For information

Legislative Council
Panel on Environmental Affairs

Sewerage Improvements for Sham Tseng/Ting Kau and Cheung Chau

INTRODUCTION

On 5 November 1999 Members considered two papers on provision of sewerage and sewage treatment in Hong Kong. One provided an overview of general sewage treatment strategy. The other addressed specifically the environmental gains expected to be brought about by the proposed sewerage improvements along the coastal strip where the Tsuen Wan beaches are situated, and at Cheung Chau. During discussion a number of issues were raised. This note provides the Administration's response.

ISSUE 1: Why is it that even after the proposed measures are implemented only two of the seven mainland Tsuen Wan beaches will meet the water quality objective (WQO) for swimming? Can the Administration say when the WQO will be met at the other beaches?

2. Pollution affecting the Tsuen Wan beaches comes from both local sources and sources further away. The latter contribute a rather high background. To ensure the bacterial WQO is met at **ALL** the beaches, **ALL** the pollution sources will need to be dealt with, both local and background. Removing the background contribution will mean dealing with the pollution in Victoria Harbour and in the north-western waters, in the manner outlined in the strategy paper circulated to Members prior to the meeting on 5 November 1999.

3. Dealing with all the pollution sources involves a combination of sewerage implementation and enforcement of pollution control laws. A detailed programme for the relevant sewerage works is at Annex. Details of enforcement activity are provided in paragraph 12 below.

4. The figures presented in the paper discussed on 5 November demonstrated that based on 1998 data, and on the implementation works at Sham Tseng/Ting Kau alone, two of the seven beaches will meet the WQO after completion of the programme. These two beaches include Lido beach which is the most popular amongst all the beaches in the Tsuen Wan area. In 1999 Lido beach received 111,000 visitors compared with only 41,000 for all the other beaches put together. Although the remainder of the beaches will not immediately meet the WQO, on completion of the scheme they will be substantially improved and further improved as other sewerage programmes are implemented.

<u>ISSUE 2:</u> Since not all the beaches will meet the WQO why doesn't the Administration instal a higher level of treatment?

5. As explained in the strategy paper circulated to Members in advance of the meeting on 5 November 1999, the level of treatment selected is driven by the environmental goals, i.e. the WQOs. In this case the critical environmental goal is the bacterial WQO for swimming at the beaches. The extent to which we can reduce bacteria at the beaches is determined primarily by the extent to which we can get the sewage into the sewers. Nevertheless, to ensure we improve bacterial conditions to the maximum extent possible we will disinfect the effluent. If we were to instal a higher level of treatment it would not bring about any material improvement in bacterial water quality conditions but it would cost a lot more money. The relationship between the degree of removal of bacteria at different treatment levels, and the additional cost, is illustrated in Figure 1. The impact on the beaches of providing different levels of treatment is shown in the table below.

Table 1. Indicative *E.coli* Concentrations at Beaches with Different Levels of Treatment at Sham Tseng Sewage Treatment Works

Beach	1998 Observed Mean *E.coli* Concentration (no. of counts / 100ml)	Estimated *E.coli* Concentration with Chemical Treatment + Disinfection (no. of counts / 100ml)	Estimated *E.coli* Concentration with Biological Treatment + Disinfection (no. of counts / 100ml)	Estimated *E.coli* Concentration with Biological Treatment Only (no. of counts / 100ml)
Approach	435	305	305	315
Ting Kau	1045	303	302	315
Lido	262	157	156	176
Casam	239	158	157	184
Hoi Mei Wan	280	255	253	291
Gemini	399	331	328	385
Angler's	502	201	200	227

6. The figure and table clearly demonstrate that chemical treatment plus disinfection will serve the purpose and biological treatment will not produce any improvement to the estimated *E. coli* level at the beaches. Therefore we see no strong justification for spending extra public money to upgrade the treatment standard.

7. Upgrading to biological treatment (based on a high rise sewage treatment works option) would probably mean a further delay of approximately three years while

designs are re-examined and the necessary planning approvals sought. This will mean an additional three years during which residents in the area have to tolerate the filthy unhygienic conditions of the Sham Tseng nullah, and substandard water quality at the bathing beaches.

<u>ISSUE 3:</u> Chemical treatment is not good enough; what alternative treatment methods has the Administration examined for this scheme?

8. The Administration has considered chemical treatment and biological treatment at Sham Tseng. However, as explained above the treatment method is driven by the WQOs. On this basis chemical treatment plus disinfection is recommended.

9. On the question of whether chemical treatment is good enough it is worth noting that, although a relatively new approach to sewage treatment, it is gaining popularity because of the high quality of effluent that it can deliver, its ease of management and its lack of susceptibility to shock loadings of toxic pollutants. In both San Diego and Honolulu it has been adopted as the treatment method for dealing with the sewage of over a million people. In both these locations the use of this method by the municipal authorities has been challenged in the courts. In both cases the courts have upheld the municipalities' use of chemical treatment because they found no evidence of environmental damage. Thus, the treatment method has withstood the rigour of public scrutiny through the medium of the United States judicial system. Our studies have confirmed that it poses no environmental risk at Sham Tseng. The planned chemical treatment will produce an effluent that can be safely discharged without impact.

<u>ISSUE 4:</u> What evidence does the Administration have that local residents in Sham Tseng are not prepared to accept the construction of a high-rise sewage treatment plant on the reclamation?

10. When the Administration consulted the Town Planning Board (TPB) in June 1991 regarding reclamation at Sham Tseng to accommodate a sewage treatment works, the Board expressed concern about the visual impact and the Administration had to investigate the alternative of housing the sewage treatment works in an underground cavern. In the subsequent consultations with the Tsuen Wan District Board (TWDB) the residents also expressed concern about an exposed sewage treatment works. In response to the views of the TPB and TWDB, in July 1992 the Environmental Protection Department (EPD) commissioned a study to evaluate two options for siting the treatment works, namely on the originally-proposed reclamation at Sham Tseng, or in a cavern constructed in the disused quarry near Tsing Lung Tau. The study found that the

reclamation option was more advantageous in terms of cost (it would be $91m cheaper to build, and nearly $3m cheaper to run each year, in 1992 prices), programming (based on the situation at that time, it could be in operation 15 months sooner than the cavern option) and flexibility (a plant in a cavern would provide virtually no scope for either future upgrading, or future expansion to cater for additional developments in the area).

11. The TWDB supported the proposal for the works to be on a reclamation, on the condition that the reclamation would be extended to provide a buffer zone between the existing development and the proposed works. The TPB supported the reclamation option on the understanding that a detailed Environmental Impact Assessment (EIA) be conducted and detailed land-use and landscaping proposals be prepared. The TPB also agreed that the proposed sewage treatment works and the buffer zone on the reclamation area could be incorporated in the draft Tsuen Wan West Outline Zoning Plan. In the EIA Report we recommended that the sewage treatment works should be of low elevation and the Environmental Affairs Committee of the TWDB raised no particular concern regarding this recommendation during consultation in September 1995. It is a common phenomenon that people consider a sewage pumping station or a sewage treatment works as an eyesore and it is better to keep the sewage treatment works out of their sight-line by building the works to a low elevation rather than adopting a high-rise form. In 1997/98 we experienced difficulties in identifying a site for the Sham Tseng sewage pumping station for the same reason, i.e. concern amongst local residents regarding visual impact.

<u>ISSUE 5:</u> What effort is the Administration making to control pollution through law enforcement?

12. Pollution of the inshore waters in the area comes from several sources notably commercial establishments (such as the restaurants in Sham Tseng), sewage treatment facilities of residential developments, and discharges from unsewered squatter areas. EPD keeps a close watch on the area to discourage illegal discharges. Since the area was declared as a Water Control Zone in mid-1993 there have been a total of 38 successful prosecutions under the Water Pollution Control Ordinance, 13 of which were for illegal discharges from restaurants. However while law enforcement helps, it is not the answer to the pollution problems around these beaches. In the absence of proper sewers pollution will still find its way into the local waters.

<u>ISSUE 6:</u> The Tsuen Wan beaches clearly do not meet the relevant WQO for swimming; why have they not been closed?

13. The beach WQO is a long-term objective that the Administration aims to

achieve at each gazetted beach. It is a risk-based objective. With an *E. coli* concentration of 180 counts per 100ml of seawater swimmers face a 1% risk of contracting a minor illness. Thus, if a beach meets the WQO (i.e. it is graded "fair" or "good") the risk of minor illness faced by swimmers is less than 1%.

14. Beaches falling in the "poor" category have an *E. coli* concentration between 180 and 610 counts per 100ml. This represents a risk of contracting a minor illness of between 1% and 1.5%.

15. Decisions on whether to open or close beaches are made by the beach management authorities (the municipal councils). When making those decisions the beach management authorities have had to consider whether an increase in risk of minor illness amounting to 0.5 percentage points justifies beach closure. This has had to be weighed against the inconvenience to the public of closing a beach and withdrawing associated facilities such as changing rooms and showers. So far the general consensus has been that a "poor" grade of itself does not justify closure, unless there is evidence of a deteriorating trend. In the absence of a deteriorating trend the preference has been to keep the beach open but ensure the public is fully aware of the grading and the risk attached to swimming there. This is achieved through EPD's weekly releases of beach water quality information and the provision of indicator signs at the beaches themselves.

16. In case Members should feel that the risk criterion is too lax, it is worth noting that in the USA the level considered acceptable is a 1.9% risk of minor illness.

CONCLUSION

17. The unsewered nature of the coastal strip behind the Tsuen Wan beaches is responsible for the unhygienic conditions that persist in a number of areas, most obviously the Sham Tseng nullah. It is also partially responsible for the poor beach water quality. Although there has been no further deterioration in the past year or two, with no proper sewerage in the area it is clear that as the population and sewage flows build up the water quality and hygiene conditions can only get worse. The installation of sewers and a sewage treatment plant will help to solve the problem. The information provided in this note explains why chemical treatment plus disinfection for the Sham Tseng and Ting Kau sewerage scheme is the most cost-effective solution that will bring about urgently needed improvement to the maximum extent possible in the shortest possible time.

Water Policy and Planning Group
Environmental Protection Department
November 1999

Annex

Programme for the Relevant Sewerage Works

Ting Kau and Sham Tseng Sewerage Scheme

	Start Date	Completion Date
- Sham Tseng Sewage Pumping Station, Sewage Treatment Works* and Submarine Outfall	Jul 2000	Jul 2003
- Trunk Sewers stretching from Ting Kau to Tsing Lung Tau	Dec 2000	Feb 2005
- Pumping Stations and village sewers for Ting Kau, Sham Tseng and Tsing Lung Tau	Apr 2002	Feb 2005

* Sham Tseng Sewage Treatment Works will treat
- Sham Tseng flow in mid 2003
- all the flow arising in the catchment in early 2005

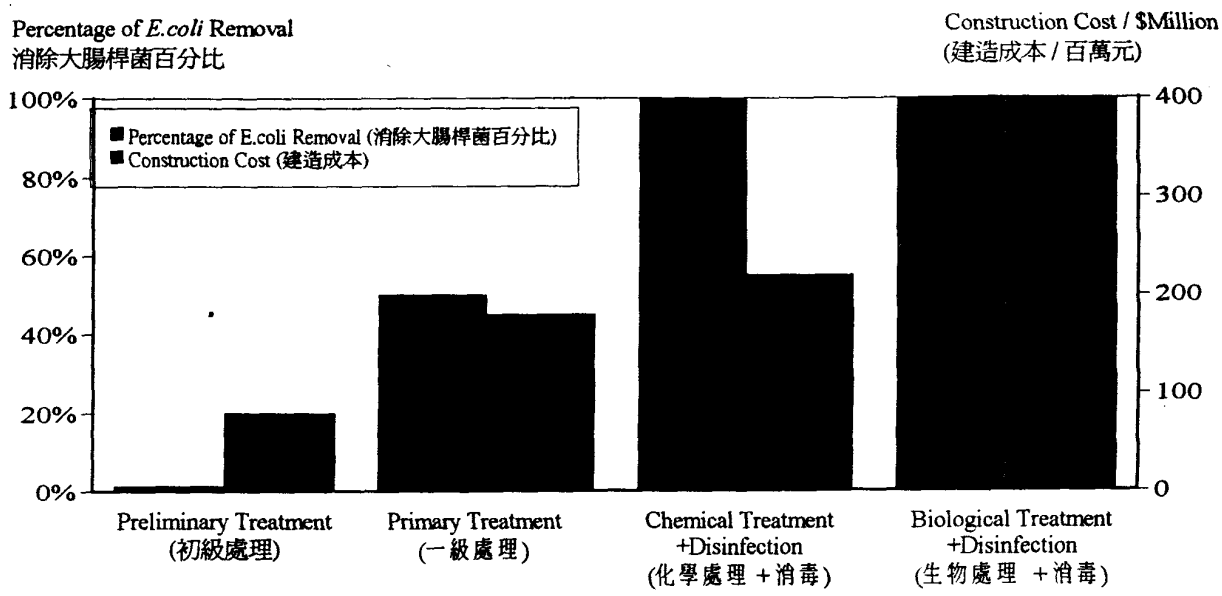
Strategic Sewage Disposal Scheme

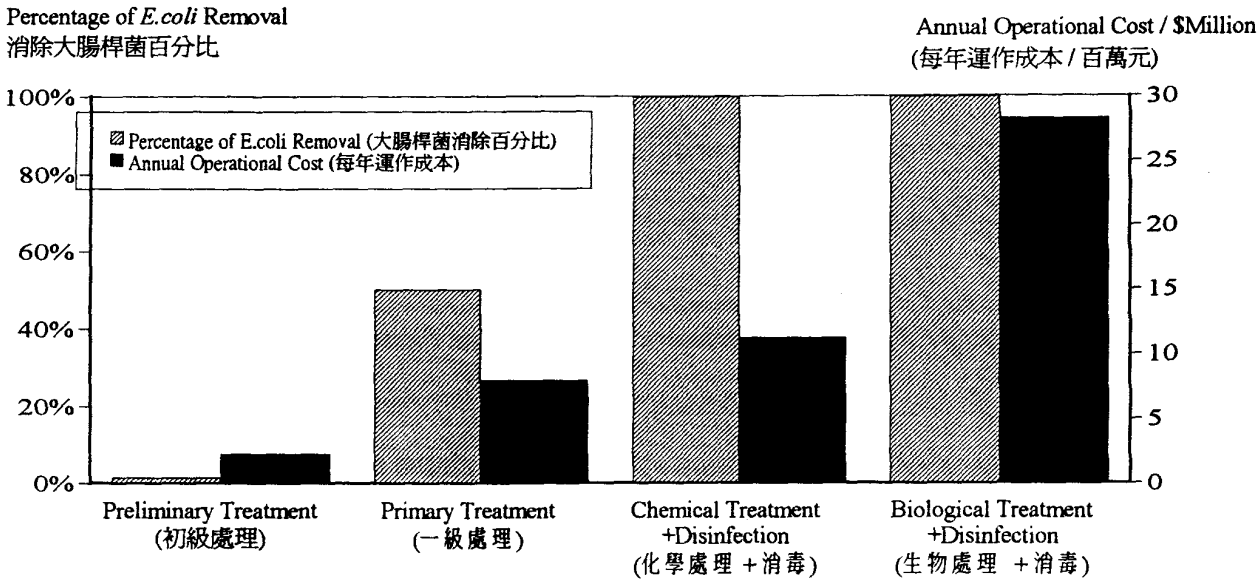
Stonecutters Island Sewage Treatment Works

- treating North West Kowloon flow since mid 1997
- will treat flows from Tsuen Wan, Tsing Yi, Kwai Chung, remaining parts of Kowloon, Kwun Tong, Tseung Kwan O and Chai Wan by mid 2001

Fig. 1 Proposed Sham Tseng Sewage Treatment Work Efficiency of Removing *E. coli* and the Associated Cost for Different Levels of Sewage Treatment

(擬建的深井污水處理廠 不同水平的污水處理的消毒效率及有關成本)





Preliminary Treatment 初級處理	: screening :隔濾
Primary Treatment 一級處理	: screening + sedimentation :隔濾 +沉澱
Chemical Treatment + Disfinfection 化學處理 +消毒	: screening + chemical treatment + disinfection :隔濾 +化學處理 +消毒
Biological Treatment + Disinfection 生物處理 +消毒	: screening + biological treatment + sedimentation + disinfection :隔濾 +生物處理 +沉澱 +消毒