City of Boulder Impact Fee Study: Transportation Component

Legal Guidelines and Best Practices for Multimodal Transportation Funding Solutions

The Transportation component of the Impact Fee Study has two primary objectives. The first is to assess new development's proportionate share of capital improvements to mitigate the impacts on Boulder's multimodal transportation system. The second is to analyze funding options to address on-going operations and maintenance (O&M) costs of the multimodal system. This first deliverable is designed to provide a review of the literature, best practices and legal guidelines for the transportation component.

Boulder currently uses a development excise tax (DET) to collect revenue for capital improvements related to new development. The first objective of the transportation component will use a plan-based approach to determine new growth's fair share of the cost to provide improvements for both residential and commercial developments based on the city's Capital Improvement Plan (CIP). The assessment will take into account both vehicle trips and person trips in relationship to projected growth in population and employment's impact on our multimodal transportation system. The study will then assess options for how developments should pay for their fair share through either DETs or development impact fees (DIFs) or a combination of the two funding mechanisms. The findings and recommendations on the capital side of the study will be incorporated into the city's budget process in 2016.

The analysis of funding options for on-going operations and maintenance is not typically included in impact fee studies since there are no legal options to assess a fee or a tax solely on new developments for ongoing O&M. Therefore, the second part of study will investigate funding options for both new and existing residential and commercial developments. Currently, the vast majority of transportation O&M is funded through the city's dedicated sales tax of 0.75 percent. In the downtown Central Area General Improvement District (CAGID) and Boulder Junction, taxing districts also provide funding for on-going transportation demand management programs, like the Eco Pass. In CAGID parking revenue is used to purchase Eco Pass for all full time employees, and the Boulder Junction TDM Access District collects property taxes to purchase Eco Pass for all employees and residents of the district and to subsidize carshare and bikeshare memberships. Through the Site Review process, a regulatory approach is often used to require new developments to fund TDM programs for a limited period. For example, many residential developments are often required to purchase Eco Passes for residents for a period of three years. After that initial three years, residents can voluntary choose to continue the program. Through the Access Management and Parking Strategies (AMPS) work program, city staff is currently investigating a possible ordinance for new development that would require TDM Plan implementation and compliance to vehicle trips standards. This regulatory approach would effectively require continuous funding of ongoing transportation programs and services to meet trip generation targets.

For the study, both the district approach and various regulatory approaches, such as a TDM Plan ordinance or parking fees, will be analyzed as ways to fund ongoing O&M. In addition, the project team will also evaluate other funding options such a transportation maintenance fee and other taxes. Due to the complexity and necessary public process, it is anticipated that the second part of the transportation component of the fee study will be on a separate and longer time frame than the capital part.

Name: _____

March 2, 2016

Multi-modal Transportation Funding

Do you have any questions about the Multimodal Transportation Funding Solutions draft report? If so, please describe them here:

Do you have any questions or comments on the methodology for the transportation development excise tax/impact fee? (To be presented in the meeting)

DRAFT Legal Guidelines and Best Practices for Multimodal Transportation Funding Solutions

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INTRODUCTION

The City of Boulder selected TischlerBise to update Development Impact Fees (DIF) and possibly revise Development Excise Taxes (DET). As part of the work scope, Boulder requested this document providing legal guidelines and best practices related to funding solutions for multimodal transportation systems. Federal and Colorado legal guidelines are discussed in the first section, followed by best practices, documented in a literature review and synopsis of case studies relevant to Boulder. This document also provides an extensive list of references for those desiring additional information related to multimodal funding solutions and the interaction of transportation with land use. The Appendix is a copy of a recent Planning Advisory Service (PAS) Memo on Next-Generation Transportation Impact Fees.

The historical trend in the United States since the 1950s has seen VMT rise faster than population growth for the following reasons. First, the average number of persons per household has declined over time due to declining birth rates and an "aging" population, plus an increase in divorce, single-person households, and unrelated persons living together. Second, the average number of workers per household has been increasing, mainly due to growing labor force participation by women. Third, the average number of vehicles available per household has increased over time as incomes grew and Americans shifted toward single-occupancy vehicle trips.

Given the importance of demographic factors and falling energy prices in understanding the historical demand for suburban housing and the resulting VMT increase, these same variables will be the keys to predicting long-term changes in housing and travel demands. Nation-wide demographic trends, such as labor force participation, vehicles available, and household formation, are leveling off thus decreasing travel demand in the long run. In Boulder, preferences of two important generational cohorts will further shift demand away from drivable sub-urban housing to favor walkable urbanism. Now that baby boomers are entering retirement, this generation seems to resist moving to the retirement communities favored by their parents. Instead, many boomers are looking for smaller units in more urban and less auto-dependent areas. Also, millennials are less attracted to suburban settings, thus further weakening the market for low density housing on the fringe of urban areas.

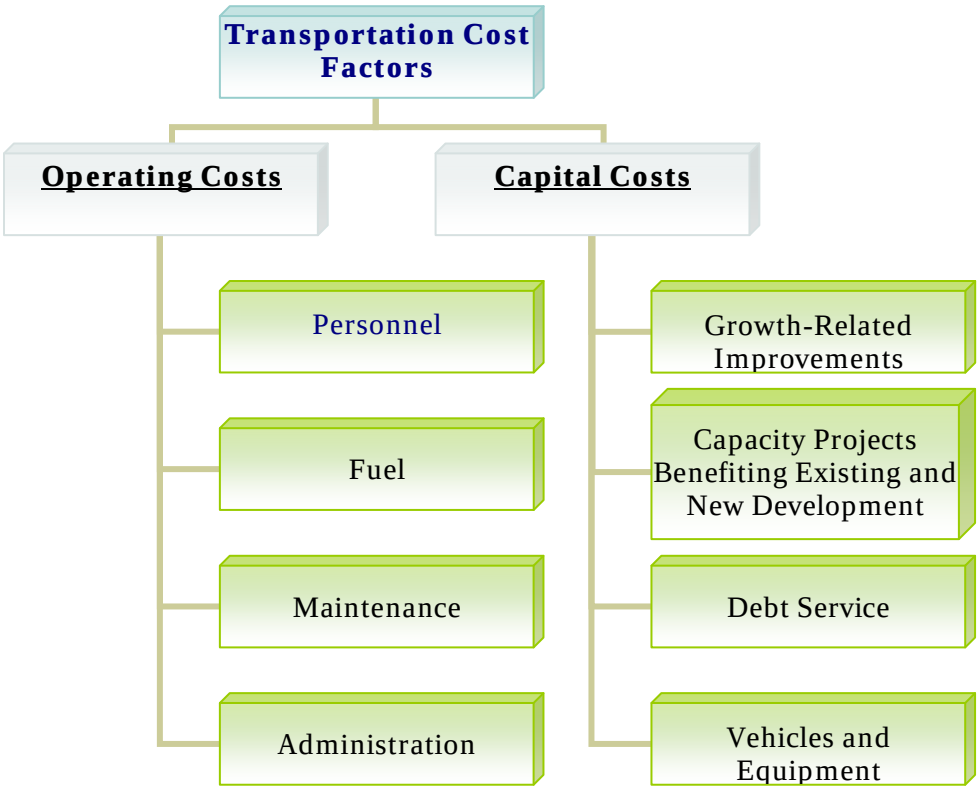
In recent decades, transportation planning has experienced a progression of thought regarding the interaction of transportation and land use development. In the early years of transportation planning, moving vehicles was the major concern of traffic engineers, with limited recognition of the interaction between transportation and land use. The classic, four-step transportation models used by most Metropolitan Planning Organizations emphasized mobility and focused on expanding infrastructure (wider and farther out). Transportation planning accommodated suburban development patterns and tended to function in modal silos. Our "predict and provide" approach, lacked connectivity between modes and land uses, while ignoring social and environmental costs.

Lately, more sustainable transportation systems are emphasizing complete streets, multi-modal improvements, and the important interaction between transportation and land use. As documented in the Transportation Master Plan, the City of Boulder has deliberated and decided on a preferred vision that integrates transportation and land use planning to manage demand, provide multi-modal improvements, and ensure a quality built environment. Although specific policies must be locally determined, general solutions to transportation problems include greater density and mix of uses in urban areas, less suburban development in fringe areas, adding housing close to employment centers, and redevelop/infill (also known as "refill"). Prime locations for refill include shopping centers, commercial strips, and surface parking (also known as "gray fields"). TischlerBise builds upon this theme, suggesting several ways Boulder

can minimize transportation costs through land use policies. Encouraging urban area infill and redevelopment can accommodate the demand for future development while reducing the cost of additional transportation improvements near the city's fringe.

The evaluation of funding options forces decision-makers to wrestle with a dynamic tension between two competing desires. Various funding options have a strong to weak connection between the source of funds and the demand for public facilities. For instance, area-specific assessments are based on known capital costs in a specific location and are paid by those directly benefiting from the new infrastructure. In contrast, sales tax revenue may be used by the City to fund infrastructure with very little, if any, connection between those paying the tax and the need for capital improvements. Unfortunately the funding options with the closest nexus to the demand for public facilities also have the smallest demand base to bear the cost of the public facilities. Given these relationships, there is typically political pressure to "cast a broad net" and collect a relatively small increment of revenue from a large tax base rather than ask a small group to make a large contribution of funds, which is the case with development excise taxes and impact fees.

A successful transportation funding strategy must consider the variation in transportation costs and the potential funding that may be available for each cost factor. The graphic below summarizes transportation cost factors into two broad categories of operating and capital costs. In urban areas, transportation solutions typically require multi-modal approaches. Various transit options, such as buses and streetcars, all require operating revenue in addition to user charges collected from patrons. Because stable, on-going funding is needed to cover operating costs, revenue sources tied to development activity are not sufficient for operating costs.



FEDERAL AND STATE LEGAL GUIDELINES

Both state and federal courts have recognized the imposition of impact fees on development as a legitimate form of land use regulation, provided the fees meet standards intended to protect against regulatory takings. Land use regulations, development exactions, and impact fees are subject to the Fifth Amendment prohibition on taking of private property for public use without just compensation. To comply with the Fifth Amendment, development regulations must be shown to substantially advance a legitimate governmental interest. In the case of impact fees, that interest is in the protection of public health, safety, and welfare by ensuring development is not detrimental to the quality of essential public services. The means to this end are also important, requiring both procedural and substantive due process. The process followed to receive community input (i.e. stakeholder meetings, work sessions, and public hearings) provides opportunities for comments and refinements to the impact fees.

There is little federal case law specifically dealing with impact fees, although other rulings on other types of exactions (e.g., land dedication requirements) are relevant. In one of the most important exaction cases, the U. S. Supreme Court found that a government agency imposing exactions on development must demonstrate an "essential nexus" between the exaction and the interest being protected (see *Nollan v. California Coastal Commission*, 1987). In a more recent case (*Dolan v. City of Tigard, OR*, 1994), the Court ruled that an exaction also must be "roughly proportional" to the burden created by development. However, the *Dolan* decision appeared to set a higher standard of review for mandatory dedications of land than for monetary exactions such as development impact fees.

There are three reasonable relationship requirements for development impact fees that are closely related to "rational nexus" or "reasonable relationship" requirements enunciated by a number of state courts. Although the term "dual rational nexus" is often used to characterize the standard by which courts evaluate the validity of development impact fees under the U.S. Constitution, we prefer a more rigorous formulation that recognizes three elements: "need," "benefit," and "proportionality." The dual rational nexus test explicitly addresses only the first two, although proportionality is reasonably implied, and was specifically mentioned by the U.S. Supreme Court in the *Dolan* case. Individual elements of the nexus standard are discussed further in the following paragraphs.

All new development in a community creates additional demands on some, or all, public facilities provided by local government. If the capacity of facilities is not increased to satisfy that additional demand, the quality or availability of public services for the entire community will deteriorate. Development impact fees may be used to recover the cost of development-related facilities, but only to the extent that the need for facilities is a consequence of development that is subject to the fees. The *Nollan* decision reinforced the principle that development exactions may be used only to mitigate conditions created by the developments upon which they are imposed. That principle clearly applies to impact fees. In this study, the impact of development on infrastructure needs is analyzed in terms of quantifiable relationships between various types of development and the demand for specific facilities, based on applicable level-of-service standards.

The requirement that exactions be proportional to the impacts of development was clearly stated by the U.S. Supreme Court in the *Dolan* case and is logically necessary to establish a proper nexus. Proportionality is established through the procedures used to identify development-related facility costs, and in the methods used to calculate impact fees for various types of facilities and categories of development. The demand for facilities is measured in terms of relevant and measurable attributes of development (e.g. a typical housing unit's average weekday vehicle trips).

A sufficient benefit relationship requires that impact fee revenues be segregated from other funds and expended only on the facilities for which the fees were charged. Impact fees must be expended in a timely manner and the facilities funded by the fees must serve the development paying the fees. However, nothing in the U.S. Constitution or the state enabling legislation requires that facilities funded with fee revenues be available *exclusively* to development paying the fees. In other words, benefit may extend to a general area including multiple real estate developments. Procedures for the earmarking and expenditure of fee revenues are discussed near the end of this study. All of these procedural as well as substantive issues are intended to ensure that new development benefits from the impact fees they are required to pay. The authority and procedures to implement impact fees is separate from and complementary to the authority to require improvements as part of subdivision or zoning review.

Impact fees must increase the carrying capacity of the transportation system. Capacity projects include, but are not limited to the addition of travel lanes, intersection improvements (i.e., turning lanes, signalization or roundabouts) and widening roads (e.g. adding paved shoulders and bike lanes). Whenever improvements are made to existing roads, non-impact fee funding will be required to help pay some portion of the cost.

Colorado Impact Fee Enabling Legislation

For local governments, the first step in evaluating funding options for multimodal transportation improvements is to determine basic options and requirements established by state law. Some states have more conservative legal parameters that basically restrict local government to specifically authorized actions. In contrast, "home-rule" states grant localities all powers that are not precluded or preempted by the state constitution or statutes. Local governments in Colorado have home rule power and the State adopted impact fee enabling legislation in 2001. Impact fees are one-time payments imposed on new development that must be used solely to fund growth-related capital projects, typically called "system improvements". An impact fee represents new growth's proportionate share of capital facility needs. In contrast to project-level improvements, impact fees fund infrastructure that will benefit multiple development projects, or even the entire service area, as long as there is a reasonable and direct relationship between the new development and the need for the growth-related infrastructure. Project-level improvements, typically specified in a development agreement, are usually limited to complete-street amenities near a proposed development.

According to Colorado Revised Statute 29-20-104.5 impact fees must be legislatively adopted at a level no greater than necessary to defray impacts generally applicable to a broad class of property. The purpose of impact fees is to defray capital costs directly related to proposed development. Other states allow impact fee schedules to include administrative costs related to impact fees and the preparation of capital improvement plans, but this is not specifically authorized in Colorado. Impact fees do have limitations, and should not be regarded as the total solution for infrastructure funding. Rather, they are one component of a comprehensive portfolio to ensure adequate provision of public facilities. Because system improvements are larger and more costly, they may require bond financing and/or funding from other revenue sources. To be funded by impact fees, capital improvements must have a useful life of at least five years. By law, impact fees can only be used for capital improvements, not operating or maintenance costs. Also, development impact fees cannot be used to repair infrastructure or correct an existing deficiency.

Boulder Development Excise Tax Authorization and Policies

The City has collected an excise tax for transportation since the 1980s. In 1998, voters approved a consolidated Development Excise Tax (DET) that included transportation, with a maximum fee schedule of $5,630.38 for a detached dwelling, $3,624.10 for an attached dwelling, and $2.48 per square foot of floor area for nonresidential development. Boulder currently collects the maximum DET from nonresidential development, but only $2,226.93 per detached dwelling and $1,650.29 per attached dwelling for transportation. By policy, a portion of the consolidated DET authorized by voters is also used to acquire land for parks, but the combined total for parkland and transportation is less than the total DET authorized for residential development.

As part of the current work scope to update Boulder's Development Impact Fee (DIF) study, additional parkland needed to accommodate new development could be added to the Parks & Recreation DIF, which would provide significant additional DET funding capacity for transportation. Boulder could also consider a policy change to collect the maximum voter-approved DET rate for residential development, which would increase the DET by $3,403 per detached dwelling and $1,973 per attached dwelling. Based on the draft Land Use Assumptions (TischlerBise 01/21/16) collecting the maximum DET from residential development would provide an additional $6.37 million for transportation improvements over the next ten years.

Special Assessments and Districts

Special assessments may be levied only on properties that realize some direct or "special" benefit from a capital improvement. One feature of a special assessment is that vacant land may be required to pay for transportation improvements. Therefore, revenue is generated from each property owner even before new development or redevelopment occurs. Special assessments are a viable option for multimodal transportation improvements in Boulder. To provide an economic incentive to encourage infill and redevelopment, TischlerBise recommends that the cost of improvements be allocated based on land area.

Special districts are a promising source of supplemental revenue for transportation costs, especially for on-going operations. Special districts have different names that vary by state, such as "Community Facilities District" or Colorado's "Business Improvement District" (see CRS 31-25-1201). The specific requirements and types of special districts vary by state. In general, special districts range from non-profit corporations to quasi-governmental entities with broad powers. Key differences between the types of special districts include their ability to levy property taxes and the composition of the governing board. The basic governance options are election of a board of directors by property owners, appointment of a board by local elected officials, or the local elected officials function as the board of directors.

A Business Improvement District (BID) is created by petition of owners of real property for the purpose of constructing infrastructure and for economic development. There are four possible types of governing bodies (DOLA 2012) but the district boundary is limited to commercial properties, which does not exclude mixed-use development with residential units. A BID has the assessment authority of a SID (discussed below).

A Special Improvement District (SID) may impose assessments for the construction of specific capital improvements (CRS 31-25-501). If 50% of property owners object, the City may not form a SID. For special districts to be successful, landowners must perceive a substantial benefit that exceeds the cost they will be asked to pay. Therefore, a key factor is the cost of improvements compared to the size of the benefit area. Benefits include increase in property value and adaptability of the property to a superior or more profitable use. Cost may be financed through bonds approved at election. The governing body of the municipality determines whether the electors of the district or the electors of the entire municipality will vote on the question of assessment bonds (DOLA 2012). Assessments can be paid over time using installment payments.

LITERATURE REVIEW

Within the past century, the geographic scale of our daily world has grown from the city (Warner 1962 and Jackson 1985), to large agglomerations of urban realms (Vance 1964 and 1977) and even global networks (Sudjic 1992; Taylor and Lang 2005). Unfortunately, many of our transportation planning concepts have not adapted to the increased scale and polycentric nature of current development patterns.

The current transportation governance structure in America is founded on the old Chicago School with its mono-centric concept of workday travel between bedroom communities and the central city. The new paradigm for transportation governance is more polycentric, edgeless and galactic (Hackworth 2005; Lang 2003; Lewis 1995) while acknowledging the tremendous increase in geographic area for commuter sheds.

In keeping with the theme of scale-dependent transportation governance, the following literature review is organized according to the "scale" of classic urban development theories. These sections address early mono-centric theories and more recent polycentric concepts. The literature review concludes with sections on walkable urbanism and impact fee adjustments.

Mono-centric Urban Form

Urban development scholars have noted that firms locate close to markets or resource endowments to maximize profits. The spatial form associated with early mono-centric theories is the pattern of concentric rings described by Burgess (1925). Using a theoretical framework of hierarchal market areas, Christaller (1933) and Losch (1940) explain spatial distribution as a tiered arrangement of central places with their respective spheres of influence. Although the graphic pattern of their market areas appears polycentric, hinterlands are focused on, and organized by, their respective centers.

The benefits of agglomeration help to explain cumulative causation, or self-maintaining feedback, that leads to economic polarization (Myrdal 1957; Hirschman 1958). Agglomeration effects of natural economic spaces are also referred to as growth poles (Perroux, 1950). Land prices and rents tend to rationally sort firms to locations where the advantages of spatial proximity match their willingness to pay for the site (Muth 1961; Mills and Lav 1964; Alonso 1968). Thus we typically find high-rise offices in high-value areas of urban centers. In keeping with this theme, Kaldor (1970) explains how support functions and labor markets gain specialized skills and efficiency.

Weaknesses in mono-centric theories are due to underlying assumptions that have become increasingly outdated. For example, employment is no longer concentrated in the center of the city, households have multiple workers and location is only one variable in complex trade-offs between housing and transportation costs. In addition to these weaknesses, strong cultural forces and changes in transportation technology have transitioned mono-centric cities to polycentric urban forms. The following sections review scholarly contributions (presented in chronological order) that explain the transition from mono-centric to polycentric development.

Hoyt (1939)

As a housing economist, Homer Hoyt provides a valuable analysis of The Structure and Growth of Residential Neighborhoods in American Cities. It is unfortunate that analytical techniques he pioneered became associated with discriminatory "red-lining" practices used by mortgage lenders. Hoyt was innovative in the use of block-level, time-series maps to illustrate dynamic change in urban areas. His book had two major purposes. First, Hoyt demonstrated techniques for mapping and measuring growth in cities. Second, Hoyt used principles of urban growth to

explain spatial patterns. For example, Hoyt understood city shape to be determined primarily by topography and transportation.

By looking at rents, housing attributes and racial segregation, Hoyt concluded the concentric circle theory of urban growth was only a loose generalization. A better understanding was his favored-sector concept that found the highest rents tend to locate in a radial wedge that comprise a quarter or less of the urban area. The "fashionable" residential areas tend to dictate the outward spread of the same pattern. Hoyt documented a connection between high-end jobs and high-end residential, noting the following locational preferences for high end development: 1) seeks higher ground, 2) locates along water fronts not used for industry, 3) grows toward free, open country, 4) gravitates toward the homes of community leaders, 5) high-end retail and services follow high-end residential development, 6) high-end residential follows the fastest transportation routes, 7) favored sector is stable over time.

Warner (1962)

Streetcar Suburbs contains numerous photos and maps to aid the reader's understanding of the time period. Warner's story of the development of Boston begins with a brief description of the 1850s seaport town that was small enough to walk across. By the end of his story, the Boston of 1900 had grown to ten square miles and encompassed 31 separate jurisdictions. Surrounding the central business district was the inner ring area of low-income, attached, rental housing. The outer ring suburbs contained middle to upper income residents living in newer, detached and predominantly owner-occupied housing.

Electric streetcars began service in Boston during 1889. A Brookline real estate developer played a prominent role in consolidating transit companies. Warner maintains that the location of streetcar lines were the primary determinants of where suburban development occurred. Decision makers during this period lived in the new suburbs and were sympathetic to the rural ideal. In contrast to current practice, local governments typically constructed the local streets within new suburbs at taxpayer's expense. Even though there were no zoning laws at this time, market forces effectively guided thousands of individual purchase/construction decisions, resulting in relatively uniform suburbs that sorted themselves out by income level. By 1900, the trolley lines extended about six miles from the central business district, with a typical door-to-door commute time of about one hour. The predominant subdivision pattern consisted of grid streets with deep, narrow lots of 30 to 60 feet. The practice of small scale retail and service businesses "following rooftops" can be traced back to these early streetcar suburbs where commercial strips appeared along the transit lines.

Jackson (1985)

The book Crabgrass Frontier offers an historical perspective on the dynamics of American land use patterns. Jackson maintains that the housing pattern during the electric streetcar period became increasingly dominated by separation, suburban character and racial/economic exclusion. In comparison to western European housing patterns, urbanized areas in America generally lack an "edge" or distinct boundary between town and country. Jackson concludes that American suburbanization has been facilitated by governmental policies.

At the beginning of the electric streetcar era, urban centers in America were primarily walking cities characterized by muscle-powered transportation, small land parcels with buildings close to the street, mixed land use pattern, short distances from home to work (if not at the same location), high status residences near the city center and low income residences on the periphery. Although accelerated by the electric streetcar, the inside-out transformation of cities began slowly with increasing transportation options that emerged from 1815 to 1875. Examples discussed by Jackson include steam ferries, railroads, omnibuses (essentially a large public

carriage pulled by a team of horses) and horsecars. The latter was an improved form of omnibus that traveled on iron rails, thus greatly reducing the rolling resistance. These transportation modes began to interconnect and integrate service starting in the 1850s. The transition to mechanized intra-urban transit began in 1867 when the first cable car system was installed in New York. Cable cars reached their peak in 1890, with systems in 23 cities. The mechanized cable cars were cleaner, more powerful and faster than the horsecars they replaced.

The first successful electric streetcars were used in Richmond, Virginia, beginning in 1887. The common name of "trolley" began to be used because of the electrical connection, or "troller", that was pulled along behind the streetcar on an overhead wire. Compared to cable cars, electric trolleys were cheaper to construct and operate, they could obtain speeds of 10-20 miles per hour and they offered quicker acceleration. In modern nomenclature, we use the term "light rail" to distinguish electric streetcars from heavy rail systems. The latter run on tracks that are separated from other vehicles and pedestrians (either above or below ground) with power provided from a third rail located near the base of the passenger cars.

Following the example of electric power companies, trolley operators tried to balance the load by having trip attractors at both ends of the streetcar lines. Jackson provided several examples of these "attractions," such as Coney Island Amusement Park. Even though residential densities decreased during the time of the trolley, nonresidential development was intensified in downtown business districts through the use of high-rise, steel-framed skyscrapers with electric elevators. Radial transit lines were ideally suited to the daily routine of concentrating people within these downtown activity centers.

Streetcar companies experienced exponential growth in their service areas and ridership during the early years of the 20th century, partly due to joint ventures that combined transit operations and real estate development. To provide access for customers, transit lines were proactively constructed to new real estate development projects. Jackson provided several examples of transit and real estate synergy in Oakland, Los Angeles and Washington, DC. An interesting case study in the nation's capitol was the Chevy Chase Land Company that purchased 1,712 acres, constructed a transit line along Connecticut Avenue to draw upscale homebuyers to their model homes (first subdivision in 1893), created amenities like Rock Creek Park and established minimum construction standards for the new houses.

McShane (1994)

Down the Asphalt Path provides a history of streets and their use, from muscle-powered transportation in walking cities through 1917, when electric trolley use peaked and automobiles were becoming the dominant form of mechanized transportation. The book, based on McShane's dissertation, claims the automobile triumphed because it was more than just a form of travel. According to McShane, rapid acceptance grew because the motorcar was a status object and symbol of liberation.

In his chapter titled "The Motor Boys Rebuild Cities" McShane discusses the City Beautiful movement that was popular during the 1890s through the 1920s. City planners, architects, engineers and public-works czars (e.g., Robert Moses in mid-century New York) changed the physical appearance of urban areas with Olmstead-style parkways, Burnham-style boulevards and parking garages. McShane explains how major public works projects were made possible by new financial resources, such as the first gas taxes (imposed by Oregon in 1919) and toll facilities.

Polycentric Metropolitan Development

During the automobile age, decreasing transportation costs and the decline in manufacturing (corresponding to a rise of services) led to more polycentric urban forms. The literature on polycentric development is extensive, but the following works provide an adequate understanding of this body of knowledge. Contributions are discussed in chronological order.

Vance (1977)

James Vance offers a concise answer to the question of "Why cities?" stating that some urban areas may be special purpose centers of government, religion or education, but generally their reason for being is economics. In his book This Scene of Man: Role and Structure of the City in the Geography of Western Civilization, Vance builds on his urban realm concept, pointing out the large geographic scale of modern cities limits daily interact to smaller realms. The differentiation of roles that occurs among urban realms also occurs for entire metropolitan areas in relationship to the rest of the nation, and even on a global scale for a few "primate" cities. According to Vance, as complexity and choice increases over time, the outlying realms become more independent from the historic core. To help understand the nature and extent of urban realms, he suggests consideration of the following: 1) terrain and topographic barriers, 2) overall size of the metropolis, 3) amount and type of economic activity and 4) geography of transportation within the region. (See page 411) Vance notes that transportation innovation is a main force in determining the scale of cities, but the full exploration of this topic was reserved for another book (Vance 1986).

Davis, Nelson and Dueker (1994)

The authors of the journal article titled "*The New Burbs: The Exurbs and Their Implications for Planning Policy*", survey new homebuyers in the exurbs of Portland, Oregon, to discover "What types of people are moving to the exurbs?" "Why are these people moving to exurbia?" and "What impact does exurban living have on commuting?" Their results indicate that over half of the exurban migrants are already living in the metro area (i.e. moving out from the city and suburbs), changing only their residential location but with few job changes. The migrants to exurbia were predominantly white-collar workers with higher incomes, two wage earners and few single working adults. Motivations for exurban living were primarily a desire for more open space and rural amenities, with finding the best/most affordable house at the top of the list. Because they typically retained the same job, moving to the exurbs initially results in a longer commute. In the long run, exurban residents may seek out new jobs closer to home, but this question was beyond the scope of the point-in-time analysis.

Lewis (1995)

In a book edited by Emery Castle, Pierce Lewis discusses the "*Urban Invasion of Rural America: Emergence of the Galactic City*." Lewis describes the galactic city as traditional urban functions in a new spatial pattern with the limited access highway serving as the new main street. After passage of the 1956 Interstate Highway Act, rural landscapes became a locational amenity of the galactic city. As areas transition from rural to exurban, the "value" of farms is no longer connected to agricultural production. Rather, the economic reason for farming is to qualify land for agricultural property tax exemptions until it is ripe for development.

Calthorpe and Fulton (2001)

In The Regional City, Peter Calthorpe and William Fulton discuss planning for the end of sprawl. Their work is linked to planners and architects who began realizing in the 1920s the fundamental change in the scale of urban areas due to the automobile and communications

technology. Calthorpe and Fulton use the term "regional city" for the new metropolitan form characterized by car dependency, decentralized service-driven economy and communities of interest rather than communities of place. Most of their recommended policy changes (such as an endorsement of urban growth boundaries) are from a regulatory mindset. The authors use case studies of Portland, Seattle and Salt Lake City to illustrate the advantages of the emerging regional city that will have "transit, affordable housing fairly distributed, environmental preserves, walkable communities, urban reinvestments, and infill development." (See page 12) The authors call for federal policies and investments to reinforce the regional city concept, pointing out federal dollars are often a major source of funding for transportation construction and operations.

Champion (2001)

The article, "*A Changing Demographic Regime and Evolving Polycentric Urban Regions*," extends the field of housing demography (Myers, 1990) to the entire urban context. Champion's exploratory research is helpful in its description of Polycentric Urban Regions (PUR). It summarizes major demographic trends such as longer life expectancy and lower fertility, countered by increased immigration, as the driving force behind population growth (especially in America). The article concludes with a challenge to researchers to "pay more attention to the potentially important role of demographic developments in reshaping the urban region." (Page 674)

Dear (2002)

Michael Dear compiled book chapters to support the premise that Los Angeles and the "LA School" are successors to the Chicago School. The latter is mono-centric and with a modernistic view that the center organizes the hinterland. In contrast, the new LA School is post modern, post polycentric and regards the hinterland as more important than the historic center. Dear describes a five-county southern California megalopolis with approximately 16 million people and suggest this area is the prototype for future urban development.

Lang (2003)

In the book Edgeless Cities, Robert Lang analyzed office development trends and discovered that most new space was not in older central cities or a few "edge cities" as documented by Joel Garreau, but rather in edgeless suburban locations. This finding is important for understanding modern metropolitan development because the dispersion of office jobs to the suburbs expands the sprawling commuter shed. According to Lang, "a revolution in metropolitan form occurred in the past several decades – the regional office hierarchy has been turned upside down." (See page 56) To explain this point, data on office floor area was tabulated by location (primary downtown, secondary downtown, edge cities or edgeless suburban space) and organized into a typology of metropolitan areas (see Figure 4-17). Examples of metropolitan areas are given for four types: core-dominated, balanced, dispersed and edgeless. Lang adds the findings of other researches on both sprawl and density measures to illustrate the complexity of metropolitan areas when examined from different perspectives.

Hackworth (2005)

"*Emergent Urban Forms or Emergent Post-Modernisms?*" is a complex journal article written for academics, yet it shares some methodological similarities with Hoyt's earlier (1939) analysis of urban form that was intended for more plebian distribution. Using extensive data sets at the census tract level for each decade from 1970 through 2000, Hackworth creates density gradients and maps to document similar patterns of urban development within the ten largest metropolitan areas in the United States. Rather than a quasi-random pattern, as postulated by postmodern urban theory, Hackworth finds similarities in the revitalization of inner cities,

decline of inner-ring suburbs and continued outward expansion of suburbanization. Hackworth's analysis of population density gradients provides evidence for increasing polycentricity, but not randomness. According to Hackworth, "newer suburbs experienced an almost unqualified valorization." (Page 514) Although not the primary focus of his analysis, wealth accumulation through suburban real estate investment continues to be a powerful variable in explaining emergent urban forms.

Walkable, Bikeable, and Transit-Oriented Urbanism

As documented in the literature review above, a key to understanding urban development is the land use-transportation connection. In contrast to the focus on moving vehicles during the suburban era, recent literature focuses on moving people under the umbrella-concepts of "walkable urbanism" and "transit-oriented development". Transit-oriented development provides opportunities for using market forces to support transit. Real estate development can be used to both attract transit riders and provide financial support for transit (Warner, 1962; Vance, 1986). A viable model for transit-oriented development is the use of public sector eminent domain power to acquire land at transit stations for major real estate development projects (TRB, 2001). Land remains in public ownership but construction and management is carried out by the private sector for a percentage of the profits, with net revenues used as a transit subsidy. Transit subsidies are legitimate, given the provision of public goods, but can be minimized through the use of zonal fares and congestion pricing (Jones, 1985; McKay, 1988). Intense urban development can be achieved by removing parking requirements within the urban service area and integrating public garages into transit oriented development, as done at Boulder Junction (Shoup 2011).

Three significant changes to current tax polices are also needed to make transit work (TRB, 2001). First, the subsidies/externalities of automobile transportation can be at least partially offset by means of a substantial increase in gas taxes (Jones, 1985). Second, property taxes within urban services areas should be determined based on the value of land, not improvements. A land-based tax system discourages under utilization of land, such as surface parking lots and large-lot housing. The third tax policy change needed to make transit work is to eliminate subsidies for owner-occupied housing, currently provided by federal/state income tax deductions for local property taxes and interest paid on home mortgages (Jones, 1985). With these realignments to market forces, along with the growing perception that automobile travel does indeed have limits, perhaps the morphogenesis of transportation will again see walking, biking, and transit thriving in urban areas (Vance, 1986).

Leinberger (2009)

In The Option of Urbanism, Leinberger clarifies important differences between drivable sub-urbanism and walkable urbanism. "Walkable urbanism means that you could satisfy most everyday needs, such as school, shopping, parks, friends, and even employment, within walking distance or transit of one's home. Walkable urbanism as a description combines the basic transportation mode used with the character of the place." A key difference is the perception of growth. Walkable urbanism leads to thriving communities with more businesses, street life, and increasing property values. In contrast, in development in drivable sub-urban areas is often resisted due to more traffic, loss of open space and environmental degradation.

Dunham-Jones and Williamson (2009)

A major contribution of Retrofitting Suburbia is the visual presentation of illustrations, plans, and photographs of case studies that help the reader compare and contrast urban versus suburban form. They call for bottom-up "incremental metropolitanism" whereby underperforming asphalt, abandoned strip centers, and dying regional malls are converted into

"urban places that reduce vehicle miles of travel, expand public space, diversify housing choices, and conserve undeveloped land at the periphery."

Speck (2012)

Writing from a planner's perspective, Speck contends that walking is best when useful, safe, comfortable, and interesting. "Walkability is both an end and a means, as well as a measure. While the physical and social rewards of walking are many, walkability is perhaps most useful as it contributes to urban vitality...Get walkability right and so much of the rest will follow."

In addition to specific "how to" steps, Walkable City provides a strong theory basis for walkability. For example, "The economic advantage that has already begun to accrue to walkable places can be attributed to three key factors. First, for certain segments of the population, chief among them young 'creatives," urban living is simply more appealing...Second, massive demographic shifts occurring right now mean that these pro-urban segments of the population are becoming dominant, creating a spike in demand that is expected to last for decades. Third, the choice to live the walkable life generates considerable savings for these households, and much of these savings are spent locally."

Nelson (2013)

Nelson's Reshaping Metropolitan America can be regarding as a market study for the nation, providing demographic analysis and clarify development trends that will likely emerge by 2030. Nelson claims that, "virtually all the demand for new development between 2010 and 2030 can be met by redeveloping existing commercial corridors and centers, including the parking lots that dominate those spaces." This book provides extensive documentation on dynamic generational changes that will see aging boomers face difficulty in selling their homes to younger generations, with growing evidence that market preferences are not being met by current real estate products. Nelson also analyses nonresidential development, which has a shorter useful life than residential construction and is becoming more efficient in terms of building space per employee. The final chapter lays out an agenda for reshaping metropolitan America, in which Nelson states, "Most local governments finance public facility capital and operating costs through average cost approaches ... the result is that less costly areas pay more than their full cost and more costly areas pay less than theirs."

Impact Fee Adjustments

Single-family housing is generally located in low-density suburbs where there are few alternatives for travel except by private motor vehicle. Higher housing and job density within urban areas, along with public transit service, facilitates alternative modes of travel. The report *Driving and the Built Environment* found a strong link between development patterns and vehicle miles of travel, encouraging mixing of land uses to reduce vehicle trip rates and reduce trip lengths. Recommended reductions up to 24% for transit service and pedestrian/bicycle friendliness is recommended for nonresidential development in a 2005 study titled *Crediting Low-Traffic Developments* (Nelson/Nygaard Consulting Associates 2005). However, the detailed methodology in this study requires extensive data on average weekday bus stops within a quarter mile of the study area, intersection density, and the completeness of sidewalk and bike networks.

Urban areas have distinct demographic profiles and physical traits that reduce vehicle trips, such as higher internal capture, design characteristics that promote walking and biking, and superior transit service. Holian and Kahn (2012) found that "vibrant downtown areas are associated with lower greenhouse gas emissions from driving and greater public transit use. Seemingly unrelated efforts, such as fighting crime and improving urban schools, actually make

for good environmental policy, as these efforts enable people to live in higher density, more compact neighborhoods, where people are comfortable driving less and walking and using transit more."

Downtown areas also have more diverse travel options including public transportation and muscle-powered mobility. For example, a study titled *Trip Generation Rates for Urban Infill Land Uses in California* documented auto trips for infill development averaged approximately 50% of the modal share, compared to 90% or higher auto dependency in most metropolitan areas (Daisa and Parker, 2009). Lower dependency on private vehicles reduces the need for street capacity and supports an impact fee reduction for new development.

Urban areas with grid streets and small blocks offer a variety of routes that encourage walking and biking. Interesting streetscapes with human-scale design features encourage people to walk and bike farther in urban areas, while lowering our perception of distance (Jacobs 2001). Also, vehicle congestion in many urban centers tends to minimize travel time differences across modes, especially when public transit is provided in separate rights-of-way or given priority signaling at intersections (Vuchic 2000).

By balancing the number of jobs with nearby housing units, urban centers have the potential for reducing journey-to-work travel. The magnitude of effect is dependent on matching job and housing locations of individual workers, which can be aided by offering a variety of housing styles and price ranges. Inclusionary policies, such as requiring at least 10% affordable housing units within each development, can foster a better jobs-housing balance and reduce the need for street capacity (Nelson, Dawkins and Sanchez 2007).

Large-scale, mixed-use developments exhibit lower vehicular trips because of "internal capture" (i.e., many daily destinations do not require travel outside the study area). For example, a study titled *Internalizing Travel by Mixing Land Uses* examined 20 mixed use communities in South Florida, documenting internal capture rates up to 57 percent with an average of 25 percent. In addition to a percent reduction for the jobs-housing balance, credit can be given for local-serving retail. Urban, transit-oriented development offers coffee shops, restaurants, general retail stores and services that reduce the need for vehicular trips outside the area (Ewing, Dumbaugh and Brown 2003).

Currans and Clifton (2015) developed and tested methods for adjusting ITE trip generation rates for urban settings. They recommend mode-share adjustments based on the number of residents and jobs per acre, which serves as a proxy for urban form. In Boulder, this "activity density" measure can be readily derived using Traffic Analysis Zone (TAZ) data available from Denver Regional Council of Government (DRCOG) or the City of Boulder, divided by the acreage of each TAZ, derived using the City's Geographic Information System (GIS). Mode share percentages were derived for all trip ends and for general land use categories such as Restaurant, Retail, Office, and Residential.

CASE STUDIES

The following case studies are relevant to the DET/DIF update for the City of Boulder. For ongoing operating costs, a viable funding option is the transportation utility concept discussed below.

Transportation Utilities

While utility charges for water and sewer facilities have been widely used since the beginning of the 20th century, on-going charges for transportation represent a relatively new application of the utility concept (Schoettle and Richardson 1993). The establishment of a utility to address transportation needs will not only allow the City to address the funding of capital improvements but it will also provide revenue to cover the cost of operations and maintenance. Utility charges may address all cost aspects, including debt service, operation, maintenance, repair and replacement of facilities. Unlike impact fees that are imposed on new development, utility revenue is generated from all development, existing and new. Unlike impact fees, which have an unstable revenue stream based solely on the amount and timing of new development, utility charges have a stable and secure revenue stream that enables the issuance of bonds backed by the anticipated utility revenue.

Legal challenges of transportation utilities have a wide spectrum of outcomes. In Florida they were overturned, in Colorado they were upheld but rarely implemented, and in Oregon they are rarely challenged but widely implemented due to the state's enabling legislation (Ewing 1993). The authority for a local government to enact utility fees must come from State enabling legislation, a City charter, or from implied authority (either statutory or legal precedent). Local governments are creatures of the state and possess only such powers as the state confers upon them, subject to addition or diminution at the state's discretion. Courts in Colorado have upheld transportation utility charges as a valid exercise of a city's home rule authority. In Bloom v. City of Fort Collins (784 P.2d 304 Colo. 1989) the court upheld the city's imposition of a transportation utility charge as a "special fee", the purpose of which was to meet the overall cost of local street maintenance. The City of Loveland has a similar transportation maintenance fee.

Utility charges should be fair and equitable, as determined by a reasonable cost allocation methodology. Utility charges should not generate excess revenues and thus appear to be a general revenue raising mechanism. The fees should closely reflect the actual costs that the City incurs in providing the service or facility for which the charge has been imposed. For additional information on this topic, please see the City of Boulder's website at the URL below.

https://bouldercolorado.gov/transportation/transportation-maintenance-fee-faq

Value Capture

Reconnecting America, a national nonprofit that integrates transportation and community development, prepared a 2008 report for the Federal Transit Administration titled "Capturing the Value of Transit." Major public sector investments in infrastructure, like a transit system, can increase property values and result in valuable development opportunities. "Value capture" is the idea that planners, elected officials, and private sector developers can work together to harness a portion of the value created by infrastructure and use it for additional public improvements.

A well-known example, near the TischlerBise office in the DC metropolitan area, is the Ballston Metro (subway) corridor in Arlington, VA. During the development review process, local governments grant increases in both residential density and nonresidential intensity for improvements to the public realm. Existing residents may welcome additional infill and redevelopment if the fixed-cost of municipal services are allocated to more development units, thus lowering their cost share. Also, developers generally do not object to making public improvements near their project if the additional cost is offset by a corresponding return on investment from greater development potential (Urban Land Institute and National Multi Housing Council 2008).

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APPENDIX: NEXT-GENERATION TRANSPORTATION IMPACT FEES

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Making Great Communities Happen

PAS Memo — January/February 2015

Next-Generation Transportation Impact Fees

By Dwayne Pierce Guthrie, AICP, and L. Carson Bise, AICP

An increasing number of communities are realizing the fiscal and economic benefits of higher density, mixed-use development that offers alternative modes of transportation. Also, significant national demographics changes, shifting market preferences for walkable urbanism, and the importance of place making are compelling local governments to encourage redevelopment in urban and suburban centers where there is existing infrastructure capacity. Next-generation impact fees are an important implementation mechanism in the smart governance toolbox, particularly transportation impact fees that embrace multi-modal travel options.

Within the context of providing adequate infrastructure to accommodate new development, there is some overlap between development impact fees and other efforts to evaluate the adequacy of public facilities. All these techniques are best understood as relative points along a growth-management continuum (i.e., they are not mutually exclusive). At one end are Adequate Public Facilities Ordinances (APFO) and concurrency evaluations, based on specific development proposals and how they affect nearby infrastructure. At the other end are impact-fee studies that focus on growth-related system improvements needed to accommodate multiple development proposals within an entire service area.

In Florida, the unintended consequences of concurrency coupled with the Great Recession led to a legislative mandate for a viable alternative that was labeled "mobility fees" (Seggerman 2009; Florida Departments of Transportation and Community Affairs 2009). In some respects, mobility fees might be regarded as a simple rebranding, but the name does emphasize multimodal improvements and is consistent with the popular concept of complete streets. Some jurisdictions in Florida have broadened mobility fees to include the up-front payment of transit operating costs, which is an expansion of impact fees that have traditionally been limited to capital costs.

This *PAS Memo* will provide a general overview of impact fees, discuss the importance of examining the spatial relationship between the movement of people and transportation infrastructure needs, and offer ways to improve transportation impact fees so that they are in line with current demographic and market forces. The article concludes with practical steps for putting next-generation impact fees into practice. In this *PAS Memo*, the term "impact fees" is used broadly to cover all one-time payments for growth-related infrastructure, typically collected at the time a building permit is issued.

Background

Transportation impact fees are one-time payments imposed by a local government on new development that must be used solely to fund system improvements. In contrast to project-level improvements, impact fees fund growth-related infrastructure that will benefit multiple development projects, or even the entire community.

Any community considering impact fees should note the following limitations:

- Impact fees can be used only to fund capital infrastructure and cannot be used for ongoing operations, maintenance, or rehabilitation costs.

- Impact fees cannot be deposited in the local government's General Fund. The funds must be accounted for separately in individual accounts and earmarked for the capital expenses for which they were collected.
- Impact fees should not be used to increase infrastructure standards unless there is a funding plan to raise the level of service for existing development in the community.

During the 1980s, impact fees grew increasingly popular, especially in high-growth communities. This proliferation of impact fees was largely due to the decline in federal and state grants available for local governments, along with restrictions on local government revenue options, which led to impact fees becoming a common funding approach for local government capital facilities.

The general steps in a conceptual transportation impact fee formula are illustrated in Figure 1. The first step (see the left box) is to determine an appropriate demand indicator. The demand indicator measures the number of service units for each unit of development. For example, an appropriate indicator of the demand for transportation infrastructure is vehicle miles of travel generated by a development unit (e.g., a detached house).

The second step in the conceptual formula is shown in the middle box below. Infrastructure units per demand unit are typically called Level-Of-Service (LOS) or infrastructure standards. In keeping with the transportation example, a common infrastructure standard is arterial lane miles per vehicle miles of travel.

The third step in the conceptual formula, as illustrated in the right box, is the cost of various infrastructure units. To complete the transportation impact fee example, this part of the formula establishes the cost per lane mile to construct arterial capacity.

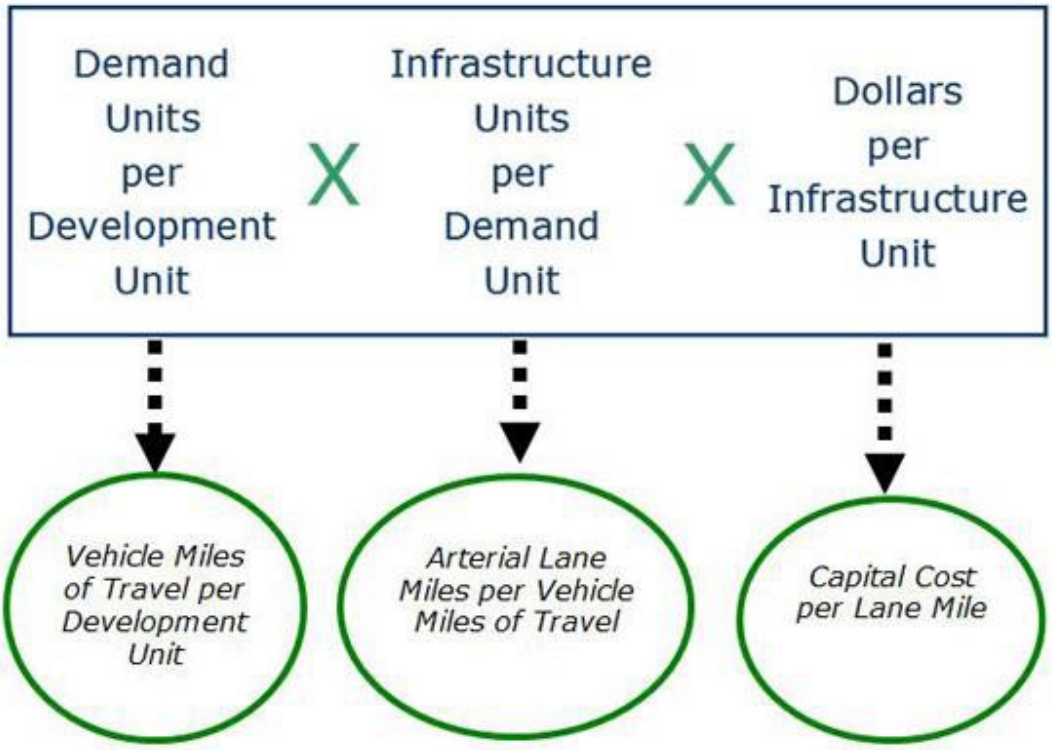


Figure 1. Conceptual Impact Fee Formula. Source: TischlerBise.

Although fee methodologies are tailored to each jurisdiction, there are three basic methods for calculating impact fees:

> **Plan-Based Impact Fee Calculation** — The plan-based method allocates costs for a specified set of future improvements to a specified amount of development. The improvements are identified by a

facility plan. In this method, the total cost of relevant facilities is divided by total demand (e.g., vehicle trips for transportation, persons for parks, etc.) to calculate a cost per unit of demand. The plan-based method is often the most advantageous approach for facilities that require engineering studies, such as roads and utilities.

Cost Recovery Impact Fee Calculation — The rationale for the cost recovery, or buy-in, approach is that new development is paying for its share of the useful life and remaining capacity of facilities from which new growth will benefit. To calculate an impact fee using the cost recovery approach, costs are allocated to the ultimate number of demand units the facility will serve.

Incremental Expansion Impact Fee Calculation — The incremental expansion, or consumption method, documents the current level-of-service (LOS) for public facilities in both quantitative and qualitative measures. The LOS standards are determined in a manner similar to the current replacement cost approach used by property insurance companies. However, in contrast to insurance practices, clients do not use the funds for renewal or replacement of existing facilities. Rather, the jurisdiction uses the impact fee revenue to expand or provide additional facilities as needed to accommodate new development. This method is best suited for public facilities that will be expanded in regular increments, with LOS standards based on current conditions in the community.

"Old-School" vs. "Next-Generation" Transportation Impact Fees

As shown in Figure 2, traditional, or "old-school," transportation impact fees were designed with a suburban worldview and designed to increase capacity for vehicle travel. Old-school impact fees are typically uniform across the entire jurisdiction, are driven by generic formulas, tend to focus on 20-year master plans or build-out guesstimates, and are designed to fund infrastructure that will move vehicles.

In contrast, the basis of "next-generation" transportation impact fees is the recognition that impact fees can actually function like a land-use regulation to help shape development patterns. Planning and policy objectives drive next-generation transportation impact fees, which vary geographically to reflect cost differences, and are intended to move people rather than vehicles alone.

Old School Fees	Next Generation Fees
"pay to play" revenue source	contractual arrangement to build improvements
driven by generic formulas	driven by plans and policy
long range to buildout	Five- to 10-year planning horizon
one and done	ongoing planning and budgeting process
suburban focus	apply transect concept
uniform across jurisdiction	vary geographically
moving vehicles	moving people
vehicle trips	inbound vehicle miles of travel
one size fits all	residential by dwelling size
loose cost analysis and generous credits	specific improvements with a funding strategy

Figure 2. Comparison of "Old-School" and "Next-Generation" Transportation Impact Fees. Source: TischlerBise.

These next sections will describe in more detail the various ways in which old-school transportation impact fees are different from their next-generation counterparts.

Intent

A misconception common to elected officials, staff, and developers is that an impact fee is essentially a financial hurdle whereby the private sector "pays to play." This type of thinking is evident when there is too little concern with the fee methods and too much concern with fee amounts in other jurisdictions. From a legal perspective, an impact fee is not a tax but functions more like a contractual arrangement. In exchange for a fee payment, there is an expectation of receiving growth-related capital improvements.

Old-school transportation fees tended to be driven by generic formulas, but next-generation fees are being driven by plans and policy. In the boom periods during the 1980s, 1990s, and even up to the Great

Recession, many jurisdictions rode the sprawl wave assuming additional arterial lane miles would solve congestion problems. The pendulum has now swung towards "deliberate and decide" that realizes the importance of connecting land use and transportation decisions along with multimodal improvements to solve mobility problems (Schiller and Kenworthy 2010; Moore, Thornes, and Appleyard 2007).

Timeframe

Due to the legal requirement that fee-payers receive a benefit, impact fees have a time dimension. Unlike many planning products that are "one and done," impact fees are an ongoing planning and budgeting function. We cannot simply translate a long-range vision into a build-out plan for capital improvements, with no concern for realistic market absorption rates and the timing of improvements.

In contrast to many planning products that look 20-plus years into the future, next-generation fees look out five to 10 years. For example, the State of Arizona recently amended its enabling legislation for municipalities to require development fees based on an Infrastructure Improvements Plan that is limited to 10 years.

Spatial Thinking and Vehicle Miles of Travel

Old-school transportation fees have a suburban worldview. This perspective is evident in trip generation rates, typically obtained from the Institute of Transportation Engineers (ITE), that are derived from traffic surveys primarily in suburban settings. A useful tool to facilitate spatial thinking is application of the transect concept during the development of next-generation transportation and mobility fees (Duany, Speck, and Lydon 2010). Just as land-use regulations and smart growth techniques need to vary by transect, so must next-generation transportation impact fees be tailored to the characteristics of the area.

In recent years, academic studies have provided extensive literature reviews and summaries of findings that document relationships between smart growth and daily travel demand (Resource Systems Group, Fehr & Peers, Cervero, Kockelman, and Renaissance Planning Group 2012). A nice framework for understanding and applying these principles are the "D" variables summarized in Figure 3 (Ewing, Greenwald, Zhang, Walters, Feldman, Cervero, Frank, and Thomas 2011). The seven variables are demographics, density, diversity, development scale, design, destination accessibility, and distance to transit.

On average, urban residential development has fewer persons and vehicles available per unit, relative to suburban residential development; thus lowering vehicular trip generation rates. Urban settings also provide options for walking, biking, and transit travel, thus lowering the vehicular mode share. Finally, mixed land use (vertical and horizontal), more compact development, and a better jobs-housing balance work together to reduce average trip lengths in urban areas. The evidence is very compelling that next-generation transportation and mobility fees must differentiate between urban and suburban areas.

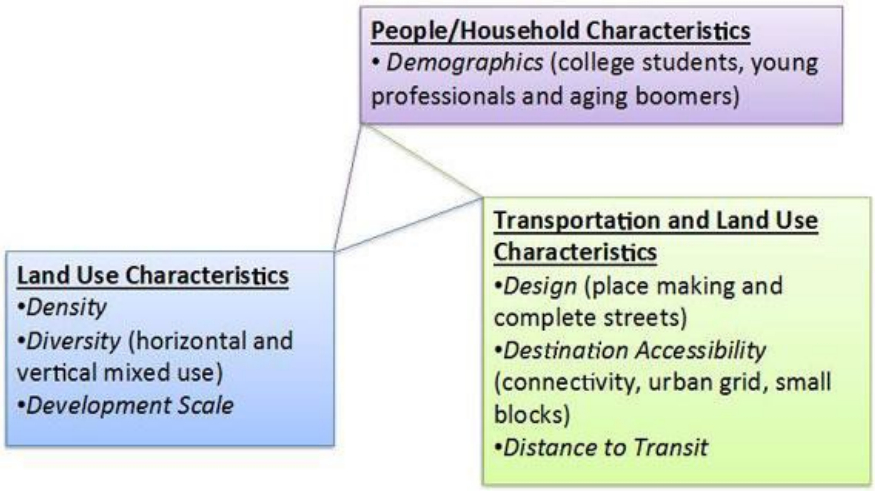


Figure 3. Graphic Summary of "D" Variables. Source: Graphic by TischlerBise

The authors' consulting firm, TischlerBise, first recommended varying fees by geographic area to take into account development context in a 2002 study conducted with the Delaware Department of Transportation for the State of Delaware. The state authorized "graduated" impact fees (i.e. variable amounts by geographic area) as part of the state's Livable Delaware Program, intended to address sprawl, congestion, and other

growth issues. The study documented average trip lengths, revealing that they varied by State Investment Strategy Areas.

Compared with trip generation rates, Vehicle Miles of Travel (VMT is equal to the number of vehicle trips multiplied by trip length, measured in miles) is a superior indicator of travel demand because it considers distance in the allocation of infrastructure costs. Development in rural areas is typically associated with longer trip lengths and higher trip generation, due to a lack of alternative modes of travel. As density and mix of development increase in urban areas, VMT decreases due to shorter trips and more walking, bicycling, and transit use. Allocating infrastructure costs by VMT is beneficial because it provides a better assessment of the demand for transportation infrastructure and it provides the rational nexus for next-generation fees that vary by geographic area. A recent example of this approach is a 2012 Mobility Fee study by Renaissance Planning Group for Kissimmee, Florida. This study demonstrated that shorter trip lengths within urban areas justified lower fees, while longer trips result in higher fees for suburban areas.

Putting Next-Generation Impact Fees into Practice

Based on the differences between old-school and next-generation transportation impact fees (described above), there are a number of practices that planners can use to bring their impact fees up to speed. The sections below describe various strategies that can be used to convert old-school impact fees into next-generation tools.

Better Assessment of Need

Old-school fees are based on moving vehicles and adding lane miles. Often, this approach is not appropriate for urban areas because intersections become the limiting factor and expansion of roads is not practical, nor desirable. Next-generation fees have a broader understanding of mobility needs requiring a combination of multimodal improvements.

In both urban and suburban areas, improvements within the right-of-way should embrace the concept of complete streets to simultaneously provide improvements for all travel modes, including walking, biking, and motorized vehicles. Transit improvements are also possible, but a couple of caveats should be considered. First, there is an important hierarchical distinction between transit facilities within the right-of-way of a street (e.g., local buses) and high-end transit improvements (e.g., bus rapid transit, light or heavy rail systems). The former fit under the complete streets framework, but high-end transit systems should undergo a separate needs analysis and have a unique cost allocation, as discussed further below.

Better Demonstration of Benefit

Old-school fees that derived a generic need for lane miles often fail to demonstrate how fee payers will benefit from future improvements because many local governments do not have a multi-year Capital Improvements Plan and annual capital budgets might lack consistent policy objectives. In contrast, next-generation impact fee studies should list specific improvements (e.g., "construct a roundabout at the intersection of x and y arterials"), so fee payers know what infrastructure will be built in the service area.

The prioritized list of improvements should be in locations experiencing congestion problems due to traffic flowing from a larger travel shed to choke points (conceptually like a funnel that tapers to fit into a bottleneck). Therefore, the location of system improvements is not concerned with accurately forecasting the exact location of specific development projects on the fringe of the travel shed. Improvements to arterials adjacent to specific development projects (e.g., outside travel lane, curb/gutter, and sidewalks) are usually specified in adopted design standards and considered to be project-level improvements.

Better Allocation of Infrastructure Costs

As described above, old-school fees allocated costs according to vehicle trips (either average weekday or PM-peak). Next-generation fees typically work best when using inbound, average-weekday VMT as the service unit. Focusing on trips destined for development within the service area simplifies fee calculations by eliminating complicated origin-destination traffic studies and fee adjustments for pass-through trips.

For high-end transit improvements, such as Bus Rapid Transit (BRT) and heavy rail systems, a better cost-allocation methodology than VMT is to simply use persons and jobs located within the service area. For example, the City of Tempe, Arizona, is currently considering a possible development fee that might provide partial funding for a new streetcar line, with the growth share of planned improvements allocated to persons and jobs in the service area (primarily downtown Tempe and the Arizona State University campus). As shown in Figure 4, work commute trips are a major component of morning and afternoon peak travel demand, and

work trips tend to be longer than other types of trips. Next-generation impact fees in urban areas should allocate high-end transit costs to persons and jobs because the movement of people from their place of residence to their place of work is being accomplished by walking, biking, and transit systems, instead of private vehicles.

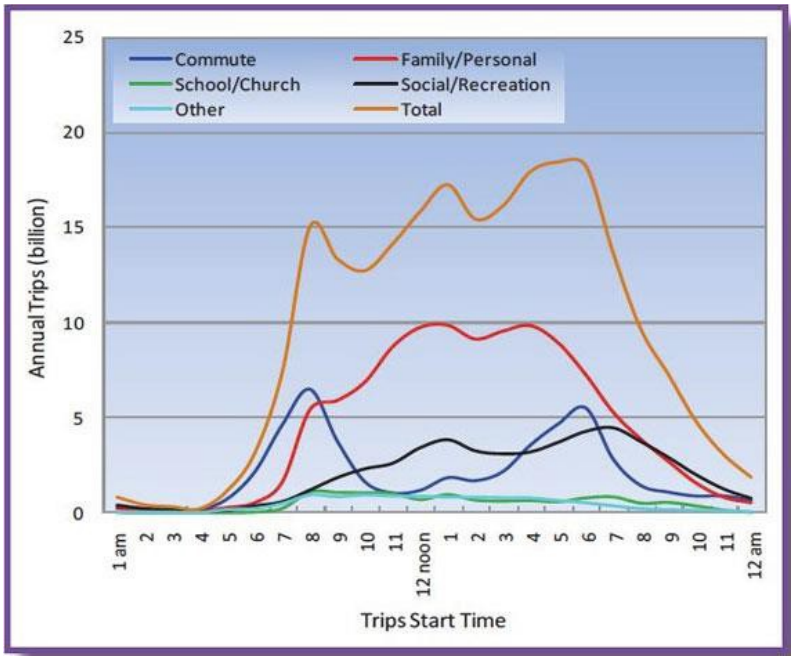


Figure 4. Start Times for Trips by Purpose. Source: *Our Nation's Highways*, U.S. Department of Transportation, 2010.

Better Proportionality for Residential Fees

Impact fees must be proportionate to the demand for infrastructure; thus, a critical first step is documenting demand units or service units per development unit. Because the average number of persons and vehicles available per dwelling unit has a strong and positive correlation to the number of bedrooms per unit, next-generation impact fees should include residential fee schedules that correlate the fee to dwelling size, with larger units charged higher fees. An old-school average fee for all types and sizes of residential development is not proportionate; further, this approach makes small units less affordable, while essentially subsidizing larger units (Nelson, Bowles, Juergensmeyer, and Nicholas 2008).

Rather than use national or state multipliers, custom tabulations of demographic data by bedroom range can be created from individual survey responses provided by the U.S. Census Bureau, in files known as Public Use Microdata Samples (PUMS). PUMS files, for areas of at least 100,000 persons, can be downloaded from the American Community Survey website. Recent data sets are based on 2010 census geography and enable large metropolitan areas to differentiate urban and suburban service areas, but small communities will be limited to demographic characteristics of the entire Public Use Microdata Area.

An example from a recent TischlerBise study for Roswell, Georgia, will help to illustrate the technique of allocating infrastructure costs based on house size. As shown below, trip generation rates and average persons per housing unit by bedroom range were derived from unweighted PUMS data. Input variables are the three columns highlighted with yellow shading (i.e., persons, vehicles available, and housing units). Footnote 2 provides the formula for deriving trip ends from persons. Footnote 3 provides the formula for deriving trip ends based on vehicles available. Average trip ends from both approaches are divided by housing units to yield the recommended multipliers (i.e., trip ends per housing unit by bedroom range). The recommended multipliers by bedroom range are for all types of housing units, adjusted to control totals for Roswell.

Roswell, Georgia

Bedrooms	Persons (1)	Trip Ends (2)	Vehicles Available (1)	Trip Ends (3)	Average Trip Ends	Housing Units (1)	Recommended Multipliers (4) Trip Ends per Housing Unit	Persons per Housing Unit	Housing Mix
0-1	47	162	31	186	174	31	5.12	1.58	6%
2	188	571	128	755	663	108	5.61	1.81	22%
3	291	850	247	1,448	1,149	133	7.89	2.28	27%
4+	666	1,805	499	2,905	2,355	221	9.74	3.14	45%
Total	1,192	3,388	905	5,295	4,342	493	8.05	2.52	

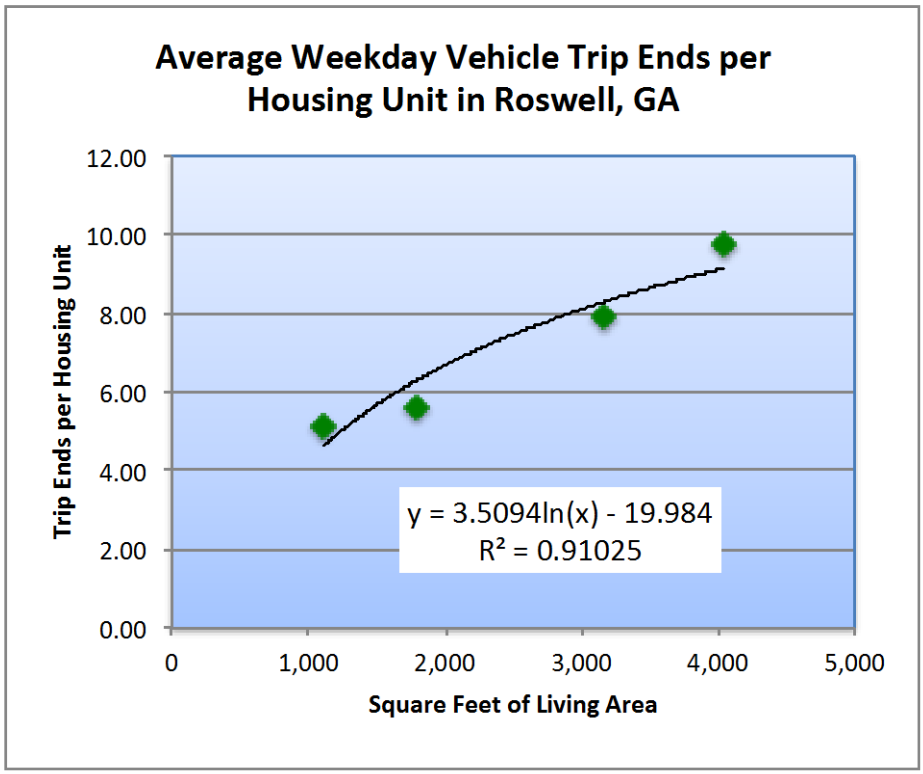
2, 1-Year data.

Figure 5. Example of Residential Service Units by Bedroom Range, Roswell, Georgia. Source: TischlerBise.

Next-generation fees based on size of dwelling are generally easier to administer when expressed in square feet of finished living space for all types of housing. Basing fees on square footage rather than the number of bedrooms eliminates the need for criteria to make administrative decisions on whether a room qualifies as a bedroom. To translate dwelling size by number of bedrooms into square footage, data on the floor area of dwellings can often be obtained from local sources, like the local government's GIS or a parcel database used for property tax assessments. At the census division level, the U.S. Census Bureau's 2013 Survey of Construction microdata is a good source to obtain the average size of single-family units (both detached and attached) by bedroom range. The Census Bureau also publishes summary tables on the size of multifamily housing units constructed in 2013 by census region.

To continue with the Roswell example, demographic data derived from U.S. Census Bureau PUMS files was combined with floor area averages obtained from Roswell building permits (3 and 4+ bedroom units) and Census Bureau construction surveys (0–1 and 2 bedroom units). Average floor area and weekday vehicle trip ends, by bedroom range, are plotted in the graph below, with a logarithmic trend line derived from four actual averages for the area that includes Roswell. The trend line formula was then used to derive estimated trip ends by dwelling unit size, in 500-square-foot intervals. The average-size three-bedroom unit has a fitted-curve value of 8.65 vehicle trip ends on an average weekday. In comparison, a very small dwelling (1,000 square feet or less) has a fitted-curve value of 4.26 trip ends and would pay 49 percent of the transportation impact fee paid by an average-size unit. At the other end of the spectrum, a large unit (4,001 square feet or more) with a value of 9.54 trip ends would pay 110 percent of the transportation impact fee paid by an average size unit.

Actual Averages per Hsg Unit			Fitted-Curve Values	
Bedrooms	Square Feet	Trip Ends	Sq Ft Range	Trip Ends
0-1	1,106	5.12	1000 or less	4.26
2	1,787	5.61	1001 to 1500	5.68
3	3,160	7.89	1501 to 2000	6.69
4+	4,039	9.74	2001 to 2500	7.47
			2501 to 3000	8.11
			3001 to 3500	8.65
			3501 to 4000	9.12
			4001 or more	9.54



Average weekday vehicle trip ends per housing unit are derived from 2012 ACS PUMS data for the area that includes Roswell. U.S. Census Bureau is the data source for average square feet of 0-1 and 2 bedroom dwellings. Unit size for 0-1 bedroom is the average of multifamily units constructed in 2013. Unit size for two bedrooms is from 2013 Survey of Construction microdata. Unit size for 3 and 4+ bedrooms is from Roswell building permit records.

Figure 6. Example of Trip Ends by Residential Floor Area. Source: TischlerBise.

It is important to note that the proposed fees by dwelling size do not increase in a linear manner. In other words, a unit in the largest size range (4,001 or more square feet) would pay a fee that is only roughly twice as much as a unit in the smallest size range (1,000 square feet or less), even though the floor area is at least four times larger. Some older impact fee studies simply recommended an average fee per square foot of dwelling. However, a dwelling with 6,000 square feet of living space is not likely to have six times the number of vehicle trips as a dwelling with 1,000 square feet of living space. This is an important consideration to avoid overcharging fees.

Specific Improvements and Funding Strategy

The "need" for transportation system improvements (e.g., additional arterial lane miles, roundabouts, or traffic signals) is more difficult to determine than improvements to utility systems. The key difference is that water and sewer utilities are closed systems, but a street network is an open system. The demand for street capacity can be influenced by development units outside the service area and by what is known as "triple convergence" (Downs 1992). In essence, this concept acknowledges that transportation capacity is consumed by drivers changing their time, route, and mode of travel, with the latter being more significant in urban areas. Also, "traffic congestion" is a relative and more subjective measure that is closely linked to the concept of "willingness to pay." In other words, planners should be asking, "What improvements are we willing to fund?" rather than compiling wish lists of what people want without any consideration of fiscal realities.

Given this complexity, communities should embrace the willingness-to-pay concept and strive to agree on a list of multimodal improvements that translates into fees deemed appropriate for their communities. If officials, with input from staff and stakeholders, determine the proposed fees are too high, lower-priority projects can be deleted, or the growth share to be funded by impact fees can be reduced, assuming additional funding is available from other revenue sources. An example of using other revenue sources to reduce fees is the recent update to Pasco County's Mobility Fees (Tindale-Oliver & Associates 2014).

To ensure planned improvements are financially feasible, it is a good idea to compare projected annual impact fee revenue to the timing of planned expenditures, which is commonly known as a cash flow analysis. Also, a good quality control measure is to compare cumulative impact fee revenue over the planning horizon to the growth cost of planned improvements. If revenues and expenditures vary significantly, there might be a problem in the analysis that warrants additional work.

Incorporating Credits in Impact Fee Calculations

Regardless of the methodology used, a consideration of "credits," or possible fee reductions, is integral to the development of next-generation impact fees. There are two types of "credits" with specific characteristics, both of which should be addressed in next-generation fee studies and ordinances.

The first is a site-specific credit, or developer reimbursement, for dedication of land or construction of a system improvement that was included in the fee calculations. This type of credit is addressed in the administration and implementation of the impact fee program. If a developer constructs a system improvement included in the fee calculations, it will be necessary to either reimburse the developer or provide a credit to reduce the fees for that particular development. The latter option is more difficult to administer because it creates unique fees for specific geographic areas. It is usually better for a jurisdiction to establish a reimbursement agreement with the developer that constructs a system improvement. The reimbursement agreement should be limited to a payback period of no more than 10 years and the jurisdiction should not pay interest on the outstanding balance. The developer must provide sufficient documentation of the actual cost incurred for the system improvement. The jurisdiction should only agree to pay the lesser of the actual construction cost or the estimated cost used in the fee analysis. Reimbursement agreements should only obligate a jurisdiction to reimburse developers annually from actual fee collections in the service area. The reimbursement percentage for a particular improvement can be derived from the list of transportation improvements used to derive the fee schedule (discussed above). Project-level improvements, such as turn lanes for safe access to a residential subdivision, are specified as part of the development approval process and are **not** eligible for credits against impact fees.

The second type of credit is due to possible double-payment situations, which could occur when other revenues may contribute to the capital costs of infrastructure funded by the impact fee. This revenue credit is integrated into the impact fee calculation, thus reducing the fee amount. Because old-school fees tended to be driven by generic formulas, the cost analysis was often generalized and included contingencies. To help avoid legal challenges, it was common to provide generous adjustments to compensate for the loose cost analysis. The most common was the gas tax credit often found in old-school fee calculations. Gas tax revenue has been declining over time, especially when expressed in constant dollars and normalized to account for the increase in population and jobs. Because most jurisdictions are struggling just to maintain their existing network of streets with decreasing gas tax revenue, jurisdictions can acknowledge the fiscal reality that gas tax revenue will not be used to expand capacity of roadways. Therefore, the gas tax credit is probably no longer applicable to next-generation fees in most jurisdictions.

Next Steps for Planners

This *PAS Memo* has discussed a number of elements that planners should consider in evaluating their current impact fees to determine whether they are encouraging the type of development desired by their jurisdictions. These actions are summarized below along with practical suggestions to help local governments transition to next-generation impact fees.

- Consider broader mobility needs and multimodal infrastructure when determining what improvements may be funded by impact fees.
- Adopt "complete streets" policies and design standards to codify the need to provide improvements for all travel modes.
- List specific capital improvements so fee payers can evaluate the benefit from infrastructure to be built in the service area.

- Consider allocating the growth share of arterial street improvements to inbound, average-weekday VMT, rather than simply using vehicle trip ends.
- For high-end transit improvements, allocate costs to persons and jobs located within the service area.
- Establish residential fee schedules by dwelling size (typically measured by square feet of finished living space).
- Embrace the willingness-to-pay concept and propose a level of improvements that translates into multi-modal fees deemed appropriate for your community.
- Vary fees by urban and suburban service areas.
- Set up a liaison group of developers and builders to get input on market assumptions and quantitative inputs like local costs.
- Avoid stumbling blocks and pitfalls, like rolling out the updated fees prior to an upcoming local election.
- Work with champions among staff, elected officials, and business leaders.

About the Authors

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