For information **PWSCI(2003-04)35**

NOTE FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

Supplementary information on
5161DR –Restoration of Shuen Wan Landfill – post-completion environmental monitoring work

INTRODUCTION

At the Public Works Subcommittee meeting held on 17 December 2003, Members, after considering PWSC(2003-04)57 on project **161DR** "Restoration of Shuen Wan Landfill – post-completion environmental monitoring work", requested the Administration to provide supplementary information on –

(a) the current and/or planned usage of the 12 restored landfills; and

(b) the types of tests carried out at Shuen Wan Landfill.

THE ADMINISTRATION'S RESPONSE

Restored Landfills – Current and Planned Usage

2. There are 13 closed landfills in Hong Kong, 12 of which have been restored so that the sites are safe for the public to enter and the surface area can be considered for some form of beneficial use. A plan showing the location of these restored landfills is at Enclosure 1.

3. Restored landfills require continuous environmental monitoring as they continue to produce landfill gas and leachate of varying quantities. The continuing decomposition of waste in the settlement process also affects the stability of the landfill surface. Therefore, there are considerable restrictions on the afteruse of restored landfills, e.g. excessive loading, or construction of permanent

/building .....

building structures, should be avoided. The restored sites are considered more suitable for recreational uses, on condition that these are compatible with the ongoing environmental monitoring work.

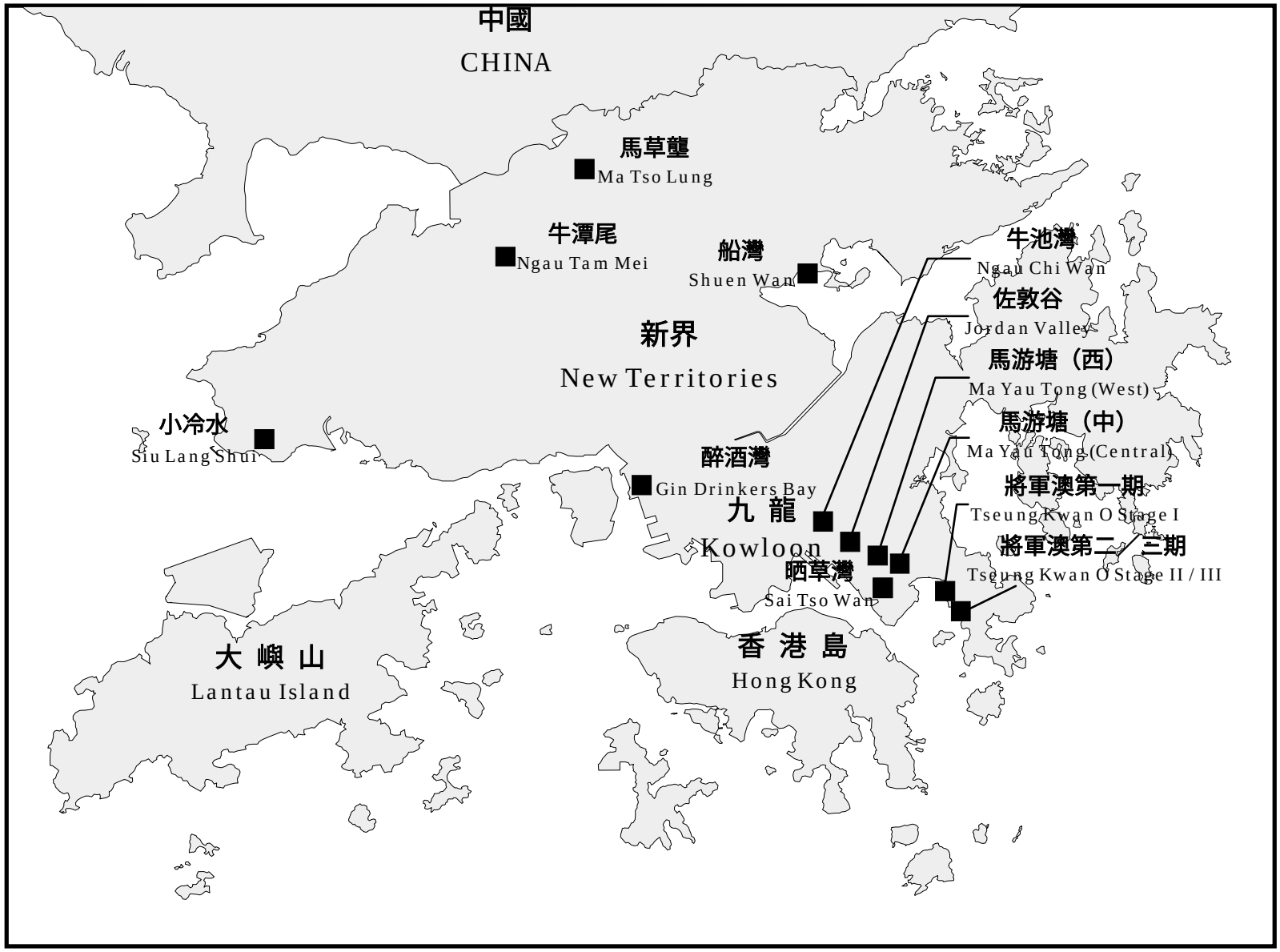
4. Enclosure 2 shows details of the planned afteruse of the restored landfills and their current development status and constraints. Briefly, the proposed recreational facilities at the restored landfill sites at Shuen Wan and Sai Tso Wan have or will shortly become operational while the Administration has taken active steps to take forward the proposed recreational uses at the sites at Tsueng Kwan O Stage I, Ngau Chi Wan and Gin Drinkers Bay. For the sites at Tseung Kwan O Stage II/III and Siu Lang Shui, private organizations have expressed interest in utilizing the sites for recreational/educational purposes and are preparing applications for the Administration's further consideration. The development of the site at Ma Tso Lung is being taken up by the Tung Wah Group of Hospitals.

Shuen Wan Landfill – Monitoring Programme

5. The current monitoring programme for Shuen Wan Landfill can broadly be divided into six categories: landfill gas, groundwater, leachate, surface water, marine and nuisance. These six categories cover a wide range of environmental interests: some are related to safety (e.g. landfill gas emissions) while others are environmental concerns (e.g. leachate and surface water quality). A detailed breakdown of the monitoring programme for Shuen Wan Landfill is at Enclosure 3.

6. We collect and analyse these data on a continuous basis to ensure that the restored landfill site is safe for public use and does not pose any safety or environmental threat to neighbouring developments. In addition, we assess, on a five-yearly basis, whether post-completion environmental monitoring work needs to be continued and if so, seek the necessary funding approval from the Finance Committee.

Environment, Transport and Works Bureau
January 2004



已修復堆填區 - 位置圖

Restored Landfills - Location Plan

2001-34A Restoration Programme.Prz
June 2001

Restored Landfills - Existing and Planned Afteruse
(December 2003)

Landfill	Surface Area in hectares (flat area available for afteruse in brackets)	Planned Usage	Current Status	Site Development Constraint(s)
Shuen Wan Landfill				
Shuen Wan 船灣 (Tai Po District)	50.00 (11.0)	A public 9-hole golf course and golf practice range	Currently used as a golf driving range. The Administration is exploring the feasibility of inviting the private sector to develop the golf course.	N.A.
Urban Landfills				
Ngau Chi Wan 牛池灣 (Wong Tai Sin District)	7.63 (4.0)	Part of the site will be developed as a rest park	The Wong Tai Sin District Council supported the development of the rest park and planning of the project is currently underway. Subject to availability of resources, works would commence in end-2004 for completion by end-2005.	Residential development adjacent to the site.
Sai Tso Wan 晒草灣 (Kwun Tong District)	9.15 (2.0)	One multi-purpose grass pitch for football and baseball	Construction work commenced in March 2003. Target completion date in March/April 2004.	N.A.
Ma Yau Tong West 馬游塘西 (Kwun Tong District)	5.53 (1.0)	Rest park	Project priority under review.	Residential development adjacent to the site. Lack of basic utilities.
Ma Yau Tong Central 馬游塘中 (Kwun Tong District)	10.87 (0.8)	Lam Tin Park extension	Project priority under review.	Residential development adjacent to the site. Lack of basic utilities.
Jordan Valley 佐敦谷 (Kwun Tong District)	10.72 (5.0)	Ecological theme park with an environmental education centre and 2 gateball pitches	Project priority under review.	Residential development adjacent to the site. Lack of basic utilities.
Tseung Kwan O Landfills				
Tseung Kwan O Stage I 將軍澳第一期 (Sai Kung District)	68.00 (9.6)	Proposed uses include a football training centre, a regional park including kite-flying area, jogging trail and cycle track and a golf driving range.	Initial planning work for developing the football training centre is in progress.	N.A.
Tseung Kwan O StageII/III 將軍澳第二及第三期 (Sai Kung District)	42.00 (2.8)	No committed use since access to the site is constrained geotechnically. Some private organisations have expressed interest in using the site for flying model aircraft or to install a dry ski slope.	Application to use the site for flying model aircraft has been received and is being processed.	Lack of basic utilities. Geotechnical constraint affecting site access to the top platform.
North West New Territories and Gin Drinker's Bay Landfills				
Ngau Tam Mei 牛潭尾 (Yuen Long District)	2.00 (1.0)	Forming part of "Green Belt" zoning	General landscaping provided. The whole site at Ngau Tam Mei is zoned "Green Belt". Given the small size of the site with limited access, the Administration is of the view that it should remain as local green scenery.	Vehicular access to the site problematic as there is only one narrow, one-lane rural access road. No public utilities and sewerage available. Residential development adjacent to the site.
Ma Tso Lung 馬草壟 (North District)	2.00 (0.9)	Tung Wah Group of Hospitals (TWGH) Holiday Camp	Site has been returned to TWGH for development upon restoration of site.	N.A.
Siu Lang Shui 小冷水 (Tuen Mun District)	12.00 (0.6)	A green group has expressed interest in developing a dolphin and butterfly sanctuary and education centre	Investigation and preparation of detailed proposal are being carried out by the interested green group.	Lack of basic utilities. Flat area is divided into two separate parts. Vehicular access to the flat area problematic due to narrow site access road. Natural terrain hazard assessment required to confirm acceptability of the proposed development.
Gin Drinkers Bay 醉酒灣 (Kwai Tsing District)	29.00 (2.7)	Kwai Chung Park development	Preliminary assessment being undertaken by the Administration to investigate the feasibility of opening part of the site for passive recreational use.	Park design should avoid applying excessive loading to the site.

Enclosure 3

Current Monitoring at Shuen Wan Landfill

Category	Monitoring Details	Measurement	Purpose
Landfill Gas	Measure surface landfill gas emission	Methane	To ensure no safety risks to the personnel on site.
	Detect landfill gas at perimeter monitoring boreholes and utility manholes	Methane , Carbon Dioxide , Oxygen , Temperature	To monitor off site migration and safeguard the neighbourhood.
	Analyse landfill gas collected from boreholes and extraction wells	Oxygen, Nitrogen, Carbon Monoxide, Carbon Dioxide, Hydrogen, Methane, Ethane, Propane, n-Butane	To monitor changes in the landfill gas quality over the years.
	Detect landfill gas in buildings and confined space on site and off site	Methane, Carbon Dioxide, Oxygen	To ensure no safety risk to occupiers of these structures.
	Measure landfill gas at the extraction system	Methane, Carbon Dioxide, Oxygen, Temperature, Differential Pressure, Static Pressure, Flow	To monitor the landfill gas composition to ensure optimal operation of the landfill gas management system.
	Analyse emissions of the flaring and utilisation plants	Oxygen, Nitrogen, Carbon Monoxide, Carbon Dioxide, Hydrogen, Methane, Ethane, Propane, n-Butane	To check performance of the plants.
	Analyse volatile organic compound (VOC)	Trichloroethylene, Vinyl Chloride, Methylene Chloride, Chloroform, 1,2-Dichlorethane, 1,1,1-Trichloride, Carbon Tetrachloride, Tetrachloroethylene, 1,2-Dibromoethane, Toluene, Methane, Benzene	To ensure the VOC contents comply with International Standards.
Groundwater	Measure groundwater level and quality	Well Depth, Groundwater Level, Temperature, pH, Electrical Conductivity, Dissolved Oxygen, Alkalinity, COD , Chloride, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Sulphite, Phosphorous, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium, Iron, Manganese , Cadmium, Copper, Nickel, Lead, Zinc, Mercury, Chromium, Sliver	To ensure no leachate contamination of the groundwater.
Leachate	Measure level of leachate at monitoring wells	Well Depth, Leachate Level, Temperature, pH, Electrical Conductivity	To avoid excessive water pressure built up at the man-made slope which might affect the overall slope stability.
	Measure leachate quality at leachate management system.	Temperature, pH, Electrical Conductivity, Alkalinity, COD, BOD, Chloride, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium , Iron , Manganese, Cadmium, Copper, Nickel, Lead, Zinc	To check leachate strength related to landfill aging
Surface Water	Analyse surface water quality	Appearance, Temperature, pH, Electrical Conductivity, Dissolved Oxygen, Alkalinity, COD, BOD, Chloride, Ammoniacal nitrogen, Total Kjeldahl Nitrogen, Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Total Suspended Solids, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium, Iron, Manganese, Cadmium, Copper, Nickel, Lead, Zinc	To ensure no discharge of contaminated surface water off site.
Marine	Analyse marine water and sediment	Appearance, Temperature, pH, Electrical Conductivity, Dissolved Oxygen, Salinity, Turbidity , COD, BOD, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, Nitrite-Nitrogen, Nitrate-Nitrogen, Total Nitrogen, Total Phosphorous, Reactive Phosphorous, Total Suspended Solids, Total Organic Carbon, Sulphate, Sulphite, PCB, PAH, Cadmium, Copper, Nickel, Lead, Zinc, Mercury, Chromium, Arsenic, Selenium	To monitor water quality of the receiving waters.
Nuisance	Dust	Total Suspended Particulates (TSP), Respirable Suspended Particulates (RSP)	To protect the general neighbourhood as well as visitors using the golf driving range from nuisance problem.
	Noise	Noise Level	
	Odour	Odour	