PROPORTIONATE-SHARE IMPACT FEES

Supplement To
The NAHB Impact Fee Handbook
2008 Version

PREPARED FOR
National Association of Home Builders

PREPARED BY
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Preface

In June 2008, HUD's Office of Policy Development and Research issued "Impact Fees & Housing Affordability: A Guidebook for Practitioners," which was prepared by Newport Partners and Virginia Tech. The primary authors were Liza Bowles from Newport Partners and Arthur Nelson from Virginia Tech. The co-authors refer to papers and case studies used to prepare the guidebook that were written by them and by James Nicholas, Clancy Mullen, and David Dacquisto. Two months earlier, a very similar treatise was published by Island Press: Nelson, Bowles, Julian Juergensmeyer, and Nicholas, *A Guide to Impact Fees and Housing Affordability*.

One major thrust of these publications is to encourage local practitioners to embrace graduated-impact fees for residential units calculated on the basis of square footage. Although impact fees for non-residential land uses reference project size in terms of square footage, residential fees are typically flat fees. If residential fees are variable, they tend to be specified by type of housing (single family, multifamily, mobile home) rather than graduated by unit size.

The National Association of Home Builders has been aware of this work since HUD initiated the project. NAHB provided input to HUD on the draft guidebook, and some of *their* suggestions were incorporated. However, NAHB remained skeptical about the merits of moving from flat residential impact fees to variable impact fees, especially ones graduated by house size as reflected in square footage. NAHB's Land Development Committee decided to seek objective, independent research on the proportionate-share impact fee approach, with special attention devoted to residential unit size. The principal investigator and senior research associate conducted this research and present the results of their work in this report.

Acknowledgements

The authors want to thank NAHB staff Debra Bassert, Thais Austin, Paul Emrath, and members of the NAHB Land Use Policy Subcommittee for their comments and suggestions on drafts of this report. The authors were assisted by Kate Pearce, who telephoned and interviewed local property tax assessors.

The arguments and conclusions drawn from this research should be attributed solely to the authors and not to NAHB or its affiliates.

About the Authors

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Dr. Malizia is the author or co-author of four books, over 130 scholarly articles, monographs, and other publications. During leaves, he has worked in federal service, as a senior adviser for a real estate investment company, and as a visiting professor at Georgia Tech. He is a member of the American Planning Association and IEDC, and is a fellow of the American Real Estate Society. He received his master's and doctoral degrees from Cornell University in regional planning and his baccalaureate from Rutgers University.

Lucy Gallo is an associate principal with Economics at AECOM, an international consulting firm concentrating in economic development and planning, real estate and land use, entertainment and leisure, transportation systems, and capital facilities planning. Her core practice areas include fiscal and economic impact analysis and public infrastructure finance. She has served as lead fiscal consultant on numerous large-scale economic development and public-private partnership initiatives. Her clients include state and local governments, public agencies, private firms, and not-for-profit institutions.

Prior to joining Economics at AECOM, Ms. Gallo was executive vice president and audit principal at one of North Carolina's largest independent accounting and consulting firms. She received her accounting degree at the University of South Carolina.

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Executive Summary

This research focuses on a recent HUD guidebook proposal: Local practitioners should calculate impact fees for new residential units that are proportionate to unit size. The rationale is that larger units have more people with higher incomes who generate greater impacts on public facilities. Larger units should pay higher impact fees than smaller units. However, the argument for impact fees graduated by unit size is not convincing and in fact is counterproductive with respect to housing affordability.

Affordable housing is clearly a worthwhile local policy goal, and many options exist to reduce the cost of housing. Although other cost factors are more important, at the margin, residential impact fees can make a difference. The approach suggested in the HUD guidebook is to charge impact fees graduated by unit size. However, the more straightforward and cost-effective way to promote affordable housing is to charge one flat impact fee for all housing units and to apply waivers selectively for affordable housing units.

We compiled census data to examine the relationships among house size, number of occupants, and household income at the national level. We found that most households would qualify for workforce housing when wages of community workforce occupations are used. Given household income levels, it is not surprising that cities in the U.S. are facing both an affordable housing crisis and shortfalls in funding for public facilities.

Local practitioners who think fees should vary by unit size can choose to calculate impact fees more precisely. But fees, as opposed to taxes, tend to be regressive. Methodologies designed to establish progressive fee structures may undermine their legitimacy as fees; such calculations are not legally mandated. The courts have rarely commented on methodology unless the resulting fee differences were extreme.

In fact, Dolan simply requires "rough proportionality" in setting impact fees that reflect the public facility costs of new residential development. Rough proportionality can be satisfied with the calculation of one impact fee for all residential units. This position is supported by the finding that the difference in persons per household is less than one person in comparing units of less than 1,000 square feet with units of up to 3,000 square feet (AHS). Local jurisdictions that develop more complicated methods in an attempt to calculate proportionate-share impact fees will find the resulting fee schedules more difficult to defend, and more costly to calculate, more time consuming to administer as well as exceeding the "rough proportionality" requirements of Dolan.

Proportionate-share impact fees should use the most relevant demand generator to estimate facility impacts, but population (including school-aged children) is the best indicator only in limited applications. Furthermore, the drivers of demand used in public facility planning and capital improvements programming should correspond to the demand generators employed in impact fee calculations. Since fees based on unit size reflect needs generated by population (or number of children) but are calculated on the basis of housing characteristics, local jurisdictions would have to reconcile these relationships.

When graduated impact fees for residential units are considered instead of one flat fee, practitioners need to select the best unit characteristic. The choices are unit type, unit size, or number of bedrooms. Unit type is by far the most popular choice. Data on single family, multifamily/apartments, and other unit types are publicly available for most local jurisdictions, and practitioners can usually generate defensible impact fees that are specific to housing unit type. Practitioners that prefer unit size to type are more likely to use data on number of bedrooms because these data are more readily available and accessible than data on unit size. If unit size data are

also available, practitioners should select the factor that predicts occupancy most consistently.

The guidebook assumes that flat fees are inferior to fees graduated by unit size. Flat fees are assumed to be regressive whereas fees graduated by unit size are progressive. Thus, graduated fees are assumed to mitigate the negative impacts of impact fees on affordable housing. This argument ignores four advantages of flat fees, the most important of which is that they are inherently progressive.

First, houses in any size/cost range that pay the same impact fees are occupied by households of different sizes. Smaller households would tend to be more affluent than larger households purchasing houses in the same size cohort. Thus, with the same fee charged for these housing units, higher-income households with fewer occupants would overpay whereas lower-income households with more occupants would underpay relative to facility impacts.

Although the claim is made that graduated impact fees improve housing affordability, this approach is very crude. Affluent households that opt to purchase smaller units would receive the same benefit as lower-income households occupying units in the same size range.

Third, flat impact fees are less sensitive to the vagaries of the market than variable fees. Revenues from graduated fees will be more difficult to predict than revenues from flat fees.

Finally, flat fees require less detailed calculations of revenue credits than graduated impact fees.

When unit size is the attribute used to estimate proportionate demand for graduated impact fees, practitioners are obligated to calculate multiple revenue credit streams that relate unit size to revenue generation. With variable fees, ad valorem-based revenue credits must correspond to residential segments of the tax base that pay the taxes. Similarly, sales tax-related credits must be proportionate to taxable spending driven primarily by household income.

Even if the guidebook presented a flawless logic to justify impact fee calculation based on unit size, the feasibility of the approach would have to be evaluated. We assessed the tasks and questions local practitioners would need to resolve to impose defensible impact fees based on unit size. We found that the conversion from bedrooms to square footage is far from simple in practice. We also tested the feasibility of combining census data with local assessor data by contacting local jurisdictions that had residential impact fees. The results support our conclusion that impact fees based on square footage will be more expensive to implement.

We have carefully reviewed unit size-based residential impact fees recommended in the guidebook. Although the guidebook offers many useful ideas and information on impact fees, its recommendations go well beyond Dolan's rough proportionality test and ignore the proportionate treatment of revenue credits. Thus, the recommended approach is inconsistent with certain fundamentals of cost accounting as well as the logic of fiscal impact analysis. When impact fees are used to raise revenues needed for public facilities, flat residential impact fees can minimize the potentially negative influences on housing affordability. Compared with impact fees graduated by unit size, flat fees are straightforward to estimate, easy to administer, and actually more progressive when revenue credits are taken into account.

Introduction

This research focuses on the main proposal in the HUD guidebook and related publications: Practitioners should calculate impact fees for new residential units that are proportionate to unit size. Their justification is to achieve "proportionate equity," which rests on three assumptions. The first one is necessary to have a legal basis for charging differential impact fees: Impacts on public facilities increase with the size of the residential unit, and differential impacts can be measured reasonably well using household size. The second assumption, which follows directly from the first, is that household size is correlated with unit size and generally increases as the size of the unit increases. The third assumption is that household income also increases with the size of the residential unit. The latter assumption addresses equity in the sense that home prices may be driven up more aggressively for households that can afford higher prices.

Evidence is presented to convince practitioners that impact fees graduated by unit size are better than flat fees. The rationale is that units with higher-income people who generate greater impacts on public facilities should pay higher fees. Thus, the assumed regressive impact of flat impact fees on housing affordability could be mitigated to some extent with graduated fees. Although formulas and supporting case studies are presented, the argument does not provide a complete picture of the relationships. Advocating graduated impact fees certainly goes beyond what is required given the legal principle of "rough proportionality." Ultimately, we find the argument for impact fees graduated by unit size not only unconvincing but counterproductive with respect to affordability.

We present our findings in the following manner. First, we discuss alternative ways to address housing affordability in the context of impact fees. Next, we examine proportionality in detail and take issue with important points presented in the guidebook that appear to be inconsistent or not well corroborated. Our treatment of proportionate-share impact fees is presented in this section. Third, we take up the basic question for practitioners: How can one calculate proportionate-share impact fees from the publicly available information? The answer to this question evaluates the feasibility of basing residential impact fees on unit size.

We supplement these sections with four appendices. In the first one, we summarize the guidance offered to practitioners in the HUD guidebook. The second appendix offers specific criticisms of this guidance. Next, we give an example of disproportionate impact fees using data presented in the guidebook. In the fourth appendix, we present a case study that "connects the dots" to underscore the merits of flat residential impact fees for practitioners concerned with both housing affordability and legally defensible impact fees.

Affordable Housing Concerns

Affordable housing is clearly a worthwhile local policy goal, and many options exist to reduce the cost of housing. Impact fees in particular and regulatory burdens in general do not have significant cost impacts, except in a few areas, such as California. Since non-utility impact fees usually amount to less than 4% of the residential project's capital budget, it is wise to attend to other line items that really matter, such as land, labor and materials costs, construction techniques, design and engineering, construction interest, etc. At the margin, however, residential impact fees can make a difference.

The approach suggested in the guidebook is to charge

EXHIBIT 1: 2004 Paycheck-to-Paycheck Survey

Location	Annual Income Needed	NACo Typical Wage Rates April 2004*		
		Police Officer	Firefighter	Elementary School Teacher
Orange County, CA, Metro Area	$134,871	$59,000	$59,000	$46,000
Honolulu, HI, Metro Area	$116,400	$37,560	$37,452	$34,294
Boston, MA-NH Metro Area	$114,471	$46,000	$43,000	$41,000
LA-Long Beach, CA, Metro Area	$104,829	$66,046	$66,302	$53,184
Nassau-Suffolk, NY, Metro Area	$ 98,914	$80,445	$48,165	$65,000
Newark, NJ Metro Area	$ 90,600	$59,819	$63,007	$42,925
Chicago, IL, Metro Area	$ 81,771	$43,089	$33,830	$38,753
Portland-Vancouver, OR-WA, Metro Area	$ 74,829	$55,000	$43,769	$45,000
Washington, DC-MD-WVA, Metro Area	$ 73,371	$47,846	$40,711	$40,000
Atlanta, GA, Metro Area	$ 69,600	$45,000	$32,556	$40,000
St. Mary's County, MD	$ 66,729	$36,421	Volunteer	$31,799
Minneapolis-St. Paul, MN-WI	$ 65,957	$51,424	$24,626	$42,469
Beaufort County, SC	$ 63,900	$38,439	$32,000	$39,901
Miami, FL, Metro Area	$ 58,200	$44,946	$44,643	$36,850
Wilmington-Newark, DE-MD, Metro Area	$ 56,743	$45,000	$60,000	$51,000
Las Vegas, NV-AZ, Metro Area	$ 56,443	$45,111	$37,601	$45,000
Daytona Beach, FL, Metro Area	$ 51,129	$30,888	$33,313	$40,284
Kansas City, MO-KS, Metro Area	$ 50,957	$35,000	$35,000	$34,000
Missoula, MT, Metro Area	$ 50,914	$38,000	$38,000	$37,600
St. Louis, MO-IL, Metro Area	$ 47,229	$35,000	$36,567	$41,800
Albuquerque, NM, Metro Area	$ 44,529	$30,120	$28,080	$26,520
Columbus, OH, Metro Area	$ 43,586	$45,000	$45,000	$35,000
Kalamazoo-Battle Creek, MI, Metro Area	$ 41,014	$50,000	$31,770	$45,000
Asheville, NC, Metro Area	$ 38,229	$25,000	$20,000	$30,000
Umatilla County, OR	$ 36,643	$48,576	$49,793	$40,000
Phoenix-Mesa, AZ, Metro Area	$ 30,943	$43,500	$43,980	$42,800
Wichita, KS, Metro Area	$ 29,314	$32,074	$32,094	$37,421
St. Lawrence County, NY	$ 29,100	$35,800	$35,000	$39,413
Lincoln County, NE	$ 28,671	$35,526	$37,565	$33,611
Oklahoma City, OK, Metro Area	$ 27,857	$42,000	$42,000	$32,000

*Center for Housing Policy County Survey of Affordable Housing for Working Families

Source: Paycheck to Paycheck, National Housing Coalition (2004)

EXHIBIT 2 AHS 2001 Distribution by Unit Size

	Percent	Percent
Unit Size	100.0%	100.0%
Less than 500 square feet	3.3%	
500 to 749 square feet	7.6%	
750 to 999 square feet	11.7%	
1,000 to 1,499 square feet	23.4%	
1,500 to 1,999 square feet	17.5%	63.5%
2,000 to 2,499 square feet	11.1%	74.6%
2,500 to 2,999 square feet	5.5%	5.5%
3,000 to 3,999 square feet	4.9%	4.9%
4,000 or more square feet	2.9%	2.9%
Refused	0.2%	0.2%
Don't Know	12.0%	12.0%
Median Square Footage	1,693 SF	

Source: American Housing Survey, Data Ferrett Tabulation

impact fees graduated by unit size. However, the more straightforward and effective way to promote affordable housing is to charge one flat impact fee for all housing units and to apply waivers selectively for affordable housing units. The general fund or other funding sources could be used to cover the shortfall. Alternative funding may not be required, but infrastructure needs may be underfunded as a result. It is not legal to increase impact fees beyond the proportionate impact of new residential units to make up the difference for units not paying fees or paying reduced fees.

Impact fees can be used to achieve other worthwhile planning or policy goals in addition to affordable housing but at the cost of lost revenues. Since the primary purpose of impact fees is to fund new or expanded public facilities, practitioners should carefully estimate the extent of revenue losses before changing fee schedules or reducing fees for other public purposes.

Although the guidebook does not define affordable housing per se, the results of the "2004 Paycheck to Paycheck Survey" published by the National Housing Coalition are cited as a key reference. A summary is provided in Exhibit 1.

To gain a better perspective on affordable housing and the ever-widening gap between public facility demand and available local revenue, we compiled several special tabulations from the 2000 Census.[1] We used number of bedrooms as the unit size indicator because square footage information is not provided in the Census. Since we found sufficient similarities in the American Housing Survey (AHS)[2] 2001 distribution of housing units by size, as shown in Exhibit 2, to the distribution by bedrooms from the 2000 Census in Exhibit 3, we preferred the 2000 Census results owing to the significant percentage of housing units (12%) in the AHS 2001 that were unable to respond to the unit size question.

First, we sought to understand the relationships among household income, housing unit size, and the number of household occupants since the guidebook's primary focus is on these factors as they relate to housing affordability. Exhibit 3 profiles households by number of bedrooms, number of occupants, and income. Vacant

EXHIBIT 3: Population in Households by Household Income and Number of Bedrooms

Population in Households			0 Bedrooms	1 Bedroom	2 Bedrooms	3 Bedrooms	4 Bedrooms	5+ Bedrooms
% of Household Population	% 0 to 3 Bedrooms	76.5%	2.1%	9.0%	23.1%	42.3%	18.7%	4.8%
% of population with HH income < $55,000 in 0 to 5+ bedrooms			83.1%	80.3%	73.0%	53.3%	33.6%	28.8%
Persons per HH with HH income < $55,000			1.87	1.76	2.13	2.58	3.04	3.42
% of population with HH income $55,000 to $150,000 in 0 to 5+ bedrooms			15.4%	17.9%	24.6%	42.3%	54.3%	50.4%
Persons per HH with HH income $55,000 to $150,000			2.60	2.37	2.55	3.07	3.54	4.11
% of population with HH income > $150,000 in 0 to 5+ bedrooms			1.5%	1.7%	2.4%	4.3%	12.1%	20.9%
Persons per HH with HH income > $150,000			2.49	2.20	2.29	2.78	3.31	3.90
1999 Median HH income	$41,994							
1999 Mean HH Income	$56,675		Average persons per household			2.59		

Source: 2000 Census, Geography: US

EXHIBIT 4: Single-Family Detached Population Profile by Household Income and Number of Bedrooms

Population in Occupied Single-Family Detached		2 Bedrooms	3 Bedrooms	4 Bedrooms	5+ Bedrooms
% of SF-detached population	% 0 to 3 Bedrooms 67.9%	14.4%	50.0%	25.7%	6.4%
% of population with HH income < $55,000 in 2 to 5+ bedrooms		70.0%	49.6%	31.3%	26.6%
Persons per HH with HH income $55,000		2.10	2.49	2.97	3.43
% of population with HH income $55,000 to $75,000 in 2 to 5+ bedrooms		14.6%	20.9%	19.0%	15.4%
Persons per HH with HH income $55,000 to $75,000		2.64	3.02	3.50	4.01
% of population with HH income $75,000 in 2 to 5+ bedrooms		84.6%	70.5%	50.3%	42.0%
% of population with HH income $75,000 to $100,000 in 2 to 5+ bedrooms		8.1%	15.0%	18.8%	16.4%
Persons per HH with HH income $75,000 to $100,000		2.77	3.11	3.57	4.16
% of population with HH income $100,000 to $150,000 in 2 to 5+ bedrooms		4.8%	9.9%	18.2%	19.5%
Persons per HH with HH income $100,000 to $150,000		2.69	3.05	3.50	4.09
% of populaton with HH income > $150,000 in 2 to 5+ bedrooms		2.4%	4.7%	12.8%	22.1%
Persons per HH with HH income > $150,000		2.43	2.79	3.30	3.87

Source: 2000 Census, Geography: US

units are excluded because no income is reported on the long-form questionnaire.

The analysis indicates that 76.5% of the population lives in housing units with 0 to 3 bedrooms. Most of these households earn less than $55,000, the approximate income mid-point in Exhibit 1. If the large majority of households consist of a community's workforce population, then it is not surprising that cities in the U.S. are facing both an affordable housing crisis and shortfalls in funding for public facilities.

In Exhibit 4, single-family detached households are more closely examined since they make up 61% of all housing units. Again, the majority of demand for public facilities is generated by 0-to-3 bedroom households with annual income of less than $55,000.

Let us assume these exhibits represent the typical locality in terms of real property and sales tax base. Given the focus of the guidebook and its recommendations, we are left with the following questions:

- To what extent do local governments depend on the tax base generated by non-residential properties and the portion of higher-income households to cross-subsidize the cost of services for the majority of lower-income households?
- If Exhibit 3 reflects the demand for public facilities in jurisdictions that charge flat impact fees, is it reasonable to conclude that larger housing units with higher household income are undermining the proportionality of fees assigned to smaller units with lower household income that require significant cross-subsidization?
- For larger housing units, do higher levels of household income per person and housing unit value (i.e., real property tax base, sales tax base) per person outweigh incremental differences in the number of persons per household when examining the net cost of public facilities?[3]

Proportionality Considerations

Impact fees are not the most appropriate source of funding for most public facilities and infrastructure. (See further discussion in Appendix I under Chapter 2 of the guidebook.) Nor are they the best development exaction in all instances. Depending on local circumstances, real estate transfer taxes, local improvement districts, or developer agreements may be better revenue-generating tools.[4] Local practitioners are in the best position to assess the priority of impact fees in comparison with other financing tools. Yet, impact fees are used increasingly because they are politically feasible.

Dolan (1994) requires "rough proportionality" in setting impact fees. Rough proportionality can be satisfied with the calculation of one impact fee for all residential units as long as that fee reflects the net public facility costs of new residential development. Local jurisdictions that develop more complicated methods in an attempt to calculate proportionate-share impact fees will find them more difficult to defend, more costly to calculate, more time consuming to administer as well as far exceeding the "rough proportionality" requirements of Dolan.

The central assertion in the guidebook is that the number of people occupying a dwelling unit increases as the size of the unit increases. This assertion is intuitively obvious; larger houses with more rooms and living space can accommodate more occupants. The AHS data on occupied dwelling units in Chapter 4 show this positive correlation. But the guidebook makes the further claim that this relationship is supported by scholarly research. We conducted an extensive literature review in May and June 2009 of various databases with the assistance of professional university librarians. We found no published empirical work on the relationship between unit size and unit occupancy.

Even if this relationship were established through empirical research, it is not sufficient for charging impact fees. The assumption is that impact and therefore public facility costs increase with unit size either because more people living in larger houses generate greater impacts or higher-income occupants generate greater impacts. We reviewed the scholarly literature on these assumed relationships as well and found no directly relevant research.

The guidebook devotes considerable attention to linking the size of housing units to the persons occupying these units in order to estimate the proportionate cost of new facilities generated by new residents. However, as shown in Appendix III below, allocating the cost of the new facilities based on anticipated square footage of new residential units without careful attention to household size can lead to impact fees that are *disproportionate*.

Legal Issues

The guidebook makes legal claims about impact fees that need to be qualified. The claims are presented, as follows:

> When the police power (government regulation) is exercised, equity should be addressed.

Equity is a very important issue in matters of taxation, but not when police power is used. Fairness is very important from both the political and planning perspectives, but fairness is a different concept. Thus, the concern in calibrating impact fees should be accurate estimation of proportionate impacts rather than equity.

> Proportionate equity, which is achieved by aligning impact fees in proportion to amount of impact, is an important form of equity from the legal perspective.

As noted, rough proportionality, not proportionate equity, is the relevant legal criterion. Proportionality is gauged in the context of rational nexus that considers the relationship between development impacts and facility costs. Legal principles such as due process, equal protection, or property rights come into play in legal proceedings, not proportionate equity.

> Legal reasoning supports the idea of charging graduated impact fees based on unit size for residential development to comport with the practice for commercial development.

Local jurisdictions that identify affordable housing as a public purpose can decide to vary fees for residential units and to calculate graduated impact fees. Yet such calculations are not legally mandated. Courts have rarely commented on methodology unless the resulting fee differences were extreme.

Furthermore, the use of square footage for commercial development does not warrant its use for residential development. First, commercial units are not meaningful with respect to impacts. To know that a community center has 23 store units is not informative, unlike the case with residential units. On the other hand, the type of commercial development (retail, office, warehouse, etc.) in combination with its size provides useful information that can be associated with impacts. Second, the scale of commercial development varies considerably, and square footage indicates scale. For example, retail development includes convenience stores and small strip centers of less than 10,000 square feet as well as neighborhood centers, community centers, power centers, regional centers, and super regional malls. The size of the malls can be in the range of 1-2 million square feet. Thus, the largest commercial units can be 100 times larger than the smallest units. The size range for residential units is much narrower, and as noted, the differences in occupancy are minimal.

Demand Indicators

Proportionate-share impact fees should use the most relevant demand generator of facility impacts. Although population (including school-aged children) can be used as the demand indicator for many public facilities, it is the best indicator for only the following: libraries, parks and recreation, and schools. Other demand indicators of development impact are better suited for a wide range of public facilities including emergency medical, fire, police, highways, transit, storm water, or water and sewage. For emergency medical, fire, and police facilities, response time is the most important consideration. Road impact fees require information on vehicle miles traveled and trips. Transit facilities depend on the density and location of development. Storm water impacts depend on the characteristics of residential development, especially lot size and impervious surface area. Water and sewer services are more sensitive to lot size and the number of bathrooms than unit occupancy. Distance to existing water and sewer facilities is another important indicator.

Furthermore, the drivers of demand used in public facility planning and capital improvements programming should correspond to the demand generators employed in impact fee calculations. Since graduated fees reflect needs generated by population (or number of children) but are calculated on the basis of housing characteristics—for example, square footage—local jurisdictions would have to figure out how to reconcile the relationships. One option is to redefine the drivers of demand for public services from people to the residential structures themselves. In this case, the demand for public facilities would have to be linked directly to the square footage of the projected residential units rather than to the new residents or the other characteristics of the structures in which they are expected to live. But this option could result in less accurate facility demand forecasts.

Housing Unit Characteristics

When graduated impact fees for residential units are considered instead of one flat fee, practitioners need to select the best unit characteristic. The choices are unit type, unit size, or number of bedrooms. Which of these factors is the best predictor of occupancy?

Unit type is by far the most popular choice (single family, multifamily/apartments, and others such as mobile homes or attached units). As discussed in the section on feasibility below, data on unit type are publicly available for most local jurisdictions. Practitioners can usually generate defensible impact fees that are specific to housing unit type.

Although number of bathrooms and total number of rooms can be counted more accurately, number of bedrooms is the more popular indicator.[5] Practitioners are more likely to use bedrooms because these data are more readily available and accessible than data on unit size.

If unit size data are available as well as number of bedrooms, practitioners should select the factor that predicts occupancy most consistently. Development practitioners

and planners apply various rules of thumb and standards to size infrastructure and public facilities, but empirical research is lacking on the impacts of housing units based on the comparison of number of bedrooms to unit size. Therefore, practitioners would have to compare these two factors with detailed local data on the distribution of housing units by persons per unit.

To make a fair comparison, the same number of categories for number of bedrooms and unit size should be used. For example, the categories for number of bedrooms could be 0-1 bedroom, 2 bedrooms, 3 bedrooms, 4 bedrooms, 5 bedrooms, and 6 or more bedrooms. The categories for unit size could be less than 1,000 SF, 1,000-1,500 SF, 1,500-2,000 SF, 2,000-2,500 SF, 2,500-3,000 SF, and over 3,000 SF.

For six categories of either bedrooms or unit size, practitioners could generate the frequency distribution of persons per unit. Depending on the detail of the occupancy data, practitioners may be able to plot the frequency of units with 1, 2, 3, 4, 5, 6, and 7 or more persons. Of course, the average value for each category gives persons per unit, that is used in the impact fee calculations. But the variance of these 12 frequency distributions (or standard deviation) is the statistic that identifies the better choice. Practitioners could calculate the average variance for number of bedrooms and compare that result with the average variance of the unit size distributions. The factor with the lower average variance would be the better choice because public facility impacts, which are estimated using average persons per unit, would be more accurate.[6]

If practitioners decide to select unit size to estimate occupancy, as suggested in the guidebook, it is important to remember that this relationship is nonlinear. Data from the American Housing Survey (AHS) indicate that increases in occupancy decline as unit size increases.[7]

Practitioners should estimate the unit size-household size relationship carefully given impact fee methodologies. As noted, population and school-aged children generate the need for public facilities, not housing units per se. By using an equation rather than average value, practitioners will better track the actual impacts that occupants of new residential units generate.

Advantages of Flat Fees

The guidebook assumes that flat fees are inferior to graduated fees. Flat fees are assumed to be regressive whereas graduated fees based on unit size are progressive since they are assumed to mitigate the negative effects of impact fees on affordable housing. This argument ignores the advantages of flat fees, the most important of which is their inherently progressive nature. We support this fundamental concept in the remainder of this section by making four points.

First, houses in any *similar* size/cost range are occupied by households of *different* sizes. The number of occupants in these houses varies around the average level. How would the households below the average compare to the ones above the average? First, almost all households would have to qualify for mortgage loans to purchase their home. (We assume conservative underwriting behavior, not the behavior that generated the recent housing crash.) The smaller households would generally be more affluent than the larger households. They would purchase their home either to enjoy more space per person or in anticipation of future space needs. The larger households are likely to have purchased as much house as they can afford. These households are more likely to include extended families or unrelated individuals who team up to meet the down payment and carrying costs.

Although larger households are expected to have greater impacts on public facilities than smaller ones, smaller households would tend to be more affluent than larger households purchasing houses in the same size cohort. Thus, with the same fee charged for these housing units based on average size, higher-income households with fewer occupants would overpay whereas lower-income households with more occupants would underpay relative to facility impacts.

One further implication leads to the second point. Although impact fees that increase with unit size claim to improve housing affordability, this approach is very crude. Higher-income households that opt to purchase smaller units would pay the lower fee and therefore receive the same benefit as lower-income households occupying units in the same size range. As noted above, to promote affordability, charging one flat fee but waiv-

ing fees for targeted affordable housing projects would be much more cost effective.

Third, flat impact fees have another advantage over graduated impact fees based on unit size. They are less sensitive to the vagaries of the market. It is more difficult to predict the distribution of house sizes that will be developed compared with the total number built over the same time frame. Revenues from graduated fees will be less predictable than revenues from flat fees as a result. Furthermore, total revenues from impact fees would decline below expected levels in jurisdictions with graduated fees during economic downturns when households are more likely to purchase less expensive, smaller units.

Finally, flat fees require less detailed calculations of revenue credits than graduated impact fees. Flat impact fees may be established simply on the basis of anticipated public facility costs net of other funding, which includes the taxes paid in the future by new residents. With flat impact fees, facility costs and revenue credits are calculated for the *average unit*. For revenue credits, using the average unit is convenient and eliminates the need to project specific revenue streams (property taxes, user fees, sales taxes) associated with specific demand for facilities generated by households.

When unit size is the attribute used to estimate proportionate demand for graduated impact fees, practitioners are obligated to calculate multiple revenue credit streams that relate unit size to revenue generation. This task is further complicated because taxes are levied on the jurisdiction's tax base, which consists of tax parcels, not persons. With graduated fees, ad valorem-based revenue credits must correspond to residential segments of the tax base that pay the taxes. Similarly, sales tax-related credits must be proportionate to taxable spending driven primarily by household income. See the case study in Appendix V for further discussion.

Although the guidebook recognizes the importance of revenue credits (page 73), the problems of incorporating them with graduated fees are masked because the authors do not present a complete methodology applying their ideas. The examples provide snapshots of various demand calculations, but none recognize the corresponding challenges in determining proportional revenue credits. Thus, thorough comparison of flat impact fees with graduated impact fees based on net facility cost cannot be made.

Feasible Impact Fee Calculations

Even if the guidebook presented flawless logic to justify impact fee calculations based on unit size, the feasibility of the approach would have to be evaluated. Although the guidebook cites various data sources, local practitioners would have to access reliable and reasonably current data to impose defensible impact fees based on unit size instead of unit type or number of bedrooms.

Several tables in the guidebook are based on the AHS since square footage for single-family detached and manufactured homes are included in the survey. Although the AHS is a useful survey, these data cannot be directly applied for impact fee calculations.

Use of Local Appraiser Information

Because the AHS data are not available in many localities, the guidebook indicates that other information is "readily available" at the local level to calculate variable impact fees. On page 119, a simple two-step process is described:

- Develop relationship between size of unit and persons per unit based on PUMS data from the U.S. Census (the American Community Survey will replace the decennial long form beginning in 2010).
- Develop relationships between the number of bedrooms in a unit and the square footage in a unit from real estate and property appraiser data.

The conversion from bedrooms to square footage will not be nearly as simple in practice. Practitioners will most likely need to address the tasks and answer the questions below.

- Define a bedroom consistently given features such as a bonus room, home office, great room or formal living/dining room, etc.
- Determine bedrooms for each new parcel by reviewing construction plans submitted by the building permit application and following the Census Bureau guidelines.
- Given that most tax assessor/GIS databases already capture the number of bedrooms in residential parcel records, figure out whether additional programming is necessary to generate custom reporting for impact fee calculation and assessment purposes.
- How will census data be extrapolated to arrive at persons per unit based on unit size? What about public school children per household? Can these tabulations be performed internally, or are outside consultants needed?
- How will capital improvement plans link to demand by size of unit? If demand is not correlated to unit size, would fees be appropriate or defensible?
- Refine residential population projections typically based on housing unit type for each unit size category.
- In a plan-based fee calculation, the cost of the relevant facilities is divided by total demand to calculate the average demand per unit, and revenue credits must be proportional to revenue creation. To calculate legally defensible variable fees, develop methodologies that prevent units from receiving more revenue credits than they actually generate. To make these computations may require information about the existing tax base (sales or property) that are not usually at hand and detailed information related to new development.
- To calculate revenue credits for an incremental expansion fee calculation, estimate relationships between the relevant portions of the tax base and existing debt on the corresponding infrastructure at full capacity. Then apply these relationships to the tax base of the projected population by type and size of housing unit.
- In a cost recovery fee calculation, facility cost is divided by the number of demand units the facility will serve. Again, population projections by type and size of housing units are necessary to ensure full cost recovery. Likewise, in revenue credit calculations, detailed projections of appropriate revenue drivers, by housing type and size, are required.

Selective Survey of Local Jurisdictions

We tested the feasibility of combining census data with local assessor data by contacting 22 local jurisdictions in 20 states that currently have residential impact fees. We completed telephone surveys with 13 property tax assessors in these jurisdictions. The 13 communities charge multiple impact fees for utility and non-utility infrastructure. Total fees range from $1,387 to $52,835 with an average of $11,445, which is close to the national average of $11,239 published in the 2008 National Impact Fee Survey by Duncan Associates. The answers compiled constitute data needed to craft legally defensible impact fees based on unit size. The survey addressed the availability of the required data as well as the level of effort necessary to obtain these data. Higher levels of difficulty signify greater costs in terms of personnel, software programming, and external consultants.

The results of the survey are presented in Exhibit 5 below. Over 46% of those surveyed indicate providing basic information needed for unit size impact fees would be moderately to very difficult.[8] This response is in sharp contrast to the guidebook, which explicitly states this information is "readily available" at the local level.

References

Dolan v. Tigard 512 U.S. 687, 1994

Institute of Transportation Engineers, Trip Generation, Wshington, DC (various editions)

EXHIBIT 5: Results of Telephone Survey of Property Tax Assessors

Survey Questions	Yes	No	
1. Does the property assessor's database include the number of bedrooms (i.e., 1, 2, 3, etc.) for each residential parcel?	13	0	
a. Per type of residential unit (multifamiliy, SFD, SF-A, mobile)	10	3	
2. Is there a standard documented definition of bedroom for each type of unit?	11	2	
a. Are the definitions consistent for the entire database?	11	2	
3. Who determines the bedroom count for new or modified units	Assessor		
4. Are special features (bonus room, home office, great room vs. formal living/dining room) that affect the square footage of residential units included for each residential parcel?	13	0	
a. Are the definitions consistent for the entire database?	6	7	
5. Can you generate a residential housing stock inventory report that summarizes total units by number of bedrooms (1, 2, 3, 4, etc.)?	12	1	
a. Per housing type (multifamily, single-family attached, single-family detached, mobile home)?	11	2	
6. Can you generate a report that summarizes (a) total square footage and (b) number of units for all residential housing stock based on the number of bedrooms?	12	1	
a. Per housing type (multifamily, single-family attached, single-family detached, mobile home)?	11	2	
7. On a scale of 1 to 5, how do you rank the following?			
a. How do you rank the effort involved in generating a report summarizing the total residential units by number of bedrooms and type of unit:	**Scale**	**Response**	
Very easy	1	1	
Moderately easy	2	2	
Normal reporting effort	3	4	
Moderately difficult	4	4	
Very difficult	5	2	46%
		13	
b. How do you rank the effort involved in generating a report summarizing the total square footage by number of bedrooms and type of unit?	**Scale**	**Response**	
Very easy	1	1	
Moderately easy	2	2	
Normal reporting effort	3	4	
Moderately difficult	4	4	46%
Very difficult	5	2	
		13	

Appendix I

Review of *Impact Fees & Housing Affordability: A Guidebook for Practitioners*

The first part of this appendix is organized by the chapters of the guidebook. Page numbers are noted after citations. The second appendix presents specific comments on and criticisms of the guidebook.

Executive Summary

Impact fees are imposed on new development to cover the burden new residents place on public facilities. Although taxes are more appropriate as a source of local revenue for operating and capital outlays, impact fees are often more politically feasible.

New development can be charged only for its proportionate share of public facility costs. When one fee is charged for all housing units, it can be regressive if larger units impose greater burdens owing to more occupants with higher income. "The purpose of this guidebook is to help practitioners design fees that more equitably reflect actual proportionate share and therefore have less of a negative impact on housing affordability." (page ii)

The factor that correlates most closely with proportionate cost is unit size. With information technology available to local governments, it is relatively easy to use the square footage of houses to determine impact fees.

Introduction

Local officials increasingly turn to impact fees as the best financing alternative. "While in theory there are many better ways to finance infrastructure, in practice impact fees often become the path of least political and legal resistance." (page 1) Yet practitioners need ways to reduce the negative effects of impact fees on housing affordability. The two approaches to make housing more affordable are 1) calculate impact fees by house size or 2) waive or defer fees on lower-cost housing. The former approach is supported by considerable research as well as being intuitively obvious: Bigger houses place greater burdens on public facilities.

Chapter 1

Local jurisdictions experiencing growth need to find ways to finance new infrastructure given increasing facility costs and less funding from state and federal government. They can more easily impose impact fees because they are based on the police power (regulatory power) compared to taxation, which often requires voter approval. Impact fees arose from "desperation" because "citizens demanded quality public services, and taxpayers insisted on lower taxes." (page 10)

When infrastructure becomes increasingly inadequate, developers and home builders prefer impact fees to avoid the no-growth alternative. Impact fees have proliferated geographically and now cover many types of facilities. Yet impact fees have drawbacks. They often generate neither sufficient funding up front nor predictable revenues over time.

Impact fees need to be considered in the context of equity. Among several equity considerations, the guidebook focuses on proportionate equity, which refers to the differential impacts of housing units on public facilities. Flat fees charged to housing units assume equal impact and are inherently unfair and regressive. (page 14)

The type of housing unit (single-family, apartment, etc.) has been used most frequently to vary residential impact fees. But impacts vary more by house size than house type. Therefore, it is better to base fees on unit size than unit type to achieve proportionate equity.

At the end of the chapter, the authors cite three jurisdictions that have fees based on unit size. "These and several other jurisdictions have been shifting away from unit type and towards assessment bases that reduce the regressivity of impact fees and properly assess fees based on impact." (page 16) According to the authors, Palm Beach County, Florida, varies its fees from $272 for the smallest units to $1,544 for the largest units instead of charging a flat fee of $1,221. Miami-Dade County, Florida, uses the

following formula to calculate school impact fees:

School Fee = $612 + $0.918 × Unit Square Footage

In Table 1-6, Canton, Georgia, adopted park and recreation impact fees based on $0.53 per square foot for new residential and $0.17 per square foot for new non-residential.

Chapter 2

The chapter begins with a review of efficient public facility pricing that compares average and marginal cost approaches. Next, five financing options are presented and compared. Impact fees are portrayed as a form of gap financing. "Impact fees are an attempt to generate revenue where general or dedicated taxes/assessments cannot cover all the capacity expansion costs. ...They are directly tied to planning in that they are used to help finance a local capital improvement program that itself implements overall community planning objectives." (page 20)

"Public finance criteria indicate that for most facilities impact fees may be inappropriate for a variety of economic efficiency or social welfare reasons." (page 20) In Table 2-2, impact fees are best only for water and wastewater facilities but not for the 11 other types of facilities/infrastructure listed.

In the third section of the chapter, the authors present an excellent summary of different methods of generating revenues. These financing mechanisms are developer exactions (mandatory, negotiated, and development agreements), special assessment districts including tax increment financing, and impact assessments, which cover impact taxes, real estate transfer taxes, and impact fees. The authors describe impact fees articulately. (page 27)

The authors next evaluate the financing mechanisms by applying the criteria of revenue potential, proportionality, geographic equity, administrative ease, public acceptance, and housing affordability. They summarize the discussion in Table 2-4. The decision charts on pages 32-36 are designed to help practitioners consider financing mechanisms other than impact fees "to be sure that the impact fee choice is the best available option." (page 32)

Chapter 3

This brief chapter summarizes state enabling legislation. Table 3-1 shows the states with impact fee legislation and which of 10 types of public facilities can be financed with impact fees.

Of the 26 states with impact fee enabling statues, 14 consider affordable housing though in different ways. A different group of 14 allows fee waivers for affordable housing projects, whereas six require that fees be paid from another source. (page 40)

Chapter 4

Impact fees for residential units that are flat fees are "inherently unfair." (page 43) Graduated fees could be based on type of unit, number of bedrooms, or heated square footage. This last metric is recommended. At the local level, it can be calculated using the estimated population divided by the total heated residential square footage on the tax rolls in the same year. Varying impact fees by unit size is the best way to reduce the negative impact on housing affordability, except through an outright fee waiver.

NAHB research supports this approach "with some refinement." (page 45) Table 4-2 shows an increase in persons per unit for all units and three specific unit types (single-family detached, single-family attached, and multi family) based on the American Housing Survey (AHS) data. The more basic point demonstrated in Table 4-2 is that change in persons per 1,000 SF is not proportionate but declines with unit size. "The rate of increase between categories falls as size increases, however." (page 45)

On page 47, AHS data that the authors reorganize in Table 4-3 are applied to come up with two formulas for detached or attached units that modify the simpler formulation on page 44, the ratio of population to heated square footage of housing. These formulas are recommended for areas covered by the AHS.

The discussion on pages 47-48 includes arguments about why charging fees based on "long-term, average occupancy characteristics" is better than modifications for the characteristics of the current occupants.

The second section of Chapter 4 (pages 48-56) shows how variable impact fees could be calculated for five different facility types, including 1) parks and libraries, 2) police and fire, 3) water, sewer, and storm water, 4) roads, and 5) schools. Impact fees for the first facility type can be based on persons per unit only. Fees for police and fire can be based on occupancy but may be modified to

account for distance to the facility. In addition to occupancy, impact fees for water-related facilities should reflect differences in distance to the facility as well as neighborhood density. Road impact fees are typically related to trips, but trips can be related back to unit size. Neighborhood density is also an important consideration. School impact fees are based on students rather than population. Fees based on unit size may have to be adjusted when unit type is also important.

The third section (pages 54-61) covers six elements of program design, namely service area design, level of service standards, special reductions, revenue credits, broadest reasonable base, and payment timing. The advice offered in this section is sound, and the examples given to illustrate points are helpful. The following discussion clarifies points selectively.

Special reductions refer to the desire to recognize specific development patterns that alter impacts. The authors suggest fee reductions for higher-density development and target water and road impact fees, which are among the highest. The authors provide examples of fee schedules for transportation and water facilities that show decreasing impact fees as density increases.

In the subsection on broadest reasonable base, the authors argue for applying impact fees to all new development, e.g., non-residential development should help pay for schools, since all development affects facilities and benefits from them in some way. To support this point, they draw on the rough proportionality principle in Dolan and note that "no precise mathematical calculation is required." (page 60)

The discussion under Timing of Payments addresses the tension generated because jurisdictions need funds sooner and developers prefer to pay later.

The authors next consider specific measures to enhance affordability in addition to well-designed impact fee programs. They argue that "even where impact fees are generally charged in an equitable manner, qualifying affordable housing may still need to be exempted from fees." (page 66) The specific measures discussed are exemptions, exclusions, waivers, forgivable down-payment loans, and deferred impact fee payments.

Chapter 5

The purpose of this chapter is to provide examples of communities with progressive impact fee schedules and protections for affordable housing. Case studies of Atlanta, Albuquerque, and Alachua County, Florida, are presented. Atlanta does not vary fees by unit size. (page 72) The city employs an innovative recoupment approach in its impact fee program. Similarly, Albuquerque does not vary impact fees by unit size. The approach is to waive impact fees for affordable housing. (page 78)

Alachua County assesses impact fees on a square footage basis. (page 90) The county also uses the general fund to subsidize fee payments on lower-priced units. Alachua's approach may be more feasible to implement in other places than the first two cases.

Chapter 6

The authors hope that the guidebook improves impact fee practice "where every reasonable design and calculation approach is used to protect or advance housing affordability, while fairly and accurately serving the underlying societal needs." (page 93)

The rest of the guidebook is devoted to four appendices, which are discussed below.

Appendix II

Comments and Criticisms of the HUD Guidebook

Executive Summary and Introduction

We agree with the general thrust of the guidebook that communities should impose proportionate impact fees and be concerned about housing affordability, which is a worthwhile local policy goal.

(The two remedies to make housing more affordable presented on page 3 cite Chapters 5 and 6 but are actually referring to Chapters 4 and 5.) However, the guidebook is inconsistent when considering the level of precision required for impact fee estimation. On the one hand, calculating flat impact fees for residential units is consistent with Dolan. On the other hand, graduated residential impact fees based on unit size is the alternative the authors want local practitioners to embrace. The guidebook suggests that practitioners be either more precise or less precise as long as the option they select results in graduated residential impact fees that increase with unit size. The trade-off between staying simple and becoming complex is never consistently resolved.

It would be more logical and consistent to show that simple impact fee calculations resulting in flat fees were inadequate in spite of Dolan. Then a methodology that added complexity to fee calculations would be necessary. Complexity could be increased by incorporating factors discussed in Appendix D, such as unit type, unit location, and neighborhood factors, such as density.

Chapter 1

The authors say that new residents demand higher levels of service but provide no supporting evidence. This point, which is mentioned twice, infers that new development overburdens infrastructure and therefore should be required to pay for these impacts. In fact, new development may result in increases or decreases in existing levels of service. However, this issue is irrelevant in the context of impact fees because impact fees cannot be used to change the existing levels of service in the community.

Impact fees arose from "desperation" because "citizens demanded quality public services and taxpayers insisted on lower taxes." (page 10) The fact that citizens and taxpayers are the same people is neither noted nor discussed.

We agree with the authors that impact fees should be equitable and fair. But it is misleading for the guidebook to focus on "proportionate equity." (page 14) Equity is a loaded term that is important both in the law and in economics. It would be better to refer simply to proportionality as the objective: to have the relationship between fees and actual impact accurately assessed.

Footnote 35 cites NAHB data on unit size and asserts that data may be used to meet the rough proportionality test in *Dolan v. Tigard* (1994).

Chapter 2

The crux of this chapter involves a comparison of six specific financing mechanisms against six criteria. The authors consider development agreements, impact fees, and local improvement districts to be superior to mandatory dedications, impact taxes, and real estate transfer taxes. With respect to the better mechanisms, a number of inconsistencies exist between the text discussion and the summary Table 2-4. For example, local improvement districts have the most potential to finance new infrastructure (page 28) but in Table 2-4 are given a low score for revenue potential. Developer exactions and local improvement districts are not sensitive to geographic equity (page 29), but development agreements, one of two forms of exactions listed in the table, and local improvement districts are scored as "high" with respect to geographic equity. As for the public acceptance criterion, all are viewed as acceptable, but only local improvement districts are not specifically mentioned. (page 30)

If revenue potential is given the most weight, the

inconsistencies between text and table are logically resolved, and housing affordability is set aside temporarily, then local improvement districts emerge as the best financing alternative with development agreements and impact fees about equal as the next best alternatives. One problem with local improvement districts is the difficulty to design them to fund off-site facilities. (page 28) Usually, these districts cannot be defined large enough to cover all impacts.

Given the focus on housing affordability, it is surprising that the authors devote scant attention to it. Furthermore, in Table 2-4, the housing affordability criterion is changed to "Calibrated to Reflect House Impact Differences." Due to this wording change, impact fees become the highest-ranked revenue source.

We would argue that any of the six financing mechanism could promote housing affordability as long as affordability were explicitly addressed. For example, the same fee waivers used with impact fees could be incorporated into establishing local improvements districts or drafting development agreements. To point to impact fees as the best option on this criterion is not accurate.

Chapter 3

The authors note that of the 14 states that allow fee waivers for affordable housing projects, six require that fees be paid from another source. (page 40) Thus, in the majority of these states, affordable housing waivers can reduce the funds available for needed public facilities. The localities in these states with the most successful affordable housing programs will be the ones facing the greatest revenue shortfalls.

Chapter 4

Readers are referred to Appendix C for further discussion of methodology. (page 43) This information is actually in Appendix D.

Differences by unit type are "de minimus" (page 44), but the analysis presented in Appendix D highlights significant differences in occupancy by type of unit.

The basic point of the NAHB data on the non-proportionate relationship between unit size and occupancy is ignored in the next two paragraphs on page. 45 of "refined analysis." First, the number of size categories is increased in Table 4-3. Next, the authors argue that occupied-only units overstate impact, even though vacancy adjustments are easily made as they demonstrate in Appendix D, page 104.

Plots of the NAHB data in Table 4-2 compared with the reorganized data in Table 4-3 show that the former approximates one declining function of occupants with unit size, whereas the latter has four different slopes and a flatter curve. The authors are attempting to make a nonlinear relationship appear to be more linear.

On page 47, the authors present several anecdotes that complicate the unit size-occupancy relationship. Their intention appears to be to obscure the nonlinear relationship between unit size and occupancy.

The authors do not identify the best data source to estimate the long-term average impacts of occupants in residential units. Practitioners could use local historical data on public facilities per capita, but these local "consumption-based" estimates tend to overestimate the needed facilities.

The discussion of schools on pages 52-53 does not address whether public school students per household varies more by unit size or by unit type. As indicated by Exhibit 6 below, both attributes are informative but for different reasons. On the demand side, a unit with household income of $50,000 generates approximately the same number of public school children as a household with income of $100,000 yet the impact-fee related revenue credit will very likely yield strikingly different outcomes. The lower-income household will generate less revenue (i.e., property or sales tax) and will therefore be entitled to a credit that is proportionately less than a higher-income household that generates greater amounts of revenue. The context of this exhibit is important since the guidebook's unit size approach assumes that unit size corresponds to persons in the household and household income.

In the discussion of timing of payments, the authors suggest tying fees to land sales to impose incidence of fees on the landowner but note that this usually is not practical. (page 60)

The information presented in Chapter 4 makes it clear that proper impact fee calculations are complex. The guidebook tries to simplify graduated fee estimation and then adds considerable complexity. It would be better to address complexity head on.

EXHIBIT 6: Public School Student Generation Rate by Household Income

Household Income in 1999					
Universe: Households	**Public School Children**	**Households**	**Public School SGR**	**% of Public School Children**	**Percent**
Less than $10,000	3,518,120	10,067,025	0.349	7%	
$10,000 to $14,999	2,337,650	6,657,230	0.351	5%	
$15,000 to $19,999	2,568,810	6,601,020	0.389	5%	
$20,000 to $24,999	2,803,630	6,935,945	0.404	6%	
$25,000 to $29,999	2,876,650	6,801,010	0.423	6%	
$30,000 to $34,999	2,943,790	6,718,230	0.438	6%	
$35,000 to $39,999	2,884,540	6,236,190	0.463	6%	
$40,000 to $44,999	2,898,120	5,965,870	0.486	6%	
$45,000 to $49,999	2,680,650	5,244,210	0.511	5%	
$50,000 to $59,999	**5,084,850**	**9,537,175**	**0.533**	**10%**	**62%**
$60,000 to $74,999	6,126,670	11,003,430	0.557	12%	
$75,000 to $99,999	6,023,080	10,799,245	0.558	12%	25%
$100,000 to $124,999	2,921,160	5,491,525	0.532	6%	
$125,000 to $149,999	1,332,320	2,656,300	0.502	3%	9%
$150,000 to $199,999	1,121,420	2,322,040	0.483	2%	
$200,000 or more	1,141,160	2,502,675	0.456	2%	5%
Total	**49,262,620**	**105,539,120**	**0.467**	**100%**	**100%**
1999 Median HH income	$41,994				
1999 Mean HH income	$56,675				

74% of public school children live in HHs with < $75,000 annual HH income

Source: NCES School District Demographics System

Chapter 5

The authors define progressive impact fees as fees that are "higher for higher-income houses that correspondingly use more services" (page 71) The authors write "higher-income houses" but actually mean houses owned by higher-income households. This statement underscores basic assumptions of the guidebook: Bigger homes have greater impacts on public facilities because they house more people who have higher incomes. It is not clear why higher income per se results in greater public facility impacts. For example, higher-income households could use parks and libraries more than lower income households. They may have more leisure time to spend in parks and libraries. On the other hand, they live on larger lots, own more books, and have more entertainment and recreational options than less affluent households.

Higher-income households generally use police and fire services less frequently than lower-income households. These services are utilized more heavily in lower-income areas not because lower-income households engage in activities that require these services. Rather, lower-income households tend to be victimized more frequently and live in areas more vulnerable to fires.

Except when certain lawn irrigation systems are present, it is not clear that higher-income households would use water and sewer services more than lower-income households. Storm water impacts depend more on the density, location, and pattern of development.

Higher-income households would use roads more than lower-income households. They own more vehicles, travel more, and pay more motor vehicles taxes.

As seen in Exhibit 6, 62% of public school children live in households with annual incomes at or below the national mean of $56,675. Furthermore, 74% of public school children are in households with annual income of less than $75,000.

The student generation rate of 0.456 for the highest-income households (>$200K) is equivalent to the student generation rate of 0.463 for households with annual income of $35,000 (85% of the national median). Clearly, developing credible fees with methodologies to address both proportionate cost (demand) and revenue credits is not nearly as straightforward as in the flat fee approach.

The general point here is that it may be fair to have

higher-income households pay more through progressive taxes on their income, purchases, or property. But it is not reasonable to assume that higher income per se increases demand for public facilities and services. Social services and many other public services primarily serve lower-income households.

In the discussion of impact fees in Alachua County, the authors contrast the "needs driven" approach with the "improvements driven" approach, stating that the latter tends to result in higher impact fees than the former. (page 89) This result assumes that facility costs are lower in the past (needs driven) than they will be in the future (improvements driven). The authors fail to mention that the latter approach is usually based on actual plans and capital improvements programs that set priorities and consider ability to pay. With these important considerations, the resulting impact fees may not necessarily be higher with the improvements-driven approach.

Chapter 6

This one-page concluding chapter was written before the current recession. House price declines are making housing more affordable, but families with high debt-to-income ratios are losing their homes.

Appendix A

This appendix supports a plan-based or improvements approach to impact fees, which relates needs to comprehensive planning and the CIP. This approach is more defensible than the needs-based approachs which is historical and ignores both future priorities and ability to pay.

Appendix B

This appendix discusses special assessment districts and draws from practice in the State of Washington.

Appendix C

The land purchase option shown illustrates how to pass impact fees back to the landowner. A more useful land purchase option would have to cover many more topics. Furthermore, capable land developers know how to calculate the residual value of the land given the market, regulatory requirements, and political realities.

Appendix D

This appendix is about proportionate share impact fees and housing affordability. (pages 103-124) It covers proportionate impacts by unit type, unit size, density, location, and configuration.

DeKalb County is presented as a model of "a breakthrough for national impact fee practice." (page 106) As shown in Table 3, the fees are set in proportion to unit size, which "coincidentally" results in progressive fees as a percent of house value as well as a percent of income. See Appendix III below for additional examination of DeKalb County impact fees.

The presentation of variation of impact by house type (pages 107-08) contradicts the argument portrayed in Table 4-1 that size matters more than unit type. The differences by unit type are significant, especially for school fee calculations.

Impact fees are rarely calculated by unit size in practice because one flat fee is easier to administer and because of the residual fear that fees based on unit size could be viewed as taxes. "However, this should no longer be a major concern. Impact fees are explicitly authorized by enabling legislation in 25 states, and are based on well-established case law in most others." (pages 119) This point that impact fees are solidly established does not address whether ones based on unit size will always be defensible.

In the next paragraph, the authors suggest how available data can be used to assess variable impact fees based on unit size. Practitioners need to relate PUMS data on bedrooms or rooms to local data on unit size. "Data on the relationship between the number of bedrooms in a unit and the square footage of the unit are available from real estate and property appraiser data in most communities." (page 119) This statement is the most specific guidance offered on how to implement variable impact fees based on unit size. It is inadequate as demonstrated in the section above on feasible impact fee calculations.

Table 21 presents data on vehicular trips by household size. Trips increase by household size but at a declining rate.

In the conclusion of this appendix, the authors mention that Dolan does not require "precise calculation" to establish proportionate fees, "but this begs the question." (page 123) Precise calculations are recommended

to implement proportionate share principles. In other words, practitioners are invited to ignore the law to generate graduated impact fees.

Local jurisdictions are called upon to implement graduated fee schedules on the basis of unit size and other features described in this appendix. Furthermore, "generally available data could be used to challenge impact fee schedules not considered truly proportionate with respect to type, size ..." (page 124) which, in effect, encourages the reader to sue when flat fees are in place.

The criticisms noted in this and the following appendices may partially reflect the absence of serious peer review of the guidebook. It appears that the review group cited in the acknowledgments did not provide detailed or critical feedback to the authors.

Appendix III

Disproportionate Impact Fees

In Appendix D, DeKalb County, Georgia, is touted as "…one of the nation's first comprehensive proportionate share impact fee…Its methodologies for parks and recreation, libraries, public safety facilities, and transportation result in impact fees totaling $1.66 per square foot. Not only was the county able to generate data and craft a methodology that converts facility impacts for a wide range of facilities…but it has also done so in a manner that is consistent with the logical extension of proportionality. This is a breakthrough for national impact fee practice." (page 106)

In fact, DeKalb County has yet to implement an impact fee program. Furthermore, the consultants to the county recommended fees that are disproportionate because they are charged on the basis of unit size without reconciling size with occupancy. Exhibit 7[9] shows the figures in Table 4, Appendix D for DeKalb in the first four columns. We have added the final three columns. The fifth column shows the impact fee per person, which is simply the fee charged for a unit of one of five sizes divided by the number of persons per unit for that size. The fees per person range from $700 to $1,763.

Let us assume that the fees per person for the 3,500-square-foot house reflect the existing level of service DeKalb County wants to maintain. The authors fail to explain how one person in a 900-square-foot house creates $1,063 less demand for public facilities than one person in the 3,500-square-foot house ($1,763 – $700 = $1,063). The final two columns show the amount and percentage of reduction of impact fees for all unit sizes. Thus, these fees based on unit square footage are disproportionate with respect to persons per unit in violation of Dolan.

Impact fees are intended to finance the gap when the property taxes generated by new development are deemed insufficient to cover their proportionate share of operating and capital costs at existing levels of service. Generally, fiscal surpluses created by non-residential properties and higher-value residential units subsidize the operating and capital costs of lower-value residential units owing to the progressive nature of ad valorem taxes and the typical configuration of government services. Revenue credit calculations usually account for these contributions.

Exhibit 8 adds three columns to the first exhibit. The eighth column is found by dividing the number of persons per unit into the value of the unit for each house size. Houses of 1,800 square feet provide a per capita tax base of about $62K per person. The smallest unit's per capita tax base is $20K less whereas the largest unit's tax base is $20K more. In the final two columns, the per capita differences in tax base are compared with the largest unit size. These results compound the disproportionate outcomes in Exhibit 7 by showing that taxes paid per person will increase with unit size. The per capita difference for 900-square-foot units is almost $40K lower than 3,500-square-foot units. Thus, units paying lower

EXHIBIT 7: DeKalb County, Georgia, Impact Fee per Person Comparison

House Size	Value	Persons	Fee	Fee per Person	Fee Gap per Person	% Fee Gap per Person
900	$ 79,819	1.9	$1,330	$ 700	–$1,063	40%
1,300	$115,295	2.2	$2,161	$ 982	–$ 781	56%
1,800	$143,142	2.3	$2,992	$1,301	–$ 462	74%
2,300	$189,197	2.7	$3,990	$1,478	–$ 285	84%
3,500	$269,573	3.3	$5,818	$1,763	$ 0	100%

Source: Impact Fees and Housing Affordability: A Guidebook, page 106 and as adapted by Malizia & Gallo, 2009

EXHIBIT 8: DeKalb County, Georgia, Impact Fee per Person Comparison

House Size	Value	Persons	Fee	Fee per Person	Fee Gap per Person	% Fee Gap per Person	Real Property Tax Base per Person	Real Property Tax Base Gap per Person	% Real Property Tax Base Gap per Person
900	$ 79,819	1.9	$1,330	$ 700	–$1,063	40%	$42,010	–$39,679	51%
1,300	$115,295	2.2	$2,161	$ 982	–$ 781	56%	$52,407	–$29,282	64%
1,800	$143,142	2.3	$2,992	$1,301	–$ 462	74%	$62,236	–$19,453	76%
2,300	$189,197	2.7	$3,990	$1,478	–$ 285	84%	$70,073	–$11,616	86%
3,500	$269,573	3.3	$5,818	$1,763	$ 0	100%	$81,689	$0	100%

Source: Impact Fees and Housing Affordability: A Guidebook, page 106 and as adapted by Malizia & Gallo, 2009

EXHIBIT 9: DeKalb County, Georgia, Impact Fees Calculated Under the Guidebook's Unit Size Approach

House Size	Value	Persons	Fee	Fee per Person	Proportionate Fees Based on $700 per Person
900	$ 79,819	1.9	$1,330	$ 700	$1,330
1,300	$115,295	2.2	$2,161	$ 982	$1,866
1,800	$143,142	2.3	$2,992	$1,301	$2,472
2,300	$189,197	2.7	$3,990	$1,478	$2,808
3,500	$269,573	3.3	$5,818	$1,763	$3,350

Source: Impact Fees and Housing Affordability: A Guidebook, page 106 and as adapted by Malizia & Gallo, 2009

fees per person than the largest units also pay far less in property taxes per capita.

If we assume that $700 per person represents the appropriate per capita charge at existing levels of service, then the impact fees in DeKalb County need to be revised.[10] The final column of Exhibit 9 presents the revised impact fee schedule. With these fees, the facilities demanded per person are equivalent regardless of the unit in which the person happens to live. These impact fees are proportionate following Dolan and are therefore defensible. The DeKalb County fees shown in column four are not.

Appendix IV

Proportionate Impact Fees: A Case Study

The guidebook recognizes that "New development often brings new revenue that in some ways helps provide the same facilities for which impact fees are also assessed. For example, general obligation bonds used to finance new or expanded capital facilities that are retired by property taxes will result in new development paying part of those bonds. Dedicated gasoline taxes, school capital assessments on real property, special levies for parks, and so forth, are candidates for revenue credit calculation to reduce certain impact fees. The reason is that unless the impact fee is reduced by this "revenue credit" the effect may be that new development pays twice for the same facility." (page 73)

Basic flaws in the guidebook's methodology regarding the treatment of revenue credits are masked because the examples provide only snapshots of various calculations rather than the complete analysis of an impact fee program developed under the author's recommendations. To illustrate the flaws, we designed a case study constructed primarily of data provided in the guidebook. The schedules are easy to replicate. Input variables developed for this exercise are highlighted in green. The housing unit distribution in Exhibit 10 is based on the 2001 AHS for consistency with the guidebook. The case study assumes an impact fee program designed to provide funding for a new public facility, which will accommodate the growth

EXHIBIT 10: Property Tax Base per Person

Based on Guidebook Appendix D Tables 1 and 2						Property Tax Base per Person	Property Tax Base
	Units	Square Footage	Persons per Unit	Persons	House Value		
Multifamily	2,968	1,000	2.25	6,678	$69,000	$30,667	$204,792,000
Single-Family	153	900	2.21	338	$10,000	$4,525	$1,530,000
	150	1,044	2.27	341	$15,000	$6,608	$2,249,925
	158	1,188	2.51	397	$25,000	$9,960	$3,949,921
	168	1,314	2.51	422	$35,000	$13,944	$5,879,916
	216	1,378	2.51	542	$45,000	$17,928	$9,719,892
	256	1,451	2.51	643	$55,000	$21,912	$14,079,872
	338	1,478	2.51	848	$65,000	$25,896	$21,969,831
	383	1,513	2.51	961	$75,000	$29,880	$28,724,809
	776	1,614	2.69	2,087	$90,000	$33,457	$69,839,612
	591	1,716	2.69	1,590	$110,999	$40,892	$65,009,705
	829	1,834	2.69	2,230	$135,000	$50,186	$111,914,586
	934	1,999	2.69	2,512	$175,000	$65,056	$163,449,533
	522	2,183	2.69	1,404	$225,000	$83,643	$117,449,739
	346	2,332	2.89	1,000	$275,000	$95,156	$95,149,827
	786	2,500	3.02	2,374	$300,000	$99,338	$235,800,000
Single-Family	6,606			24,367			$1,151,509,167
Total	**9,574**					**Unit Average**	**$120,275**
	AHS 2001 Average Persons per HH			2.55			

Source: Impact Fees and Housing Affordability: A Guidebook, page 105 as adapted by Malizia & Gallo, 2009

EXHIBIT 11: Facility Cost per Person

$6,000,000	Estimated facility cost, at existing LOS, to serve projected new residents
24,367	Projected new residents
$246.24	Facility cost per person

Source: Malizia & Gallo, 2009

of 9,574 housing units that serve a projected population of 24,367. Assumptions for multi-family units were benchmarked from the 2001 AHS Survey and are intended for illustrative purposes only. Non-residential properties are excluded from the analysis. This case study is intended to examine carefully the application of proportional revenue credits and not facility costs.[11]

The cost of the new facility, based on existing levels of service, is estimated at $6,000,000, or $246.24 per person, as shown in Exhibit 11. Dedicated ad valorem taxes will finance the debt service for the new facility consistent with ongoing capital improvement programs for such facilities. It is important to remember that any reduction applied to the demand (cost) component must be assigned in proportion to the applicable taxes or tax base (i.e., property or sales) of the units generating the reduction.[12]

The existing dedicated tax rate for new capacity is assumed to be $0.01 per $100. Exhibit 12 presents the present value of the new ad valorem taxes of $1,798,897, which would be used to offset the facility's cost.

With one flat impact fee, the $4,201,103 (or 70%) unfunded portion of the facility cost is financed by impact fees of $438.80 per unit, as shown in Exhibit 13. Applying impact fees by type of unit gives $461.66 for single-family units and $387.92 for multifamily units.

In the flat impact fee approach, the facility cost and the revenue credit apportionments are handled consistently. Both are applied on an average unit basis.

The guidebook's unit size methodology is applied in Exhibit 14 to the case study data in order to compare the two approaches. The presentation of the revenue credits follows the example in Chapter 4. The resulting impact fee is $172.41 per person.

EXHIBIT 12: Projected Property Taxes Allocable to the New Facility

Based on Guidebook Appendix D Tables 1 and 2						Property Tax Base per Person	Property Tax Base	Annual Property Taxes @ Estimated Rate per $100	Applicable Annual Property Taxes	Applicable Property Taxes Over 25 Years	Value of Applicable Property Taxes @4% Over 25 Years	PV of Property Taxes Paid per Unit
	Units	SF	Persons per Unit	Persons	House Value							
								$0.010				
Multifamily	2,968	1,000	2.25	6,678	$69,000	$30,667	$204,792,000	$0.010	$20,479	$511,980	$319,928	$107.79
Single-Family	153	900	2.21	338	$10,000	$4,525	$1,530,000	$0.010	$153	$3,825	$2,390	$15.62
	150	1,044	2.27	341	$15,000	$6,608	$2,249,925	$0.010	$225	$5,625	$3k515	$23.43
	158	1,188	2.51	397	$25,000	$9,960	$3,949,921	$0.010	$395	$9,875	$6,171	$39.05
	168	1,314	2.51	422	$35,000	$13,944	$5,879,916	$0.010	$588	$14,700	$9,186	$54.68
	216	1,378	2.51	542	$45,000	$17,928	$9,719,892	$0.010	$972	$24,300	$15,184	$70.30
	256	1,451	2.51	643	$55,000	$21,912	$14,079,872	$0.010	$1,408	$35,200	$21,996	$85.92
	338	1,478	2.51	848	$65,000	$25,896	$21,969,831	$0.010	$2,197	$54,925	$34,321	$101.54
	383	1,513	2.51	961	$75,000	$29,880	$28,724,809	$0.010	$2,872	$71,812	$44,874	$117.16
	776	1,614	2.69	2,087	$90,000	$33,457	$69,839,612	$0.010	$6,984	$174,599	$109,104	$140.60
	591	1,716	2.69	1,590	$110,000	$40,892	$65,009,705	$0.010	$6,501	$162,524	$101,559	$171.84
	829	1,834	2.69	2,230	$135,000	$50,186	$111,914,586	$0.010	$11,191	$279,786	$174,834	$210.90
	934	1,999	2.69	2,512	$175,000	$65,056	$163,449,533	$0.010	$16,345	$408,624	$255,342	$273.39
	522	2,183	2.69	1,404	$225,000	$83,643	$117,449,739	$0.010	$11,745	$293,624	$183,481	$351.50
	346	2,332	2.89	1,000	$275,000	$95,156	$95,149,827	$0.010	$9,515	$237,875	$148,644	$429.61
	786	2,500	3.02	2,374	$300,000	$99,338	$235,800,000	$0.010	$23,580	$589,500	$368,369	$468.66
Single-Family	6,606			24,367			$1,151,509,167		$115,151	$2,878,773	$1,798,897	
Total	**9,574**				**Unit Average**		**$120,275**					
AHS 2001 Average Persons per HH				**2.55**								

Source: Impact Fees and Housing Affordability: A Guidebook p. 105 as adapted by Malizia & Gallo, 2009

EXHIBIT 13: Flat Impact Fee Calculations

Estimated facility cost at existing levels of service			$6,000,000
Less Revenue Credit:			
Projected units	9,574		
Projected value per unit	$120,275		
Projected tax base	$1,151,509,167		
Tax rate applicable to credit per $100	$0.010		
Annual property taxes subject to credit	$115,151		
PV of property tax collections over 25 years at 4%	$1,798,897		–$1,798,897
	Facility cost subject to fee		**$4,201,103**
	Projected units		9,574
	Impact fee per unit		**$438.80**
	OR		
	Impact fee per SF unit	$3,019,746	
	Units	6,606	
	Per unit		**$461.66**
	Impact fee per Multifamily Unit	$1,151,357	
	Units	2,963	**$387.92**
	Total Fees	**$4,201,103**	

Source: Malizia & Gallo, 2009

EXHIBIT 14: Per Person Impact Fee Under the Guidebook's Unit Size Approach

Estimated facility cost at existing levels of service			$6,000,000
Less Revenue Credit:			
Projected units	9,574		
Projected value per unit	$120,275		
Projected tax base	$1,151,509,167		
Tax rate applicable to credit per $100	$0.010		
Annual property taxes subject to credit	$115,151		
PV of property tax collections over 25 years at 4%	$1,798,897		–$1,798,897
	Facility cost subject to fee		$4,201,103
	Projected persons		24,367
	Impact fee per person		**$172.41**

Source: Malizia & Gallo, 2009

The guidebook's unit size approach fails to generate proportionate-share impact fees as the authors claim. In fact, the fees are disproportionate. Although each person is assumed to receive the same level of service, each person does not pay the same amount of property tax. The amount of property tax paid for the unit depends upon its value, which is directly associated with its size. If the flat impact fee approach is to be unbundled to account for unit size differences that specifically assign higher costs to larger units because they house more persons, then the same standard must be used when considering revenue credits.

Exhibit 15 demonstrates why adherence to basic concepts of cost accounting is essential in calculating proportionate impact fees; otherwise, significant errors arise. The gross impact per person of $246.24 (Exhibit 11) and the per person impact fee of $172.41 (Exhibit 14) are applied to the projected units according to the number of persons associated with each unit's size category. Since the amount of property taxes paid per person var-

EXHIBIT 15: Actual Facility Cost Funding Under the Guidebook's Unit Size Approach

Units	SF	Persons per Unit	Persons	Gross Impact per Person	Impact Fee per Person	Gross Impact per Unit	Impact Fee per Unit	Present Value of Applicable Property Taxes @ 4% over 25 Years	Total Collections per Unit	Total Collections All Units
2,968	1,000	2.25	6,678	$246.24	$172.41	$554.03	$387.92	$107.79	$495.72	$1,471,285
153	900	2.21	338	$246.24	$172.41	$554.18	381.03	$15.62	$4396.65	$60,687
150	1,044	2.27	341	$246.24	$172.41	$558.96	$391.37	$23.43	$414.80	$62,221
158	1,188	2.51	397	$246.24	$172.41	$618.05	$432.75	$39.05	$471.80	$74,545
168	1,314	2.51	422	$246.24	$172.41	$618.05	$432.75	$54.68	$487.43	$81,888
216	1,378	2.51	542	$246.24	$172.41	$618.05	$432.75	$70.30	$503.05	$108,659
256	1,451	2.51	643	$246.24	$172.41	$618.05	$432.75	$85.92	$518.67	$132,780
338	1,478	2.51	848	$246.24	$172.41	$618.05	$432.75	$101.54	$534.29	$180,591
383	1,513	2.51	961	$246.24	$172.41	$618.05	$432.75	$117.16	$549.92	$210,618
776	1,614	2.69	2,087	$246.24	$172.41	$662.38	$463.78	$140.60	$604.38	$469,001
591	1,716	2.69	1590	$246.24	$172.41	$662.38	$463.78	$171.84	$635.63	$375,655
829	1,834	2.69	2,230	$246.24	$172.41	$662.38	$463.78	$210.90	$674.68	$559,311
934	1,999	2.69	2,512	$246.24	$172.41	$662.38	$463.78	$273.39	$737.17	$688,517
522	2,183	2.69	1,404	$246.24	$172.41	$662.38	$463.78	$351.50	$815.28	$425,576
346	2,332	2.89	1,000	$246.24	$172.41	$711.62	$498.27	$429.61	$927.87	$321,044
786	2,500	30.2	2,374	$246.24	$172.41	$743.63	$520.68	$468.66	$989.34	$777,623
9,574										$6,000,000

Source: Malizia & Gallo, 2009

ies according to the type and size of unit, the present value of the actual cash flows provided in Exhibit 12 is included in Exhibit 15 in order to make the source of funding for the $6 million facility transparent.

Using an average unit approach for the revenue credit in the guidebook's unit size methodology undeniably results in fees that are disproportionate. The math is clear. Units with lower values, highlighted in blue, do not pay their proportionate share, whereas units with higher values, highlighted in tan, pay more than their proportionate share. The results in Exhibit 15 contradict the claims made in the guidebook about the greater fairness of the unit size approach.

Exhibit 16 presents the correct extension of the unit size approach to address the revenue credit portion of the impact fee calculation. In this case study designed using AHS 2001 data, the differences in the average per person tax base of the various unit sizes outweigh the differences in the number of persons per unit size and logically generate higher impact fees for lower-value units and lower impact fees for higher-value units. Again, the findings in Exhibit 16 are not surprising since fiscal impact analysis typically illustrates that progressive ad valorem taxes result in cross-subsidies.

Comparing the fees in Exhibit 16 with the flat fee of $438.80 calculated in Exhibit 13 reveals that smaller, lower-value units actually benefit from the flat fee approach because their share of the revenue credit exceeds the amount of credit they actually generate. The gap is financed by a cross-subsidy from the property taxes of higher-value units.

In conclusion, flat impact fees have successfully withstood legal challenge because although the resulting fees are not precisely proportional, they are far more proportional than fees based on unit size advocated in the guidebook. A thorough analysis of the guidebook's application exposes the improper treatment of revenue credits. In contrast to the unit size approach, smaller, lower-value units benefit from paying flat impact fees.

The decision to calculate impact fees on the basis of unit size may prove to be both expensive and risky. The local data needs for the calculations are significant, particularly in regard to the revenue credit calculations. Furthermore, the results may raise a basic question about

EXHIBIT 16: Unit Size Impact Fees Assuming Proportionate Impact Fee Credits

Units	Based on Guidebook Appendix D Tables 1 and 2			Gross Impact per Person	Gross Impact per Unit	Property Tax Credit per Unit	Impact Fee per Unit	Projected Impact Fee Collections
	SF	Persons per Unit	Persons					
2,968	1,000	2.25	6,678	$246.24	$554.03	–$107.79	$446.24	$1,324,437
153	900	2.21	338	$246.24	$544.18	–$15.62	$528.56	$80,870
150	1,044	2.27	341	$246.24	$558.96	–$23.43	$535.52	$80,329
158	1,188	2.51	397	$246.24	$618.05	–$39.05	$579.00	$91,482
168	1,314	2.51	422	$246.24	$618.05	–$54.68	$563.38	$94,647
216	1,378	2.51	542	$246.24	$618.05	–$70.30	$547.75	$118,315
256	1,451	2.51	643	$246.24	$618.05	–$85.92	$532.13	$136,226
338	1,478	2.51	848	$246.24	$618.05	–$101.54	$516.51	$174,580
383	1,513	2.51	961	$246.24	$618.05	–$117.16	$500.89	$191,840
776	1,614	2.69	2,087	$246.24	$662.38	–$140.60	$521.78	$404,899
591	1,716	2.69	1,590	$246.24	$662.38	–$171.84	$490.53	$289,905
829	1,834	2.69	2,230	$246.24	$662.38	–$210.90	$451.48	$374,275
934	1,999	2.69	2,512	$246.24	$662.38	–$273.39	$388.99	$363,316
522	2,183	2.69	1,404	$246.24	$662.38	–$351.50	$310.88	$162,279
346	2,332	2.89	1,000	$246.24	$711.62	–$429.61	$282.02	$97,577
786	2,500	3.02	2,374	$246.24	$743.63	–$468.66	$274.97	$216,127
9,574			**24,367**					**$4,201,103**
							Property Tax Collections, PV Over 25 Years	**$1,798,897**
							Impact Fees + PV of Property Tax Collections = Facility Cost	**$6,000,000**

Source: Malizia & Gallo, 2009

revenue credits that has been successfully avoided with flat impact fees. Can higher impact fees be justified for higher-value units when they generate fiscal surpluses beyond their proportionate share of operating and capital costs? This question is answered in the negative when differences in house value on which property taxes are based[13] overwhelm differences in persons per unit which range from 2.03 for all units less than 1,000 square feet to 3.05 persons per unit for all units of 3,000 square feet or more and decline as unit size increases (Guidebook, Table 4-2, page 46).

Notes

1. Since the guidebook uses 2001 and 2003 data, the 2000 Census is a reasonable point of comparison.

2. The AHS collects national data in odd-numbered years and for 47 selected metropolitan areas in a six-year cycle. The national sample covers an average of 55,000 housing units, and each metropolitan area sample covers 4,100 or more housing units. The AHS returns to the same housing units year after year to gather data.

3. We address the last two questions in Appendix V.

4. In fact, Page i of the Executive Summary, *Impact Fees & Housing Affordability: A Guidebook for Practitioners*, itself states, "...impact fees are not the best way in which to finance most public facilities from a variety of theoretical perspectives and instead taxes are."

5. It is difficult to distinguish bedrooms from other uses such as home office, guest room, bonus room, playroom, etc.

6. Practitioners can use additional data to refine this analysis by combining data on unit type with number of bedrooms. In this case, it would be sufficient to use 2-3 unit types and 3-4 categories for number of bedrooms.

7. We ran regression models with the data for all units, detached single-family units, and multifamily units in Chapter 4, Tables 4-2 and 4-3. A log-linear relationship generated the best results (highest R-squared). The equation that best fits the data for all units shown in Table 4-2 is as follows:

$$Y = 3.4968 + 0.8195 \ln(X),$$

where: Y = occupancy in persons per unit and X = unit size using the midpoint of the four size ranges and end points for the smallest and largest categories.

Most practitioners are familiar with the ITE reference, Trip Generation. Nonlinear relationships are often estimated between trip ends and unit size for many land uses. Therefore, practitioners should be comfortable using nonlinear relationships to estimate occupancy from unit size.

8. Local jurisdictions should budget for increases in staff and software as well as external consultants. Complicated impact fee methodologies are likely to benefit consulting firms by increasing the cost of the initial engagement, update, and additional work if challenges arise.

9. In Exhibits 7-9, which include modified tables from the guidebook, the highlighted columns indicate analysis performed by Malizia and Gallo.

10. Information on existing levels of service in DeKalb County was not included in the guidebook.

11. Since impact fees by law are intended to finance capital outlays, it is important to estimate facility costs accurately in relation to levels of service. Since most of the assumptions are derived from the 2001 AHS Survey, the refined formulas for facility cost allocation included in Chapter 4 are not integrated into this case study. Note that attempts by some consultants to add their charges into impact fees are inappropriate.

12. Some consultants inappropriately conclude that reducing demand (cost) by existing debt eliminates the need to apply a credit. Associating existing debt with level of service is an incorrect accounting application. Past and future debt payments are funded by tax parcels, not persons, the driver for demand.

13. Higher-income households that reside in houses of higher value also have more disposable income and therefore generate more sales tax receipts than lower-income households.