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Note:- Two other Government publications are being produced which will provide supporting information. They are:-

- 'Pollution - A time to act' - a simple summary of the White Paper; and
- 'Environment Hong Kong 1989', containing more detailed background information on current programmes and projects.

CHAPTER 1

SAVING OUR ENVIRONMENT

1.1 Each day our community generates:-

- 5,000 tonnes of garbage,
- 2 million tonnes of sewage and industrial waste water,
- 600 tonnes of sulphur dioxide,
- 200 tonnes of carbon monoxide,
- 300 tonnes of nitrogen oxides,
- a large amount of energy dissipated as noise, and
- a whole host of other wastes generated by industrial and commercial activities, farming, and the day to day life of every one of our 5½ million population.

1.2 It is these wastes, in the wrong place or at the wrong time, that cause pollution. The annual generation of wastes normally increases in line with population and Gross Domestic Product. Hong Kong is no exception. In the past 15 years our population has increased by 30%, our GDP by 300%, and our wastes 300%.

1.3 At the opening of the 1988/89 session of the Legislative Council on 12 October 1988, the Governor stated that serious environmental pollution is an unfortunate by-product of Hong Kong's economic success and population growth. One of our major priorities must be to halt this decline and to do more to improve our environment. Immediately afterwards, on 25 October 1988 the Executive Council advised that a White Paper should be prepared on pollution.

1.4 This White Paper is an outline for a comprehensive ten year plan to tackle pollution. It:-

- sets out the Government's environmental policy objectives;
- assesses the adequacy of current programmes;
- explains, in 'the way forward' sections of each chapter, the steps Government intends to take to reduce pollution and improve the environment; and
- provides a summary of main initiatives and targets, at Chapter 9.

1.5 The White Paper acknowledges that the main reason why our environment is now in an unsatisfactory state is that in the past the Government and the community made choices which gave too little emphasis to the needs of the environment. We now have to recover lost ground. Government will therefore give greater emphasis to the environment in future, and seek to allocate resources for our major infrastructural projects. While detailed assessments of individual projects will need to be made, the requirement to take

urgent and positive steps to finance the infrastructural projects in the White Paper is recognised.

1.6 Accordingly, if all the initiatives within the White Paper are implemented, at least $20 billion (1988 prices) and at least 950 new staff will be required by Government alone over a period of ten years. Of this $20 billion, about $12 billion is for the construction and maintenance of adequate sewerage and drainage facilities, and a further $5 billion for landfills and transfer stations. Polluters will also have to pay. Treatment facilities will have to be installed and less polluting processes and fuels will have to be adopted to meet more stringent standards, which may lead to an increase in capital and recurrent cost. Although rapid improvements cannot be expected right away we must take immediate steps to prevent further deterioration of our environment, and then gradually improve it over the period of the ten-year plan.

1.7 The increased emphasis on improving the environment must not ignore the needs of the economy particularly where the introduction of the new legislation is concerned. For this reason extensive consultation will be needed with all those affected by new environmental protection measures.

1.8 Government intends to provide a new administrative framework to carry forward existing environmental programmes and new initiatives, including establishing:

- a Planning Environment and Land Branch (PELB) on 1st September 1989, which will ensure that due attention is given to environmental aspects and their integration into the planning system;
- a Drainage Services Department (DSD) on 1st July 1989, to be primarily responsible for design, maintenance and operation of sewerage and sewage treatment and disposal facilities, under the PELB's sewerage programme.
- a Planning Department on 1 January 1990, to be responsible to the Secretary for Planning Environment and Land for planning at all levels -strategic, subregional and district.

1.9 The Environmental Pollution Advisory Committee (EPCOM) will continue to provide advice to the new Secretary for Planning Environment and Land (SPEL) on major policy initiatives; and the Environmental Protection Department (EPD) will continue to be responsible to SPEL for recommending policy initiatives; developing the waste disposal and sewerage programmes as client department; enforcing the main provisions of the noise, air and water pollution control, and waste disposal ordinances; and environmental impact assessment.

1.10 A review of progress will be submitted to the Governor in Council every two years.

CHAPTER 2

MANAGEMENT OF WASTES

2.1 The 5½ million people living and working in Hong Kong generated about 22,500 tonnes per day of solid and semi solid wastes during 1988. This amount would fill a building the size of Exchange Square Tower 1 every week. The task of dealing with this huge amount of rubbish is formidable.

2.2 This 22,500 tonnes mainly consists of:

• household	4,600	• livestock	2,000
• industrial and commercial	1,800	• sludges	4,200
• construction	6,500	• coal ash	3,000

2.3 During 1988 a further 3,100 tonnes per day of waste, -mostly scrap steel, paper, and aluminium cans were separated by private operators from the waste stream and exported for recycling as substitutes for various raw materials.

2.4 Over the past 15 years the amount of solid and semi solid wastes has increased three times, roughly in line with the increase in Gross Domestic Product. If this continues the amount of waste generated each day is forecast to rise to 30,000 tonnes per day by the year 2001. Failure to deal effectively with this growing amount of wastes can give rise to serve pollution of our air, water and land, as well as the risk of poisoning by chemical wastes and the spread of disease from hospital wastes, decomposing carcasses and other organic matter.

Overall Policy Objectives

2.5 The Government's overall policy objectives for the management of wastes are to ensure:

- the provision, by either the private or the public sectors, of facilities for the cost-effective and environmentally satisfactory disposal of all wastes;
- the availability of and proper enforcement of legislation aimed at safeguarding the health and welfare of the community from any adverse environmental effects associated with the storage, collection, treatment and disposal of all wastes.

Current Programmes

2.6 Wastes are collected and delivered to disposal sites by the collection authorities (the Urban and Regional Councils and the

DEP) and by numerous private waste collection contractors. The collection authorities collect and deliver for disposal most household wastes, all street wastes, and some commercial and chemical wastes. Other waste is handled by the private sector.

2.7 Final disposal is to one of four Government landfills at Pillar Point, Shuen Wan, Jordan Valley and Junk Bay. Some publicly collected household wastes are burnt first in incinerators, to reduce their volume, with some 25% (by weight) of the residue being disposed at the landfill sites. Privately collected wastes are disposed of free of charge at the Government's landfills. Most livestock wastes are disposed of into watercourses and most chemical wastes into drains, although a stop-gap advisory service on chemical waste disposal has been operated successfully by the EPD and the Civil Engineering Services Department over the past 10 years. Water works sludges are discharged either to sea or to inland watercourses and sewage treatment works sludges are partially dewatered and disposed to landfill. Pulverised fuel ash is either recycled in construction materials or stored in purpose-designed lagoons. The overall scheme is illustrated in Figure 1.

Adequacy of Current Programmes

2.8 The small landfill sites near the main urban areas and municipal incinerators, built and operated over the past 20 or 30 years, have generally served Hong Kong well. Also, through the independent efforts of Hong Kong's entrepreneurs, a significant proportion of Hong Kong's wastes are recovered and exported for recycling. Nevertheless, with the growth in the amount of wastes produced by the community, not only in volume but in the proportion of potentially hazardous chemicals, radioactive and clinical wastes, combined with the growing expectations of the community for improved environmental conditions, the current waste management programme is encountering difficulties.

2.9 The relatively small landfill sites near the urban areas are being filled rapidly. Fumes from incinerators are giving rise to increasing concern and complaints. Completed landfill sites which were not designed to present-day standards are giving rise to problems with contaminated water seeping out of the landfill and with escaping gases. As a result many hectares of land on old landfill sites, with much potential for community use, require remedial measures.

2.10 Special categories of waste such as clinical, medical and radioactive wastes and various types of sludges are inadequately controlled in terms of storage, transportation and disposal.

2.11 There is therefore a need to provide new and expanded facilities for the disposal of the growing amount and variety of wastes, and

also to tighten-up the controls on the storage, transportation, treatment and disposal of those wastes that are hazardous to the community or have the potential to damage the environment.

The Way Forward: Disposal Facilities

Municipal Wastes

2.12 The need to provide much-expanded disposal facilities for the growing quantities of household and other wastes was recognised more than ten years ago. Since then the Government has developed a long-term strategy aimed at providing secure, cost-effective and environmentally acceptable disposal for all wastes that are not recovered or recycled. The strategy will be further spelt out in a draft Waste Disposal Plan, to be further discussed with the Municipal Councils (para 2.29 refers).

2.13 The long-term waste disposal strategy is based on the construction of 3 very large landfill sites. One is at Nim Wan (the West New Territories or WENT landfill), a second in the North East New Territories (or NENT landfill) and the third south of the existing Junk Bay landfill (the South East New Territories or SENT landfill). The landfills will be designed and operated to minimise their environmental impact not only during their operating life but also after closure.

2.14 These landfills have a potential life of 15 to 25 years. Wastes will be taken there by barge or containerised road vehicle, from refuse transfer stations (RTS) built close to major centres of population. It is intended that the RTS's and the landfill sites will be designed, constructed and operated by the private sector. The waste strategy described above is illustrated in Figure 2.

2.15 The first contract for an RTS was signed in late 1988 (Kowloon Bay). The RTS will be built to the highest environmental standards and will take wastes from the Kowloon area. A study is currently being conducted on the design and construction of an RTS in Chai Wan. When resources are made available further studies will be undertaken with a view to providing Refuse Transfer Stations in Hong Kong West, and in the New Territories. Studies are being carried out on the WENT and NENT landfills, and studies on SENT are expected to start in late 1989/90. Target dates for the commissioning of new facilities are:

1990	Kowloon Bay RTS
1991	WENT landfill
1992	Hong Kong Island East RTS
1993/4	NENT landfill
	SENT landfill
	Hong Kong Island West RTS
	Yuen Long/Tuen Mun RTS
	Sha Tin RTS
1995 onwards	Further RTS's at West Kowloon, Tai Po and possibly a third location on Hong Kong Island

2.16 The provision of the above facilities should permit the following existing facilities to be phased out, with significant environmental gains:

1989		Lai Chi Kok incinerator station B
1990	{	Lai Chi Kok incinerator station A
	{	Jordan Valley landfill
1992	{	Pillar Point landfill
	{	Kennedy Town incinerator
1993/4	{	Shuen Wan landfill
	{	Junk Bay Stage III
after 1995		Kwai Chung incinerator

Chemical Wastes

2.17 The demand for chemical waste disposal facilities, and the further demand that will result from the enactment of effluent control legislation, will be met in two ways, Most of the demand will be met by a Chemical Waste Treatment Centre (CWTC) to be constructed at Tsing Yi. The remainder will be disposed of at the Junk Bay landfills.

2.18 The CWTC will be designed, built and operated by a single contractor. The contract will include a requirement to operate a fleet of specialist vehicles to collect such wastes as acids, alkalies, solvents, organic compounds, and oils, to be treated at the CWTC. The Centre is expected to be commissioned in 1991.

2.19 Chemical wastes not requiring treatment, and residues of treated wastes from the CWTC will be disposed of at the Junk Bay landfill, under carefully controlled conditions, reflecting 4 years of pilot experiments with test cells at the landfill.

2.20 A secondary purpose of the CWTC will be to serve as the designated reception and disposal point for oily waste and noxious liquid substances from ships which use Hong Kong's port facilities, in accordance with the requirement for Hong Kong to provide these facilities under the International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 (MARPOL).

Clinical Wastes

2.21 The increasing use of plastic and paper disposable materials by hospitals, clinics, pathological laboratories, and veterinary establishments dictates the need for disposal facilities for clinical wastes that meet the most exacting standards. Such facilities require specialist operation and close control. This is best achieved at a centralised facility. So Government intends to build a clinical waste incinerator in the Western New Territories to international safety and security standards. Clinical wastes will be transported there in sealed refrigerated containers and waste storage areas will be refrigerated. It will also dispose of confiscated narcotics, and other wastes that require complete destruction under carefully regulated conditions. This facility is scheduled for commissioning in 1993/4.

Sludges

2.22 The amount of sludge from water and sewage treatment plants and from other wastewaters is expected to increase from the present 1.5 million tonnes to a total of 2.7 million tonnes by the year 2001.

2.23 The current practice of disposing of the sludges from Sha Tin water treatment works into the Sha Tin nullah will be replaced by a marine disposal scheme for disposal at sea, which will also dispose of some treated sewage sludges. The pipelines, tanks and jetty for this scheme are being built at Shing Mun and a specialist contractor is scheduled to commence disposal operations in 1991. The disposal site, south east of Waglan Island, has been monitored for several years, and the EPD will continue monitoring during the 5 year life of the scheme, so that appropriate action can be taken in the unlikely event that there are signs of adverse effects on the marine environment.

2.24 Marine disposal is not necessarily the best long-term option for the disposal of sewage sludges, so the EPD is giving consideration to alternative, recently developed processes for dealing with sludges such as fluidised bed incineration, high efficiency filtration and the production of oil from sludge.

Coal Ash

2.25 The large quantities of pulverised fuel ash (PFA) produced by the coal-fired power stations at Lamma Island and Tap Shek Kok are expected to increase further from the present total of 0.95 million tonnes to 1.4 million tonnes in 2001. It is the responsibility of the two power companies, as the generators of this waste, to make appropriate arrangements for the disposal or reuse of PFA.

2.26 While there are many beneficial uses of PFA, there is seldom an exact balance between supply and demand. Government will therefore permit the construction of lagoons of a limited size to serve as a 'buffer store' for the PFA, and at the same time will encourage the power companies to find uses for as much as possible of the PFA produced. Government will also examine to what extent PFA could be used more extensively, in particular in civil engineering works, land reclamation and restoration of worked-out quarries.

The Way Forward: Legislation

2.27 While it is essential to provide facilities for the collection, treatment and final disposal of wastes, Government must also establish and enforce controls to ensure that the different wastes are directed to the appropriate facilities and that the operation of the facilities themselves meet satisfactory environmental standards.

2.28 The Waste Disposal Ordinance (WDO) provides the statutory framework for achieving the level of control required. In particular, it includes provisions for the enactment of regulations to control the collection and disposal of specified types of waste, and for the licensing of specified waste treatment and disposal facilities. It also includes a requirement that the present and planned arrangements for managing wastes are clearly set-out in a Waste Disposal Plan.

2.29 A draft Waste Disposal Plan has been prepared and the Municipal Councils, and EPCOM are being consulted on it. The draft plan will shortly be published for public comment. The draft plan, together with proposed amendments arising out of the consultation, will then be submitted to the Governor-in-Council by the end of 1989.

2.30 Regulations under the WDO to control livestock wastes were made in March 1988. Under this legislation, livestock keeping is banned in designated urban areas and subject to controls in the remainder of the territory. The ban was implemented on 24 June 1988 and livestock keeping has now ceased on all 831 farms in these areas. The livestock waste controls are being enforced in the Tolo Harbour, Mui Wo, and Anglers Beach areas and will be extended in a phased programme, covering the entire territory by 1996 - see figure 3. The Government would like to see an acceleration of this control programme and, subject to consultation with all affected parties, will review the situation during 1990.

2.31 Government considers that there is an urgent need to tighten-up on chemical wastes, especially in view of the expected growth of the chemical industry in Hong Kong. Regulations are now being drafted to provide for complete control of chemical wastes, including those intended for import or export. Industrial and community interest are being consulted on these regulations with a view to introducing them when the CWTC is commissioned in 1991.

2.32 In some cases additional controls are needed on the use of chemicals before they become wastes, in order to minimise environmental and public health hazards arising from their use. Proposals are being developed for a new ordinance to provide this control, similar to legislation enacted in many industrialised countries. In the meantime some progress will be made through voluntary arrangements such as those covering polychlorinated biphenyls, a toxic fluid used in some electrical installations, the use of which is now being phased out by the power companies and other users.

2.33 It is the Government's view that the provisions under the WDO to control environmental conditions at waste treatment and disposal facilities are unnecessarily limited. It therefore intends to extend the powers to issue licences under the WDO to cover all major landfills, public dumps, incinerators, transfer stations, the CWTC and waste recycling/recovery plants. These licences will contain conditions setting the standards required of these facilities in order to prevent environmental damage and

harm and nuisance to the public. Disposal practices for PFA and construction wastes will be examined with a view to maximising the beneficial uses of those materials.

The Way Forward: Waste Limitation, Recovery and Recycling

2.34 So far the emphasis in the Government's approach to waste management has been to provide secure, long term, strategies for the final disposal of the growing quantity of wastes produced by our community, together with measures to prevent environmental problems associated with waste disposal. It is considered that the measures set out in the paragraphs above will generally achieve this aim.

2.35 The Government therefore intends to examine more fully measures to limit the amount of waste generated, and to encourage the recovery and recycling of wastes. The prime objectives are to reduce the demand on the limited space available at landfill disposal sites and restrict the generation of wastes that give rise to litter problems.

2.36 There is already a substantial waste recovery industry in Hong Kong. $2.1 billion of recovered waste was exported in 1988, for recycling elsewhere. Apart from these export earnings, the industry also contributes directly towards reducing the among of waste Government has to dispose of.

2.37 Further opportunities to recover wastes should now be explored. The EPD is now assessing other possibilities, such as the recovery of waste at source, the introduction of new recycling technologies, and the expansion of the present waste recovery activities. Many waste materials that are currently disposed of at landfills have comparatively low recovery value, and would require more elaborate reprocessing and marketing for the recycled products. Government therefore intends to identify practicable measures with a view to promoting, facilitating and supporting waste recovery and recycling schemes that have an overall beneficial effect on waste management. However direct participation in waste recovery and recycling activities is not appropriate for Government. The measures identified by Government should complement the industry, which has the knowledge and flexibility required to operate viable recycling developments.

2.38 Consumer packaging wastes such as plastic bags, bottles and lunch boxes create a persistent litter problem. The Government is seeking the cooperation of the beverage manufacturers, supermarket chains and other major users of such containers, to find satisfactory solutions to the problems these containers create when in the hands of the consumer. These solutions might include alternatives to plastic bags and separation of household wastes, or even statutory controls.

2.39 A strategy will therefore be required for this difficult area. Increased use of degradable plastic bags would do little to solve

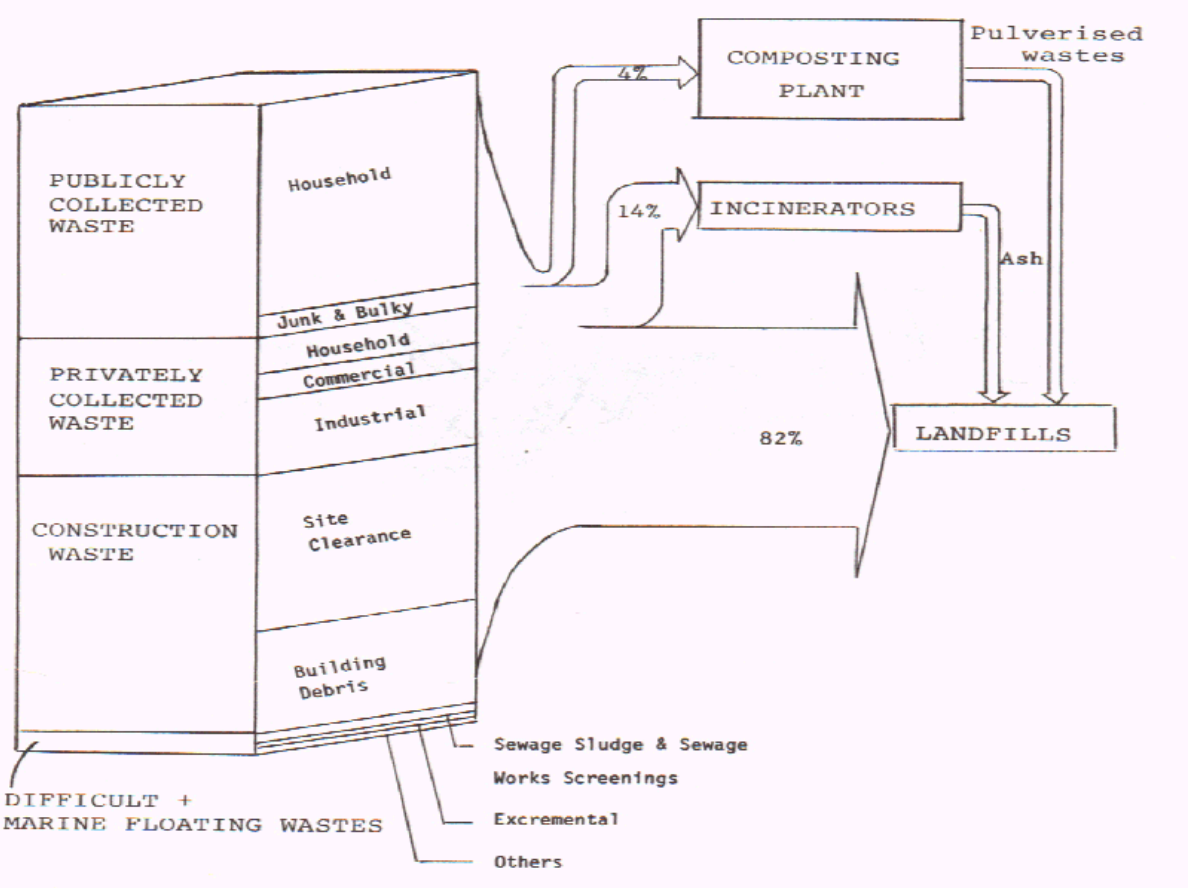
the immediate nuisance caused by plastic materials in litter, although it could help to prevent the long-term accumulation of plastic litter, and reduce the amount of landfill space required. But degradable bags are not so good for recycling and their use will discourage efforts to recycle plastics.

2.40 Construction wastes -timber, concrete and other rubble- are an important and rapidly growing category of waste that will be examined by the EPD to assess the opportunities for resource recover and reuse.

2.41 A further substantial opportunity for resource recovery is the gas produced at landfill sites. There are currently about 80 million m^3 of methane generated at existing landfill sites, which represented 7% of gas used in Hong Kong in 1988. The quantity of landfill gas generated will increase in future, along with the growing quantities of wastes, and as a greater proportion of wastes is disposed of in landfills. This gas will need to be collected and controlled for safety reasons, and to prevent odour. But wherever possible the gas should be used as a fuel, thereby reducing the amount of atmospheric emissions.

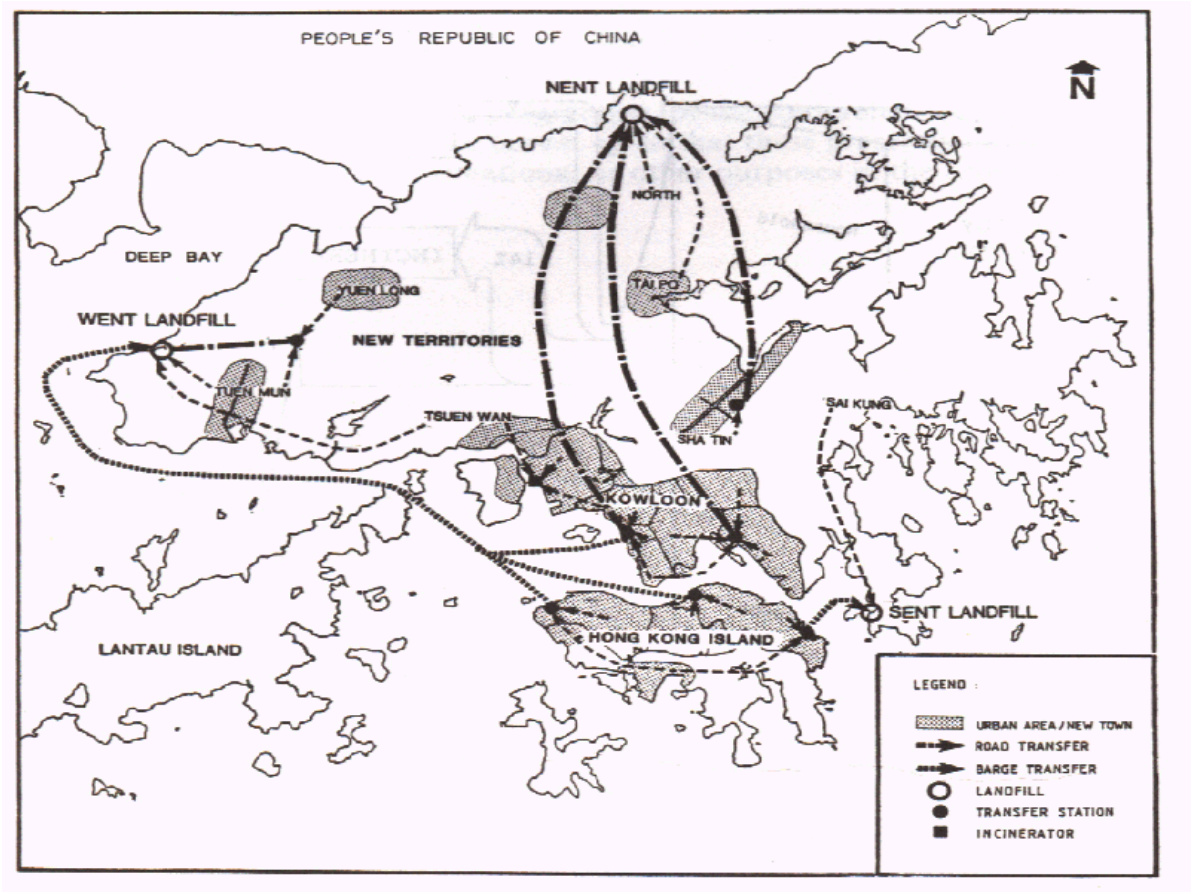
2.42 As a long-term proposal a programme for the comprehensive restoration of completed landfill sites will be drawn up so that these presently derelict sites can be brought into use for recreational or other purposes in the urban area.

Figure 1 Municipal Waste - collection and disposal flow for 1988 (para. 2.7 refers)



Note: This figure only shows those wastes which are collected for disposal at the municipal waste disposal facilities (i.e. municipal incinerators, composting plant or landfills).

Figure 2 Municipal Waste Disposal Strategy for Hong Kong (para. 2.12 refers)



Note: There will be 3 landfills (WENT, NENT, SENT). Wastes will be sent to the landfills from refuse transfer stations by container truck or barge. Incinerator will be phased out when refuse transfer stations have commenced operation (see para. 2.16).

Figure 3 - Livestock Waste Control Scheme (para. 2.30 refers)

LIVESTOCK WASTE PROHIBITION AND CONTROL AREAS			
		Area No	Location (Effective Date)
PROHIBITION AREAS	PHASE 1	1 & 2	Urban Council Area (24.6.1988)
		3	Shatin New Town and Environs (24.6.1988)
		4	Part of Tai Po New Town (24.6.1988)
		5	Part of Tsuen Wan and Kwai Tsing New Towns (24.6.1988)
		6	Part of Tuen Mun New Town (24.6.1988)
		7	Part of Fanling and Sheung Shui New Towns (24.6.1988)
		8	Part of Yuen Long New Town and Tin Shui Wai New Town (24.6.1988)
		9	Part of Junk Bay New Town (24.6.1988)
CONTROL AREAS	PHASE 1	10	River Indus Area (1.1.1989)
		11	Tolo Harbour and Tolo Channel Area (24.6.1988)
		11A	Tiu Yue Wan (Angler's Beach) and Environs (24.6.1988)
		11B	Mui Wo Environs (24.6.1988)
		12	Upper Sham Chun (Shenzhen) River Area (1.1.1989)
		13	Tsuen Wan Environs, Liu To Village & Environs and Tai Lam Chung Area (1.1.1989)
		14	Tuen Mun Environs (1.1.1990)
	PHASE 2	15	Corridor Between Tuen Mun and Yuen Long (1.6.1991)
		16	Yuen Long Environs (1.6.1991)
		17	Kam Tin River Area (1.12.1991)
		18	Tin Shui Wai Environs (1.6.1992)
		19	San Tin Area and Lau Fau Shan Envrions (1.6.1993)
		20	Mau Wu Tsai Village and Environs (1.6.1993)
	PHASE 3	21	Sai Kung Area (1.6.1994)
		22	Junk Bay Environs (1.6.1994)
		23	Outlying Islands (1.6.1995)
		24	Long Harbour Area (1.6.1995)
		25	Starling Inlet Area (1.6.1995)

CHAPTER 3

WATER QUALITY AND SEWERAGE

3.1 Over 2 million tonnes of sewage and industrial wastewaters are generated daily by the community in Hong Kong. This huge volume would fill 1,000 Olympic-size swimming pools, daily.

3.2 All this wastewater is discharged by one route or another into the sea. Roughly 10% receives biological treatment before discharge, 40% receives partial treatment and is discharged offshore through marine outfalls, and the remaining 50% enters the sea, close to the shore, without any treatment whatsoever.

3.3 The quality of our inshore waters and inland watercourses has deteriorated as the population and industrial activity in Hong Kong have increased. This has led to the closure of some six beaches, red tides, contaminated seafood, and visual pollution. Cooling water intakes have been contaminated, and anchorage buoys and boats suffer accelerated corrosion and deterioration of surface coatings.

3.4 There is also a growing accumulation of toxic chemicals in marine sediments in waters adjacent to industrial areas; and even on land sewerage sometimes overflows from drains.

3.5 There are many other factors that determine the quality of our inshore waters. There are many areas where the circulation of the sea is constrained, such as the natural bays in Tolo Harbour, Deep Bay, Port Shelter, Junk Bay and the typhoon shelters. In these areas, the dilution and dispersion of wastewaters are hampered and pollution can accumulate. Also, inland streams which could assist flushing have been progressively intercepted to provide potable water. In Tolo Harbour for example the reduction in run-off to the sea over the years has been a massive 70%. As a result cleansing freshwater flows have been reduced substantially.

3.6 The quality of our territorial waters is influenced strongly by the flow from the Pearl River Estuary. This influence is reflected in the difference in nature between the brown sediment-laden waters to the west of the territory and the blue translucent waters to the east. This influence means also that any pollution carried by the Pearl River, or discharged more directly from Shen Zhen into areas such as Deep Bay or Starling Inlet, could have a significant effect on the quality of our inshore waters.

Policy Objectives

3.7 The Government's overall policy objectives for water pollution are:

- to achieve and maintain the quality of inshore waters so that they can be used for their legitimate purposes; (e.g. bathing, other recreation, as a habitat for marine life,

as a source for food or commercial fisheries, navigation and shipping, etc -depending on the area)

- to provide public sewerage of adequate size to accept all existing and prospective wastewater discharges;
- to provide wastewater treatment and disposal for all wastewaters collected in the public sewerage system at standards which will ensure that water quality objectives are achieved and maintained;
- to put in place and enforce legislation aimed at safeguarding the health and welfare of the community from the adverse environmental effects associated with the discharge of toxic chemicals and bacteria.

Current Programmes

3.8 Current programmes mainly comprise the provision of sewerage and sewage treatment and disposal facilities, and the enforcement of legislation to control wastewater discharges to the sewerage system or direct to the environment.

3.9 During the past decade $5 billion has been invested in sewerage and sewage treatment and disposal facilities. The wastewater collected in the foul sewerage system passes either to the eight secondary treatment works, -at Sha Tin, Tai Po, Yuen Long, Shek Wu Hui, Sai Kung, Sha Tau Kok, Hei Ling Chau and Mui Wo,- or to one of the screening plants, before passing to inland or marine outfalls. These sewage facilities are to be operated and maintained by the new Drainage Services Department. In addition, in places with little or no mains sewerage, like Middle Bay and Clearwater Bay, new developments have been required to install biological treatment plants, in which disinfection of effluents may be required.

3.10 The basis for much of the investment in sewage treatment and disposal facilities was the recommendations of a 1971 consultant's report entitled 'Marine investigation of sewage discharges in Hong Kong'. Part of the $5 billion has been invested in sewerage infrastructure constructed to service the new towns or as ad hoc additions to the existing sewerage system around Hong Kong harbour. The latter has grown incrementally, without begin subjected to a comprehensive review, ever since the blueprint for a system of separate storm water and foul water sewers was established over 100 years ago.

3.11 The provision of sewage infrastructure is complemented by the control of wastewater discharges, primarily through enforcement of the provisions of the Water Pollution Control Ordinance (WPCO). This Ordinance aims to achieve three goals through the control of the quantity and quality of liquid discharges. One is to protect the health and safety of people working in sewers, another is to prevent damage to the fabric of sewers and to avoid disruption by toxic chemicals of the bacteriological processes that take place in sewage treatment works. The third goal is to achieve and maintain the Water Quality Objectives (WQO's) declared under the WPCO. WQO's protect the beneficial uses of their Water Control Zone.

These beneficial uses range from swimming and mariculture, which require stricter WQO's, to the less stringent requirements of typhoon shelters and anchorages.

3.12 The WPCO is currently enforced in two Water Control Zones: Tolo Harbour and Southern.

3.13 In areas not covered by the WPCO, Government relies on lease conditions applied to land use and on some provisions under the Public Health and Municipal Services Ordinance to control liquid effluents. Neither of these is effective.

3.14 Planning is also important. Planning work is carried out to ensure that developments such as new reclamations, typhoon shelters and port facilities do not disturb water flows in a way that will produce backwaters where pollution can accumulate or lead to an unacceptable deterioration of water quality. This planning function is assisted by the Water Quality and Hydraulic Model (WAHMO). Consultants were commissioned to develop this computer model and, as from December 1988, it has been used to explore the implications for water flows and water quality of a range of reclamation locations for future port and airport development.

Adequacy of Current Programmes

3.15 Until relatively recently the 1971 strategy for the disposal of wastewaters and ad hoc additions to the sewerage system appeared to be preventing serious deterioration in most of Hong Kong's waters. But in the early 1980's it became clear that these arrangements were not adequate to deal with an increasing flow of wastewater or to maintain acceptable water quality standards in relation to the beneficial uses made of each area, and to bathing beaches in particular.

3.16 However it is not simply a case of inadequate infrastructure. A major problem is the widespread connection of wastewater discharges from industry, restaurants and residential accommodation directly to stormwater sewers instead of to foul sewers. Thus, instead of reasonably clean storm water being discharged harmlessly at seawalls or even into typhoon shelters, heavily polluted wastewater is discharged, giving rise to the black water and familiar stink in Kowloon Bay, the Yau Ma Tei and Causeway Bay typhoon shelters and elsewhere. In some sewage catchment areas as much as 90% of the wastewater enters the storm water drainage system instead of the sewers, and 50% is quite common in other catchments.

3.17 Another reason for the deterioration of our inland waters is that substantial areas of the Territory, such as the south of Hong Kong Island and the Clearwater Bay area, have been developed without the provision of mains sewerage. The requirement that developments in these areas should be provided with package sewage treatment plants, has not in practice served as a satisfactory alternative to mains sewerage. An EPD survey has shown that more than 80% of these packages sewage treatment plants do not meet

the required effluent standards. The plants are seldom maintained and are generally operated by inexperienced staff.

3.18 The fact that the WPCO is in force in only two out of the ten Water Control Zones makes it all the more difficult to deal with the problems arising from illegal wastewater discharges to stormwater drains and the malfunctioning of packaged sewage treatment plants. Also, the WPCO itself is not as comprehensive or as stringent as it should be. For example, dischargers can obtain exemption for their existing discharges and may even increase the amount of discharge by up to 30%. Also, there is no requirement on the Ordinance for existing dischargers to connect up to a sewer when one is newly provided and the processing of notices and licence applications under the Ordinance is time-consuming for EPD staff, thereby reducing the manpower available for inspection and enforcement.

The Way Forward: Sewerage and Sewage Disposal Facilities

3.19 When the EPD was established in 1986, it became responsible for the sewage programme. At an early stage the department took a number of steps to achieve fundamental improvements in the sewerage infrastructure. The first was to initiate a series of studies reviewing the adequacy of the sewerage in selected sewage catchment areas and, based on the results of the review, to proceed to the preparation of Sewerage Master Plans (SMP) for these areas and the planning of any new sewer construction works that are needed to rectify the problems. The aim of an SMP is to get the sewage and industrial effluents into the foul sewerage system, rather than the storm-water drains, and to ensure that the foul sewers are large enough to receive these wastewaters.

3.20 The next step is to decide how best to dispose of the wastewaters that are collected by the sewerage system, in a cost-effective and environmentally satisfactory way. Accordingly, a further major study, the Sewage Strategy Study, was initiated by the EPD in early 1987. The objective of the Sewage Strategy Study is to review and recommend water quality objectives for the coastal waters of Hong Kong, and to develop options to treat and dispose of the sewage from existing developments and those planned for the next decade under the SMP's. The possible options are expected to range from one extreme of very high levels of sewage treatment and disposal of the effluent close inshore, to the other extreme of very little treatment but very long sea outfalls that discharge well away from our shores where the wastewaters can be broken down, over a period of time, by natural processes. The study is expected to recommend a preferred option and construction works packages to be incorporated into the Public Works Programme. The Sewage Strategy Study will be completed in August 1989 and in order to ensure early implementation of its recommendations, a total of $5.25 billion has been identified as being required, in advance of detailed project specifications becoming available. $72 million has been earmarked to enable quick initial steps to be taken in the implementation of the projects.

3.21 The SMP programme (para. 3.19) covers the whole territory in 21 SMP areas -figure 1 refers. So far, the SMPs for East Kowloon and Hong Kong Island South have been largely completed, and about $1 billion worth of works has been identified for implementation progressively as and when funds are voted.

3.22 Further SMP's are being prepared for unsewered areas in Tolo Harbour, Tsuen Wan/Kwai Chung/Tsing Yi and North West Kowloon and these will be completed in early 1990, and middle and late 1991 respectively.

3.23 Government intends that all the major sewage catchment areas will be covered by SMP's progressively over the next 5 years. Preparation of the Port Shelter SMP is due to start in 1989/90 and funding has been earmarked for a start to be make on the unsewered areas in Yuen Long/Kam Tin in 1990, the unsewered areas in Tuen Mun in 1992 and on Kowloon North SMP in 1992.

3.24 Each SMP exercise will lead to a requirement for new or modified sewerage systems and it is envisaged that a total of approximately $5 billion will be required for their construction over the next decade. Of this, a total of $173 million has been earmarked from 1988/89 to 1992/93.

The Way Forward: Water Pollution Control Legislation

3.25 Government intends to extend the implementation of the WPCO to cover all territory waters -figure 2 refers. The intended timing for the declaration of the remaining eight Water Control Zones is:

Port Shelter	August 1989
Junk Bay	August 1989
Deep Bay	1990
North Western	1990
Eastern and Mirs Bay	1990
Western Buffer	1991
Eastern Buffer	1991
Victoria Harbour	1991

Implementation of the Water Pollution Control Regulations in these Zones will follow shortly after their declaration, so that the regulations will be implemented in all zones by April 1993.

3.26 While enforcement of the WPCO in these zones will achieve significant improvements, it is necessary to remedy several deficiencies in the Ordinance that have become apparent in the ten years since it was drafted. The following changes will therefore be considered for incorporation into an amended Ordinance, to be submitted to the Governor-in-Council in 1990:

- removal of exemptions and the allowance of a 30% increase in discharge over and above the amount discharged at the

time the controls in a particular WCZ are implemented;

- a new requirement that existing premises within a specified distance of a new or existing public foul sewer will be obliged to connect discharges into it;
- a new requirement that the design and construction of private sewage and industrial effluent treatment plants should be approved by the control authority and that minimum qualification requirements should be established for people who maintain and operate such plants.

The Way Forward: Planning Against Water Pollution

3.27 All new developments, such as reclamations, typhoon shelters and marine outfalls, that could have a significant effect on water flows or water quality, will be tested using models for prediction purposes. In many cases, the water quality and hydraulic model WAHMO will be used (see para. 3.14).

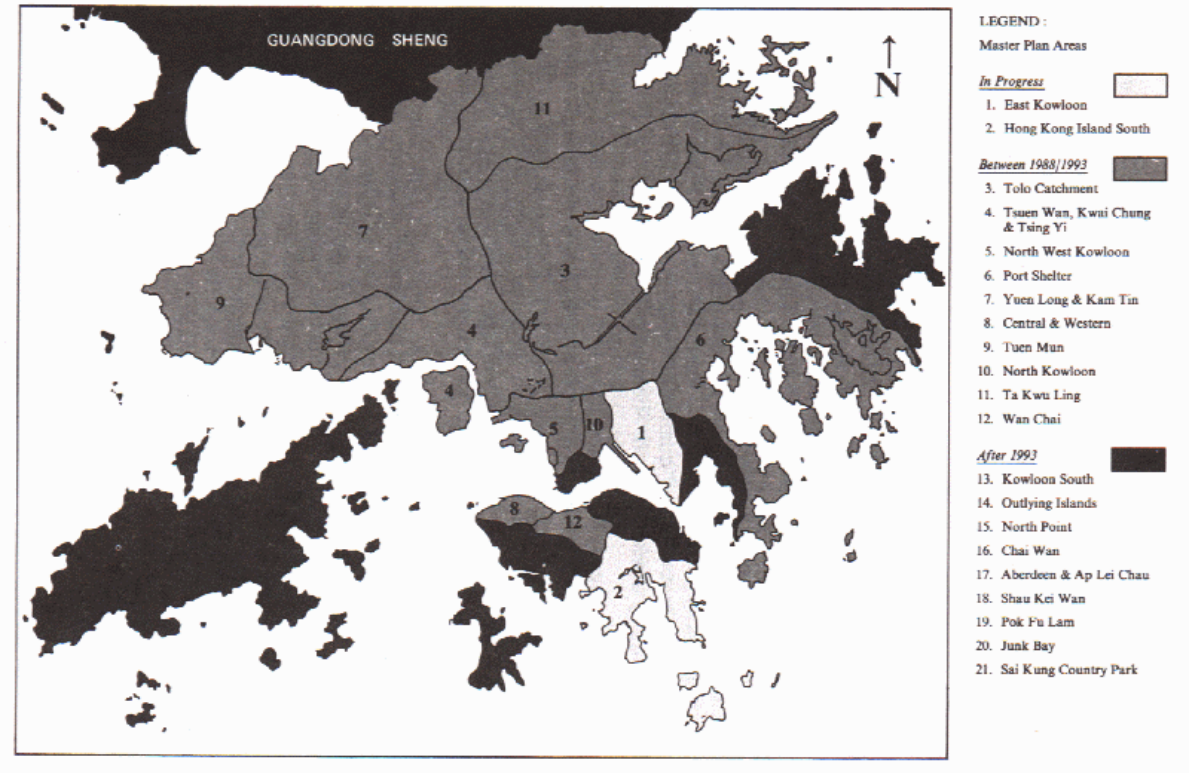
3.28 The success of the various measures taken to protect the quality of Hong Kong's inshore waters could be seriously undermined if pollution from neighbouring territories is not kept in check. The flow from the Pearl River affects Hong Kong directly and water quality in Deep Bay and Mirs Bay can be affected adversely by discharges from Shenzhen.

3.29 The EPD has already established links with its counterparts in Guangdong and Shenzhen and joint studies have been carried out on pollution of the Shenzhen river and of Deep Bay itself. However, there is a need to develop mechanisms by which the joint interests in the water quality in these areas can be safeguarded. Accordingly there are advantages in establishing a permanent, joint environmental protection body to address mutual air and water pollution problems.

3.30 The Government is concerned about a number of other sources of water pollution that are not adequately covered by existing activities. These include pollution from mariculture, and floating refuse. Coordinated plans for improving specific areas also need to be implemented vigorously, for example in Tolo Harbour. And a comprehensive watercourse management and maintenance programme is being mapped out. Where appropriate Government will formulate action or management plans to tackle these problems. With regard to mariculture, however, no new fish culture zones will be designated pending further research into the polluting effects of mariculture.

3.31 Renewed efforts will be made to tackle floating refuse. A new action plan will be prepared aimed at reducing land-based sources of refuse, improving scavenging arrangements in the harbour, and applying tighter controls over illegal dumping, and the cleanliness of reclamations, cargo handling areas and typhoon shelters. The Private Sector Committee on the Environment is also addressing this problem, and such initiatives should be encouraged.

Figure 1 Sewerage Master Plan Areas (para. 3.21 refers)



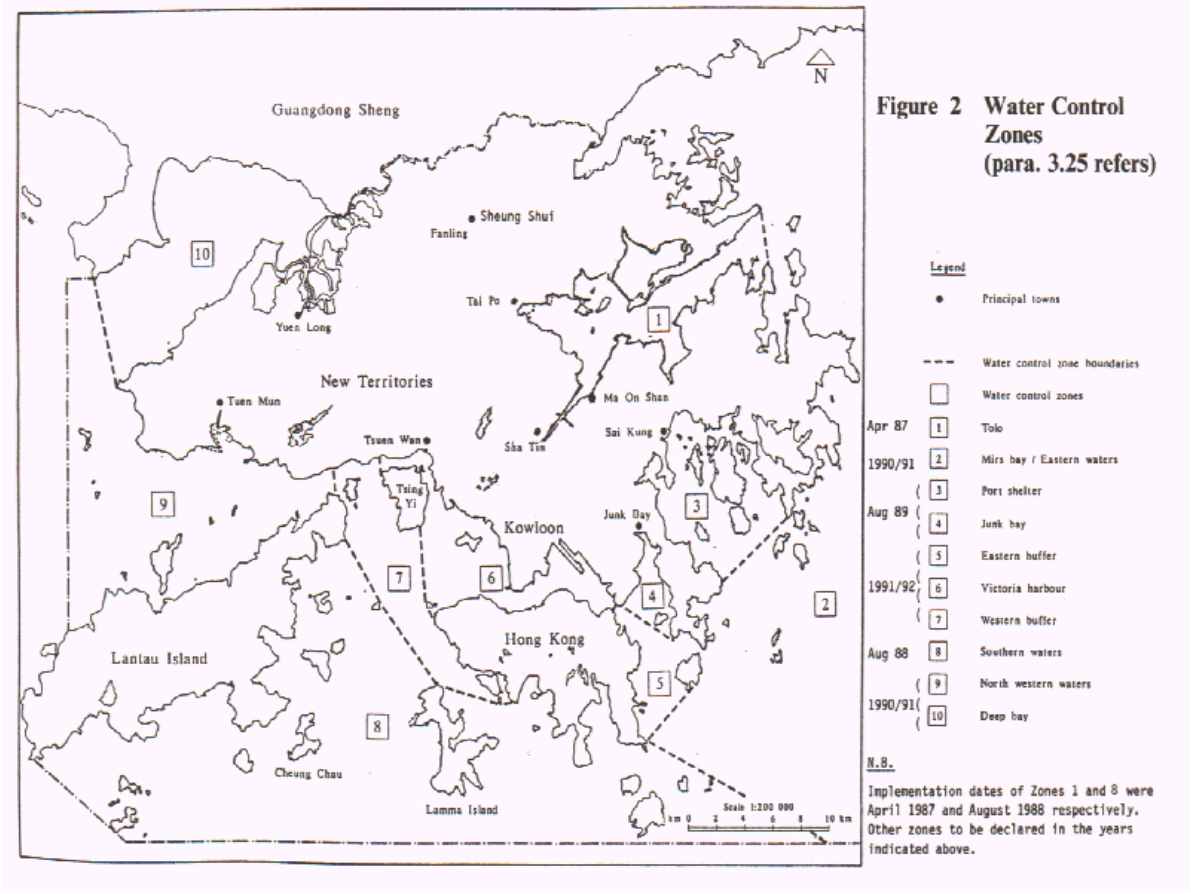


Figure 2 Water Control Zones (para. 3.25 refers)

CHAPTER 4

AIR QUALITY

4.1 Some 1.5 to 2 million people are exposed to unacceptable[1] levels of sulphur dioxide and nitrogen dioxide and about 3 million people are exposed to high particulate levels. Many people are exposed to unacceptable[1] levels of all three pollutants. These pollutants, particularly when combined, can seriously affect health, especially of those who are less robust, such as the elderly, the very young and those already suffering from illness.

4.2 The most common adverse health effects of these pollutants take the form of increased incidence of respiratory illnesses, such as asthma and bronchitis. The high levels of air pollution in many parts of Hong Kong must seriously aggravate the condition of those already suffering from such illnesses and contribute to the onset of chronic conditions. Other health effects such as lung cancer can be caused by air pollution, as certain air pollutants, such as those emitted from diesel vehicles, are known to be carcinogenic.

4.3 Air pollution in Hong Kong costs the community very large sums of money. Although it is impossible to be precise, hundreds of millions of dollars are spent every year on combatting air pollution or paying to rectify its effects. This expenditure arises in many different ways, from the obvious, such as maintaining EPD's air control staff and equipment, to the less obvious, such as the cost to the public of maintaining more hospital beds and medical staff, the cost of cleaning buildings and clothes more frequently and the cost of replacing or repairing equipment or parts of buildings or other structures that have been severely corroded as a result of the acidic properties of some pollutants. Considerable expenditure is also incurred by industrialists and the government in minimising air pollution, sometimes because of the inappropriate siting of industrial or residential buildings.

4.4 Hong Kong faces particular difficulties in dealing with these problems. For example, our hilly terrain, with residential development often on high ground, limits the scope for dispersing air emissions by using tall chimneys. Also high-rise development leads to trapping of air pollutants in street canyons.

Policy Objectives

4.5 The Government's overall policy objectives for air pollution are:

[1] 'Unacceptable' means exceeding the Air Quality Objectives at figure 1.

- to limit contamination of the air in Hong Kong so as to safeguard the health and well-being of the community. In particular, in relation to certain common air pollutants, to ensure that the minimum standards, as laid down in Table 1, are met.
- to limit air pollution through the enforcement of the Air Pollution Control Ordinance and through land use planning measures.

Current Programmes

4.6 Air quality may be improved by implementing legislation, and through environmental planning.

4.7 The importance of planning cannot be overstated. Hong Kong is constantly developing, so there are many opportunities for improving and safeguarding air quality through better town planning and project development. The EPD is now consulted on virtually all planning matters. Factors taken into account in planning against air pollution are contained in the Environment Chapter of the Hong Kong Planning Standards and Guidelines. (see also para. 6.7).

4.8 The statutory controls of the Air Pollution Control Ordinance (APCO), together with its regulations and orders, complement these planning efforts. This legislation is enforced by the EPD and includes a wide range of controls over emissions from stationary sources. The most significant features include:

- Parts of Hong Kong may be declared to be air control zones. Two zones have been declared so far; these are the main industrial and residential areas around the harbour and the Tsuen Wan-Kwai Chung area;
- Air quality objectives may be established for each air control zone.
- Abatement notices may be issued by the DEP to the owners of factories, requiring them to reduce their emissions.
- The emission of excessive dark smoke from chimneys and other plant is an offence.
- Approval must be obtained from DEP for the installation or alteration of any chimney or boiler and certain other types of fuel-using plant.
- Twenty-three types of industrial undertaking, that have significant potential to pollute, are designated as specified processes. Any new specified process, or any existing one which has undergone any significant alteration or expansion, must be licensed by DEP.

4.9 To complement the provisions dealing with stationary sources in the APCO, controls on emissions from motor vehicles are contained in regulations under the Road Traffic Ordinance. These regulations govern the emission standards of all motor vehicles when newly imported and provide controls on smoke emissions from vehicles. The controls on new vehicles are administered by the Transport

Department while the smoke emission controls are enforced by the EPD.

4.10 A voluntary programme adopted by the oil industry to reduce the lead content in petrol has contributed to reducing harmful vehicle emissions. The present level of lead in petrol is 0.15 g/l, which is the lowest practicable level short of adopting the use of lead-free petrol.

Adequacy of Current Programmes

4.11 Although significant gains are now being made in protecting air quality through preventive planning and implementing existing legislative controls, major air pollution problems remain and, for the most part, the Air Quality Objectives are not being met. So the health of a significant portion of our population is therefore at risk.

4.12 There are two main reasons why Hong Kong's air quality remains unsatisfactory. One is the sheer number of serious air pollution problems left over from the past, when environmental considerations were not given sufficient regard. The other is the inadequacies of existing legislative controls.

4.13 Several measures should be pursued over the next five years to improve the present situation, which will lead to the attainment of our Air Quality Objectives. These measures are outlined in the following section and collectively they form an air quality management plan.

The Way Forward: Air Pollution Control Legislation

4.14 During 1989/90 Government intends to declare additional air control zones to cover all the remaining parts of the territory and to establish the air quality objectives in Table 1 for these zones. This will provide a comprehensive legislative framework against which territory-wide control measures can be developed and implemented.

Stationary Sources

4.15 Several amendments to the Air Pollution Control legislation are necessary to enable more efficient and effective action to achieve the Air Quality Objectives. Amendments include increased penalties for various offences and significant changes to the sections dealing with the issue of abatement notices, so as to relate such notices directly to the attainment of the Air Quality Objectives. The target is to introduce an amendment Bill to the 1989/90 session of the Legislative Council.

4.16 Existing regulations under the APCO prohibit the use of high sulphur fuel oil in certain locations and were introduced to protect particularly sensitive areas, with poor meteorological dispersion,

form sulphur dioxide problems. However sulphur dioxide problems in other parts of the territory remain serious and the only effective way of dealing with them is to extend the existing regulations to prohibit the use of industrial fuel oil with a sulphur content greater than 0.5% by weight. Although this will result in significantly higher fuel costs, it will substantially solve our sulphur dioxide problem, so this initiative is a very high priority. It is intended that the new regulations, incorporating suitable lead times, will be introduced in 1990.

4.17 Because of the number of industrial chimneys in some parts of Hong Kong, the existing regulations under the APCO that control dark smoke emissions are inadequate to prevent localised nuisance and health problems. Although each chimney is not permitted to emit dark smoke for more than a few minutes, the large numbers of chimneys on many industrial buildings can cause almost non-stop emissions of dust and grit from a single building.

4.18 Government therefore intends to tighten the dark smoke emission limit criteria in the present regulations. The target is to introduce these amended regulations in 1990.

Mobile Sources

4.19 Control standards for motor vehicle emissions in Hong Kong are less stringent than those of many other developed countries with less serious air pollution problems. The Government therefore intends to introduce more stringent vehicle emission standards in order to reduce emissions from motor vehicles, and to phase-out the use of leaded petrol.

4.20 The most serious pollutants are oxides of nitrogen and particulate emissions from diesel engined vehicles, which produce about 44% of all respirable particulates emitted in the territory and up to 75% of all ground level concentrations of oxides of nitrogen. This is primarily due to the very large numbers of diesel-engined taxis, light buses and goods vehicles, which account for the majority of vehicle kilometres travelled in Hong Kong. Diesel emissions must therefore be a prime target for control.

4.21 The strategy now being considered by the Government involves:

- the introduction of regulations requiring all vehicles imported into Hong Kong, both diesel and petrol engined, to comply with the most stringent international emission standards (probably Japanese and/or US standards). This will mean, in the case of petrol engined vehicles, that catalytic converters must be fitted, which require lead-free petrol.
- ensuring that lead-free petrol is supplied and used widely in Hong Kong as soon as possible.
- examining and, if feasible, implementing measures aimed at reducing reliance on diesel-engined vehicles.
- introducing new regulations which will enable more effective control to be exercised over smoke emissions

from vehicles in use.

4.22 There are many details to be considered before the above proposals can be implemented and it is therefore difficult to be precise about timing. A specialist on motor vehicle emissions has been recruited from overseas to develop these controls and it is the intention to start implementing them over the next three years.

Asbestos

4.23 Existing legislation is primarily aimed at protecting the health of workers dealing with asbestos. But there is also a need to protect the general public more adequately and introduce further statutory controls over the emission of asbestos fibres into the environment.

4.24 Government intends to employ a specialist consultant to develop the detailed proposals for the legislative controls and to make recommendations on the resources required to implement them. Licensing provisions to control the activities of asbestos removal contactors will be required. It is intended to introduce this legislation in 1990.

Protection of the Ozone Layer

4.25 Although the protection of the ozone layer is not immediately pertinent to Hong Kong's air pollution problems, the Government believes that Hong Kong should play its part in the international effort now being made, by prohibiting the production and limiting the use of certain chemicals known as chloroflurocarbons(CFCs) and halons which are contributing to the depletion of the ozone layer in the stratosphere.

4.26 The depletion of the ozone layer will cause an increase in the amount of ultraviolet light reaching the earth's surface, which in turn will have harmful effects on human health, such as increased incidences of skin cancer, and on other organisms, ecosystems and materials useful to man. Changes to the ozone layer may have serious consequences also for weather and climate.

4.27 The Vienna Convention for the Protection of the Ozone Layer 1985 and the Protocol to the Convention known as the Protocol on Substances that deplete the Ozone Layer 1987 apply to Hong Kong following Hong Kong's inclusion in the United Kingdom's ratification of these treaties. The effect of the Protocol is that Hong Kong must now introduce controls on the manufacture and consumption of CFCs, and on halons in a few years. The necessary legislative and administrative controls are being prepared.

The Way Forward: Other Air Pollution Strategies

Incinerators

4.28 Incinerators are a major source of pollution in the urban areas. They account for approximately 18% of all respirable particulates emitted into the atmosphere of the territory and can be a source also of trace quantities of highly toxic substances. Government therefore intends to phase out the existing municipal incinerators as land-based disposal facilities are introduced to replace them. (see para. 2.16)

Construction Dust

4.29 Construction activities account for some 30% of all total suspended particulates emitted in the territory. There is considerable scope for reducing these emissions. Present practices and controls in the construction industry are now being examined with a view to developing suitable codes of practice and, if necessary, legislative controls. This work will be completed by 1991.

Monitoring and Investigation

4.30 Data from air quality monitoring stations provide important indications as to the success or otherwise of air quality control programmes. Government therefore intends to expand the fixed monitoring network over the next five years to provide a comprehensive monitoring capability for the whole territory. Priority will be given to establishing monitoring stations in the areas which contain major concentrations of industry or have been earmarked for major industrial development.

4.31 The EPD will continue to monitor acid rain and the Royal Observatory will monitor the long range transport of pollutants. The impact caused by acid rain in Hong Kong is not great, and the level of acidity in rainfall has not increased over the last few years. Acid rain, by itself, is not known to have any important direct adverse effects on public health in Hong Kong. Nor is it responsible for damage to our local vegetation or agriculture. However acid rain, when combined with other common air pollutants leads to corrosion of building materials. The principal measures for reducing the acidity of rainfall are those measures being taken to improve air quality generally, especially plans to control the sulphur content of fuel oil and the emission of acidic gases from motor vehicles.

4.32 Though the above strategies are probably the most urgent, it will also be necessary to investigate indoor air pollution and toxic air contaminants as soon as resources can be provided.

Table 1. Hong Kong Air Quality Objectives (para. 4.5 refers)

Pollutant	Concentration in micrograms per cubic metre (I)					Health effects of pollutant at elevated ambient levels
	Averaging Time					
	1 Hour (ii)	8 Hours (iii)	24 Hours (iii)	3 Months (iv)	1 Year (iv)	
Sulphur Dioxide	800		350		80	Respiratory illness; reduced lung function; morbidity and mortality rates increase at higher levels.
Total Suspended Particulates			260		80	Respirable fraction has effects on health.
Respirable (v) Suspended Particulates			180		55	Respiratory illness; reduced lung function; cancer risk for certain particles; morbidity and mortality rates increase at higher levels.
Nitrogen Dioxide	300		150		80	Respiratory irritation; increased susceptibility to respiratory infection; lung development impairment.
Carbon Monoxide	30,000	10,000				Impairment of co-ordination; deleterious to pregnant women and those with heart and circulatory conditions.
Photochemical Oxidants (as ozone) (vi)	240					Eye irritation; cough; reduced athletic performance; possible chromosome damage.
Lead				1.5		Affects cell and body processes; likely neuropsychological effects, particularly in children; likely effects on rates of incidence of heart attacks, strokes and hypertension.

(i) Measured at 298°K(25°C) and 101.325kPa (one atmosphere).
(ii) Not to be exceeded more than three times per year.
(iii) Not to be exceeded more than once per year.
(iv) Arithmetic means.
(v) Respirable suspended particulates means suspended particles in air with a nominal aerodynamic diameter of 10 micrometres and smaller.
(vi) Photochemical oxidants are determined by measurement of ozone only.

CHAPTER 5

NOISE

5.1 More than one million people in Hong Kong are exposed daily to unacceptably[1] high levels of noise from road traffic. Nearly half a million people are exposed to unacceptable[1] aircraft noise and perhaps two million people are exposed to excessive noise from construction, industrial, commercial or domestic activities.

5.2 A small land area, rapid economic growth and a neglect of environmental issues are the main reasons for our present noise problems. We have an airport virtually in the centre of the city, major elevated roads within a few metres of bedroom windows and almost non-stop construction and industrial activities in close proximity to high-density residential and commercial developments. Our climate makes matters worse, since windows often need to be open to provide ventilation. For schools this can be a particular problem and sometimes teachers have to use megaphones to make themselves heard.

5.3 The effect of environmental noise on people depends on the nature and intensity of the noise, the time of day, the activity being performed, and the physical and mental state of the person hearing the noise.

5.4 Whilst some noise is inevitable in a major city like Hong Kong, present noise levels are excessive and must be reduced in order to safeguard the well-being of the community.

Policy Objectives

5.5 Because people's reactions to noise are highly subjective and it is very difficult to have noise levels for many activities it is not possible to set practically attainable, absolute noise objectives that would satisfy the entire community. Our aim should therefore be to implement controls and planning strategies that are capable of achieving a tolerable noise climate, which the majority of the population would find acceptable.

5.6 The Government's overall policy objectives for noise control are therefore:

- to control specific sources of noise through enforcement of the Noise Control Ordinance (NCO) and its associated regulations.
- to prescribe noise standards in the Environment Chapter of the Hong Kong Planning Standards and Guidelines, to guide those concerned with development in planning against noise in both the public and private sectors.
- to have due regard to noise in planning the Government's

[1] 'Unacceptable' means exceeding the Planning Standards and Guidelines

own development projects, such as schools, roads, and hospitals as well as in Outline Zoning Plans and Development Plans where many opportunities exist to plan against noise.

Current Programmes

Legislative Controls

5.7 The most significant controls on environmental noise are contained in the new Noise Control Ordinance which is being introduced by stages during 1989. The more important provisions are:

- Noise from domestic premises and public places is controlled by the police on a subjective assessment basis.
- Percussive piling is prohibited at night or on Sundays or public holidays and controlled at other times by a permit system administered by DEP. The noise standards to be observed are contained in the Technical Memorandum on Noise From Percussive Piling.
- Noise from general construction work at night or on Sundays or public holidays is controlled by a permit system administered by DEP. The noise standards to be observed are contained in the Technical Memorandum on Noise from Construction Work Other Than Percussive Piling.
- Noise from industrial, trade or commercial premises is controlled by abatement notices, which may be issued by DEP whenever noise levels exceed the criteria set down in the Technical Memorandum for the Assessment of Noise From Places Other Than Domestic Premises, Public Places or Construction Sites.
- Noise from individual products such as motor vehicles, jack hammers or compressors may be controlled by regulations specifying noise standards for such items when first manufactured or imported into Hong Kong and also when in use in Hong Kong.

5.8 Permits for general construction work will be required from August 1989 and for percussive piling from November 1989. It is expected that the provisions relating to noise abatement notices, domestic premises and public places will be brought into effect by November 1989.

5.9 In addition to the NCO, there are other legislative controls on environmental noise in the Civil Aviation (Aircraft Noise) Ordinance and its subsidiary regulations and in the Road Traffic (Construction and Maintenance of Vehicles) Regulations. The former provides for an aircraft noise certification scheme consistent with international standards together with restrictions on aircraft operations and aircraft engine ground runs at Kai Tak airport during night time. The latter provides for controls on motor vehicle noise emissions by requiring exhaust systems to be properly maintained.

Planning Against Noise

5.10 Preventive planning against noise ensures wherever practicable that major noise problems are avoided in the future. Since almost all planning proposals have the potential to create a better or worse noise climate all such proposals are examined to ensure that environmental noise considerations have been properly taken into account.

5.11 Traffic noise is the most pervasive form of noise in Hong Kong, and is more amenable to control through the planning process than by legislative action. The EPD provides technical advice on all traffic noise problems encountered in planning proposals and on possible remedial measures. The standards to be met depend on the individual situation: for example they are more stringent for certain parts of hospitals than for residential buildings. For new roads these standards are to be met, where practicable, through measures incorporated within the road reserve, such as route alignment variations, noise barriers or even tunnels. For new residential or institutional development the EPD provides advice on building location, orientation and design, so as to achieve the standards.

5.12 Noise from aircraft is another problem. But solutions are not readily available while the airport remains at Kai Tak, as it is not practicable to restrict all development and re-development in the urban areas on account of excessive aircraft noise. Nevertheless, planning standards have been prescribed for major new developments and any such development containing residential, medical or educational uses should not be located within the 30 NEF (Noise Exposure Forecast) contour around the airport.

5.13 Although railway noise affects fewer people than traffic or aircraft noise, it can still be a significant problem especially at night. EPD provides advice to the rail companies, and to those planning developments adjacent to rail routes, on measures that can taken to achieve this standard, including track alignment and platform design.

Remedial Programmes

5.14 The Government is implementing a phased programme to provide insulation to Government and aided schools that are badly affected by noise from aircraft or road traffic. The first phase of this programme should be completed by the end of 1989, when 37 schools that suffer worst from aircraft noise will have been provided with double glazing and air-conditioning at a cost of $70m. The next stage will then commence, and 90 to 100 schools affected by extreme traffic noise will be provided with similar insulation over a period of three years, at an estimated cost of $80m.

5.15 Another programme to reduce the adverse effects of transport noise is the re-surfacing of stretches of road with a material that produces less traffic noise. Part of the Island Eastern Corridor has already been provided with the new surface as a trial

and $2m has been allocated for another segment during 1989/90.

Adequacy of Current Programmes

5.16 Current legislative controls, when fully developed and implemented, should counter most noise problems. Others will be solved by better planning. Even so, some problems will remain. Aircraft noise cannot be substantially reduced while the airport is located at Kai Tak. Despite the use of new surfacing materials, traffic noise problems from many existing roads will continue to be intractable. Also it will still sometimes be difficult to meet the planning standards through measures confined to the road reserve. Further initiatives need to be taken in this area.

The Way Forward

5.17 While the main provisions of the NCO will be fully implemented by the end of 1989, work is proceeding on the preparation of new regulations under the NCO to provide control on noise generated by certain additional construction activities, such as erection of form work and rubble disposal, within the scope of the night-time construction noise permit system. The target for the introduction of these regulations is 1990. Work has also started on regulations to control noise from new road vehicles.

5.18 All new developments that may give rise to significant noise problems, such as highways, container terminals and rail links, or which could be severely affected by noise, such as hospitals, schools and residential accommodation, will be assessed for their noise implications and, where appropriate, provisions will be incorporated in the layout or design to avoid creating unnecessary noise.

5.19 The programme of treating selected stretches of road with noise reducing material will also be extended. And in recognition of the practical difficulties encountered in relying purely on measures within new road reserves to achieve traffic noise planning standards, consideration will be given to the feasibility of providing remedial measures outside the road reserve. Such measures may take the form of insulation to affected noise sensitive buildings or noise barriers within other property boundaries.

CHAPTER 6

PLANNING AGAINST POLLUTION

6.1 In the drive for growth and development in the 1960's, 70's, and 80's to meet the needs of a rapidly expanding population and increased commercial and industrial activity, environmental considerations usually took second place to development. Although in recent years there has been a greater desire to address environmental matters and increased understanding of such issues, the lack of adequate planning controls has led to the creation of new environmental problems.

6.2 Thus, in an effort to meet urgent housing needs, blocks of residential flats have been built on sites surrounded by industrial buildings so that living rooms and bedrooms look straight out onto chimney tops not many metres away. Other blocks have been sited adjacent to the aircraft servicing and engine test area at Kai Tak airport.

6.3 To meet urgent infrastructural requirements, large areas of land have been reclaimed changing water flows and creating putrid backwaters. And new roads have been built very close to existing developments.

6.4 Neither have the rural areas escaped the results of piecemeal development. The relative ineffectiveness of lease conditions and unsatisfied demand for storage space have resulted in large areas of agricultural land in the New Territories being filled and turned over to open storage, for containers and construction materials, vehicle breakers yards and light industrial uses. Thus large tracts of the rural land have become environmental 'blackspots'.

6.5 While there are problems, there have also been successes. For example, the Country Parks which cover some 40% of the Territory, and the better planning of the New Towns which should, given sufficient emphasis on maintenance, provide a far better environment for new town communities.

Objectives

6.6 The Government's overall policy objectives for environmental planning are :

- to avoid creating new environmental problems by ensuring the consequences for the environment are properly taken into account in site selection, planning and design of all new development;
- to seize opportunities for environmental improvement as they arise in the course of urban redevelopment;
- to safeguard against urban encroachment into rural areas, unless adequate services have been provided.

Current Programmes

6.7 During the last few years Government has taken various major steps to ensure that its planning will help to improve and not impair the environment. One example is the introduction in 1985 of an Environment chapter in the Hong Kong Planning Standards and Guidelines. These guidelines are used by Government planners as well as architects, landscape architects and others involved in planning and development activities. The Environment chapter provides detailed guidance on the implications of development for air quality, water quality, noise and waste management as well as the rural environment and urban landscape. It also sets out guidelines to minimise adverse effects of new development with the potential to cause nuisance or pollution.

6.8 Another example is the procedure whereby an environmental review must be carried out by the EPD on all projects in the Government's Public Works Programme that have a potential to cause significant adverse effects on the environment. This arrangement covers roads, water supply schemes, waste management projects, such as landfills, sewage treatment works, and airports.

6.9 The establishment, by the EPD, of standard administrative procedures for executing Environmental Impact Assessments (EIA) of major private and public sector development projects is a further improvement in the planning process. The EIA procedure involves the preparation of a brief by the EPD, the setting-up of a Study Management Group chaired by the EPD and including representatives from other interest Government departments, and the identification of the major environmental issues to be addressed in the project.

6.10 The EPD is now routinely consulted on most planning proposals with a view to identifying potential environmental problems and avoiding or mitigating them where possible. This is achieved through the provision of detailed advice by EPD staff in respect of :

- major strategic planning studies, such as the Port and Airport Development Strategy and Metroplan;
- the preparation of statutory Outline Zoning Plans and non-statutory Outline Development Plans;
- planning applications under Section 16 of the Town Planning Ordinance and other development proposals;
- layout plans for housing and other developments;
- the location of schools, hospitals and other environmentally sensitive institutions;
- short-term tenancies, short-term waivers and other miscellaneous planning matters.

Adequacy of Current Programmes

6.11 Although it has been satisfactorily improved, the present system relies almost entirely upon administrative measures and guidelines, with very little statutory control. There are few effective sanctions if guidelines and administrative procedures, or even lease conditions, are flouted.

6.12 A further drawback of the current programme is that the statutory planing system in the Town Planning Ordinance only applies to existing and potential urban areas. This leaves most of the New Territories subject to few controls on development and land use, giving rise to haphazard and disorderly infiltration of urban-type activities into rural areas.

6.13 On the other hand, new development and redevelopment provide many opportunities for environmental improvement. But these opportunities must be taken at the planning stage; otherwise they are lost for ever.

The Way Forward

6.14 The most important step is to provide the correct legal framework for planning. In order to improve the statutory basis for planning against pollution, it is the Government's intention to include among the proposals that are being put forward in the current review of the Town Planning Ordinance, certain important provisions that relate to environmental planning, aimed at achieving explicit recognition of the need for planning activities to give due consideration to environmental factors. These proposals will be the subject of separate public consultation.

6.15 At the strategic planning level there are two major planning studies that will have a significant impact on the urban environment over the next ten years. The Port and Airport Development Study (PADS) is examining various strategies which may well involve the development of a replacement airport for Kai Tak. If a decision is made to relocate the airport, this would greatly relieve the half-a-million residents in Kowloon who are now exposed daily to excessive aircraft noise.

6.16 The second major urban planning study is Metroplan. Whereas our New Town Programme should be completed by the mid 1990's we now need to pay more attention to the upgrading and redevelopment of the Metropolitan Area around the harbour in order to improve its crowded environment and make it a better place for the majority of our population to live and work. Some of these areas are heavily congested, with dilapidated living conditions and a lack of essential amenities. The reclamations now being planned at Hung Hom, Western Kowloon, and Central and Western District will provide a real opportunity to plan a restructuring of the harbour area so as to reduce some of the excessive building density. The Metroplan will provide a strategic policy basis for improving the urban environment.

6.17 Planning for the rural areas will also gather momentum. To counter the rural problems in paragraph 6.4, a study entitled the Rural Planning and Improvement Strategy was recently completed. Its aims are to improve the quality of life for the 330,000 rural population, through a programme of basic facilities, expanded infrastructure and amenities, and to address problems such as flooding, pollution and unplanned development. This study is also the subject of separate consultation.

6.18 In the rural areas and the urban fringes there is also a need to improve the planning and coordination of territory-wide countryside conservation measures. As a first step Government is reviewing which policy branch should have responsibility for countryside conservation, including the urban fringe areas. Government will also review its quarrying policy, with a view to rehabilitating quarries in urban areas as soon as practicable. There will be no new quarries above the ground in urban areas.

6.19 Finally, the Government will comprehensively update the Environment Chapter of the Hong Kong Planning Standards and Guidelines, to account for recent changes in the various pollution control ordinances, and to generally improve our environmental planning criteria.

CHAPTER 7

ENFORCEMENT AND COMPLIANCE POLICIES

7.1 With the recent enactment of new legislation, controls are now applied to :

- all gaseous and particulate emissions from stationary sources and some from mobile sources;
- effluent discharges in two water control zones;
- livestock waste disposal;
- marine dumping; and
- noise from various sources.

To help the public comply with this legislation Government makes available copies of laws; guides to the legislation clearly setting out in layman's terms the provisions of each ordinance, including action needed to comply with the law; and technical memoranda and codes of practice on pollution control matters.

7.2 However legislation will not produce a cleaner environment if it is not complied with and enforced. We must therefore aim for a very high degree of compliance but this can only be achieved by assistance and encouragement on the one hand, and firm but fair enforcement on the other. Government's overall policy objectives for enforcement and compliance are :

- To establish and maintain a credible inspection and investigation presence that will convince potential offenders that any breaches of legislation are likely to be detected.
- To establish a clear and consistent enforcement policy, which will be implemented whenever breaches of legislation are detected.
- To ensure that there is available to all potential polluters sufficient technical assistance and advice in respect of the application of pollution control and waste reduction technology.

Adequacy of Current Arrangements

Inspection, Investigation and Enforcement

7.3 In Hong Kong pollution laws and codes are enforced by regular but infrequent inspection of the most significant polluters, and in response to complaints. This mixed system has its merits -in particular it enlists the assistance of the public in detecting offences. However, response times must be shortened, existing levels of inspection improved, and an enforcement policy defined.

7.4 The Government runs numerous construction projects which can cause severe adverse effects on the environment, and engages contractors to carry out these projects. At present, there are guidelines for noise pollution offences, and contractors convicted of such offences may be suspended from tendering for Government

contracts for a period of time. But it is questionable whether the guidelines are stringent enough, and there is scope for extending them to cover offences under other ordinances.

Technical Assistance and Advice

7.5 The Government recognises that industries operate under conditions peculiar to Hong Kong, and pollution control equipment may have to be specially designed and manufactured. Also many industrialists are unfamiliar with pollution control technology and very few persons in the industrial sector have received any training in this area. There is therefore a demand for consultancy and training services which ideally should be provided by the private sector for the private sector. But it appears there is a gap between the price that those who require these services are willing to pay and the price that suppliers would charge for them. If the smaller factory operators are not to be squeezed out of business by the pollution controls that must be applied, they will have to get assistance and advice to help them to comply.

7.6 Staff of the EPD provide some advice in the course of inspection visits, but this has to be limited to advice on the degree of abatement of pollution required and the standards to be achieved. This advice is often complemented by a general indication of the nature of the measures that should be adopted. This level of advice has in the past been sufficient to enable a high proportion of those concerned to take the action necessary to achieve compliance.

7.7 Both technical assistance and advice may be obtained from the Hong Kong Productivity Council (HKPC), a non-profit-making Government-subvented organisation. HKPC's environmental management division specialises in pollution control work. But even the HKPC cannot, under present arrangements, reach out to a sufficient number of small factories and workshops, or provide services at a price they are willing to pay.

The Way Forward : Inspection and Investigation

7.8 The Government must work towards providing sufficient resources to establish and maintain a credible inspection and investigation presence, and adopt effective performance measures for inspecting every category of offence, and investigating complaints. To improve responses to local communities the Government plans to regionalise control activities.

7.9 The private sector can also play a significant role in 'environmental auditing' -the periodic and systematic evaluation by company management of the impact that the company's operations have on the environment, and the extent to which the company's activities meet the regulatory requirements. The objective of such audits would be to reduce environmental impacts wherever feasible, for example by minimising waste generation, and to ensure that the company is complying with the law in every respect. Moreover, the Government intends to involve potential polluters in

self-surveillance wherever possible, and it will be the Government's policy to require the installation of secure automatic surveillance devices, paid for and maintained by the potential polluter, in appropriate licence conditions. Depending upon the industry or process in question, these devices will monitor and record key information about effluent streams such as flow rates, physical variables such as temperature, and pollutant concentrations. Government will also require access to the records generated by such devices during inspections, and the reporting of any abnormal emissions and malfunction incidents that may be recorded. The information thus obtained will be kept confidential.

The Way Forward : Enforcement Policy

7.10 Those offences or circumstances where immediate prosecution without prior warning is both necessary and justifiable include :

- offences which have already given rise to fatality or injury, or to significant environmental damage; or which involve an immediate environmental danger or hazard to human health;
- offences which are causing an intolerable nuisance; or which are frequently repeated;
- failure to comply with a Notice to abate pollution;
- failure to comply with a court order made under any legislation;
- failure to obtain prior approval of a permit, licence or exemption, for an activity or installation, as required by law;
- wilful provision of false information in relation to any investigation or application; or wilful obstruction of an officer in the course of his duty.

7.11 For all other cases, if an offence is detected, the usual response will be to give oral advice and a written warning. A prosecution will then follow if the written warning is not heeded.

7.12 The Government, in managing its own lists of contractors, will ensure that contractors who commit repeated offences against environmental protection ordinances are not permitted to carry out further contracts in environmentally sensitive locations. This is only part of the general example that Government should set in reducing pollution in all its operations -from the control of tipping at reclamations and supervision of other works projects, to the maintenance of government vehicles and cleanliness of government buildings.

The Way Forward : Technical Assistance and Advice

7.13 The Government encourages initiatives by tertiary institutions who wish to expand their research and development work in the pollution control technology and waste reduction and recovery fields. It therefore strongly supports the Centre of Environmental

Technology for Industry which has been established at the City Polytechnic, in conjunction with the HKPC, and with financial assistance from the Hong Kong and Shanghai Bank. The Centre will demonstrate non-polluting treatment and recovery systems for industrial waste produced by industries, including textiles, electronics, metal finishing and food manufacturing, with particular emphasis on assisting small and medium-sized factories. These constitute 90 per cent of Hong Kong's industry, many operating in multi-storey buildings with severe space constraints.

7.14 There is a need to make the services similar to those provided by the Environment Division of the Hong Kong Productivity Council more readily available and accessible to small factories and workshops, at prices that the latter should be willing to pay. There is also a need for more long-term applied research in fields that would assist the development of waste reduction and pollution control technology that is suitable for Hong Kong. Government therefore intends to review the current level and mechanisms of support to industry with a view to determining whether arrangements can be made to :

- provide more training opportunities;
- increase the effectiveness of the dissemination of information on waste reduction and pollution control;
- reach out to more small factories and provide them with consultancy services at attractive rates; and
- undertake more and better long-term research and development in the clean technology, pollution control and waste recovery fields.

CHAPTER 8

ENVIRONMENTAL EDUCATION

8.1 It is not unusual for a community to start according some priority to the environment only after it has planned adequately for food, housing and other basic needs. Such is the case with Hong Kong. But times are changing. The community is now starting to accord some priority to the environment, though many are still ignorant and apathetic about it.

8.2 This situation must be reversed, because an environmentally aware and well informed public can contribute to achieving a better environment by the pressure it brings to bear on the administration, District Boards and the legislature.

8.3 An environmentally aware community is also more able to appreciate the contribution that it can itself make to protecting or improving the environment. Contributions range from individual members of the public simply showing consideration to their neighbours when watching TV, entertaining or playing mahjong, to engineers taking account in their designs of the adverse effects on the environment of roads, typhoon shelters and other projects; or developers appreciating the intractable problems they may create by promoting residential development in essentially industrial areas; or architects being alive to the scope for designing against noise in new commercial or residential complexes; or industrialists and farmers in ensuring their factories and farms include waste treatment facilities; or vehicle owners in maintaining their vehicles properly to reduce excessive smoke; and every member of the community in the fight against litter.

Overall Policy Objectives

8.4 The Government's overall objectives for environmental education are :-

- to make our community, including specific sectors of the community, aware of their responsibilities in creating and maintaining a healthy and pleasant environment;
- to encourage the development, through the formal education system, of a well informed, environmentally aware and responsible community;
- to make professionals concerned with development, and decision makers, more aware of the implications of their decisions on the environment and the health and welfare of our community.

Current Programmes

General Publicity and Information

8.5 Over the past few years the Government has run several publicity campaigns comprising poster, pamphlets, and television 'Announcements in the Public Interest', aimed at increasing public awareness of the problems caused by pollution or highlighting the way specific sectors of the community can make a contribution. For example, vehicle owners by better servicing of their vehicles to eliminate smoke emissions; and farmers by not discharging livestock wastes into New Territories streams. However this programme has been relatively low-key, and over the past five years only $400,000 has been spent on general environmental publicity, though much more has been spent on countryside conservation and the Municipal Councils' keep Hong Kong Clean Campaign, exhorting the public to 'pitch in'.

8.6 The World Environment Day (WED) programme has also helped to raise public awareness. Held annually on 5 June, but with programmes leading up to and beyond this date, activities have been coordinated by a sub-committee of the EPCOM, with a wide range of community groups and commercial concerns, schools and government departments contributing to a series of outdoor and media functions, reaching many hundreds of thousands. The main activities of 1989 include TV special shows, a photo exhibition, district tree-planting and clean-up activities, and a schools outdoor painting competition.

8.7 Information is also disseminated through:

- Interviews and talks by government staff to the media, school, colleges and community groups. EPD staff alone have given over 600 talks and interviews over the past two years.
- Codes of practice (asbestos wastes, polychlorinated biphenyls, chemical waste) and guidance notes on legislation-see para. 7.1.
- 'Environment Hong Kong 1989', an annual review of Hong Kong's environmental protection work.
- 'Green Productivity', a quarterly HKPC journal, which provides a direct channel of communication especially to small and medium-sized industries, on techniques and new developments in pollution control.

Environmental Education

8.8 Elements of environmental education permeate the curriculum through a number of subjects -Primary Science, Social Studies and Health Education at the primary level; and at the secondary level Social Studies, Economic and Public Affairs, Geography, Integrated Science, Biology, Human Biology, Physics, Chemistry and Religious Education. Students thus acquire an awareness of environmental issues at all levels.

8.9 Environmental education is also vigorously promoted in schools through various social service activities and the Community Youth Club scheme. Through direct participation in these activities students acquire a better understanding of the local environment and the importance of conservation.

8.10 Environmental education permeates the curricula of the four government-run colleges of education in much the same way as in schools. This is enhance by field trips and projects, which are undertaken by trained teachers to ensure an appropriate standard of professionalism in environmental education.

8.11 The Sai Kung Field Studies Centre, which organises residential and non-residential courses and seminars on ecology, pollution and conservation for sixth-form students and secondary school teachers, contributes significantly to the promotion of environmental education. Since its establishment in 1979, more than 12,000 students and 2,500 teachers have participated in its courses and seminars.

8.12 At the tertiary level a variety of courses on environmental subjects are available. These include diploma courses in acoustics, water pollution control and waste management at the Hong Kong Polytechnic, and a new MSc course in environmental management due to start in September 1989 at the Hong Kong University.

8.13 Other measures taken by the Education Department to promote environmental education include :

- the organisation of short refresher courses and seminars on environmental education for in-service teachers;
- the provision of financial support to teachers for designing and developing projects on environmental education through the school-based Curriculum Project Scheme; and
- the provision of funds to support the World Wide Fund for Nature, Hong Kong in organising visits for students to the Mai Po Wild Life Education Centre and Nature Reserve, and to assist other organisations providing environmental education activities for students from time to time.

8.14 The majority of technicians and professional people working in the environmental field obtained their original qualification in a conventional scientific or engineering discipline. They have become experienced and competent in the field through on-the-job training and in some cases by attendance at courses such as those referred to above. In this way they become able to make a contribution in depth.

Learned Societies and Voluntary Agencies

8.15 There are a number of learned societies and voluntary agencies in Hong Kong concerned with the conservation of natural resources, protection of the natural environment and pollution control, including the Environmental Division of the Hong Kong Institution of Engineers, the Institution of Water and Environmental Management, the Hong Kong Marine Biological Association, the Hong Kong Meteorological Society, the Royal Society of Health and others. They serve a valuable function in providing opportunities for the exchange of technical information in the field and the general development of expertise in environmental matters in Hong Kong.

Occasionally the Government has directly encouraged these activities through financial support, such as for the international environment conference 'POLMET 88', held in December 1988 and jointly sponsored by the Hong Kong Institution of Engineers and EPCOM.

8.16 Voluntary agencies, such as the World Wide Fund for Nature, the Conservancy Association, Friends of the Earth and Green Power, are all involved in raising environmental awareness amongst the community at large - through seminars, news sheets, competitions with an environmental theme, news conferences and general public comment on environmental issues.

Adequacy of Current Programmes

8.17 In very recent years there has been some increase in public awareness of environmental matters and in environmental education activities. The reasons for this include world awareness; the growing affluence of our society and increased expectations of the quality of life; a noticeable deterioration in environmental quality, for example at bathing beaches; and the various publicity programmes and media exposure. Nevertheless environmental awareness and the general appreciation of environmental issues in Hong Kong are still well below that in most developed countries.

The Way Forward

8.18 The Government therefore intends to expand general publicity work on environmental matters and a sum of $400,000 has been allocated for an Environmental Protection Campaign 1989/90. The campaign strategy is aimed at showing how different sectors of the community can participate in saving the environment.

8.19 In early 1990 a series of five films on environmental protection in Hong Kong will be released and made available to community groups, professional institutions and educational establishments. These films, to be made in both Cantonese and English, are being financed from a grant of $5 million from the Royal Hong Kong Jockey Club. They cover air, noise, water, waste management , and the environment in general.

8.20 The Government plans to establish in 1990/91 an environmental information resource centre in the urban area, which will contain a range of information materials, including copies of the Royal Hong Kong Jockey Club audio/visual packages, to be made available to community groups, professional institutions and educational establishments.

8.21 Environmental education will continue to be promoted in schools. In this connection the Curriculum Development Committee has recently proposed the introduction of a new subject in the school curriculum, Environmental Studies, at senior secondary level. The Hong Kong Examinations Authority is considering the viability

of this subject for the Hong Kong Certificate of Education examination, in the light of schools' response to the proposal.

8.22 It is expected that environmental education in schools, particularly at secondary level, will receive a boost from the planned development over the next few years of three new field studies centres, on Lantau, Cheung Chau and in the Tso Kwung Tam Park, to complement the only existing field study centre at Sai Kung. The Royal Hong Kong Jockey Club audio-visual packages, which will become available in 1990, will provide complementary material for many subjects in the school curricula.

8.23 The start in about 1993/94 of a first degree in Chemical Engineering at the new University of Science and Technology, will provide an important addition to degree subjects that are relevant to environmental protection work. Other courses on narrowly defined environmental protection and pollution control topics will be needed, but these will take the form of short and often one-off courses. The EPD plans to seek funds in 1990/91 for a full-time senior professional to promote and coordinate the organisation of such courses, inter alia.

8.24 It will be necessary in 1989/90 to define the relationships between Government and those environmental voluntary agencies which have a significant role to play in environmental education issues. Government should first set environmental education objectives, then ascertain how agencies could separately participate in achieving these objectives through designated schemes, funding for which should be explored.

CHAPTER 9

SUMMARY OF MAIN INITIATIVES

9.1 This Chapter summarises the main initiatives described in the White Paper. It will also serve as a checklist in assessing future progress against the planned target dates, achievement of which will depend on a number of factors, particularly the allocation of financial and staffing resources having regard to Government's overall policies and priorities, as well as the budgetary situation; and consultation with those affected, especially industry, and the Municipal Councils regarding initiatives under the draft Waste Disposal Plan. On attaining these initiatives, however, we can expect :

(a) an environmentally acceptable waste management programme for the foreseeable future;
(b) comprehensive and environmentally acceptable territory-wide schemes for sewage collection and disposal, lasting well into the 21st century;
(c) Hong Kong waters to be an asset for community use, in particular swimming and recreation;
(d) attainment of air quality objectives, with significant reductions in the risks to health;
(e) a general improvement in environmental conditions as a result of better planning;
(f) a more environmentally aware and well informed community geared to improving its environment; and last but not least;
(g) a quieter city.

9.2 The major initiatives are tabulated below :

Chapter	Target	Initiative
1.8	1989	Establish a Planning Environment and Land Branch, Drainage Services Department, and Planning Department.
1.10	1991	Submit review of progress on the White Paper to the Governor in Council.
Waste Management 2.29	1989	Submit a draft Waste Disposal Plan to the Governor in Council.
2.17	1989/90	Start construction of a Chemical Waste Treatment Centre.
2.37	1989/90	Investigate further measures to encourage increased recovery and recycling of waste.
2.15/16	1990	Commission Kowloon Bay Refuse Transfer

		Station (RTS); cease operating Jordan Valley landfill; and close down Lai Chi Kok incinerator.
2.15	1991	Commission WENT landfill
2.23	1991	Start a marine disposal scheme which disposes of waterworks sludges and some treated sewage sludges.
2.31	1991	Introduce chemical waste regulations.
2.15	1992	Commission Hong Kong Island East RTS.
2.15	1993/4	Commission NENT and SENT landfills.
Water Quality and Sewerage 3.20	1989	Complete the sewage strategy study, and decide on options for territory-wide disposal of waste-waters.
3.25	1989	Declare Water Control Zones at Port Shelter and Junk Bay.
3.23	1989/90	Start preparation of the Port Shelter Sewerage Master Plan; and Yuen Long/Kam Tin unsewered area.
3.26	1990	Submit to the Governor-in-Council a Water Pollution Control (Amendment) Bill, to achieve significant improvements to water quality throughout Hong Kong.
3.22	1990/91	Complete Sewerage Master Plans for unsewered areas in Tolo Harbour, Tsuen Wan/Kwai Chung/Tsing Yi, and North West Kowloon.
3.25	1990/91	Declare remaining Water Control Zones.
Air Quality 4.27	1989	Introduce legislative and administrative controls on ozone layer protection.
4.14	1989/90	Declare air control zones to cover the remaining parts of Hong Kong.
4.21/22	1989-92	Develop a strategy for controls on new vehicles including the fitting of catalytic converters; the introduction of lead-free petrol; more effective control over smoke emissions from vehicles; measures aimed at reducing reliance on diesel engined vehicles.
4.16	1990	Introduce regulations to prohibit generally the use of industrial fuel oil with a sulphur content greater than

		0.5% by weight.
4.18	1990	Introduce regulations to further reduce smoke emissions from chimneys.
Noise 5.17	1989	Fully implement the Noise Control Ordinance provisions covering noise from domestic, commercial and industrial premises, and construction noise, including daytime piling.
5.14	1990	Start second phase of programme providing insulation to schools badly affected by noise.
5.17	1990	Introduce regulations to provide control on noise generated by other construction activities, such as erection of form-work and rubble disposal; and noise from new road vehicles.
Compliance 7.14	1990	Review the current level and mechanisms of support to industry.

9.3 Progress on other initiatives not included above will also be monitored through the two yearly review, which will examine how far specific objectives are being achieved, for example air and water quality objectives.