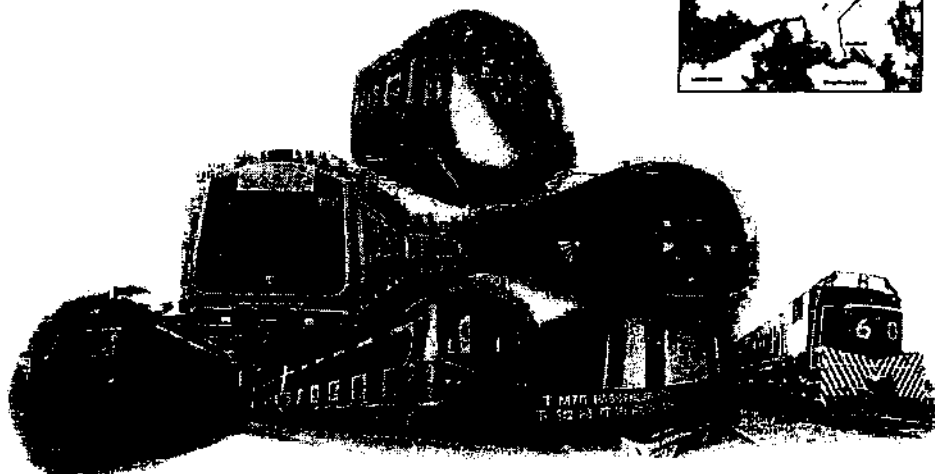
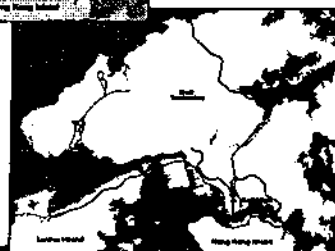
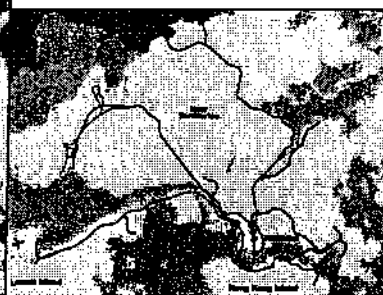
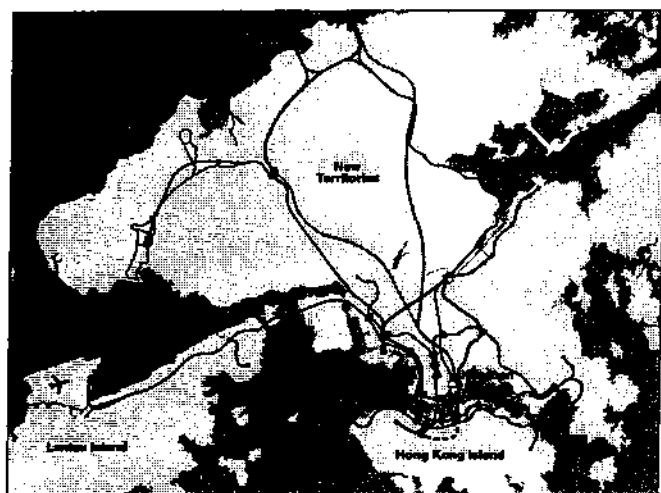


## *Review of Transport Planning Procedures in Hong Kong*



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### 3. REVIEW OF TRANSPORT PLANNING PROCEDURES IN HONG KONG

#### 3.1 Introduction

3.1.1 Historically Hong Kong has evolved land use and transportation systems that provide the potential for a sustainable transport system. This has been brought about by factors including:

- compact, high density residential and commercial development;
- high use of public transport, in particular the expanding railway network; and
- restraint in the growth of private vehicles through high licence charges, First Registration Tax, and expensive parking charges.

3.1.2 Despite the above, however, in recent years a number of shortcomings have become evident, and there has been a growing awareness of the need to find sustainable solutions. In particular, road traffic volumes have grown at a worrying pace, and the environment of the HKSAR has worsened with road traffic related pollution being one of the major concerns.

3.1.3 Both political and technical factors have contributed to this unwanted trend of worsening environmental conditions. Today the political environment and the public's awareness have changed and environmental concerns are now given a higher priority. For example, in 1997 the Government commissioned the SUSDEV 21 Study to develop technical procedures to enable decision-making to more effectively recognise the longer term implications of plans and actions. This important study will report in mid 2000 and will make recommendations for tools and institutional changes which will facilitate the incorporation of social and environmental factors into the government decision making process.

3.1.4 As discussed in Section 1, the Government has developed its HKSAR strategic planning principals within the Territory Development Strategy, MetroPlan and sub-regional studies. An important emphasis of these documents, and one which has been promoted by the PELB, is to pursue sustainable land use and transportation mechanisms, and to promote environmentally friendly modes.

3.1.5 In this context, and following completion of CTS-3, the Transport Bureau has published its Transport Strategy for Future Growth and places high priority on:

- improved integration of transport and land use planning;
- improved use of railways as the back-bone of our passenger transport system;
- improved public transport services and facilities;
- improved use of advanced technologies in transport management; and
- improved environmental protection.

3.1.6 RDS-2 is set firmly in this overall planning framework and the modal policy objectives clearly favour railway development and co-ordinated land use/railway (transport) development.

- 3.1.7 Notwithstanding the high level of commitment to railways, there are certain aspects of the planning and evaluation process which militate against the implementation of railways. These are a mix of technical and policy matters, and other fiscal measures, aimed at achieving logical policy objectives in their own right, but which are not supportive to rail. This chapter presents an overview of current transport planning procedures in the context of the RDS-2 Study and the evolving planning process.
- 3.1.8 The broad corridors within which new railways may be developed were established by identifying all the potential railway corridors (i.e. the initial comprehensive network), and rejecting those which were considered unfeasible or unacceptable (for example because they conflicted with absolute environmental constraints). Further details of this process are presented in Section 4. Having established these broad corridors RDS-2 Study undertook the following broad tasks:
1. development of a transport model incorporating assumptions on the future development of residential areas and employment areas as the basis for determining the potential transportation demand between various locations;
  2. preparation of forecasts of modal share of passenger journeys comprising rail and road-based forms of transportation such as private cars, taxis, public light buses and buses based on planning and transport policy assumptions adopted by Government studies;
  3. generation of passenger ridership figures for rail services within identified transportation corridors;
  4. development of engineering costs for indicative new railway alignments within the transportation corridors; and
  5. analysis of costs and benefits to determine the performance of specific new rail services against established project appraisal criteria.

#### *A Blueprint for the Future*

- 3.1.9 The establishment of the SEA as an integral part of the Study enabled the screening of rail proposals to avoid conflicts with the Hong Kong Government's stated strategic environmental objectives and provided a means by which environmental constraints, opportunities and objectives could be defined for the future development of identified new railways. An inherent assumption in the terms of reference for the SEA, and in the currently evolving debate on the future development of railways, is that a shift in emphasis is required in the HKSAR's approach to transport planning, such that the environmental advantages of railways, over road-based alternatives, may be maximised.
- 3.1.10 As part of the SEA Study, the SEA team prepared two Discussion Papers that have sought to examine the current system of assessing and approving road and rail schemes. These papers provided pointers as to how these systems might be modified such that the environmental and community benefits arising from the promotion of rail over road might be maximised.

3.1.11 The two Discussion Papers prepared by the SEA team addressed the following issues:

- Discussion Paper E5 provided an insight to alternative techniques for the economic appraisal of the environmental costs and benefits of new railways and mechanisms for incorporating such techniques into the Hong Kong project appraisal system. The full text of Discussion Paper E5 is provided as *Annex A* to this Report.
- Discussion Paper E10 undertook a comparative assessment of road and rail schemes and provided an analysis of the various environmental implications of the road-based and rail-based modes of transport. The full text of Discussion Paper E10 is provided as *Annex B* to this Report.

3.1.12 This section provides an overview of the analysis provided in the two Discussion Papers and indicates the means by which future rail development planning might be enhanced and extended in order to meet the Administration's current stated preference for rail over road. These concepts are introduced at this stage in the Final SEA Report as a means of illustrating the alternatives available in the assessment and appraisal of new railways. For this Study, the traditional approaches to transport planning have been used in the development of the conceptual corridors to a level of refinement whereby new railway infrastructure has been defined and selected. The output of this process, and the more limited SEA applied to this output, is reported in the remaining sections of the Report.

## 3.2 The Environmental Benefits of Railways

### *The Perceived Environmental Performance of Railways*

3.2.1 Although railways are often perceived as being "more environmentally friendly" than road-based forms of transportation, little research has been undertaken in Hong Kong or the Region on the quantifiable environmental benefits accruing from railways when compared with road systems. As a consequence, limited data is available on the tangible benefits that railways can provide in terms of minimising impacts to air quality, environmental noise, ecological, landscape and heritage resources and the reduction in risk faced by the travelling public.

3.2.2 In order to test these perceived advantages, the SEA Team undertook a series of technical reviews and comparative assessments, which provided an illustration of the environmental performance of railways versus road-based forms of transport. The findings of these reviews and assessments are summarised below; for a more detailed examination of these issues see *Annex B*.

### *Air Pollution Implications*

3.2.3 The predominant types of air pollutants generated by road and rail were reviewed and the different means by which the two transport modes are regulated and controlled with respect to their emissions was assessed.

- 3.2.4 Before reviewing the relative level of emissions that are generated by the different modes, it is worthy of note that there is a key difference between the two modes, with respect to the implications for air pollution. This relates to the source of emission and the extent to which such emissions are diluted by dispersion. Road vehicle emissions have a direct impact on the local air quality conditions given their point of emission discharge at street level. By comparison the point of discharge for electric rail systems is the electricity provider's power station, where emissions are more effectively controlled (through emission from relatively high stacks) and are, therefore, typically regarded as influencing regional air quality and contributing to, rather than causing, urban air quality conditions. It should also be noted that a substantial proportion of Hong Kong electricity is currently generated by nuclear power (eg from Daya Bay). This means of electricity generation has zero air pollution emissions, and, in principle, it could be possible to operate an electric rail system from zero emission power generation plant. However, it should also be noted that such a means of electricity generation poses some as yet unresolved solid waste challenges.
- 3.2.5 The SEA Team reviewed the ability to regulate and control emissions from both road and rail transport modes. Clearly, the effective control of emissions from a wide ranging and large vehicle fleet is more problematic than the control of a discrete emission point source such as a power station. The disparity is brought into focus by the current difference in methods used to achieve regulation in each case; random emissions checking of diesel vehicles, augmented by voluntary assistance from the community (smokey vehicle spotters) in the case of road vehicles compared with the real-time information which the EPD is able to access from the newest of Hong Kong's four operating power stations.
- 3.2.6 The Consultants also undertook a comparison of the total emissions from road and rail sources based on pollutant "efficiency" or emissions on a per passenger per kilometre-travelled basis as the most appropriate unit of comparison. The emissions comparison, which was based on robust historical data for the year 1997, indicated that rail transport is generally more efficient than road transport in terms of the analysed air pollutants of NO<sub>x</sub>, RSP and CO<sub>2</sub>. It was demonstrated that weighted average NO<sub>x</sub> emissions from road transport are approximately 2.5 times greater than rail, RSP emissions from road are about 10 times greater than rail and CO<sub>2</sub> emissions from road could be up to two times greater than rail. (Further details of the breakdown of emissions by mode of transport are provided in Table 3.1 of Annex B).
- 3.2.7 Of the three pollutants studied, RSP stands out particularly as showing the greatest disparity between road and rail modes, even with the assumption that vehicular trafficked dust, or paved road dust, (comprising the particulates that are not generated from the tailpipe but consist of silt on the road being 'stirred up' and suspended by the wheels of the vehicle and mechanical turbulence in a vehicle wake), and which is expected to be a major source of RSP, has not been included. RSP is particularly prevalent in Hong Kong, as indicated by a long-term exceedance of the annual average Air Pollution Control Ordinance (APCO) requirements, and its control presents a serious challenge for the future air quality in Hong Kong. The comparative assessment clearly illustrated that the provision and promotion of rail has an important role to play in the curtailment of existing air quality problems. However, the analysis also identified the need for an integrated solution that is strategic and cross-sectoral in approach; an approach focussed solely on one mode or a single sector is unlikely to provide the potential, long-term improvements to Hong Kong's air quality.

- 3.2.8 Consideration of the potential cumulative air quality 'benefits' that may be gained from the implementation of the rail networks developed by RDS-2 are presented in Section 8.
- 3.2.9 Potential air quality 'benefits' brought about by reductions in air quality emissions are likely to have economic benefits. These potential economic benefits could be related to:
- reductions in the cost of treating (both real and perceived) health effects (particularly affecting people suffering from heart and respiratory health problems, the very young and the very old), and/or reductions in the amount of 'sick leave' taken by affected members of the working population;
  - reductions in costs associated with repairing/preventing the degradation of building materials (due principally to attack from acids). However, due to the building materials used in Hong Kong this is not considered to be a major area of concern;
  - increase in property values resulting from a "cleaner", and therefore more "desirable" living environment;
  - reductions in costs of damage to agricultural crops and/or loss of agricultural productivity;
  - potential increase in tourism due to a higher willingness of tourists to visit/return to Hong Kong;
  - potential increase in the willingness of businesses to locate in Hong Kong; and
  - reduction in the potential, and therefore cost, of shipping accidents due to poor visibility.
- 3.2.10 Whilst the above points provide an overview of the economic benefits that could potentially be accrued from improvements in air quality brought about by a modal shift from road based transportation to rail, the actual monetisation of these benefits is a complex issue that is outside of the scope of the SEA. This issue is, however, an area that warrants further analysis.

#### *Noise Control Implications*

- 3.2.11 The review of the residential noise criteria for road and rail traffic which operate in Hong Kong concluded that these are not consistent in terms of stringency, and that the rail noise criteria at residential resources are more stringent than those for road traffic.
- 3.2.12 Internationally, the review also demonstrated that people generally find rail noise to be less intrusive than road noise.
- 3.2.13 The more stringent noise performance criteria that are applied to railways have direct implications to railway operators. In particular, the rail noise criteria form an absolute performance standard that must be met through the provision of direct (at-source) mitigation measures without the recourse for using in-direct methods (such as acoustic glazing) that could be permitted to control road noise. This requirement can have implications on the financial feasibility of new (above-ground) railways and the travel costs to rail passengers. It should be noted that the cost of providing the mitigation measures for railways must be borne by the rail operator whereas, the costs associated

with the attenuation of road noise (to less stringent requirements) are borne by the wider Hong Kong community via Government funding of the road building and maintenance programmes. Such inequities act as a restraint to encouraging the transportation of passengers and freight by rail in favour of road transport. (However, it is understood that there have been discussions between the railway companies and the Government on the funding responsibility for costs associated with the attenuation of rail noise at source).

- 3.2.14 As a result of railway operators complying with more stringent noise performance criteria than are required for roads, there is, with the implementation of the proposed rail network, the potential for a relatively greater proportion of the population to experience lower levels of noise. As well as the obvious environmental benefits of this, there are potentially economic benefits that can also be accrued. These include:
- lower potential for land/property prices to be depreciated and/or land 'sterilised' due to elevated noise levels; and
  - reductions in the cost of treating (both real and perceived) health effects (including mental health effects) brought about by exposure to elevated noise levels.

#### *Landtake Implications*

- 3.2.15 A review was undertaken of the landuse efficiency of road and rail transport infrastructure. The comparison demonstrated that rail infrastructure is less land consuming and that this inevitably reduces the potential destruction of environmental resources, which are located on the land surface.
- 3.2.16 The greater landtake requirements of highways have commensurably greater impacts upon ecological, landscape and heritage resources and on the ability of project proponents to effectively mitigate predicted impacts.
- 3.2.17 In addition to the greater direct loss of land, the greater noise and air quality impacts associated with operational highways (see Sections 4 and 3 respectively of Annex B) act as a constraint to the developability and uses to which land alongside the highway may be put. For example, due to the more stringent noise criteria for railways, the set-back or buffer distances that are likely to be required between a railway and sensitive landuses (such as residential housing) will be less than for an equivalent capacity highway. Thus there is a lower potential for railways to 'sterilise' land.
- 3.2.18 It was concluded, therefore, that the landtake requirements of railway developments provide greater opportunities to manage the allocation of land in a sustainable manner, particularly in the context of Hong Kong's limited available land area.
- 3.2.19 The implementation of railways, with their reduced landtake requirements compared to similar capacity roads, can also be considered as providing potential economic benefits. These include reductions in the costs of compensating or re-provisioning the loss of land with high ecological or landscape value.

*Risks Faced by the Travelling Public*

- 3.2.20 The risk evaluation conducted confirmed the widely-held perception that rail travel offers significantly reduced levels of risk for the travelling public compared with road transport. This conclusion was based on historical accident data for Hong Kong. For new railway developments, rail operators are demanding still lower levels of risk to be achieved and quantitative risk assessments have shown that it is possible to achieve a lower level of risk than for the existing railways. The provision of platform screen doors (PSD) for new railways and the desire for retrospective fitment to busier stations along the current operating railway network is also expected to further reduce risks in respect of falls onto the track.
- 3.2.21 In respect of risks due to transportation of Dangerous Goods, it was concluded that, in general, no clear distinction can be made on a risk basis between the safety of transporting dangerous goods by rail and/or road. Any such comparison would have to be undertaken based on specific details of defined routes and dangerous goods.
- 3.2.22 In respect of the risks posed by external sources of hazards, for the majority of Hong Kong's Potentially Hazardous Installations (PHIs), rail development is generally preferred to road development, with the proviso that stations, and any station-related development, are located outside the Consultation Zone of the PHIs. This preference for rail arises because the travelling public is generally better protected from external hazards when within a rail car than within a road vehicle.

*A Summary of the Environmental Benefits of Railways*

- 3.2.23 The perception of railways as providing substantial environmental benefits over road based forms of transportation, has been supported by the research and analysis undertaken by the SEA Team.
- 3.2.24 The SEA Study Team undertook legislative reviews of the air quality and operational noise criteria for road and rail transport as well as technical assessments regarding the comparative air quality implications of using these different transport modes. These reviews provided a means of comparing the pollution efficiency of each form of transport. The results of the legislative review for operational noise concluded that in Hong Kong, railways are more stringently regulated than roads. The technical assessments conducted support the existing position that railway developments generate less pollution than roadways, and that in terms of control over the resulting noise and air emissions, railways are more easily managed and offer advantages through more strict and enforceable regulations.
- 3.2.25 The review of landuse efficiency of road and rail transport infrastructure demonstrated that rail infrastructure is less consuming of land. This inevitably reduces the potential impacts to environmental resources and the conclusion is made, not unsurprisingly, that within such constraints as Hong Kong's limited available land area, that railway developments are considered a more environmentally sustainable form of transport.
- 3.2.26 A review of the potential risks of serious injury and fatality when travelling by road as opposed to rail concluded that the risks associated with rail travel are significantly lower than that posed by road. The data supporting this conclusion is presented in Annex B, however, it has been determined that, for travel in Hong Kong, the individual risk of travelling by road is 270 times greater than travelling by rail.



- 3.2.27 The findings of the technical reviews and the identification of the environmental benefits accruing from railway developments is an important element in the overall environmental justification for the development of additional railway infrastructure in Hong Kong.

### 3.3 Choosing Rail over Road

#### *The Appraisal of Transport Projects*

- 3.3.1 Given the demonstrable environmental advantages that arise from the development of new railways in preference to new roads, a review of the approaches that have traditionally been employed in Hong Kong for the appraisal of highway and railway projects has indicated that there appears to be a number of differences in appraisal which seem to favour road construction.
- 3.3.2 At the strategic transport planning level, CTS-3 looked into the economic return of strategic highway projects. At the implementation stage, highway projects are normally funded out of the Public Works Programme (PWP) and "bid" for funding based on need and transport performance. Occasionally, projects are considered for privatisation such as harbour crossings or tunnels if they can be shown to be financially viable. If not, they are included for prioritisation in the PWP as Government infrastructure projects.
- 3.3.3 Railways are subjected to economic appraisal which takes into account the capital and operating costs and benefits to all affected users. Railway projects are also subjected to financial appraisal, initially to be funded from fare revenue. The guidance of operating railways under prudent commercial principles can often present a financial hurdle to potential rail projects when the financial returns from the projects do not meet set criteria. The Government will need to provide support to less viable railway projects if the perception of promoting the environmentally friendly rail mode of transport is to be realised.

#### *Economic Evaluation*

- 3.3.4 Within a comprehensive framework such as that used in RDS-2 or CTS-3, the evaluation process applied to proposed road and rail schemes includes mainly transport variables. However, in the wider context, the appraisal systems being used at the present time militate against rail investment because environmental factors are omitted from the quantifiable framework that is currently being used. An example of this relates to 'air quality benefits'. However, before the methodology for the assessment of these factors is fully established, they can only be estimated in rough orders. Nevertheless, the earlier discussion clearly demonstrates that railways are more efficient in terms of their emissions of NO<sub>x</sub>, RSP and CO<sub>2</sub>. These lower emissions could have an effect on Hong Kong's overall air quality and thereby provide 'benefits' in terms of reduced impacts to health, reduced damage to crops/agriculture and possibly even influence Hong Kong's attractiveness to tourist or businesses considering locating in Hong Kong. However, under the current evaluation systems that are being used, such environmental benefits are not considered, and as such, railways are being "undersold" in the evaluation. The inclusion of a wider economic appraisal, and in particular consideration of the environmental benefits, would allow a more holistic assessment of the proposed developments to be undertaken, and thereby provide decision makers with useful information to assist in the project selection process,

minimise the negative environmental consequences that can be associated with transport provision, and assist with achieving broader environmental/sustainable policy goals.

#### *Financial Evaluation*

- 3.3.5 The financial evaluation of railways provides an assessment of the project internal rate of return from fare revenues, initially with no financial support from Government. The railway costs cover all infrastructure and recurrent costs.
- 3.3.6 As the principle road based mode of public transport, the bus operators pay no taxes for road usage, fuel, or first registration. Therefore bus operators only have to cover vehicle supply and operations maintenance and depot costs and in effect have free "track" or infrastructure. This enables bus operators to hold down fares and capture a large market share. This meets a policy objective of promoting public transport, although it reduces rail patronage and revenues and worsens the railway financial position.
- 3.3.7 On the other hand, major railway projects are treated as public sector investment. Government flexibly seeks ways to implement railways through equity injections, property development rights, and supportive public works. Railways are funded from the Capital Investment Fund which has different criteria in its application than the Capital Works Reserve Fund for PWP.
- 3.3.8 While a full-scale critique of the alternative approaches to evaluation, and the potential impact of these, is outside the scope of this study, it should be noted that the two approaches do give different results, (further details are presented in Annex A). It is therefore important that the differences in evaluation approach do not militate against good railway schemes.
- 3.3.9 Given the discussion above, it is suggested that, when considering railway proposals, greater emphasis should be placed on the potential environmental benefits. The overall adverse environmental impacts of railway developments are far less than those of roads. Coupled with the community benefits that can be demonstrated to be provided by railway projects and the Administration's desire to adopt more sustainable approaches to the future development of Hong Kong, placing emphasis and giving priority to railway projects would serve to fulfil a basic tenet of this philosophy. Including environmental and potential community benefits in the economic evaluation of railway projects would further enhance their economic returns. This will help to justify the investment in the new railway projects and their early implementation, hence meeting the Administration's goals of expanding the rail network and improving the environmental (and in particular air quality) conditions in Hong Kong.

### **3.4 The Need for Sustainable Solutions**

- 3.4.1 Having reviewed the findings of the RDS-2 discussion papers which sought to address some of the economic and environmental disparities in the planning and operation of railways and roads in Hong Kong, this section draws some conclusions on the implications of these constraints in terms of a sustainable transport framework for the Territory.

3.4.2 As with definitions of sustainable development generally, attempts to define the key attributes of sustainable transportation systems have provided a wide range of interpretations and policy objectives. In broad terms, definitions of sustainable transportation systems have converged around a number of common objectives associated with:

- reducing the environmental impacts associated with the development of transport infrastructure (e.g. land use and habitat loss, disruption to existing communities, etc.);
- minimising the environmental impacts associated with the operation of new transportation systems (e.g. air pollution, excessive noise, etc.);
- maximising the social and economic benefits that improved accessibility can provide to the fulfilment of broader economic development objectives, and
- improving the environmental performance of the existing transportation system.

#### *Current Barriers to Sustainable Transport*

3.4.3 Hong Kong is approaching a critical stage in its social, economic and environmental development. *Hong Kong 1999* states that close to 1,000,000 people are exposed to a road traffic noise level higher than the minimum acceptable standard outlined in the Hong Kong Planning Standards and Guidelines and that this makes traffic noise one of the most pervasive forms of pollution in the Territory. Similarly, Hong Kong's deteriorating air quality conditions have recently been highlighted in the international media and have caused public health concerns for local residents as well as for international visitors and foreign investors. Clearly, air quality and noise are two fundamental environmental concerns that must be tackled in the near future to bring about relief to the public and provide an environmental quality which will support the growth and development of Hong Kong into the next millennium.

3.4.4 A series of technical reviews and institutional and legislative assessments were undertaken as part of the SEA of RDS-2. The technical assessments have demonstrated that the environmental benefits attributable to rail transport (safety to the travelling public, air quality and noise emissions) clearly outweigh those of road transport. In theory, therefore, the development of railway infrastructure, as the main thrust of future transportation initiatives, would form a robust basis for best meeting Hong Kong's transport needs whilst providing long-term sustainable solutions to the Territory's environmental challenges. However in practice, to receive these benefits in full, the Administration needs to both ensure a balanced and equitable approach to the appraisal and approval of new rail infrastructure, and actively promote alternatives to road-based forms of transportation.

3.4.5 In particular, whilst respecting the "prudent commercial principle" set for railway operation, the SEA Study Team has investigated the disparity in the financial and economic criteria by which railway and highway infrastructure are judged and has noted that for railways, the criteria should be reviewed.

- 3.4.6 The introduction of competition between modes of transport is generally desirable because of benefits it is perceived to provide in terms of lower fares. However, due to the fundamental differences in the infrastructure financing criteria applied to roads and to railways inter-modal competition is not currently undertaken on a "level playing field". Furthermore, evidence from the RDS-2 patronage forecasting studies indicate that the proliferation of Hong Kong's road-based public transport services is in fact eroding the potential benefits of the existing rail services, as the lower fares that road-based services charge draws potential passengers from the rail network. Whilst the operation of low-cost road-based public transport services may be desirable from the consumers' point of view, a farsighted strategic approach to Hong Kong's current environmental challenges would involve harnessing the benefits that both modes can offer with services which are structured to complement rather than compete (unfairly) with each other.
- 3.4.7 An additional point which deserves further attention (and which is related to the issues identified above) is the detrimental effect that the "true-cost" fare structure, imposed on rail services only, has on the achievement of modal shifts from road to rail. The advantages to Hong Kong of achieving such a modal shift are considerable and range from the improvement of environmental conditions to the increase in the life span of existing road infrastructure that would be achieved through a reduction in road traffic.
- 3.4.8 In Hong Kong, rail links are retrospectively introduced into urban areas where a roadway network has been established often for long periods of time. As mentioned above, the "prudent commercial principle" provides railway operators with little flexibility to lower their fares in order to attract greater patronage and thereby encourage and enhance potential modal shifts. Another aspect of this situation is how rail transport can better meet community needs. Current levels of service by both railway operators are superior to the reliability and frequency of road transport alternatives, although the increasing levels of comfort and direct "door-to-door" service provided by bus and minibus services (and by private cars and taxis) will ensure that these forms of transport are an essential complement to an expanded rail network.
- 3.4.9 The logical extension of the Administration's stated aim of giving preference to rail transportation will be changes to the objectives and guidelines applied to new residential and commercial developments, so as to ensure that the future development of Hong Kong is not structured towards a reliance upon road transport. By way of encouraging examples, there are already a number of existing, and planned, residential and commercial centres that have maximised the efficient and convenient service provided by railways. Examples of residential estates include those at Kowloon Bay, Tai Koo Shing and Laguna City at Lam Tin, whilst Hong Kong's premium shopping centres, such as Pacific Place, Festival Walk, Times Square and the Princes Building, have each been developed with rail service provision as an integral component. These examples of rail-led or rail-integrated developments provide a range of proven development concepts that could, and should, provide the basis for the next generation of new town developments including the proposed new residential areas within South-East Kowloon and the north east and north west of the New Territories. Such an approach could also provide alternatives to the new road infrastructure that each of the current Planning & Development Studies are proposing.

- 3.4.10 The incorporation of a preference for rail would also ensure that priority is given to improving the level of convenience that rail offers through the development of systems and mechanisms for moving passengers to and from station ingress and egress points perhaps by dedicated trolley buses, light rail systems or extended walkways (eg accelerated moving walkways). In such a manner, while road infrastructure would still need to be provided in and around new developments, the magnitude of the infrastructure required could be considerably lessened. At a more detailed level, the improvement in accessibility to rail services could be complemented by the provision of active incentives to encourage residents and visitors to use the rail system.
- 3.4.11 In summary, therefore, it can be seen that the traditional approaches to the planning of transport and land use development, the setting of strategic economic objectives and the general framework for the provision of social and community needs whilst generally supportive, could be significantly enhanced in the development of sustainable transportation strategies. Property values and an increasingly service-led economy have predominated in influencing the criteria for strategic decision-making with correspondingly less regard for the consequent environmental and social disbenefits of this approach. Despite very high public transport patronage, private car ownership continues to increase and the traditional response has been to cater for more car use, with attendant problems of poor air quality, concerns about health and inconvenience for other road users and pedestrians.
- 3.4.12 However, there are a number of initiatives and recent developments which, when coupled with the Administration's recent declaration for preference to be given to rail-based transportation provision, provide a basis for moving toward a transportation strategy for Hong Kong that is both sustainable and environmentally beneficial. The broad framework within which a move towards sustainability might be achieved is examined below.

#### *A Sustainable Transport Planning Framework*

- 3.4.13 Sustainable development implies a strategic and holistic approach to the planning of future development, infrastructure and services and one which takes account of the interdependence between economic, social and environmental considerations. A sustainable approach to transport planning would need to accommodate these objectives and should deliver efficient, accessible and reasonably priced transport services, which minimise environmental impact.
- 3.4.14 The CTS-3 report concluded that, compared to 1997, there was likely to be an increase in number of non-compliances with the air quality objectives in 2016 even with after the implementation of the most stringent vehicle emission control measures. This prediction is due to the significance increase in vehicle numbers and movements that are predicted to accommodate the anticipated population growth in Hong Kong, and that offset the emission reduction achieved by control measures. As such, it would seem that measures should be implemented to try and reduce the amount of road traffic, without inhibiting the mobility of the population. Additions to the railway systems would appear to be an important means of achieving this objective.

- 3.4.15 It is now well documented that Hong Kong is witnessing significant undesirable economic and social effects arising from the deterioration of the physical environment. Much of this environmental impact can be attributed to transport operations. Piecemeal solutions and technical fixes in response to such problems will not provide a long term sustainable approach - the newest technologies and detailed environmental impact studies do not necessarily translate into a sustainable approach. Instead, transport planning needs to be applied in a strategic and co-ordinated manner across the principal modes and with co-operation between infrastructure providers and service operators whether in the public or private sector.
- 3.4.16 This approach certainly poses a challenge for Hong Kong where development patterns and services have traditionally followed a 'predict-and-provide' approach particularly for road development.
- 3.4.17 Nevertheless, there is an increasing recognition in Hong Kong, both at grassroots and governmental levels, that sustainable development is a critical goal in the future development of the Territory. Studies such as SUSDEV21 are beginning to signal the need for better cross-sectoral decision making and planning among the many government departments, and a similar approach is required for transport planning.
- 3.4.18 Sustainable planning will require institutional barriers to 'joined-up' decision making to be overcome and a shift in attitudes amongst those professions that have a role in forward planning so as to avoid the narrow perspectives of the past. This latter point is of particular importance as the responsibility for transport planning management and operation is currently shared amongst governmental, quasi-public sector and private sector organisations.
- 3.4.19 Crucially, however, because of the nature of the transport problems discussed in this report, a sustainable approach to transport planning is likely to involve measures to curb and discourage road use. Such measures, which may include demand management and pricing systems, may prove politically and culturally unpalatable at present and will require high levels of political skill in order that the long-term benefits are promoted over the short-term resistance to change. If sustainability implies increased travel by environmentally efficient means (i.e. mass public transport) then it will be necessary to increase the already high proportion of passengers using public transport and, in particular, rail.
- 3.4.20 The pursuit of sustainability for urban transport systems will require a fully integrated planning process with input from landuse and transport planners, engineers, environmental professionals, economists and decision makers such that the full range of methods which can be used to influence passenger travel and demand can be harnessed and measures complementary to the sustainability objectives systematically provided across all levels of the community. Sustainable solutions will also require appropriate measures to be identified through a strategic approach which recognises that ultimately a balance between the competing needs of the community; the economy, society and the environment must be found in order to be acceptable.

3.4.21 Such solutions cannot be achieved unilaterally and require a partnership approach between transport planners, infrastructure providers and operators. For solutions to be truly sustainable, co-operation and agreement of the wider community and the plethora of transport users, providers and operator groups will be a crucial prerequisite. Many city authorities, wary of the economic consequences of driving businesses to competing centres have fought shy of implementing more radical measures. However, the economic consequences of worsening delays from traffic congestion, inefficient transport systems and the increasingly persistent environmental and social impacts of unrestrained transport make a sustainable approach all the more pressing in Hong Kong.

### 3.5 Summary and Conclusions

3.5.1 In this Section, the Consultants have reviewed current approaches used to determine the need for new railway infrastructure and have highlighted the limitations that exist for strategic environmental and sustainable development principles to be applied to the existing transport planning approach.

3.5.2 The Strategic Environmental Assessment Study, in addition to contributing to the development of the proposed RDS-2 rail networks, has identified a number of opportunities for enhancing the mechanism that enables the environmental benefits of new railways to be maximised. These may be summarised as follows:

- Increased emphasis on economic appraisal techniques to enable the environmental costs and benefits of new railways to form part of the project appraisal system for new railways. The formal acknowledgement of the environmental and community benefits that accrue from new railways will enable the justification of new beneficial railway infrastructure. The concepts and techniques associated with the economic appraisal of new railways are examined, at length, in Discussion Paper E5 which is presented at *Annex A*.
- In parallel to the introduction of the economic appraisal of environmental costs and benefits of new railways is the recommendation that similar techniques, measures and criteria are applied, in a standardised fashion, to both road and rail projects. With appropriate weighting applied to the incorporation of environmental costs and benefits into the decision making process, not only would the environmental benefits of railways be highlighted, but the true cost of the environmental impact of roads would also receive appropriate consideration.
- The technical and legislative review of the environmental performance of rail and road transport has highlighted a number of inequities in the environmental performance requirements imposed on road and rail schemes. Performance criteria should be standardised. In practice, this would involve, for example, the application of equitable noise criteria for roads and railways.
- Similarly, existing standards should be enforced. Railways currently receive higher levels of scrutiny in the control of environmental performance than do individual road users or road transportation operators.

- In combination with the expansion of the railway system, it is recommended that opportunities to extend the levels of restraint on road traffic are investigated and implemented as appropriate (e.g. increased pedestrianisation, greater use of bus lanes etc.) and that the development of integrated land use/transport systems are pursued in order to promote environmentally acceptable /sustainable transportation built around railways.
- The actions taken in support of the Administration's commitment to giving preference to rail need to be effectively explained and promoted to the general public. Some short-term resistance to change is inevitable, although with skilful communication and concerted promotion the longer term benefits to the community, and the environment that supports it, will be self-evident.

3.5.3 The adoption of the above and similar measures would provide significant a contribution to the future development of sustainable transportation systems.