

Development of Tuen Mun New Town, Hong Kong

D. R. Butler and R. A. McKittrick

G. B. O'Rorke *Former Director of New Territories Development, Hong Kong*

I should like to say a few words to place the Tuen Mun New Town development in the context of the new towns in Hong Kong as a whole. There are actually eight new towns under construction at the present time. In addition to those shown on Fig. 1, one is a town at Junk Bay, now known as Tseung Kwan O, east of Kowloon. The first two of three phases are under way and should be completed by the end of the century; the population is expected to be 440 000. Also, north-west of Yuen Long, work has started on Tin Shui Wai, with a first phase for some 130 000 people. However, site formation has started for a bigger area of some 400 hectares, using marine fill from the sea and what is reputedly the second largest suction dredger in the world.

92. In § 5, reference is made to the fact that 70% of the housing in the town is planned as public housing; this figure is higher than for other new towns, where 60% would be the normal range. In fact, public housing leads the new town programmes, which arise from the continuing need for acceptable housing at affordable rents. The Government of Hong Kong has had to take the lead in financing such projects rather than leaving it to the private sector, which is more susceptible to changes in market conditions. In the new towns as a whole, about 100 000 people per year have been accommodated for several years at a cost of approximately £300 million per annum, and land has been identified for development well into the next century. This has been made possible because of the favourable political will in Hong Kong and because, fortunately, resources have been available.

93. Reference is made in § 4 to the aim for a balanced development in the towns, and this is maintained as far as possible as development proceeds. However, the emphasis on public housing leads inevitably, in the early stages, to a good deal of commuting between each new town and the existing urban areas in Kowloon and Hong Kong for work and many social services. As can be seen from Fig. 1, Tuen Mun is more remote than most of the towns, and it is probably fair to say, therefore, that there was a slower take-up by the private sector. Nevertheless, the town is very popular now and can be regarded as being successful.

94. In §§ 37–40, reference is made to borrow areas. I think it might be added that, wherever possible, platforms are formed in the borrow areas and used for development to supplement that on the reclamation areas.

95. In § 26, it is stated that granite is the basic bedrock on the east side of the Bay and volcanic rock on the west side. Granite occurs in much of the development areas in Hong Kong and generally provides good conditions for site formation. The soft material of decomposed granite may be some 50 m deep, providing

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the fill for reclamations, and, as it is a good sandy soil, it does not have too many stability problems. There is, however, less experience with the volcanic rock which is found, for instance, in the hill on the west side of Castle Peak Bay. Could the Authors say something about their experience of the stability of the excavations in this material?

F. E. Short *Retired Director of Engineering Development, Hong Kong*

I think it is worthwhile to underline the important role of the multidisciplinary project management teams set up by Government to push forward the new towns.

97. The new town development programmes, which the project managers updated annually and which provided a rolling ten-year programme of physical and social development, took account of practical and economic constraints. The works progress committee and its clearance subcommittee also played an important role in progressing the engineering works.

P. H. Gray, *G. Maunsell & Partners*

In regard to managing and programming a Hong Kong new town in the face of a moving target, reference was made to the use of a computer-based critical path programming technique. Maunsell Consultants Asia was involved in more of the new town work towards the east of Hong Kong New Territories. We thought about it hard and decided that we could not keep up, on the computer, with what was changing so rapidly in reality. Perhaps the Authors could say how successful they were in using their critical path.

99. It is appropriate to record the key role of the District Officers and their staff—responsible for land management, for liaison with the local communities and with experts advising on the important aspects of ‘fung shui’. They were in a very difficult position. I can remember works progress committee meetings where, in one breath, the District Officer would say, ‘We are awfully sorry, we have a fung shui problem with making land available for engineering works’, and in the next breath he would say, ‘But we need the land serviced, and ready for rehousing, as soon as possible’. That illustrates one of the key issues of the complex programming of a new town, particularly in the early stages, when cleared and serviced land was in such short supply as to limit the scope for flexibility and innovation in its management.

100. The Hong Kong Government should be complimented on setting up the multidisciplinary new town teams within the New Territories Development Department, an idea which spread into other parts of Hong Kong and led to the setting up of the Territory Development Department.

W. R. Kemp, *Scott Wilson Kirkpatrick*

I spent seven years from 1976 to 1983 working closely with the Authors on the Tuen Mun development.

102. The original concept of Tuen Mun was of a phased development, with housing, industry and social facilities being developed in parallel. This concept was clearly shown in the programmes in the Stage II Report in 1976. Inevitably, the original programmes were disrupted, principally by various financial constraints, and replanning and reprogramming were required. In what significant ways did the final order of development differ from that originally envisaged and what lessons were learnt from these changes? For example, it was important to develop

the transport infrastructure before housing and industrial development was started.

103. I am currently involved with an urban development corporation in Britain, and one of the critical issues in the planning is the relocation of residents and businesses from the areas to be developed. I believe a key element in the success of new town development in Hong Kong was the availability of temporary housing and, to a lesser extent, temporary industrial areas. Would the Authors comment further on the role of such areas in the development, especially in regard to programme?

104. The pace in the early years of development (1975–78) required the installation of roads on fresh reclamation, the roads in some cases even being constructed under the same contract as the reclamation. In order to cater for the expected major early settlement of the reclamation, a series of cheap, temporary roads were installed with a project life of three years. These consisted of 70 mm of asphaltic concrete wearing course laid over 180 mm of wet mix macadam. This highly flexible form of construction adapted itself well to the reclamation settlement profile, and lasted, with minor patching only, for some five years. Then, following practical completion of reclamation settlement, the permanent road construction was installed.

105. Reverting to the original concept of balanced development, the Authors are no doubt concerned that there are still 400 000 journeys per day in and out of Tuen Mun from a population of only 330 000.

J. F. Lindsay, *Retired Partner, Scott Wilson Kirkpatrick*

In § 14 of the Paper, reference is made to the fact that although the crest level of the breakwater and the seawalls was recommended to be 6.4 m above principal datum, a lower level was adopted to tolerate a significant amount of overtopping in extreme conditions. Have any extreme conditions been experienced and if so has there been any significant overtopping?

107. In § 73, the reason is given for the relocating the ferry pier from what I always thought was the ideal position in the centre of the town to the sea front. Has there been any significant effect on ferry movements—firstly, because the ferry pier is in a more remote location and, secondly, because it is in a much more exposed situation?

R. G. Mabbitt, *Partner, The Conservation Practice*

I was with the project manager's office from 1980 to 1983, working alongside the Scott Wilson Kirkpatrick engineers, and it was certainly a project being undertaken at a very fast pace. For instance, by the time I left there were 70 000 people living in one of the areas I was responsible for planning, which had been under water when I arrived. However, the cost of this fast-track planning design and development was that we did not have the luxury we would have liked: the time to reconsider, to reassess and to replan a number of the major components of the plan, and we were stuck with certain fixed elements. An example of this is the main road running through the heart of the town. I am sure that if we had the opportunity of starting again we would look for a way of taking the traffic out of the centre of the town.

109. There was also a great deal of discussion at the time about the light rail system and whether it should be fully grade-separated, not grade-separated at all,

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or partially grade-separated, as I understand it now is. If the Authors were able to turn the clock back 20 years and had the chance of doing it again, what would they do differently and what lessons have been learned from the mistakes that were made in Tuen Mun?

A. Mellon, *Lemrer McGovern International*

Did the market orientation of the UK Government ever have an effect on the public housing policy of the Hong Kong Government and, if so, what effect?

111. Could the Authors expand on the management role of the consultants in relation to the client, the Hong Kong Government, the architects, the contractors, and also on any interrelationships with the private sector developers?

112. In the Docklands area of London, a number of restrictions have been placed on the contractors working in the area adjacent to the Docklands Light Railway. What kind of restrictions were placed by LRT on the development in Hong Kong?

113. In my previous experience of major reclamation in Japan, at the airport in Yokohama Bay, extensive use was made of sand drain and sand compaction methods to facilitate the settlement. Could the Authors say whether such methods were used on this project?

P. Vernon, *Mott MacDonald*

The Authors mentioned that their figures of projected population growth were increasing drastically and that the government at one time thought the figure would go up to one million. Do they think that the population was curtailed as a result of natural reasons, or perhaps because of these seventh, eighth and ninth new towns, which are helping to stabilize Tuen Mun at the present half-a-million?

115. Secondly, the Authors mentioned the daily 400 000 people trips. Are these trips in the immediate locality of Tuen Mun, or are they between Tuen Mun and Kowloon and the mainland? If the former is the case, would not taxis have played a very big role and not only the LRT and the buses as stated by the Authors? If the movement is between Tuen Mun and downtown Kowloon and Hong Kong Island, is there now a case for extending the LRT, or the Metro from the other direction, to cater for that large transportation need?

P. H. Gray, *G. Maunsell & Partners*

I should like to come back to the point about planning and community standards, because I think it is fair to observe that the planning of these towns began many years ago, when the population predictions, the desirable housing standards, the aspiration of the population and the feasible standards of provision were what they were then, rather than what are accepted today. The actual crude standards of people per hectare have improved significantly over time. Allied to that, the programme was already a few years old before new environmental quality aspects were incorporated. The reclamation work was well under way before it was decided to initiate a landscape study.

117. In the Sha Tin context, the initial study was based on a projected population of one million. However, changes to both the predictions of total Hong Kong population and the space standards led the Government to conclude ini-

tially that this figure was too high. Therefore, we did a study for half-a-million and then increased the figure slightly. I think the population is now about 800 000, or it will be some time early in the next century, and will eventually exceed one million, but on a larger area of development and with higher environmental standards.

118. There was a question about what the Government project managers were doing. The consulting engineer's client in each town was the New Town Development Office: this office had its own group of clients within other Government departments—housing, health, education, urban services, fire services, etc. Added to that was the dimension of the private sector with its own programme, which was slightly different perhaps from that of Government. The balancing of the programming, planning architectural and engineering input to the required output in several dimensions was one important role of each project manager and his office.

119. The involvement of the private sector also led to exciting developments. In Sha Tin, the private sector was involved not only in housing and industry: Sha Tin had a benefit in terms of greenery and space, although a disbenefit in terms of the core problem of land for housing, by having a huge privately sponsored racecourse in it. I think it is a commentary on the programming process and an indicator of its success, and of the co-operation between Government and the private sector that, after some four years' reclamation and development of the site, the first race began only two minutes late, on a date declared years in advance.

120. With reference to the question of what should have been done beforehand, I would suggest to the Authors that, in view of the significant demands for new housing, in terms of quantity and of quality, it might have been tempting to have attempted more pre-planning. However, because of the constantly changing standards and priorities, I do not think it would have significantly changed the quality of what was done—it would just have delayed it.

121. I make one political comment: one important aspect which made it possible to achieve what was done in Hong Kong was that the one-tier government allowed decisions to be taken rapidly, using a simple consultation and co-ordination framework.

Mr Butler and Mr McKittrick

Mr O'Rorke will be interested to learn that there is now a ninth new town, announced by the Governor of Hong Kong in October 1989, as part of the replacement airport package.

123. Although balanced developments were aimed for, there is more travelling to and from all of Hong Kong's new towns than was originally envisaged. These new towns were developed very much in the style of the postware British new towns where experience has been similar, namely that however far they are located from the other centres, they have become more like commuter towns than was originally hoped. Currently there are about 400 000 daily people trips to and from Tuen Mun for a current population of about 350 000. Many of these are children and workers attending school and work outside Tuen Mun; some are those travelling into Tuen Mun to work.

124. *Mr O'Rorke* also asked about the possible problems with volcanic materials. It is correct that the western side of the valley at Tuen Mun is composed of relatively fine grained volcanic material. There were stability problems in borrow areas formed in this material. The prime objective of these areas was to create fill for the reclamation, but the secondary and very important objective was

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to use them as part of the development, including for public housing. One borrow area is still causing some trouble and has not yet been developed, but it is hoped that the problems will be solved in due course. Otherwise, there have been no particular difficulties with the stability of slopes in Tuen Mun.

125. *Mr Short* quite properly elaborated on the lead role played by the Government management teams specially established for the development of the new towns. The Government role was clearly the key one in the development of this and the other new towns. The role of the consultants was to look after the technical side.

126. *Mr Gray* asked how much success there was in the use of critical path programming techniques. In the event, the moving target moved so fast that it was not possible to use the critical path successfully. The Government produced annual development programmes which evolved through discussions at the inter-departmental works progress meetings. Fundamental factors, such as changes in the economy, affected the development. Because of land problems and the needs of other projects, the requirements for fill materials changed quite radically.

127. The District Officer played a crucial role in the development of Tuen Mun, especially during its early stages. The ways in which the District Officer was able to influence and direct matters in the New Territories are interestingly described by Austin Coates in his book *Myself a Mandarin*. Temporary housing was provided for those displaced by the development and for whom no permanent housing was yet available; a basic water supply, a concrete floor slab, timber columns and a roof were provided. The tenants, with the aid of cash grants dispensed by the District Officer, built the remainder of their houses.

128. The multidisciplinary teams were a very interesting phenomenon and they worked well. At the start of the development there were planners, engineers and administrators; then, as things developed, foresters with experience of reforestation, many from Australia, came in. The architects' departments supplied staff with additional skills.

129. The order in which the town was developed was very different from that originally envisaged, for reasons which included those mentioned by *Mr Kemp*. A flexible approach, guided by clear and practicable policies, is essential when one is dealing with the relocation of so many people. Adequate housing, services, social amenities, educational facilities, employment and public transport must be provided in advance of demand. The Authors agree that temporary housing and work places are essential where a community is being replaced by a development of the nature and scale of Tuen Mun.

130. Tuen Mun has not, in the event, been as balanced a development as originally planned. There were many reasons for this but the most important one was the impossibility of imposing a particular population mix. Older people resisted moving from the old established but congested urban areas, and hence Tuen Mun's population is an especially young one. The population is also unevenly distributed: in 1988, those aged 5–9 numbered 42 000, those 15–19 numbered 13 000 and those 30–34 numbered 35 000. Such numbers create a very rapidly changing demand; for example, for kindergartens, primary and secondary schools, and tertiary education. The balance will improve gradually as the community matures.

131. Because, for reason of economy, the marine mud was normally left under the reclamation, there was as much as 2 m of surface settlement. By careful design, relative settlement was generally not great. Ideally, time was allowed before roads

were constructed but often this was not possible. The temporary light pavements referred to by *Mr Kemp* proved successful and economical.

132. In reply to *Mr Lindsay*, the seawalls and breakwater have performed as designed, although extreme wave conditions have not been met since they were constructed. Water overtopping during extreme conditions should flow away, as the ground surface has been shaped with falls towards the main water courses.

133. In our view, it was a mistake to relocate the ferry pier from the town centre to the sea front. This was at the insistence of the ferry operators and it has clearly had an effect on ferry patronage (only 8000 of the current 400 000 external passenger trips are by ferry) as well as on the planning of Tuen Mun's transport system. The exposed position of the pier has had no significant effect on ferry operations.

134. In reply to *Mr Mabbitt*, we consider that the concept of taking what was planned as a primary road through the town centre was excellent. What is wrong is the failure to construct the bypass planned for the trunk road and its through traffic; this causes continuous distress in the town centre which will not be satisfactory until the bypass is built.

135. We would have liked to have dealt in some better way with the problem of planning in relation to the distribution of population, but would otherwise not have wished to have changed any of the fundamentals of the new town.

136. Light rail transit (LRT) is at its best when at street level because there it is most convenient for the travelling public and also least expensive. (Less cost means lower fares which mean more patronage and less road traffic.) Recent work by Scott Wilson Kirkpatrick on LRTs in Nottingham and Sheffield confirm this. The majority of the LRT in Tuen Mun is on an exclusive public right of way which runs either at the side of the road or, occasionally, in the centre of the road. Only two short sections run in the street. A few at-grade junctions in Tuen Mun have in practice proved very complex and would have been better had they been grade separated. There have been few accidents and their frequency has decreased with increased public awareness and familiarity with the system. In our view, the fundamentals of the system could not have been bettered at Tuen Mun.

137. In reply to *Mr Mellon*, the policies of the United Kingdom Government have had no bearing on those of the Hong Kong Government. *Mr O'Rorke* explained the reasons for the high level of public housing in the initial new town developments. However, there is a move towards private ownership, the Government providing an increased range of housing with varying levels of support and subsidy.

138. The management role of the consultants was mainly to support the client who had the prime responsibility for the management of the project. It was also to manage the engineering and related construction for the new town and to interface with both public and private building development.

139. Strict restrictions have been placed on working close to the LRT lines since operations started. However, as most of the line-side construction had already taken place before the LRT started operating, the restrictions have had little effect on the development.

140. Various methods of accelerating consolidation of the reclamation were used where appropriate; these included surcharging, sand drains and deep compaction. Generally, the effect of settlement was minimized by design.

141. In reply to *Mr Vernon*, the intention of the earlier planning studies was to see what population could be accommodated in the space which could be achieved

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at Tuen Mun. After considering all possible new town sites, the population for each new town was optimized and about 500 000 was determined for Tuen Mun.

142. The 400 000 daily trips are external trips of which taxis serve a small proportion; taxis serve a greater proportion of internal trips. Scott Wilson Kirkpatrick have undertaken studies for the extension of the LRT system to the older urban areas for which there is a good case.

143. The views expressed by *Mr Gray* are a very good summary of the discussion and we would concur with them, particularly with those on the essential role of the project manager.