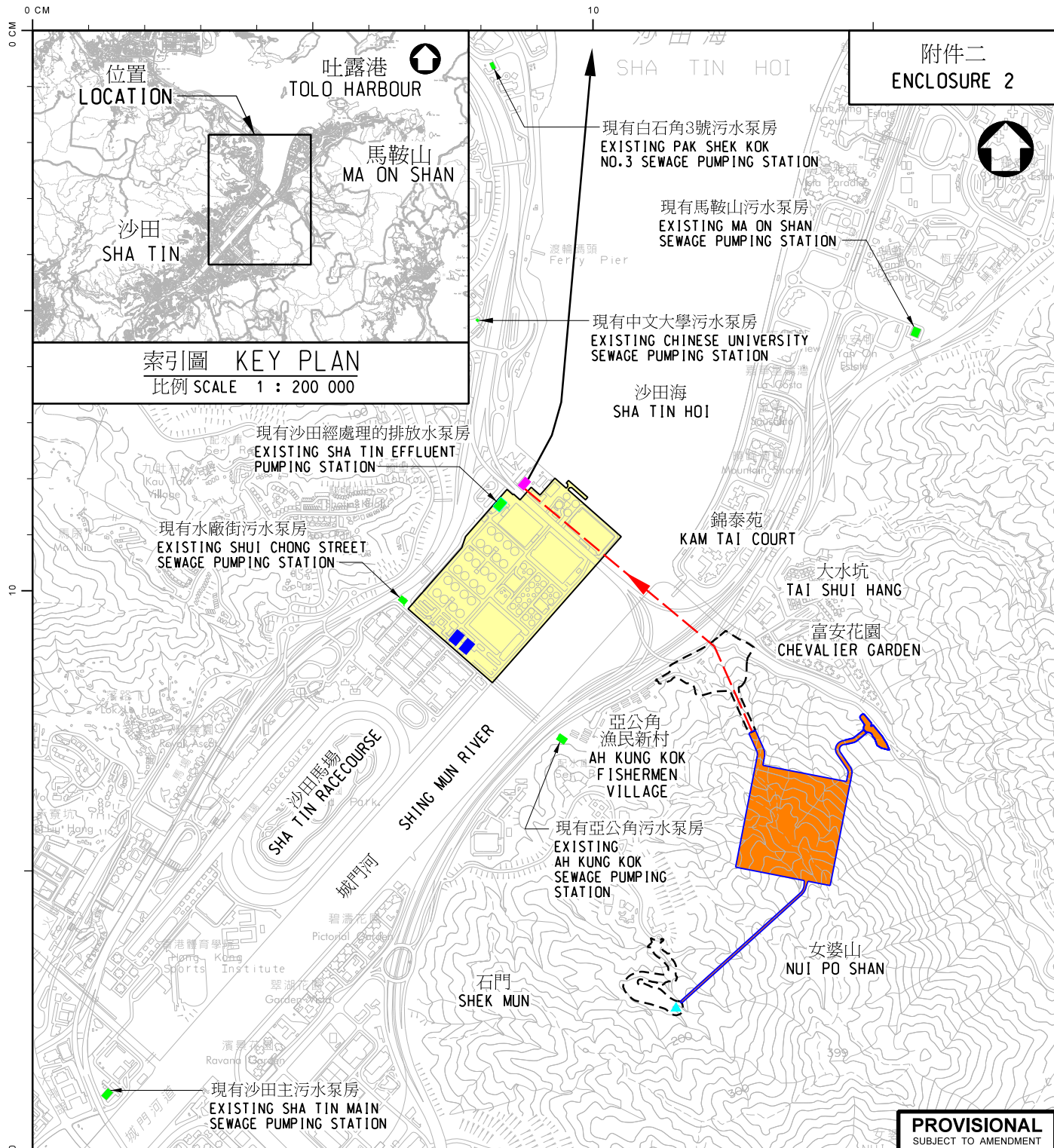
Development Bureau
June 2018

⁸ Of 1 963 trees affected by the Project, all of them will be removed under Stage 1 Works.

⁹ “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 events;
- (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 or canopy spread equal or exceeding 25 m.





圖例 LEGEND:

- [- - -] 工地開拓及連接隧道工程 (第一階段工程)
SITE PREPARATION AND ACCESS TUNNEL CONSTRUCTION (STAGE 1 WORKS)
- [黃色] 拆卸現有沙田污水處理廠
EXISTING SHA TIN SEWAGE TREATMENT WORKS TO BE DEMOLISHED
- [橘色] 沙田岩洞污水處理廠 - 主體工程
SHA TIN CAVERN SEWAGE TREATMENT WORKS - MAIN WORKS
- [綠色] 擬議改裝/改建的現有污水泵房/設施及改建/建造的上游/下游污水管道系統
EXISTING SEWAGE PUMPING STATIONS / FACILITIES PROPOSED TO BE MODIFIED / RE-PROVISIONED AND THE UPSTREAM / DOWNSTREAM SEWERAGE SYSTEM TO BE MODIFIED / CONSTRUCTED
- [粉紅色] 改裝現有排水出口閘
EXISTING OUTFALL CHAMBER TO BE MODIFIED
- [藍色] 擬建污水泵房/設施及上游/下游的污水管道系統
PROPOSED SEWAGE PUMPING STATIONS / FACILITIES AND THE UPSTREAM / DOWNSTREAM SEWERAGE SYSTEM TO BE CONSTRUCTED

- [藍色三角形] 擬建的通風井
PROPOSED VENTILATION SHAFT
- [紅色箭頭] 擬建緊急排放管道
PROPOSED EMERGENCY DISCHARGE PIPES
- [黑色箭頭] 現有緊急排水出口
EXISTING EMERGENCY OUTFALL

註 NOTES:

1. 擬議岩洞及附屬設施的佈局有待詳細設計。
THE LAYOUT OF PROPOSED CAVERNS AND ANCILLARY FACILITIES IS SUBJECT TO DETAILED DESIGN.
2. 為保持清晰，擬議改建/建造的上游/下游污水管道系統沒有顯示。
PROPOSED MODIFICATION / CONSTRUCTION OF UPSTREAM / DOWNSTREAM SEWERAGE SYSTEM ARE NOT SHOWN FOR CLARITY

圖則名稱 drawing title
工務工程計劃項目第399DS號 -
搬遷沙田污水處理廠往岩洞 -
餘下工程
PWP ITEM NO. 399DS -
RELOCATION OF SHA TIN
SEWAGE TREATMENT WORKS TO CAVERNS -
REMAINING WORKS

繪畫 drawn	K. W. CHAN	日期 date	01 FEB 2018
核對 checked	H. M. WONG	日期 date	01 FEB 2018
批核 approved	H. W. LEUNG	日期 date	01 FEB 2018
部門 office	污水工程部 SEWERAGE PROJECTS DIVISION		

圖則編號 drawing no.	DSP/399DS/61021	比例 scale	1:20000 OR AS SHOWN
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香港特別行政區政府渠務署 DRAINAGE SERVICES DEPARTMENT GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION			

Enclosure 3 to PWSC(2018-19)26

399DS – Relocation of Sha Tin Sewage Treatment Works to caverns

Breakdown of estimates for consultants' fees and resident site staff costs (in September 2017 prices)

			Estimated man- months	Average MPS* salary point	Multiplier (Note 1)	Estimated fee (\$ million)
(a)	Consultants' fees for contract administration (Note 2)	Professional	-	-	-	18.5
		Technical	-	-	-	9.4
					Sub-total	27.9#
(b)	Resident site staff (RSS) costs (Note 3)	Professional	765	38	1.6	96.4
		Technical	1 707	14	1.6	75.1
					Sub-total	171.5
	Comprising –					
	(i) Consultants' fees for management of RSS				4.5#	
	(ii) Remuneration of RSS				167.0#	
					Total	199.4

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the consultants (as at now, MPS salary point 38 = \$78,775 per month and MPS salary point 14 = \$27,485 per month).
2. The consultants' staff cost for contract administration is calculated in accordance with the existing consultancy agreement for the design and construction of the project. The construction phase of the assignment will only be executed subject to Finance Committee's approval to upgrade part of **399DS** to Category A.
3. The actual man-months and actual costs will only be known after the completion of the construction works.

Remarks

The figures in this Enclosure are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 13 of the main paper.