CHAPTER 9 DEVELOPER CHARGES POLICY IN PRACTICE: AN EXAMINATION OF NEW SOUTH WALES 'SECTION 94' POLICY: OPEN SPACE AND ROADS

9.1 *Introduction*

In Chapter 8 we examined the present practice (and proposed reforms) for determining developer charges for water and sewerage in New South Wales. In this chapter we extend our empirical investigation to include open space and roads, with these two items comprising around half of total developer charges collected in New South Wales. Following this discussion, in Chapter 10 we will examine drainage and other leviable items where governments have provided the service in order to mitigate the impacts of development.

The legislation which governs the levying of developer charges for the infrastructure items considered in this chapter and Chapter 10 is Section 94 of the New South Wales *Environmental Planning and Assessment Act* 1979. The history and growth in the use of Section 94 charges has already been examined in Chapter 2. The guidelines as to how local councils should administer Section 94 policy are provided in a *Section 94 Contributions Manual* produced by the New South Wales Department of Urban Affairs and Planning (1997). This Manual places particular emphasis on four basic principles of policy: the demonstration of the '*nexus*' (between the type of development and the demand for additional public facilities); the requirement for '*reasonableness*' in determination of the contribution (comprising, according to the Manual, 'fairness, equity, sound judgement and moderation' (New South Wales Department of Urban Affairs and Planning 1997:12)); '*apportionment*' of costs of a public facility (such that 'the contributing population only pays for its share of the total demand' (New South Wales Department of Urban Affairs and Planning 1997:13)); and the necessity for '*accountability*' of public funds (requiring, for example, clear and informative documents, maintenance of appropriate financial records, and public participation in decision making).

A marked contrast exists between the advice provided by the New South Wales Government Pricing Tribunal to water and sewerage authorities under the proposals for reform (as discussed in the previous chapter), and the advice provided by the New South Wales Department of Urban Affairs and Planning to local councils in regard to Section 94. Whereas on the one hand the Tribunal suggests a specific method of calculation which recognises the economic attributes of water and sewerage (such as asset longevity, indivisibilities and excess capacity), on the other hand the Department provides calculation guidance only at a general level: for example, stating the requirement for observance of the nexus and apportionment principles. Moreover, the one general formula provided in the Manual is overly simplistic (see section 9.10).

A major objective of this chapter and Chapter 10 is to attempt to address the deficiency in detailed advice on calculation methods by adopting an approach closer to that of the Tribunal. The economic attributes of each type of infrastructure will be analysed and examples of real world practice examined with a view to suggesting approaches tailored more specifically to the nature of the actual infrastructure under consideration. Case studies selected for description comprise two groups: the first group have been 'deliberately' chosen because the procedure involved is instructive in demonstrating how a particular problem can be handled, whilst the second group is somewhat more randomly selected to illustrate the 'typical' or 'representative' calculation of a charge. In the latter group, it was often the fact that details of calculations were reasonably clear which caused the selection of the methodology of a council. Clarity of formulae and calculation method was not a strong feature of Contribution Plans, particularly for those 'pre-PRC review' plans.

In order to contain the size of the present study it has been necessary to omit separate empirical investigation of infrastructure described as 'community facilities' (other than recreational facilities which fall in the category of open space). Fortunately, the application of developer charges to community facilities is the one area which has been studied previously in some detail, although not from an economic perspective (see Briggs 1990, 1992 and 1995). It is clear from the Briggs' studies (see especially Briggs

1995) that the issues and commentary of Chapters 9 and 10 apply equally well to the calculation of developer charges for this category of infrastructure.

Chapter 9 is divided into ten sections. After initial introductory comments on open space in section 9.2, section 9.3 summarises the general findings on open space from the PRC's (1994) review of Contribution Plans. As we have observed, the PRC research was mainly concerned with presentational and 'good planning' aspects of Plans and is generally not relevant to this study. For example, the PRC examined aspects such as whether a formula for calculation of the charge was actually presented in a Plan. They did not attempt to evaluate formulae. In this study we are centrally concerned with evaluating the adequacy of a formula. However, as we shall see in some cases the general comments of the PRC on a specific infrastructure category are useful as a background perspective, and two questions examined in their survey are of particular interest, notably questions 8.1 and 8.2 (PRC 1994:85). These questions ask whether Contribution Plans demonstrate a concern for 'efficient pricing or user pays' (Q. 8.1) and whether they indicate an interest in 'equity, fairness and consistent application' (Q. 8.2). In section 9.4, we explore the economic attributes of open space and the implications of these characteristics for methods of determining charges. In section 9.5 we discuss key issues in the calculation of open space charges, and describe and evaluate real world practice. Examples are drawn from Hornsby Council (section 9.5.2), Lake Macquarie Council (section 9.5.3) and Shell Harbour Council (section 9.5.4).

A similar structure is adopted for the discussion of roads infrastructure in the second half of the chapter, with introductory comments on roads in section 9.6, PRC findings in section 9.7, economic attributes in section 9.8 and the key issues in the application of developer charges to roads and the examination of existing practice are presented in section 9.9. We examine practice employed by Eurobodalla Council (section 9.9.1), Tweed Shire Council (section 9.9.2), and problems calculating contributions at Coffs Harbour (section 9.9.3). Section 9.10 presents the concluding remarks of the chapter.

9.2 *Open Space: Introductory Comments*

Developer charges for open space are substantial in terms of the revenue returned. The ABS figures supplied for the purposes of this study indicate that open space contributes around 26 per cent of total developer charges raised in New South Wales, slightly more than roads (at 24 per cent) and water and sewerage (at 23 per cent). Across all councils, open space is also the most frequently occurring contribution item (PRC 1994:121, Barnes 1995:53). Barnes' (1995) survey of all councils in New South Wales indicated that open space is the most popular contribution item, levied by over 50 per cent of councils in the state.

9.3 *The PRC (1994) Study Findings on Open Space*

In the PRC's (1994) review of contributions plans, open space was judged as performing at a 'poor-fair level' (PRC 1994:130). The PRC (1994:130) noted that 'given that Open Space is levied for more than any other type of amenity or service, it would be expected that a better system of contributions would be in place'.

The worst performing aspects of Open Space Contribution Plans, according to the PRC (1994:130), were the demonstration that the amenities were provided to serve new development (or the nexus) and the presentation of formulae. On the question of demonstrating a nexus, the PRC (1994:132) criticised the fact that demand was more likely to be established by relying on past practice than by reference to background studies, and also that background studies tended not to be used even for establishing current population characteristics or the availability of existing facilities. This aspect of Plans was singled out as particularly 'questionable planning practice' (PRC 1994:132).

Clarity, coherence and consistency of documentation were also classified as only 'poor-fair'. On the question of whether Open Space Contribution Plans express concern for efficient pricing, the PRC found that 83 per cent of those Plans surveyed did not. However, 50 per cent of Plans assessed did embody equity and consistent application considerations.

9.4 *The Economic Attributes of Open Space*

A distinguishing feature of open space compared to other items of leviable infrastructure, such as drainage or roads, is that it represents an asset for which the target community can express diverse preferences regarding the desired form of open space. There is a surprisingly wide range of options for providing open space. Examples include formal gardens, small parks/playgrounds, large parks, bushland, undeveloped land, ancillary land (e.g. adjacent to road corridors), beachfront/foreshores/river frontage, outdoor sports facilities, bike paths, walking tracks, and civic spaces (such as in shopping malls). However, since there is often no direct usage charge for these facilities, there is not a market mechanism in which preferences can be directly elicited for the type and quantum of open space which should be provided. By contrast, for roads or drainage, there is little scope for the exercise of consumer preferences in any case and these infrastructure services often have prescribed health and safety standards in any event. Not meeting consumer preferences (i.e. not having knowledge of the demand curve) is clearly much less of a problem for these services than for open space. As we shall see, the need to ascertain the nature of the demand curve for open space poses the central challenge for the determination of an efficient developer charge.

An additional economic attribute of open space resides in the fact that there is a significant capital cost attached to providing the asset (a substantial component of which will be the opportunity cost of the land), but almost a zero marginal cost in using it. However, there is a recurring maintenance cost which may vary marginally with use but most of this maintenance cost will occur irrespective of the extent of use of the facility. Marginal usage costs will cease to be negligible if facilities begin to become congested, but until this point is reached, usage costs will not be a significant component of the cost of open space. Not being able to levy a usage charge (i.e. a charge which increases the more one uses open space) then will not mean, as it would for a service like water, that important signals for calculating optimum capacity are lost. In the case of open space though, it does place all the more emphasis on the need to know the preferences of consumers at the time of construction in order to provide the 'optimum capacity' of open space.

A further attribute of open space is that by its nature it must be provided in 'lumps' and hence may contain excess capacity for a period. In this respect, open space is typical of other urban infrastructure assets, such as water supply, sewerage and roads, where (as we have seen), the calculation of a charge requires an estimation of the final 'demand' or the final population of users of the service. There will usually be two types of circumstances applying here: either the demand for the service (e.g. water) is expected to grow over time as the population expands, so that extensions to capacity will be required in the future; or alternatively, existing capacity is expected to suffice indefinitely. If the demand for the service is growing over time, then the estimate of the 'final number of users' will be determined according to the principles discussed in Chapter 5. That is, the period to full capacity (and hence the demand at full capacity) will be determined by comparing running costs in a given year to first year amortisation of the next 'lump' of capacity plus running costs of that next increment. If existing capacity if expected to suffice indefinitely (e.g. a road to a specific site with little additional traffic potential), then the 'final number of users' is simply an identification of the present and future demand for the service, which will probably be less than the full capacity service potential. For some types of open space, for example, sporting facilities of regional appeal, growth in use may continue indefinitely and the former principles will apply, but for more local open space, it is most likely that the final number of users will be fewer than the facility could have served at full capacity. The basic reason for this is that the demand for local open space tends to be limited to the number of people within geographical reach of the asset. Local playgrounds, for example, will be used most if they are only a few minutes walking distance away from their intended beneficiaries.

However, there is another dimension to the propinquity of open space and the benefits from it, which complicates the issue of determining the final number of users of open space. This is the fact that non-users (i.e. people who do not actually visit the space) can still derive an 'amenity' benefit since open space tends to enhance the beauty and livability of an area. Using terminology from environmental economics, it might be argued that open space offers 'existence value'; that is, a benefit without any direct use

9.5 *Key Issues and the Determination of Charges for Open Space in Practice*

9.5.1 *The Identification of the Demand Curve*

As we have already observed, identifying 'demand' for open space is one of the central issues in the determination of an efficient charge. There is little opportunity to reveal preferences through a market by indicating willingness to pay a price for the service, whilst at the same time there is a wide range of choices and standards for open space assets. One pragmatic approach to this difficulty would be for councils to use general studies of consumer preferences for open space options and/or undertake their own surveys of preferences within their jurisdictions. Clearly it will not be possible to ascertain the preferences of people who have yet to move in to the area, so it will be necessary for councils to rely on studies of areas with expected similar population characteristics.

One example of such a general study is provided by Zanon and Wheatley (1995). They analyse the recreational demand for urban parks in Melbourne. By surveying both households and park users, Zanon and Wheatley (1995:2) sought answers to questions like the composition of visitors to parks, how far these visitors are prepared to travel, what facilities and services they prefer and why, and how often they visit the parks. Some 17 park attributes (e.g. picnic tables, walking tracks, etc.) were identified and visitors were asked to rank these in terms of importance. Zanon and Wheatley (1995) also estimated a model to predict visitor numbers based on characteristics of actual visitors to various parks and on the various attributes of 13 urban parks in Melbourne.

Zanon and Wheatley (1995) appear to have produced some useful insights for park management. For example, it is found that there are increasing returns to improving the services in parks. To maximise visitation then, they argue that 'it is better to put resources into fewer well serviced parks than have more poorly serviced parks' (Zanon and Wheatley 1995:4). Other findings of the study include the proposition that there is an inverse relationship between distance from a park and visits to it. For example, the first 100 000 in the surrounding population (for a park sized 74.3 ha and offering a '75 per cent standard of service') creates most of the demand for the park.

Increasing the size of a park brings diminishing returns in terms of visitor numbers and in general people do not seem to want to travel long distances to visit an urban park (Zanon and Wheatley 1995:4-5). Apart from the direct application of the results of research such as this, the Zanon and Wheatley (1995) study also contains useful methodologies which councils can apply (perhaps on a smaller scale) to open space assets within their area.

The *Section 94 Open Space Contributions Plan* for the shire council of Hornsby, New South Wales, provides an example of the use of a study of the open space preferences of the shire population. We turn shortly to the Hornsby case study, but before doing so, it should be noted that the Hornsby case is far from the common practice in determining developer charges for open space.

The (then) New South Wales Department of Planning (1991:18) noted at the time of issuing planning guidelines for outdoor recreation and open space that 'it was not possible to locate a case where a council had undertaken a needs based approach (to open space requirements)'. It appears that by far the most common practice of determining open space provision (and hence developer charges) in an area has been to apply a simple traditional standard of 2.83 hectares of open space per 1000 population (New South Wales Department of Planning 1991:17). This standard is believed to be adopted from the British standard of seven acres per 1000 population used in the early 1900s. The British standard was based on the idea of providing adequate 'space for play and gymnastics for children' (New South Wales Department of Planning 1991:17). Its acceptance in Australia has been encouraged by the judiciary which has upheld the standard when challenged by developers. As the New South Wales Department of Planning (1991:17) has observed, 'the planning and legal professions have to date shown a reluctance to question this standard, even though there is clearly no logic in the Australian context for its application'.

One of the problems noted by the New South Wales Department of Planning (1991:18) and others (e.g. Duffield 1995) with regard to the common 2.83 ha standard is that the focus on a quantity standard has led to the neglect of *quality* of open space.

For example, Duffield (1995) emphasises the importance not only of size of open space but also accessibility in terms of site characteristics (slope, drainage, quality of vegetation) and the services offered (bushwalking, play equipment, sporting fields). Duffield (1995:4) recommends a 'points system' where such features of open space are evaluated and 'performance standards' are derived.

The New South Wales Department of Planning guidelines (1991) advocate 'needs based studies' in place of reliance on the traditional standard. The principles underlying the calculation of efficient charges derived in this study also supports the use of these kinds of studies provided those whose preferences are being elicited are also confronted with cost options.

9.5.2 *Determining Developer Charges for Open Space in Hornsby*

Hornsby shire encompasses an area of 510 sq kms and its population (of 132 000 in 1993) enjoys a high level of open space (Hornsby Shire Council 1997:16). Open space areas include a national park (Kuring-gai Chase), several regional parks under council control and local open space and recreational facilities also managed by the council. Prior to the Open Space Contributions Plan, Hornsby shire had used the historical standard to determine open space contributions. For example, in the case of residential flat development, a developer charge for open space was assessed on the basis of 2.8 ha per 1000 population and the quantity of land so assessed was computed at the value of land in the immediate area. This procedure applied notwithstanding the fact that the funds were often applied to embellishment of existing open space and sometimes not even in an area capable of being used by future occupants of the residential flats (Hornsby Shire Council 1995:4).

Other problems with the use of the quantitative (rather than qualitative) standard which were noted by Hornsby Shire Council were that at the local reserve level, a substantial number of reserves were less than 0.5 ha in size. These had been offered as land dedicated by developers but 'the sites have often been on steeper, less developable land, frequently fulfilling a drainage role, or affected by an overhead cable easement'

(Hornsby Shire Council 1997:16). Opportunities to enjoy the asset were therefore limited.

In 1991, Hornsby Council commissioned a study of the open space and recreational needs of the population of the shire. The objectives of the study were to assess the existing provision and distribution of open space and recreational facilities, identify the characteristics of the existing and expected future population, and find out the community's preferences for open space and recreational activities (Hornsby Shire Council 1995:6). Some of the more important findings of the study were that bushland settings were 'extremely popular' throughout the community; that passive recreational activities such as picnics, walking and visiting parks and gardens, were more popular than organised team activities (although the latter were popular with the younger age groups); and that recreational opportunities for youth were held to be high priority by the community but in new development areas these facilities were lacking (Hornsby Shire Council 1995:7).

This study was then used as background information for the preparation of the Hornsby open space Contributions Plan. For the purposes of the Plan, the shire is divided into nine districts and the population increase and population profile in each district over the five year period of the Plan is estimated. It appears that the additional open space and recreational requirements in each district were then identified using two main steps. Firstly, the *quantity* of open space required was determined by applying the existing shire-wide standard (4.5 ha per 1000 population) to the new population. Secondly, effort was made to determine the *type* of open space asset on the basis of the needs study. Capital works programs were identified which involved both the purchase of additional land and the embellishment of existing open space. The justification given for the first step (i.e. the use of the 4.5 ha per 1000 standard (which is significantly higher than the historical standard)), is that in the needs study residents expressed the view that the existing level of open space was an important reason for choosing to live in that shire and hence there was a 'community expectation' that this standard would be maintained 'to meet the needs of the future population without compromise to the existing population' (Hornsby Shire Council 1995:10). In the

second step (i.e. the identification of the nature of the capital works required) it must be said that it is not always clear in the 1997 Plan which works involve upgrading existing areas to a more equitable geographical distribution of open space within the shire and which works are attributable to new population only.

The final contribution rate for each of the nine identified residential areas depends on the works and land acquisition required within any one area. All areas contribute to requirements (identified as 'regional' and 'district' level), but contributions for local works apply only in the area to which they relate. This produces a significant variation in contribution rates. For example, for residential area D_8 which includes most of the new release area in the shire, contribution rates are assessed as $1778.44 per person whilst in area D_5, rates are $663.33 per person (Hornsby Shire Council 1997:9).

With regard to the actual contribution calculations, the Hornsby Plan indicates that for acquisition of land the following formula was used:

$$\text{Contribution (per person)} = \frac{\text{Cost of acquisition of land}}{\text{Population increase in the next five years}}$$

For example, if the cost of sites to be acquired in area D_1 is $416 000 and the expected increase in population over five years is 1079, then the contribution rate is calculated as $385.54 per person.

For augmentation of works, a similar formula is employed where:

$$\text{Contribution (per person)} = \frac{\text{Cost of augmentation}}{\text{Population increase in the next five years}}$$

A number of general comments can be made at this stage on the Hornsby procedure for determining developer charges for open space. Firstly, the attempt to identify the preferences of the community is a significant advance on earlier procedures in Hornsby (and evidently on most common practice in other councils). However,

efficient charges require that preferences be elicited given the explicit costs of alternatives and it is not stated in the documents whether this important information was included in surveys. Nevertheless, it is interesting to note parenthetically that a stronger preference was indicated for natural bushland as compared to formal gardens, which are presumably significantly more expensive to maintain. Secondly, the definition of nine local catchments and consequent geographic variation in charges accords with the principles propounded in the present study. If correctly calculated, charges should signal relative costs appropriately.

With regard to the formula used by the council, it is apparent that the time value of money is not being taken into account. Although involving only a five year period, this may not leave the council significantly short of funds, but it nonetheless seems sensible to suggest that the correct formula be used, namely; the present worth of the capital cost (of acquisition or works) divided by the 'present worth' of the population, that is:

$$\frac{PW(I)}{PW(D)}$$

where I = the capital cost of land acquisition or capital works; and

D = population increase over the period.

As we saw in Chapter 6 (Equation 6.3) and again in Chapter 8 (Equation 8.7), such a formula will calculate a constant MCC per unit of demand or output (in this case indicated by population) which, when multiplied by the demand in a year and summed over all years, will in principle return an amount equal to the present worth of the construction or acquisition costs. The amount calculated by the Hornsby formula will fall short of this sum. The charge calculated using the Hornsby formula should be indexed each year by the increase in costs indicated by yearly movements in the non-dwelling construction implicit price deflator, as calculated by the Australian Bureau of Statistics. Even so, at the end of the five year period, the value of contributions collected by the formula will not cover the real interest costs of the capital outlay required. The only additional information required to use the technically correct formula is an estimate of the population increase each year. For ease of estimation, a

constant yearly population increase can be assumed. An annual percentage increase in population (in each district) has been assumed in any case in order to arrive at the single denominator in the Hornsby formula (Hornsby Shire Council 1997:19).

A final observation on the Hornsby procedure concerns the issue of double dipping. The Contributions Plan identifies nine areas where varying increases in population are expected over the next five years. Where the charges apply to recouping new development's share of existing spare capacity, and these facilities are still being financed through general rates, then the new population should be identified in each area and an appropriate offset made to the general rates bill. The Hornsby Plan makes no mention of this issue, but their procedure for determining developer charges, commendable in many respects on efficiency grounds, does bring to light the problematic issue of double dipping. A further illustration of this is suggested by the following paragraph from Hornsby Shire Council (1995:15):

> Part of the contribution assessed within individual planning districts is directed to Shire-wide regional facilities where, on an apportionment basis, no more than 9.03 per cent of the cost may be reasonably charged against new development [9.03 is the percentage increase in population expected over the planning period]. Regional recreational facilities are primarily funded through general funding and grants.

To the extent that regional facilities *are* funded by loans serviced from 'general funding' (rate revenues) then the new population that have already paid their 9.03 per cent share in the form of a developer charge would have to be identified and excluded from the general arrangements applying to most of the population. The administrative complexities which might be required in order to avoid the problem of double dipping begin to become apparent.

9.5.3 *Determining Developer Charges for Open Space in Lake Macquarie*

Lake Macquarie, a coastal council lying between Newcastle and Wyong on the central coast of New South Wales, is interesting because it has a provision of open space of 17 ha per 1000 population, substantially greater than the standard of 2.83 ha per 1000 population and more than three times the Hornsby standard. Notwithstanding

this high quantitative standard, it is evident that the Lake Macquarie Council perceives a need for Section 94 levies as a means by which the quality and accessibility of open space can be improved for new development (Lake Macquarie City Council 1993).

The Plan notes that developers have generally preferred to offer land rather than monetary contributions and that 'this is frequently a means by which land least suited to development can be "excised" at no cost to the developer' (Lake Macquarie City Council 1993:15). As a result, and in common with Hornsby, the donated open space is small in size (less than 0.5 ha), often contains a creek line or drainage facility, is frequently relatively inaccessible, and would be costly to maintain if access was improved.

Reasons given in the Plan for levying for open space include the fact that the distribution of open space varies throughout the council; access to open space opportunities can be improved by linking existing open space areas (for example, to provide bikeway routes around the Lake foreshore); and there are instances when 'large single residential developments (e.g. of more than 30 allotments) may create a need for local open space currently not available in the vicinity of the site' (Lake Macquarie City Council 1993:16). The Plan identifies land acquisitions for such purposes. However, for the most part, the existing level of reserves is considered adequate and developer charges are sought 'to augment existing reserves to a standard that matches anticipated demand of the new population, at a basic facility level' (Lake Macquarie City Council 1993:16). The works identified and the estimated costs of each are listed in a schedule at the front of the Plan.

The developer charge calculation procedure consists of projecting the number of new parks that will be required over the next five years if the same ratio of persons to parks as currently exists (1,648 persons/park) were to continue to apply to the new population estimated to move into the area. For example, if the population is expected to increase by 8,800 over the next five years and if the existing standard of persons/park is to be maintained, then some 5.3 district parks and 27.7 local parks will be required. The cost of the new parks is estimated at $3,466,673 and the developer

charge is calculated by dividing $3,466,673 by the 8,800 estimated increase in population over the next five years. This produces a basic charge of $394 per head of population. The basic charge is then translated into per lot or per dwelling charges, assuming a given rate of occupancy per lot or dwelling.

While this presents only a brief sketch of the Lake Macquarie procedure, it is nevertheless clear that one of the central problems facing the council is justifying a levy when such a high quantitative standard of open space currently exists. The council has outlined reasons why some works are still necessary and has adopted the basic position that the existing (quantitative) standard of open space should continue to apply to new residents. The Plan makes no mention of a user preferences survey similar to Hornsby, but it would seem advisable that some kind of survey be done in order to establish in the Plan the importance of open space to residents especially if such a high standard of open space is to be maintained. Toon (1995*a*:2) has argued that Lake Macquarie's position might be difficult to sustain under challenge. Simpson (1989) appeared to take the view that standards higher than 2.83 ha per 1000 population were acceptable provided the need for this level of service, especially the nexus, was adequately documented (see, for example, Simpson 1989:77, 86). Economic efficiency requires that the area be provided with a standard residents have indicated a willingness to pay for. These considerations reinforce the suggestion that Lake Macquarie Council would be advised to undertake supporting studies when revising the current open space Contributions Plan.

In common with the Hornsby Shire Council, the formula used by Lake Macquarie to calculate charges does not take into account the time value of money. In Lake Macquarie's case, the levy does not vary by area according to works required. Some implicit cross-subsidisation between areas is thus contained in the formula.

9.5.4 *Further Examples of Open Space Calculations: Shell Harbour (1994)*

Most of the open space Contributions Plans examined for the purposes of this study calculate charges broadly according to the general formula: that is, increases in cost divided by increases in population over the period, without using present values.

Some councils, such as Shellharbour, calculate a levy based on the estimated average cost of the infrastructure service. For example, the formula used in calculating Shellharbour open space embellishment charges is described as follows (Shellharbour 1994:23):

$$\text{Developer charge} = \frac{C_1 + C_2}{D} \times AF$$

where:

C_1 = Actual cost to council to date of embellishing open space adjusted to current day values by the Implicit Price Deflator;

C_2 = Estimated future cost to Council of embellishing open space;

D = Projected increase in Shellharbour dwellings by 2013 (7730); and

AF = Apportionment factor for existing households (15 780) to benefit from works (7,730/23,510 = 0.3288).

Since D = 7730 and AF = $\frac{7730}{23\,510}$, D and the numerator of AF cancel out, so that in effect the charge is an average cost formula. Like the SWC method of Chapter 6, the Shellharbour (1994) approach uses past costs to determine averages for future pricing. It has been suggested in this study that only future costs are relevant to developer charges. Moreover, since the planning period extends a considerable number of years in this example (to the year 2013), the shortfall in funds by not using present values might be significant.

9.6 *Roads: Introductory Comments*

Of all the types of urban infrastructure, funding for roads appears to be the most topical (see, for example, *The Economist*, 6 December 1997:13-14, 19-22; Industry Commission 1994). According to Kirwan (1990:188), road financing is also 'probably the most difficult part of any infrastructure cost recovery system to get right'. Neutze's (1997) extensive analysis of urban physical infrastructure, including case studies of roads (Neutze 1997:45-50; 82-3; 164-70; 174-8), gives some indication of the complexities involved. In essence, there are multiple outputs or products associated with roads (e.g. they provide durability or strength for use by buses and trucks, and they also produce access to properties); roads exhibit economies of scale and scope in

some circumstances and increasing costs in others (e.g. road widening in inner city areas); SRMC is low when the road is not congested, but rises quickly as congestion begins; and all road users impose external diseconomies on others (e.g. pollution, damage and injury from accidents). One puzzling aspect of the recent literature on road financing is that whilst there appears to be a growing interest in the area, particularly in road pricing (see ACIL Economics and Policy 1995 for a survey of the international literature on road pricing), the question of developer funding of roads is seldom analysed or even mentioned.

However, Neutze (1997:50, 69) represents an exception to this general neglect of developer charges insofar as he is clearly aware that some roads are currently being funded by developer charges and he provides analysis of when this form of funding might be appropriate. For instance, he argues that developer charges are a suitable way to finance that 'output' of roads which provides access to places, although he also observes that there is seldom a clear distinction between access roads and through roads.

Whatever the particular merits or otherwise of developer charges compared to other possible ways of funding roads, it is clear that developer charges are currently being used by councils to fund urban roads within their jurisdictions. For present purposes, the task is to analyse the attributes of roads and examples of how charges for roads are being calculated with a view to suggesting steps which might be taken to align practice more closely with economic efficiency principles.

9.7 *The PRC Study Commentary on Roads*

The PRC reported that in general the roads and traffic Contributions Plans scrutinised in their study were set out reasonably well. However, for the most part, their discussion on roads, unlike that on open space, does not lend any particular insights as to the extent to which councils calculated economically efficient developer charges. Moreover, the results of the questions as to whether documents expressed a concern for efficiency or equity were not reported for this category.

9.8 *The Economic Attributes of Roads*

It is neither technologically nor economically feasible (for reasons outlined in more detail in Chapter 3) to extend road capacity in small increments to match expected marginal increases in the use of a road, as demand arises. Like open space, it is probable that a road will automatically have excess capacity for a time, even if it is built to minimum specifications. However, it is also frequently the case that it is efficient to anticipate the future load on a road and build it to the expected higher standard earlier (rather than later) when development pressures have raised the value of land. This means that the calculation of the developer charge encounters an 'excess capacity' problem where estimates must be made of final demand and the period over which this demand will build up, before a charge per unit of demand can be calculated.

At this point we encounter a particular problem with roads, which has not arisen with other types of urban infrastructure considered thus far. The problem is that roads possess the non-excludability characteristic of public goods, except where direct road pricing is introduced. Since road tolls are only introduced for significant arterials, all but the more isolated rural roads will have an element of through traffic in the 'final demand' using the service. The problem this raises for the calculation of a developer charge can be phrased as follows: should *all* beneficiaries of the road contribute to its funding ('through traffic' paying through general rates) or should it be only those who have occasioned the need for the road? This issue is discussed below when we examine real world practice.

Road use has significant external costs, on which there is a large literature (see, for example, Industry Commission 1994:237-266, Maddison, Pearce *et al.* 1996, and Barde and Button, 1990). The question this raises for developer charges is to what extent should charges attempt to reflect some of these costs? Given that the direct 'environmental impact' of any particular road would be difficult to identify, pragmatic considerations suggest that externalities may better be internalised through charges which have a wider base, but yet still contain a 'polluter pays' dimension. Petrol taxes or registration charges are an example.

One 'institutional' attribute of roads provision which might be mentioned in the Australian context is the fact that roadworks are funded by all three levels of government, and it appears that there are times when institutional responsibility for a road is unclear (see, for instance, Coffs Harbour example discussed below). In principle, the Commonwealth government funds national highways, the states fund the major 'arterials', and local government funds 'local' roads (see Commonwealth Government 1996:33-34, 43-44). However, confusion arises, among other instances, when a road within a local jurisdiction serves more than one of these functions and is difficult to classify. The Industry Commission (1994:112) observed that overlapping responsibilities did appear to be a particular problem with roads, and some participants in that inquiry suggested that 'there is some evidence to suggest that both the State and Federal Governments rely on the existing confused position to avoid their responsibilities to the detriment of all Australians (Australian Road Federation submission to the Industry Commission Urban Transport Inquiry, Industry Commission 1994:112). Accordingly, the problem is not one of how to calculate a charge, but rather how to identify the roads to which developer charges should apply.

9.9 *Key Issues and the Determination of Developer Charges in Practice*

9.9.1 *The Determination of Developer Charges for Rural Roads in Eurobodalla*

The method used by Eurobodalla Council to calculate developer charges for rural roads is notable for the amount of effort devoted to identifying particular catchments for specific development areas. This aspect of their developer charges methodology was also commended by the PRC (see Westing 1995).

Eurobodalla Shire comprises an area of 3250 sq km on the south coast of New South Wales. The resident (or non-holiday) population is around 29,000. The Shire contains three main population centres (Batemans Bay, Moruya and Narooma), about 35 km apart from each other, and a number of smaller communities on the coastline between these centres. Development in the area is 'new' development. Redevelopment or 'infill' development is not significant in the shire.

The steps in the calculation procedure of developer charges, as described in Eurobodalla Council (1993:2-3) and Westing (1995:3-4), appear to be as follows:

- divide the non-urban section of the Shire into thirteen road catchments;
- identify the number of existing and future lots which will be served by each of those road catchments;
- estimate the potential traffic generation by lots within a road catchment area at 'full development' using 'adopted traffic generation rates' and also estimate the through traffic using the roads at this time (Eurobodalla Council 1993:2);
- apply road design standards and estimate the cost of the necessary roadworks in each road catchment;
- apportion the cost of roadworks between through traffic, existing lots and future lots; and
- designate existing lot and through traffic costs to council to fund by other means and assign the costs attributable to future lots to the developer charge.

From an economic perspective, the method used by Eurobodalla introduces desirable elements of fairness and locational variation into charges for roads. However, whilst this aspect of the methodology should by all means be retained, there are a number of difficulties with the actual apportionment procedure outlined. In particular, the assignment of a portion of the cost of new roads to through traffic and to existing lots raises at least two problems; one of these, the councils seem to be well aware of and the other it appears they may be less so.

The difficulty which does not seem to be widely appreciated is the fact that if new roadworks are undertaken in response to development pressures and existing lots and through traffic are automatically assigned a portion of the cost, then the expenditure has not been subjected to systematic evaluation of whether the benefits exceed the costs. Those involved in new development may certainly want the road to the extent of their (say, one-third) share of the costs, but do existing residents really want the road (notwithstanding the fact that it may be convenient to use it once it is in place), and how do the benefits of this project compare with competing projects?

The second problem is closely related to the first in that if existing residents are almost 'automatically' assigned a share of costs, then as development proceeds there will be an accumulation of debt to be serviced by existing residents. This is, in fact, one of the most frequently mentioned problems of Section 94 raised by the various officials interviewed for this study (e.g. Hallgarth, R. 1996, Tweed Shire Council, pers. comm., 8 February; Savage, D. 1996, Blacktown City Council, pers. comm., 16 February; Kirwan, J. 1996, Wagga City Council, pers. comm., 6 March). If the benefits of projects exceed the costs, then debt build up is of less concern but, as we have seen, this may not always be the case.

Both problems are exacerbated by the fact that once developer charges begin to be collected, there is created an expectation that the particular capital works for which a levy was paid will proceed in the near future. This is a factor which also arises with charges for community facilities and as a result some councils deliberately choose to avoid these pressures by not charging for community facilities at all (Savage, D. 1996, Blacktown City Council, pers. comm., 16 February). Section 94 legislation requires that councils use the contribution 'within a reasonable time' (New South Wales Department of Urban Affairs and Planning 1997:11). The Departmental Manual notes that '3-5 years' has been suggested by the courts as a reasonable time (New South Wales Department of Urban Affairs and Planning 1997:12), although the Manual also states that 'reasonable time' will vary with the nature of the project.

To lessen problems of debt accretion and concerns that new roadworks may not be adequately scrutinised, there may then be an economic case for development to fully fund some new roadworks necessitated by development, even though existing residents may use the new roads. In other words, 'apportionment' may need a special interpretation for items such as roads and community facilities. In particular, apportionment should reflect the need (demand) for the additional infrastructure, rather than the incidence of benefits derived from the infrastructure once it is provided. The problem does not arise for other types of urban infrastructure considered in this study. For instance, water and sewerage have a technology which excludes 'free-riders' from

any new system, and open space, whilst it clearly could be used by persons anywhere in a city, tends naturally to exclude those who live a distance from the facility.

At least one council (i.e. Tweed Shire Council) has adopted the approach that developers pay for (almost all) works necessitated by a development, irrespective of later use by existing residents or through traffic. Further details on the Tweed Council methodology follow.

9.9.2 *The Determination of Developer Charges in Tweed Shire Council*

The methodology used by the Tweed Council for determining developer charges for roads has several distinctive features, one of which is that it employs what has become known as a 'Trips' model. This model appears to have originated for the calculation of road impact fees in the United States (see, for example, Snyder and Stegman 1987:82; Downing and McCaleb 1987:60-62; Heath, Kreger et al. 1988: 214-216). A key feature of Trips modelling is the attempt to be more precise about the quantum of demand for road capacity generated by various forms of development. The models are based on the assumption that traffic will behave in a mathematically predictable way (Downing and McCaleb 1987:60). Following Downing and McCaleb (1987:60-61), Trips models generally consist of four steps:

(1) Calculation of the number of trips a proposed development will generate. These trip generation rates for the type of land use associated with the development are usually derived from empirical observation (e.g. through the use of automatic counters). The rates are multiplied by the number of each type of land use (e.g. mobile homes, townhouses, single houses in a residential area, square feet of office space in a commercial area, schools, shops, etc.).

(2) Calculation of the minimum path from the development to specific sites or centres of influence. Traffic is assumed to be attracted to specific places such as shopping centres, schools, office buildings. In assessing specific routes to these various centres it is the shortest time rather than the shortest distance which is relevant (Downing and McCaleb 1987:61).

(3) Distribution of trips to and from the development among each of the centres of influence. The 'strength' of trip attraction is assessed (i.e. how often are trips likely to be made to these places), again using empirical observation.

(4) Assignment of trips to and from the development to specific road segments. After assessing the number of trips that will be generated between the development site and the attraction centres, and the minimum path for these, the number of trips is assigned to each segment of roadway along each minimum path. Half of the number of trips can be assigned to the centre and half to the development site (Downing and McCaleb 1987:61).

The Trips model used by Tweed Shire Council appears to follow these steps broadly (Tweed Shire Council 1997:9-10), although traffic generation patterns are developed for the whole shire in addition to new release areas. For the new release areas, the roadworks required to serve the site, given the trip numbers, are calculated and this figure is divided by the relevant number of trips attributable to the area to derive a charge per trip. The charge for any specific developer will therefore depend on the share of total trips attributable to his or her site and the charge per trip.

For existing residential areas it appears that the cost of road capacity consumed per trip is calculated by estimating the value of all roads in each sector of the shire and the total number of trips (existing and new) which will be generated by that sector at 'build out'. This is an essentially correct approach to a per unit charge per trip in terms of the principles recommended in this study. In effect, the method is saying that there is sufficient capacity in the existing road system to service the estimated amount of traffic (until the year 2011), both existing and new, and given the total amount of final demand a charge per unit of demand can be calculated. Clearly, only new development will actually be charged these amounts since existing development will already have contributed to the cost of existing roads (either by earlier developer charges or by some other form of funding). The two main difficulties with the Tweed description of their procedures are that no details are given as to the basis on which the existing road system was valued (e.g. was a modern equivalent asset (MAE) approach used; were grants from other levels of government deducted; etc.) and net present values do not

appear to have been used. However, with regard to the latter deficiency, Tweed Council has included some interest costs in the calculation by apparently ascertaining the amount of money which it will be necessary to borrow and including an interest cost at 10 per cent for twenty years. Although this is not the treatment of interest costs recommended in this study, it is at least a recognition of interest costs in the calculation of the charge.

Some other councils, like the Hastings Shire Council, have also used a Trips methodology in a broadly similar manner to the Tweed Council. With these councils, the question of administrative efficiency must arise with the use of a Trips approach because of the volume of data required. Is the benefit (including the reliability) of the forecast trip estimates worth the cost and time devoted to obtaining them? Interviewees for this study have suggested that such studies are increasingly being done as a part of Councils' forward financial plans and normal capital budgeting activities. To the extent that this is so, then re-using this data to calculate rational developer charges is clearly desirable.

Other councils' Contribution Plans for roads (e.g. Wyong and Wagga Wagga) demonstrate an awareness of the need to identify the amount of traffic generated by different types of development, but do not indicate how this was estimated. Still others, especially ones for new urban release areas (e.g. Boambee Valley, Coffs Harbour, Castle Hill, Baulkham Hills and Horsley at Wollongong) simply estimate future roadworks required and divide this by the estimated population of the new area (without using present values). Simpler methods may be feasible for new release areas especially if the type of development is relatively uniform (e.g. all residential).

9.9.3 *Coffs Harbour City Council: Institutional Difficulties*

The Coffs Harbour City Council provides a good example of how institutional difficulties can arise when the demarcation of responsibility for roads between the three tiers of government is unclear. The Pacific Highway which runs through the centre of the city, has both a local and a main road function. The road is currently experiencing high levels of congestion. At the state government level, the official position is that it is

new development in Coffs Harbour which is causing the problem and hence the Coffs Harbour Council should be responsible for the necessary upgrading (financing the works from developer contributions). The Council, on the other hand, argues that the Pacific Highway is classified as a main road and thus the costs of upgrading it are a state responsibility. Meanwhile, apparently the road continues to be congested (Logues and Toon 1995:2).

Before concluding the discussion on roads, a final observation should be made. It is apparent that few Contribution Plans set out the criteria for deciding when new development pressures create sufficient congestion to necessitate an expansion of capacity. From an economic perspective, this is clearly an important issue in the cost of roads. Johnston (1995:1) provides relevant information here by setting out the processes which would 'normally be considered' by road authorities. The timing of extensions to capacity will depend on 'network efficiency' - which is 'how efficiently the network is at moving traffic between relevant origins and destinations' (Johnston 1995:2). Six levels of service are defined by Johnston. These range from free flow of traffic and excellent levels of 'comfort and convenience' through increasing discomfort and inconvenience, and slower traffic flows, until long delays result. Johnston argues that it will not be the theoretical level of traffic failure (Level F, which has the greatest inconvenience) which determines when improvements are necessary but the level at which local communities demand better conditions. The latter may vary between communities.

Whatever criteria *is* used in a local jurisdiction, it would seem important to publish this broadly in public documents. But even more importantly, efficiency principles suggest that supply side considerations (i.e. how much it costs to expand a road in a location) should also be taken into account. These appear to be being ignored in the processes being described by Johnston (1995). Rather than any 'automatic' progression up to a higher level of service, or as a response to community complaint, it is clear that the current congestion and maintenance costs of existing road capacity should be compared with the costs of capacity expansion in an area before decisions

are made. In some inner city areas, for example, one might expect expansion to be delayed. Neutze (1997:132) has argued as follows:

> ... the fact that roads are narrow and sewers are inadequate in some older parts of cities may not be a result of inadequate investment but rather a reflection of the very great cost of increasing their capacity. Short of demolition of all buildings and resubdivision, which itself would be economically and socially costly, such differences in service quality should probably continue.

9.10 *Concluding Remarks*

This chapter has analysed some of the conceptual problems in the application of developer charges to open space and roads infrastructure, examined real world practice and suggested some ways in which developer charges policy might be improved. For example, for open space, the need to support developer charges policy with studies determining the preferences of residents, especially where cost options have been included, has been stressed. For roads, a case has been argued that where through traffic cannot be avoided, and the primary purpose of the road has been to service a site, then the principle of apportionment of costs between final users might be reconsidered. The Chapter has also queried the practice of automatically upgrading roads standards by reference only to demand rather than supply (cost) considerations.

Aside from such specific observations, two more general problems are apparent from the examination of examples of calculation procedures, even where, as is the case for Hornsby Council, many other aspects of their policy are exemplary. The first problem concerns the formulae used by councils to calculate charges and the second is the problem of double dipping. With respect to deficiencies in the formulae, it is apparent that formulae do vary between councils, they are not tailored to the attributes of the infrastructure being considered and they do not take the time value of money into account. None of this is surprising, given that the Section 94 Manual emphasises only general principles and contains limited advice on specific formulae.

The Manual addresses the issue of the formulae used to calculate contributions in two places: in section 4.5 of the main text of the Manual and in Appendix D, a 'Sample

Contributions Plan' (New South Wales Department of Urban Affairs and Planning 1997:42, 74). In the former, it is stated (p. 42) that:

> While the formulas (sic) used to calculate the contribution ... may be expressed in a variety of ways, its general structure may be expressed simply as:
>
> $$\text{Contribution Rate} = \frac{\text{Cost of Facilities (\$)}}{\text{Increased Demand}}$$

The explanation given for this 'formula' does not say how the cost of facilities is to be ascertained, or recognise, for example, that only minimum efficient costs should be used. The word 'incremental' is not used to specify which costs and, in fact, it is clear that this formula assumes the simplest possible case of a calculation of a charge. This is where the facility is perfectly divisible and new facilities can be built to the exact size to cater for the increased demand. As we have seen, this rarely applies to leviable urban infrastructure. The explanation accompanying the formula fails to address any implications of the fact that the increase in demand may take place over a number of years. The same is true of the formula in the Sample Contributions Plan. Here, under the question 'what formula is used to determine the contribution?', the Manual (New South Wales Department of Urban Affairs and Planning 1997:80) suggests the following:

> The formulas used to determine the initial contributions are:
>
> Total Contribution (C_T) = \$ Cap + \$ Land – \$ ECon – \$ Grant
>
> THEN
>
> $$\text{Contribution per person } (C_P) = \frac{CT}{P}$$
>
> OR
>
> $$\text{Contribution per lot } (C_L) = \frac{CT}{L}$$
>
> where:
>
> \$ Cap - sum of capital costs for facilities which have been or which are to be provided.
>
> \$ Land - sum of land costs which have been or are to be acquired to provide the required public facilities.

$ ECon - sum of any existing contributions which have been previously paid towards the provision of the public facility.

$ Grant - sum of any grants, subsidies or other funding source which may be available to fund capital works.

P - anticipated increase in the total population for Mytown to the year 2005.

L - anticipated increase in the number of lots to be created to the year 2005.

This formula correctly points out that any grants from other levels of government must be deducted, in common with any existing contributions collected, but again perfect divisibility of infrastructure facilities is assumed. Also, P and L are described as the increase in population or lots respectively to the year 2005, but it is not explained anywhere why the year 2005 has been chosen. It is clearly *assumed* to be the time to 'build out' of the development site (expressed in terms of population or lots), or it could equally be the period after which new facilities will be needed. Either way, it is the estimated final demand (again, expressed in population or lots) for the facilities, and amongst which the cost of the facilities must be apportioned, but these assumptions are not stated anywhere. And again, the time factor is ignored.

Perhaps an even more serous deficiency in the formula advice in the Manual is the failure to provide any advice at all on how to calculate a developer contribution when it is intended for recoupment of the cost of facilities already built. This is an important omission because the Section 94 legislation states clearly that there are two situations when developer contributions can be exacted. These are: when the development requires new public amenities or public services to be provided (section 94(1)) - which is the circumstance assumed in the formula advice given; or when the development requires recoupment of public amenities or services which have been previously provided and will be drawn upon also by the development (section 94(2B)). A formula for the latter situation appears to have been avoided altogether. In sum, it appears that the formula advice given to local councils in the Manual is devoid of any theoretical context, omits recoupment issues altogether, and elsewhere fails to address some of the most obvious real world features or urban infrastructure.

The second general problem identified in the chapter concerns double dipping. It cannot be predicted with confidence just how prevalent this problem might be. One aspect which does seem to be clear is that where funding of assets is mixed (between recurrent sources and developer charges) there will be an awkward problem of identifying those assets already partly paid for by new development in various suburbs across local government areas. Moreover, each time any new asset is built, to which new development will contribute but existing development will also pay a share (e.g. a sports stadium of council-wide appeal), then a mixed funding arrangement will result, requiring the separate identification of the asset, an estimate of the amounts paid by whom and from where, and appropriate offsets to the general rates bills. The fact that councils do not make mention of this problem in policy documentation, at the same time as it appears to be quite a complex problem to overcome, leads one to suspect that for administrative ease, and because of a possible lack of awareness on the part of new residents, the practice of double dipping is implicitly condoned.

CHAPTER 10 DEVELOPER CHARGES POLICY IN PRACTICE: AN EXAMINATION OF NEW SOUTH WALES 'SECTION 94' POLICY: DRAINAGE AND OTHER INFRASTRUCTURE REQUIRED TO MITIGATE DEVELOPMENT IMPACTS

10.1 *Introduction*

In this chapter we continue the discussion of real world practice in calculating developer charges. The contribution items considered in this chapter differ to some extent from those discussed in preceding chapters. The chief difference is that whereas the services considered so far can be viewed as those which were provided (or extended) for development to *use* or derive a direct benefit from, the infrastructure examined in this chapter focuses on restoring service standards to pre-development levels: that is, to mitigate the impact of development. Accordingly, some of this infrastructure, like drainage and low income housing, may not actually be of direct benefit to, or used by, the development which will be charged for it. This affects the interpretation of some of the principles to be applied to calculate charges.

A diverse range of infrastructure is examined in this chapter. We commence with an investigation of developer charges for drainage. Drainage charges raise nine per cent of revenue accrued under Section 94 and these charges are levied by around 30 per cent of New South Wales Councils (Barnes 1995:54). However, this understates both the frequency and amount of revenue generated by drainage charges because some councils levy for drainage under Section 64 of the New South Wales Local Government Act 1993 (Toon 1995*b*:10).

Introductory comments on drainage are made in section 10.2. Section 10.3 outlines the findings of the PRC study on drainage and section 10.4 examines the economic attributes of drainage. A discussion of the key issues and determination of charges occurs in section 10.5. We focus on methods used in two councils, Wagga Wagga (section 10.5.1) and Liverpool urban release areas (section 10.5.2). Following drainage, the discussion moves to items which are less frequently levied and which could perhaps be termed 'novel' applications of Section 94. The first such item is the levies for affordable housing in two Sydney councils; Waverley and North Sydney

which are discussed in section 10.6. We follow this with an investigation of how developer charges on extractive industries for road use were determined in Baulkham Hills Shire Council in section 10.7; and then to charges for tourism impacts, looking firstly at Cessnock City Council in section 10.8.1 and then to Coffs Harbour in section 10.8.2. The final type of charge examined briefly in section 10.9 is that for protection of Koala habitat. Some concluding observations are made in section 10.10.

10.2 *Drainage Services*

Techniques for the provision of drainage services are under review in New South Wales and some other states (Industry Commission 1992:130-132). Environmental impacts and institutional problems apparently lie behind the current reassessment of drainage infrastructure. As the Industry Commission (1992:131) noted, problems appear to be especially bad in Sydney:

> In Sydney, perhaps more than in any other Australian city, local council provision of drainage services has created significant environmental problems. Local Council boundaries often do not align with natural catchment areas, so it is difficult to sheet home responsibility for adverse environmental effects to the Local Council concerned. Local Councils are responsible for the provision of drainage services, but it is the SWB [now Sydney Water Corporation SWC] which is judged on the condition of the waterways. The SWB contends that its efforts to improve the condition of the waterways through improved sewage treatment are impaired by the effects of drainage.

Among the options being considered to address some of these problems is the physical integration of sewerage and drainage systems. For example, at Rouse Hill in Sydney, the ownership of the drainage infrastructure has been vested with the Sydney Water Corporation (which is responsible for sewerage), so that infrastructure can be built in the most effective place in the catchment (Industry Commission 1992:132). Other possibilities explored by academic researchers involve a fundamental reappraisal of the nature of sewerage and drainage infrastructure itself (e.g. Civil Engineers Australia 1996:28, Troy 1996:82-93; Neutze 1997:88-90, 158-60, 249-50). In the United Kingdom it has been estimated that meeting European Community wastewater pollution targets using 'traditional' sewerage and drainage systems would be extremely

costly. Suggestions for lower cost systems include making greater use of natural drainage channels and introducing drainage controls closer to water sources (Civil Engineers Australia July 1996). Single pipe systems which follow natural drainage systems are envisaged, together with retention measures at source, whenever flows will exceed downstream sewer capacities. Neutze (1997:249) gives some examples of such retention measures. They include installation of storage basins which retard stormwater run-off and permit stormwater to be used for watering local public space. Designing wetlands or ponds to allow nutrients, sediments and pollutants to settle out so that downstream discharge is cleaner is another option as is directing stormwater discharge to local playing fields. All three measures reduce the requirements for downstream drainage capacity.

An option being considered at state level in New South Wales is that local councils be charged for their discharges into major trunk drainage systems (Industry Commission 1992:131). Making local councils accountable for the amount of run-off leaving council boundaries is seen as implementing the principle that those responsible for downstream effects should be made to bear the responsibility for them. Troy (1996:85) argues that local councils and developers have been adopting 'bugger thy neighbour' approaches by making sure that land for which they are responsible is well drained, but with no concern for those lower down the drainage basin. With regard to developers, Troy (1996:176) suggests that all new developments should be required to ensure that no more run-off occurs after development than prior to development, including the amount of run-off at peak flow. This policy is termed 'zero impact' and has become a requirement for newly developed urban sites in north America (Neutze 1997:158, 249). If zero impact cannot be achieved on a site, then developers are required to pay the cost of offsite facilities needed to maintain pre-existing water quality and flow levels further downstream. Lee (1988:301), working in the north American milieu, is more specific about how developer charges should be designed in this regard, arguing that developers should be presented with a choice:

> Impact can be measured directly as the peak volume of run-off leaving the site, after development, with the impact fee based on the cost of absorbing that run-off elsewhere. If on-site devices can be fashioned to reduce run-off to zero, then there should be

> no impact fee. In contrast, paving over a hillside would result in the maximum fee.

In advocating a similar policy in Australia, Neutze (1997:159) argues that developers have an incentive to examine on-site absorption storage and re-use possibilities, and since drainage costs do vary significantly by location, it would also provide an incentive to subdivide land where stormwater can be dealt with relatively cheaply. Neutze (1997:159) does note that 'there may be difficulties in calculating the cost of off-site facilities', but adds that 'these would be no greater than making the cost estimates for implementing some other aspects of developer charges'. If alternatives can be accurately costed, then Lee (1988) and Neutze's (1997) suggestions might represent the economically optimum solution. Developers, in choosing the cheapest alternative, would also choose the most socially efficient from the point of view of the community as a whole.

10.3 *PRC Study Findings on Drainage*

The PRC study of Contribution Plans ranked drainage as the poorest performing of all the contribution items examined (PRC 1994:122-24). According to the PRC, purpose, nexus, and the costing of works schedules were inadequate and apparently many of the key requirements of document preparation were also not fulfilled. Moreover, Plans were apparently poorly set out and written. Toon (1995*b*:7) reported that 'costings were often presented in a cavalier manner with little or no explanation of how they were formulated'; and works programs seldom presented a time frame. This led Toon (1995*b*:7) to remark that 'this assessment suggests to me that drainage engineers have either found the requirements for CP's to be rather boring or not felt it necessary to justify their proposals'. Toon (1995*b*:7) recommended that:

> Drainage CPs should be conceptually approached more like contribution plans and less like engineering plans. They must be more coherent, with better justification, better expression and closer links to a council's other contribution plans.

The PRC (1994:124) also reported that they found no drainage Contribution Plans that had mentioned a concern for efficient pricing or user pays.

10.4 *The Economic Attributes of Drainage*

In common with water and the other urban infrastructure assets examined thus far, drainage infrastructure can be capital intensive, location specific, durable and relatively indivisible. The calculation of developer charges therefore confronts many of the same issues as we have previously discussed, not least of which is the excess capacity problem and the need to forecast 'final demand' for drainage assets.

However, there are some notable differences in the characteristics of demand for (as distinct from supply of) drainage compared to those for water. These have distinctive implications for the calculation of charges. Using terminology employed by Neutze (1997:88-90), water and drainage can be said to have a demand that is both collective and individual. For example, for water there is an individual demand for the commodity itself (water) to be supplied to individual properties, and there is a collective demand for water as a health, or at least disease prevention measure. Similarly, for drainage there is an individual demand for stormwater drainage to avoid flooding on individual properties but there is also a collective demand to avoid general flooding from the run-off from properties, roads and public spaces in order to prevent environmental damage and damage to the property of others. For drainage it is the collective component of demand which is the largest, whilst for water it is the individual component which is most significant. One of the key consequences of this difference is that those who should bear the costs of a developer charge for drainage are those who give rise to the need for measures to avoid harm elsewhere. By contrast, with water, those who should pay the developer charge are those who derive a direct benefit from consumption of water. The essential point here is that for drainage, developer charges might be more correctly viewed as an application of polluter pays principles, whereas for water it is user pays principles which apply.

One implication of this is that the apportionment principle which, according to the Section 94 Manual, requires distribution of costs amongst beneficiaries may have to be reconsidered. Strictly speaking, it can be argued that it is not the *beneficiaries* of

drainage services who should be charged, but rather those who gave rise to the need for these services.

Another contrast between drainage and water services resides in the fact that it does not appear to be administratively feasible to recoup costs through recurrent charges based on on-going consumption of drainage services. Moreover, even if it were feasible, few efficiency gains would ensue. As we have seen, when usage prices can be charged, signals are sent to service providers as to the optimum capacity of service to provide. However, drainage capacity is influenced mainly by peak stormwater run-off. Day to day usage in between these peaks will have a zero marginal capacity cost. Whilst peak run-off may be reduced by one-off consumer actions (such as collection of roof run-off and planting trees), it is the initial long term decisions of developers and consumers (such as the choice of site, its slope characteristics and the amount of impermeable area) which will have the most significant influence on drainage capacity requirements. It seems likely that a more effective response to signals about drainage capacity costs will take the form of a locational decision at the time of purchase of a home or industrial site rather than in any form of usage charge. Drainage may be an example of an urban infrastructure asset for which upfront developer charges are particularly suitable, provided the price signal is relatively accurate, and includes the costs of mitigating any downstream impacts.

10.5 *Key Issues and the Determination of Developer Charges in Practice*

If the price signals provided by developer charges for drainage are to be effective, then charges must reflect the cost of all the drainage requirements caused by a development. However, unless all run-off is retained on site, drainage infrastructure will sometimes be required in areas separate from the sites causing the infrastructure. For the purposes of determining a catchment area for developer charges - that is, an area which identifies the land blocks to be charged - costs of drainage infrastructure located in one area would have to be assigned to the 'polluting' area. This requirement is straightforward in principle, but in real world situations it becomes clear that the link between cause and effect is complex: any particular drainage asset is often the result of many upstream causes.

We commence the examination of real world practice with the example of Wagga Wagga Council. This council is in an area where drainage problems are acute. Kerwan (1995) offers a rare insight into the views of a Section 94 policy officer on the problems of determining developer charges for drainage in Wagga Wagga.

10.5.1 *The Determination of Developer Charges in Wagga Wagga*

The Wagga Wagga City Council expects population growth in its urban area of around 17,000 between 1991 and 2004 (Wagga Wagga City Council 1993:21). Population growth is anticipated in all suburbs, with the highest growth forecast in the southern suburbs and the least growth in the outer areas. To cater for this growth, some 23 drainage projects have been identified. These consist of trickle flow pipes in existing drains, stormwater pump stations, open drain lining and contour banking. They will be required in various parts of the city.

The 23 drainage projects are estimated to cost $2.57m. of which $0.59m. has been allocated to be paid for by existing sectors and $1.98m. costed to new growth, payable through Section 94 contributions. The Contribution Plan does not discuss the apportionment process at all, but lists, in an appendix, all 23 projects with a percentage alongside (most commonly 100-0, 80-20, or 50-50) designating the split for each project between Section 94 and other funding. In a second appendix, each project is then allocated to one of 15 designated urban zones. In most cases, the allocation is one project to one zone, but in three instances the costs of a project are spread over more than one geographic zone. In a third appendix, the cost of projects allocated to each zone is tallied for each zone.

Having determined a cost of drainage projects per zone, the developer charge per dwelling in a zone is calculated by dividing the cost of projects by the expected number of new dwellings in that zone. For forms of development other than an 'average dwelling house', an 'average dwelling house equivalent' is calculated for that type of development. For example, an average dwelling house is considered to have a roof area of 200 square metres, and if the drainage contribution per dwelling in zone 1

is $863.79, then the developer charge for a 20 unit motel development in zone 1, where the roof area for each unit is 40 square metres and there is also one residence of average house size, would be calculated as follows:

$$\text{Number of equivalent houses} = \left(40 \text{ sq. m} \times \frac{20}{200}\right) + 1 = 5$$

$$\text{Developer charge for drainage for motel} = 5 \times \$863.79 = \$4\,319$$

Industrial developments are also converted to dwelling equivalents in order to arrive at a charge (see Wagga Wagga City Council 1993:17).

The Wagga Wagga Contribution Plan for developer charges for drainage envisages a charge for the 23 new projects over the period 1993-2004. Per dwelling charges are calculated on the basis that the initial capital cost (in nominal terms) must be repaid over the period of the Plan. There appear to be no charges for planned excess capacity in existing headworks or major works (comparable, for example, to charges for water headworks, such as dam or reservoir capacity).

There is insufficient explanation in the Wagga Wagga drainage Plan to provide a detailed understanding of how each project was allocated to a charging zone. There could be a suspicion (because so few projects are charged to more than one zone) that those located in the zone in which the work is being done are being charged for the project, rather than those causing the works. However, it should also be noted that many of the projects listed appear to be relatively small scale developments so that it could not be safely assumed that the area requiring the works was not also the area in which the works are being undertaken. Kerwan (1995:8) does not provide an answer to this question but does lend some insight into the problems encountered by Section 94 policy makers in Wagga Wagga City Council when attempting to define catchments for drainage.[1]

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[1] The problem of defining 'catchments' for Section 94 purposes - that is, areas to be charged for the cost of drainage works - is not made easier by the fact that in the context of drainage, a 'catchment' is also the area or drainage basin into which flows are directed. Because drainage works may be in an area remote from those contributing to the flows the two areas will not always be identical.

In arguing that defining catchments is one of the principal problems in assessing developer contributions for drainage, Kerwan (1995:8) observed that:

> In many instances, there are catchments within catchments. If councils assess contributions on a sub-catchment basis, then inevitably there would be higher costs for a small number of dwellings and thus contribution rates would be unreasonably high. Conversely, the larger the catchment the "easier" it is to distribute costs across a larger number of dwellings. This would also mean there is more chance Council has to pay some of the costs to meet the "established" sector's proportion. The larger the catchment, the greater the possibility of "upstream" development paying for works carried out "downstream" ...

Various pertinent issues arise. Firstly, if Kerwan is conceding that the larger the defined catchment, the greater the chances of getting Section 94 charges to meet the established sector's proportion of costs, then this clearly contravenes the apportionment principle, but probably reflects his concern about the buildup of the existing sector's liability for drainage projects deriving from drainage requirements for new development (Kerwan 1995:12). This is the same problem as we encountered in the discussion on roads, where we argued that there may be a case for reconsidering the apportionment principle and charging new development for the full cost of roads required by them. The idea can be restated more formally as follows: if building a road of a standard required for new development, also provides incidental benefits to the existing sector, there may nonetheless be an economic case for charging the full cost of the road to new development. In the context of drainage, Kerwan (1995:8) provides a similar example:

> An example in Wagga Wagga has been the construction of a detention basin to hold water in a small part of a large catchment, before water enters a piped drainage system and thence into the Murrumbidgee river. This piped system is nearing capacity. Therefore, as well as benefitting immediately adjoining areas, the detention basin frees up capacity in the piped system and thus benefits the larger catchment as a whole.

Whilst Kerwan appears to accept that this might be an instance which supports the case for larger catchments generally, it will be helpful to clarify the application of the apportionment principle in instances such as the example given. The principle which

might apply here, is the same as that for roads. If building drainage capacity to a minimum efficient scale also provides incidental benefits for existing development, there is nonetheless a case for new development to pay the full cost of capital works. In other words, the catchment area (for Section 94 purposes) would include only new development. However, if at the same time as building sufficient capacity to handle new development, it is more efficient to also install now, rather than later, extra capacity for existing development, then that share of capacity should be charged to existing development. Having established this principle, the next question to be investigated in discussion of the issues raised by Kerwan (1995) is how can the new development which caused the work to be undertaken in the first place be identified? Whilst it is true that for small scale local drainage works, both the cause and the works to deal with it may be in the same area, the problem clearly is that the further downstream the drainage basin is situated the greater the upstream contributors to the need for this capacity. Downstream works become analogous to the headworks for water, except that they are needed at the end rather than the start of the service network. Accordingly, the larger the catchment area defined, the more the 'price' of drainage services will be averaged across the area so that potential locational signalling benefits will be lost. On the other hand, the smaller the area, the more potentially effective the signals, but the higher the risk of charging some areas for a portion of works necessitated by other developments outside the area. Kerwan (1995:8) concludes that in the Contributions Plan Wagga Wagga Council may have been 'simplistic' in its definition of catchments.

The solution to this dilemma may be that the problem is not so much an 'either or' issue of larger catchments or smaller catchments in the terms in which Kerwan (1995) has presented it, but rather a question of defining catchments in a hierarchical series similar in concept to those described in the discussion on open space. Liverpool City Council (1995) Contributions Plan No. 6 for the new urban release areas of Cabramatta Creek, Carnes Hill and Prestons appears to provide an excellent example of how this might be done.

10.5.2 *The Determination of Developer Charges for Drainage in Liverpool Urban Release Areas*

The Liverpool City Council (1995) Section 94 Contributions Plan No. 6 relates to the new release areas of Cabramatta Creek, Carnes Hill and Prestons. Together these three precincts are estimated to have a development potential of 10,910 conventional residential lots between 1993/94 and 2006/7. Subsequent development of three other areas (Cecil Hills, Aerodrome and Edmondson Park) will complete what is described as the Hoxton Park Stage II release areas. The development potential of the entire Stage II is estimated to be 20,050 conventional lots, some industrial and commercial land and a total population of around 74,000. No time frame has been determined for the development of the final three areas.

The Contributions Plan for drainage for the new release areas outlines how the development of new areas can lead to significant change in the run-off characteristics of drainage catchments and how these factors may exacerbate flooding problems in areas remote from the development areas themselves. To offset these impacts, the Plan describes a drainage system known as Option A3. In essence, this system appears to comprise a series of wet and dry detention basins which will release water sequentially into the downstream drainage system. Technically, in the Council's words, 'the scheme relies on the principle of controlling differential catchments response rates to optimise the required basis storage capacities' (Liverpool City Council 1995:55). The scheme offsets the impacts of development both on creek tributaries within the release areas and on those downstream of the release areas, so that it is judged to be a 'district' level catchment where the entire release areas are to contribute to the cost.

The cost of option A3 is estimated to be $21,752,000. To estimate a developer charge the Council uses as the denominator, not the 10,910 potential lots estimated for the three areas which the Plan covers, but rather the 20,050 potential lots plus 6735 equivalent conventional lots to which the industrial and commercial land areas are converted. In other words, there is an attempt to estimate the final demand for the drainage facilities before calculating a per lot charge although (as we have already

noted to be common practice), the time period to final demand is not taken into account.

Having identified a district level charge, the Liverpool Plan then specifies 12 local catchment areas within Cabramatta Creek, Carnes Hill and Prestons. Each of these catchments contains projects ranging between $95,000 and $6.3 m, averaging around $1.6 m per catchment. Each catchment also forms a drainage system within the larger system. The charge for each local catchment is calculated by dividing the capital cost by the estimated conventional residential lot equivalents in that area. The local charges vary between $407 per lot and $1792 per lot, with a modal value around $1500 per lot. These local charges are then added to the constant district level charge (of $812 per lot) to arrive at a final developer charge for each area. There seems little doubt that the actual process of delineating catchment and sub-catchment areas in the three release areas involved judgements of less certainty than the precision implied in the final document. However, the Liverpool method appears to be a rational approach to the problem of providing drainage services and it also provides a degree of local variation in charge according to different drainage costs.

One aspect of both the Liverpool and Wagga Wagga Contribution Plans which is commendable is the way capital charges within a catchment area are allocated according to the relative (drainage cost) impacts of different types of land development. For example, conventional residential lots, schools (with sealed surfaces) and shopping centres are all allotted varying run-off coefficients according to their potential impact (see Liverpool 1995:82). Drainage Contribution Plans of other councils (see, for example, Wyong Shire Council 1995, Penrith City Council 1993 and Blacktown City Council 1993) appear to simply use a denominator which measures 'developable' area (e.g. in hectares). This measure would not account for the differential impacts of varying land use.

One further issue regarding drainage contributions which should be mentioned is that there appears to be a view among commentators that greater use could be made of the opportunities to combine drainage and open space requirements (see, for example,

Toon 1995*b*:10; Kerwan 1995:14). For instance, in Sydney some councils are creating wetlands both for scenic amenity as well as for drainage and water purifying purposes (Glencross-grant, R. 1998, pers. comm., 29 Jan.). Toon (1995*b*:10) notes that in the past it has been commonplace for councils to delineate drainage reserves and then determine open space requirements according to formulas related to population.

A final issue on which comment should be made here concerns the trend for councils to remove drainage from Section 94 Plans and to levy for it under Section 64 of the New South Wales *Local Government Act 1993*, from which authority (as we noted in Chapter 8) water and sewerage charges are now levied. Toon (1995*b*) is unhappy with this trend and argues that councils perceive the benefits to be that drainage plans and costs are not therefore subject to the same degree of transparency and accountability as is required with Contribution Plans. Toon (1995*b*:10) adds that 'costs of works can be inflated at beneficial rates by avoiding the impact of the Allsands decision'. However, because of the new views on how drainage should be provided, and in particular the preferences for integrating the water-sewerage-drainage cycle, it may make sense to bring drainage arrangements into line with those of water and sewerage. As we have already observed, drainage assets can have long lives and contain excess capacity for lengthy periods in common with water and sewerage assets, and accordingly there is a broad similarity in the issues affecting calculation methodology. In this regard it may be better to bring drainage within the purview of the New South Wales Independent Pricing and Regulatory Authority (IPART) which is a consequence of transferring authority to Section 64. This may ensure that Development Servicing Plans are prepared and that a greater uniformity of contribution assessment procedures ensues. Moreover, the IPART proposed procedures (as we have seen in Chapter 8) are for the most part consistent with the efficiency principles recommended in this study. In addition, the IPART proposals do contain avenues for redress if issue is taken with the amount of charges assessed (although they may not be as powerful as the appeals process under Section 94). At the time that Toon (1995*b*) was expressing his concern about the transfer of drainage to Section 64, the nature of IPART's proposed reforms for both metropolitan and non-metropolitan areas were not known.

10.6 *Key Issues and the Determination of Developer Charges for Affordable Housing: Waverley Council and North Sydney Council*

Two Sydney councils, Waverley and North Sydney, levy Section 94 charges to replace affordable housing when its availability is reduced as a result of development. Both councils have had a history of involvement in low income housing - North Sydney since the mid-1970s and Waverley since the early 1980s - and both councils had Section 94 levies for housing in place before the Simpson Inquiry reforms of Section 94 practice (Cox 1995, Bishop 1995).

The basic idea of both programs is that if development of a residential area means that the area ceases to be used for residential purposes, or if it remains a residential property but 'there is a net loss of housing or any loss of low to moderately priced accommodation', then a charge will be levied (Waverley Council 1996:19). The revenue collected is then applied towards the cost of each councils' affordable housing programs. Typically, the projects in each program involve joint ventures with the Department of Housing to augment the supply of housing for aged, disabled, or low income tenants. North Sydney Council has published figures on the loss of affordable housing through development applications between 1984-85 and 1994-95 (Cox 1995:23). The figures fluctuate from one year to the next, but for the ten years from 1984-85 to 1994-95 the average annual loss was 91 bedspaces per year. Between 1990-91 and 1994-95 the annual average loss was 89 bedspaces per year (Cox 1995:23). The Council reported that development pressure prior to the Sydney Bicentennial in 1988 led to acute losses of low income bedspaces in boarding houses when these were converted to tourist uses. Concern has been expressed that this trend will accelerate in the period preceding the 2000 Olympic Games (Cox 1995:26).

An implicit assumption of the local government claim that replacement housing is necessary is that there is insufficient excess capacity in the existing low income housing stock to absorb the losses created by development. In this respect, Cox (1995:25) examined the rental housing vacancy rates in North Sydney and confirmed a rate below

the three per cent deemed by the industry to represent a situation of no excess capacity.

10.6.1 *The Method of Calculation of Charges*

The methods of calculation of charges by each council are broadly comparable. Waverley Council calculated the average replacement cost of a bedroom in Waverley in 1992 and indexed this amount to 1995 prices. In joint ventures with the Department of Housing, the council normally contributes 20-30 per cent of the total replacement cost of a bedspace. For 1995, the council's cost contribution towards replacing bedrooms was estimated to be $24,514 per bedroom (or 25 per cent of the estimated full replacement cost). The developer is not required to contribute the full amount of council's share in the cost of replacing a bedroom, but only 25 per cent of this amount (i.e. 25 per cent of council's 20-30 per cent share in the cost of replacing a bedspace). That is, for every bedroom the development takes away, the charge will replace only one quarter of the council's costs to replace that bedroom. The actual contribution rates specified in the 1996 Contributions Plan are $6,144 per bedroom lost for developments where the property is no longer used for residential purposes, and $3,993 for properties which remain residential but are strata titled and/or upgraded. The latter figure is calculated at 65 per cent of $6,144 because council's research indicated that change to strata title caused a loss of 65 per cent of rental accommodation. Thus, for example, for a block of six two-bedroom flats, if approval was given for strata subdivision, the levy would be $47,916 ($3993 × 12). Alternatively, if approval was given for demolition of the flats and replacement by a commercial building, the levy would be $73,728 ($6,144 × 12).

For North Sydney Council, the actual derivation of a rate is less clear. The contribution rate is described as also being based on 'a proportion of the construction cost of a one bed unit' (Cox 1995:19). The rate as at July 1995 was $1710 per bedspace lost, although an increase to around $2500 per bedspace lost was foreshadowed (Cox 1995:55). The latter rate was estimated in 1995 to be one-fifth of council's actual cost of replacing a bedspace (Pearce, M. 1998, North City Council, pers. comm., 4 February).

The fact that the contribution rate is only one-fifth of the cost to council of replacing a bedspace for North Sydney, and one-quarter of the cost in the case of Waverley, appears to be a generous discount, and it is quite possible that this is the impression both councils wish to convey by expressing their contribution rates in this way. However, the extent to which the levies are in fact concessional, in the sense that developers are levied for something less than the actual incremental cost which will be incurred by the councils in responding to the need created, will depend on whether it is council policy to actually replace each bedspace lost on a one to one basis. In fact, it appears that the replacement rate is something less than this. The Waverley Council Plan does not provide any information, but figures supplied by North Sydney Council to Cox (1995:45) indicate that the existing council policy has been to supply one bedspace (funded by Council in combination with other housing authorities with whom they enter joint venture arrangements) for every seven bedspaces lost. On this basis, the revenue from the current levies will actually enable the council to upgrade slightly its replacement rate policy since the levies are based on a one to five replacement rate, *ceteris parabus*. The conceptual difficulty here is that the marginal capacity cost of responding to the need created by development will depend on council policy: that is, it will rise if council's replacement rate rises. The current situation in North Sydney Council might be construed as upgrading the standard of policy (or charging more than the current marginal cost based on existing policy) in which case the council's levies may be susceptible to legal challenge as being unreasonable. However, this is not an aspect which has been raised in the literature.

10.6.2 *The Legal Context of Housing Levies and Section 94 Policy*

The housing levies of both councils have been challenged in the Land and Environment Court. In Waverley's case the challenge occurred in 1989, whilst for North Sydney it appears there has been several challenges (see Simpson 1989:120 and Cox 1995:50-52). The levies in both councils have withstood these legal challenges. The details of these legal cases cannot be discussed here, but it appears that the principles in each case endorsed a point emphasised by Simpson (1989:120); namely, that if a nexus can be established with adequate documentation, then the challenges are

less likely to be successful. For example, in a challenge to North Sydney Council in 1994, aspects of the case which reflected in the council's favour (Bishop 1995:9-10) included the fact that the aims of the council's housing policy were written in the Contribution Plan, also in the Local Environmental Plan, and in supporting Housing Policy documentation; that council was able to prove to the Court that the development would result in the loss of low to moderately priced accommodation because the rent levels applying to the property were less than the median weekly rent for North Sydney; and that the amount of the levy (at that time $1600 per bedroom) was considered to be not unreasonable because it was based on 'the actual cost of replacing one bedroom for every 15 bedrooms lost' (Bishop 1995:10).

It might be added that it seems unlikely that other councils will be able to emulate the success of the two Sydney councils as far as housing levies are concerned. To the lay observer, it appears that the fact that the councils already had housing policies in place was important - it was only through this that an obligation could have been imposed on the councils to restore the negative impact of the development.

The 1997 Section 94 Contributions Manual does not include any advice or direct comment on levies for affordable housing. It appears to be seeking to discourage such levies in the following extract (New South Wales Department of Urban Affairs and Planning 1997:16):

> The proponents of impact mitigation programs argue that while there are benefits of new development (e.g. employment generation, housing diversity), there are also negative impacts which developers should mitigate. Such impacts include gentrification, displacement of poorer people, additional commuters on transport systems.
>
> Whereas s.94 is a contribution for the share of increased demand for public facilities created by development, impact mitigation fees seek to offset the negative impacts of development. Section 94 does not enable the negative impact of development to be compensated for through a form of development tax. For this reason, impact mitigation fees are excluded from consideration under s.94.

The quotation illustrates some of the interpretative difficulties associated with Section 94 policy. It can be argued that Section 94 does enable the negative impacts of development to be compensated because the housing levies of Waverley and North Sydney have withstood legal challenge. Moreover, if it were strictly true that Section 94 did not permit negative impacts to be compensated, then levies would not be possible for downstream drainage problems caused by development, or for road levies on mining development where heavy vehicle use will lead to a deterioration in the road standards for non-mining use. Not only does the Manual condone levies such as the mining levy, but it also suggests that this is an area where the reach of Section 94 may be extended to include recurrent costs. For example, the New South Wales Department of Urban Affairs and Planning (1997:32) has observed that 'Where as a result of development there is excessive wear and tear on roads, contributions may be sought for the ongoing maintenance of the road ...'.

In instances where it can be demonstrated that negative impacts of a development will impose a fiscal burden on council, there are strong equity and efficiency arguments for including these costs into the 'price' of development. As discussed in Chapter 7, the central theoretical pillar of environmental economics is the Pigovian tax (see Cropper and Oates 1992 for a survey of the environmental economics literature). This tax can have one of two effects. First, it can lead negative externality producers to contract their activities to more optimal levels (this is the aspect concentrated on by environmental economics theoreticians). And secondly, it can create a fund which can be earmarked for restoration purposes (this aspect is apparently emphasised in Pigou's later writings - see Andersen 1994:4, 36-39). Moreover, as Lee (1988:291) has observed, the negative impacts 'act as prices on the undesirable side effects of development, and serve to internalize environmental costs that would otherwise be imposed on others as a result of the development'. For example, it does not seem reasonable to charge existing residents for road repairs caused solely by quarry trucks. Thus, there is an argument for retaining impact mitigation levies (or, more precisely, an argument for retaining *fiscal* impact mitigation levies, if we wish to distinguish these levies from the broader impact mitigation fees which apply in the United States (see Collignon 1991:118)). This is so provided that a

clear nexus can be demonstrated between cause and effect (see later discussion on tourism impacts where we argue that this cannot be demonstrated). We proceed shortly to a real world example of the use of road levies for extractive industries, but to sum up this brief examination of housing levies, we can say that the calculation of the levies for affordable housing in North Sydney and Waverley gives the impression of having some 'science' to it but on closer inspection requisite pieces of information are missing in the Contributions Plans. The determination of the marginal cost to council of restoring the housing mix to the pre-development standard requires knowledge of councils' pre-development replacement rate policy. Neither council presents this as part of their calculation procedure. We have also noted that other councils are unlikely to be successful in levying charges for affordable housing, unless they have had a history of local council assistance for this purpose. Finally, the Section 94 Manual appears to discourage levies, such as the housing levies, but it can be argued that there may be good economic grounds for retaining them, and they do not appear to be inconsistent with Section 94 principles any more than some of the more common levies (such as drainage).

10.7 *Key Issues and the Determination of Developer Charges on Extractive Industries: Baulkham Hills Shire Council*

Some of the key issues involved in levying extractive industries for road reconstruction and maintenance are exemplified by the experience of Baulkham Hills Shire Council. This is so largely because of a legal challenge to a proposed levy in 1989. In this section we examine the contents of the Baulkham Hills Contributions Plan for extractive industries and then discuss aspects of the judge's decision in the appeal against the levy. The latter contained important information as to how the charge was set.

The Baulkham Hills Contributions Plan for extractive industries (Baulkham Hills Shire Council 1993) begins by identifying the areas within the shire where extractive activities are permissible. In an attempt to articulate a nexus, the document then summarises some of the key points in another council plan, notably the 'Plan of Management of Extractive Industries at Naroota', where the nature and quality of

deposits are identified, and attention is drawn in particular to where the Management Plan has noted that the poor state of the road is a constraint on future development. The Contribution Plan then directs attention to the significance of the extractive industries in the shire and the 'continued strong demand to serve the Sydney Markets resulting in more heavy extractive industry vehicles' (Baulkham Hills Shire Council 1993:5). The intention to levy a charge for damage to roads by extractive industry vehicles is spelt out (Baulkham Hills Shire Council 1993:5) in the following paragraph:

> Damage to road pavements due to heavy vehicles is an impact of particular significance to the extractive industry developments in the shire. Where a development will result in significant movements of heavy vehicles on the road system and the existing road is inadequate to carry the additional loads in the short term, a contribution to the cost of maintenance, repair and reconstruction will be required by Council.

The Plan then states that the levy (for 1993) will be set at 56 cents per tonne of extracted material which is an indexed value of the 1989 rate set by the Court. The Plan discusses administrative and implementation matters such as the annual indexation of contributions and the presentation of the financial information in the accounts. Moreover, since the developer charge is expressed as a levy per tonne of extractive material, the Plan prescribes that the charge be paid on a monthly basis after council has received certified copies of weighbridge dockets or other records showing the 'true quantities' of extractive or processed material transported in the preceding month (Baulkham Hills Shire Council 1993:7).

Since all that the quotation above does is assert that damage is done, the two glaring omissions from the Baulkham Hills Plan from an economic point of view are the discussion of how the amount of road damage inflicted by heavy vehicles might be estimated, and hence how the figure of 56 cents per tonne (or 50 cents per tonne as it was originally set in 1989) was actually derived. It is this information which can be found in the Court judgement (Stein 1989).

The judgement in the appeal against the road levy in 1989 is valuable because the judge settled on a method of calculation of a levy which would, in principle, correctly

identify the incremental cost of the damage done. However, the judgement also shows just how difficult implementing this approach can be. Some of the questions which must be answered before a levy can be calculated are indicated in the judgement. They include:

- which roads will be affected and over what lengths of road?
- over what time period will the trucks be using the roads?
- how much daily traffic will the industry generate?
- what tonnage will the trucks be carrying?
- what damage do heavy vehicles do compared to normal cars? How many of each type of vehicle will be using the road?
- how many heavy vehicles will be using the roads other than those for the industry for to which the levy will apply?
- what is the pattern and extent of the use of the roads currently and how much maintenance is done on the roads?

In attempting to answer these questions, Justice Stein began by identifying the roads that would be affected (Old Northern Road and Wiseman's Ferry Road) and the relevant lengths of the roads over which damage could be assessed (e.g. sections of these roads outside the Baulkham Hills' local government area could not be included). The judge then accepted expert evidence to the effect that one five axle truck does an amount of damage equal to 37,600 cars (or 41,400 cars if it is a 'spread tandem' (Stein, 1989:11). This evidence suggests that car travel on the road can be ignored. Regarding other heavy vehicles using the road, the judge indicated that a 75 per cent/25 per cent ratio had been assumed (25 per cent being the use by other heavy vehicles). He then proposed an 'incremental cost approach' to calculating the levy which is described by Stein (1989:11) as the difference between costs as they would be incurred without the extractive industry operations and those as they could be incurred with these operations, and charging this difference to the extractive industry concerned.

In weighing up expert opinion given in testimony as to variables such as the volume of traffic and costs of damage, Justice Stein (1989:11) noted a significant amount of disagreement:

> The experts disagree about traffic counts and the number of ESAs [equivalent standard axles] referable to heavy trucks and extractive industry. They disagree in some respects about what should be done to repair and reconstruct the roads. They disagree on the costs of the work and on what proportion should be borne by the extractive industry. They also disagree on the tonnage from extractive industry presently (and in the future) being hauled down the roads.

Notwithstanding these differences in opinion, the judge concluded after 'balancing the evidence' that 90 cents per tonne was a 'fair and reasonable rate of contribution' for Old Northern Road and 40 cents per tonne for Wiseman's Ferry Road (Stein 1989:13). However, rather than charging the two roads at different rates (and running the risk that heavy vehicles would elect the cheaper route and incur greater damage on Wiseman's Ferry road), the judge chose a figure of 50 cents per tonne for both roads. He concluded that (Stein 1989:13):

> It may be thought that these results are somewhat arbitrary but they are an attempt to determine a reasonable figure, taking into account the large number of imponderables and discrepancies in the expert evidence and my assessment of these differences. I am firmly convinced that 50 cents per tonne achieves the desired goal at a reasonable result.

The underlying incremental cost approach used by Stein is clearly in accordance with calculation principles recommended in this study, and the Baulkham Hills experience is valuable insofar as it provides a good model to follow. If, in other proposed levies, these data and procedures are transparent, as they are in the Stein judgement, it is less likely the levy will be challenged.

10.8 *Key Issues and the Determination of Developer Charges for Tourism Impacts*

Tourism development levies were foreshadowed as a possible new area to move into by several Section 94 officers interviewed for this study. Moreover, the PRC study team (Toon 1995*c*:5) noted that use of these levies might increase:

> Very few councils levy for tourism yet it is an activity that profoundly shapes the demand for services and facilities in many Council area. The Review Team is of the opinion that the incidence of tourism levies is likely to expand.

However, on close examination, it appears that developing an acceptable method for determining tourism charges is quite problematic. In this section we begin by examining the Contributions Plan for Tourist Development levied by Cessnock Council (Cessnock City Council 1993). This seems to be one of the first examples of this type of levy. We will also look briefly at Coffs Harbour's Contribution Plan for Beach Protection Works and Surf Life Saving Equipment.

10.8.1 *The Determination of Tourism Development Charges at Cessnock City Council*

The introduction to the Cessnock Contributions Plan stresses the growing popularity of the wineries in the area and the growth in tourism developments centred around the wineries. A potential for further developments is argued. The Plan makes projections of the growth in tourist numbers over the period 1993 to 1998, based on an annual average increase of 5.1 per cent, which was the annual average increase that took place between 1987 and 1991. Table 10.1 below shows the forecasts made. The overall increase in tourist visitors to the city between 1993 and 1998 is forecast to be

Table 10.1 Projections of Annual Visitors to Cessnock 1993-1998

	1993	1994	1995	1996	1997	1998
Total tourists	700 599	736 329	773 882	813 350	854 831	876 629
New tourists (Jan-Dec)	33 997	35 731	37 553	39 468	41 481	21 798 (to June)
Total new tourists (July 1993 to June 1998)						193 029

Source: Adapted from Cessnock City Council (1993, Figure 5, p.19).

193,029. The Plan postulates that this growth in tourism will put pressure on facilities and services provided by council, and the following are identified as works that will be required:

- upgrading of tourist parks (paths and amenities);
- roadworks to tourist attractions;
- seven new tourism information 'laybys' (noticeboards);

- upgrading of the council owned aerodrome; and
- roads and bridgeworks around Rothbury - the charge for these will apply only to the Rothbury area, so that there will be a sub-catchment for Rothbury charges and a council-wide charge for all other works.

The estimated cost of the Tourism Development Capital Works Program is $0.81 m. The upgrading of the aerodrome is additional to this amount and the Contributions Plan indicates that this cost should be apportioned between 'existing tourists' facilities and new tourist development (Cessnock City Council 1993:20). Somewhat surprisingly, apportionment to normal residential growth is not mentioned. The total cost of the aerodrome upgrade ($0.73 m.) is divided by the expected total number of tourists in 1998 (876,629 - see Table 10.1) to arrive at a charge of $0.83 per additional tourists in a year. For the rest of the capital works, the Plan states that it is the additional tourists over the five year period who are necessitating these works. Put differently, the Plan is effectively saying that were the number of tourists to remain constant each year at the 1993 level, then the existing facilities would cope; it is the fact that tourist levels are rising which is putting pressure on local government facilities. For instance, the Plan appears to draw the logical conclusion that it is the additional tourists who should pay a developer charge. The Plan (Cessnock City Council 1993:20) observes that:

> It is considered that these facilities and works are required solely by the increased tourist development. Hence, it is appropriate to levy on a full cost basis. This means that new development expected to June 1998 will contribute on the basis of the additional new tourists to the city.

The assumption that the Council appears to be making here is that by levying new tourism *developments*, it is possible to arrange that *additional* tourists (only) will, in effect, be paying the charge (when it is passed forward). The contribution formula given (Cessnock City Council 1993:20) is:

$$C = \frac{TC}{IV}$$

where:

C = Section 94 contribution per additional tourist;

TC = the total cost of the Tourist Development Capital Works Program ($813,000); and

IV = the expected increase in the number of visitors from July 1993 to June 1998 (193,029).

The formula calculates a charge of $4.21 per additional tourist. The next step in the procedure is to identify the number of additional tourists associated with any particular development. At this point the Plan becomes less clear. Indeed, all that is said on this is as follows (Cessnock City Council 1993:22):

> To obtain the total contribution applicable, firstly an estimate of the additional tourists visits per year has to be made. This estimate must be to the satisfaction of Council and can be based on similar types of existing tourist facilities in the locality.

A worked example is provided 'to assist understanding of the calculation method' although this example seems to raise more questions than it answers. In the example, Cessnock City Council (1993:23) calculates a developer charge for a new medium sized winery as follows:

- estimate the total number of additional visitors per week 600
- estimate the number of weeks of operation 48
- multiply these figures to obtain total visitors per year 28,800
- multiply total visitors by the rate per additional visitor $145,152
  [$4.21 plus the aerodrome charge of $0.83 = $5.04
  ∴ 28,800 × $5.04 = $145,152]
- round to the nearest $10 to give the total contribution payable $145,150

Among various difficulties with this example (including what appears to be a particularly high charge), is that it appears to be assuming that all of the visitors to this winery are new visitors and that this winery alone (and not existing facilities) is creating the new visitors. (In fact the number of additional visitors which this example suggests the new winery might create is not much less than the total yearly new tourists to Cessnock each year since 1993 (see, for instance, Table 10.1, e.g. 33,997 for 1993, 35,731 for 1994, etc.). If all new developments between 1993 and 1998 were

levied at a rate that assumed that all visitors to a new facility were new tourists, the tourism developer charge would return many times the cost of the works program. The apparent assumption of the example that all visitors to new development are new tourists is clearly fallacious, since even before any new development existing tourist facilities were creating extra tourists at a growth rate of 5.1 per cent per annum. A more credible procedure might be to estimate the expected number of visitors per year to the new winery on the basis of the average annual visitors to similar wineries already established, and then increase this amount by 5.1 per cent (or the annual growth assumed for the projections) and apply the per tourist rate (of $5.04) only to the 5.1 per cent of total estimated yearly visitors. Instead of the assumption that only new development creates new tourists, this revised method makes the more plausible assumption that both existing and new developments attract new tourists at the same rate (or the rate that they have attracted them in the past). However, even with this method, it will only be by chance that 5.1 per cent of the estimated yearly visitors of all new tourism facilities over the five year period will approximate the 190,000 odd visitors required to return the nominal cost of the capital works program. In other words, even though it may be a relatively straightforward matter of principle to state that new tourists are creating fiscal pressures and therefore they should pay the full attendant costs, it would appear to be difficult, if not impossible, to 'levy' new tourists exclusively via a tax base related to new tourism development. The underlying problem relates to the theory expounded in Chapter 3. For example, user pays principles can be applied to developer charges for water and sewerage services, because the users (that is, new development) can be identified geographically. On the other hand, new tourists cannot be identified at all let alone traced to development areas where charges might apply. The basic developer charges principle that 'new development should pay for new services they require' cannot translate readily to 'new tourists should pay for new services they require'. It may be true that new tourism developments will attract increasing numbers of visitors to an area, but since particular facilities are not exclusively allocated to new tourists, it is the *total* number of tourists in the year that will cause facilities to become congested, and it would be more efficient and equitable to attempt to tax the total number of tourists, perhaps by a special rate levy on all tourist facilities (see Chapter 11) or a bed tax on tourist accommodation.

In sum, the current method of levying tourism development charges in Cessnock appears to be flawed. A less problematic method can be suggested, but the underlying problem is that no form of developer charge on new tourism development can be designed that will target new tourists in the same way that a developer charge for water, for example, on new residential development can isolate the users of the new water service.

10.8.2 *The Determination of Developer Charges for Beach Protection Works and Surf Life Saving Equipment at Coffs Harbour*

The Coffs Harbour Plan for Beach Protection Works and Surf Life Saving Equipment begins by reporting the results of a survey of people visiting Coffs Harbour beaches. It is noted that 52 per cent of beach users are tourists and 48 per cent are Coffs Harbour residents (Coffs Harbour City Council, undated:2). A separate survey of residents of Coffs Harbour is also reported in the Plan, and this indicated that beaches were the most popular of recreation venues, with 91 per cent of those surveyed visiting beaches in the previous six months. Having established that most residents use the beaches, the Plan argues that increases in residential and tourism development will generate additional demand for surf life saving facilities and equipment and also for beach protection works. Hypothesising that existing facilities are adequate to serve the needs of the existing population (and presumably existing tourist numbers), the Plan identifies Beach Protection Works costing $267,660 which will be required over the next five years and $153,837 worth of Surf Life Saving Equipment over the same period. The demand for these works is said to derive from an estimated population increase of 13,000 and 1,000 additional tourists over this period. The Plan then argues the following proposition:

> The survey established that beach usage was generated almost equally between tourists (52.3%) and residents (47.7%). The costs of satisfying the increased demands should therefore be met equally by all forms of residential development including tourist facilities.

To achieve this, the Plan calculates a per person contribution by dividing the cost of the capital works by the combined population and tourist numbers increase (over five years) of 14,000 people. A per residential lot charge is then arrived at by multiplying the per person charge by an assumed average residential lot occupancy of 3.2 persons per residence. For motels, flats and caravan parks, the per person charge is multiplied by an assumed occupancy rate of two people per motel unit, flat, or caravan. For example, to calculate the surf life saving equipment charge, the cost of new equipment required ($153,837) is divided by 14,000, and the result ($11) is multiplied by two for the motel unit developer charge ($22), and by 3.2 for the per residential lot developer charge ($35).

If the beaches are attended at any one time by roughly the same proportion of Coffs Harbour residents as tourists, it does not follow that new residents and new tourist accommodation should pay the same charge per person. What *does* follow from this is that *half* of the capital works program to protect the beaches and buy equipment should be contributed to by the new residents (and half should be funded in some way by tourists). This is not the same thing as charging each group equally because the two groups are not equally represented. It also does not follow that new tourist accommodation should pay a charge because as we have already discussed, new tourism development does not identify new tourists.

What is relevant to calculating a charge is how much of the future growth in the use of the beaches is attributable to new residents and how much to use by tourists. If all or most of the growth in use is due to residential population growth, then it is appropriate that a charge be set such that at the end of five years, new residents would have contributed all, or most, of the capital works program. This is, in fact, what the Coffs Harbour charge does achieve the way it has been calculated in the Plan. However, if that it is what was intended, then it should be noted that the information on the current usage of the beach is irrelevant.

The example demonstrates some of the pitfalls which can occur and how a basic theory as to what a charge should be doing can assist to remove some of the conceptual confusion in Plans.

10.9 *Developer Charges for the Protection of Wildlife*

One of the more recent applications of Section 94 has been the endeavour to protect wildlife habitat or other areas of environmental significance against adverse impacts of development. Councils, such as Coffs Harbour City Council, argue that there is an obligation under the Regional Environment Plan to protect flora and fauna (Coffs Harbour City Council 1995:14). Bellingen (Bellingen Shire Council 1992:24) and the Lake Macquarie Council (Withers, M. 1996, Lake Macquarie Council, pers. comm., 6 March) argue that proximity to wildlife corridors confers natural amenity benefits to an area. All three councils identify and value land that is required for wildlife corridor purposes. For example, at South Urunga 40.5 ha of land valued at $10,000 a hectare is identified (Bellingen Shire Council 1992:24). The Urunga Plan then proposes that this land be dedicated in lieu of Section 94 contributions for other purposes. A similar approach is taken at Lake Macquarie.

At the new release area of North Boambee Valley in Coffs Harbour, a land acquisition and works program for Koala Habitat is proposed in the Contributions Plan. The whole of Stage 1 of the North Boambee Valley development is to be levied and the amount is calculated simply as cost of the program divided by the prospective Stage 1 population. For example, the cost of land acquisition is estimated to be $380,000 and the final stage 1 population is projected to be 3710, so that the Koala Habitat Land Acquisition contribution is assessed at $102 per person (in 1995 prices). (No time frame for the development of stage 1 is mentioned in the Plan).

The issues in the determination of a charge for environmental protection programs overlap several of the areas previously discussed. In common with the housing levies, to establish a nexus it would be necessary to demonstrate that there is an obligation on council to protect the environment, and documentation of requirements under planning law or other commitments would be strongly advisable to

support the levy. Final demand or the catchment area for the charge should be determined geographically, but not on the basis mentioned by two of the councils. That is, catchments should not be determined on the basis of identifying the geographic area which benefits from species protection because it could very well be argued that the whole nation benefits from special preservation. The appropriate catchment for the developer charge would define the geographical extent of those *causing* the immediate threat to the environment. In this way the koala levies are akin to drainage and other impact mitigating services.

10.10 *Concluding Remarks*

Chapter 10 has examined the calculation of developer charges for a diverse range of urban services whose commonality lies in the fact that they may all be regarded as services which mitigate the impacts of development. The theoretical basis for calculating charges for this type of service is relatively straightforward; development should be charged for the cost to council of mitigating the impacts to pre-development standards. However, the chapter has demonstrated that the practical difficulties involved in calculating charges to achieve this principle should not be underestimated. Broad judgement is necessary. Moreover, even estimating the number and nature of incoming population to an area, and the take-up rates of development, particularly for infill development (as opposed to new release areas) is fraught with uncertainty (e.g. see Briggs 1995:1-3). With regard to population forecasts, it must be said that they are an essential planning skill and are required for a range of important purposes in addition to their use in calculating charges.

The need for judgement, the necessity of compromise and workable solutions must be recognised in attempting to apply efficiency principles to developer charges. The general observation which can be drawn from the empirical investigations of Section 94 items in Chapters 9 and 10 is that Contribution Plans do not always reveal a consistent understanding of the underlying theory or purpose of a developer charge; or of the mathematics of a charge. The Section 94 advice is not particularly helpful in this regard and certainly takes insufficient account of the distinctive attributes of particular types of infrastructure and the range of complex issues which can arise in determining

charges for different infrastructure items. Indeed, the impression arises that a greater exchange of information, ideas and advice could see a marked improvement in consistency and uniformity of approaches. In addition to these general conclusions, two further concerns (additional to those mentioned in the concluding remarks of Chapter 9) must be registered about actual calculation procedures. The first is the possible lack of understanding of the methodological consequences of excess capacity in infrastructure and the second is the need to review the wording of the principle of apportionment as defined in the Section 94 Manual.

In order to address the treatment of excess capacity in Contribution Plans, it is certainly the case that some Plans have given careful consideration to the time period over which incoming development should be charged for an asset. For example, the case was noted in the Liverpool new release areas where the population to be charged for a drainage scheme specifically included areas which would be developed later and were currently outside the three areas with which the Plan was concerned (see Liverpool City Council 1995:56). However, most of the time plans appear to project requirements and population five years ahead, this being the period used in the example in the Section 94 Manual. This will be a suitable procedure to use under either of two circumstances: firstly, where, after the five years, there will be no further incoming development to use the facility; or secondly, where, after five years, the facilities will need to be extended or replaced. It is possible that some, if not most, of the time either of these circumstances will apply; but the problem is that the matter is almost never explicitly mentioned in Plans. A five year planning period may be a convenient and reasonably predictable planning period, but will the excess capacity of all items of infrastructure really run out simultaneously in the five years (or the final demand always be reached)? It would be reassuring if Plans did bring out the implicit assumptions here and explain clearly the relationship between the five year planning period in Plans and the time until final demand or full capacity for items is reached. As we have seen in the calculation examples for water and sewerage, the period to full capacity can vary markedly with the type of asset, and charges should be designed to recoup asset values accordingly. It must be said at once that since the issue of excess

capacity or period to final demand is not discussed at all in the Section 94 Manual, it is not surprising that Plans are deficient in this respect.

The second area where comment should be made concerns the potential for confusion which we have observed in applying the principle of apportionment. The wording on the apportionment principle in the Section 94 Manual is as follows: 'Apportionment is a process which seeks to define the demands of *all those who may benefit from* the provision of a public facility to ensure that the contributing population only pays for its share of the final demand (emphasis added)'. However, as we have seen, when we come to examine the attributes of particular types of infrastructure it is not always the case that those who benefit from a facility should be charged for it. For example, for drainage, the beneficiaries of a downstream drainage system may be in a different suburb from the development which gives rise to the run-off causing the need for the service. For environmental protection services, such as koala habitat protection, the beneficiaries of preserved species could be argued to extend well beyond the immediate area, but the cost of protection should surely be borne by those disturbing habitat in the first place. For roads, we have argued that where a road is required primarily by a development but when built to the minimum standard for that development has sufficient excess capacity to serve others who will make a convenience of it, it may nevertheless be efficient to charge only those giving rise to the original need for the road. A similar principle was suggested where the provision of drainage for one development provides unintended benefits to existing development. In the light of these considerations, we make the suggestion that the wording on the principle of apportionment be changed to replace 'all those who may benefit from the provision of a public facility' with 'all those who give rise to the need for the public facility'. Put simply, apportionment should be based on need rather than on benefit. Further explanation and examples would be needed in the Section 94 Manual to explain that if there are incidental benefits to others whilst meeting the minimum efficient needs of development, then no charge should be made. But if at the time the service is being provided to development, it is also efficient to add to capacity for existing users at that same time, then the cost of the added capacity must be apportioned out of the developer charge. However, as it stands, the wording of the

apportionment principle in the Section 94 Manual is too simplistic: it tends to create confusion in the attempts to define catchment areas to charge, it leads to a buildup of debt to service on the part of the existing residents of an area, and it may lead to the provision of facilities before they are subjected to adequate economic scrutiny.

CHAPTER 11 CONCLUSION

11.1 *The Principal Findings of this Study*

The objectives of this study were to develop a theoretical model to underpin the calculation of an economically efficient developer charge and to examine real world practice to see how efficiency might be promoted as far as possible. The study examined that part of economic theory underlying user pays pricing techniques because of the commonplace acceptance that developer charges are user pays levies. However, it has been argued that the conventional understanding of an efficient user charge (i.e. one which rations capacity efficiently) is not applicable to the particular circumstances of developer charges. For one-off lump sum payments payable before development commences, it is the efficiency of urban settlement, or the locational efficiency objective that is targeted more effectively. To achieve this, the study has argued that it is the marginal cost of access to a service, described here as the long run marginal capacity cost (MCC) to which charges should be set. Evidence suggests that MCC will vary significantly by location for the sort of infrastructure services on which developer charges are currently levied, and it seems justified to assume that consumers will react to locational variation in charges.

An important question is: how does one actually define 'marginal' capacity cost, given that local urban infrastructure is typically not 'marginal' or readily divisible into small segments which can respond incrementally to demand? Following Turvey (1968*a*, 1969, 1971, 1976) we have adapted a definition of MCC into the context of developer charges as one which can be measured for any individual infrastructure service as the present worth of the least cost planned investment expenditure stream for the service *with* the permanent output increment due to development less the present worth of the least cost planned investment expenditure stream *without* the increment. However, because it is unlikely that local government databases will contain the planned forward investment streams required to estimate this ideal measure of MCC, an alternative 'backdoor' route to MCC is proposed in this study. We call this method the Adjusted Amortisation Method (AAM), and the principles on which it is

based derive from the economics of amortisation and valuation of assets as embodied in the Turvey theory.

The charges calculated by AAM were tested in a simulation model together with Turvey's ideal method and several alternative approaches to estimating MCC suggested by the OECD and others for use in public utility pricing. The results showed that for AAM to perform 'well' (that is, calculate a charge close to that calculated by the ideal method), adjustments to reflect future costs are necessary. But even a simple broad judgement rule could improve markedly the AAM measure. An example is a rule such as 'if the costs of expanding capacity are estimated to increase by 10 per cent, then the charge should be increased by 10 per cent'. AAM requires less precise forward expenditure data than other methods, it is a consistent approach which can be used to calculate distribution components of infrastructure services as well as headworks and major works assets, and a charge can be calculated for each individual service asset thus enabling greater reflection of locational variation in costs. Interest costs are also distributed equitably with AAM. Methods of calculation which annuitise the initial cost of infrastructure assets can be made consistent with AAM provided that two principles are kept in mind. First, the period to full capacity must be regarded as a variable. This period is determined by the Expansion Rule which says that capacity can be extended only when the benefits of doing so are greater than the costs. The second principle is that the valuation of an asset for the purposes of calculating a charge must be based on current (rather than historical) costs. If the period to full capacity is more than a few years, regular reviews of asset values and the likely length of the period to full capacity are necessary.

Developer charges which are designed to restore development impacts to pre-development levels should be assessed by a calculation objective which follows the same broad principle: that is, what costs are in the presence of the development minus what costs would have been in the absence of the development. The details required for each calculation will vary significantly depending on the nature of the impact. For example, methods for calculating the fiscal impact of road damage by heavy mining trucks will be quite different from those for calculating the fiscal impact on councils of

the loss of low income housing. However, for most other types of developer charges, a standard formula and set of procedures which follow the AAM rules can be prescribed. The objective of the calculation, the formula and steps involved in the calculation are shown in Table 11.1. These steps summarise procedures which have been described in greater detail in Chapters 6, 8, 9 and 10 of this study.

The main formula is $\frac{PW(I)}{PW(O)}$. To calculate PW(O) a distinction must be made between assets where demand for the service is expected to grow steadily over time and those for which a final demand for the service will be reached only when the site is fully developed. To calculate PW(I), the procedures will be different, as indicated in Table 11.1, according to whether the facility or service already exists or whether it is to be built. The charge (as calculated by this methodology) should be indexed annually to maintain constant purchasing power and the whole calculation should be reviewed regularly.

Table 11.1 Calculating Developer Charges - A Proposed Standard Format

Aim: to calculate a charge which will, when collected over a period of time as development proceeds, return an amount equivalent to the current valuation of the asset or service by the time final demand for the assset is reached.

Formula: $DC = \frac{PW(I)}{PW(O)}$ (indexed annually)

Steps in the Calculation:

1. Identify the final demand for the service and the time period until final demand is reached (PW(O))

   Ask
   - Where does the requirement come from for this service? Which area is causing the need for the service?
     note: *not* who is benefiting from this service
   - Is a hierarchy of catchment areas applicable? If so, then for each catchment...
   - ask what will be the repayment period, i.e. the time until final demand for the asset or service is reached?

(cont. p. 317)

Table 11.1 (continued)

There will be two possibilities here, according to whether the demand for the asset or service is expected to grow continually over time as population grows (this will usually apply when catchments are large, e.g. major water, sewerage or drainage assets, shire wide open space and recreation assets)

or

whether the assets are to serve a given area and when that area is built out there will be no further new population for the asset to serve

Final demand will be reached when excess capacity is used up:	Final demand will be reached when the area is built out:
• the period until excess capacity is used up is a matter for assessment *in the light of future cost conditions* [when the SRMC (including congestion costs imposed on users) is equal to the LRMC of extending capacity, where LRMC equals the first year amortisation of the capital costs of expanding plus the new running costs]. Congestion may have to be tolerated if expansion costs are high. • set out the period to full capacity and the full capacity final demand in yearly intervals.	• forecast the number of units of final demand at build out (e.g. population at build out, equivalent residential lots at build out, etc.) • set out the final demand in yearly intervals

2. Estimate the value of the capital works being provided (PW(I)

If previously provided amenity or service is being recouped (Sn 94(2B))...	If a new amenity or service is being provided (Sn 94(1))...
• value the asset (both the capacity serving existing users and the capacity which is to serve new development) on a Modern Equivalent Asset basis) e.g. if a pump station has a period to full capacity of 14 yrs and by 1998 it was 9 years old, the asset is still valued in 1998 as if it was an equivalent asset of 14 yrs capacity.	• is the asset or service being built at the minimum efficient scale to serve development, or is extra capacity deliberately being built in at the same time to serve other users? —If yes→, apportion out the cost of the capacity that will serve other users —If no→, estimate the *minimum technically efficient* cost of providing the service • *note*: even if the service, by its nature, has some excess capacity and may be used by others (e.g. a road) the development should be charged the full cost of the *minimum efficient size* required

3. Divide PW(I)/PW(O) and
   - index annually to relevant Implicit Price Deflator
   - review developer charge regularly.

One of the major findings of the empirical review undertaken in this study is that there is an urgent need for current procedures to be standardised. Table 11.1 is now suggested as the most appropriate way in which this could be achieved. A second finding of the review of current procedures is that there is a need for the advice to councils on calculation procedures to recognise the distinctive and varying attributes of each type of infrastructure. With regard to this, Table 11.2 presents a summary of some of the key conclusions of this study vis-á-vis individual infrastructure items. For completeness, some of the basic theoretical principles derived in earlier chapters are repeated at the start of Table 11.2.

Table 11.2 Summary of Guidelines Recommended For Calculation of Developer Charges

Issue	Recommendations
On which infrastructure items is it appropriate to levy a developer charge?	Because developer charges are viewed as user pays charges it is appropriate to use them when new development requires use of a service, and when those users of the service can be readily identified.
Should charges be set to SRMC or to LRMC?	Charges should be set to LRMC, at the minimum technically efficient scale of operations. If past over investment has occurred, charges should be scaled down accordingly. *Pragmatic considerations*: If scaling down is necessary it will be largely a matter of guesswork, in the absence of firm knowledge about demand and cost curves.
Are there any circumstances where charges should be set to a SRMC-analogous charge?	There are two circumstances where it would be efficient to levy SRMC-analogous charges: (1) where unplanned excess capacity already exists in an urban area and is unlikely to be used up for a very long time. There is no marginal capacity cost in these circumstances. Therefore there should be no charge. (2) where a shortage of capacity exists and this situation cannot be rectified for a very long time. In these circumstances a 'rationing' charge should be levied.

(cont. p. 319)

Table 11.2 (continued)

Should charges include recurrent and capital expenditures or just capital expenditures?	Except where marginal usage costs are very low, or can be predicted with certainty, it is practical to confine developer charges to capital expenditures. For infrastructure services like water, the opportunity would then still exist to signal marginal usage costs in the price of the service.
Should charges be used to finance backlogs of infrastructure?	To charge for backlogs would contradict the central objective of the charge (i.e. to charge long run marginal capacity cost).
How can marginal capacity cost be defined in a real world (as opposed to a textbook) context?	Marginal capacity cost can be formally defined as: the present worth of the least cost planned investment expenditure stream with the extra output occasioned by the development minus the present worth of the least cost planned investment expenditure stream without the extra output.
How can marginal capacity cost be measured?	An AAM approach is recommended whereby a charge is calculated such that, when collected over time as development proceeds, an amount equivalent to the current economic value of the asset will be returned by the time final demand for the asset is reached. The formula suggested is $\frac{PW(I)}{PW(O)}$ (indexed annually). The steps in the calculation are set out in Table 11.1. *Pragmatic considerations*: The timing and nature of incoming development is difficult to forecast, particularly for infill development. However, forecasts are required for other important forward planning purposes, as well as for calculating efficient charges.
How should costs be apportioned between existing users and new users?	Apportionment should be based on causation rather than on benefit. Thus apportionment should be a process which seeks to define the demands of all those who give rise to the need for the public facility to ensure that the contributing population only pays for its share of the final demand.
Should developer charges be used for impacts (akin to impact fees in north America)?	Provided a nexus between the development activity and the fiscal impact on councils can be proved satisfactorily (which it cannot for tourism, levies, for example) incorporating

(cont. p. 320)

Table 11.2 (continued)

	negative impacts into charges acts as a price on the undesirable side effects of development and internalises environmental costs that would otherwise be imposed on others as a result of development. Impact charges are therefore efficient and equitable.
What special considerations are pertinent to determining developer charges for:	
Water and Sewerage	With one important exception, the proposals for the reform of calculation of developer charges as detailed in IPART (1997) are in accordance with the principles recommended in this study. The exception is that the 'reduction amount' should not be deducted from the capital charge (see Chapter 8). Using a reduction amount approach appears to profoundly contradict the theoretical rationale for charges as emphasised by IPART itself. Alternative mechanisms for avoiding double dipping must be used.
Open Space	There is no market mechanism to transmit preferences as to type and quantum of services required. Hence background studies on consumer preferences are required. The estimated costs of alternatives should be included in questionnaires. Automatic use of traditional standards of open space is not justified. Quality as well as quantity of open space is important. *Pragmatic considerations*: Incoming population cannot be surveyed, hence existing populations with similar expected population profiles must be used. Moreover, for open space 'final demand' cannot be 'the number of users' because non-users derive amenity benefits. Thus 'final demand' should be estimated by estimating the likely geographic benefit region of a given area of open space.
Roads	Existing development cannot be excluded hence final demand will consist of existing demand and new demand. If existing demand is automatically apportioned out, roads may be being built before it is economically viable to do so and debt will accumulate for existing ratepayers. Thus, unless a road is expected to be a major one, new development should fully fund the road (or the road should be delayed until a cost benefit analysis confirms it is viable).

(cont. p. 321)

Table 11.2 (continued)

	Current practice appears to upgrade roads by reference to demand side indicators only. However, upgrading should occur only when the costs of congested conditions exceed the first year amortisation and running costs of an expanded road.
Drainage	It would be incorrect to charge the area where the drainage works are located if there are upstream contributors to the drainage problem. The efficiency principle here may be more correctly viewed as 'polluter pays' rather than as 'user pays'. Developments producing the run-off should pay for the cost of drainage works required. The charge should be structured in a way which lowers the charge the less the run-off. *Pragmatic considerations*: Defining cause and effect will be difficult in practice. The aim is, as far as possible, to identify 'self contained' catchments. Smaller works may have smaller catchments. Large works may have many 'causers' upstream. A hierarchy of catchments may be appropriate.
Affordable Housing	Developments which take away affordable bedspaces should pay the actual cost incurred by council to replace a bedspace *at the going rate at which bedspaces are currently being made available* (not at a higher rate)
Heavy Vehicle Road Use Levies	Quantifying the impact of heavy vehicle road use requires estimating the difference between what road maintenance and reconstruction would have been in the absence of the development activity of the extractive industry and what road costs will be with the extractive industry activity. *Pragmatic considerations*: Arriving at a levy per tonne will require broad judgement to be exercised over a range of variables e.g. estimates of damage done by heavy vehicles compared to cars; road maintenance and reconstruction costs and how these are affected by the current state of the road; estimates of tonnage to be hauled and traffic volumes.
Tourism Levies	It does not seem possible to prove a satisfactory nexus between the requirement for expanded

(cont. p. 322)

Table 11.2 (continued)

	tourist facilities and new tourism development. buyers who require an expansion of water services. It is *all* tourists who contribute to congestion of facilities. *Pragmatic considerations*: An alternative tax base (a special rate levy or a tourism bed levy) would be preferable.
Protection of Species	Collect appropriate documentation to be able to justify the obligation to provide the service. Use an apportionment principle based on causation rather than benefit i.e. define the catchment area to charge by identifying the area posing a threat to the environment.

11.2 *Alternatives to Developer Charges*

When defining the scope of this study in Chapter 1, we argued that developer charges are likely to remain a sufficiently important source of revenue to local government for it to be a useful task to examine their efficiency characteristics and consequences. We did not intend to analyse how developer charges compare in efficiency terms with alternative means of financing infrastructure. Nevertheless, it is useful to conclude this thesis by providing some perspectives on where developer charges stand in relation to other forms of urban infrastructure finance. To this end, we briefly review some of the recent Australian literature on alternatives to developer charges. Proposals in the literature which require major legislative changes and fundamental changes of attitude, like land banking and 'betterment' taxes, are not included.

The most recent Australian literature on the issue of possible alternatives to developer charges consists largely of work by two economists who are prominent in the urban economics literature, namely, Neutze (1995*b*, 1997) and Kirwan (1991, 1990), and two federal government reports [that is, a report of the Australian Urban and Regional Development Review (AURDR) entitled *Financing the Fringe: Efficient and Equitable Charging for Infrastructure* (AURDR 1995*b*), and the report by the Industry Commission on *Taxation and Financial Policy Impacts on Urban Settlement* (Industry Commission 1993)].

Neutze (1997; 1995*a*; 1995*b*; 1994) has written extensively on the theory and practice of alternative funding arrangements for different types of urban infrastructure in Australia. Neutze clearly has reservations about the widespread use of developer charges. His main argument appears to be that it is direct user charges rather than developer charges which offer greater potential efficiency benefits because they 'discourage high levels of use of the service which create the need for increases in off-site capacity' (Neutze 1995*b*:27). By discouraging excessive use of a service, it is argued that user charges have the merit of reducing the environmental impacts 'which are mainly proportional to the level of use' (Neutze 1995*b*:27). Neutze also observes that there is in any case a good deal of concern about the impact of developer charges on housing costs.

Neutze contends that developers should be required to pay for on-site reticulation of services and connection to a network (because he believes it encourages forms of development which can be serviced efficiently), and he also argues that developers should pay the full cost they impose on the system by any 'out-of-sequence' development. However, for headworks and major works off-site he advocates user charges. For example, for water, Neutze argues that developers should pay for on-site reticulation and connection to the network, but the remaining costs of supplying water should be met through a flat charge per unit of water used. The flat user charge should include marginal running costs plus the marginal capacity costs including headworks. Moreover, Neutze maintains that the price of water should include a component for the opportunity cost of water being used for urban purposes, such as the forgone value of water for recreation, irrigation and environmental improvement (Neutze 1997:162). For sewerage, Neutze suggests that developers should meet the capital costs of reticulation and connection, but that all other costs be covered through a user charge on discharge into sewers. For industrial and commercial discharge, he claims it is cost effective to use technology to measure both volume and composition of discharge. For domestic sewerage, Neutze suggests a charge based on the volume of water use during that period of the year when minimum water is consumed (e.g. winter in Australia). Neutze argues that a sewerage charge based on water use during the period of lowest use would provide an incentive for developers to install composting toilets and

use would provide an incentive for developers to install composting toilets and methods of dealing with grey water which might avoid connection to the sewerage system altogether. Another option is for developers to install a local sewage treatment facility, where the effluent is used for irrigation. For drainage, Neutze suggests that as well as providing drainage facilities within subdivisions, developers should also be required to make a capital contribution to the cost of dealing with the run-off from the development site based on the estimated increase in run-off due to development (Neutze 1995*a*:237). Such a charge would give developers an incentive to provide for on-site absorption, short term storage and possible re-use on the site. For maintenance and replacement costs in new areas (and all costs in established areas), Neutze proposes an annual user charge calculated on the basis of the area of impermeable surfaces (e.g. roofs and driveways on a home site, with discounts for on-site collection or absorption (Neutze 1997:159). For roads, Neutze advocates that developer charges should cover only on-site roads and the capital costs of access roads. For uncongested arterials and collector roads outside subdivisions, Neutze suggests that some type of motor vehicle or fuel tax should be used, but for congested arterials and freeways, Neutze is a strong advocate of direct road user charges (see Neutze 1997:164-170). He does not appear to have addressed specifically the issue of optimal funding for open space, although for community facilities which are provided mainly for equity reasons, Neutze suggests that progressive taxes are an appropriate source of funds.

Kirwan (1991, 1990) advocates a wider role for developer charges than Neutze. Kirwan believes that the trend away from recurrent charging towards capital cost recovery through developer charges provides opportunities to reap economic benefits. He lists the five basic policy principles which have been developed in relation to the implementation of charges on developers: that is, the need to demonstrate a nexus, fair apportionment of costs, the fact that charges are not open-ended and must relate to costs, earmarking of revenues and the time limit on the expenditure of revenues. He argues that these principles mesh well with the economic principle of benefit equity (Kirwan 1990:188). But the real benefit of the growing use of developer charges resides in the changed attitudes to the management of infrastructure which they invoke. The new set of disciplines which Kirwan argues infrastructure managers should be

subjected to include: the necessity to raise finance only where an equivalent benefit is demonstrated; cost variations to be reflected in price variations; and the capital component of pricing schemes to be identified and rationalised (Kirwan 1990:189). Moreover, planners have to face the discipline of having to evaluate how proposals for development (or redevelopment) are going to be financed, whilst developers will have to accept that the provision of infrastructure is a 'legitimate charge' on development and that 'the situations in which the general taxpayer contributes to the costs of development should be the exception, rather than the norm - except in the case of social infrastructure, whose financing is traditionally based on redistributive principles...' (Kirwan 1990:189).

The major difference between the viewpoints of Kirwan and Neutze appears to be one of judgement as to which areas of current practice are most in need of reform. For Kirwan it is infrastructure management in general which has the greatest potential efficiency benefits, whereas for Neutze it is the effects of appropriate recurrent pricing on economic decisions made with respect to capacity which offers the most potential. In common with Neutze, Kirwan is also concerned about the impact of charges on house prices but he contends that targeted subsidies are much more likely to be cost effective than a general subsidy on infrastructure to all home buyers (which was what Kirwan believed to be the effect of pre-developer charge financing).

There is a further (and apparently quite strong) difference between Kirwan and Neutze: namely, their respective beliefs as to whether it is a positive benefit for developer charges to be encouraging urban consolidation. Kirwan's position is that unless fringe development pays the full cost of development through developer charges, then there will be too much development at the urban fringe rather than in built-up areas. Kirwan (1990:186) argues as follows:

> It so happens, moreover, that in relation to infrastructure, the effect of the general 'under-pricing' of supply has been extremely detrimental to urban development policy. It has encouraged excess demand for land and the peripheral expansion of metropolitan areas, leading to under-use of some categories of infrastructure in existing built-up areas and under-supply in areas of new development.

In reply, Neutze (1995*b*:25) postulates that Kirwan's argument assumes that there is spare capacity in infrastructure in all areas where infill or redevelopment is likely to occur and that this is 'manifestly not correct'. It seems that a more accurate view is that sometimes redevelopment and infill will be more costly and sometimes it will be less costly (Neutze 1995*b*:25). Chapter 4 of this study argued that the state of existing infrastructure is one of the major reasons why locational variation in costs occur. Ideally the costs for development in built-up areas should be assessed against those of fringe development for each proposal.

The AURDR report on funding infrastructure contains an assessment of the relative advantages of recurrent versus upfront charging (AURDR 1995*b*:26-31). The discussion concludes in favour of recurrent charging systems, arguing that upfront charges are 'inferior' in allocative efficiency terms.

The Report maintains that the economic inefficiency of upfront charges is evident in three main areas: in the signals sent to suppliers; in the implications for managerial discipline (contrary to Kirwan's opinion); and in the amount of service demanded. The chief difficulty with the arguments of the Report relating to the supply and demand inefficiencies is that in common with the conventional literature on marginal costs pricing generally, the efficiency or otherwise of a charge is judged solely in terms of the potential to achieve efficiency of *use* of the service. For example, it is argued as follows:

> [R]ecurrent charges can be varied according to the actual levels of consumption of individual users so that charges incorporate the costs each user imposes ... [whereas] up-front charges are unlikely to perform this signalling role as well as recurrent charges *because it cannot be assumed that in any given area, for any given quality of service, all users will consume an equal and constant volume of service* over the life of the infrastructure assets being provided. ... Therefore, when consumption varies between users, there is no guarantee that upfront charges will provide the signal to supply authorities about the variation in valuation of service between different users (emphasis added).

There are a number of comments which should be made here. Firstly, in drawing these comparisons between upfront and recurrent charges, the AURDR Report appears to be assuming either that urban infrastructure must be completely funded by a developer charge (including the marginal running costs) or by recurrent charges. A combination of a developer charge meeting the marginal capacity cost and a recurrent form of finance (user charge or rates) covering the running costs is not considered as an option. Secondly, the authors of the Report apparently believe that in addition to information about the level and quality of a service, recurrent charges will also convey information about the location of service since it is said that 'suppliers will be prepared to provide service in high cost areas if users are prepared to pay commensurately higher charges' (AURDR 1995*b*:27). But the Report has not foreseen the possibility of a conflict between efficient congestion charging and pricing to convey information about locational cost differences, as discussed in Chapter 4 (section 4.4). Thirdly, the authors appear to be unaware that there may be efficiency benefits in having developer charges which signal variations in marginal capacity cost between areas. There is no mention that there might be any other sort of marginal cost (such as the marginal cost of access to a service) other than a marginal cost of use of a service. This is surprising given the emphasis on developer charges as signals of locational variation in costs in the Industry Commission (1993) Report, which was published two years earlier.

Further confirmation of the Report's limited focus on marginal costs only as used in the congestion pricing literature is provided when the following argument is presented: 'Purchasers who would have been prepared and able at the time of residential purchase to pay only their efficient recurrent infrastructure charges will be deterred from purchasing in areas where infrastructure charges are levied even though the actual costs of service might be lower in these new areas' (AURDR 1995*b*:30). The argument appears to be directly analogous to analyses in the congestion price literature which argues against a fixed capital charge to accompany a short run operating cost charge when excess capacity exists early in the life of an infrastructure asset. It is argued that if excess capacity exists, such that SRMC is less than LRMC, then to charge LRMC will dissuade some purchasers of the service from doing so even though the real cost of their use of the service is quite small.

However, the argument cannot be transposed directly into the context of developer charges as the AURDR Report appears to have done. In the congestion pricing literature, SRMC pricing is usually advocated on the grounds that the lower SRMC encourages greater use of capacity when there is no capacity constraint, and when capacity becomes limited, a SRMC price (which is now higher than LRMC) will ration capacity. The key assumption here is that there is an elasticity of response of the service to the price being charged such that optimum use can be made of capacity at all times. The difficulty with translating this argument into the context of allowing people *to purchase land and live permanently* in an area when SRMC is less than LRMC is that there is less scope to regulate access to the service when SRMC is greater than LRMC. People cannot be made to simply disappear later when the recurrent charge is much higher in the same way as people can decrease their use of water when its price rises. So long as all the charge for the service is recurrent, with no upfront component, new buyers may not be dissuaded readily from buying in an area where capacity has now become scarce. Moreover, as this study has argued, if excess capacity is intentional for a planned period of time, then encouraging a greater rate of development by charging a recurrent cost based on SRMC ignores the cost involved in having to bring forward future expansions of capacity.

The AURDR's argument as to why recurrent charging imposes greater managerial discipline suggests that recurrent funding, because it involves borrowing, 'dissuades supply authorities from inefficient over-expansion of their infrastructure networks' (AURDR 1995*a*:29). The Report goes on to say that supply authorities 'will be encouraged to provide additional infrastructure capacity and particularly peak capacity only where charges can be expected to cover the additional capital and operating costs, and to provide a sinking fund for the replacement of assets' (AURDR 1995*b*:29). The argument may be intuitively plausible, although it must be said that borrowing does not seem to have discouraged over-expansions of capacity in some infrastructure services in the past (e.g. electricity generating capacity in Australia during the early 1980s). However, it should be noted that the added clause that charges can provide a sinking fund for replacement of assets is both inconsistent with

the economics of amortisation (discussed in Chapter 5 of this study), is not necessarily good financial practice (see, for example, Bishop 1997:185 and Watson 1995), and is inconsistent with the Report's own argument. This is because after a time, assets will be replaced from the sinking funds accumulated rather than through borrowing.

A final comment which can be made on the AURDR Report is that the debate on recurrent versus upfront charges is couched throughout as if the infrastructure under consideration is water supply, and that the arguments which apply to water will extend generally to all other types of infrastructure on which charges might be levied. As we have seen in this study, different types of leviable infrastructure services can have markedly different supply and demand attributes. The arguments as to the relative merits of different types of funding should therefore consider each type of infrastructure separately [as does Neutze (1997)]. In sum, it is argued here that the AURDR contentions on recurrent charges versus upfront charges are not a particularly useful contribution to the debate. They assume that infrastructure must be funded all by recurrent sources or all by upfront charges. The theoretical analysis is inadequate because it appears to be aware of only one type of marginal cost, and the analysis implicitly assumes only one type of infrastructure service to be funded.

The Industry Commission Report (1993) has a principal focus on the efficiency of urban settlement patterns and so it is not surprising that the Report is enthusiastic about developer charges as a way of transmitting signals about variations in cost and hence directing resources spatially to their most efficient outcome. These arguments were set out in more detail in Chapter 4. As to whether there might be a better alternative to developer charges, the Commission takes a view somewhat similar to Neutze in arguing that a mix of funding instruments might be used rather than as single means of financing alone. The Commission points out the relative merits of each type of instrument. For example, developer charges can reflect geographical variation in cost; periodic access charges can recover the total costs of providing services; usage charges can be used to ration capacity; and property taxes can capture a portion of the increase in value which results from infrastructure. With regard to developer charges in particular, it is clear that the Commission had a stronger preference for these than

Neutze, arguing that developer charges had 'great appeal'. However, the Commission did note, as we have done, that 'the information requirements of a system that calculates developer contributions precisely (for example, a system that estimates them as residuals to equate costs and charges over time including all future asset replacement) can be quite demanding ' (Industry Commission 1993:150).

The Commission also makes a valid, if somewhat unusual, point with respect to the equity of developer charges. It is argued that they are often seen as more equitable than differentiated access and usage charges because 'it is apparently more acceptable to offer lower charges to developers in areas of genuine excess capacity, than to levy purchasers of developed lots; for example, lower access and usage charges for water or lower registration fees for motor vehicles than neighbouring residents' (Industry Commission 1993:150-151).

When making an overall assessment as to what constitutes efficient charging the Commission is disappointingly vague. Statements are made to the effect that 'it is not possible to recommend a single charging system which would apply to all authorities' (Industry Commission 1993:150) and that 'in general, because efficient pricing has more than one dimension, it will usually be necessary to employ a number of charging instruments simultaneously' (Industry Commission 1993:152). In this respect, the Commission could be criticised for failing to be more specific in recommending different funding mixes for different types of infrastructure.

One alternative which is not considered in the Commission's (or Neutze's) discussion of efficient charging is the levying of a special rate (as a surcharge on general rates).[1] The four categories of infrastructure funding options considered by the Industry Commission are developer charges, periodic access charges, user charges and general revenue sources, such as property rates. However, general rates revenues and special rate revenues are conceptually different. The latter is a supplementary levy

[1] Although not included in the discussion on optimal charging, the Industry Commission Report does mention special rates in section C5 on local government rates. The discussion in this section concludes that 'something akin to a benefited area concept is worth implementing further' (Industry Commission 1993:337).

which is earmarked for a particular purpose and payable only by those judged to benefit from the service. Special rates are apparently used in the eastern states of Australia (see Industry Commission 1993:335-337). For example, in Queensland the Brisbane City Council (Submission to the Industry Commission Report (1993:335)) applies special rates to some specific areas:

> At the present time this [special levies] applies only to Malls constructed in the central City and Fortitude Valley. Properties in the immediate vicinity pay a separate rate to cover the full cost of financing and operating the facility. The Council is currently considering providing infrastructure to facilitate the development of two regional business centres. It is expected that these would be financed by a levy based on potential gross floor area of each property benefited.

In New South Wales, section 495 of the *Local Government Act* 1993 empowers councils to levy a special rate on land that will benefit from, contribute to the need for, or have access to, an infrastructure service (Pearson 1994:138). Many councils have begun to levy special rates for specific environmental purposes, such as to finance water catchment remedial works (Dickenson, T. 1997, Hornsby Shire Council, *pers. comm.*, 22 August). It is apparent that this power could also be used in place of developer charges to levy a special rate to finance the cost of providing infrastructure to new development. Such a levy would be similar to the north American system of 'special assessment district' financing (also known as 'special improvement districts' or 'municipal utility districts'). The form of special district financing varies widely in the United States, but essentially it appears to involve single (or limited) function governments or utilities which are specially created to provide to a defined district an infrastructure service which has local benefits confined only to that district (as distinct from infrastructure which is of general benefit to a whole city). The popularity of special district financing apparently 'waxes and wanes' in the United States, but Lee (1988:299) argues that it could be used more extensively and that the reticence to do so is based on a 'weak understanding of the economic principles for calculating assessments' (Lee 1988:299). He also argues that there is a strong similarity in the principles needed to design both special assessments and impact fees: 'the analysis that would be relevant to the formulation, cost estimation and benefit distribution of a

special assessment district is the same as the analysis that should be done for impact fees' (Lee 1988:300). Thus, impact fees can become a way of 'operationalising' the concept of special assessment district financing without having to formally create the districts (Lee 1988:300). On the other hand, Yinger (1998:231) argues that special assessments are preferable to impact fees because one can be more certain with special assessments that the burden of financing will always fall on those who are going to use the service; namely, the new housing.

Irrespective of their potential efficiency and equity benefits, special assessment district financing is a controversial form of financing in the United States (see Snyder and Stegman 1987:63-72 and Porter *et al.* 1992). The most vehement criticism appears to be that in practice there has been a lack of accountability with special assessment financing (Snyder and Stegman 1988:67). In the Australian context, greater use of special rates along lines similar to special assessment districts would avoid the widely perceived problem with developer charges that part of the cost of infrastructure is capitalised into higher housing or land prices. On the other hand, although special levies in New South Wales must be included in a council's management plan (Pearson 1994:138), some of the safeguards and accountability mechanisms present in the requirements to levy a developer charge might be avoided with special rates. There is also a danger that special rates, once levied, might be difficult for governments to part with once their special purpose has been fulfilled. Finally, special levies are an overt form of financing, whereas developer charges have the political advantage that they are less noticeable. They also have the appeal that they appear to make the developer pay for the requirements or consequences of development.

A further alternative to developer charges which has not been mentioned in the literature discussed so far is a tax or levy on the value of the development approved. Both Barnes (1996:56-57) and Barnes and Dollery (1996*b*) suggest that for small councils in New South Wales, where the cost of preparing Contributions Plans is relatively higher than for larger councils, an *ad valorem* tax on the value of development might be more effective. However, acceptance of this pragmatic recommendation may be difficult because it is clear that those responsible for policy in

New South Wales are firmly attached to the principles of nexus, limiting charges to costs of services required, transparency and accountability which are embodied in the Contribution Plans required for Section 94 charges. Some of these features may be lost if the requirement to produce a Contribution Plan is waived for smaller councils.

In any event, the attitude of Section 94 policy makers to an *ad valorem* tax has been demonstrated in the instance of Sydney City Council. Legislation passed in the New South Wales parliament in May 1997 has allowed Sydney City Council to introduce a one per cent levy on all new development within the CBD (Australian Financial Review 1997, 29 May). However, it has been emphasised that the main intention of this levy is to replicate, rather than replace, developer charges. The reason a levy was required was because increases in visitors to the CBD, attendant upon development, was putting pressure on the council to expand and upgrade services, yet the council was apparently unable to levy a Section 94 charge because (without an actual increase in population residing in the area), a nexus to the requirement for improved services was difficult to prove (Bathurst, C. 1997, New South Wales Department of Local Government, pers. comm., 7 August). Hence the council was permitted to raise a levy on the value of development to be undertaken, but an attempt is being made to apply all the controls that are required for Section 94 charges to the proposed levies. In particular, Contribution Plans must be prepared. Moreover, unlike normal Section 94 charges where only council approval is required, each levy proposed by Sydney City Council must obtain the approval of the state Minister for Urban Affairs and Planning.

To sum up this brief sketch of perspectives as to whether there are alternatives which might be preferable to developer charges, it appears that the issue is not one of replacing developer charges altogether, but instead of finding the optimal combination of financing instruments for different types of infrastructure. On balance, it appears that a continued role for developer charges on economic grounds is favoured, although some, like Neutze, argue that this role may be somewhat smaller than is reflected in the current enthusiasm for developer charges in New South Wales. Accordingly, an important follow up to the present study will be to investigate, empirically and

theoretically, the economic efficiency of developer charges *vis-à-vis* other infrastructure funding options.

APPENDIX A

Section 94 Planning Officers Interviewed

Council	Officer(s)
Wagga Wagga	John Kerwan
Tweed	Ray Hallgarth, Douglas Jardine
North Sydney	Lesley Hall
Waverley	Meryl Bishop
Urunga	Daris Olsauskas
Baulkham Hills	Brad De Lapurre
Blacktown	Donna Savage
Eurobodalla	Darren Crombie
Hornsby	Ted Dickering
Ulmarra	Ken Exley
Wyong	Ken Grantham, Julie Verness
Goulbourn	Ray Brown
Liverpool	Vince Abreu
Taree	Wayne Burgess
Wollongong	Mohini Nair
Penrith	Terry Agar
Lake Macquarie	Malcolm Withers

Other Interviewees:

New South Wales Department of Urban Affairs and Planning	Helen Ting
Department of Prime Minister and Cabinet	Ron Perry
Hunter Water Corporation	Bruce Hokin
Independent Pricing and Regulatory Tribunal (IPART)	Kevin Melville
New South Wales Department of Local Government	Carol Bathurst
Planning Research Centre	Prof. John Toon
Australian National University - Urban Research Program	Prof. Max Neutze

APPENDIX B

DATA SUPPLIED UPON INDIVIDUAL REQUEST TO THE AUSTRALIAN BUREAU OF STATISTICS

Table B.1 Developer Charges in N.S.W., 1995-96

	$ million
Section 94 charges	
Land	13.7
Roads	53.7
Drainage	15.7
Traffic Facilities	2.8
Parking	3.2
Open Space	58.2
Community Facilities	22.0
Other	5.1
Total	174.4
Water and Sewerage Charges	
Water	25.3
Sewerage	26.5
Total	51.8
Grand Total	226.2

Source: Supplied by Dennis Jollife, 12 March 1997.

Table B.2 NSW Local Government Revenues 1995-96

	$ million
Current receipts	
Rates	2148.5
User Charges	826.8
Interest	180.1
Grants from Other Levels of Government	664.3
Other Operating Revenue	122.1
Contributions to Operating Purposes	132.7
Total Current	4074.5
Capital receipts	
Grants from Other Levels of Government	182.1
Contributions for Capital Purposes	298.8
Total capital	480.9
Grand Total	4555.4

Source: Supplied by Dennis Jollife, 4 March 1998.

Table B.3 Local Government Gross Debt

YEARS	NSW $m	VIC $m	QLD $m	SA $m	WA $m	TAS $m	NT $m	TOTAL $m
1988	2888	1142	2377	606	315	198	23	7548
1989	2778	1180	2346	758	314	212	23	7610
1990	3458	1192	2366	829	304	219	24	8391
1991	3348	1207	2687	889	276	220	23	8649
1992	2550	1154	3038	754	263	205	25	7988
1993	2414	992	2931	702	243	208	22	7512
1994	1938	846	2905	685	214	197	24	6810
1995	1787	793	2881	659	142	181	32	6474
1996	1845	644	2867	444	138	174	36	6148

Source: Supplied by Donna Nicholson, 5 August 1997.

REFERENCES

ACIL Economics and Policy Pty Ltd. 1995, *Road Pricing: Finding the Problem*, report to the New South Wales Government Pricing Tribunal, Research Paper No.4, New South Wales Government Pricing Tribunal, Sydney.

Advisory Council for Intergovernment Relations (ACIR) 1984, *Responsibilities and Resources of Australian Local Government*, Report No.7, Relationships Reference, AGPS, Canberra.

Alchian, A. 1959, 'Costs and outputs' in *The Allocation of Economic Resources, Essays in Honor of B.F. Haley*, Stanford University Press, 1959, pp.23-40, reprinted in *Price Theory*, ed. H. Townsend 1971, Penguin, Ringwood, Victoria, pp.228-249.

Altschuler, A. and Gomez-Ibanez, J. 1993, *The Political Economy of Land Use Exactions*, The Lincoln Institute of Land Policy, Cambridge, Massachusetts.

Alterman, R. (ed.) 1988, *Private Supply of Public Services*, New York University Press, New York.

American Water Works Association (AWWA) 1991, AWWA Manual M34, Washington.

Anderson, M. 1994, *Governance by Green Taxes*, Manchester University Press, Manchester.

Ansoff, H. 1979, *Strategic Management*, Macmillan, London.

Archer, R. 1976, 'The Sydney betterment levy, 1969-1973: an experiment in functional funding for metropolitan development', *Urban Studies*, Vol.13, No.3, pp.339-342.

Atkinson, A. and Stiglitz, J. 1980, *Lectures on Public Economics*, McGraw Hill, London.

Aulich, C. 1997, 'Competition in local government' in *Australian Local Government: Reform and Renewal*, eds B. Dollery and N. Marshall, Macmillan Education, Melbourne, pp.189-208.

AURDR, see Australian Urban and Regional Development Review.

Australian Bureau of Statistics (ABS) 1995, *Government Finance Statistics*, ABS Catalogue No.5512.0, ABS, Canberra.

_____ 1989, *Classifications Manual for Government Finance Statistics, Australia*, ABS Catalogue No.1217.0, ABS, Canberra.

Australian Institute of Urban Studies (AIUS) 1989, *Urban Infrastructure on Melbourne's Fringe: Financing of Infrastructure Provision, Stage I, Infrastructure Costs and Pricing Policies*, AIUS, Victorian Division, Melbourne.

Australian Urban and Regional Development Review (AURDR) 1995*a*, *Green Cities*, Strategy Paper No.3, AURDR, Melbourne.

_____ 1995*b*, *Financing the Fringe*, Discussion Paper No.4, AURDR, Melbourne.

_____ 1995*c*, *Investing in Infrastructure*, Workshop Paper No.5, AURDR, Melbourne.

_____ 1995*d*, *Smart Planning. Not Sprawl*, Discussion Paper No.5, AURDR, Melbourne.

_____ 1994, *Financing Local Government*, Discussion Paper No. 1, AURDR, Melbourne.

Balmer, C. 1989, 'Local government in the federal system' in *The Australian Local Government Handbook*, Australian Local Government Association, AGPS, Canberra, pp.1-7.

Bannon, J. 1991, Transcript of the Judgement in the Land and Environment Court of NSW, Allsands Pty Ltd. v. Shoulhaven City Council No.10181 of 1991, Internet site http://www.austlii.edu.au/au/cases/nsw/landenv/26.htm/

Barde, J. and Button, K. 1990, *Transport Policy and the Environment*, Earthscan Publications, London.

Barnes, N. 1995, An economic analysis of section 94 of the Environmental Planning and Assessment Act of 1979, Bachelor of Economics with Honours Dissertation, University of New England, Armidale.

Barnes, N. and Dollery, B. 1996*a*, 'Financing urban infrastructure in New South Wales', *Urban Futures*, Vol.21, pp.19-28.

Barnes, N. and Dollery, B., 1996*b*, 'An economic analysis of section 94 of the NSW Environmental Planning and Assessment Act of 1979', *Urban Policy and Research*, Vol.14, No.2, pp.119-127.

Baulkham Hills Shire Council 1993, *Contributions Plan No.6, Extractive Industries*, Baulkham Hills Shire Council, Baulkham Hills.

Bellingen Shire Council 1992, *Section 94 Contributions Plan for the South Urunga Development Area*, Bellingen Shire Council, Bellingen.

BIE, see Bureau of Industry Economics.

Bird, R. and Slack, E. 1983, 'Urban finance and user charges' in *State and Local Finance: The Pressures of the 1980s*, ed. G. Break, University of Wisconsin Press, Wisconsin, pp.211-237.

Birrel, R. and Tonkin, S. 1991, Constraints and opportunities of urban growth: Sydney and Perth compared, paper prepared for the National Population Council, Population Issues Committee, National Population Council, Canberra.

Bishop, M. 1995, Approaches to special needs in contribution plans - the case of Waverley, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Bishop, T. 1997, 'Financial reforms' in *Australian Local Government, Reform and Renewal*, eds B. Dollery and N. Marshall, Macmillan Education, Melbourne, pp.172-188.

Blacktown City Council 1993, *Section 94 Contributions Plan No.5, Parklea Release Area*, Blacktown City Council, Sydney.

Borcherding, T. (ed.) 1977, *Budgets and Bureaucrats: The Sources of Government Growth*, Duke University Press, Durham, North Carolina.

Bös, D. 1986, *Public Enterprise Economics*, North-Holland, Amsterdam.

Brealey, R. and Myers, S. 1981, *Principles of Corporate Finance*, McGraw Hill, New York.

Brennan, H. 1977, 'Criteria for state and local taxes' in *State and Local Taxation*, ed. R. Mathews, ANU Press, Chapter 1, reproduced in the *The Economics of Federalism*, eds B. Grewal, G. Brennan and R. Mathews, 1980, ANU Press, Canberra, pp.341-350.

Brett, D. 1993, *Developer Charges and Urban Development Water and Related Services*, NSW Government Pricing Tribunal Research Paper No.2, May, NSW Government Pricing Tribunal, Sydney.

Briggs, S. 1995, To charge or not to charge? Issues for councils, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

_____ 1992, *Guidelines and Methodology for the Application of Developer Cotnributions for Social Infrastructure*, AGPS, Canberra.

_____ 1990, *Study into Developer and other Contributions for Social Infrastructure*, AGPS, Canberra.

Bromley, D. 1990, 'The ideology of efficiency: searching for a theory of policy analysis', *Journal of Environmental Economics and Management*, Vol.19, pp.86-107.

Brueckner, J. 1997, 'Infrastructure financing and urban development: the economics of impact fees', *Journal of Public Economics*, Vol.66, pp.383-407.

Bureau of Industry Economics (BIE) 1995, *Issues in Inrastructure Pricing*, AGPS, Canberra.

Centre for International Economics 1997, *Water Supply and Environmental Values*, report to ACT Electricity and Water Corporation, Commonwealth Department of the Environment, Sport and Territories and the National Office of Local Government, Centre for International Economics, Australian National University, Canberra.

Cessnock City Council 1993, *Contributions Plan for Tourist Development*, Cessnock City Council, Cessnock.

Civil Engineers Australia 1996, 'Integrated drainage systems could be more viable', *Civil Engineers Australia*, July, p.28.

COAG, see Council of Australian Governments.

Coase, R. 1970, 'The theory of public utility pricing and its application', *Bell Journal of Economics*, Vol.1, No.1, pp.113-128.

_____ 1946, 'The marginal cost controversy', *Economica*, Vol.13, pp.169-182.

Coffs Harbour City Council 1995, *North Boambee Valley - Stage 1 Contributions Plan*, Coffs Harbour City Council.

_____ undated, *Section 94 Plan for Beach Protection Works and Surf Life Saving Equipment*, Coffs Harsbour City Council, Coffs Harbour.

Collignon, F. 1991, 'Where's the money coming from?' *Australian Planner*, September, Vol.28, pp.114-121.

Commonwealth Government 1996, *Commonwealth Financial Relations With Other Levels of Government 1995-96*, Commonwealth Government Budget Paper No.3, AGPS, Canberra.

Commonwealth Grants Commission 1991, *Report on the Interstate Distribution of General Purpose Grants for Local Government*, AGPS, Canberra.

Council of Australian Governments (COAG) 1995*a*, *Report of the Expert Group on Asset Valuation Methods and Costs Recovery Definitions for the Australian Water Industry*, Commonwealth Department of Prime Minister and Cabinet, Canberra.

_____ 1995*b*, *The Second Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, February, Commonwealth Department of Prime Minister and Cabinet, Canberra.

_____ 1994, *Report of the Working Group on Water Resource Policy to the Council of Australian Governments*, Commonwealth Department of Prime Minister and Cabinet, Canberra.

Cox, G. 1995, *Review of Section 94 Contributions Plan - Housing*, North Sydney Council, Sydney.

_____ 1991, *Financing of Urban Public Infrastructure from Developer Contributions*, Monograph No.32, Planning Research Centre, University of Sydney, Sydney.

Cropper, M. and Oates, W. 1992, 'Environmental economics: A survey', *Journal of Economic Literature*, Vol.XXX, June, pp.675-740.

Cutts, L. 1989, Economic development: the local government perspective, Agenda Item No.6, Economic Planning Advisory Committee Meeting, 17 November, 1989.

Davis, G. and Weller, P. 1993, *Strategic Management in the Public Sector: Managing the Coastal Zone*, report prepared for the Resources Assessment Commission, Centre for Australian Public Sector Management, Griffith University.

Delaney, C. and Smith, M. 1989, 'Impact fees and the price of new housing - an empirical study', *American Real Estate Journal*, Vol.17, No.1, pp.41-54.

Demetz, H. 1969, 'Information and efficiency: Another viewpoint', *Journal of Law and Economics*, Vol.82, No.4, pp.713-719.

Desrousseaux, J. 1965, *L'evolution Economique et le Comportement Industriel*, Dunod, Paris.

Dollery, B. 1997*a*, 'The economics of amalgamation' in *Is Bigger Better? Towards a Model Reform Process for Local Government*, eds A. Witherby, N. Marshall and B. Dollery, Chapter 2, Australian Institute of Urban Studies, Sydney, pp.1-17.

Dollery, B. 1997*b*, 'Reforming Australian local government: forced or voluntary amalgamations?', *Agenda*, Vol.4, No.4, pp.445-453.

Dollery, B. and Marshall, N. 1997, (eds), *Australian Local Government, Reform and Renewal*, Macmillan Education, Melbourne.

Downing, P. (ed.) 1977, *Local Service Pricing Policies and Their Effect on Urban Spatial Structure*, University of British Columbia Press, Vancouver.

_____ 1977, 'Policy perspectives on user charges and urban spatial development' in *Local Service Pricing Policies and Their Effect on Urban Spatial Structure*, ed. P. Downing, University of British Columbia Press, Vancouver, pp.435-456.

Downing, P. and Gustely, R. 1977, 'The public service costs of alternative development patterns: a review of the evidence' in *Local Service Pricing Policies and Their Effect on Urban Spatial Structure*, ed. P. Downing, University of British Columbia Press, Vancouver, pp.63-85.

Downing, P. 1974, 'User charges and the development of urban land', *National Tax Journal*, Vol.26, No.4, pp.631-637.

Downing, P. and McCaleb, S. 1987, 'The economics of development exactions' in *Development Exactions*, eds J. Frank and R. Rhodes, Planners Press, American Planning Association, Washington, DC, pp. 42-69.

Draper, G., Thomas, J. and Mcleod, P. 1996, *Principles for Setting Developer's Contributions for Urban Water Infrastructure*, Urban Water Research Association of Australia, Research Report No.103, Melbourne.

DUAP, see New South Wales Department of Urban Affairs and Planning.

Duffield, B. 1995, Using section 94 to provide relevant open space into the future, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Dulich, C. 1997, 'Competition in local government' in *Australian Local Government Reform and Renewal*, eds. B. Dollery and N. Marshall, Macmillan Education, Melbourne, pp.189-208.

Etzioni, A. 1988, *The Moral Dimension: Towards a New Economics*, Free Press, New York.

Eurobodalla Shire Council 1993, *Section 94 Contributions Plan*, Eurobodalla Shire Council.

_____ 1990, *Section 94 Study and Policy*, Eurobodalla Shire Council.

Ferris, J. 1992, 'Local governing in the American federal system' in *The Impact of Federalism on Metropolitan Strategies in Australia*, eds C. Fletcher and C. Walsh, Federalism Research Centre, Australian National Universitiy, Canberra, pp.90-97.

Frantz, R. 1988, *X-Efficiency: Theory, Evidence and Applications*, Kluver Academic Publishers, Boston

Fredrickson, J. (ed.) 1990, *Perspectives on Strategic Management*, Harper Business, New York.

Friedman, M. 1953, *Essays in Positive Economics*, Chicago University Press, Chicago.

Glazebrook, G. 1992, 'Finance for urban development', *Australian Planner*, Vol.29, September, pp.152-161.

Goyal, R. 1989, 'Rate of return reporting' in *Government Policy, Financial Guidelines and Accounting Data: Issues for Statutory Authorities*, eds L. Hagan and J. Staunton, AFM Exploratory Series No.14, Department of Accounting and Financial Management, University of New England, Armidale, pp.132-162.

Gramlich, E. 1984, 'A fair go: fiscal federalism arrangements' in *The Australian Economy: A View from the North*, eds R. Caves and L. Krause, George Allen and Unwin, Sydney, pp.231-275.

_____ 1977, 'Intergovernmental grants: a review of the empirical literature' in *The Political Economy of Fiscal Federalism*, ed. W. Oates, Lexington Books, Massachusetts, pp.219-240.

Grantham, K. 1997, 'Establishing the nexus for infrastructure allocation' in *Developer Charges for Water, Sewerage and Drainage, Understanding the Pricing*, Independent Pricing and Regulatory Tribunal (IPART) Seminar Proceedings, 20 February, IPART, Sydney, Paper No.4.

Greater Taree City Council 1992, *Section 94 Contribution Plans*, Greater Taree Council.

Groom, E. 1995, 'Issues in the choice of discount rate', paper prepared for the NSW Government Pricing Tribunal, *Water Industry Forum Report on Developer Charges for Water, Sewerage and Drainage Services*, Attachment 1, NSW Government Pricing Tribunal, Sydney.

Hallgarth, R. 1995, Unity approaches towards an integrated variable levy system within an ILAP planning framework, paper presented to the Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-22 July.

Hamilton, C. 1997, 'Foundations of ecological economics' in *Human Ecology, Human Economy*, eds M. Diesendorf and C. Hamilton, Allen and Unwin, Sydney, pp.35-63.

_____ 1994, *The Mystic Economist*, Willow Park Press, Canberra, ACT.

Hanke, S. 1981, 'On the marginal cost of water supply', *Water Engineering and Management*, February, pp.60-68.

Hanke, S. and Davis, R. 1973, 'Potential for marginal cost pricing in water resource management',*Water Resources Research*, Vol.9, No.4, August, pp.808-825.

Hanke, S. and Wentworth, R. 1981, 'On the marginal cost of wastewater services', *Land Economics*, Vol.57, No.4, November.

Hazelwood, N. 1951, 'Optimum pricing as applied to telephone service', *Review of Economic Studies*, Vol.18, pp.67-68, reprinted in *Public Enterprise*, ed. R. Turvey, 1968, Penguin, Ringwood, Victoria, pp.237-257.

Heath, D., Kreger, G., Orlin, G. and Riesett, M. 1988, 'Traffic impact fees' in *Development Impact Fees*, ed. A. Nelson, Planners Press, American Planning Association, Washington D.C., pp.188-203.

Henderson, S., Peirson, G. and Brown, R. 1992, *Financial Accounting Theory*, Second edition, Longman Cheshire, Melbourne.

Herrington, P. 1997, 'Pricing water properly' in *Ecotaxation*, ed. T. O'Riordan, Earthscan, London, pp.263-286.

_____ 1987, *Pricing of Water Services*, OECD, Paris.

Hirschleifer, J. 1984, *Price Theory and Applications*, Prentice Hall, New Jersey.

Hodgson, A., Holmes, S. and Kam, V. 1992, *Accounting Theory*, John Wiley and Sons, Sydney.

Hornsby Shire Council 1997, *Development Contributions Plan 1993-1998*, Hornsby Shire Council, Sydney.

_____ 1995, Open space and recreational needs relative to Hornsby Shire developmnent contributions plan, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Horridge, M. 1992, 'Land use and commuter transport within Melbourne', *Urban Futures*, Special issue 5, pp.96-110.

_____ 1991, *A General Equilibrium Model Of Australia's Second Largest City*, Centre of Policy Studies Discussion Paper, September, Monash University.

Hotelling, H. 1938, 'The general welfare in relation to problems of taxation and of railway and utility rates', *Econometrica*, Vol.6, pp.242-269.

Housing Cost Inquiry 1978, *The Cost of Housing*, 3 Vols., AGPS, Canberra.

Hulten, C. and Schwab, R. 1997, 'A fiscal federalism approach to infrastructure policy', *Regional Science and Urban Economics*, Vol.27, pp.139-159.

Hyman, D. 1990, *Public Finance*, Third edition, The Dryden Press, Fort Worth.

Independent Pricing and Regulatory Tribunal of New South Wales (IPART) 1997, *Developer Charges for Water, Sewerage and Drainage Services, Understanding the Pricing*, Seminar Proceedings, 20 February, IPART, Sydney.

_____ 1997*a*, *Benchmarking Local Government Performance in New South Wales*, Interim Report, IPART, Sydney.

_____ 1996, *Pricing Principles for Local Water Authorities*, IPART, Sydney, September.

Industry Commission 1994, *Urban Transport*, Report No.37, Vols I and II, AGPS, Canberra.

_____ 1993, *Taxation and Financial Policy Impacts on Urban Settlement*, Report No.30, Vols I and II, AGPS, Canberra.

_____ 1992, *Water Resources and Waste Disposal*, Report No.26, AGPS, Canberra.

_____ 1989, *Inquiry into Government (Non-tax) Charges*, Four volumes, Report No.422, AGPS, Canberra.

IPART, see Independent Pricing and Regulatory Tribunal.

Jacobs, M. 1991, *The Green Economy*, Pluto Press, London.

Jenkins-Smith, H. 1991, 'Continuing controversies in policy analysis' in *Policy Analysis and Economics*, ed. D. Weimer, Kluwer Academic Publishers, pp.23-44.

Johnson, D. 1995, Road standards, traffic density and apportionment, paper presented to the Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Jones, M. 1993, *Transforming Australian Local Government*, Allen and Unwin, Sydney.

_____ 1981, *Local Government and the People*, Hargreen Publishing Company, Melbourne.

Kafoglis, M. 1977, 'The potential for local service charges' in *Local Service Pricing Policies and Their Effect on Urban Spatial Structure*, ed. P. Downing, University of British Columbia Press, Vancouver, pp.3-21.

Kerwan, J. 1995, Integrated planning for infrastructure: standards, timing and works programmes, paper presented to the Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, 17-21 July.

King, D. 1992, (ed.) 'Current issues in the theory of fiscal federalism' in *Local Government Economies in Theory of Practice*, Routledge, London, pp.23-42.

Kirwan, R. 1991, *Financing Urban Infrastructure: Equity and Efficiency Considerations*, The National Housing Strategy Background Paper No.4, AGPS, Canberra.

_____ 1990, 'Infrastructure finance: aims, attitudes and approaches', *Urban Policy and Research*, Vol.8, No.4, pp.185-193.

Lake Macquarie City Council 1993, *Section 94 Contributions Plan No.1*, Lake Macquarie City Council, Speers Point.

Lang, J. 1991, *Local governments' role in urban infrastructure*, report to the Office of Local Government, AGPS, Canberra.

Larkin, J. and Dwyer, T. 1995, *Refocussing Microeconomic Reform*, Business Council of Australia, Melbourne.

Lee, D. 1988, 'Evaluation of impact fees against public finance criteria' in *Development Impact Fees*, ed. A. Nelson, Planners Press, American Planning Association, Washington DC, pp.290-312.

Leibenstein, H. 1976, *Beyond Economic Man*, Harvard University Press, Cambridge, Massachusetts.

Levine, J. 1994, 'Equity in infrastructure finance: when are impact fees justified', *Land Economics*, May, Vol.70, No.2, pp.210-222.

Lindblom, C. 1979, 'Still muddling not yet through', *Public Administration Review*, Vol.39, pp.517-526.

_____ 1959, 'The science of muddling through', *Public Administration Review*, Vol.19, pp.74-88.

Littlechild, S. 1979, *Elements of Telecommunications Economics*, Peter Peregrinus, London.

Lipman, Z. 1991, *Environmental Law and Local Government in New South Wales*, The Federation Press, Sydney.

Lipsey, R. and Lancaster, K. 1956, 'The general theory of the second best', *Review of Economic Studies*, Vol.24, No.1, pp.11-32.

Liverpool City Council 1995, *Section 94 Contributions Plan No.6*, Cabramatta Creek, Carnes Hill and Prestons, Liverpool City Council, Sydney.

Logues, D. and Toon, J. 1995, Roads and traffic management: overview of the issues, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Lynn, N. and Wildavsky, A. (eds) 1990, *Public Administration: the State of the Discipline*, Chatham House, New Jersey.

McNeill, J. 1995, Linking growth management problems with fiscal incentives, paper presented to the inaugural Ecological Economics Society Conference, Coffs Harbour, 20-22 November.

Maddison, D., Pearce, D., Johansson, O., Calthrop, E., Litman, T. and Verhoef, E., 1996, *The True Costs of Road Transport*, Earthscan Publicatins, London.

Maddock, R. and King, S. 1996*a*, 'Competition and almost essential facilities: making the right policy choices', *Economic Papers*, Vol.15, No.3, pp.28-37.

_____ 1996*b*, *Unlocking the Infrastructure: The Reform of Public Utilities in Australia*, Allen and Unwin, Sydney.

Magee, S., Brock, W. and Young, L. 1989, *Black Hole Tariffs and Endogenous Policy Theory*, Cambridge, University Press, Sydney.

Mankiw, G. 1997, *Principles of Economics*, The Dryden Press, Fort Worth.

Mathews, R. 1980, 'Mechanisms for fiscal equalisation' in *The Economics of Federalism*, eds B. Grewal, G. Brennan and R. Mathews, ANU Press, Canberra, pp.255-284.

_____ 1967, *Public Investment in Australia*, F.W. Cheshire, Sydney.

Mathews, R. and Grewal, B. 1997, *The Public Sector in Jeopardy*, Centre for Strategic Economic Studies, Victoria University, Melbourne.

Mayo, W. 1989, 'Pricing for capacity utilisation with public enterprises', *Australian Economic Review*, Third Quarter, pp.16-24.

Mishan, E. 1980, 'How valid are economic evaluations of allocative changes?' *Journal of Economic Issues*, Vol.14, pp.143-161.

_____ 1971, *Cost Benefit Analysis*, Fourth edition, Allen and Unwin, London.

Montgomery Watson (MW) 1995, *Armidale City Council Water Supply and Sewerage Development Strategy Study*, report to Armidale City Council, November, Armidale City Council, Armidale.

Musgrave, R. and Musgrave, P. 1984, *Public Finance in Theory and Practice*, Fourth edition, McGraw Hill Book Company, Sydney.

National Commission of Audit 1996, *Report to the Commonwealth Government*, AGPS, Canberra.

Nelson, A. 1995, *System Development Charges for Water, Wastewater and Stormwater Facilities*, CRC Press, Boca Raton, Florida.

_____ 1988, *Development Impact Fees*, Planners Press, American Planning Association, Washington D.C.

Neutze, M. 1997, *Funding Urban Services*, Allen and Unwin, Sydney.

_____ 1995*a*, 'Financing urban services' in *Australian Cities*, ed. P. Troy, Cambridge University Press, Cambridge, U.K., pp.220-245.

_____ 1995*b*, 'Funding urban infrastructure through private developers', *Urban Policy and Research*, Vol.13, No.1, pp.20-28.

_____ 1995*c*, 'Public and private sector investment', in *Investing in Infrastructure*, AURDR Workshop Paper No.5, AURDR, Melbourne, pp.121-140.

_____ 1994, *The Costs of Urban Physical Infrastructure Services*, Urban Research Program Working Paper No.42, Research School of Social Sciences, Australian National University.

New South Wales Department of Planning 1991, *Outdoor Recreation and Open Space*, Department of Planning, Sydney.

New South Wales Department of Urban Affairs and Planning 1997, *Section 94 Contribution Plans Manual*, Second edition, NSW Department of Urban Affairs and Planning, Sydney.

_____ 1996, *Section 94 Contributions Plans*, Draft Revised Manual, October, NSW Department of Urban Affairs and Planning, Sydney.

_____ 1995, *Review of Developer Contributions System Under Section 94(2A), E P and A Act 1979*, report to Taskforce, June, NSW Department of Urban Affairs and Planning Sydney.

New South Wales Government Pricing Tribunal 1995*a*, *Pricing Principles for Local Water Authorities: An Issues Paper*, Discussion Paper No.9, NSW Government Pricing Tribunal (now IPART), Sydney.

_____ 1995*b*, *Sydney Water Corporation Prices of Developer Charges for Water, Sewerage and Drainage Services*, Determination No.9, 14 December, NSW Government Pricing Tribunal (now IPART), Sydney.

_____ 1994, *Developer Charges in the NSW Water Industry*, Discussion Paper No.8, September, NSW Government Pricing Tribunal (now IPART), Sydney.

_____ 1993*a*, *Inquiry Into Water and Related Services*, NSW Government Pricing Tribunal (now IPART), Sydney.

_____ 1993*b*, *Water - An Interim Report*, Vol.2 - Attachments, NSW Government Pricing Tribunal (now IPART), Sydney.

New South Wales Local Government Grants Commission 1996, *Annual Report 1995/96*, NSW Department of Local Government, Bankstown.

Ng, Y. 1987, 'Equity, efficiency and financial viability: public utility pricing with special reference to water supply', *Australian Economic Review*, Third Quarter, pp.21-35.

Nicholas, J. 1992, 'On the progression of impact fees', *Journal of the American Planning Association*, Vol.58, No.4, Autumn, pp.517-524.

Niskanen, 1971, *Bureaucracy and Representative Government*, Aldine Atherton, Chicago.

Oates, W. 1977, 'An economist's perspective on fiscal federalism' in *The Political Economy of Fiscal Federalism*, ed. W. Oates, D.C. Heath and Co., Ottowa, pp.3-20.

_____ 1972, *Fiscal Federalism*, Harcourt Brace Jovanovich, New York.

Office of Local Government 1994, *Strategic Local Government Approaches to Infrastructure*, AGPS, Canberra.

_____ 1993, *Funding Local Social Infrastructure*, AGPS, Canberra.

Oi, W. 1967, 'The neo-classical foundations of progress functions', *Economic Journal*, September, Vol.67, pp.579-594.

Olson, M. 1969, 'The principle of "fiscal equivalence": the division of responsibilities among different levels of government', *American Economic Review Proceedings*, Vol.49, May, pp.479-487, reprinted in *The Economics of Federalism*, eds B. Grewal, G. Brennan and R. Mathews 1980, Australian National University Press, Canberra, pp.26-37.

Parmenter, B. and Webb, L. 1976, 'Amortization and public pricing policies', *Australian Economic Papers*, Vol.15, No.28, pp.11-27.

Paterson, J. 1991, 'Water utilities and water resources' in *Issues in the Pricing and Management of Natural Resources*, Economic Planning and Advisory Committee Background Paper No.16, November, AGPS, Canberra, pp.69-78.

Pearson, L. 1994, *Local Government Law in New South Wales*, Federation Press, Sydney.

Peiser, R. 1988, 'Calculating equity-neutral water and sewer impact fees', *Journal of the American Planning Association*, Vol.54(1), Winter, pp.38-48.

Penrith City Council 1995, *Glenmore Park Release Area Section 94 Contributions Plan*, Penrith City Council, Sydney.

Perkins, F. 1987, *Infrastructure for Resource Development*, Centre for Resource and Environmental Studies Monograph No.20, Australian National University, Canberra.

Pigou, A. 1920, *The Economics of Welfare*, Macmillan, London.

Planning Research Centre 1995*a*, Making Contribution Plans: Towards Best Practice, Conference Papers, Coffs Harbour, 17-21 July, Planning Research Centre, University of Sydney, Sydney.

_____ 1995*b*, *Servicing our Cities: Micro-economic Reform and Urban Development*, Planning Research Centre Monograph No.45, Universitiy of Sydney, Sydney.

_____ 1994, *Review of Contribution Plans*, Planning Research Centre Monograph No.41, University of Sydney, Sydney.

Porter, D., Lin, B., Jakubiak, S. and Peiser, R. 1992, *Special Districts: A Useful Technique for Financing Infrastructure*, Second edition., Urban Land Institute, Washington, DC.

PRC, see Planning Research Centre.

Price, C. 1993, *Time, Discounting and Value*, Blackwell, Oxford.

Pullen, J. 1971, 'The NSW Land Development Contribution Act 1970', *Royal Australian Planning Institute Journal*, Vol.9, No.1, pp.5-11.

Quiggan, J. 1988, 'Murray river salinity - an illustrative model', *American Journal of Agricultural Economics*, Vol.70, No.3, August 1988, pp.635-645.

Rees, J. 1977, 'Toward implementation realities' in *Ecotaxation*, ed. T. O'Riordan, Earthscan, London, pp.287-303.

Rees, R. 1984, *Public Enterprise Economics*, Second edition, Weidenfeld and Nicolson, London.

_____ 1979, 'The pricing policies of the Nationalised Industries', *Banking Review*, No.122, June, pp.3-31.

Reid, C. 1997, 'IPART's perspective' in *Developer Charges for Water, Sewerage and Drainage Services, Understanding the Pricing*, NSW Independent Pricing and Regulatory Tribunal (IPART), Seminar proceedings, 20 February, Paper No.5.

Richardson, H. 1969, *Regional Economics*, Second edition, Weidenfeld and Nicolson, London.

_____ 1969, *Elements of Regional Economics*, Penguin, Ringwood, Victoria.

Robinson, J. 1995, 'Integrated decision making for urban water infrastructure', *Urban Research Program Newsletter*, 23 June, pp.2-3, Research School of Social Sciences, Australian National University, Canberra.

Ross, S., Thomson, S., Christensen, M., Westerfield, R. and Jordan, B. 1994, *Student Problem Manual for Use with Fundamentals of Corporate Finance* (First Australian Edition), Irwin, Sydney.

Rubinfeld, D. 1987, 'The economics of the local public sector' in *Handbook of Public Economics*, Vol.II, eds A. Averbach and M. Feldstein, North Holland, Amsterdam, pp.571-646.

Ruggles, N. 1950, 'Recent developments in the theory of marginal cost pricing', *Review of Economic Studies*, Vol.17, No.43, pp.107-126.

_____ 1949, 'The welfare basis of the marginal cost pricing principle', *Review of Economic Studies*, Vol.17, No.42, pp.29-46.

Salter, W. 1966, *Productivity and Technical Change*, Second edition, Cambridge University Press, London.

Samra, S. 1997, 'Water supply and sewerage developer charges for NSW councils: guidelines and case studies', presentation to seminar on Developer Charges for Water, Sewerage and Drainage Services, Understanding the Pricing, Independent Pricing and Regulatory Tribunal (IPART) Sydney, 20 February.

Saunders, R., Warford, J. and Mann, P. 1977, *Alternative concepts of marginal cost for public utility pricing: problems of application in the water supply sector*, World Bank Staff Working Paper No.259, May, World Bank, Washington.

Sears, J. 1997, 'An industry overview' in *Developer Charges for Water Sewerage and Drainage Services, Understanding the Pricing*, NSW Independent Pricing and Regulatory Tribunal (IPART), Seminar proceedings, 20 February, IPART, Sydney, Paper No.3.

Self, P. 1995, *The Australian Urban and Regional Development Review: What Can It Achieve?* Urban Research Program Working Paper No.46, Research School of Social Sciences, Australian National University.

_____ 1990, *Metropolitan Planning: Economic Rationalism and Social Objectives*, Urban Research Program Working Paper No.22, Research School of Social Sciences, Australian National University.

_____ 1985, (Chairman), *National Inquiry Into Local Government Finance*, AGPS, Canberra.

Sen, A. 1987, *On Ethics and Economics*, Basil Blackwell, London.

Shankie-Williams, N. 1992, 'Developer contributions', *Australian Planner*, Vol.29, March, pp.33-34.

Shell Harbour City Council 1994, *Section 94 Contributions Management Plan*, Shell Harbour City Council, Blackbutt.

Simpson, W. 1989, *An Inquiry Pursuant to Section 119 of the Environmental Planning and Assessment Act 1979 with Respect to the Operation and Practices Associated with Contributuions under Section 94 of the Environmental Planning and Assessment Act 1979*, Commission of Inquiry Report to the NSW Minister for Local Government and Minister for Planning, NSW Department of Local Government, Sydney.

Singell, L. and Lillydahl, J. 1990, 'An empirical examination of the effect of impact fees on the housing market', *Land Economics*, Vol.66, No.1, February, pp.82-92.

Skaburskis, A. and Qadeer, M. 1992, 'An empirical estimation of the price effects of development impact fees', *Urban Studies*, Vol.29, No.5, pp.653-667.

'Small-scale systems halve water use', *Water Management and Engineering*, September 1996, pp.18-21.

Snyder, T. and Stegman, M. 1987, *Paying For Growth*, Urban Land Institute, Washington DC.

Soble, C. 1988, 'Developers' perspective on impact fees' in *Private Supply of Public Services*, ed. R. Alterman, New York University Press, New York, pp.145-152.

Staunton, J. and Hagan, L. 1989, 'Economic measures of performance of water authorities, including issues of measurement' in *Government Policy, Financial Guidelines and Accounting Data: Issues for Statutory Authorities*, eds L. Hagan and J. Staunton, AFM Exploratory Series No.14, Department of Accounting and Financial Management, University of New England, Armidale, pp.48-55.

_____ 1989, 'Returns to government and consistency of social objectives' in *Government Policy, Financial Guidelines and Accounting Data: Issues for Statutory Authorities*, eds L. Hagan and J. Staunton, AFM Exploratory Series No.14, Department of Accounting and Financial Management, University of New England, Armidale, pp.163-172.

Stein, J. 1989, Judgement on Collin C. Donges and Associates Pty. Ltd. v. Baulkham Hills Shire Council, New South Wales Land and Environment Court, Internet site: http://www.austlii.edu.au/do2/dis.../nsw/landenv/97.html?

Stiglitz, J. 1988, *Economics of the Public Sector*, W. Norton and Co., London.

Sullivan, A. 1985, 'The pricing of urban services and the spatial distribution of residence', *Land Economics*, Vol.61, No.1, February, pp.18-25.

Tamworth City Council 1992, *Tamworth Section 94 Contributions Plan*, Tamworth City Council.

Tasmanian Department of Environment and Land Management 1997, *Trialing Development Contribution Plans in Tasmania*, Department of Environment and Land Management, Hobart.

Taylor, C. 1997, 'An industry perspective of developer charges of finance' in *Developer Charges for Water, Sewerage and Drainage Services, Understanding the Pricing*, NSW Independent Pricing and Regulatory Tribunal (IPART), Seminar Proceedings, 20 February, IPART, Sydney, Paper No.2.

Thompson, N. and Walsh, C. 1981, 'Cross subsidisation of rural areas via utility pricing policies', *Australian Journal of Agricultural Economics*, Vol.25, No.3, December, pp.221-232.

Tiebout, C. 1956, 'A pure theory of local expenditures', *Journal of Political Economy*, Vol.64, pp.416-424.

Toon, J. 1995*a*, Open space and recreation facilities, overview of the issues, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

_____ 1995*b*, Section 94 contributions for stormwater; overview of issues, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.

Treasury 1990, *Financial Monitoring of Government Business Enterprises: An Economic Framework*, Treasury Economic Paper No.14, AGPS, Canberra.

Troy, P. 1996, *The Perils of Urban Consolidation*, The Federation Press, Sydney.

_____ (ed.) 1995, *Australian Cities*, Cambridge University Press, Cambridge, U.K.

Tullock, G. 1969, 'Federalism: problems of scale', *Public Choice*, Vol.6, Spring, pp.19-29, reprinted in *The Economics of Federalism*, eds B. Grewal, G. Brenman and R. Mathews, 1980, Australian National University Press, Canberra, pp.39-49.

Turvey, R. 1976, 'Analysing the marginal cost of water supply', *Land Economics*, Vol.52, No.2, pp.158-168.

_____ 1971, *Economic Analysis and Public Enterprises*, Allen and Unwin, London.

_____ 1969, 'Marginal cost', *Economic Journal*, Vol.79, pp.282-299.

_____ 1968*a*, *Optimal Pricing and Investment in Electricity Supply*, Allen and Unwin, London.

_____ (ed.) 1968*b*, *Public Enterprise*, Penguin, Harmondsworth.

Tweed Shire Council 1997, *Tweed Road Contribution Plan*, CP No.4, Version 4.0, June, Murwillumbah.

Urban Development Institute of Australia (UDIA) 1997, *Review of S94 EPA Act and Infrastructure Financing*, UDIA, Sydney.

USA Real Estate Research Corporation 1974, *The Costs of Sprawl*, report prepared for the USA Environmental Proteciton Agency, Government Printing Office, Washington DC.

Victorian Department of Planning and Development 1994, *Review of Development Contributions*, Reference Group Report, Department of Planning and Development, Melbourne.

Victorian Office of Planning and Heritage 1995, *Guidelines for Development Contributions*, Department of Planning and Development, Melbourne.

Vince, A. 1997, 'Amalgamations' in *Australian Local Government, Reform and Renewal*, eds B. Dollery and N. Marshall, Macmillan Education, Melbourne, pp.151-171.

Vining, A. and Weimer, D. 1991, 'Government supply and government production failure: A framework based on contestability', *Journal of Public Policy*, Vol.10, No.1, pp.1-22.

Vipond, J. 1990, The Use of Section 94 of the Environmental Planning and Assessment Act 1979, paper presented to the Association of Consulting Surveyors Seminar entitled Section 94 Revisited, 6 August, Department of Planning, NSW.

Voran Consultants 1992, *A Comparison of Urban Consolidation and Fringe Development - Housing Costs and Benefits*, report prepared for Homewest and Commonwealth Department of Health, Housing and Community Services, Canberra.

Wagga Wagga City Council 1993, *Section 94 Contributions Plan 1993-2004*, Wagga Wagga City Council, Wagga Wagga.

Wagner, R. 1991, (ed.) *Charging for Government*, Routledge, London.

Walsh, C. 1989, 'Financing local government in the Australian federal system: what case is there for reform?', in *The Australian Local Government Handbook*, Australian Local Government Association, AGPS, Canberra, pp.117-128.

_____ 1988, 'Federalism Australian style' in *Taxation and Fiscal Federalism: Essays in Honour of Russell Mathews*, eds G. Brennan, B. Grewal and P. Groenewegen, ANU Press, Canberra, pp.222-239.

Warner, R. 1997, 'Developer charges for water and related services' in *Developer Charges for Water, Sewerage and Drainage Services, Understanding the Pricing*, Independent Pricing and Regulatory Tribunal (IPART), Seminar proceedings, 20 February, Paper No.4.

Watson, A. 1995, *Conceptual Issues in the Pricing of Water For Irrigation*, Dairy Research and Development Corporation, Glen Iris, Victoria.

Waverley Council 1996, *Draft Waverley Council Contributions Plan*, Waverley Council, Sydney.

Weimer, D. and Vining, A. 1992, *Policy Analysis*, Prentice Hall, Englewood Cliffs, New Jersey.

Weimer, D. (ed.) 1991, *Policy Analysis and Economics*, Kluwer Academic Publishers, Boston.

Wensing, E. 1997, 'The process of local government reform: Legislative change in the states', in *Australian Local Government, Reform and Renewal*, eds B. Dollery and N. Marshall, Macmillan Education, Melbourne, pp.89-102.

Westing, P. 1995, Section 94 Contribution Plans, hierarchies of catchments: the case of Eurobodalla, paper presented to the Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, 17-21 July.

Williamson, O. 1985, *The Economic Institutions of Capitalism*, Collier Macmillan Publishers, London.

Wiseman, J. 1959, 'The theory of public utility price: a further note', *Oxford Economic Papers*, February, pp.88-97.

Witherby, A., Marshall, N. and Dollery, B. 1997, *Is Bigger Better? Towards a Model Reform Process for Local Government*, Australian Institute of Urban Studies, Sydney.

Wolf, C. 1988, *Markets or Governments*, MIT Press, Cambridge, Massachusetts.

Wollongong City Council 1993, *Horsley Section 94 Contribution Plan - Water Quality Controls*, Wollongong City Council, Wollongong.

Wyong Shire Council 1995, *Development Contributions Manual*, Wyong Shire Council, Wyong.

Yinger, J. 1998, 'Who pays development fees?', in *Local Government Tax and Land Use Policies in the United States*, ed.H. Ladd, Edward Elgar, London, pp.218-233.

Zanon, D. and Wheatley, B. 1995, An asset management approach: modelling visitor demand and open space requirements, paper presented to Planning Research Centre Conference on Making Contribution Plans: Towards Best Practice, Coffs Harbour, 17-21 July.