DESIGNING AND USING TRAFFIC IMPACT FEES
IN OREGON

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EXECUTIVE SUMMARY

As development occurs and traffic increases, communities must either construct additional road capacity or watch service levels deteriorate. Oregon law allows for the use of systems development charges or impact fees either to serve as reimbursement for projects already completed or to provide funds for new projects required because of the growth. Systems development charges in Oregon are restricted to capital improvements related to water supply, waste water, drainage and flood control, parks and recreation, and transportation. Traffic impact fees are systems development charges for road improvements. Many communities throughout the nation levy traffic impact fees on development to help fund construction of additional capacity associated with the development, as do a number of communities in Oregon. No cases were found in Oregon of the use of impact fees for reimbursement, but it remains an option.

Most of the communities using such fees use them to fund part of their requirements for increased road capacity. In Oregon and most other states, the law allows for fees which cover the full cost of new construction associated with development; however, no community in Oregon comes close to this level of charge and few communities in other states seem to set full recovery of cost as a target for such fees. Rather the development charge is viewed as part of the funding package that a community needs to keep up with development. The revenue from such charges can help prevent the community from developing chronic capacity problems and deteriorating roads.

Each land use is expected to generate a different amount of traffic based on the activity, and the traffic generated may have differing effects on the demand for new road capacity. Some trips are short, or at off-peak hours, and generate little demand for additional road capacity while others, which are longer or occur at peak times, may create substantially more impact on roads. The method used to estimate road demand then becomes a key feature of a systems development charge for roads.

KEY POINTS

* Traffic impact fees are used in Oregon, as in other states, to partially fund the construction of roads. The roads must be required because of development, off-site relative to the development, and function as collectors or arterials.

* The major purpose of the fees is to raise revenue to help provide increased capacity required because of new development.
* Fees are seldom set to recover the full cost of developing off-site road capacity to accommodate new development. Communities in Oregon which use such fees collect a lower percentage of the cost than communities in some other states.

* The most common method used to levy such fees is based on standard estimates of the number of trips each unit of property development will generate.

* Some communities allow reductions in fees for property design or other characteristics that result in fewer trips than indicated by standard models.

* No evidence was found of communities using traffic impact fees to try to affect the type or density of development.

* Traffic impact is likely to occur beyond the community in which development takes place, so coordination of traffic impact fees among governments in the affected region can lead to a more effective program of road funding. A coordinated approach also reduces the competitive pressure which may arise when some jurisdictions have such fees and others do not.
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INTRODUCTION

Many communities have trouble funding all of the road improvements needed to keep pace with development. Some of these communities use traffic impact fees to raise at least part of the required funding. Such fees help raise required revenue, but they are typically set to collect only part of the total cost. In addition to the revenue generated, they may somewhat reduce the incentive for development in new areas relative to redevelopment of existing areas where capacity is already in place. Further, the availability of funds can improve efficiency of infrastructure provision by allowing it to be provided in a timely manner.

While impact fees are becoming more popular, a community must address a number of concerns before attempting to implement one. This paper is meant to provide a brief discussion of the major issues which typically must be addressed before implementing a traffic impact fee.

Definitions

A Systems Development Charge is a charge levied on new development to help finance the cost of providing off-site infrastructure needed to accommodate the demand for capacity associated with the new development. Such charges can be used for any type of capital expense needed to create capacity to serve the new users, but they are typically used for a subset of the possible uses. A Traffic Impact Fee is a systems development charge which is used to increase capacity on the road system.

The Trip Generation Rate is the rate at which a particular type of development generates trips on the road system per unit of development. The units of development can be defined in many ways, but the most common are dwelling units for residential construction and thousands of square feet of floor area for other types of development. New Trips are trips for which the new development is either the major source or destination of the travel, while Pass-by Trips are trips in which the stop is made only as part of some other trip. Peak Hours are the times when roads are most congested. These are usually represented by the most congested time during the pm peak on a weekday. Average Trip Length is the distance travelled on an average trip from the origin to the destination for a particular type of trip. It is likely to vary by type of trip and by location.

Legal Issues

Systems Development Charges and Impact Fees are authorized in Oregon by ORS 223.297. Under the statewide standards prescribed in ORS 223.297-223.314, cities, counties, and certain special districts may establish such charges by local ordinance. Systems Development Charges in effect after July 1, 1991 are restricted to capital improvements in connection with water supply, waste
water, drainage and flood control, parks and recreation, and transportation (Rufolo et al, 1990, pp. 20-21). The charges may be made either to generate funding for construction needed to meet current and expected future requirements, or they may be specified as reimbursement for using up existing excess capacity. The former is more typical.

Revenue generated by such charges must be spent on capital improvements which benefit the properties generating the revenue. This objective can be met using an approved capital improvements program. While the charge could legally be set to recover the full cost of needed road improvements, the more common practice is to set the charges below this level. Hence, the required capacity improvements will typically be financed partly by more general sources as well. If the intent is to generate full funding from the charges, then very careful allocation of costs and revenue is likely to be required. Communities may not collect more than the cost of providing the required improvements.

The traffic impact fee may be specified as a development fee or as a tax on development. It appears that when levied as a tax on development, the tax can be defined so as not to fall under the "Measure 5" limits.

BASES FOR CHARGES

Charges which are levied as part of a traffic impact fee should not be related to the value of the property. Rather, they should be related to the amount of traffic which is likely to be generated by the proposed development. There are a variety of approaches to this calculation. The simplest is to specify a charge for specific types of development based on some objective measure of development, such as square footage of floor area. The specific charge should be related to the demand which will be placed on off-site roads. This is most commonly done using national studies of trip generation by the type of development.

Most jurisdictions either directly or indirectly use the trip generation rates by land use type which are reported in Trip Generation by the Institute of Transportation Engineers. The fifth edition of this manual was published in 1991, and it contains information on trip generation rates for many different types of land use. The trip generation rates specified can be applied to the type of development directly or certain types of adjustments may be made. It is possible to require that each development be studied in detail to determine its expected impact, but this conflicts with the desire for simplicity and certainty in setting fees.
Basic Form

Many formulas for calculating impact fees start from the general form:

\[
\text{Charge} = [\text{TGR} \times \text{Size} \times \text{ATL}] \times [\text{Cost/Capacity}]
\]

where TGR is measured in vehicle trips per unit of development, Size is the number of units of development associated with the project, ATL is one-half\(^1\) the average trip length for trips associated with this type of project, Cost is the dollars per lane-mile needed to construct roads in the area, and Capacity is the number of vehicle miles per lane mile. The charge is then a measure of the average cost of constructing enough new road capacity to accommodate the traffic from the new development. The specific numbers will differ depending on the definitions used. For example, capacity will differ if it refers to the entire day rather than peak hour. This base charge can then be adjusted for various reasons.

There are a variety of methods to implement this basic approach, and some specific applications include the following. Barnebey et al (1988) used a basic structure of half the average trip length times the trip generation rate divided by the capacity per lane-mile of road construction. This was then multiplied by the average cost of constructing a new lane-mile. Duncan et al (1989) determined roadway costs by the number of peak hour trips generated by current land uses, average trip lengths, peak-hour lane-mile capacity at different levels of service using average capital construction and right-of-way costs per lane-mile for new roads. Delafons (1990) looked at the amount of road space required to service each type of land use.

An alternative approach tries to address the differences in road impact without explicitly using road construction cost as part of the formula. This fee calculation formula has the following general form

\[
\text{TIF} = \text{Fee} \times \text{TGR} \times \text{ADJ}
\]

where

TIF = Charge per unit of land development  
Fee = The amount charged per trip  
TGR = Trip generation rate for the particular land use  
ADJ = Adjustment factors

Adjustment factors are attempts to take account of the difference

\(^1\) Using half of the trip length divides the responsibility for the trip between the origin and destination land uses.
between trip generation rates and the demand for road capacity. Among the adjustment factors which could be considered are: trip length, percentage of trips occurring at peak hours, percentage of trips which are new to the road system, trip generation by trucks, and seasonal demand for road capacity.

The fee which is charged per trip could be related to the cost of road construction directly or it could be specified at some rate which is lower than the expected full cost of providing road capacity. Use of adjustment factors varies among jurisdictions. The calculated TIF is then multiplied by the number of units of land use development to determine the total charge for a particular development. This charge may then be adjusted for credits related to the activities of the developer.

The ITE Trip Generation manual contains summaries and some statistical analyses of the results of many studies conducted over decades. In particular, the manual provides estimates of "average weekday trip generation" for a large variety of land uses. Since this is a number which is a plausible proxy for impact on demand for road capacity and which has as much reliability as any other standard reported, it is often used as the basis for estimating impact fees. Unfortunately, it does not provide as good a proxy for demand for road capacity as might appear. For example, the distribution of road use at peak versus off-peak has some impact on the demand for capacity.

Average weekday trip generation is the average number of times that a vehicle will arrive at or depart from a site each weekday per unit of development. The units of development are measures of activity. For residences, they are usually the number of units, although other bases are available, such as the number of cars. When specifying a fee for property which is not yet developed, objectively measured units which are part of the development application are preferred over other measures of activity, since many of the other measures will not be known prior to project use. For example, there are estimates of trip generation per employee for some land uses, but it is often difficult to tell prior to occupancy what the number of employees will be.

While there is some information on peak trips and some other characteristics in the ITE manual, it is not as comprehensive in coverage nor based on as wide a sample as the data for average weekday trips. Hence, there is some trade-off between the use of the better data and the simplicity and reliability of the estimates which are generated. There is also some trade-off between the number of land use classifications and the ability to enforce the impact fee. Specifically, it may be possible to identify a particular use in the development application but to legally use the property for another purpose once development is completed. Hence, it may be preferable to specify fees which
vary only by broad land use category.

There are a variety of alternatives to the use of the ITE data, ranging from simple fixed fees to formulas which rely on extensive analysis of each development. It may be helpful to consider the range of impact fees which are in use. In a recent national study, Leithe and Montavon (1990) found that, of the 31 communities charging impact fees for roads, the range was from $298.50 to $5,000 per dwelling unit, with an average of $1,329. In addition to fees per single-family dwelling unit for roads, other methods referred to trip ends (e.g., $30 per trip end or $150 per trip end, which could vary by subarea); average multifamily rates ($831 per unit); average business rates ($260 to $8,414 per 1000 sq. ft. of space); and pm peak hour trips through a specific intersection ($355 per peak hour trip). Other rates included 10% of the value of new business construction, $300 per house or $1.00 per sq. ft. of space, $0.20 per sq. ft. for dwellings, $300 residential ($450 non-residential) per vehicle mile for pm peak hour traffic, and $130 per acre (p. 17). Over two-thirds of the respondents had separate fee schedules for residential, commercial and industrial developments.

Obviously, there are substantial differences regarding the method used to implement such fees. The next sections will discuss some of the issues which could be addressed in designing an impact fee, but it should be recognized that few jurisdictions address any of these issues and that none address all of them directly. There is a definite trade-off between simplicity and certainty of the fee schedule and complete equity in assigning cost to different types of development.

Adjustments For Trip Chaining Behavior

Estimates of trip generation rates typically do not differentiate new trips from other stops. Making multiple stops on a single trip is known as trip chaining, and counting each stop as a full trip overstates the impact on roads. When such trips are considered, the sequencing and causality may affect the impact which will be felt on the road system. For example, a fast food restaurant may have many trip ends, but if the people stopping were driving by on their way to other destinations, the traffic system impact of the trips would be quite different than if each customer had made a special trip.

Nicholas, Nelson, and Juergensmeyer (1991) approached the problem of determining which trips were 100% attributable to a development and which were not by adding the variable "percentage of new trips". The rationale for the adjustment factors came from national studies. However, according to the authors, "the percentage of new trips is, ultimately, a professional judgment" (p. 130).
Snyder and Stegman (1986) looked at the formula structure used in Orange County, Florida. It used a "percent new trip" factor to adjust for "impact and non-impact shopping trips". Non-impact trips were designated as trips to commercial land uses "that occur only after the vehicle is already on the road network...and have no independent effects on overall trip generation rates" (p. 116). The Orange County planners claimed that 100% of residential and office trips were impact, while "only about half of those generated by retail land uses in commercial centers are impact trips. The remainder are so-called diversionary trips that take place only after the vehicle is on the roadway for another purpose" (p. 116).

Barnebey et al (1988) observed that the results of the formula used in Manatee County, Florida, were reduced by a "capture and diversion factor." In their case, studies of travel behavior regarding nonresidential destinations showed "that office development actually generates only 50 percent of the trips normally assigned to it....20% for drive-in bank tellers" (p. 26). The fee for these uses was then reduced by the corresponding percentage.

Duncan et al (1989) found that many communities in Florida reduce the ITE trip rates for retail uses by a factor for pass-by trips, defined as "trips that would be on the road anyway and for which the retail stop is not the primary destination" (p. 27). The pass-by rate decreases as the size of the center increases, since larger centers are more likely to be primary destinations than small ones. They use a formula provided in the ITE manual for determining pass-by trips. "These new trip rates range from 50% for the smallest neighborhood shopping centers to 89% for a 1.25 million square foot regional shopping center" (p. 27). The ITE manual is less useful for other non-residential trips. As a result, the authors used 50% as the new trips factor for other non-residential uses.

Tindale (1991) concluded that trips in a line between origin and destination should be considered "captured"; and he observed in his study of Pinellas County, Florida that as trip rates per square foot increased, the percentage of trips captured also increased. He concludes that land development activities that have high trip rates also had a tendency to have shorter trip lengths.

**Trip Length Adjustment**

If all other factors are constant, roadway costs increase proportionately with trip length. Trip lengths vary by the distance between residences and employment, by density, and by mix of land use, among other factors. However, if trip chaining behavior is ignored, trip lengths associated with a single trip result in "a vast overstatement of actual travel" (Nicholas,
Nelson and Juergensmeyer, 1991, p.130). Adjustments to trip generation rates to reflect differences in trip lengths for various land uses are necessary to more accurately reflect the impact on roads.

Trip length adjustments might be used instead of adjusting the number of trips for pass-by or trip chaining. Land uses that attract pass-by trips could have their fees reduced by factors that reflect the marginal distance traveled or deviation from the primary route distances.

**Peak Hour Adjustment**

The basic method of calculating traffic impact often does not differentiate for the amount of travel at peak versus off-peak times. Long peak-hour trips cause the greatest impact on the demand for new road capacity. A case can be made for charging either only for such trips or more heavily for these trips. The basic problem is determining which trips are likely to be peak ones.

Some jurisdictions include the impact of peak-hour travel behavior in their formulas. Phillips (1990) recommends an adjustment to the basic trip generation model ranging from .75 to 2.00 based on land use categories (p. 23). Cervero (1988) indicates that the data sources used to generate peak-hour travel projections varied widely. The ITE manual was used by 37% of the counties and 28% of the cities. Twelve percent of the counties and 36% of the cities used their own staff engineers or hired consultants to project peak hour travel. Twelve percent of the counties and 7% of the cities used the trip generation assumptions from their general plans. Eight percent of counties and 10% of cities used trip generation projections from environmental impact reports of each project (p. 539).

Duncan et al (1989) used peak hour trips as determined by transportation planners. Eighteen percent of all daily trips occur during the two peak hours, 8% in the am and 10% in the pm. They concluded that the most important factor in calculating roadway costs is the average peak hour travel distance.

**Adjustments For Road Type**

Impact fees are generally used to address greater demand for arterial or collector roads rather than the impact on local roads or highways. However, trip generation formulas do not differentiate between the types of roads on which trips occur nor do they allocate trip length by road type. In addition, the percentage of trips on each road type are likely to differ depending on trip length and destination.

In addition to differences by land use type within a community,
there may be some inconsistencies in using formulas based on total road cost to generate fees for some subset of the road system. Communities show substantial differences in the types of roads which are intended to be funded with existing fees. Snyder and Stegman (1988) found that Orange County, Florida, used all roads in their assessment, but Raleigh, North Carolina, only used major arterials.

**Adjustments For Geographic Differences**

A single rate does not allow for geographic variations which affect traffic demand, trip length, or construction costs. For example, Wilsey and Ham (1985) felt that Washington County, Oregon had large disparities between "subareas with respect to growth rates and the maturity of the transportation system." (p. 11) To address these concerns, they recommended a system which determined rates by subarea activity. Barnebey et al (1988) report on a district divided into two parts to represent different average travel lengths for urban and rural areas. Leithe and Montavon (1990) observed that two-thirds of the respondents in their study assessed fees on a jurisdiction-wide basis while 15% assessed fees on specific areas only.

Cervero (1988) found that one-third of the counties and half the cities in his study with impact fees applied their programs uniformly across the jurisdiction. Impact fees were used in 38% of the cities and in 16% of the counties. Some communities limited the geographic scope of the fees because of development in concentrated areas while others, such as San Diego with 42 planning areas, varied the fees to take account of differences in construction costs and other factors.

Duncan et al (1989) found only two of the six jurisdictions with impact fees used a location-sensitive variable fee rate for their impact fee program. They claim that downtown residents either work downtown or commute against peak flows out to the suburbs, and thereby create little or no need for additional capacity. However, new downtown offices and industrial uses "compound already existing peak hour traffic problems, thereby creating the need for increased land capacity" (p. 34). Downtown retail uses, however, have much less impact on peak hour traffic. In one of the jurisdictions, the residential rates in the CBD are less than half the rates in the suburbs, while the office CBD rates are 50 to 100% higher.

The study conducted by the Colorado/Wyoming Section of ITE (1987) found that municipalities generally required impact fees within entire jurisdictions, while counties used them for certain corridors or subareas.
Rate Adjustments and Credits

There are a variety of issues which arise with respect to the need for credits when impact fees are used. In the literature, the term "credit" is used for two distinct types of adjustments. The first type of credits relate to the contributions which new development will make through property taxes, gasoline taxes, and other general sources of revenue towards existing road needs. It is widely accepted that these revenues should be credited to the development in determining the level of fees. (Porter, 1986; Nicholas, Nelson, and Juergensmeyer, 1991; Moore and Muller, 1990; Angell and Shorter, 1988). These credits will be referred to as rate adjustments for our purposes. The second type of credits given by communities are reductions in the calculated liability to reflect expenditures made by developers on road improvements not directly related to the development. These may be expenditures required by the community or the community may offer the developer an option of making such improvements. In either case the community may allow a credit for these improvements in calculating the impact fees.

Leithe and Montavon (1990) found that only 20 percent of the respondents in their study gave credit (or rate adjustments) for the amount of other revenues that a new development was anticipated to generate, suggesting that "relatively few impact fee programs have incorporated detailed estimates of other revenues contributed by new residents in determining the amount of the impact fee charges. However, these respondents may, in effect, credit new development for other contributions made by setting the amount of the impact fee at less than the total cost of providing capital facilities" (p. 21). The credit most widely given is an allowance for future gasoline tax payments, followed by motor license fees, retail sales, and property taxes (Snyder and Stegman, 1986).

TRIP DISTRIBUTION METHODS

Some communities have approached traffic impact fees using a variable fee developed with transportation modeling techniques rather than a trip generation process (Samdahl, 1991).

Broward County, Florida, uses a trip distribution model to determine traffic impact fees (Thompson, 1986; Downing and McCaleb, 1987; Auerhahn, 1988; Frank, 1984; Knack, 1984; Frank, 1988; Stewart, 1984; Snyder and Stegman, 1986). Johnson (1990) describes it as the "pay-as-you-go" or "extra-cost" method. According to Nelson (1988), it "involves an algorithm in which the assessment depends on the location of the development and the variable cost of adding new or expanding existing facilities" (p. 122).

This procedure has the advantage of distributing impact fee
burdens more precisely based on cost estimates of different projects. How a development will impact current traffic patterns is first determined. No impact fee is charged if the level of service is not changed. However, this also means that earlier developments can "soak up" capacity without having to pay an impact fee. If the development will contribute to congestion, the model computes the fee based on "the proportion of the improved capacity that can be assigned to the traffic generated by the development" (p. 124).

Lee (1988) finds one obvious error in calculating traffic impact fees based on the congestion caused by a new development's traffic. This method violates the basic principle of efficient pricing, that all users face the marginal cost. Removing some existing users would eliminate the congestion, indicating that any group of users could be called "marginal". If existing residents are not paying peak prices, why should new residents? Lee concludes that as with other forms of infrastructure, it only matters that the agreed-upon miles of road are provided, not which roads are paid for by which development. The efficiency incentive addressed through such fees can only alter the development pattern, not the use of roads after the development occurs.

Bladikas and Pignataro (1990) point out that if impact fees are computed "only on road segments that are already over capacity, a proposed development may be charged substantially different fees depending on location" (p. 286). According to Frank (1988), using a fee structure of this nature creates "the possibility of creating incentives for in-fill development" (p. 211) to locations for which road capacity is available. However, he admitted there is no hard data to support this "in-fill" effect. He points out also that customized fees have uncertainty associated with them not found in formula/schedule types.

Another variation, proposed for use in Bellevue, WA, utilizes the select link analysis of traffic assignment models. The cost of projects needed for new development (a build out plan) is allocated to specific developments in proportion to the traffic using the new links. However, this approach requires great foresight in developing a plan for new development and a plan for road improvements needed by that development.

ADMINISTRATIVE AND IMPLEMENTATION ISSUES

Ease of administration is an important consideration in the implementation of any impact fee program. The cost of the initial study and later updates, the tracking of funds, the collection and disbursement of revenues, the determination of credits for construction in lieu of cash, and the need to transfer accounts to future buyers can be burdensome for small jurisdictions (Meisner et al, 1988).
Cervero (1988) found that planning offices cited three problems most frequently. The greatest problem was technical difficulties, either because of frequent changes in lot ownership or the use of complicated formulas for allocating costs. The second problem was administrative burden, with major time commitments required of staff, often inexperienced with the mechanisms, along with the need for coordination among local, county, and state jurisdictions. The third problem cited was financial, the inability of programs to "raise enough money for meaningful-scale projects, due either to inadequate fee levels or the devaluing effect of inflation" (p. 540).

Leithe and Montavon (1990) found sixty-one percent of the respondents to their survey update their fees for inflation on varying time intervals. Their study identified problems faced with impact fees including: determining levels of demand and costs of construction; setting rates that were accurate; and "fairly apportioning costs among residential, commercial, and industrial units" (p. 30).

Meisner et al (1988) concluded that traffic impact fees are, on the whole, considered equitable for all types and sizes of development. However, Cervero (1988) concludes from his study that a "sizeable gap" remains between theory and practice. He cites most of the problems with implementation stemming from the inability of program designers to "accurately and fairly apportion the cost of infrastructure improvements to developers and gauge the spatial and temporal extent of the traffic impacts of new developments" (p. 540). He cites the need for horizontal equity, where developers in similar situations should be treated the same.

POLITICAL CONCERNS

Developers are often opposed to traffic impact fees while existing residents of a jurisdiction generally favor them. Political decision-makers often have to trade off the concerns of each group in determining the actual level and administration of such fees (Link, 1988a; Link, 1988b).

Lillydahl et al (1988) cite five political objectives of local communities using impact fees: to shift the capital financing burden to new development; to synchronize new development with the installation of new facilities; to impose economic discipline on land development decisions by requiring development to absorb the costs of providing new services and facilities; to enhance the quality of life within communities; and to mollify anti-growth or slow-growth interest groups (p. 4).

Meisner et al (1988) claim that traffic impact fees, if known in advance and included in feasibility studies for projects, often do not significantly affect the cost of a development. They
identified a set of politically desirable conditions for a successful program: existing traffic congestion which is perceived by the public and the developer as being a problem; recent rapid growth and resulting traffic growth which polarizes a community into promoting a policy of making new development pay; a perceived strong economy where it is assumed that development will occur regardless of fees; strong citizen participation, with political influence; support from the business community; previous experience with an impact fee program; larger projects, as they have a greater impact and are more capable of funding infrastructure than small projects; and project types that are relatively high density, high cost or "upscale" and high generators of traffic volume. They also observed impact fees being set at a level significantly below anticipated costs, which they attributed to local governments taking into account the "need" by the public at large for the proposed facilities.

Cervero (1988) found none of the jurisdictions in his study charged developers the total cost of necessary off-site improvements as a formal policy. Half of his survey respondents indicated that they collected less than one-quarter of the cost of highway improvements attributable to new development. "Most indicated that elected officials were politically unable or unwilling to write formal ordinances which pass on the full cost of off-site improvements" (p. 538). Uncertainties about trip generation estimates and concerns over litigation were cited as reasons for these policies. He concludes that the flat fee approach is considered the most politically acceptable and easiest to establish. He states that "since all developers pay the same amount per square foot or per peak-hour trip, few charges of inequities have been aired" (p. 538).

The Technical Committee of the Colorado/Wyoming Section of ITE (1989) found fees collected at 20% of the calculated impact cost, resulting in inadequate funding for necessary projects to be constructed. Duncan et al (1989) found that the greatest percentage of actual roadway costs captured was 34%, and the least was 10%.

Draper (1987) cites a FHWA study on developer-funded improvements which found developers want to minimize up-front capital costs by phasing in improvements (or fees) to coincide with build out; to share with other developers the expense burden of off-site improvements that benefit more than the new development; and to have control over improvements constructed with his/her money. "Thus, a developer often prefers to assume responsibility for constructing the off-site improvements so he has more control over the cost and the timing and has assurance that the improvements will be constructed" (p. 69).

Lee (1988) claims that "only some small portion of the street
system can be financed efficiently through impact fees and the bulk of this is on-site to most development" (p. 303). Specifically, he claims that impact fees do not promote efficient expansion of the road system nor increase the price to users, so they do not promote efficiency.

**Housing Prices**

Affordable housing advocates are concerned that impact fees are adding to the financial burden of future home buyers. Incidence of the fee is a major concern for most communities. (Nicholas, Nelson, and Juergensmeyer, 1991; Morgan, 1988; Singell and Lillydahl, 1990; Delaney and Smith, 1989a; Delaney and Smith, 1989b; White, 1991; Stegman, 1987; Delafons, 1990).

Nicholas, Nelson, and Juergensmeyer (1991) claim that public officials argue that the land market is competitive and therefore prices of inputs do not dictate the price of new development. The actual structure of the fees should be such that they will be absorbed into lower raw land prices. However, this assumption of pure competition is violated if the sellers of buildable land are enjoying a location monopoly. With this market power, developers may not be able to force the impact fee backwards onto the landowner. The authors indicate that these developer concerns are not supported through empirical work.

It is worth noting also that without facilities the supply of developable land would diminish, causing housing prices to rise. Impact fees may actually work to forestall or prevent adverse price effects in a competitive housing market.

**Community Competition**

Communities are often concerned with the prospect of driving away development or losing new development to neighboring communities. If the development is a net drain on the community, this position may not make much sense; but if the new development is expected to generate a net surplus of revenue over cost for the community in relation to all services provided, the community may be better off with the development even if it requires subsidization for some infrastructure.

Snyder and Stegman (1986) found that calculated fees are often explicitly "discounted" for seemingly political reasons (p. 119). Barnebey et al (1988) observed Manatee County, Florida, also used a "competitive factor adjustment." In a compromise between a full fee and fees of surrounding communities, the county commission kept the residential road impact fees at 100 percent, but reduced those for commercial, industrial, and institutional developments. For example, of the 16 commercial land use categories, the county reduced 12 by at least 40% and the remaining uses by about 75% (p. 26). Nicholas, Nelson, and
Juergensmeyer (1991) observed a "discount" of between 5% and 15%, being applied to the final traffic impact formula.

According to Angell and Shorter (1988), an underlying concern in selecting a type of impact fee was "how to achieve private-developer participation without discouraging all development" (p. 20). They concluded that there was little evidence that exactions alone dampen development in the communities that used them, nor have they driven development elsewhere.

Duncan et al. (1989) found most of the jurisdictions with impact fees consider themselves as "pro-growth." "Where the impact fees have been in place for some time, all of the jurisdictions indicated that the fees have not had a noticeable impact on growth" (p. 41).

The potential for community competition and the interaction of road demand across local jurisdictional boundaries argue for coordinated impact fee programs among jurisdictions within the same housing market. Washington County, Oregon started its impact fee program in the unincorporated areas of the county, but it was later expanded to include the entire county. A logical extension would be to establish a floor fee level applicable to all three counties of the Portland metropolitan area. Holding all communities within a housing market to a minimum fee level, thereby protecting each from being placed at a competitive disadvantage, is a role statewide standards can perform.

Moore and Muller (1990) point out that communities can exempt certain users from the fee, such as affordable housing. They concluded that communities appear to prefer taking the risk of not collecting sufficient revenues to meet infrastructure expansion requirements by applying impact fees that recover only a portion of the calculated costs in order to avoid lengthy equity disputes.

**CONCLUSIONS**

Traffic Impact Fees are a viable and growing method for financing at least part of the cost of off-site road construction associated with new development. However, there are many issues which could be addressed in designing such systems. Communities implementing the fees must make a decision regarding the trade-off they are willing to accept between equity and simplicity. Simple fee schedules may not collect revenue in close proportion to the impact on the road system which the development generates, but complex systems may not be worth the effort, especially for small jurisdictions or jurisdictions where the level of the fee is small relative to the expected cost of road construction.

Among the most important issues are the level of the fee, the method of determining differences in traffic impact for various
types of land use, and the administrative and political problems created by using impact fees. The level of the fee can be determined in principle, but this calculation faces various practical problems. Estimates of both road construction cost and traffic impact have substantial uncertainty. Perhaps more important, there is not a consensus that new development should pay the full cost of the required road construction. The reluctance to charge fees representing the full cost may simply reflect uncertainty about a relatively new financing mechanism or it may reflect more fundamental disagreements about the appropriate level of fees and the methods of determining them.

The issues relating to the level of the fee are also closely tied to the political acceptability of the fees. While there is little evidence that they have any detrimental effect on community growth or on the cost of housing or other development, the issues continue to be debated. It is unlikely that the impact on cost or development will be resolved without additional empirical evidence.

When a traffic impact fee has been determined to be the appropriate method for financing road construction, there are two distinctly different approaches. One uses detailed studies of the impact of each new development on the existing road system and tries to estimate the specific impact the development will have. The other relies on estimates of the average impact development will have and sets fees based on this average cost. The former approach is better for optimizing the use of an existing road system in the short run, but it can treat otherwise identical developments very differently depending on the timing of development. The latter approach is more common, both because it is easier to implement and more uniform. However, there are problems with estimating the average impact on road use and relating this to the cost of road construction.

Small jurisdictions would probably be best served by using existing studies to determine the allocation of the cost among different types of land uses. Several have been cited and this project also generated a set of relative factors which are specified in the report "Analysis of the Traffic Impact Fee Structure for Washington County." Larger jurisdictions may find it preferable to complete a study of their road needs and the expected impact of different types of development. Traffic impact fees can be fairly complex but they do not have to be. Many of the potential problems can best be addressed by using a regional structure for the implementation of the fees; but even in the absence of a coordinated effort, such fees seem preferable to sole reliance on general revenue sources.
REFERENCES


Washington County, OR. Ordinance No. 379.


