MUNICIPAL SERVICE PRICING: IMPACT ON URBAN DEVELOPMENT AND FINANCE
SUMMARY AND OVERVIEW

PREPARED FOR THE NATIONAL SCIENCE FOUNDATION

LAURENCE DOUGHARTY  CHARLES CHEW
ISAO KOBASHI  ELIZABETH ROLPH  GERALD SUMNER
SANDRA TAPELLA  JUDITH WEBB  BENJAMIN ZYCHER

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PREFACE

This report serves as a summary for a series of Rand reports, sponsored by the National Science Foundation and produced in conjunction with the Santa Clara County (California) Planning Department, on the impact of alternative municipal service pricing policies on urban development and finance. A pricing policy is basically a method of allocating the cost of a service to various segments of the community (e.g., new residents, service users, the entire community). Primary attention is paid to policies for pricing the capital facilities necessary to serve new residential development. Therefore, these reports should be of most interest to cities that have significant growth potential.

Qualitative estimates are made of the effect of pricing policy on community objectives in the following areas: fiscal position, spatial location of development, residential growth, low-cost housing, and residential density. Alternative pricing policies are ranked according to impact on each objective.

The estimates of the effectiveness of pricing policy were developed from case examples in San Jose and Gilroy, California; they are not directly transferable to other locations. Nevertheless, because San Jose, a fairly large city that has already experienced much of its growth, and Gilroy, a city that could yet undergo explosive growth, are prototypical of a large number of American cities, the reports in this series should suggest the broad potential usefulness of municipal service pricing as a tool in shaping future urban development.

This report is aimed at an audience of local government officials. The purpose is to provide guidance in formulating a service pricing policy consistent with municipal objectives (e.g., growth containment, high-density development). Other reports in the series are:


Laurence Dougharty, Elizabeth Rolph, and Gerald Sumner are members of the Rand professional staff; Benjamin Zycher is a Rand consultant. Charles Chew, Isao Kobashi, Sandra Tapella, and Judith Webb are members of the Santa Clara County Planning Department.
SUMMARY AND CONCLUSIONS

Residential growth is often accompanied by problems in urban structure and finance. Cities are concerned about fiscal problems accompanying growth, as well as its effects on environmental quality related to both the size and the pattern of new development (compact or scattered).

Local government has two different, but not alternative, policies for shaping development in accordance with community objectives: regulatory policy and pricing policy for municipal services (e.g., streets, fire stations, sewers). Regulatory policy attempts to achieve its objectives through prohibiting certain types of behavior (e.g., zoning laws limiting the number of dwelling units). Pricing policy, which allocates the cost of service to various segments of the community (e.g., new residents, service users, the entire community), works through changing the economic incentives for certain types of behavior. For example, a pricing policy could be designed so that the costs of development far from the existing community are quite high compared with those for contiguous development. Remote development should then be discouraged by the higher municipal service prices that reduce the developer's profit.

This report summarizes research estimating the effect of municipal service pricing on local objectives. Our attention was focused on the pricing of capital facilities (e.g., streets, fire stations, interceptor sewers) to serve new residential development. The impact of pricing policy on the following objectives was examined:

1. Fiscal position: To what extent can pricing policy alleviate the tax burdens imposed on existing residents by the expansion of facilities to serve new development?
2. Spatial location: To what extent can pricing policy deter noncontiguous (leapfrog) development?
3. Growth: To what extent can pricing policy restrain new residential growth?
4. Low-cost housing: To what extent can pricing policy encourage the production of more low-cost housing?
5. Residential density: To what extent can pricing policy alter the incentives for more compact (measured by number of dwelling units/land area) development?

Quantitative estimates of the effect of alternative pricing policies on fiscal position, spatial location, and growth were made in a case study conducted in Santa Clara County, California. These precise estimates are not directly transferable to other localities. Our research, along with evidence from previous research, does allow us to draw qualitative conclusions about the comparative effectiveness of pricing policies as tools for attaining municipal objectives. These conclusions are presented in two steps.

We first assess the relative strength of pricing policy in achieving each objective. A strong influence implies that pricing policy should be a primary part of a program to achieve a particular objective. A medium influence means that pricing policy can
contribute to achieving an objective, but other forces may counteract its effect. A weak influence implies that pricing policy may have second-order effects, but it should not be considered a major tool in designing a program to attain an objective.

Pricing policy was found to be a strong influence in achieving the fiscal position objective, a medium influence in directing spatial location of development, and a weak influence in deterring growth, promoting low-cost housing, and encouraging more dense development.

Second, we rank all of the pricing policy alternatives according to impact on each objective. For example, if the city wants to ensure its fiscal position, how should it price the various types of capital facilities that are necessary to serve new development?

The results of our analysis provide local officials with both information and procedural guidance for formulating a service pricing policy consistent with municipal objectives.
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We would also like to pay special tribute to the late Mrs. Ethel Bowers, who served as project secretary. She was a constant source of encouragement, inspiration, and good humor that served us well and that will be sorely missed.
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I. INTRODUCTION

Residential growth is often accompanied by problems in urban structure and finance for local government officials. An immediate concern is whether the existing municipal service infrastructure (e.g., sewage treatment plants, fire stations) has the capacity to serve the larger population; and, more important, whether the increase in demand for services will add to the tax burden on existing residents.

Longer-term issues also arise, such as whether the development pattern will be acceptable to the community. Will growth manifest itself in "leapfrog" or compact development, high-rise development or suburban sprawl? The nature of the development pattern is important since (1) some patterns are more costly to provide with municipal services; (2) some patterns are difficult to serve with public transportation, requiring more private transportation with its high energy consumption and air pollution; and (3) some patterns consume extraordinary amounts of open space or prime agricultural land. Community interests are entwined with the development process, although in ways not always fully articulated in local policy. Local government has available two different, but not alternative, policies for shaping the development process—regulatory policy and municipal service pricing policy.

Regulatory policies encompass zoning ordinances, building code restrictions, and other special laws (e.g., urban development policies, growth-control legislation) limiting construction on certain parcels of land. The relative effectiveness of such policies in guiding urban development has been discussed elsewhere. Scant attention has been paid to the pricing of municipal services as a potential tool for local policymakers.

This report is intended to increase knowledge about the effectiveness of municipal service pricing policy for controlling and shaping urban development. Since pricing policy has received so little attention, clarification is necessary. Both regulatory policy and pricing policy are designed to alter developers’ incentives in a way that promotes public objectives. Regulatory policy works directly by proscribing certain behavior (e.g., no manufacturing in a residential zone). Pricing policy attempts to alter developers' behavior by increasing (or decreasing) the profitability of desired (or undesired) forms of development. For example, if municipal service prices to the developer were higher for noncontiguous (leapfrog) development than for compact, we would expect less leapfrog development.

Municipal services can be divided into two components—capital and operating. The capital component is the provision of facilities and equipment (e.g., fire stations,

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2 The neglect at the federal level has been attributed to the fact that most congressmen are lawyers and are therefore more familiar with regulatory policy. See Allen V. Kneese and Charles L. Shultze, Pollution Prices and Public Policy (Washington, D.C.: The Brookings Institution, 1975), p. 116.

sewage treatment plants, streets). The operating component consists of the current expenses to maintain service (e.g., street maintenance, fire fighting personnel). Pricing policy can be applied to both types of service in order to both recover costs and alter incentives.

This report focuses on the impacts of pricing policy for capital services. The structure of urban development will be shaped most effectively by pricing policy for capital costs, since it is these policies that are typically aimed at developers. Altering the price paid for capital services changes the incentives facing the developer for different types of building programs (e.g., single-family, location within the city). The structure of urban development will, in turn, affect the level of operating costs since some forms of development tend to be less costly than others. Operating costs may be much larger than annual capital costs for a city, but still the leverage on urban development will come from the pricing policy for capital services.

To illuminate the prospects for pricing policy as both an alternative and a complement to existing land-use regulation, a series of research projects were undertaken. Each project examined the impact of pricing policy on a specific objective in urban development and finance. Our analysis of pricing policy had two major goals. The first was to estimate its strength as a tool for attaining municipal objectives (e.g., fiscal position, spatial location). A strong influence implies that pricing policy should be a primary part of any city program to achieve a particular objective. A medium influence implies that pricing policy can contribute to achieving an objective, but other forces may counteract its effect. A weak influence means that pricing policy may have second-order effects, but it should not be considered a major tool in designing a program to attain an objective. Our second goal was to rank the various pricing alternatives according to impact on each objective. This report summarizes our findings.

Section II prepares for the analysis by delineating all pricing policies examined in our research. Section III presents our findings on the impact of municipal service pricing on the fiscal position of the city. The effects of various pricing policies on the spatial location of new development are addressed in Sec. IV. Specifically, we consider whether pricing policy can alter the incentives for what is known as "leapfrog development."

A third possible impact is on the level of residential growth (number of dwelling units constructed per year). The effect of pricing policy on the level of growth is almost impossible to predict with real certainty. Section V presents rough estimates of the impact in Santa Clara County, California, and indicates certain characteristics of the city that would make pricing less or more effective in restraining growth.

These three studies hardly exhaust the possible impacts that pricing policy can have. Section VI examines two other important effects that should be considered when selecting a pricing policy—the provision of low-cost housing and residential density. The final section suggests a systematic procedure for evaluating and selecting pricing policies consistent with community objectives.

II. PRICING POLICY ALTERNATIVES

INTRODUCTION

Cities have a wide variety of pricing alternatives from which to choose. This section describes the following policies, which we determined to be practical alternatives for pricing capital services and therefore used in our analyses:  
- Incremental budget pricing.
- Incremental budget pricing with payback.
- Average incremental pricing.
- Average incremental zone pricing.
- General revenue pricing.
- General revenue zone pricing.

Each policy is described in terms of five basic features: (1) the pricing structure under each policy; (2) its success in placing the burden of the costs of service expansion on new development (an equity criterion); (3) its success in charging a developer only for the costs of service that he receives (an efficiency criterion); (4) additional advantages and disadvantages associated with each policy; and (5) the types of service facilities for which each pricing policy is typically used.

INCREMENTAL BUDGET PRICING

Pricing Structure. Under this policy, the developer is charged only for increases in the government budget that are directly related to his development. If, for example, a long sewer extension is necessary to serve his development, the developer would pay the entire cost of its installation. If sewer capacity were already available, however, the developer would not be charged, since the budget would not be increased to serve his development.

Equity. Incremental budget pricing can place the burden of financing service expansion on new development if it is consistently applied. If, however, some of the existing excess service capacity has been financed out of general revenues, the developer would in effect be subsidized under an incremental budget pricing policy. For example, if a sewage treatment plant had excess capacity, the development would escape paying for the capital facilities, since there would be no increase in the budget.

Efficiency. Incremental budget pricing is inefficient in the cases where the developer must purchase excess capacity or is not charged for using capacity already

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1 Two common forms of pricing were excluded from our analysis. Marginal cost pricing was eliminated because of the operational problems involved in measuring marginal cost. Average cost pricing has been separated into two different policies—average incremental pricing where costs are allocated among service users, and general revenue pricing where costs are allocated throughout the entire community. See Laurence A. Dougharty, Sandra O. Tapella, and Gerald Sumner, Municipal Service Pricing: Impact on Fiscal Position, The Rand Corporation, R-1878/2-NSF, November 1975.

2 The pricing structure is the set of prices that face the developer. A pricing policy might say that a developer should be charged the average incremental cost of a new fire station. The pricing structure is a statement of the exact price (say, $20 per dwelling unit) that the developer would be charged.
in existence. In these cases, he is paying either more or less than the cost of service for the development. Since it is often impossible to buy additional service capacity in arbitrarily small units, incremental budget pricing will frequently be inefficient. For example, to provide adequate fire protection for one hundred new houses, the city may have to build a new fire station. That fire station can, however, serve many more than one hundred houses. Assessing the first developer the full cost of the station overcharges him for the services he receives, while letting subsequent developers escape payment for the station. Therefore, to meet the efficiency objective, incremental budget pricing should not be employed in pricing large capital facilities (e.g., sewage treatment plant expansions, fire stations, interceptor sewers) where large amounts of excess capacity may be created.

**Advantages and Disadvantages.** The use of this policy under conditions of excess capacity has obvious disadvantages. By setting the price to the developer equal to zero, the excess capacity is distributed on some basis other than price, such as first come, first served. This nonmarket type of allocation is common in the provision of government service, often rationalized by the argument that is not fair for persons to compete for government service with dollars. The competition for government service often disregards dollars and rewards other attributes such as promptness (seats at a free concert) or patience in waiting (tennis courts).

Although other forms of competition for public service are not necessarily undesirable, they do not provide information on the benefits from the service, as a pricing program would. Without some indication of how much people are willing to pay for a service, it is difficult for city managers to make a rational decision on whether to expand present service levels or replace the current equipment when it wears out. ③

Another disadvantage stems from the problems encountered in measuring service capacity. Can an existing fire station serve a new development or should a new fire station be built? Who is to say which development "broke the camel's back" and necessitated a new fire station?

**Typical Use.** Facilities that will primarily serve one development—e.g., short sewer extensions, on-site services.

**INCREMENTAL BUDGET PRICING WITH PAYBACK**

**Pricing Structure.** Under this policy, the developer pays for all increases in service system capacity as before, but with an important difference. Additional development in the service area is charged a fee that is in turn repaid to the original developer who installed the excess capacity. For example, assume that the original developer extended a sewer main through a large area of vacant land. The developer would pay for this main that must be designed to handle the growth that is expected in the now-vacant land. As houses fill the area, the developers are charged a share of the cost of the sewer main. The revenue collected (usually over some specified time period) is then returned to the initial developer.

**Equity.** Same as that for incremental budget pricing.

**Efficiency.** The payback feature of this pricing policy makes it a more efficient

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pricing alternative than incremental budget pricing. That is, the price the developer eventually pays is closer to the cost of the services that his development will receive. This policy should not be used for major capital facilities, since the developer is unlikely to be able to raise the required capital as easily and as inexpensively as a city government.

Advantages and Disadvantages. This policy has the advantage of letting the original developer bear the risks of installing excess capacity in the hopes of future growth. By shifting the capital burden onto the developer, the incentives for local government to encourage growth are reduced. No longer must city officials obtain growth in order to fully use existing capacity, thereby lowering the average cost of the capital facilities to each taxpayer. The city would be indifferent (at least with regard to paying for capital costs) to future expansion. At the same time, the developer is encouraged to build only in places where future demand for housing is likely. Therefore, this pricing policy would tend to eliminate speculative building in remote areas of the city.

Typical Use. Facilities sufficiently inexpensive for one developer to finance and permitting additional users to be easily identified—e.g., long sewer extensions where hook-up charges can be used to repay the initial developer.

AVERAGE INCREMENTAL PRICING

Pricing Structure. Under this policy, the incremental capital costs associated with increased service are averaged over the expected number of service users. For example, if a fire station is to be built to serve a new area at a capital cost of $300,000, then that cost would be divided by the number of houses, acres, or some other measure of service area to find the average incremental cost per unit served and hence the price.

Equity. Average incremental pricing places the cost of service expansion on the developer and hence meets our equity criterion.

Efficiency. The average incremental cost is likely to be very close to the full cost of service, so the efficiency criterion can be met. This criterion is most likely to be fulfilled when the municipal service is not location-specific, such as for central plants. For location-specific services, however, incremental average cost pricing policy will subsidize developments that require the most expensive expansion of facilities. For example, a development close to the existing community would be charged the same as a development far from the existing service infrastructure under this pricing policy. Therefore, when the city has large variations in cost among different parts of the city, this pricing policy would be inefficient.

Advantages and Disadvantages. Under this policy, the city bears the risk involved in financing service expansion. If the growth does not meet planning expectations, the existing residents may have to pay the cost of the facility. The city has several options, however, to minimize its risk:

1. The city can set some threshold population that is necessary before the facility is built, to ensure that the zone could carry the operating costs of the facility without burdening the existing community. This option is not

* The full cost of service is defined to be the long-run marginal cost.
open for some services (e.g., streets, sewers), which must be in place at the time of development.

2. The city could fund and construct a facility early in the development cycle but overcharge earlier developers with a payback plan for when the zone reaches its growth potential.

3. The city could build the facility at its convenience. The financing costs of the new facility borne by the existing community could be paid back by including them in the calculation of the average incremental cost that will be paid by developers.

Typical Use. Major facilities where service use is more directly tied to an area than to any particular development—e.g., fire stations and central facilities such as sewage treatment plants.

AVERAGE INCREMENTAL ZONE PRICING

Pricing Structure. This policy is similar to average incremental pricing, but here the costs of service are averaged over particular areas of a city rather than new developments alone. Zones are determined through an analysis of the costs of service where high-cost areas are isolated. The zones may be different for each municipal service.

Equity. Same as average incremental pricing.

Efficiency. By isolating expensive service areas, this policy brings service price more closely in line with service cost. Average incremental zone pricing is then more efficient than average incremental pricing.

Advantages and Disadvantages. Identifying high-cost zones should discourage development in these areas. Since they are likely to be the farthest from the existing service infrastructure, average incremental zone pricing will provide definite incentives for compact development.

Typical Use. Major facilities that serve primarily one geographical area—e.g., flood control system, fire station for a remote area.

GENERAL REVENUE PRICING

Pricing Structure. This policy allocates the costs of service expansion across the entire community. For example, a large sewer to serve a remote development would be funded out of the capital improvement budget financed through a citywide property tax. Under this policy, the developer does not face a direct charge for service.

Equity. This policy shifts much of the burden of financing service expansion onto the existing residents and therefore does not meet our criterion of equity. By burdening the existing community, this policy would encourage existing residents to seek the type of antigrowth legislation that is appearing in communities throughout the country.²

² Petaluma, California is a prominent example. That city has enacted legislation restricting the number of building permits used each year. Although the legislation is now being appealed to the Supreme Court, it has been upheld by the Federal District Court of Appeals (Los Angeles Times, August 34, 1975).
Efficiency. This policy causes misallocation of resources and inefficiency, and creates strong pressures for budget expansion when it is used to price capital services. For example, a portion of the community might petition the city council for a neighborhood park if the cost of that park were to be shared by the entire community. Such cost-sharing greatly reduces the price to be borne by the requesting community and, hence, increases the amount of park space demanded.

Under general revenue pricing, special interests at all levels of government see that they can reap large benefits from a program at only a small cost to themselves. At the local level, we see residents in leapfrog developments demanding a fire station to serve their area. Since the difference between benefits and price will be quite large for this group, they will exert strong pressure at the council meeting. The per-capita cost of the fire station when spread out over the entire community will be quite small. Though the other residents will receive little or no benefit from this remote fire station, they will also bear a very small cost individually—a cost so small that it is hardly worth the effort to attend a council meeting and protest. Because of the divergence between benefits and price, this pricing policy does not meet our efficiency criterion.

Advantages and Disadvantages. The principal advantage of this policy is that it is easy to administer. Costs are simply pooled and allocated over some measure, such as property value or land area, to arrive at a price. If, in fact, the benefits of the service are in turn proportional to the measure (e.g., property value), general revenue pricing can be an efficient method of financing. However, capital facilities that serve primarily new developments are unlikely to deliver sufficient benefits to the existing community to justify such financing.

General revenue pricing can be used to subsidize certain types of development to promote commercial or residential growth. Cities facing decline could, for example, use this type of pricing policy to lower service prices in order to attract new development.

Typical Use. Major facilities that serve the entire area—e.g., major streets, government offices.

GENERAL REVENUE ZONE PRICING

Pricing Structure. This policy allocates the costs to residents or property owners within a zone.

Equity. If zones are drawn to separate the existing community from developing areas, general revenue zone pricing can meet the equity criterion.

Efficiency. If zones are drawn to isolate high-cost areas (as well as low-cost areas), service prices are more in line with cost than under simple general revenue pricing. The price can be quite high for the first residents in a zone, however, if they

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4 At the federal level, a prime example would be a Corps of Engineers project. These projects are coveted by congressional districts not necessarily because their benefits far surpass their cost, but because local benefits received far outweigh the local share of the cost. An example at the state level would be the proliferation of state colleges. Again, many areas want a state college nearby for an assortment of reasons. Since they will bear only a small share of the cost of that institution, it is not irrational for them to push for a program that may be economically irrational for the state as a whole.

5 For example, let us assume that a fire station costs $300,000. In a city of 500,000 the per-capita cost of the fire station is only $0.60.
have to support all of the costs. If this policy is to be used, financing plans can be designed to have the annual payment increase with the expected rate of development.

**Advantages and Disadvantages.** This policy could discourage development in high-cost zones if buyers were fully aware of the likely charges they will be paying for service. Too often, however, the buyer becomes aware of his financial obligations only after taking title to the property. Therefore, this policy would be less effective in discouraging development in high-cost services areas than average incremental zone pricing. In the latter policy, the developer must pay for the service upon construction, so he is readily aware of any incentives provided by zone pricing. General revenue zone pricing, however, is an acceptable alternative for financing capital improvements in areas already developed, since it comes closer to equating benefits of service to price and, hence, partially eliminates the major defect of general revenue financing.

**Typical Use.** Capital improvements in developed areas—e.g., installation of underground utilities, resurfacing of streets.
III. FISCAL POSITION

Many cities are concerned about the impact of new development on their fiscal positions. Cities often undertake "cost/revenue studies" of new development in order to estimate whether new development will contribute more or less in revenues than it will cost in new services. These studies typically determine only whether the current pricing policy when applied to a particular development leads to a budget surplus or deficit. The purpose of the research undertaken in this study was to widen the cost/revenue studies by evaluating the fiscal implications of development under a variety of pricing alternatives. Specifically, we examined the magnitude of the tax burden placed on existing residents under each pricing policy alternative.

The focus of our research was on pricing policy for the recovery of capital costs. We concentrated on capital costs (as opposed to operating costs) for two main reasons. First, for the services under study (fire stations, streets, sewers, and flood control), per-unit operating costs were unlikely to differ for the existing and the new developments. For example, the costs of street maintenance in the old community and the new should be about the same. If this assumption concerning equal operating costs is valid, then our cost-based pricing policies would all yield equivalent prices. There is no need to evaluate pricing policies in this case, since all would yield identical results.

Second, the pricing of capital facilities is a possible tool for shaping the spatial location of development. It is feasible to charge developers for capital facilities but not for operating costs. Therefore, it is primarily in the pricing of capital facilities that cities have their best opportunities to influence developers' behavior.

Our discussion of the pricing policies under consideration gives a qualitative picture of the burden that each policy is likely to place on the existing community. To determine more precisely the size of the fiscal burden produced by each policy, a cost/price simulation model of growth in two cities in Santa Clara County (San Jose and Gilroy) was constructed.

The simulations answered several important questions:

1. Are the costs of capital facilities for new developments large enough to cause fiscal problems for the city?

Not surprisingly, the answer depends on the extent of the growth relative to the existing community's size. In cities that have already undergone most of their development (e.g., San Jose), new development is unlikely to produce large increases.

1 See Laurence A. Dougharty, et al., Fiscal Position, R-1879/2-NSF, for a discussion of the pitfalls in cost/revenue analysis.

2 Such costs assume no large economies of scale in the operations of local government. Constant returns to scale have been the most consistent finding in the reported research in this area. Therefore, we have not developed pricing policies based on decreasing or increasing returns to scale in the production of the service. See D. J. Alesch and L. A. Dougharty, Economics of Scale in State and Local Government, The Rand Corporation, R-748-CIR, May 1971.

In education, service consumption levels may differ if the new community has more children on the average than the existing community. The pricing policies to finance operating costs of local schools are controlled principally by state government. Such policies as statewide property tax or complete state financing of public education would alleviate some of the burdens that growth may imply for local communities.
in the tax rate to support the expansion of service. In small towns that may undergo rapid expansion (e.g., Gilroy), the costs of service threaten to severely strain the financial resources of the city.

2. Is the type of development pattern an important determinant of the cost of service expansion?

The answer to this question is "yes," as Table 1 illustrates. It shows the projected costs of capital facilities for the four services under study for three types of development patterns—(1) the compact development ( contiguous to existing development), (2) scattered development (low-density sprawl), and (3) leapfrog development (occurring far from the periphery of the existing community). The table indicates that compact development is by far the least costly development pattern. The two other patterns are about equally costly.  

Table 1
Fifteen-Year Projected Costs for Capital Facilities: Gilroy, California
(In thousands of dollars)

<table>
<thead>
<tr>
<th>Service</th>
<th>Development Pattern</th>
<th>Compact</th>
<th>Scattered</th>
<th>Leapfrog</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>(b)</td>
<td>(b)</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Streets</td>
<td>(b)</td>
<td>4000</td>
<td>2250</td>
<td></td>
</tr>
<tr>
<td>Sanitary sewer</td>
<td>900</td>
<td>1200</td>
<td>1950</td>
<td></td>
</tr>
<tr>
<td>Flood control</td>
<td>150</td>
<td>600</td>
<td>550</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1050</td>
<td>5800</td>
<td>4950</td>
<td></td>
</tr>
</tbody>
</table>

a Excludes capital facilities internal to the development.

b Negligible.

3. Will different pricing policies have an effect on the cost of new development borne by the existing community?

In the case of the mature city, the cost to existing residents under most pricing alternatives is unlikely to represent more than a small part of the overall tax burden. It is in towns such as Gilroy, which may undergo rapid growth, where pricing policy can be effective in preventing a large burden from being placed on the existing community.

In our study of Gilroy, we estimated the costs paid by the developer and the existing residents under each pricing alternative. One important variant test was the isolation of high-service-cost areas into "pricing zones"—e.g., flood plains de-

The cost numbers in this example can be deceptive about the relative differences among development patterns. In order to serve the scattered and leapfrog growth community, it is necessary to build a great deal of excess capacity. If one were to study the capital costs of growth over the next 30 years when perhaps most of the area has filled in, the difference in costs may be less significant. For further discussion of the costs of development patterns, see G. C. Hufbauer and B. W. Sevior, "Municipal Cost and Urban Area," Journal of Urban Economics, Vol. 2, No. 3, July 1975, pp. 199-211; and Real Estate Research Corporation, The Costs of Sprawl—Detailed Cost Analysis, Council on Environmental Quality, Department of Housing and Urban Development and the Environmental Protection Agency, U.S. Government Printing Office, Washington, D.C., 1974.
manding large flood-control channels, remote areas requiring a new fire station, or areas that would require large interceptor sewers.

The study showed two major conclusions:

a. The costs of growth borne by the existing community can be significant if general revenue financing is employed.¹

b. The proper use of pricing can diminish municipal fiscal problems caused by new development.

We have therefore labeled pricing policy as a “strong” instrument for achieving the fiscal objective.

4. What set of pricing policies best safeguard the fiscal position of a city (i.e., minimize the tax burden placed on existing residents)?

No one policy will be best for all cities and all services. Our recommendations will vary by type of city (older, mature city versus small community undergoing rapid growth) and service characteristic (fixed node versus fixed network). Fixed-node services are characterized by fixed centers or headquarters from which the services are dispensed or to which users go to receive service. Examples of fixed-node public services are parks, police and fire stations, and libraries. Fixed-network services are rendered by a fixed capital network in close proximity to the user. Examples are streets, storm drains, and sanitary sewer systems. The capital cost of a fixed-network service typically includes a central plant (sewage treatment plant), a distribution system (sewer lines from the central plant to the development), and an on-site system (sewer lines within the boundaries of the development).

Mature City. For the fixed-network services, we recommend incremental budget pricing for on-site and distribution-system capital costs. In the mature city, it is unlikely that service expansion costs would be too large for one developer to finance. Therefore, incremental budget pricing is possible without raising prohibitively high barriers to development.

The central plant for the fixed-network service (e.g., sewage treatment plant) and the center for the fixed-node service (e.g., fire station) should be financed through average incremental zone pricing to help ensure that those who receive the benefits also bear the costs.

Rapidly Growing City. The recommendations for a rapidly growing city are the same as those for the mature city with one exception—pricing the distribution system (e.g., interceptor sewers, traffic arteries) for fixed-network services. In the rapidly growing community, these costs can be quite high. It would not be reasonable to charge one developer for a large interceptor sewer, for example.

The rapidly growing city is also likely to have large variations in the costs of providing service among different areas. Under such circumstances, we recommend average incremental zone pricing. This policy places the cost of service expansion on the developer and discourages development in areas with high service costs (both capital and operating).

¹ In the first five years of development, general revenue financing of the services for scattered development would lead to a 15-percent increase in the property tax bill for an average house in Gilroy.
Table 2 below summarizes the ranking of the pricing policies for ensuring the fiscal position of the city.

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Incremental Budget</th>
<th>Incremental Budget w/ Payback</th>
<th>Average Incremental</th>
<th>Average Incremental Zone</th>
<th>General Revenue</th>
<th>General Revenue Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed network</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-site</td>
<td>1</td>
<td>(a)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Distribution</td>
<td>(b)</td>
<td>(b)</td>
<td>3</td>
<td>(c)</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Central plant</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Fixed node</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service center</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

*Not applicable.
*Rating: mature city = 1, rapidly growing city = 3.
*Rating: mature city = 3, rapidly growing city = 1.
IV. SPATIAL LOCATION

INTRODUCTION

One concern of urban planners and public officials is "sprawl." The term is not precise. However, we distinguish two measures of sprawl that are of practical concern to local policymakers: (1) the density of residential development (i.e., dwelling units/acre), and (2) the placement of residential development within the city. This section discusses placement. Specifically, we concentrate on deciding whether the development is contiguous with the existing city or whether it "leapfrogs" available urban land. We review the determinants of leapfrogging and then consider the effectiveness of alternative pricing policies for deterring it. Section VI discusses the impact of pricing policy on density.

DETERMINANTS OF LEAPFROGGING

Determinants of leapfrogging are reviewed here to identify the forces that pricing policy would need to overcome. Leapfrogging is not yet widely understood. Harvey and Clark\(^1\) list the variables thought to govern the supply of leapfrog housing. They have included such cost factors as

- The physical terrain (because it may make contiguous development expensive);
- Differences in the public regulation of development between the contiguous and leapfrog areas (which may make leapfrog development more profitable);
- Income tax factors (which may encourage discontinuous development).

Perhaps the major incentive for leapfrog development, however, is the relative cost of land in the fringe area. Two costs are germane here. The obvious one is the price received by the seller. The second is the administrative cost entailed in purchasing the land. Both costs may encourage the developer to construct houses in the leapfrog area.

First, land prices usually decrease the farther one recedes from the central city. A typical explanation for this phenomenon is that land prices fall because other costs such as transportation associated with living on that land rise. In a community where everyone commutes to the central city, economic theory would predict that land values would fall as transportation costs increase.\(^2\) The price of land for residential use would fall until it reached the value of land in some alternative use (agriculture, recreation). Within the region where the value of land in residential use is higher than its value in any alternative use, leapfrog development is just as

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likely as contiguous development. That is, the buyer's preference among alternative sites will be independent of its location, since total costs will be the same in all locations. Leapfrogging, under these assumptions, is an expected outcome.

A second cost associated with the purchase of land is administrative. Developers typically deal with very large tracts of land to achieve economies of scale in the production and marketing of housing. Now it is reasonable to assume that the smaller the number of sellers, the easier it is to negotiate for the land. The developer would prefer to bid on large parcels of land, thus reducing the costs associated with the negotiations, as well as reducing any possible difficulties with "holdouts" when more than one seller is involved. If the average acreage per owner differs significantly between the contiguous and the outlying area (it usually does), this difference would be another strong incentive for the developer to leapfrog.

Leapfrog development would be deterred, however, by a pricing policy that raised service prices (i.e., developer charges) outside of the contiguous belt relative to those prices charged inside the belt. One study in this series examines the difference in price (essentially a "tax" on leapfrogging) that would be necessary to affect developer location decisions in a case study of Santa Clara County, California. We estimated that, without a tax (i.e., no difference in service price among areas of the city), approximately 8 percent of new development would occur in the leapfrog area. A tax of $500 would reduce leapfrog development to about 6.4 percent. A tax of $1000 per dwelling unit would further reduce the amount of leapfrog development to 3.8 percent of the total amount of development, or about a 50-percent reduction in leapfrog development.

Our numerical estimates are not directly transferable to other jurisdictions. These results do, however, suggest that pricing policy can affect the spatial location decisions of developers with certain qualifications. The effect of the pricing policy will depend in part on how much of the discriminatory tax the developer can pass on to the home buyer and how much of the tax is capitalized in the value of the land. The ability to pass on the tax will depend on the availability of similar housing in other jurisdictions without the tax. If there is an abundance of housing in the same price range with similar characteristics, it is doubtful that much of the tax could be passed on.

Part of the tax could be capitalized into the value of land. However, since the size of the tax declines over the years as it becomes less costly to extend services, the tax acts to increase the optimum holding period for the land speculation. Moreover, the tax is imposed only if the land is developed. The value of land for agricultural purposes remains the same, so at least some land would be held longer in agricultural use of the tax were implemented. Therefore, the tax has both the direct

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3 Assuming a community with identical preferences and incomes.
5 For example, assume that land is selling for $10,000/acre in two cities. A leapfrog tax of $2000 is now imposed on land in one city. The developer in the city with the tax would have to pay $12,000/acre to develop land ($10,000 plus $2000 tax). The developer would have an incentive to build in the city without the tax. To make the developer indifferent, a landowner in the taxed city would have to lower his price (capitalize) by $2000.
6 The cost of extending service is typically a function of distance from the existing service infrastructure. As the city expands, this distance necessarily becomes shorter for potential development sites.
7 A similar argument is that undercharging fringe areas for municipal services raises the value of the land. The increase in value may make the land uneconomical for agricultural use and lead to premature development of the fringe land. See Paul B. Downing, "User Charges and the Development of Urban Land," *National Tax Journal*, Vol. 26, No. 4, December 1973, pp. 631-637.
effect of discouraging developers and the indirect effect of making less land available in the noncontiguous areas.\textsuperscript{a}

THE EVALUATION OF PRICING POLICIES TO DETER LEAPFROGGING

Given the strong incentives already in place, pricing policy must be able to create large differentials in cost between the leapfrog and nonleapfrog areas if it is to discourage leapfrogging. Two policies that meet this test are average incremental zone pricing and incremental budget pricing.

Average incremental zone pricing is a way of isolating the "high-cost" leapfrog area from the rest of the community by requiring it to pay for its own capital facilities. Although this policy can create the largest differentials in price, the question remains whether the difference is sufficient to affect the spatial location decisions of developers. In one case study conducted in this research,\textsuperscript{b} the use of average incremental zone pricing led to cost differences well in excess of $1000 per unit—a price differential that would be expected to discourage leapfrog development substantially.\textsuperscript{c} The actual differentials in other cities will depend on the cost of service expansion and the number of units to be built in the leapfrog area. Despite our limited evidence, it seems likely that differences in pricing can be large enough to have a significant influence on developer locations.\textsuperscript{d} Because of the influence of other strong forces (price of land, availability of rapid and inexpensive transportation) in determining the extent of leapfrog development, however, we label pricing policy as probably an instrument of only medium strength in affecting spatial location.

Table 3 shows the qualitative ranking of the pricing policies for deterring leapfrogging. Incremental budget pricing (with or without payback) is recommended for capital facilities directly related to the development (e.g., on-site costs, sewer and street extensions). Average incremental pricing is ranked low because it does not discriminate among different locations. Although this policy assigns the capital cost of service expansion to developers rather than sharing it with the existing community, it offers no incentives for contiguous development. Average incremental zone pricing is recommended for use in financing areawide service facilities such as fire stations and neighborhood parks.

General revenue pricing equalizes the cost of development among areas and should be avoided if the goal is to deter leapfrog development.

General revenue zone pricing is ranked in the middle of all pricing policies. Although this policy raises the price for leapfrog development, it must have its effect through potential homebuyers who are unwilling to pay the high service costs in the area. This effect may not be very powerful, since potential residents are not as sensitive to the annual price for service as developers would be to the one-time

\textsuperscript{a} The possibilities of passing the tax on and the capitalization of the tax on land values are considered at length in David de Ferranti, et al., Spatial Location, R-1878/4-NSF.

\textsuperscript{b} Laurence A. Dougherty, et al., Fiscal Position, R-1878/2-NSF.

\textsuperscript{c} David de Ferranti, et al., Spatial Location, R-1878/4-NSF.

\textsuperscript{d} If price differences under average incremental zone pricing are not large, then this signals that leapfrog development is not costly, and is unlikely to place an undue financial hardship on the existing community.
developer fee. Therefore, general revenue zone pricing would not be as effective as average incremental zone pricing in curtailing leapfrog development.

Table 3
RANKING OF PRICING POLICIES FOR DETERRING LEAPFROG DEVELOPMENT
(1 = recommended; 3 = avoid)

<table>
<thead>
<tr>
<th>Pricing Policy</th>
<th>Ranking</th>
<th>Discriminates against High-Cost Areas</th>
<th>Developer Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental budget</td>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Incremental budget with payback</td>
<td>1</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Average incremental</td>
<td>3</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Average incremental zone</td>
<td>1</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>General revenue</td>
<td>3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>General revenue zone</td>
<td>2</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
V. RESIDENTIAL GROWTH

This section reviews the impact of pricing on residential growth. Our discussion first compares pricing policy with other growth-control mechanisms, then evaluates the effectiveness of various pricing policies in achieving a growth-control objective. Next, we present the results of one study in this series on the impact of pricing policy on growth. The section concludes with a ranking of the various pricing policies in terms of their relative strength in deterring growth.

The results of this section are important to a wider audience than just opponents of growth. The information presented here should be helpful in any review of municipal pricing policies to ensure that they are not inadvertently encouraging growth by subsidizing the provision of municipal services. Many cities' pricing policies were set when the attitude toward growth was much more favorable, and should now be adjusted to present objectives. In addition, some departments in local government might still favor growth (and translate departmental objectives into a growth-inducing pricing policy). The examination of pricing policy in this section may give city councils a better understanding of the residential growth implications of various departmental pricing policies.

POLICIES FOR CONTROLLING GROWTH

Attitudes toward urban growth have shifted substantially over the last 15 years. No longer do we see signs proclaiming that a city is the "fastest-growing" city. Where growth was once considered a tonic to the vitality of a city, it is now viewed as a poison as noxious as the plague. "More" is no longer better; and "most" is certainly not best.

In line with this change in attitudes, cities have devised a vast array of measures to deter growth.¹

1. Limiting the number of building permits: Petaluma, California, has taken the most direct approach in trying to control growth by restricting the number of building permits issued annually.² The permits are awarded on the basis of points that are earned for various design characteristics of potential development projects. The availability of municipal service capacity is one criterion for awarding points.

¹ We are speaking here mainly of the departments that are responsible for building additional capital facilities (e.g., public works departments). Reduced growth would entail a smaller workload and, hence, a reduction in personnel. Clearly, the bureaucrats who manage such departments have reason to encourage growth. Another problem might be special districts (e.g., sanitation) that need to pay off large capital indebtedness. These districts need to encourage growth because they are paying for capital facilities through user charges to the population rather than through developer fees. Although such a pricing strategy may be optimum for the special district, it certainly may not be optimum for the total service system (e.g., education, fire, police).


2. **Tying development to service availability:** Ramapo, New York, has restricted development to the same pace as the capital improvement plan. As the service system expands, more land can be developed. Developers can locate in other locations but they must pay the full cost (incremental budget pricing) of service extension. In the areas where development is allowed, the extensions will be financed through general obligation bonds (general revenue financing).

3. **Urban reserves:** Under this program, such cities as San Jose, California, have designated areas where development cannot occur unless some very high administrative hurdles are cleared and the developer is willing to pay the full cost of extensions.

4. **Large-lot zoning:** A common technique for controlling growth (which is also incorporated in the Ramapo Plan) is to set relatively large minimum lot sizes. Large lots essentially make inexpensive housing economically unfeasible. The increase in the cost of land per housing unit would make large-lot developments uncompetitive with similar houses built on smaller sites.

5. **Purchase of development rights:** Under this method of controlling growth, cities buy the development rights of vacant land. The owner is then able to continue with the present use of his land (e.g., agricultural), but it can never be subdivided for housing.

6. **Greenbelting:** Under this method, the city buys vacant land to hold in reserve. It is by far the most expensive (in terms of costs paid by city government) of all the methods for controlling growth.

Each of these policies will have a strong effect in both limiting the size and configuration of growth and directing that growth toward a more compact configuration. Each policy may, however, have inadvertent and perhaps deleterious side effects. The Petaluma policy of limiting the number of building permits raises complex legal and ethical questions of whether the first persons in an area have the right to restrict entry of later arrivals. This policy not only infringes on the right of outsiders to migrate to a city, it also depresses land values by limiting the amount of land that can be converted to residential use.

A Petaluma-type policy applied by many cities throughout a region would have major effects on the local economy, cutting back housing construction and having a generally inflationary effect by increasing the costs of housing. In such a case, we

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*City of San Jose, California, *Urban Development Policies, November 1974.


*Large-lot zoning may be the exception, by encouraging decreased housing density. However, large-lot zoning may also inspire more compact development by making leapfrog development economically unattractive.

would anticipate that the construction of new housing would slow down or halt, whereas rents and prices of existing houses would rise, with the subsequent effects of transferring wealth to existing owners of housing and pricing many of the poor out of the housing market.

The Ramapo plan depends for its success on the formulation of an ideal master plan for development. A weakness here, however, is that what city planners like is not necessarily what city residents want.\textsuperscript{11} Whenever regulatory authority is handed over to a small group of individuals, it is assumed that they can somehow balance all of the conflicting interests to arrive at an optimum plan. Little empirical evidence, however, supports that assumption.

The San Jose urban reserve plan is similar to the Ramapo plan, but appears to permit the developer more flexibility in choosing his location. The urban reserve program is not primarily a policy to deter growth, but rather a policy of containing that growth within reasonable service areas based on the cost of providing municipal service. By taking some land out of consideration for development, the urban reserve plan may, however, have some effect on the level of growth. If a sufficient supply of land is available for development (e.g., a five-year inventory at present growth rates), an urban reserve program is unlikely to curtail growth severely.

Large-lot zoning can effectively deter growth. It is not economical to build large developments without an intensive use of land. Since most developments are built in the low- to medium-price range, developers keep prices low by offering only a small amount of land with each house. There just does not appear to be a market for small houses on large lots.

Although large-lot zoning can greatly limit the number of housing starts, it has many of the same problems that accompany other nonprofit restraints to growth. It denies the right to those who cannot afford a large lot (usually presumed to be the poor, or minorities), yet still desire to live in that city. That is, a large-lot zoning raises the price of housing, which naturally tends to discriminate against low-income households.

Purchasing development rights and greenbelting are other possibilities, but they are extremely costly to the city. The purchase price of the land is likely to be high. Moreover, these two methods reduce tax revenue either by leading to lower assessments (development rights) or removing the property from the tax rolls altogether (greenbelting). Both appear to be equitable, since they do not place the large share of the burden of controlling growth on the owners of vacant land. A more definitive examination of the equity question, however, would have to estimate who pays the taxes for purchasing land, and who receives the benefits.

**PRICING POLICY AS A METHOD FOR DETERRING GROWTH**

Pricing policy can deter growth by not subsidizing municipal services to new developments. Lack of subsidization raises the developer's costs and should induce him to move to cities with more favorable policies. Pricing policy has the additional

\textsuperscript{11} In a survey, both residents and planners were asked their preferences about the various types of development (e.g., a high-density, skyscraper-dominated, but very modern city). There was not a high degree of agreement between the two sets of preferences. See Francois G. Cristien, *Citizen Preference for Home, Neighborhood and City in Santa Clara County*, The Rand Corporation, R-1227-NSF, October 1973, p. 18.
advantage of letting market forces determine where development will take place, rather than the local bureaucracy, as with the Ramapo plan. In theory, it would also be possible to set prices so high that all or most developers would be discouraged from building in a city. However, the policies considered in this report are cost-based pricing policies; and the deterrent effect of cost-based pricing on the rate of growth is probably not strong enough to satisfy the opponents of growth.

There are two basic arguments against growth. The first is financial. Growth necessarily imposes costs on existing residents. Though pricing policies can be devised to shift the capital costs of service expansion onto the developer, it does not appear as feasible to assess the new residents for all increased operating costs due to the new development. For example, the operating costs of the public school system are by far the largest component of local expenditures. If the new community has more children on the average than the old, then the education of these children will undoubtedly result in a higher property tax bill for the existing residents. Since education is currently financed (i.e., priced) primarily by local property taxes, existing residents have strong incentives to discourage developments that are likely to contain young child-bearing couples.

The second argument against growth is based on the degradation of environmental quality that often accompanies growth. Increases in noise and air pollution, the loss of the small-town atmosphere are costs that are imposed on existing residents for which they cannot be reimbursed. Pricing policies have not effectively incorporated these costs into the prices paid by new development, because no feasible method exists for determining their magnitude. Greenbelting is one method for attacking this problem. The price the community is willing to pay for a preserve is an indirect measure of the environmental costs believed to be associated with growth. The limited use of this technique implies that new residents may value the land more as housing than the existing residents do as open space. In addition, however, cities find it less expensive to control growth through the use of their police powers (e.g., zoning, issuing of building permits) than through the purchase of vacant land. Using police powers shifts the costs of growth control onto the owners of vacant land and other cities.

Moreover, pricing policy cannot achieve the growth-control objective with the same certainty as some of the nonmarket control devices. If an ordinance states that only 500 building permits will be issued, then an absolute limit to growth is set. Pricing policy, by itself, cannot impose any upper bound on the rate of growth.

Therefore, if cities want to exert a strong and sure influence on the rate of development, it appears that the pricing policies examined in this research are not sufficient instruments. To validate this assumption, the strength of the impact of pricing policy on growth was estimated using data from Santa Clara County. The strength of the effect on growth is important for two reasons: (1) to measure the effectiveness of pricing policy in controlling growth; and (2) to measure the side effects of curtailing growth for cities that are using pricing policy to enhance their fiscal positions.

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12 The legality of noncost-based pricing policies is in serious question. See Laurence A. Dougherty, et al., Fiscal Position, R-1878/2: NSF.

13 Education accounted for 38.9 percent of all direct general expenditures of state and local government in 1972. The next largest service was welfare, which accounted for 12.6 percent of expenditures. See Statistical Abstract of the United States, Table 410 (Washington, D.C.: Department of Commerce).
IMPACT OF PRICING POLICY ON GROWTH

It is reasonable to suppose that changes in development charges (i.e., price), as well as other factors, such as relative property values, proximity to employment and commercial centers, available acreage, legal maximum zoning densities, educational quality, public safety, and quality of fire protection, would affect the distribution of new residential growth by causing inequalities in the expected rates of return to development in different cities. One study in this series of reports tested an econometric model employing all of these factors as explanatory variables determining the distribution of new countywide residential growth.14

The model and empirical analysis of housing location developed in this research demonstrates that charges for municipal services can have a small but significant effect on the distribution of new residential growth within the county.15 The evidence is from only one county, so that the parameters estimated in the model cannot be assumed to hold for other jurisdictions in the nation without extreme caution.

We can, however, make some tentative judgments about the effect of charges on the distribution of growth in other jurisdictions. If a county were more homogeneous with respect to the location characteristics, we would expect charges to play a more significant role in the distribution of growth. In Santa Clara County, for example, many cities are relatively heterogeneous with respect to several relevant characteristics. Some of the towns have very high income levels, whereas others have low or moderate. Since the developer has few choices of location for a given housing-unit price range, charge levels will have little impact on his supply of units to the given community.

Also, in a region with few jurisdictions or only one, we would not expect service charges to play as significant a role as that found in this study. As a monopoly, the jurisdiction can charge more for its services without affecting the growth rate significantly.

PRICING POLICIES FOR CONTROLLING GROWTH

Although pricing policy can have a small but significant effect on the growth of residential housing, the magnitude of reduction in growth may fall far short of the objectives of those advocating strong curbs. Moreover, the reduction in growth is less certain than with the administrative growth-control techniques discussed above. Accordingly, pricing policy is not recommended as a foolproof method for controlling growth, although it can be a useful tool. In terms of our summary characteristics, we have categorized pricing policy as a "weak" instrument for deterring growth, suggesting that it be part of an integrated policy of growth management. Within the confines of a larger policy, Table 4 ranks policies according to effectiveness in deter-

14 Benjamin Zycher, et al., Growth of Residential Development, R-1878/3-NSF.
15 The model predicted that an increase of $455 per housing unit in the city's average charge level would induce a reduction in the city's share of about 1 percent of the countywide growth. To put it differently, the model predicts that a city that historically received about 8 percent of the countywide growth would find its own absolute growth reduced by about 12 percent by such an increase in the price paid by developers.
ring growth. The ratings are based on the price facing the developer under normal circumstances, with the highest-price policy being the one recommended.¹⁶

Table 4
RANKING OF PRICING POLICIES FOR GROWTH CONTROL
(1 = recommended; 3 = avoid)

<table>
<thead>
<tr>
<th>Pricing Policy</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental budget</td>
<td>2</td>
</tr>
<tr>
<td>Incremental budget with payback</td>
<td>2</td>
</tr>
<tr>
<td>Average incremental</td>
<td>1</td>
</tr>
<tr>
<td>Average incremental zone</td>
<td>1</td>
</tr>
<tr>
<td>General revenue</td>
<td>3</td>
</tr>
<tr>
<td>General revenue zone</td>
<td>3</td>
</tr>
</tbody>
</table>

¹⁶Incremental budget pricing may increase costs if it is feasible to assess the initial developer for large increases in capacity over and above what his subdivision requires. Since it is not usually possible to charge a developer for increases in capital facilities (e.g., sewage treatment plant, interceptor sewers, or arterial streets), the rankings shown in the table should hold under most conditions.
VI. OTHER IMPACTS

INTRODUCTION

The previous sections have discussed the effects of pricing policy on three important areas related to urban structure and finance—fiscal position, spatial location, and growth. These are not the only areas that must be considered, however, in the selection of a pricing policy. This section reviews provision of low-cost housing and density of residential housing. These were selected both for their importance and because they seemed to be related to pricing policy.

LOW-COST HOUSING

The provision of low-cost housing is a concern of local government, but it often conflicts with other community objectives. For example, extensive low-cost housing would undermine a city's financial health. The low-income residents of these units would undoubtedly contribute less in various taxes than the costs of services provided to them. Also, since leapfrog housing typically is less expensive (but not necessarily low-cost housing) than housing in the urban areas due to the lower land costs, the elimination of leapfrog housing could truncate the lower range of new housing prices being offered.

Pricing policy should lower the costs to the developer, if it is to be consistent with the city's objective of assuring the availability of low-cost housing. General revenue financing gives the largest subsidy to the developer and, hence, would be the highest-ranked alternative for this objective. The other pricing policies all attempt to place the costs of service expansion on new development. General revenue financing, however, subsidizes all new housing—not just low-cost housing. Therefore, the strict application of general revenue financing would subsidize all new homebuyers, although the limited objective is to help only low-income homebuyers.

To narrow the scope of the subsidy, it has been suggested that the developer fees for "market-minimum" housing be waived. That is, if the developer wanted to construct low-cost housing, he would not have to pay a fee for the expansion of

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1 Another possible impact of innovative land-use controls is to increase the time and money cities must spend in fighting suits opposing controls. Therefore, it is only prudent that the selection of a pricing policy be done with full knowledge of the legal issues. A summary of the major court decisions concerning the pricing of municipal service is contained in Laurence A. Dougherty, et al., Fiscal Position. R-1878/2-NSF. Since the law in this area is in a constant state of transition, the material that we have gathered can serve only as a starting point for assessing legal implications.

2 Many land-use control devices have seemingly discriminated against low-income housing. The courts usually examine this issue of discrimination in resolving the legal disputes about new land-use control plans. See Potomac Institute, Controlling Urban Growth—But for Whom? (Washington, D.C.: The Potomac Institute, March 1973).

3 Daniel B. Syrek, Land Use, Energy Flow and Decision Making in Human Society: The Fiscal Impact of California Residential Growth (Davis: University of California, 1974). Syrek estimates that the value per dwelling unit required to provide revenues equal to cost was $41,408 for municipal services.

4 San Jose, Measure B Study (Office of the City Manager), July 1975.
municipal service facilities. This plan, however, has some serious drawbacks in terms of operational feasibility and appropriateness of objectives:

- What is "market-minimum" housing?
- How do you prevent owners from taking the subsidy and then upgrading the property later?
- Is it appropriate to use pricing policy to correct perceived inequities in the distribution of income in this country?²

For these reasons, we conclude that the use of pricing policy to encourage low-cost housing is a weak policy instrument with questionable feasibility and equity. Although some pricing policies will result in higher costs to developers than others, it is unlikely that any policy will significantly alter the amount of low-cost housing that is built. Too many forces of greater strength are at work to affect the distribution of housing prices.³ Table 5 ranks the contribution of each policy to the objective.

![Table 5](image)

<table>
<thead>
<tr>
<th>Pricing Policy</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental budget</td>
<td>3</td>
</tr>
<tr>
<td>Incremental budget with payback</td>
<td>3</td>
</tr>
<tr>
<td>General revenue</td>
<td>1</td>
</tr>
<tr>
<td>General revenue zone</td>
<td>3</td>
</tr>
<tr>
<td>Average incremental</td>
<td>3</td>
</tr>
<tr>
<td>Average incremental zone</td>
<td>3</td>
</tr>
</tbody>
</table>

**RESIDENTIAL DENSITY**

The density of residential development can be measured in several ways:⁷

1. **Number of units per acre within the city’s boundaries** measures the compactness of existing development, but can be misleading if considerable open space is devoted to agriculture or recreation within the city's boundaries.

2. **Number of units per urbanized acre** is a more exact measure of compactness of individual developments, but it cannot discern between large-lot developments and compact developments that have been placed in either a scattered or leapfrog development pattern.

3. **Average lot size** measures how closely spaced the housing is. We take it as our measure of density in this discussion.

³ If general revenue financing for low-income housing were used, it could possibly be a regressive form of taxation. That is, the plan would help the lower-middle-income persons buy a home while taxing many who can only afford to rent.

⁴ If cities want to attack this problem, there are better programs (e.g., rent subsidies, direct grants to developers) for the encouragement of low-cost housing than the use of pricing policy of municipal services. These other programs also have the advantage of visibility in the budget process so that explicit consideration of the size of the subsidy can be made by policymakers. Tax subsidies, such as waiving development fees, are essentially appropriations of uncertain size often made without the direct annual consideration of the city council.

⁷ The first two measures of sprawl are related to location of development and, hence, belong more properly in Sec. IV.
If a city wants to control average lot size, more powerful instruments are available than pricing policy. Cities have the power to set minimum lot sizes. In Santa Clara County, at least, the minimum lot size tends to be the average lot size. Developers attempt to put as many units on an acre as is legally possible. Therefore, cities that may object to sprawl (as measured by lot size) actually encourage it through minimum constraints on lot size.

Although sprawl has a negative connotation, cities with large lot sizes seem to be most aesthetically pleasing. Cities like San Jose are denigrated because they sprawl, yet other more sprawling cities with more expensive housing escape criticism. Evidently, aesthetically minded persons object not to sprawl, but rather to the sight of low-to medium-cost tract housing that has replaced the more scenic vistas. The concept of sprawl is really very vague, and we recommend that a city identify clearly and precisely what its objectives are in this area.

If a city imposes minimum-lot-size constraints, pricing policy can have no impact on this measure of residential density. Within the limits imposed by other land-use controls, however, pricing policy can alter incentives for more compact development. Incremental budget pricing leads to economizing on-site capital service facilities, so it is by far the best pricing policy to ensure higher residential densities. Incremental budget pricing for on-site services motivates the developer to economize his demand for these services. Other forms of pricing (e.g., general revenue, average incremental) would encourage greater consumption of services (e.g., longer streets and sewer lines associated with large lots), since the developer in these cases pays either no fee or one not directly related to the services his development receives.

Table 6 gives qualitative ratings of pricing policies in achieving more dense development. However, the economic incentives will be ineffective in the presence of a binding minimum-lot-size ordinance. Therefore, we have labeled pricing policy as a weak instrument in achieving the density objective.

<table>
<thead>
<tr>
<th>Pricing Policy</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incremental budget</td>
<td>1</td>
</tr>
<tr>
<td>Incremental budget with payback</td>
<td>1</td>
</tr>
<tr>
<td>Average incremental</td>
<td>3</td>
</tr>
<tr>
<td>Average incremental zone</td>
<td>3</td>
</tr>
<tr>
<td>General revenue</td>
<td>3</td>
</tr>
<tr>
<td>General revenue zone</td>
<td>3</td>
</tr>
</tbody>
</table>

*For example, see San Jose: Sprawling City (Stanford, California: Stanford Law and Environmental Society, March 1971).

This argument is made by Sandra O. Tapella, Locational Patterns of Residential Development in San Jose and Other Santa Clara County Cities (San Jose, California: Santa Clara County Planning Department, unpublished).


Incremental budget and incremental budget pricing with payback are the same policy in the case of on-site services. General revenue and average incremental pricing have been rated the same, since averaging costs among developers substantially reduces their incentives to economize on on-site capital facilities.
VII. SELECTING A PRICING POLICY

This section describes a systematic procedure for selecting pricing policies consistent with community objectives. The procedure is essentially a series of questions for policymakers to review and answer.

CATALOGING PRESENT POLICY

The first question that must be answered is "What is the present pricing policy?" A cataloging policy is important. Since the pricing policies of the various departments may have been designed with no appreciation of their impact on local objectives or in a period when the city pursued different objectives, the suggested review should pinpoint the inconsistencies between objectives and policies so that the city can begin to take remedial action. We recommend that all local services be studied, whether they are controlled by the city, county, or special districts, in order to aid in developing a consistent pricing policy among governments.

This cataloging will entail a thorough survey of service agencies. Service providers cannot, however, simply be asked what their pricing policy is. They will be unfamiliar with the terminology of this report, so they should describe both the pricing structure and the process by which prices were determined. For example, in our case study, a typical response from a service provider was that

... the price was $80 per developed acre. The exact figure was arrived at some ten years ago by the engineering department that estimated that this would be sufficient to cover the costs for a typical acre of development.

This information would show that the service provider was using average incremental pricing—though his prices were probably far out of data and should be revised.

Once determined, the pricing policies of the various service providers can be conveniently displayed in matrix form, as shown in Table 7. All major services should be listed in the left-hand column, with pricing policies on the top row. A check mark indicates that a particular pricing policy is used for that service.

RATING THE CURRENT PRICING POLICIES

Once the pricing policy for each service has been established, answers should be given to the second question: "What objectives are served by current policy?" To perform this evaluation, we suggest replacing each check mark in the matrix with the rating of the policy shown earlier. For example, if a city facing rapid growth were evaluating its policy for ensuring its fiscal position, the ratings from Table 2 would be inserted in the matrix as shown below in Table 8. (In this case, general revenue financing is rated 3 for the fiscal position objective. Therefore, all check marks under

1 We would restrict the services studied to only the major ones with costs great enough to be of concern to the developer. For example, we would examine pricing policies for fire protection services, but would neglect the small plan-check fees of the planning department.
general revenue financing are replaced with a 3). For the eight services under consideration, the total rating is 18 and the average rating is 2.25. (An average rating of 1.0 would signify the most effective policy.) The scores indicate the remaining room for improving the pricing policy in order to promote the fiscal position objective. Thus, the difference between, say, 1.9 or 2.1 is less significant than the fact that both are considerably higher than 1.0 (and hence policy is not as effective as it should be).

When the process is completed for each objective, the ratings can be conveniently displayed in one column. Displayed in this form, the data enable the policymaker to gauge the implicit priorities of the existing pricing policy. For example, Table 9 indicates that current policy is directed more toward promoting growth than ensuring fiscal position.
Table 9

AVERAGE RATINGS OF CURRENT PRICING POLICY BY OBJECTIVE

<table>
<thead>
<tr>
<th>Objective</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiscal position</td>
<td>2.25</td>
</tr>
<tr>
<td>Spatial location</td>
<td>2.25</td>
</tr>
<tr>
<td>Growth</td>
<td>2.62</td>
</tr>
<tr>
<td>Low-income housing</td>
<td>1.75</td>
</tr>
<tr>
<td>Residential density</td>
<td>2.25</td>
</tr>
</tbody>
</table>

REVISING THE PRICING POLICY

Having defined the existing (and perhaps de facto) pricing policy, the next step is to ascertain to what extent the objectives being pursued by current policy accord with local goals and priorities.

Let us assume that the policymaker sees a conflict between the priorities expressed in Table 9 and the intended priorities of the city. For example, it might be desired to revise the pricing policy to enhance fiscal position. The first step in the revision process is to scan the matrix for services that are not recommended for the fiscal position objective (i.e., ratings of 3 or 2). For example, we would first see (Table 8) that fire stations are currently funded through general revenue pricing, but should be changed to average incremental pricing in order to better ensure the fiscal position objective.

Although such a change results in a lower score (i.e., close to the recommended policy), a great deal of information has yet to be collected before any change in policy can be seriously considered for adoption. First, the policymaker should see that lowering the rating for the fiscal position will raise it for some objectives (density, low-income housing) and lower it for others (growth, spatial location). He must assess the tradeoffs involved and decide whether the overall impact on all objectives warrants a change.

This assessment of change should not be done in terms of the qualitative ranking alone. The decisionmaker must estimate the magnitude of the impact of adopting average incremental pricing. In the fiscal position example, this would require estimating the change in prices that would occur under the new policies. From this analysis of prices, the policymaker can estimate the difference in tax burden borne by existing residents under the current and the proposed pricing policies. Then he must weigh the gains in the fiscal position against the losses in the other objectives. The only guidance we can give on this decision is to urge the policymaker to consider the relative strength of the impact of pricing policy on each objective. Although the ratings on the density of residential housing may go up, for example, pricing policy is such a weak force that the impact of the proposed pricing policy on the quantity of low-cost housing being built may be quite small.

The selection procedure described here is an iterative procedure, through which the different effects of alternative mixes of policies are tried and evaluated. Al-

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2 We especially want to warn against selecting policies based on the total rating. These ratings highlight certain problem areas and point out services where changes in pricing policy might be in order. They cannot, however, be added together to form a measure of effectiveness.

3 A detailed methodology for doing this type of analysis is presented in Laurence A. Dougherty, et al., Fiscal Position, R-1879/2-NSF.
though there is no easy formula for finding the best pricing policy, there is a systematic procedure for appraising the alternatives available. The information and procedures for seeking better policies presented here can be helpful. Only a combination of hard work (estimating impact) and good judgment, however, will formulate a pricing policy consistent with community objectives.