

Optimisation of Infrastructure within the Melbourne Urban plan

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ABSTRACT: Congestion is a growing concern of many global cities and the demands on Infrastructure services within a locale coupled by the rising expectations from the growing population places stress on these cities. This entails the ability to build a sustainable community that requires an understanding and recognition of Population growth, changing demographics and the ever changing urban development on both a macro and micro level.

Infrastructure is an integral part of Australian economy, particularly the 'Infrastructure Assets Management' which highlights the importance towards the development of sustainable communities for Melbourne's future. Melbourne 2030 is a comprehensive representation of government's response to a wide-ranging population growth within Melbourne metropolitan and surrounding areas. Urban plan and specific Infrastructure Assets Planning needs not only to provide sufficient Infrastructure to a community, but it must also be efficient and innovative so that it produces an optimised management system. A system that incorporates engineering techniques that will be sustainable for decades to come by maintaining an acceptable level of services to its intended community in an effective manner, which also strengthens service delivery.

The fundamental challenges for optimization of Infrastructure with the Melbourne urban plan is, the ability to manage and sustain maintenance of Infrastructure to provide the acceptable level of service required by the community in a most effective manner which also strengthens service delivery to contribute towards Melbourne 2030. This paper particularly investigates some of the fundamental issues within the Melbourne urban plan such as Infrastructure Asset Management, AusLink and the Australian Road Management Act 2004, which the Governments at all levels must deal with to provide an economically viable solution to the changing Infrastructure so it may suits the needs and services the strategies of a metropolis.

Keywords: Melbourne Urban Plan Factors, Melbourne Infrastructure Planning and Development, Engineering, Economics, Social and Environmental Issues

1. INTRODUCTION

Infrastructure is an important investment of any developed country, therefore it is essential to manage the Infrastructure well, in order to provide continuous sustainable and economic services. The development and maintenance of essential public Infrastructure is an important ingredient for sustained economic growth and fundamental urban planning (Finnerty, 2007; Dermine, 2007).

Inadequate Infrastructure is perhaps the most binding constraint to urban growth throughout Australia. As a country develops and grows, the demand on the local Infrastructure is tested and governments at all levels need to manage and monitor the performance of their Infrastructure effectively and precisely.

As communities expand they depend on greater Infrastructure and governments inevitably are required to ensure that budget constraints are met to satisfactorily and that adequate means are sustain for Infrastructure growth and future maintenance.

The population expansion and urbanization policy, such as the Melbourne 2030 or Melbourne at 5 million, should identify and respond to the importance of Infrastructure investment toward the sustainability of a growth city, and to maintain a high level of economic growth that supports a nation's social objectives such as Health, Education, efficient Water and

Sanitation services.

1.1 Will Urban Growth Boundary Influence Infrastructure Planning and Development?

The Department of Sustainability and Environment(DSE) in their development of Melbourne 2030 (in 1999) identified that in the next 30 years, Melbourne will grow by up to one million people and will consolidate its reputation as one of the most liveable, attractive and prosperous areas in the world for residents, business and visitors.

This increase in mass places strain on the current Infrastructure and amenities that service greater Melbourne. Economic, social and environmental matters are an integral part of the Melbourne 2030 with the governments concern focused on maintaining liveability within the metropolitan growth boundaries established to give a high-level overview of the direction in which Melbourne metropolitan areas will take.

In June of 2010 the Planning and Environment Amendment (Growth Area Infrastructure Contribution) Act 2010 (GAIC) was given the royal assent.Thus the passing of the GAIC legislation has triggered the Government's expansion of the Urban Growth Boundary (UGB) through a planning scheme amendment which will redefine the city's boundary, and establishing new parameters that will focus on Infrastructure initiatives.

The Melbourne 2030 scheme looks at managing urban growth and sharing the responsibilities amongst government, the community and industry to plan communities that have developed strategies towards a better uses of land which provides a sense of identity and to offer a more affordable approach to living that is geared around environment and sustainability. (DSE2000)

Will the liveability be reduced as Infrastructure struggles to keep pace with the expansion of people? If the rationale behind Melbourne 2030 is to extend the Urban Growth Boundary in order to accommodate unprecedented population growth in Victoria, it should be feasible to see Infrastructure spending explode experientially to maintain momentum and cater for the stress placed on the environment, the land and the people.

In the three capital cities across Australia’s eastern sea board (Melbourne, Sydney and Brisbane), the public has come to understand that the urban Infrastructure has fallen well behind demand and reasonable levels of provision for the future (Wilmoth, 2003).

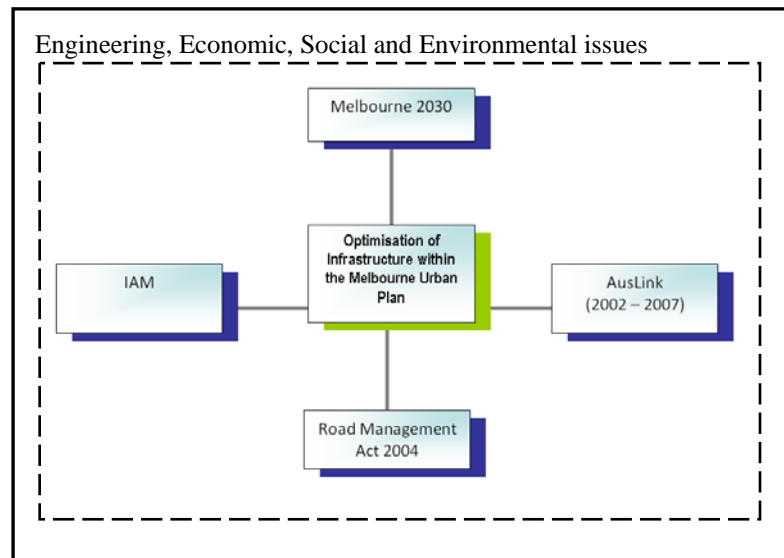
The initial impact of Melbourne 2030 may be small in nature considering the overall population it is still insignificant. However, as Australia grows and outstrips supply, the impact can have a detrimental effect on the environment that impedes on the nations sustainability. In addition, urban sprawl can see the increase in Green- house emission, the destruction of native land and depletion of wetland.

Managing Infrastructure planning and the development of efficient communities are in line with Melbourne 2030 policy. “Systematic alignment of Melbourne Urban Plan Factors”, should be constructed and observed to ensure there isn’t a negative impact on the environment or the creation of a poorly organised community without Infrastructure.

2. SYSTEMATIC ALIGNMENT OF MELBOURNE URBAN PLAN FACTORS

Good urban planning needs to engineer “Systematic alignment between the engineering components, the social and economic situation and environmental factors as outlined in Figure 1

Figure 1, Systematic alignment of Melbourne Urban Plan Factors



As it can be noticed, the Melbourne urban plan factors, such as Infrastructure Asset Management (IAM) and Melbourne 2030, are key elements of establishment of the regulation for sustainable urban planning. The optimisations of these factors are critical processes for creating a liveable city. However, the optimisation process needs to include Engineering, Economic, Social and Environmental issues too.

The Melbourne urban plan factors, such as AusLink and the Australian Road Management Act 2004, are also key elements in establishing regulation for sustainable urban planning to not only increase the liveability but also to sustain future growth.

2.1 Infrastructure Asset Management (IAM)

Infrastructure Asset Management (IAM) is the discipline of managing Infrastructure assets that underpin an economy (Franks and Stewart, 2008). Furthermore, IAM is the process of guiding the acquisition, its use and disposal of assets to make the most of their service delivery potential and manage the related risks and costs over their lifetime (Gharehbaghi, 2005). IAM is an engineering tool that assists in the decision-making framework to cover an extended period and draws from economics as well as design issues, to consider a broad range of assets (Gharehbaghi, 2006).

The IAM approach incorporates the economic assessment of trade-offs among alternative investment options and uses this information to help make cost-effective investment decisions. It underpins the delivery of essential services, drives economic growth, supports social needs and is closely linked to high quality of life (Hardwicke, 2005).

Effective IAM implementations are both operational and strategic and formulate the base for continuous improvement within asset management (Gharehbaghi, 2005).

With ever increasing system demands, budgetary requirements and accountability to the public, efficient IAM is necessary so that many levels of the Infrastructure such as design, construction, maintenance and operations, can be appropriately aligned.

Change requires optimization and with the future urban plans such as Melbourne 2030, and Melbourne at 5 million, the IAM process is critical and extremely necessary to investigate environmental changes and service demands to the general public now and well into the future.

Gharehbaghi, (2009) identified that today's transportation environment is characterised by high user demand, stretched budgets, declining staff resources, and a transportation system that is showing the signs of age. Furthermore, Gharehbaghi (2009) distinguished that the public has to make significant investments in the Design, Construction, Maintenance, and Operation of the Infrastructure systems and expects that Federal, State, and Local Government and other authorities inclusive of organisations will be responsible for these investments.

Changes in the transportation environment and changes in public expectations lead to extraordinary advances in technology such as increasingly more powerful computer systems that make the practice of precise Infrastructure Asset Management possible.

These computer systems not only provide sophisticated design and analytical tools, but also allow company officials to perform risk analyses that in turn facilitate discussions with other stakeholders and create an alignment of the Infrastructure design, construction, maintenance and operational issues with any future urban plans such as AusLink.

2.2 AusLink (2002 – 2007)

'AusLink' is both the generic name for the federal Government's ideas to reform the way in which transport Infrastructure of national importance is funded in Australia, and, the title of a Green Paper (AusLink: Towards the national land transport plan) released in November 2002, Kilsby (2003).

In 2002, the Australian Federal Government and the department of transport and regional services initiated a cooperative transport plan called AusLink, to which the Commonwealth injected \$15 billion in funding for road and rail projects in the five years to 30 June 2007.

The primary aim behind AusLink was to develop transport corridors of strategic national importance in order to improve logistics, enhance trade, and promote connectivity that is consistent with sustainability. The AusLink project looked at new cost-effective and technologies that enhance road management practices in-order to ease congestion on urban arterial roads.

Evaluation methods were developed to help improve the quality of decision making and to assist in the allocation of resources. Based on facilities of importance, AusLink was designed to improve and enhance rail and road links between cities to encourage connections between production/ manufacturing areas and their distribution centre and by greater linkage between major ports and airports (Gharehbaghi, 2005).

In 2002 AusLink developed a five-year multimodal national plan for the network, based on input from both the public and private sectors which encouraged and identified that more integrated and efficient Infrastructure policies were required to be invested upon (Gharehbaghi, 2009).

In part, the strategic and operational decision were allocated to projects that best contributed towards national objectives on strategic transport networks, and incorporated best solutions embracing, wherever possible, new technology and better management systems.

In 2003 a new inter-Governmental agreement was proposed between the Federal, State and Local Governments that underpin the new planning and funding arrangements for the network. This was to be a joint venture between public and private sector development know as Public Private Partnership (PPP). This partnership was devised to encourage investors to buy into projects so that fund contributed would increase (Gharehbaghi, 2009).

In addition, a national advisory body was established to advise transport ministers (at both state and federal levels) on priorities for national Infrastructure investment and reforms to support inter-modal integration and Infrastructure pricing.

At the time it was proposed that eventually AusLink would evolve into a broader national transport policy by integrating improvements to IAM practices and related issues, through the creation of Infrastructure Investment Plan. AusLink assisted Australia's Transport Infrastructure to better meet the challenges, which Australia faces in the global market place.

To be effective, Government at all levels needed to be successfully involved in this extensive exercise, including the creation of broad and detailed Acts such as Infrastructure Road Management Act 2004, which in turn involved the refinement of processes and practices.

2.3 Australian Road Management Act 2004

The Road Management Act 2004 has regulated road management responsibilities in Victoria (and other states) in conjunction with respective authorities to maintain road assets to the standards.

The standards were adopted after consultation with community and end-users. Subsequently, each municipality's Road Management Plan (RMP) identifies responsibilities, maintenance standards and inspection processes required to manage civil liability. Furthermore, each municipality's RMP should demonstrate that the Council as the road authority is responsible for managing all the road assets under its control.

In principle RMP consists of four main elements (Australian Government, 2002; Australian Government, <http://www.auslink.gov.au/>):-

- A register of public roads which entails the list of roads for which the Council is responsible.
- A road asset register, which includes a list of all assets in the road reserve and includes valuation of these assets.
- A road asset management system which provides an outline of how road assets will be managed to deliver a safe and efficient road network.
- A schedule of maintenance standards which contains the development of responsible maintenance standards to meet community expectations.

As already discussed the Road Management Act 2004 is a key part of the Optimisation of Infrastructure within the Melbourne Urban plan. Effective utilisation of this Act ensures that improved control and restriction mechanisms are applied during the urban development. To gain the maximum benefits, these restrictions should be centred within the overall Melbourne 2030 planning provisions.

2.4 Melbourne 2030

During its establishment in early 2000, Melbourne 2030 (planning for sustainable growth) was a 30-year plan to manage growth and change across metropolitan Melbourne and the surrounding region (within the state of Victoria). It emphasised Melbourne's interdependence with regional Victoria, to provide maximum benefit to the whole State of Victoria.

As previously mentioned, it was predicted that in that next 30 years, Melbourne will grow by up to one million people and will consolidate its reputation as one of the most liveable, attractive and prosperous areas in the world for residents, business and visitors. (Department of Sustainability and Environment (DSE), 2002)

Melbourne 2030 provides a framework for governments at all levels to respond to the diverse needs of those who live and work in and near to Melbourne, and those who visit, through a set of Principles and nine Key Directions.

The plan is anchored in the stated principles of: sustainability; innovation; adaptability; inclusiveness; equity; leadership; and partnership. Drawing on these principles, nine broad directions are outlined in Melbourne 2030, (Butterworth etl (2005)). These are (i) a more compact city; (ii) better management of metropolitan growth; (iii) networks with the regional cities; (iv) a more prosperous city; (v) a great place to be; (vi) a fairer city; (vii) a greener city; (viii) better transport links; (ix) better planning decisions and careful management.

As Melbourne expands and the population grows, and as the demand on Infrastructure increases, the Principles and key Directions of Melbourne 2030 are utilised to ensure that Melbourne retains the qualities that people enjoy and the social relationship Melbournians have with the surrounding regions.

Melbourne 2030 focuses primarily on the metropolitan Melbourne urban area and the nearby non-urban areas. However, it also deals more broadly with the wider region where, increasingly, development is linked to and affected by metropolitan Melbourne in terms of commuting, business and recreation.

Wood etl (2008) identified that the two key thrusts of the strategy, enshrined in the state planning policy framework are: designation of a network of inter-metropolitan "activity Centres", and the creation of Urban growth boundaries". Furthermore some of the more important key questions which the Melbourne 2030 tackles include:-

- How to successfully meet the growing population's demand and ensure that the communities live within the available resources of water, land and energy.
- How should urban development be controlled and what pattern of Infrastructure expansion should be planned.
- What additional Infrastructure will be needed to support a growing city such as Melbourne?

Responding appropriately to these questions is a fundamental process of optimisation of Infrastructure within the Melbourne urban plan. In addition, optimisation of Infrastructure within the Melbourne urban plan took on a new direction in December 2008, with Melbourne at 5 million which is an extension of Melbourne 2030 and focuses on the creation of a multi-centre city through, six new Central Activities Districts (CAD); in Box Hill, Broadmeadows, Dandenong, Footscray, Frankston and Ringwood.

Moving from one centre (the Central Business District) to a number of centres will reduce congestion and enable people to spend less time commuting to and from work and more time with their family (Department of Planning and Community Development).

With the creation of these CAD the juxtaposition of IAM, AusLink and Road management is critical in assuring that Melbourne 2030 has the ability to sustain the requirements of the growing demand for cross-town movement of freight, commercial and commuter traffic to the long-term development and the economy viability of Melbourne. More over, to achieve this effectively and efficiently, sufficient Melbourne Infrastructure Planning and Development is a must. This ensures that the Engineering, Economic, Social and Environmental requirements of the Melbourne urban plan are appropriately satisfied.

3. CONCLUSIONS AND RECOMMENDATIONS

As the demand for better and improved Infrastructure increases, the Governments (at all levels) need to be aware of the amplified demand and create an optimised IAM process that meets our escalating urban demand.

In generating "Melbourne Urban Plan Factors" alignment, this paper investigated some of the fundamental issues in urban planning such as Infrastructure Asset Management, AusLink and the Australian Road Management Act (2004), which the Governments at all levels must deal with precisely.

Infrastructure is an integral part of the Australian economy and to build a sustainable community requires an understanding and recognition of Population growth, changing demographics, the demands on Infrastructure services within a locale coupled by the rising expectations from the growing population.

IAM require specific Infrastructure Assets Planning, not only to provide sufficient Infrastructure to a community, but also be efficient and innovative, so that it produces optimised management and engineering techniques that will be sustainable for decades to come by maintaining an acceptable level of services to its intended community in an effective manner which also strengthens service delivery. Urban plan and the optimisation of Infrastructure is case specific in its application and need to address the possible challenges for decades to come.

On the other hand, AusLink, Road Management Act 2004, and Melbourne 2030 are comprehensive representation of a government's response to a wide-ranging population growth together with service optimisation within Melbourne metropolitan area.

The ability to plan and link Infrastructure around IAM, AusLink, the Road management Act and Melbourne 2030 creates a clear focus for the future management of growth, land use and Infrastructure investment. Infrastructure Contribution will provide a vital context for urban development and specific scope to the overall Melbourne urban planning scheme and the directions metropolitan Melbourne is expected to take.

This paper has investigated the fundamental issues that contribute to Optimisation of Infrastructure within the Melbourne Urban Plan to highlight the importance of innovative process which included systematic alignment of Melbourne Urban Plan Factors that help develop sustainable communities for the future.

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