PRACTICALITIES OF CBD FRINGE AREA CAR PARKING POLICY

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Abstract

Fringe areas are those where the Melbourne CBD policy of severely limiting car parking confronts the policy of generating sufficient parking, applied elsewhere in the metropolitan area. The paper explores the issues raised in the development of a fringe area policy bridge, using the South Bank redevelopment area (south bank of the Yarra River) as a case study. The investigation involves a new look at the underlying reasons for both types of parking policy.

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INTRODUCTION

Most transport studies have to do with movement from point A to point B. This paper is concerned with arrival at point B. Since 1982 the authors have been involved with developing policy for Melbourne's CBD and adjoining city fringe areas. The aim of this paper is to document some conclusions and ideas derived from the experience.

The Victorian Government (1984) has adopted an Economic Strategy which, among other things, seeks to enhance the competitive advantage of the State's capital city and revitalise inner Melbourne. This has refocused attention on land use and development policies for the inner area. Parking policy has, at times, been in the spotlight.

The problems of cars in cities are world-wide but there are considerable differences in the policy instruments used to deal with congestion. Possibilities include congestion pricing, park and ride systems, use of non-motorised vehicles, taxation measures, public transport marketing and so on (nowhere has Will Rogers' suggestion of allowing only paid-for cars to use the roads been tried). Hong Kong's electronic road pricing and Singapore's central area vehicle pricing may point the way to the future.

In Melbourne, control of supply of parking spaces has been an important instrument of policy. This approach has a 25 year history of analysis and refinement. The issues have been canvassed in council meetings, Planning Appeals Board hearings, reports and strategy plans. The policy of supply restraint in the CBD has become established and is now difficult to replace with what some may consider superior policy instruments.

Melbourne is, thus, one of a small number of Western cities with draconian CBD parking restrictions. It is as difficult to imagine Melbourne replacing its parking restrictions with, say, central area vehicle pricing and aggressive public transport marketing, as it is to imagine Alan Bond offering to transfer the Americas Cup Challenge to Port Phillip Bay. The issues raised in this paper are based on the assumption that CBD parking limitation policies will remain a feature of Melbourne's planning, at least in the short to medium term.

Hence the fringe area problem: the fringe areas are where the CBD parking limitation policy abuts the general metropolitan parking policy of ensuring provision of sufficient spaces. Development of a coherent policy for the fringe areas requires a re-examination of the policies in both the adjoining areas.

The history of Melbourne's parking policies is outlined in the next section of the paper. Economic theory is then used to make some important distinctions between the foundations of supply restraint policies and supply ensuring policies. The methodology used to develop a policy for one of Melbourne's fringe areas - the South Bank area - is given in the fourth section leading to a discussion of issues, practicalities and strategies involved in policy implementation. This discussion begins with the South Bank area but applies to other CBD fringe areas, where a similar policy might be extended. The concluding section draws together ideas and points of interest.

BACKGROUND TO MELBOURNE'S PARKING POLICIES

Historical Policy Development

The evolution of Melbourne's urban policies has been influenced by three major factors:

(a) the traditional separation of transport and land use planning organisations (unlike many European countries) which tends to inhibit integration of policies;

(b) the flat, low density urban form, with its predominantly radial road network that, together with the overemphasised value of the car, results in increased travel activity through the CBD node as the metropolis grows; and

(c) the choice of supply-restraint type policy instruments rather than demand management or marketing strategies.

In the 1960s the Melbourne City Council (MCC) generally encouraged developers to build public parking stations and allowed vacant land and buildings to be used for car parking as an incentive to city development. Whilst parking problems were clearly the responsibility of municipal councils, the metropolitan regional planning authority (the Melbourne and Metropolitan Board of Works or MMBW) since the mid 1950s conducted research and initiated policies particularly with respect to maintaining traffic flow on main roads and in commercial centres (MMBW 1956).

The amount of car parking in new development in metropolitan Melbourne has been regulated principally through parking standards that were incorporated into the Melbourne Metropolitan Planning Scheme in 1968. The Planning Scheme generally specifies minimum amounts of parking spaces for particular land uses. Municipal officers were given some discretion in administering the scheme. The result has been that for, say, office development, 20 different minimum rates now apply throughout the 51 municipalities (Perrott Lyon Mathieson 1982).

The first major shift in policies for the CBD came from the Melbourne City Council initiatives in the early 1970s which culminated in the 1974 Strategy Plan. The Council analysed the parking problem in relation to particular issues such as long term versus short term parking, on-street and off-street problems, local and main road differences, parking density requirements for individual city blocks, etc. (MCC 1972, MCC 1974, Wilbur Smith 1976). Over the same period other municipal councils also required more refined parking standards in the Planning Scheme with greater flexibility of application as well as car space provisions updated in the light of increased car usage and availability.

The MMBW, having realized that parking policy could be a powerful strategic planning instrument for influencing development rather than simply reflecting parking demand, commissioned a series of comprehensive studies. The first, a conceptual study by Nicholas Clark and Associates (1976b), proposed that the MMPS Ordinance be revised with consideration of environmental effects, trip generation effects and development economics. The principle of "parking limitation" areas was proposed in addition to the established "parking generation" policies.

The so-called "parking generation" policies are those which generate sufficient parking on-site in suburban areas where parking would otherwise tend to be under-supplied by developers. "Parking limitation" policies are those which reduce locally generated traffic in areas where parking would tend to be supplied by developers up to the level indicated by road capacity, in the absence of regulation.

Nicholas Clark (ibid.) proposed parking limitation areas where traffic density exceeded environmental capacity, or where the MMBW wished to stimulate commercial development by dropping the minimum parking standards. It was accepted at the time that designated limitation areas would be attractive to developers due to the increased profitability associated with construction cost savings from lower car park provisions as well as with increased amenity.

Two further MMBW studies (Wilbur Smith 1977, Nairn 1978) developed permissible parking rates under each of these policies and methods of effecting the concept of limitation. Interest in the CBD parking problem was growing. While other studies were tackling specific parking problems associated with particular CBD issues and markets (notably MCC 1978 and later Ove Arup 1982) further major transitions in policy were underway. The MMBW commenced the lengthy process of introducing a single comprehensive amendment to its Planning Scheme. Amendment 150 (Part 4) contained major revisions to suburban parking standards, as well as proposing a site-area based parking limitation scheme for the CBD which was never promulgated.

The Melbourne City Council was dismissed in 1981 by the State Government of the day and administrators were appointed. A Local Development Scheme (LDS) was drafted in 1981 by the State Government and the MCC Administrators. The provisions of the LDS were to give statutory effect to the much talked-about city parking limitation policy. However, the policy was not exclusively on the site area basis as proposed earlier by the MMBW and Nicholas Clark (1976b). The draft LDS was overtaken by events.

In 1982, the newly elected Labor Government assumed direct responsibility for Central Melbourne's development. It instituted the CBD limitation policy as part of a comprehensive package of city planning and development policies, in the Central City Interim Development Order (Department of Planning 1982a; 1982b). This was significant in changing both the policy and its operation. No longer could objectors to developments be party to hearings within a Planning Appeals Board process. Instead, with the Minister for Planning assuming reponsibility, the appeals board process was replaced, for larger developments, by an advisory panel system over which the Minister had the final say.

The CBD limitation policy still applies but is not without its critics. Contrary to earlier expectations, developers have not welcomed the policy, which has been blamed for the loss of some developments from the CBD. Even the City of Melbourne's 1985 Strategy Plan has proposed some relaxation of the restrictive provisions. That very restrictive policy has never had the benefit of a buffer zone policy around the city, as originally envisaged by the MMBW and Nicholas Clark (op cit.).

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The Minister for Planning intervened further by introducing an Interim Development Order over the South Bank area in 1983. This was the first step towards revising planning controls in the city fringe area to provide for redevelopment. It allowed time for the fringe area parking policies to be researched, and early South Bank development applications to be processed in the interim.

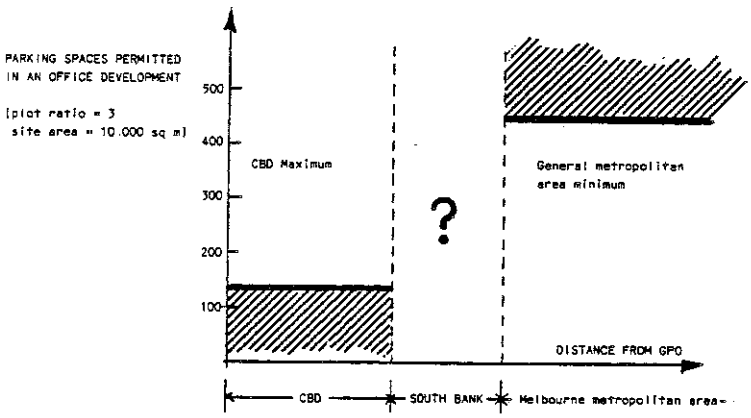
The City Fringe Area Parking Problem

By locating an office development just outside the CBD, a developer would be able to gain approval for three times the car spaces that would be permitted in the CBD. The parking limitation policy applying in the CBD contains similar disincentives for other traffic-generating land uses, not the least of which is public commuter car parks, which are banned outright.

Whilst there has been historical reliance on fringe areas to accommodate the city parking overflow, this has been discouraged by recent transport and urban planning policies, because this kind of city commuter travel - city fringe park and ride to the city - taxes both the arterial road and public transport capacities at their peak times. The greater efficiency of outer-suburban park and ride travel has been demonstrated, particularly for rail. Fringe area parking by city commuters may blight the area and adversely affect development possibilities

The essence of the city fringe area parking problem is the need to create a buffer zone between the restrictive CBD car space provisions and the metropolitan generation policy. The problem is shown in Figure 1.

FIGURE 1 ILLUSTRATION OF CITY FRINGE AREA PARKING PROBLEM



JUSTIFYING PARKING POLICY — DIFFERING REASONS FOR INTERVENTION

Basis of Fringe Area Policy

Broadly, then, parking policy makers have concerned themselves with two areas. The first is typical of suburban commercial centres or flats in residential neighbourhoods and is referred to as the general metropolitan problem in this paper. The second area, and the more recent to emerge, is typical only of major metropolitan centres and is referred to as the CBD problem in this paper.

The endeavour to find a soundly based policy in the fringe area involved some analysis of the reasons for the existence of the policies in adjoining areas. To justify the fringe area policy, one must be able to justify the policies in both the adjoining areas, since it is the conflict of these policies which creates the fringe area problem.

General Metropolitan Parking and Social Goods Theory

A justification for allocating resources by public policymaking rather than by market forces can be derived from consideration of the neo-classical economic theory of social goods (Moore 1978, 390ff; Samuelson 1975, 100-101). A justification for intervention in the general metropolitan situation can be found in this theory, if provision of parking spaces can be shown to share the characteristics of social goods.

In the neo-classical economic model, a pareto optimal distribution of resources occurs by the action of individual consumer preferences through a market. The distinction between "private" goods and "social" goods is usually made to draw attention to certain cases of consumption where a free market will not arrive at an efficient distribution of resources, even in theory. Private goods are defined as those to which an "exclusion principle" applies.

The exclusion principle applying to private goods ensures that:

(a) consumption is rival, and

(b) exclusion of non-payers is in operation.

To illustrate the first limb of the principle, there is no more straightforward example than Musgraves' (1980, 56) "a hamburger eaten by A cannot be eaten by B". The benefits from consumption flow to the particular individual who pays for them. The benefits are internal to the market transaction.

The second limb of the exclusion principle gives rise to the so-called "free rider" problem. In the case of national defence, for example, tax evaders receive as much protection as anyone else. The problem arises because, when the number of participants is large and partaking in consumption is not made contingent upon payment, people are not forced to reveal their preferences in offering to buy the social goods. It is in the interests of any individual to share as a "free rider" in the provision made by others, since supply will not be affected significantly by a single person. However, if all consumers act in this (rational) fashion, the market fails because there is no revealed demand for the goods.

In cases where consumption is non-rival, the marginal cost of consumption is zero, so exclusion is inefficient. In cases where consumption is rival, exclusion may nonetheless, be impossible, too costly with existing technology, or simply not practised.

This set of distinctions, together with some pertinent examples, is summarised in Table 1.

TABLE 1 PRIVATE AND SOCIAL GOODS

	EXCLUSION OF NON-PAYERS IN OPERATION	EXCLUSION OF NON-PAYERS NOT IN OPERATION
CONSUMPTION IS RIVAL The satisfaction of one consumer excludes the satisfaction of other consumers with that unit of production.	CASE 1 Pure private goods; market allocation will lead to pareto optimum. Example - parking in a commercial car parking station.	CASE 2 Market failure due to non exclusion "free rider" problem. Example - parking in a crowded, Council-operated public car park on a busy Saturday morning in a suburban shopping centre.
CONSUMPTION IS NON-RIVAL The satisfaction of one consumer does not affect the satisfaction of others; marginal cost of consumption is zero.	CASE 3 Market failure; Because the marginal cost of consumption is zero, exclusion is not efficient. Example - parking at public airport car park when there is a charge even when there is little air traffic and plenty of empty parking spaces.	CASE 4 Market failure due to non exclusion and non rival consumption there is no effective measure of demand. Example - parking in a suburban shopping centre on Christmas Day, when nearly all the shops are closed.

(after Musgrave & Musgrave (1980,57)

From this discussion, it appears that the general metropolitan problem is a clear instance of Case 2 in Table 1. It is the current expectation that somehow, someone else will supply the parking spaces - the "free rider" syndrome - which is at the root of the problem. This may have arisen because parking on roadways has been regarded as a right and this has led to the expectation that parking is something which is provided by the public sector.

That this is an instance of the free rider problem will be confirmed by considering what would happen if all public parking were eliminated - parking on roads made illegal and the public sector banned from supplying public car parking. The general metropolitan problem would, over time, resolve itself through market forces. Availability or lack of parking would become a factor in market choices of shoppers, tenants, commuters, developers, buyers and sellers and preferences would be revealed.

The basis of intervention in the general metropolitan case is, thus, quite straightforward. Although policies may be complex in operation, the objective is to ensure that users pay for the car parking spaces they use, leading to equivalence of supply and demand through the operation of market forces - Case 1 in Table 1.

CBD Parking: A Merit Good?

Just as the general metropolitan problem has been (correctly) seen as one of the tendency to under-supply parking spaces, the CBD problem might be seen as the reverse – over-supply of spaces – but this would be misleading. From the discussion above, it is clear that the CBD parking problem is not a case of market failure due to non-rival consumption or due to lack of exclusion of non-payers.

It could be argued that the market in CBD car parking spaces fails due to externalities of consumption and production. The former might include congestion and air pollution near parking stations, while the latter might include visual blight caused by multi-storey parking stations. This argument has merit and is the basis for intervention to either eliminate externalities – say, by redesign of parking stations – or internalise externalities – say, by requiring queuing to be contained within the parking station or by taxing car parks to ensure price is equivalent to marginal social cost.

To see the CBD parking problem in terms of externalities is to leave a number of questions unanswered. A parking limitation policy cannot be derived from consideration of externalities because:

(a) it does not eliminate externalities but merely tends to reduce them, giving rise to the question of where the "acceptable" level is to be determined; and

(b) it does not internalise social costs because, although restriction of supply may increase the price of parking spaces, the price is fixed by supply and demand, not by consideration of the value of negative externalities involved.

The CBD problem is better viewed as deriving directly from certain policy decisions only remotely connected to supply or demand for parking. The situation may be likened to those involving so-called "merit goods" which are considered desirable notwithstanding expressed personal preferences (Musgrave & Musgrave 1973, 84).

While the supply of benefits in kind might be criticised (Samuelson 1973, 281), subsidised housing, free tertiary education, legal aid and many other examples of merit goods surround us. Similarly, a government may take a view on the desirability of cigarette smoking, for example, or the environmental quality, urban form, level of pedestrian amenity or other characteristics desired for a city. Reducing growth in commuter car traffic might be seen as a means to these latter ends.

Having decided that the amount of commuter car traffic ought not to grow in accordance with market forces, the government may then adopt policies which will achieve this aim. One such policy might be encouragement of public transport instead of cars, another might be a restriction on the supply of parking spaces (others might include licencing car spaces, permits for entry to the CBD, taxation to discourage commuter traffic).

The conclusion is that the CBD problem has very little to do with the market for parking spaces. Intervention is justified by reference to environmental, safety, urban form or other objectives, not by reference to demonstrable market failure in the market for car parking.

Implications For Parking Policy Formulation

Understanding the profound differences between the two problems leads to the conclusion that completely different approaches are required. While there is, theoretically, a unique correct answer to the general metropolitan problem of how much parking should be supplied, there is no such theoretically "correct" answer to the CBD problem.

The general metropolitan problem has been addressed in Melbourne by techniques which attempt to relate the amount of parking required to the amount and type of development. These techniques cannot be simply transferred to give a solution to the CBD problem. As CBD intervention is based on objectives external to the market for parking spaces, the correct starting point is these objectives, not the market.

Again, the general metropolitan problem is comparatively straightforward in political terms. The actual methods and numbers used in practice vary but the objective is clearly to quantify the demand for parking spaces and ensure it is supplied. In stark contradiction, the objectives on which a CBD policy is based are overtly matters for political resolution. Objectives which are set politically can, legitimately, be changed by political action.

As the CBD "parking" problem is not directly related to parking, it is to be expected that the efficacy of parking policy in achieving urban development or amenity objectives will be questioned continually. The implications are that CBD parking policies should be simple, easily comprehended and impartially applied, or the policy will not last.

The need for simplicity arises because the parking policy must become internalised in property prices if the policy is to endure. Owners who cannot develop land "economically" because of an essentially arbitrary parking policy are a strong lobby.

The CBD parking policy relates to urban form objectives, among others, so transfer of solutions between cities will be limited. Melbourne CBD and Sydney CBD, for example, have differences in ease of access. The solutions of the general metropolitan problem, on the other hand, transfer more easily.

Finally, a policy of limiting supply in the CBD contains the seeds of its own demise. In the absence of demand management, a successful policy will drive up the price of car parking, making it more profitable to supply spaces, and pressure to allow public commercial car parks will increase. In relation to road traffic, the limitation of supply of parking favours through traffic over local CBD traffic. Additional through traffic will tend to take up the space made available by suppressed local traffic, thus defeating the policy objectives. This necessitates that any CBD parking limitation policy is accompanied by a local traffic scheme. With local traffic management, the through traffic may not replace suppressed local traffic but this could give the appearance that road capacity is adequate for more CBD parking, giving rise to pressure to modify or abandon the limitation policy.

All of this leads to the conclusion that, if limiting supply of spaces is an effective policy, it can only be so for the short or medium term. Ultimately, consumer preferences must be changed to reduce demand if the urban form safety and other government objectives are to be met

APPROACH TO PARKING POLICY FORMULATION IN FRINGE AREAS

Acknowledgement of Objectives

Given that a CBD supply-restraint type parking policy was seen to be appropriate, the task of finding a fringe area policy commenced by focusing on the objectives, in accordance with the argument of the previous section.

The overall objective derived from Government Policy statements, is to provide adequate parking provision to stimulate building development in inner Melbourne through adequate accessibililty and assured economic viability whilst, at the same time, meeting the Government's objectives for urban form, environmental quality, etc.

Sub-objectives for the South Bank and other fringe areas might be stated as:

(a) to encourage future redevelopment of the area which complements the function of the CBD as the dominant metropolitan centre.... (the development aim);

(b) to ensure floorspace leasability through the provision of adequate access, parking provision and urban design.... (the commercial aim);

(c) to improve local amenity by, inter alia, reducing car parking by CBD commuters... (the environmental aim);

(d) to moderate the growth in community expenditure on roads, by discouraging growth in peak-hour road traffic and encouraging the increasing use of public transport, particularly for journeys to work in the peak period.... (the fiscal aim);

(e) to maintain Melbourne's relatively uncongested arterial road traffic flow.... (the mobility aim).

Sub-objectives (c) and (d) are the basis for limiting parking provisions in new developments or on-street. Sub-objective (b) implies the need for parking provisions that are less strict than the CBD limitation policy and less liberal than the metropolitan generation policy. It implies the need for equitable treatments across the fringe area and between types of development.

Sub-objective (e) may be another basis for limiting on-street parking but is otherwise of less relevance, as Melbourne's arterial road and public transport capacities can service a faster rate of growth in the City and fringe areas than that envisaged. This sub-objective is relevant only where (large) developments have a significant impact on traffic flows in a locality. In most cases, mitigating road works or traffic signalling changes can easily overcome any local traffic problems caused by large developments, subject to an overall limitation policy.

Approach to Policy Formulation

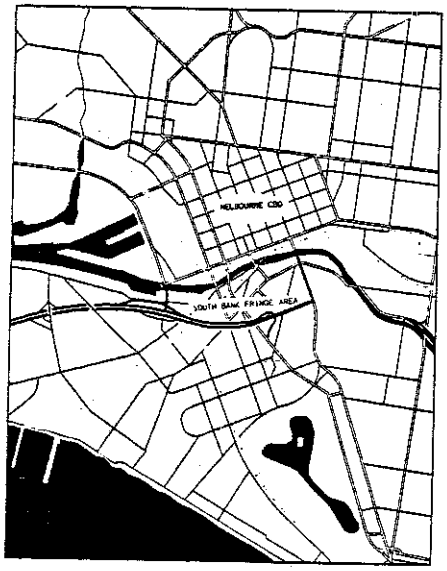
The methodology used for parking policy in the South Bank may serve as model for other fringe areas. It is summarised below in Table 2.

TABLE 2 METHODOLOGY FOR PARKING POLICY FORMULATION

METHODOLOGY	SOME COMMENTS
1. Identify allotments with potential for redevelopment over 20 years.	Includes land, vacant or built on, that is economically under-utilized and is likely to be redeveloped. 60 hectares (52%) of the South Bank site areas were found to be 'developable'.
2. Define redevelopment scenarios.	"Expected" redevelopment scenarios were defined but a "maximum development" scenario was used for planning conservatism. South Bank redevelopment involves the changing of old industrial areas to office, residential and mixed-use developments, upgrading much under-utilized Crown land.
3. Assess impact of projected additional peak hour traffic generation on road capacity to determine - development scenario feasibility - any traffic engineering constraints on parking.	Consultants were engaged to undertake transport studies and to produce traffic and parking demand projections. The briefs involved mode spilt assumptions favourable to public transport.
4. Consider parking limitations in light of planning, environment, public transport and other sub-objectives. Decide on limitation or generation policy	There are different reasons for limitation and generation approaches. A compromise was needed. The issue was to find the amount of parking adequate for commercial viability but compatible with the environmental, fiscal and mobility aims.
5. Determine bases for statutory expression of controls e.g. site area, building floor area, etc.	Site area based formulae were favoured for limitation policies (for discussion see next section).
6. Set limits/rates of parking provisions minimising boundary discontinuities and discrimination between types of development.	The central issues were the amount and distribution of newly permitted car spaces. The numbers are discussed in the next section.
7 Expose policies to political process and confirm political commitment.	This process is now in train.
8. Statutory promulgation of policies and ensure complementary actions by all agencies.	Interim measures to deal with urgent cases have been enacted, based on research and evolving policies.
9. Monitor application of policy as medium term instrument.	Research into long term policies is needed as supply-restraint parking policy is seen only as a short or medium term strategy.

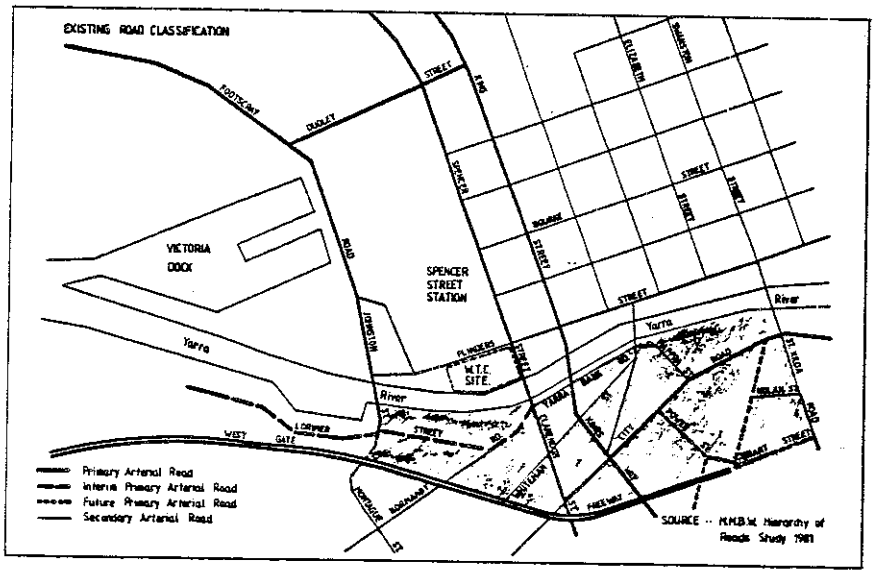
The next section summarizes major issues encountered in applying this approach to the South Bank area which is defined in Figure 2.

FIGURE 2 LOCATION OF SOUTH BANK FRINGE AREA



The area is typical of former light industrial and warehousing areas in many Australian cities, where the decline in manufacturing together with the trend towards decentralisation of industries from inner city areas to outer suburbs or country locations, has left areas ripe for urban renewal. As the working population of Melbourne, particularly the segment employed in the CBD service sector, is unevenly distributed around the CBD with bias to the south and east, the area is traversed by some major commuter routes. This is illustrated in Figure 3.

FIGURE 3 MAJOR ROADS THROUGH THE SOUTH BANK FRINGE AREA



PRACTICALITIES, ISSUES AND POLICY INFLUENCES

Outcomes of Transport Studies

Transport-land use and traffic studies provided estimates of traffic generated and parking demand in future years under several development scenarios. The studies lend support to the following conclusions:

(a) Redevelopment of the South Bank at the scale indicated in the maximum redevelopment scenario is feasible in the sense that the road network is adequate: roads and intersections in the area have the capacity to sustain additional traffic, although minor modifications are desirable.

(b) The future ability of the roads and intersections in the area to handle the estimated traffic increase will, nonetheless, become more limited, especially beyond year 2000. If South Bank development were not occurring, the additional traffic would occur anyway from redevelopment elsewhere in inner Melbourne. It is desirable for new developments to be planned in ways that contribute to both the moderation of locally generated traffic and the reduced diversion of through traffic into other areas. Together with other planning controls, parking policy should therefore seek to provide fewer total spaces than would occur with unconstrained development.

(c) A mild parking limitation policy is not an effective traffic control instrument on its own, as any gain is so easily lost by small increases in the predominant through-traffic component in the fringe area. To increase its effectiveness as a traffic growth inhibitor, the policy would have to either be so restrictive as to compromise the development aim or be accompanied by unacceptable controls on through traffic, and public transport initiatives which are unlikely to occur.

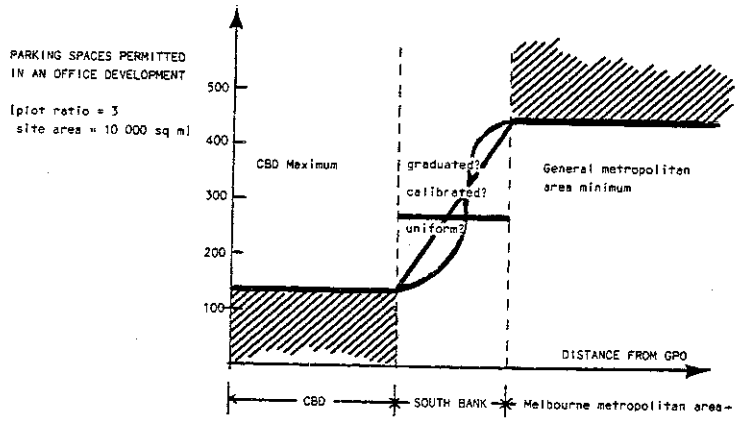
(d) Maximum development scenarios, if unaccompanied by a parking limitation policy, would generate in excess of 10,000 two-way peak hour vehicle trips in the South Bank area. The generation of road traffic to and from the South Bank should be allowed to increase by a maximum of about 5,000 vehicle trips in peak hour by year 2000. This is the net addition to the existing 4,500 trips. Redevelopment of the South Bank demands about 9,500 net additional parking spaces over the existing 5,500 spaces (with mild parking restraint and policies promoting public transport).

Clearly, the primary contribution of the parking policy is towards the development, commercial and environmental aims. Any contributions to the fiscal and movement aims are secondary and significant only in the longer term.

Distribution of Parking Spaces under Proposed Policies

Conceptually, the supply of parking spaces permitted in new development could be distributed in various ways: graduated, from restricted levels at the City boundary to more liberal levels away from the City; calibrated, for individual precincts' local traffic needs and likely development types; or uniform over the whole area.

FIGURE 4 HOW TO DISTRIBUTE PARKING IN A FRINGE AREA



A graduated rate of parking provision would tend to remove discontinuities at the boundaries. If the rate were calibrated for individual precincts, parking could be limited more in precincts with relatively more difficult road access and less in those with better access. This would reduce disruption to traffic flows where they are congested. Either a graduated or calibrated rate would create multiple internal boundary anomalies within the small, relatively homogenous, fringe area.

In accordance with the development aim, parking limitation could be more relaxed in precincts with greater redevelopment potential but, as the precincts with greater redevelopment potential in the South Bank area also have more difficult local access, this is not feasible. The syndrome is found in other fringe areas.

Uniformity has the advantage that all site owners in the fringe area are treated equitably. A uniform policy is more understandable to those in the land market and would readily be internalised into land prices, without discrimination between owners. Furthermore, an anlaysis in which parking spaces were distributed uniformly over the eight precincts into which the South Bank area was divided for analysis, showed that the entitlements for likely development in each precinct were compatible with property access requirements. In the case of South Bank, the Yarra River to the north and a wide reservation containing an elevated freeway to the south form physical boundaries at which some policy discontinuities can be manifest.

For simplicity and ease of statutory application, a uniform parking rate was thought to be desirable. The simplicity was seen as a virtue in the light of political considerations discussed above.

Basis for Parking Rate Formulae

Floor Area Based Formulae

This is the appropriate basis for distributing parking spaces under parking generation policies in the general metropolitan area. It ensures that at least the minimum number of spaces is supplied for each land use in a development (in proportion to trip generation or building floor area as its proxy).

Floor areas, land uses and activities in buildings are often not known on application for planning permit or may change after the permit is granted, or after the building is constructed and are certainly unclear when land is knocked down to a developer at auction.

Under a floor area formula, the greater the size of the development, the greater the amount of parking. So, with a limitation policy based on floor area, any limitation on parking therefore comes about indirectly from planning restrictions on floor areas and land uses – through architectural and urban design constraints, maximum plot ratios, building envelopes, setbacks, etc. Such restrictions typically involve bonus provisions which compromise parking limitations. Parking spaces tend to be bargained to shape building form or obtain public facilities during negotiations with developers.

This basis then relies on an assessment of the traffic impact of large developments as a check that plot ratio bonuses do not result in excessive parking. The giving away of "extra" spaces to developers with "desirable" developments on a "first-in, best-dressed" basis prejudices subsequent developers who may find that road capacity has been "used up" by previous development. The subsequent developers lobby for a parking provision similar to that in earlier developments and planning appeals boards have frequently determined that this is a just claim. The floor area based limitation policy thus fails and the overall objectives of the CBD parking policy are not achieved.

Site Area Based Formulae

The provision or rationing of spaces in proportion to site area has the advantage that it treats all sites equally and is simple to compute in advance especially when floor area, land uses, and activities in buildings are unknown at the early stages of development proposals, before permits are sought or when land is being sold.

With a site area formula applied, early developers would have the same provisions as future ones and a potential purchaser of land can ascertain precisely the parking "entitlement". This precludes bids for extra parking on the basis that developers were not aware of parking requirements. Acquiescence to bids on this basis "blows out" overall parking numbers and defeats the aims of the limitation policy.

One concern raised about site area based policies is that developments with low plot ratios (say less than 0.8) may tend to have more parking per unit of floor area than is necessary for tripmaking, given the objective of increasing the public transport share of travel for the CBD and inner areas. This can be seen in Figure 5, where the proposed South Bank site area limitation would permit more spaces than is deemed necessary under the metropolitan floor area generation policy. However, to encourage economic development, this more liberal provision for low plot ratios is exactly what is needed in a fringe area. The low plot-ratio development generally refers to small site areas and to projects that lack economies of scale. To facilitate redevelopment of a large proportion of Melbourne's building stock, which is on small sites, the flexibility (liberal nature) of site area based policies is more consistent with the overall objectives. Further, the absolute limit on the number of parking spaces permitted over the whole area is fixed, irrespective of the mix of development plot ratios, so from an overall viewpoint, the transport effects of small development are not significant.

The need to ensure that any excess spaces in low plot ratio developments are not taken up by commuters leads to a caveat on the site area policy: any car spaces provided under a site area (or any limitation policy) must have a nexus with the activity on the site. This nexus precludes the type of solution which involves devotion of large areas to public car parking.

Land Use Variables

Floor area based generation policies conventionally include a schedule of land uses showing different parking provisions for each land use. These provisions are normally based on 24 hour parking demand as opposed to peak hour parking demand.

As the thrust of generation policies is to ensure that each land use is accompanied by sufficient parking space, the correct starting point is the individual land uses. By contrast, limitation policies are derived from the desirable capacity of an area for peak-hour trip ends (Nicholas Clark 1976b, 78). So, the correct starting point for limitation policies is the individual site area as a fraction of the limitation area, not the land uses on the site.

In most cases, however, there is merit in separating land uses that generate peak-hour trips from off-peak ones. Site area based formulae can include this consideration by arriving at a total number of spaces on the basis of peak-hour generation for an overall development scenario.

Suggested Resolution

Site area based provisions are recommended for parking limitation areas for the following reasons:

(a) easier statutory application and less expensive implementation

(b) certainty offered to developers and owners who will know a site's approximate parking entitlement from the outset

(c) applicability without prior knowledge of floor areas and land uses proposed

(d) greater likelihood of enduring political debate over objectives.

(e) equity between site owners

(f) neutrality to development types and constancy regardless of future changes in land uses

(g) independence of architectural constraints and bonuses

(h) reduced negotiating ambit between the planning authority and developer and reduced possibility of policy "blow out" over time.

(i) inbuilt incentive to small development (i.e. those with low plot ratio) by virtue of the site based entitlement.

Selecting The Appropriate Level of Limitation on Spaces

On a site area basis, two possible formulae for distribution of total potential parking among developable sites suggest themselves:

$$\text{Equation A: PARKING PROVISION} = \frac{\text{TOTAL SOUTH BANK AREA PARKING SUPPLY}}{\text{TOTAL SITE AREA OF SOUTH BANK AREA}}$$

$$\text{Equation B: PARKING PROVISION} = \frac{\text{PARKING SUPPLY IN NEW DEVELOPMENTS}}{\text{DEVELOPABLE SITE AREA}}$$

As planning controls apply only to new developments, the left hand side of the equation must refer an amount of parking to be provided in new development. The right hand side of Equation A is a poor approximation to the required amount of parking. Equation B is preferred, although the numerator is more difficult to quantify. For computation purposes Equation B can be restated as follows:

$$\text{Equation C: PARKING PROVISION} = \frac{\text{NET ADDITIONAL PARKING SUPPLY IN NEW DEVELOPMENTS} + \text{REPLACEMENT OF EXISTING SUPPLY IN NEW DEVELOPMENTS}}{\text{DEVELOPABLE SITE AREA}}$$

On the assumption that existing parking provision in the South Bank area is uniformly distributed, Equation C can be approximately restated as follows:

$$\text{Equation D: PARKING PROVISION} = \frac{\text{NET ADDITIONAL PARKING SUPPLY IN NEW DEVELOPMENTS} + \left[\text{DEVELOPABLE SITE AREA AS A FRACTION OF SOUTH BANK TOTAL SITE AREA} \times \text{TOTAL EXISTING PARKING SUPPLY IN SOUTH BANK AREA}\right]}{\text{DEVELOPABLE SITE AREA}}$$

Inserting into equation D the South Bank figures for Net Additional Spaces in New Developments (being the parking demand projected for the preferred development scenario in the traffic studies assuming a modal split in favour of public transport) yields:

$$\text{PARKING PROVISION} = \frac{(9500) + (0.52) \times (5500)}{310{,}000}$$

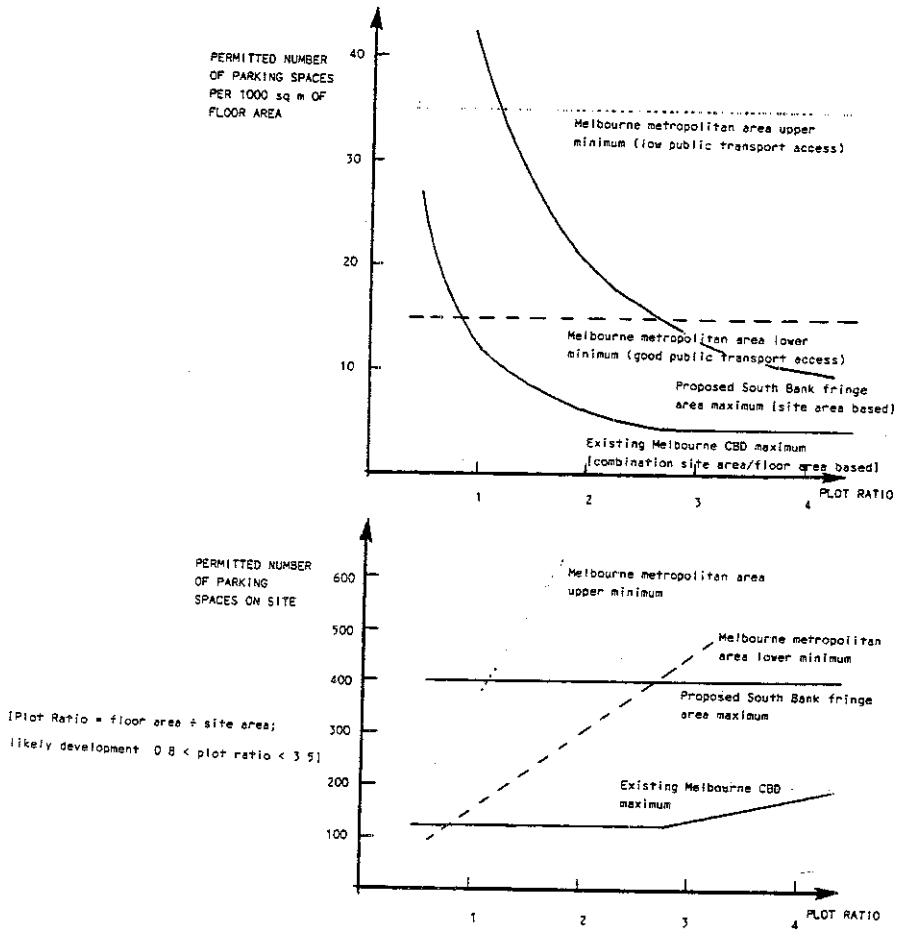
$$= 40 \text{ SPACES PER 1000 SQUARE METRES OF SITE AREA}$$

The implications of adopting such a policy in the South Bank fringe area can be ascertained from Table 3 and Figure 5, which compare the fringe area policy to the policies for adjoining areas.

TABLE 3 EXAMPLES OF PARKING PROVISIONS FOR DIFFERENT SIZED OFFICE DEVELOPMENTS

Site Area (m^2)	Plot Ratio	Gross Floor Area (m^2)	No. of Car Spaces permissible: Melbourne CBD Maximum	Southbank Maximum Under Proposed Fringe Area Policy	Melbourne Metropolitan Area Lower Minimum
10,000	1	10,000	120	400	150
10,000	2	20,000	120	400	300
10,000	3	30,000	130	400	450
10,000	4	40,000	170	400	600
10,000	5	50,000	220	400	750

FIGURE 5 COMPARISON OF PARKING PROVISIONS FOR OFFICE DEVELOPMENT ON A 10,000 SQUARE METRE SITE



Without any change in objectives, the calculated parking provision might be incorrect due to failure of any one technical assumption. For example, the actual mixture of uses developing may differ significantly from the assumed scenario. Under a site area based limitation policy, the symptoms of such problems as development proceeds would be –

(a) if the provision were too high, development applications would be biased towards higher plot ratios, developers would frequently be content with less than the maximum permitted and CBD commuters would tend to take up spare spaces; and

(b) if the provision were too low, development application would be biased towards lower plot ratios, developers would almost always demand the permitted maximum and overall development may be slow.

Should these symptoms emerge during the monitoring phase of the approach, re-evaluation of the asumption should be carried out and, if necessary, a revised parking provision derived.

The Fringe Area Parking Policy Set

The outcome of applying steps 1 to 6 of the methodology set out in Table 2 is a mild parking limitation policy. The policy is to be expressed for the purposes of practical application in terms of site area, rather than building floor area. Any car spaces provided on a site must have a nexus with the activity on the site. For the South Bank fringe area, the amount of parking to be permitted should be 40 spaces per 1000 square metres of site area.

The straightforward application of a policy of 40 spaces per 1000 square metres of site area would have the virtue of simplicity but, to give the policy the strength to endure the political debate, it must be combined with complementary parking policy elements into a fringe area policy set.

The first element of the set is the provision of spaces in new development, derived above. The second element relates to management of those spaces to ensure that cars cannot be parked in excess of the basic provision. "Jockey" parking should be prohibited and, wherever possible, parking spaces should be leased or otherwise dedicated to specific parts of the development. Statutory agreements, which are registered at the Titles Office and binding on future owners, are being tried to bring this about.

Car parking buildings for commuter parking are prohibited in the Melbourne CBD and the third element of the policy bundle refers to their place in the fringe area. Generally, as parking is to be provided on-site, the CBD proscription should extend to the fringe area. In practice, even proposals for short-term parking facilities are viewed sceptically by planners. There has been little success with contracts in enforcing price structures favourable to short-term parking and suspicion remains that operators are merely waiting for the appropriate political climate to convert to commuter parking and reap inflated prices in the shortage of parking space created by the limitation policy.

There are a number of exceptions where car parking stations could contribute to achievement of the objectives. Legal Agreements have been used successfully to ensure that space in a commercial car park proposed for employees of an adjacent public hospital was, in fact, used by the employees. Again, there is sometimes difficulty in finding spaces for carparking for businesses in conservation areas and this might be a case for a commercial car park, without prejudice to the aims of the policy. (Parking on vacant allotments is treated in the same way as commercial car parking buildings).

The fourth policy element relates to on-street parking spaces. The environmental aim would be compromised if displaced commuters were able to use on-street parking, particularly in residential areas. This policy element can contribute to the development and commercial aims by providing short-term parking for customers, visitors, trade suppliers and others. The fiscal and mobility aims might be assisted by removing on-street parking from the numerous through routes. This should be increasingly practical as development under the fringe area policy proceeds, since on-street spaces are included in "Total Existing Parking Supply" in Equation D.

Finally, a note is in order on the major threat which might cause the policy set to come apart: the Government itself. Recent examples in Melbourne indicate that:

(a) Commercial car parking in breach of the limitation policy may be used as a source of income by a non profit organisation with the Government's approval.

(b) Public sector agencies seeking to redevelop land surplus to requirements do not easily see why parking policy should stand in the way of maximising income from sale of the land, and

(c) Having announced a major proposal at the development application stage with the usual mass media exposure, the Government becomes reluctant to refuse the application on the ground that it does not comply with the parking policy.

This reinforces the view that, as with merit goods, the objectives for car parking limitation policies are derived from political agenda rather than consumer preferences expressed through demand and supply. The policy set should be developed to withstand not market forces but political pressures. Step 7 in the methodology is the first test.

CONCLUSIONS

The history of parking policy development for Melbourne's CBD has shown a change from generating supply of spaces to policies based on restraint of aggregate supply of spaces through limitations on new development. Re-thinking of these supply restraint policies is now required with a view to producing better supply side policies or, preferably, pricing or demand management strategies. While these other approaches are being developed, there is no alternative to building on existing policies.

Parking policies address two types of problems: the general metropolitan problem and the CBD problem, which require fundamentally different approaches. The general metropolitan problem amounts to ensuring adequate supply of car parking spaces where the market fails to do so due to the "free rider" syndrome. The CBD problem has its origins in urban policy objectives not derived from preferences expressed in the market. CBD policy formulation needs to be robust enough to withstand, not so much the vicissitudes of the market, as changing short-term political priorities.

Solutions to the general metropolitan problem are based on balancing supply and demand and, therefore, should translate from one urban area to another, subject to quantity changes due to differing demand functions. On the other hand, solutions to the CBD problem are based on value judgements and objectives specific to a time and place. These solutions should be transferred with caution after comparison of objectives and urban form.

Owing to the differences between the two types of policies, boundary problems arise in the city fringe areas where these policies abut. The fringe areas consequently require policies to ensure a level of parking supply attractive to development as well as being complementary to CBD policies and compatible with fringe area objectives. Bridging the gap between metropolitan and CBD policies with an eye to the political dimension is required.

The methodology employed began with a detailed study of the objectives derived from public policy. Transport-land use studies were used to estimate demand under assumptions derived from the objectives.

Four qualities are considered most important for fringe area limitation policies in general:

(a) a politically acceptable solution relying on exogenous values and trade-offs rather than transport-land use market considerations;

(b) simplicity in concept and application to withstand the complex political environment in which the policies and the values they reflect are likely to be continually challenged - consequently it is preferable to adopt simple formulae to distribute parking provision uniformly over a fringe area;

(c) the site area basis for limiting supply is preferable to basing the policy on building floor areas and other measures; and

(d) the solution is found in a set of complementary policy elements, each directed at a particular market segment of parking supply: provision of parking spaces in new development, management of those spaces, control of commercial parking stations (including parking on vacant lots), and on-street parking.

The sub-objectives for the South Bank and other fringe areas are reflected in the parking policy as follows:

(a) the development aim is satisfied since the fringe area policy supports the CBD policy by providing a buffer zone while being favourable to fringe area development at a lower plot ratio than would be expected in the CBD (see Figure 5);

(b) the commercial aim should be assured for the maximum development scenario because the policy is derived from transport studies which indicate that, with some shift to readily available public transport, the permitted amount of parking will satisfy the locally generated demand and, as this parking is to be on-site, access to redeveloped sites will be good by motor vehicle and public transport;

(c) the environmental aim will be achieved as redevelopment occurs and the requirement for a nexus between development and parking provision causes CBD commuters to be displaced, if the displaced commuters convert to public transport or some car pooling arrangement;

(d) the fiscal aim may be attained in the longer term after the minor modifications to the road network have been carried out and when the redevelopment scenario is substantially realised and modal split for commuters has moved towards that assumed in the transport studies;

(e) the effect on the mobility aim will depend upon the growth in the dominant through traffic component and the effectiveness of the modifications to the road network, but a positive effect is likely in the longer term from the combination of CBD and fringe area limitation policies.

The process of formulating and promulgating new city fringe area policy instruments is seen with hindsight to have been a difficult and time consuming one. Ever present was the tendency to want to adopt the usual techniques applicable to the general metropolitan problem and the floor area based prescriptions which are not effective in limitation areas. This was exacerbated by the previous adoption in the CBD limitation policy of a joint site area and floor area approach - something in need of simplification to this day. It appears from initial testing of draft policies with a limited number of developers and bureaucrats that the site area formulae and the "limitation" parking provisions derived from them have met with reasonable acceptance.

What remains, in Melbourne, is the short term need to gazette policy changes and monitor their effects on economic development. Doubts linger that CBD limitation policies in their current form may turn away development, but alternative policies would take at least two years lead time for research and promulgatiaon, just to replace existing policies. This research needs to commence soon. A collaborative effort is needed between transport and land use planning agencies as well as Treasury and local governmnent representatives. An organizational commitment - a task force, commission or, perhaps, a Metropolitan Parking Authority - may be needed as a first step.

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