

Environmental Carrying Capacities and Sustainability of the Refined Preferred Options

Chapter 19



CHAPTER NINETEEN
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REFINED PREFERRED OPTIONS

1. When the environmental baselines were profiled, at the commencement of the TDS Review, development thresholds were defined for each of the sub-regions. The findings of the baseline study were that development should be confined in the NWNT to a population equivalent of 600,000, in SENT to 435,000 and in SWNT to 260,000. Although these thresholds will be exceeded under the present forecasts, thereby implying that the development proposals may not be sustainable, the question of sustainability does not have a demarcation line at the territorial boundary and there are many external forces (a wide footprint for the environmental sphere of influence) which affect the concepts which are promulgated in connection with sustainability. The following paragraphs outline the concepts of the development strategies which have been considered and the inherent conflicts between conservation and development in an attempt to focus on ways to integrate the private and public policies for the future.

Carrying Capacities

2. Throughout this assessment the concept of carrying capacities and development thresholds has been implicitly considered. In many cases it is difficult to define the carrying capacity of a system as baseline data are often out of date. Notwithstanding this difficulty, an attempt has been made to define the carrying capacities of the individual air sheds through the air quality modelling process, the noise climate through the forecasting of changes in levels due to the development strategies in both the medium and long term. In addition to these, the existing and planned sewerage collection, treatment and disposal facilities have been examined in connection with the development proposals to determine the level of growth which can be sustained by these systems.

Air Quality Carrying Capacities

3. On the basis of the air quality model results, even with the pollution controls applied, the carrying capacities in Harbour ACZ are forecast to be under great stress from 2001 with a further deterioration as the increased traffic demands are reflected in the pollution levels for both Refined Preferred Options.
4. In Tuen Mun ACZ, the carrying capacity is forecast to be exceeded by 2006 for Scenario B and 2011 for Scenario A. In The Tsuen Wan/Kwai Chung ACZ, there is an improvement forecast under Scenario B in the period between 2006 and 2011 which can be assumed to be a reflection of the redistribution of the traffic on the road networks.
5. Considering the "realistic" industrial emissions forecast it has been forecast that in the Harbour ACZ, instead of these strategies being untenable in terms of SO₂, the ability of these ACZ to assimilate the emissions has increased for both of the Refined Preferred Options. In Tuen Mun ACZ, the industrial strategies are also sustainable if the development trends are maintained. In Tsuen Wan/Kwai Chung ACZ, the forecasts are for a steady increase in the industrial emissions, and thus air pollution, regardless of the year or Preferred Option being considered.
4. Notwithstanding the foregoing, the carrying capacity in the Harbour ACZ (where AQO's are exceeded at present) is currently stressed to the extent that the AQO's are frequently breached. Close attention will need to be given to detailing the outline designs and the layouts for new roads and industrial or residential developments to ensure all means of maximising the dispersion of air pollutants are considered.

5. To assist in the detailed planning/implementation processes for improving air quality and to provide reliable data for interpretation of the impacts of development, it is recommended that serious consideration is given to install air quality monitoring stations in Tuen Mun and on North Lantau to monitor the changes in air quality due to developments. In order to address the issues associated with increases in levels of dusts, it is recommended that a study should be carried out to quantify the nature and extent of this problem throughout the territory and to make recommendations for ways to minimise this source of air pollution. In concert with this, efforts should be made to develop a suite of territorial and possibly regional air pollution models. It is recommended that these should be developed to provide both global solutions as well as being able to be used in detailed and localised planning/engineering studies.

Noise Climate

6. If it is considered that the noise levels generated by road traffic and industrial activities are dominant noise sources (in general terms), by maintaining the volume of traffic (and traffic mix) throughout the territory, the strategic development proposals will be sustainable and will not exceed carrying capacities. The carrying capacities of the "system" are considered to be exceeded with traffic noise forecasts will be exceeded with ambient noise levels elevated by more than 1dB(A), representing a significant increase in the volume of traffic which could have a knock on effect in terms of air quality. However it must be stressed that the issues of carrying capacities and provision of sustainable development are particularly complex due to the multifarious variables which need to be considered. The nature of these issues, suggests that this intricate parameter should be developed through future studies.
7. Notwithstanding the foregoing, in view of the forecast increases in traffic volumes, particularly in hitherto rural areas and the road building programmes planned to accommodate the strategic developments, consideration will need to be given to ways to reduce ambient noise levels to make "Hong Kong a better place to live and work". Reductions in ambient noise levels are strongly recommended especially through the planning and implementation processes.

Water Quality

8. On the basis that the WQO's for many of the WCZ's are already exceeded on a number of occasions throughout the year, the forecast increases in pollution loadings will have a consequential impact on receiving waters unless adequate treatment is provided. The provision of appropriate levels of treatment depends on many factors including the receiving water quality, constraints on the water bodies (such as the zero discharge policies for Deep Bay and Tolo Harbour) in addition to costs. It is well recognised that any effluent can be treated to a very high standard but there are inherent constraints in terms of financial and land availability. One of the assumptions which was built into the TDS Review was to locate developments in areas which are currently sewered or which are included in the comprehensive SMP studies. Many developments were screened out at an early stage to accord with this fundamental assumption and although there are still some developments proposed for unsewered areas, the requirement to review these in detail in connection with the SMP's is clearly stated elsewhere in the text. In this connection development constraints are placed on SENT (to avoid incremental development in rural areas). As no new discharges are permitted to Deep Bay and Tolo Harbour WCZs, these are the areas of particular concern in terms of the disposal of effluent. In connection with the development proposals made herein, the Deep Bay Water Control Zone is the focus of attention for the protection of water quality. The forthcoming study on sewage collection, treatment and disposal for NWNT will address the issues raised herein.
9. To illustrate the point that the increase in forecast pollution loads could have implications in

terms of levels of treatment provided to attain the WQO's, the increase in pollution loads in Metro area were estimated to be 14% under Scenario A and 21% for Scenario B (between base growth and 2011). It should be noted that these loads will be incorporated in the SSDS Scheme. In NWNT, increases of 10% and 21% were forecast for Scenarios A and B respectively, and in NENT the commensurate increases were 6% and 20%. These two areas are particularly critical with respect to the zero discharge policy for Deep Bay (via the Shenzhen River) and collection, treatment and disposal options need to be considered both in the intra-territorial and regional context. In the NWNT and NENT, land constraints are not as great a problem as in others for example Metro area. In SWNT, land has also been reserved for the upgrading of the Siu Ho Wan sewage treatment works and the Islands SMP has made proposals for improving existing and planned future treatment works or collection systems. In SENT, the modest increases which were forecast reflects the controlled development planning strategy conceived for this area.

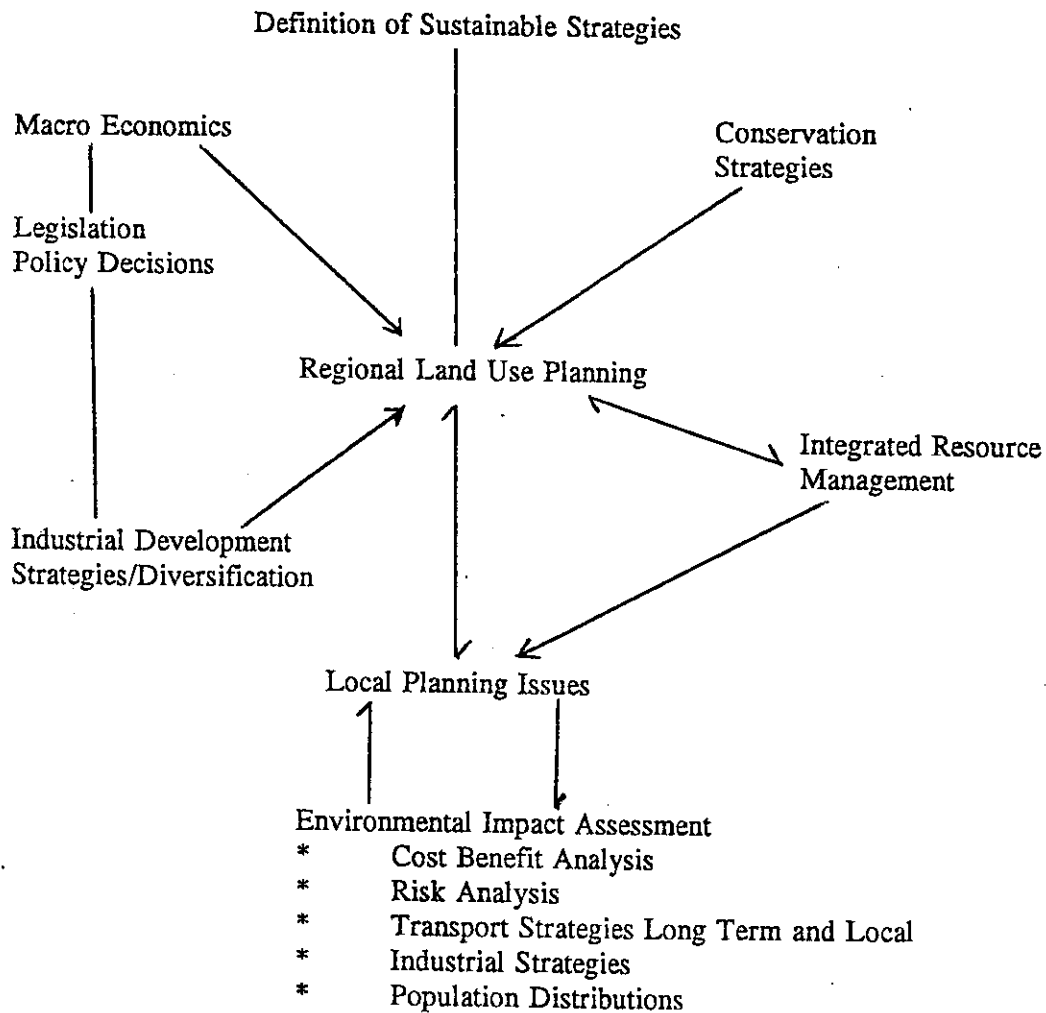
10. On the basis of these estimates it is shown that in relative terms the environmental costs associated with sustaining the development proposed for Scenario B will be considerably greater than that for A especially in SWNT. In each case it may be assumed that the carrying capacities are exceeded in each of the sub-regions in respect of pollution loadings discharged to the ultimate receiving waters.

Guidelines for Environmental Sustainability

11. One of the most important aspects of this assessment is not necessarily to provide all the answers in connection with sustainable development but rather to highlight potential areas where resolution of environmental issues with the cost benefits can be attributable to the project. Any areas of conflicting interests which are identified would need to be taken forward into the more detailed assessments. The concept of sustainable development promulgated by the United Nations Commission that "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" is the cornerstone of the development proposals made under the TDS.
12. Clearly Hong Kong's environmental "footprint" needs to be defined in order to perceive how sustainable development can be achieved. This concept was discussed by Professor Hill in an address to the Conference on Planning Hong Kong for the 21st Century in which he stressed that the footprint should be looked at both locally and in global terms. It is evident that environmental footprint will change as Hong Kong's relationship with the Guangdong Province develops and that the process of sustainable development will have to be constantly reappraised and reviewed. Notwithstanding this, a series of guidelines are formulated to ensure the components of the TDS Refined Preferred Options are considered in terms of their sustainability within the overall framework of the development proposals.
13. Multivariate criteria need to be developed as the concept of sustainability especially in the wider context cannot be examined as a single identity. Just as the air quality assessments examine the impacts of traffic and industrial developments, so they have to take account of the global and regional alterations in air quality. The increase of trade with China will bring both benefits and disbenefits which can be quantified in economic terms. It is also essential to ascribe an environmental cost to such developments to permit rational decisions to be made with all available information.
14. The overall guideline for environmental protection as well as sustainable development is the often cited precautionary principle. An environmental law has been promulgated by Costanza and Cornwell in 1992, in which they stated "rather than await certainty, regulators should act in anticipation of any potential environmental harm to prevent it". This is the overall aim of the Environmental Assessments of the TDS.

15. While many of the principles of sustainability appear to be onerous at project level, they can be screened out at a regional level, and through careful planning and forward thinking, these problems can be resolved at an early stage. Although not referred to in terms of sustainability, this has been the overall aim of the environmental assessment process developed in conjunction with EPD, and carried out for the TDS which has culminated in the latest round of environmental assessments of the Refined Preferred Options.
16. An evaluation process based on that promulgated by Sadler and Jacobs, which was considered for use in the TDS is illustrated below:

Evaluation Process of Sustainable Strategies used in TDS Review



17. It must be stressed that although issues herein are being considered at a macro scale, the fundamental issues and implications are perceived at a local level and thus both bottom up and top down analyses are essential. The criteria which were used to assess the Refined Preferred Options in terms of sustainability are given in Table 19.1.

Table 19.1 CRITERIA USED FOR ASSESSING THE PREFERRED OPTIONS IN TERMS OF SUSTAINABILITY

Parameter/Criteria	Application	Applicability in Terms of TDS
Population	No net increases over a given period of time	Increase of about 2 million under Scenario A and 2.5 million under Scenario B.
Greenhouse gases	No increases in road traffic or industrial developments.	Adopting a greener fuel/ generation technology will assist. Examples are the adoption of natural gas in the CLP's Black Point Power Station.
Acidification	Reduction in the use of fossil fuels to reduce acidification of soil by H ₂ S (more appropriate regionally rather than territorially).	Achieved through EPD's initiatives but not in the regional context.
Toxic material	No production of toxic materials or others which are non-biodegradable.	Could be achieved in the long term through waste minimisation measures
Soil Degradation	Avoid changes in land use, denudation of the land, avoid change of drainage regime (reduce siltation and avoid erosion of soils). This is intrinsically linked with the avoidance of the depletion of natural vegetative cover.	A fundamental aim of the TDS built into the basic strategy
Potable Water Supplies	Regulate population movement or industrial development in accordance with the supplies available.	Increase in population (2 and 2.5 million) integral to the two Refined Preferred Options.
Protection of natural aquatic ecosystems, freshwater, coastal and estuarine	Protection through developmental control and strategic planning	A basic tenet of TDS and incorporated into the development strategies.
Species/habitat extinction	Protection of natural habitats.	A basic tenet of TDS and incorporated into the development strategies.
Energy Intensity	Are the industrial and domestic consumption rates too high, could they be controlled through conservation strategies and incentives?	An aim of Government in general through energy conservation projects.
Renewable Energy Resources	In regional terms is there sufficient energy (renewable) to accommodate developments? Hydro electric schemes etc. may be considered.	Not applicable in Hong Kong.
Material Intensity	Are the industrial sectors manufacturing or service industries ? Fuel for transport strategies and materials for infrastructure and development ? Need to find external suppliers for building materials ?	Industrial strategies founded on the premise that the industries are high tech and basically service industry.

Parameter/Criteria	Application	Applicability in Terms of TDS
Transport Strategies	Do the proposals promote mass transit and public transport rather than individual car users or heavy goods vehicle usage on the roads? Promotion of rail usage rather than road?	Transport strategies formulated to encourage public transport and aim to locate jobs close to residential areas. Reduce the need to or frequency of travel.
Water Consumption	Population and industrial forecasts increases relate to increased consumption? Measures to save water not only through direct reduction in consumption at the tap but also by investing in repair, maintenance and upgrading of water supply systems which loose huge amounts of water daily (as well as coffers).	Increases in population forecasts will require increased water demand especially as the population becomes more affluent. Water intensive industries moving out of Hong Kong (but still exert demand in the catchment area)
Regional Food Production	Increased food resources as the population increases, self sufficiency important in dealing with the regional strategy, such as the abattoir at Sheung Shui.	Strategic locations for meat fowl and fish, fruit and vegetables from PRC, but other staple foods such as rice and flour not grown locally but imported.
Cultivation of land	Arable / agricultural lands to be retained/redeveloped where possible.	This is an inbuilt component of TDS agricultural/ conservation strategy.
Recreational Activities	Essential for the improvement of the quality of life.	The recreation strategy was inbuilt at the inception of the TDSR.
Promotion of Human Health	Provision of healthy living and working environment, need to consider inter alia the implications of noise, air quality, access to open space, adequate food and fresh water.	The promotion of improved living environment is an aim of the TDSR but needs further development through reduction in ambient noise levels and air pollution.
Protection of the Atmosphere	Through rationalisation of transport and industrial strategies.	This is an aim of the TDS but not achieved in the context of the Tuen Mun and Harbour ACZ's where the majority of the population live and work.
Protection of Urban environment	Through reduction in noise (traffic reduction, widening of streets, preventing cannon effect of no breaks in the long line of high buildings) and improvement of inner city air quality (reduction in traffic and industrial development, and increasing open space), urban renewal and regeneration (as promulgated under METROPLAN), promotion of environmental awareness of one's surroundings, environmental education for all.	These are basic objectives which need to be translated into policy issues at the detailed planning stage.
Promotion of sustainable consumption patterns	Includes reduction in solid waste generation, water consumption, use of disposable materials (adjustment of consumer behaviour) such as cans, plastic wrappers etc. without compromising health and safety.	This is a priority goal for the overall well being of the Region but is difficult to achieve in the short term.

18. To expand this concept of sustainability in connection with the development proposals under the TDS Review it is appropriate to examine the principal articles of Agenda 21 and review these in the context of the formulation of the Refined Preferred Options. Agenda 21 is given in Table 19.2 along with the ways in which these have been attempted to be integrated when formulating the development proposals.

Table 19.2 PRINCIPAL COMPONENTS OF AGENDA 21 AND THEIR APPLICATION IN THE GENERATION OF THE TDS OPTIONS

Principal Components of Agenda 21	Component Principles Already Integrated into the TDS
Make trade and environment mutually supportive; implement environmental measures while preserving free trade	A basic tenet of the TDS is to integrate land-use-transport and environmental components into the overall long and medium term strategies
Combat poverty to maintain sustainable livelihood for the population	Implicitly a principal aim of the TDS inasmuch as the objective is to maintain and create a high standard of living and working already enjoyed
Internalise environmental costs into the pricing mechanisms	Although not a TDS aim per se the Governmental principle of "the polluter pays" and the sewage costs and waste disposal costs which have been introduced are implicitly supported by the TDS
Promote sustainable consumption patterns	The trend based development strategy aims to produce a sustainable growth rate
Incorporate demographic trends in the analysis of environment and development issues	Environmental impacts to be fed back into the transport model to produce an improved and wholly integrated transport/environment/land-use strategy
Protect and promote human health	Provision of clean drinking water and an adequate supply of fresh food (not increasing the population forecasts above those which can be accommodated by basic needs); improvement of air quality by rationalising the industrial development, (which has already been included in the TDS process), minimising the industrial/residential and residential/transport interfaces; improvement in air quality through reduction in emissions, promotion of "clean industries", high technology corridors; improved recreational facilities through the inbuilt recreation strategy which was built into the TDS at the earliest stages of development;
Protect the atmosphere	Improvement of air quality through the reduction in emissions, the increased controls on the nature of industrial developments, the enhancement of high technology corridors and Science Parks; mechanisms to induce the expansion of public not private transport; enhancement of railway patronage rather than only roads
Promote environmental education	This is not within the remit of the TDS although the principle is strongly supported
Implement land-use planning for conservation strategy	Land use planning for conservation strategy was included in the Rural Land Use Study and the identification of potential sites for country park extensions. One of the first components of the TDS was to incorporate a conservation strategy into the development options. Protection was afforded to Country Parks, Agricultural lands and SSSI's.

Principal Components of Agenda 21	Component Principles Already Integrated into the TDS
Protect marine resources	Implicitly incorporated into the TDS through the adherence to all existing legislation. Development concepts which could have an adverse impact on existing tidal flow regimes have been screened out or development controls incorporated into the strategies (except the promulgated Route Y). Examples of this include the development control exerted on NENT (scattered low density developments were promulgated in the Hybrid Options) which should be protected from development in unsewered areas (receiving waters are Tolo Harbour which has had a vast injection of capital to remedy the errors of the past) or scattered development. Other controls have included the elimination of various proposals to span sensitive water bodies by bridge which could alter the flow and water quality characteristics
Protect the quality and supply of fresh water resources	Restriction of development in water gathering grounds has been incorporated in the TDS strategy formulation. The highly visible destruction of the hinterland catchments in the Pearl River Delta (to clear land for development) could have a serious consequence in terms of water supply to Hong Kong in the coming years.
Provide and environmentally sound management of solid wastes	The Waste Disposal Plan and the initiatives for the reduction of solid waste promulgated by EPD are supported in the TDS, and translated into the industrial development strategy through the types of industry proposed in the medium and long term
Participation by the business sector, industrial sector, trade unions, women and youth groups in achieving sustainable development should be encouraged	While not implicitly included in the strategy formulation the concept of, inter alia, business and industrial cooperation in the promotion of sustainable growth are of paramount significance
Strengthen the role of Non-Government Organisations in achieving sustainable development	This is fully supported and the primary target should be ensuring the full support of groups such as the ACE when undertaking the component studies, designs which comprise the TDS

19. The concepts outlined above are but the tip of the iceberg when considering the sustainability of the ultimate TDS strategy. To summarise, some of the issues which need to be resolved in connection with developing sustainable development strategies for the territory include:

- (a) integration of the policy issues within the Government, after all the living and working environment affects every individual;
- (b) review the advisory role of external auditors in connection with monitoring the development process, early involvement of advisory bodies in the development process would assist, with public awareness and perception of the impacts of development in a more informed manner (rather than emotive arguments);
- (c) Hong Kong has been at the forefront of many unique global developments and is a leader in the field of environmental planning, this position should not be undervalued or lost, as the monitoring of global trends (environmental as well as economic) is essential for maintaining the position in the worlds economy; and
- (d) the need to develop a long range vision of the future role of Hong Kong, and not focusing on the immediate issues, while ensuring the policies are robust and have enough flexibility to respond to any changes in both long and medium term.

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