

ADVISORY COUNCIL ON THE ENVIRONMENT

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(For Information)

Restoration of Existing Landfills

Introduction

At the meeting on 22 June 1992, the Environmental Protection Department was requested to keep members informed of the progress of the restoration studies and works for the existing landfills. This paper informs members of the Advisory Council on the Environment progress made by the Department so far on the restoration of existing landfills.

Background

2. At present there are 13 existing landfills in Hong Kong as shown on the map attached at Annex A. Nine of them have ceased operation and the remaining four will be closed down in phases when the three strategic landfills, namely the West New Territories (WENT) Landfill, the North East New Territories (NENT) Landfill and the South East New Territories (SENT) Landfill, are commissioned. None of the existing landfills has been properly restored except for some partial restoration at the Sai Tso Wan Landfill in Kwun Tong.

3. Most of these landfills have been left as derelict sites since they were closed down. Landfill gas and leachate, which are the products of biodegradation of organic wastes, are continuously released and have considerable impact on the environment. If landfill gas is not contained within the site and properly disposed of, it may accumulate to a dangerous extent in areas adjacent to the landfill site.

4. Although the existing landfills were originally sited in remote areas, the developing urban areas have now often drawn quite close. For safety and environmental reasons, the Environmental Protection Department has commissioned a series of studies to assess the extent of the problems, recommend mitigation measures and identify possible future land use options for the sites. Restoration works will commence after the completion of these studies.

Studies in Progress

5. There are four feasibility studies for the restoration of existing landfills as indicated at Annex B. The studies for restoration of Shuen Wan Landfill, Urban Landfills and Tseung Kwan O Landfills (Packages A, B & C) are substantially completed. The studies have identified various means of landfill gas and leachate control and identified options for future land use at individual landfills. These recommendations are summarised at Annex C.

6. The study for restoration of North-West New Territories Landfills (Package D) is in progress and is scheduled to be completed in April 1994.

Works in Progress

7. At the partially restored Sai Tso Wan Landfill a gas abstraction plant was commissioned in February 1991 and has been operated by the Electrical and Mechanical Services Department since then. Subsequent monitoring of landfill gas migration carried out by EPD shows no sign of methane migration which indicates that the plant is functioning effectively. A further study to investigate leachate disposal and possible land uses is in progress.

8. For the other sites, the areas adjacent to the landfill are being monitored for any possible migration of landfill gas. To ensure better safety and environmental control, a number of restoration measures will be implemented in advance of the proposed long term restoration contracts.

9. At Gin Drinkers Bay Landfill a combined landfill gas and leachate collection trench will be built by the Civil Engineering Department whilst at Jordan Valley and Tseung Kwan O Landfills they will construct passive landfill gas barriers. All of these works will commence in 1994.

10. At Shuen Wan Landfill a leachate collection and pre-treatment system and an active gas abstraction and flaring system will be constructed under the current landfilling contract. The works started in late 1993 and are scheduled for completion at the end of 1995.

Current Development

11. As recommended in all the feasibility studies to date, and accepted by the relevant Government departments, the restoration works will be implemented under a series of design, build and operate (DBO) contracts in much the same way as the strategic landfills and the refuse transfer stations have been handled.

12. Under the DBO restoration contracts, the contractors will be required to design and construct the restoration works subject to the Government's approval of their proposals. Following the construction phase, the contractors will be required to operate and maintain the works and may be allowed to make use of the sites within specified categories of land uses.

13. Upon further development of the detailed restorations strategy, the landfills will be categorised into different DBO restoration contract packages for implementation. The DBO restoration contracts will commence in phases from 1995 with the

construction work scheduled for completion in 1997. After the completion of this work the sites can be used for a productive purpose. The contracts will last for 10 to 15 years until landfill gas, leachate generation and ground settlement rates are reduced to acceptable levels.

The Way Forward

14. In view of the unique nature of the DBO restoration contracts, EPD has commissioned a consultancy study to further develop the detailed restoration strategy, produce a new contract framework and prepare a new set of standard contract documents. The study commenced in January 1994 and will be completed by the end of 1994 when tenders for the first restoration contract will be invited.

Financial Implications

15. It is estimated that the restoration works alone for all the existing landfills will require expenditure of about \$1,318 million (at 93 prices) and, depending on the contractors' design, the expenditure is predicted as follows :-

| <u>Project Description</u> | <u>Project Estimate</u> | <u>Estimated Cash Flow (\$m)</u> | | | | |
|-------------------------------|-------------------------|----------------------------------|--------------|--------------|--------------|--------------|
| | | <u>94/95</u> | <u>95/96</u> | <u>96/97</u> | <u>97/98</u> | <u>98/99</u> |
| Restoration of Landfill Sites | \$1,318m | 15 | 20 | 700 | 555 | 28 |

16. The above cash flow is tentative. The actual funding requirements may need adjustment when the scope of restoration works for the North-West New Territories Landfills is better defined at the end of the feasibility study.

Summary

17. The timetable and scope of works as presently constituted, will enable the safe restoration and efficient afteruse of the Territory's thirteen older landfills. The consultancy study now underway will assess the core facts common to all landfills, to enable separate DBO contracts to be drawn up for each landfill.

18. Members are requested to note the content of this paper.