

**Outlying Islands Sewerage Stage 1 Phase II Package J –
Sok Kwu Wan Sewage Collection, Treatment & Disposal Facilities**

Purpose

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report for the Proposed Outlying Islands Sewerage Stage 1 Phase II Package J – Sok Kwu Wan Sewage Collection, Treatment and Disposal Facilities under Section 6(2) of the Environmental Impact Assessment Ordinance (EIAO). The representative(s) of Director of Drainage Services and their consultants will make a presentation.

Advice Sought

2. Members' views are sought on the findings and recommendations of the EIA report. The Director of Environmental Protection will take into account the comments from the ACE and the public when he makes his decision on the approval of the EIA report under the EIAO.

Need for the Project

3. Water quality at Sok Kwu Wan (also known as Picnic Bay) on Lamma Island has been deteriorating over the last decade with the increase in both the number and size of seafood restaurants in Sok Kwu Wan (SKW) Village which are currently only served by individual septic tank and soakaway systems. The water quality surveys conducted in 1998 and 1999 for the EIA showed that the background levels of total inorganic nitrogen (TIN) were high in Sok Kwu Wan (0.08 mg/L and 0.23 mg/L during wet and dry seasons respectively), with the dry season level exceeding the WQO limit of 0.1mg/L.

4. The proposed sewerage system will collect and transfer sewage arising from the existing villages and restaurants to a new sewage treatment works (STW). The sewage would then receive full secondary treatment with nitrogen removal and disinfection prior to disposal near the mouth of Sok Kwu Wan through a proposed submarine outfall. It will serve the daily sewage service need of about 1800 residents and 6000 day visitors by year 2016.

Description of the Project

5. The proposed sewerage system comprises the following elements (Figure 1):

- about 1.4km of gravity sewers and 1.4km of rising mains;
- 3 pumping stations of approximate capacities of 353m³/d, 508 m³/d and 879 m³/d;
- a secondary level STW of an installed capacity of 940m³/d with nitrogen removal and UV disinfections; and,
- a 765m long submarine outfall.

6. The outfall is a designated project (DP) under item F6, Schedule 2 of the EIAO: “A submarine sewage outfall”. The STW, pumping station P1a (capacity 353 m³/d and a small section of sewage pipeline are DP under item Q1, Schedule 2 of the EIAO: “... partly or wholly in an existing...conservation area, ...”. Construction of the project is programmed to commence in December 2004 for completion by August 2007.

Consideration of Alternatives

7. Alternatives options (fig 2) have been considered in the Outlying Islands SMP study (options 1 to 3) as well as in the EIA study (option 4). These alternative options include:

Option 1 – preliminary treatment at a site along the southern shore of Sok Kwu Wan and discharge through a long outfall to the entrance of the bay.

Option 2 – full secondary level treatment plus disinfection at a site along the southern shore of Sok Kwu Wan with disposal to inshore waters.

Option 3 – export the sewage to Yung Shue Wan for treatment and discharge.

Option 4 – to transfer the sewage to the Lamma Quarry Site at the northern shore of Sok Kwu Wan for treatment and discharge.

It should be noted that the sewer pipelines and pumping stations inside and in the vicinity of the existing villages would be similar for all options since the proposed facilities are to serve these villages.

8. The final recommended scheme has enhanced Option 1 above by elevating the treatment level to full secondary with disinfection and nitrogen removal, extending the submarine outfall length from 600m to 765m and shifting the outfall further to Mo Tat Wan. It has a number of advantages over the other alternatives, including a better effluent quality through a higher level treatment process, no reclamation required and outfall location further away from the Sok Kwu Wan Fish Culture Zone (SKWFCZ).

9. Alternative construction methods for the submarine outfall have also been considered to minimize impacts on the nearby SKWFCZ. Horizontal directional drilling (HDD) method, a non-dredging construction technique, has been recommended to avoid dredging within 300m from the boundary of the nearest SKWFCZ.

Specific Environmental Aspects to Highlight

Water Quality Impacts & Benefits

10. The proposal would reduce the pollution load from entering into Sok Kwu Wan, thereby generating water quality benefits in the long term.

11. During construction, the potential water quality impacts arise mainly from elevation of suspended solids (SS) concentration during dredging for the submarine outfall pipelines. To reduce the potential SS elevation during dredging, the EIA recommended the use of HDD technique, closed-grab dredger, double-layer silt curtain and reduced dredging rate. With these measures, the EIA predicted that SS elevation at the boundary of the nearest SKWFCZ would be 1.7mg/L, which satisfies the WQO requirement of being less than 30% of the 5.9 mg/L background level.

12. Concerning the impact due to the discharge of treated effluent from the submarine outfall during normal operation phase of the system, the EIA predicted that the SS, E.Coli and unionized ammonia at the boundary of the nearest SKWFCZ would satisfy the WQOs.

13. For TIN, as stated in para 3 of this paper, the background level is 0.23 mg/L during dry season, which has already exceeded the WQO of 0.1mg/L. The EIA predicted that with the discharge of treated effluent from the submarine outfall, the

TIN level at the boundary of the nearest SKWFCZ would be increased by 0.01mg/L, which is within the annual ranges of background variation. Considering the fact that the existing untreated/partially treated sewage discharged from the SKW Village will be collected by the proposed system for secondary level treatment, nitrogen removal and disinfection prior to submarine discharge, and the nitrogen removal process in the proposed STW would remove more than 50% of the nitrogen contents in the raw sewage, pollution load entering into Sok Kwu Wan would be reduced and it is anticipated that the TIN level, after the proposed facilities come into operation, would not be worse off than the current situation.

Fisheries Impacts

14. During construction, dredging works would be conducted at least 300m from the SKWFCZ. The EIA assessed that, while ammonia might be released from sediments due to the dredging work, the predicted unionized ammonia level at the SKWFCZ would be about 0.0021 mg/L and well below the WQO of 0.021 mg/L, and would not have any adverse impact to the fish. Mitigation measures recommended for water quality, such as the use of HDD, double-layer silt curtain and limiting dredging rate, would also prevent sediment plumes from reaching the SKWFCZ to ensure environmental acceptability.

15. During operation stage of the system, no adverse fisheries impact is expected with the SS, DO, E. Coli and unionized ammonia level meeting the WQO. It is anticipated that the small contribution to TIN levels around the outfall by the treated effluent discharge would not significantly enhance algal growth.

Emergency Discharges

16. In view of the likely significant consequences of emergency discharges of untreated sewage to the nearby water quality and SKWFCZ, the EIA report has also paid attention to the control of emergency discharges.

17. DSD's normal practice is to provide either a standby pump or standby generator and a 2-hour temporary storage at Average Dry Weather Flow (ADWF) for sewage pumping stations. Based on DSD's record, no more than 12 hours during normal hours were required to resume service of a pumping station in case of failures. To allow sufficient time for DSD to resume the service, the EIA has committed to provide standby pumps at all pumping stations and the STW, standby generators plus 24-hour temporary storage capacity for all the pumping stations. An emergency response plan including automatic shutdown of upstream pumping stations and telemetry system is also proposed. By allowing sufficient time to resume normal

services, the need for emergency discharge would be minimized.

Other Impacts.

18. The EIA has assessed other impacts including air quality, noise, ecology as well as visual and landscape from the proposed system. The assessment concluded that, with implementation of various measures such as odour control, landscape treatment and adoption of quiet equipment, the proposed facilities would meet the laid down criterion except construction noise inside the villages during construction of sewers along the alleyways near the houses and restaurants and the pumping stations. The residual noise impact were predicted to be in the range of 82 to 98dB(A) when the receivers are only 2 to 12m away from the construction activities. Further noise mitigation measures including the use of noise screening structure and manual working have been examined in the EIA report. The assessment indicated that provided that site condition allows for these additional measures, construction noise level would meet the established criteria except one village house at Chung Mei Village with the predicted residual noise level being 76dB(A) (standard is 75dB(A)).

19. Concerning the duration of the construction noise impact, the EIA indicated that for a 20m section of sewer, the noisy activities of pavement breaking and trenching work would take about half a day and seven days respectively. In addition, trenching work would only continue intermittently and would only be on-going for 1-2 hours in one go. Considering the short duration of the construction noise that individual sensitive receiver might be exposed to, the fact that the construction noise will be transient and gradually drop as the sewer laying activities move away from individual noise sensitive receiver, and the environmental benefits that this project would bring along, the construction noise impact is not considered unacceptable.

Environmental Monitoring & Audit (EM&A)

20. In view of the close proximity of the sensitive receivers such as the SKWFCZ and SKW Village, the EM&A Manual recommended air, noise and water quality monitoring during construction.

21. For operational stage, water quality monitoring is recommended due to the close proximity of the outfall to the SKWFCZ and the high TIN levels predicted under the conservative scenario. According to the EM&A Manual, monitoring would be undertaken at least 2 days per month during the first 12 months after the commissioning of the STW.

22. Implementation of the EM&A programme will be included as an

Environmental Permit condition.

Public Consultation

23. DSD has held public consultation sessions with the Islands District Council, the South Lamma Rural Committee and the Lamma Area Committee during the course of the EIA study. All of them supported the proposed project. Notes of meeting for these consultation sessions are incorporated in Appendix 2.3 of the EIA report.

24. DSD has also made the EIA report, EM&A manual and Executive Summary available for public comment under the EIAO on 22 August 2003. Members will be briefed about any comments received from the public at the meeting.

Environmental Protection Department.
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