



White Paper

## Effective Airport Master Plans

*By Rob Rushmer, ICF*

Anyone who has worked at a few airports has probably had cause to ask something along the lines of "who on earth thought building that there was a good idea?"

For many airports, especially for the vast majority that are smaller than the relatively large few, there can be pressing business reasons for making a swift decision to capture an immediate opportunity. The concession owner, inevitably, has a fixed horizon with planning and investment decisions that must make financial sense within that timescale, rather than what might be optimum over the extended long term. The smaller airport may also lack a depth of planning experience, and management can be left somewhat exposed to an eventually regretted decision.

In time, those decisions can come back to bite, and not all large airports are free from examples of inappropriate planning either. By contrast, well-planned airports are notable for their evident infrastructural logic, their ability to respond to their inevitably changing marketplace, and a portfolio of flexible developments that can be brought forward to best match those changing conditions. It comes down to how well the airport has been planned: its master plan.

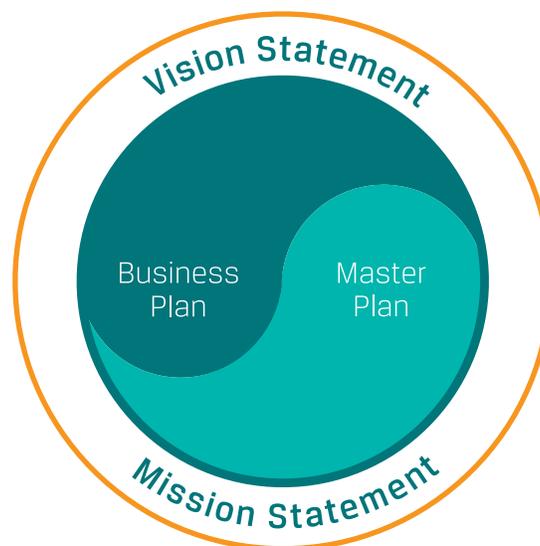


What do we mean by an airport's "master plan?" Still valid, if a little dated, ICAO's Airport Planning Manual<sup>1</sup> defines an airport's master plan as *"the planner's conception of the ultimate development of a specific airport. It effectively presents the research and logic from which the plan was evolved and artfully displays the plan in a graphic and written report,"* and that it *"should be the most effective framework within which the individual facilities can operate their separate functions at the highest possible levels of efficiency."*

Although not within this definition of a master plan, ICAO's manual, correctly, goes on to set the physical master plan within the economics of the airport. Some people refer to the combination of the physical and the financial strategies as the master plan.

This paper concentrates on and refers to an airport's master plan as its physical development strategy, while recognizing it is an integral component of the financial strategy. Clearly the physical, operational, and financial strategies must be aligned. For example, if the infrastructure is too "gold plated" it cannot be afforded by the financial strategy, while scrimping on the physical may not deliver the level of services needed to achieve the financial. Ultimately, the master plan must be aligned with the airport's core values expressed in its mission and vision statements.

The physical strategy is literally and figuratively the base on which the others are built. The financial and physical strategies share an intimate relationship: the physical strategy enables the financial to be delivered and the financial creates the ability to achieve the physical. If one is out of balance, the other will fail. Collectively, the financial strategy and the physical create the airport and its service embodied in the company's mission and vision.

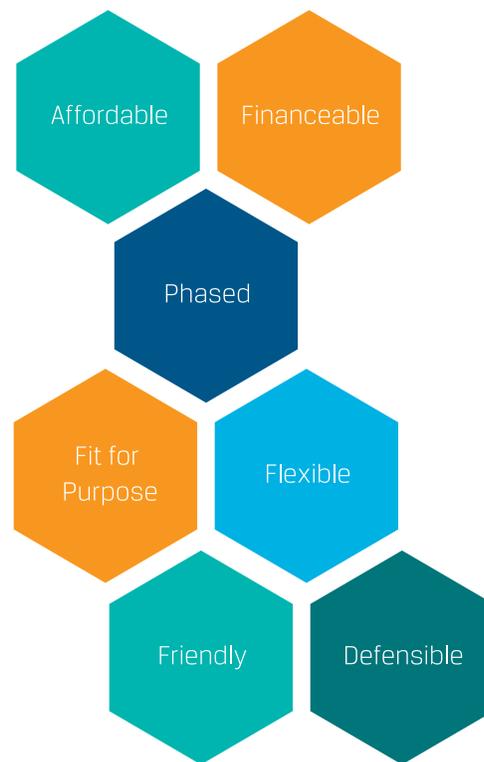


<sup>1</sup>ICAO, (1987). Airport Planning Manual, Part 1, Master Planning, Doc 9184-AN/902, Second Edition Montreal: ICAO.

ICF proposes seven core principles that help shape an airport's master plan. They help ensure that it is effective and provide protection against the changes that all airports and businesses must manage successfully to thrive for the long term. ICF's seven principles of effective master planning comprise fit for purpose, flexible, friendly, defensible, phased, affordable, and financeable.

These principles form the basis of ICF's master planning services and of our balanced scorecard health check reviews of development proposals.

#### 7 PRINCIPLES OF EFFECTIVE MASTER PLANS



### Fit for Purpose, Flexible, Friendly, and Defensible

A master plan that is overall fit for purpose must:

- Define appropriate infrastructure within the current and future business contexts of the airport
- Be defensible in public and able to achieve regulatory approvals
- Be environmentally sensitive, meeting regulatory, legislative, and policy requirements and aspirations

## MASTER PLANNING FOR LEONARDO DA VINCI FIUMICINO AIRPORT ROME (1970s - 2000s)



1970s



1980s



1990s



2000s

It stands to reason that the master plan must be fit for purpose – that it should lay out a suitable infrastructure strategy in the business, market, and financial contexts of the airport – all while supporting achievement of its mission.

However, the challenge is to define a master plan today based on a future forecast with all its inherent uncertainties. Therefore, the master plan must also be sufficiently flexible to allow it to adapt to changing circumstances both within and beyond the airport.

That future uncertainty relates not only to traffic volumes but also to the nature of that traffic and to the airport's aspirations over the level of service it offers to its markets. For example, a master plan predicated on a hubbing strategy, enabling substantial transfer flows of passengers and bags, may be inappropriate should the hub carrier cease such operations or the airport change strategic direction driven by market forces.

While it is somewhat inevitable that the master plan is generated at a time when a clear strategic need exists, an effective master plan contemplates a range of future uses and seeks to define infrastructure with the flexibility to accommodate those ranges of use. It is a challenge, but an effective master plan plans for uncertainty and plans for change: the unexpected needs to be considered and accommodations made.

An effective master plan is therefore a menu of options that can be realized in an appropriate sequence appropriately phased, or substituted depending on the future direction. Of course no one master plan can accommodate all potential futures, but the best master plans are noteworthy for the "a la carte" menu that allows future management to make effective investment decisions in their own context minimally constrained by previous decisions.

For example, consider the southern central terminal area at Leonardo da Vinci Fiumicino Airport Rome. The accompanying images show a succession of revisions from one of its earliest versions in the 1970s to the 2000s. Naturally the plan evolved over revisions and inspection of these images shows not insignificant changes, but the fundamental concept remained consistent.

From the outset (the 1970s), the master plan contemplated the horseshoe of terminals accessed from the circulatory highway and central rail station. Each terminal and pier had defined uses (domestic, international, etc.) allowing successive generations of management (from the 1980s to the 2000s) to deploy elements of the master plan that were appropriate for the needs of the business at the time.

The plan was flexible enough to allow management to react to the inevitably unforeseen changes in their market (e.g., the rise of low cost carriers demanding different infrastructure, the change from domestic purely to Schengen and Non-Schengen, or the need to provide temporary accommodation to serve the substantial peak in demand from passengers transiting to and from their cruise ships).

This is not to say that those accommodations were simple, but they were facilitated by the master plan, not hindered by legacy infrastructure.

The success of this master plan is twofold. First, an effective master plan was defined. Second, and importantly, the plan was adhered to so that successive developments did not frustrate future expansion. Space was protected for the planned future infrastructure element. It may well have been convenient at the time to have built something in place of the planned development, but to do so would have invalidated part of the planned ultimate build out. This was avoided and the airport is nearing completion of the southern terminal area as it contemplates its longer-term expansion to the north of the site.

Infrastructure planning and construction cycles are long and can be protracted and unpredictable – an inevitable consequence of the elaborate planning systems prevalent in many developed countries. Furthermore, the infrastructure – notably new passenger terminal buildings – will have perhaps a 50-year design life and therefore likely long outlive the operational and commercial view that defined it.

Consider the currently proposed Terminal 6 (T6) at London Heathrow, itself part of the current seven-year process to determine the preferred location for expansion of London's airport capacity – at least for the moment, the culmination of a process that started in the 1960s. T6 is being designed now, but it will only open well into the second half of the 2020s and will likely still be in operation in the 2070s. Its planners cannot possibly anticipate all the changes it will see and need to accommodate. Yet, it has to be fit for purpose and flexible enough to cope with those changes.

This is highlighted, for example, by its retail proposition. Heathrow earns a significant proportion of revenue from non-aeronautical sources and is regulated under a single till. With airline pressure to minimize charges (especially in the context of making Heathrow's expansion affordable, potentially within a "flat real" charging obligation), to be fit for purpose, the master plan needs to optimize and maximize non-aeronautical income. But what will retail look like in 30 years? In 50 years? Will a retail capability that is fit for purpose in 2030 still be appropriate in 2070? The challenge is to design a flexible space today that allows future generations of management to adjust to changing conditions: planned for uncertainty, flexible for change.

The current Heathrow master plan was only adopted following lengthy public scrutiny and analysis by the body specifically established to consider the question of additional capacity for London (the Airports Commission). That hurdle – to be the recommendation of the Airports Commission – was only the first of three hurdles the master plan will have to clear to eventually be granted permission to be built. At each stage, the depth of inquiry increases and the master plan must be able to deliver. It must be defensible against regulatory investigation and public scrutiny.



Much of that defensibility depends on how the master plan manages its environmental impact. By regulation, legislation, the airport company's policy, and by public scrutiny, the master plan must be environmentally friendly. For Heathrow, the economic impact of the master plan demonstrated a substantial benefit, but the master plan also set out the means by which its environmental cost will be managed.

## Phased

First, an effective master plan avoids, insofar as practicable, large steps in investment, phasing the expenditure and the provision of additional capacity so that delivery can be fine-tuned to the variation in actual demand. Second, it offers a range of capacity elements that can be brought forward in line with demand.

Often, the first aspect cannot be avoided. In many cases, it is the very need for major investment that gives rise to the master planning study. However, it is generally true that the greater the step in capacity, and therefore investment, the greater the risk of inefficiency of inappropriate infrastructure.

In extremis, consider Montreal Mirabel. A completely new airport is the largest single step in investment. In 1975 Mirabel was conceived to be one of the world's largest airports; by 2004 it had closed. A master plan that more slowly developed capacity may not have avoided the ultimate fate of Mirabel, but it would have limited the financial cost of failure.

A trend seen through the 2000s was the mandating of a master plan by the vendor, usually the government, of an airport for sale. The sale or concession award was the route to financing the master plan. Often though, these master plans were too aspirational. They were not appropriately phased and did not allow the financing risk to be effectively managed. The master plan was not financeable and was therefore not really fit for purpose through a lack of effective phasing.

In cases where large capital investments are unavoidable, the phasing of the development will have an impact on the capital structure of the airport and the differing appetite of equity and debt for brown- or green-field construction risk. An effectively phased master plan, and subsequent capital delivery program, embodies phasing that is appropriate to the ownership structure of the company and meets the needs of its stakeholders.

Conversely, the Fiumicino master plan contemplated a number of interconnected terminal elements. As a result, these elements were constructed in phases that allowed each element to be attuned to the needs of the market at the time, delivering a charter-focused terminal, a low-cost-focused terminal, and progressive expansion of more conventional short-haul Schengen and long-haul Non-Schengen capacity. The plan embodied effective phasing and appropriate flexibility within the confines of a single master plan.

<sup>2</sup>HM Treasury (2013). The Green Book: appraisal and evaluation in central government. London: TSO.

## Affordable and Financeable

The master plan must be affordable. It must deliver the revenue-earning capability to support the capital investment. It must also be financeable, delivering the return on capital that equity is seeking and appropriately managing the risk to debt.

Without any criticism intended, the master planning stage is a key time for focus from management. As the UK Government's guidance<sup>2</sup> to the public sector makes clear, scheme promoters are systematically inclined to over-estimate benefits and under-estimate costs. Master planners are no different. This is not to say that the promoters/master planners are ineffectual, just to note that they are human and subject to the human bias in favor of the case that they are advocating.

Similarly, the private sector is not so different from the public. Equity and debtholders can provide some counter-balance, but they have imperfect knowledge. So, it remains incumbent on management to plan effectively and deliver a master plan that embraces both the physical and financial factors.

## Conclusion

The master plan must be aspirational. It must look beyond the next incremental development but not be unrealistic. The global financial crisis has, for now, put an end to unrealistic master plans; concessions necessarily restrict the concession owner's horizon; and not all owned airports always plan for the long term. In all these cases, it would behoove management, owners, and consultants to establish master plans that are prudent, affordable, and financeable while being balanced against the owners' aspirations.

A master plan must deliver the business benefit it is designed to achieve. It can best do that if it is fit for purpose, flexible, and appropriately phased. Flexibility allows variation as the financial conditions change. Effective phasing helps to de-risk the use of capital.

Ensuring the master plan performs against ICF's seven principles of effective master planning does not guarantee success, but it provides an appropriate framework and allows management, owners, and consultants to maximize the success and longevity of the master plan.

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**About the Author**

**Rob Rushmer** specializes in master planning and multi-disciplinary airport projects with complex financial, commercial, regulatory, and engineering interfaces. His airport experience has involved all aspects of strategic planning, business planning, master planning, and airport development. Mr. Rusmer's particular expertise is the preparation and assessment of strategic development scenarios and the interaction of financial, planning, environmental, regulatory, and licensing requirements. His view of airport planning is that the master plan is the physical embodiment of the business plan.

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