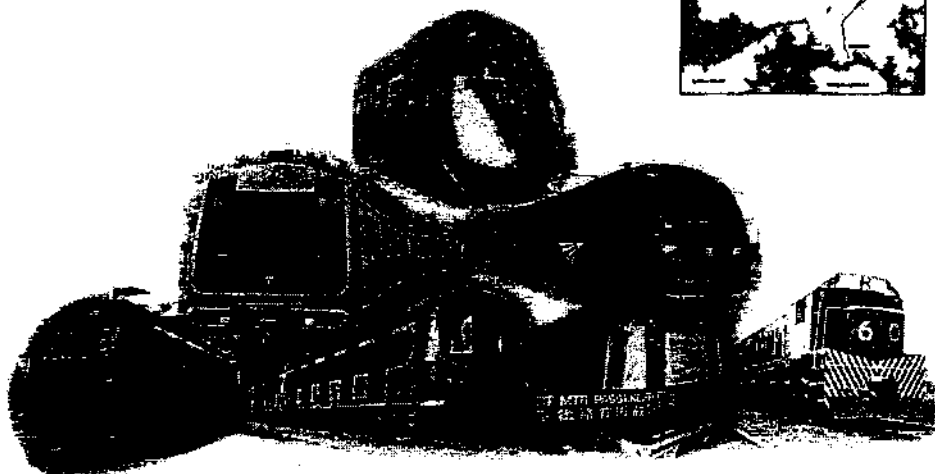
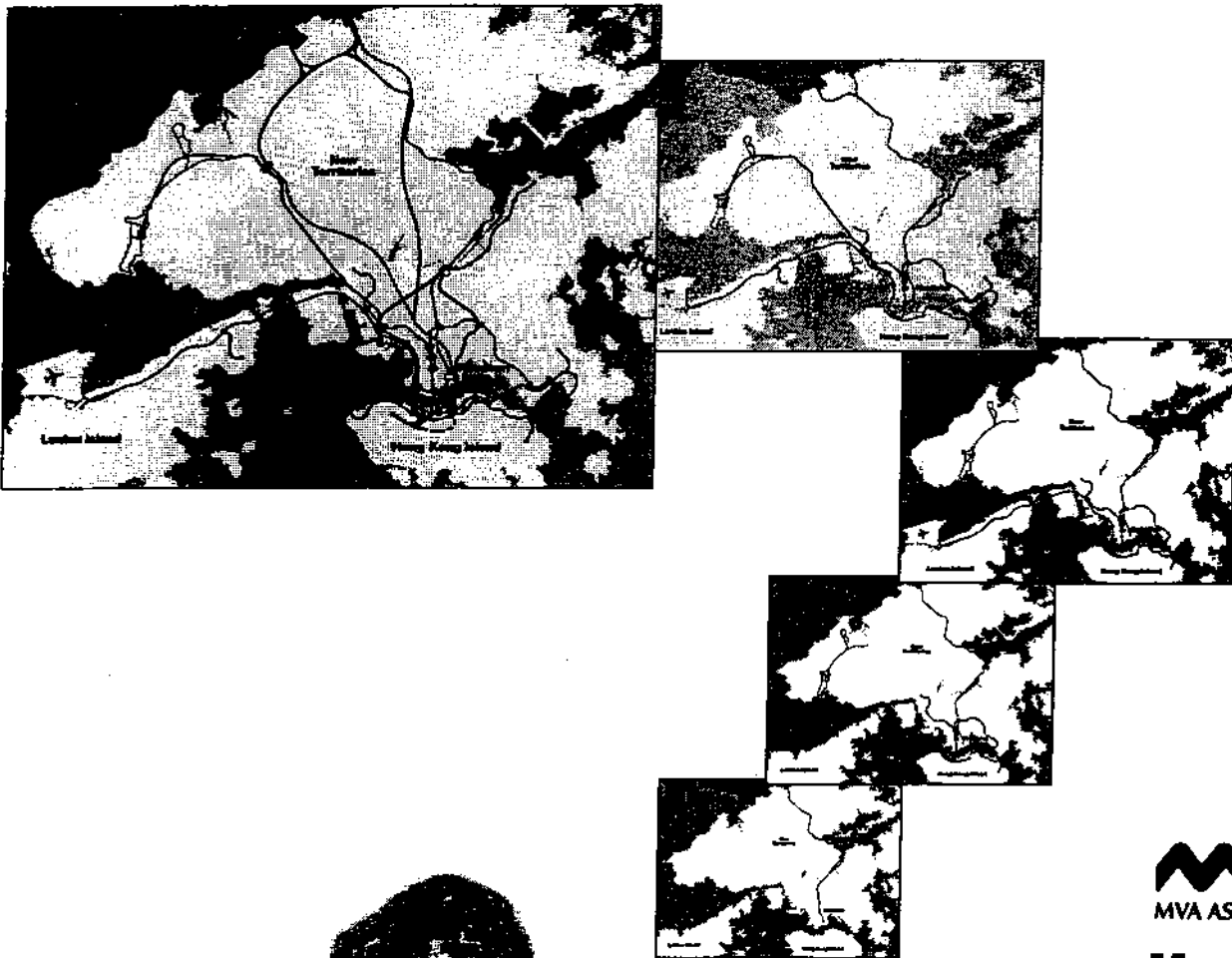


Conclusions and Recommendations



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10. CONCLUSIONS AND RECOMMENDATIONS

- 10.1 The work undertaken by the SEA Team throughout each stage of RDS-2 has contributed to the development of the proposed railway development network expansion plans. During Stage 1, the SEA Team identified environmental resources protected by statute and "sieved" the initial comprehensive rail network against these "absolute constraints". A number of alignment corridors were rejected on environmental grounds, and this process provided a means by which the remaining potential railway corridors could be initially vetted in an environmental sense. Further work and input into the Top Down and Bottom Up approaches to the main study continued during the subsequent stages of the study, with a view to identifying an environmentally preferred railway network expansion plan.
- 10.2 The rail development options that were developed during Stages 2 of the study were all very similar, based around the same component schemes and differing only in relation to the option for the Fourth Harbour Crossing. The main differences related to the phasing of the implementation of the schemes and the assumed operators of the lines.
- 10.3 Since the schemes within each of the proposed rail development options were the same, the corridor evaluation work carried out during Stage 2, (which assumed broad development corridors of 1km width) was, at this level of assessment, unable to find significant environmental differences between the three proposed network development options. As the majority of the corridors considered were assumed to comprise predominantly underground railways, the strategic (operational) environmental impacts are significantly reduced from equivalent above-ground options.
- 10.4 In addition to the corridor assessments undertaken at Stage 2, an investigation was also undertaken into the potential air quality benefits that could be accrued from each of the proposed rail development options in comparison to road based alternatives.
- 10.5 The assessment of the air quality and GHG "benefits" was based upon the patronage projections for each rail development option, and the assumption that, without their implementation, the patronage captured by the rail networks would be transported instead by road vehicles. Whilst confirming that road based emissions were greater than rail, the assessment found similar potential environmental benefits offered by the networks as the projected patronage figures were similar for each option. The results did however, verify that the greatest emissions savings could, potentially, be accrued from the network with the greatest patronage capture figures. This highlights the notion that patronage led network development may also result in an environmentally preferred rail development option.
- 10.6 Whilst the intention of the Stage 2 SEA work was to assist in the determination of a preferred railway development option, this did not prove possible to the extent originally envisaged since the options proved to be very similar. It was thus concluded that all of the options could be considered, from a strategic stand-point, as being "environmentally accommodating", and none was considered as representing a single "environmentally preferred" railway development option.

- 10.7 During Stage 3, the rail development options were further refined into two basic network expansion options; reflecting a regional and an urban emphasis. Whilst both options contained the same Component Schemes, they differed with regard to the FHC option. The Urban options had the East Kowloon Line providing the connection between Kowloon and Hong Kong Island, whilst in the Regional options this link was provided by East Rail. Each set of options also had two options on Hong Kong Island, either running to Central West via Exhibition and Admiralty, or to Central West via Victoria Park and Hong Kong Park. These alternatives resulted in a total of six network expansion options.
- 10.8 Environmental assessments were undertaken for each of the Component and Stand Alone Schemes included within the network options. As the schemes in each of the options were predominantly underground, it was determined that each of the Component Schemes was, at the strategic level, environmentally acceptable, and none were expected to give rise to insurmountable environmental impacts. The assessment also concluded that it was not warranted to nominate a single network option as being "environmentally preferred".
- 10.9 In addition to the assessment of the Component and Stand Alone Schemes, the SEA also considered the predicted cumulative environmental impacts that would result from implementing the rail network expansion plans. Key findings of this aspect of the work included the assessment of potential air quality implications. It was predicted that, in the year 2016, (and based on the major network assumptions used in the CTS-3 medium scenario) reductions in road based journeys brought about by the expanded network could result in reductions in the ranges of 565-676 tonnes/annum for NO_x, 50-61 tonnes/annum for RSP and 152,000-181,000 for CO₂. (These benefits are about 30-40% higher than for the Component Schemes only). These predictions were based on modelled transport data and NO_x and RSP emission factors obtained from the EPD's vehicle emission group for the year 2011 (which assumed, for example, that taxis would be using LPG, and that all new imported vehicles would be to EURO III standard).
- 10.10 An assessment of the cumulative ecological implications of the above ground schemes found that 4.42 ha of natural woodland, 2.7 ha of other wetlands (including marsh areas) and 21.3 ha of inland water (including fishponds) may be affected. In line with best practice, measures should be taken during the rail development process to avoid or minimise the potential ecological impacts.
- 10.11 Although no insurmountable environmental impacts were identified during the strategic assessments of the Component and Stand Alone Schemes, each of the schemes was considered to have the potential to give rise to environmental impacts. To ensure that these potential impacts are carried forward and addressed throughout each scheme's development process, recommendations have been made in relation to the mechanism for achieving this. For each impact related to each scheme, recommendations have been made as to the future work that should be undertaken to address and avoid/minimise the magnitude of the impact at future stages of the development process. In addition to the scope of the work required and its assumed timing, broad recommendations have been made in relation to the agents who are envisaged to undertake this further work.
- 10.12 As well as assisting in the development of the proposed rail network, the SEA undertook separate, but related studies, into the environmental benefits that could be accrued from choosing rail over road based forms of transportation, and into the economic appraisal of the environmental costs and benefits of new railways.

- 10.13 These studies clearly demonstrated the environmental advantages of adopting rail over road. However, the studies also highlighted that discrepancies exist in the road and rail appraisal processes, and that these discrepancies, to a certain extent, present a hurdle for the development of new railways. It was recommended that if the full environmental benefits of adopting rail are to be accrued, the discrepancies in the appraisal system should be removed whilst measures complementary to the use of rail must also be jointly implemented. In order to aid the Administration's stated objectives of giving preference to rail over road and of developing a sustainable transportation system, recommendation has been made to place more emphasis on the environmental benefits of railways over roads in the project appraisal procedures.
- 10.14 In summary, the SEA played an important role in the development of the proposed rail network and clearly established the environmental benefits that could be accrued from promoting rail in preference to road; highlighting that roadside air quality benefits could be accrued from the implementation of the network development options.
- 10.15 With the majority of the schemes proposed to be constructed underground, the potential for environmental impacts has been greatly reduced and no insurmountable environmental problems are anticipated from the construction or operation of the rail network expansion proposals.
- 10.16 The Environmental Performance Indicators (EPIs) that were developed during the SEA study to assist in the selection of preferred rail schemes were not used to the extent originally envisaged. This was mainly because the study did not develop any significant "alignment" options where it was considered that they could be used for their intended purpose (i.e. to assess one option against another). Nevertheless, it is considered that the work done in developing the EPIs provides useful information and a mechanism that could be used in future rail related SEA projects. It is therefore recommended that the work undertaken in this area is retained with a view to developing and using it during future strategic studies.
- 10.17 The SEA clearly demonstrated that rail is a more 'environmentally friendly' form of mass transportation than road based alternatives, and that the promotion of rail would assist in achieving the Administration's stated objectives of developing a sustainable transportation system.