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ACE Paper 8/2018

For information by circulation

An Update on the Planned Maintenance Works of the Harbour Area Treatment Scheme Stage 1 System

PURPOSE

This paper updates Members on the progress of planned maintenance works at the Stonecutters Island Sewage Treatment Works (SCISTW) of the Harbour Area Treatment Scheme (HATS) Stage 1 System.

BACKGROUND

2. At the meeting of the Advisory Council on the Environment (ACE) on 4 December 2017, we briefed Members on the planned maintenance works to be undertaken by Drainage Services Department (DSD) at the main pumping station of SCISTW under HATS Stage 1 System while providing updates on the water quality improvements in Hong Kong over the past three decades and seeking views on the proposals for further enhancing the quality of coastal waters of Victoria Harbour (details are in ACE Paper 25/2017).

3. As mentioned in ACE Paper 25/2017, the maintenance works at the main pumping station of SCISTW under HATS Stage 1 System comprise replacement of the two outermost inlet penstocks of Main Pumping Station No. 1 (MPS1) of SCISTW that were installed under HATS Stage 1 works and have been continuously operated in submerged condition since being commissioned in 2001. To allow workers to gain access to the penstocks, sewage flow to MPS1 has to be temporarily stopped,

necessitating temporary short-term bypass of sewage after preliminary treatment at seven upstream preliminary treatment works (PTWs) of HATS Stage 1 in five occasions, each lasting about two weeks, while the sewage flow from the remaining PTWs of HATS Stage 1 and the whole HATS Stage 2A is unaffected. The locations of the affected PTWs are shown in **Figure 1.**

PROGRAMME AND PROGRESS OF MAINTENANCE WORKS

4. The sequence and programme of planned maintenance works and associated exercises of sewage bypass are shown in **Figure 2**. The works are planned to be carried out in three steps. Step 1 of the maintenance works for securing the existing penstocks and surveying the adit tunnel involves the first round of temporary bypass to be carried out. In respect of Steps 2 and 3 for the dismantling of the existing penstocks and the installation of the new ones respectively, each step involves two rounds of temporary bypass.

5. To assess the potential impact of the temporary sewage bypass exercises for reference in devising appropriate mitigation measures, DSD had employed an independent consultant to conduct detailed water quality modeling simulations during the planning of the maintenance works. The finding was that the potential impacts were limited and transient, and that water quality would resume normal within a few days after cessation of the bypass.

6. Before embarking on the first bypass exercise, DSD in conjunction with the Environmental Protection Department (EPD) had communicated with relevant Government departments to draw up management and contingency plans in relation to potentially affected facilities and sensitive receivers.

7. In accordance with the works schedule, DSD performed the first bypass exercise from 20 February to 4 March 2018, spanning a total of 13 days, and smoothly completed Step 1 of the maintenance works within that period. In the process, DSD has formulated and implemented a series of mitigation measures, including:

i. Scheduling the works in the non-bathing season when the beaches were less patronized and fewer people engaged in water sports;
ii. Limiting the duration of bypass to within two weeks;
iii. Maximizing the effects of dilution and dispersion of the bypassed sewage

through pre-dilution, submarine discharge, etc.;

iv. Applying various odour control measures including purging of sewage tunnels, deployment of odour mitigation and suppression agents, and installation of additional de-odorizers, etc.;

v. Issuing a press release and erecting public notices at prominent locations of potentially affected areas, such as gazetted beaches and promenades, to alert the public of potential water quality impacts and advise them to refrain from fishing or water contact activities during the bypass period;

vi. Conducting intensive water quality monitoring on water quality at potentially affected areas including beaches, fish culture zones, coral sites, promenades, etc. located near or within Victoria Harbour throughout the bypass period, with the results promptly uploaded to the project site (http://www.dsd.gov.hk/others/HATS1bypass) for information of the public;

vii. Carrying out odour patrol and monitoring along shorelines;

viii. Establishing a telephone hotline and an email address for public enquiry; and

ix. Maintaining close coordination with relevant departments on the latest situation for any response action throughout the bypass period.

8. The results of water quality monitoring conducted in the bypass period were generally in line with the previous model prediction. *E. coli* concentrations measured at the gazetted beaches in Tsuen Wan District during the bypass period remained at levels that were suitable for swimming. The water quality parameters measured at the fish culture zones and coral sites in the vicinity of Victoria Harbour were also found to be comparable to the baseline situation before the bypass period. As the model predicted, water quality also resumed normal in a few days after cessation of the bypass. In brief, the bypass exercise had no significant impact on the water sensitive receivers while the overall water quality impact was generally limited and transient (please refer to **Annex I** for a summary of monitoring results).

PLAN FOR THE REMAINING MAINTENANCE WORKS

9. Upon completion of Step 1 of the maintenance works, DSD has reviewed the detailed work arrangement and proceeded with the design and manufacturing of the new penstocks as well as detailed planning of the upcoming installation works. Step 2 of the works will be carried out in the non-bathing season of 2018/19, including two

rounds of bypass (each lasting about two weeks) scheduled to start in early November 2018 and early March 2019.

10. In the coming bypass exercises, DSD will continue to implement various mitigation and control measures to minimize the potential impact of the bypass on water quality in the Harbour and adjacent waters. Also, DSD will conduct environmental monitoring during the bypass with the results timely released for information of the public. In the process, DSD will keep close liaison with relevant Government departments for taking contingency actions and responses as and where necessary.

11. Furthermore, DSD will continuously review the works arrangement and endeavor to reduce the overall duration of temporary sewage bypass required. After the completion of penstock replacement, the robustness and reliability of the HATS system will be further enhanced.

ADVICE SOUGHT

12. Members are invited to note the progress of maintenance works at the SCISTW of the HATS Stage 1 System and the plan for execution of the remaining works.

Environmental Protection Department
Drainage Services Department
August 2018

Figure 1 – Temporary Sewage Bypass of HATS Stage 1 System

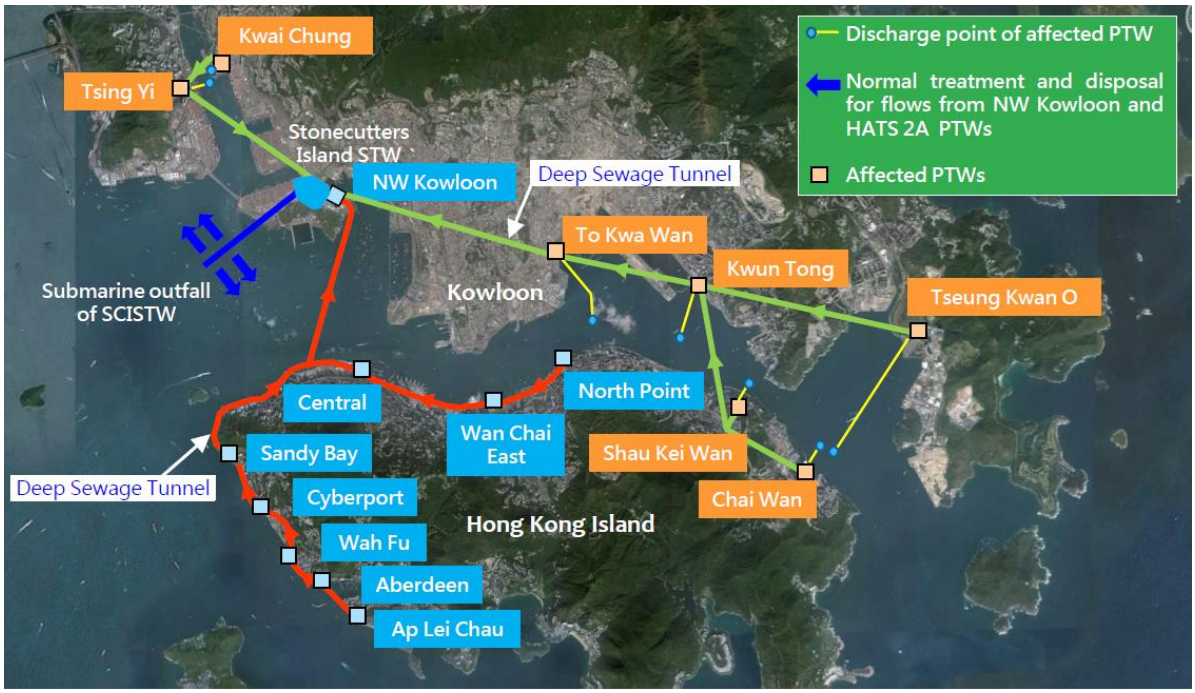
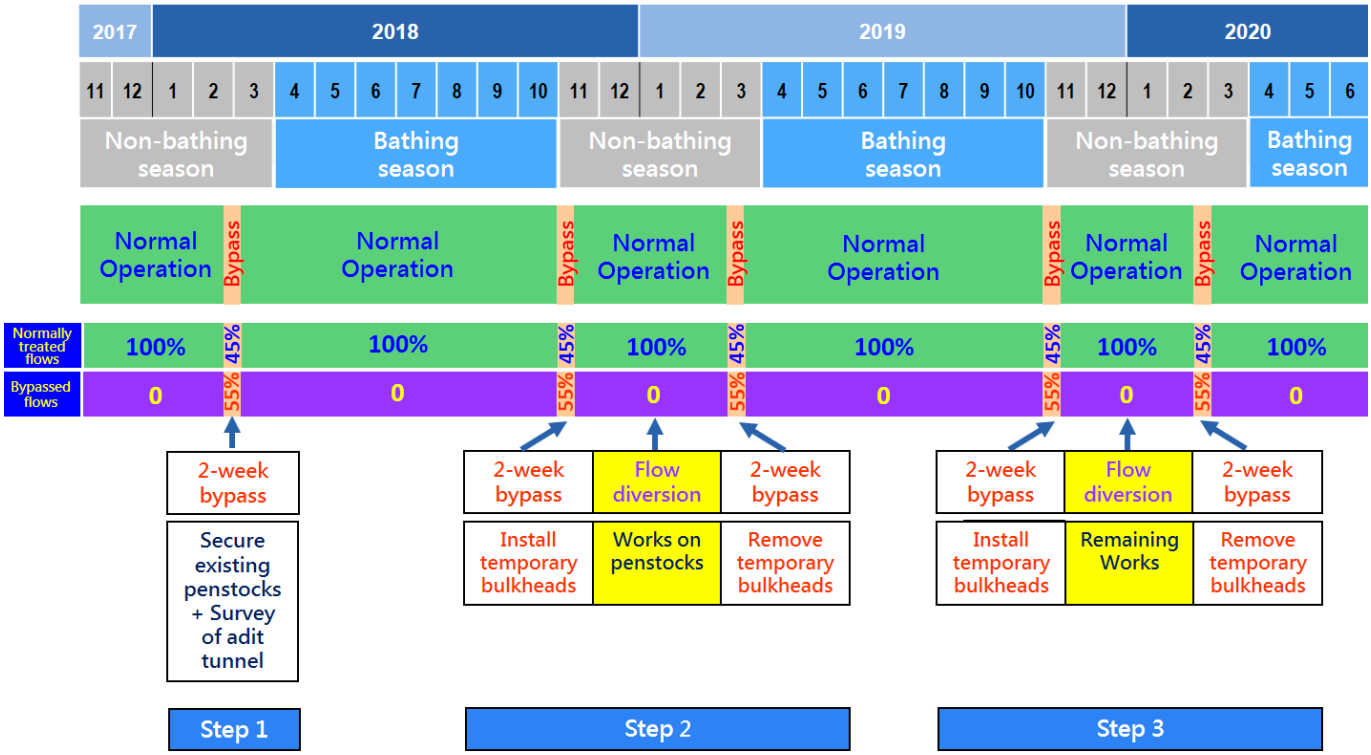


Figure 2 – Works Sequence of Penstock Replacement



Annex I

Planned maintenance works for the Harbour Area Treatment Scheme (HATS) Stage 1
Temporary sewage bypass (20 Feb to 4 Mar 2018) - Water quality monitoring results

泳灘 Beaches

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間												After Temporary Sewage Bypass 臨時繞流後			
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	20.02.18	21.02.18	22.02.18	23.02.18	24.02.18	25.02.18	26.02.18	27.02.18	28.02.18	01.03.18	02.03.18	03.03.18	04.03.18	05.03.18	06.03.18	07.03.18	08.03.18
大腸桿菌 *E.coli*	B7	釣魚灣 Anglers' Beach																			
	B8	雙仙灣 Gemini Beach																			
	B9	海美灣 Hoi Mei Wan Beach																			
	B10	粟生灣 Casam Beach																			
	B11	麗都灣 Lido Beach																			
	B12	汀九灣 Ting Kau Beach																			
	B13	近水灣 Approach Beach																			
	B14	馬灣東灣 Ma Wan Beach																			
	B24	大浪灣 Big Wave Bay Beach																			
	B26	石澳 Shek O Beach																			

圖例 Legand				
大腸桿菌 (每100毫升含有的細菌菌落總數) *E.coli* (cfu/100mL)	≦180	180 to 610	610 to 1,600	>1,600

漁類養殖區 Fish Culture Zones

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間												After Temporary Sewage Bypass 臨時繞流後			
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	20.02.18	21.02.18	22.02.18	23.02.18	24.02.18	25.02.18	26.02.18	27.02.18	28.02.18	01.03.18	02.03.18	03.03.18	04.03.18	05.03.18	06.03.18	07.03.18	08.03.18
大腸桿菌 *E.coli*	F1	東龍洲 Tung Lung Chau																			
	F5	馬灣 Ma Wan																			

圖例 Legand				
大腸桿菌 (每100毫升含有的細菌菌落總數) *E.coli* (cfu/100mL)	≦180	180 to 610	610 to 1,600	>1,600

Parameter 參數	監測站 Station	Description	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間												After Temporary Sewage Bypass 臨時繞流後			
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	20.02.18	21.02.18	22.02.18	23.02.18	24.02.18	25.02.18	26.02.18	27.02.18	28.02.18	01.03.18	02.03.18	03.03.18	04.03.18	05.03.18	06.03.18	07.03.18	08.03.18
溶解氧量 (水深平均值) Dissolved Oxygen	F1	東龍洲 Tung Lung Chau																			
	F5	馬灣 Ma Wan																			

圖例 Legand			
溶解氧量(水深平均值) (毫克/升) Dissolved Oxygen (Depth-averaged) (mg/L)	≧5	≧4 to <5	<4

Annex I

Planned maintenance works for the Harbour Area Treatment Scheme (HATS) Stage 1
Temporary sewage bypass (20 Feb to 4 Mar 2018) - Water quality monitoring results

避風塘 Typhoon Shelters

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	21.02.18	23.02.18	25.02.18	27.02.18	01.03.18	04.03.18	06.03.18	08.03.19	09.03.18
大腸桿菌 *E.coli*	ET2	筲箕灣 Shau Kei Wan												
	TS1	土瓜灣 To Kwa Wan												
	TS2	柴灣 Chai Wan												
	TS3	醉酒灣 Gin Drinkers Bay												

圖例 Legand				
大腸桿菌 (每100毫升含有的細菌菌落總數) *E.coli* (cfu/100mL)	≦1000	>1,000 to ≦10,000	>10,000 to ≦50,000	>50,000

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	21.02.18	23.02.18	25.02.18	27.02.18	01.03.18	04.03.18	06.03.18	08.03.18	09.03.18
溶解氧量(水深平均值) Dissolved Oxygen (Depth-averaged)	ET2	筲箕灣 Shau Kei Wan												
	TS1	土瓜灣 To Kwa Wan												
	TS2	柴灣 Chai Wan												
	TS3	醉酒灣 Gin Drinkers Bay												

圖例 Legand		
溶解氧量(水深平均值) (毫克/升) Dissolved Oxygen (Depth-averaged) (mg/L)	≧4	<4

海濱公園 Promenades

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間												After Temporary Sewage Bypass 臨時繞流後				
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	20.02.18	21.02.18	22.02.18	23.02.18	24.02.18	25.02.18	26.02.18	27.02.18	28.02.18	01.03.18	02.03.18	03.03.18	04.03.18	05.03.18	06.03.18	07.03.18	08.03.18	09.03.18
大腸桿菌 *E.coli*	TYP1	青衣北海濱公園 Tsing Yi Northern Promenade																				
	TYP2	青衣東海濱公園 Tsing Yi Eastern Promenade																				
	CWDP1	中西區海濱長廊(中環段) (Central and Western District Promenade (Central Section)																				
	RKTD1	觀塘海濱公園 Kwun Tong Promenade																				

圖例 Legand				
大腸桿菌 (每100毫升含有的細菌菌落總數) *E.coli* (cfu/100mL)	≦1000	>1,000 to ≦10,000	>10,000 to ≦50,000	>50,000

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間												After Temporary Sewage Bypass 臨時繞流後				
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	20.02.18	21.02.18	22.02.18	23.02.18	24.02.18	25.02.18	26.02.18	27.02.18	28.02.18	01.03.18	02.03.18	03.03.18	04.03.18	05.03.18	06.03.18	07.03.18	08.03.18	09.03.18
溶解氧量(水深平均值) Dissolved Oxygen (Depth-averaged)	TYP1	青衣北海濱公園 Tsing Yi Northern Promenade																				
	TYP2	青衣東海濱公園 Tsing Yi Eastern Promenade																				
	CWDP1	中西區海濱長廊(中環段) (Central and Western District Promenade (Central Section)																				
	RKTD1	觀塘海濱公園 Kwun Tong Promenade																				

圖例 Legand		
溶解氧量(水深平均值) (毫克/升) Dissolved Oxygen (Depth-averaged) (mg/L)	≧4	<4

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Planned maintenance works for the Harbour Area Treatment Scheme (HATS) Stage 1
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珊瑚區
Coral Sites

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	21.02.18	23.02.18	25.02.18	27.02.18	01.03.18	04.03.18	06.03.18	08.03.18	09.03.18
懸浮固體 Suspended Solids	CR25	將軍澳 - 東南 Junk Bay - South East												
	CR26	將軍澳 Junk Bay												
	CR27	將軍澳 Junk Bay												
	CR28	將軍澳 - Junk Bay - Junk Island												
	CR31	東龍洲西 Tung Lung Chau West												
	CR44	歌連臣角 Cape Collinson												
	CR46	東龍洲北 Tung Lung Chau North												
	CR52	青洲 Green Island												
	CR54	沙灣 Sandy Bay												

圖例 Legand				
懸浮固體 (毫克/升) Suspended Soilds level (mg/L)	≤4	>4 to ≤7	>7 to ≤10	>10

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
			Dec 2017 十二月	Jan 2018 一月	Feb 2018 二月	21.02.18	23.02.18	25.02.18	27.02.18	01.03.18	04.03.18	06.03.18	08.03.18	09.03.18
溶解氧量(底層) Dissolved Oxygen (Bottom)	CR25	將軍澳 - 東南 Junk Bay - South East												
	CR26	將軍澳 Junk Bay												
	CR27	將軍澳 Junk Bay												
	CR28	將軍澳 - Junk Bay - Junk Island												
	CR31	東龍洲西 Tung Lung Chau West												
	CR44	歌連臣角 Cape Collinson												
	CR46	東龍洲北 Tung Lung Chau North												
	CR52	青洲 Green Island												
	CR54	沙灣 Sandy Bay												

圖例 Legand			
溶解氧量(底層) (毫克/升) Dissolved Oxygen (Bottom) (mg/L)	≥4	≥2 to <4	<2

Planned maintenance works for the Harbour Area Treatment Scheme (HATS) Stage 1
Temporary sewage bypass (20 Feb to 4 Mar 2018) - Water quality monitoring results

Annex I

海水監測站
Marine Stations

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
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大腸桿菌 *E.coli*	VM1	維多利亞港 (筲箕灣) Victoria Harbour (Shau Kei Wan)												
	VM2	維多利亞港 (鰂魚涌) Victoria Harbour (Quarry Bay)												
	VM4	維多利亞港 (紅磡) Victoria Harbour (Hung Hom)												
	VM5	維多利亞港 (灣仔) Victoria Harbour (Wan Chai)												
	VM6	維多利亞港 (中環) Victoria Harbour (Central)												
	VM7	維多利亞港 (西面) Victoria Harbour (West)												
	VM8	維多利亞港 (青洲) Victoria Harbour (Green Island)												
	VM12	藍巴勒海峽(葵青) Rambler Channel (Kwai Tsing)												
	VM14	藍巴勒海峽(荃灣) Rambler Channel (Tsuen Wan)												
	VM15	昂船洲 Stonecutter Island												
	JM3	將軍澳(內灣) Inner Junk Bay												
	JM4	將軍澳(外灣) Outer Junk Bay												
	EM1	柴灣 Chai Wan												
	EM2	藍塘海峽(東龍洲西北面) Tathong Channel (Tung Lung Chau Northwest)												
	EM3	藍塘海峽(東龍洲西南面) Tathong Channel (Tung Lung Chau Southwest)												
	WM2	青洲(西面) Green Island (West)												
	WM3	青衣(南面) Tsing Yi (South)												
	WM4	青衣(西面) Tsing Yi (West)												

圖例 Legand				
大腸桿菌 (每100毫升含有的細菌菌落總數) *E.coli* (cfu/100mL)	*≤ 1000*	*> 1,000 to ≤ 10,000*	*> 10,000 to ≤ 50,000*	*> 50,000*

Planned maintenance works for the Harbour Area Treatment Scheme (HATS) Stage 1
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Annex I

海水監測站
Marine Stations

Parameter 參數	監測站 Station	位置 Location	Baseline 基線			During Temporary Sewage Bypass 臨時繞流期間						After Temporary Sewage Bypass 臨時繞流後		
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溶解氧量(水深平均值) Dissolved Oxygen (Depth-averaged)	VM1	維多利亞港 (筲箕灣) Victoria Harbour (Shau Kei Wan)												
	VM2	維多利亞港 (鰂魚涌) Victoria Harbour (Quarry Bay)												
	VM4	維多利亞港 (紅磡) Victoria Harbour (Hung Hom)												
	VM5	維多利亞港 (灣仔) Victoria Harbour (Wan Chai)												
	VM6	維多利亞港 (中環) Victoria Harbour (Central)												
	VM7	維多利亞港 (西面) Victoria Harbour (West)												
	VM8	維多利亞港 (青洲) Victoria Harbour (Green Island)												
	VM12	藍巴勒海峽(葵青) Rambler Channel (Kwai Tsing)												
	VM14	藍巴勒海峽(荃灣) Rambler Channel (Tsuen Wan)												
	VM15	昂船洲 Stonecutter Island												
	JM3	將軍澳(內灣) Inner Junk Bay												
	JM4	將軍澳(外灣) Outer Junk Bay												
	EM1	柴灣 Chai Wan												
	EM2	藍塘海峽(東龍洲西北面) Tathong Channel (Tung Lung Chau Northwest)												
	EM3	藍塘海峽(東龍洲西南面) Tathong Channel (Tung Lung Chau Southwest)												
	WM2	青洲(西面) Green Island (West)												
	WM3	青衣(南面) Tsing Yi (South)												
	WM4	青衣(西面) Tsing Yi (West)												

圖例 Legand

溶解氧量(水深平均值) (毫克/升) Dissolved Oxygen (Depth-averaged) (mg/L)	≧4	<4

Note 注釋

1 The baseline *E.coli* level at the station is the geometric mean *E.coli* level of the month.
基準大腸桿菌數量是該月份採樣的大腸桿菌幾何平均數。

2 Except where indicated and except there are less than 5 sampling occasions at the station, the *E.coli* level is the geometric mean *E.coli* level of the 5 most recent sampling occasions.
除另有闡釋或少於五次採樣，大腸桿菌數量是最近五次採樣的大腸桿菌幾何平均數。

3 Marine Station refer to the monitoring locations of EPD Water Quality Monitoring Station
海水監測站，依據環境保護署之水質監察站地點而設立。

4 The sewaee bvpass has stopped on 4 March 2018. For the result after bypass, the *E.coli* level is the geometric mean *E.coli* level of the 5 most recent sampling occasion since 5 March 2018.
臨時繞流已於三月四日完成，臨時繞流後的大腸桿菌數量是由三月五日起最近五次採樣值的大腸桿菌幾何平均數。