

Lead Staff: Krishna Akundi

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**Summary:** Sprawl is a consequence of the market’s failure to efficiently allocate resources. This market inefficiency manifests itself as a scattered or discontinuous or low-density development pattern. Low-density development patterns increase costs for all (businesses, residents, and governments) in the region. Thus, it is in everyone’s interests to correct for those inefficiencies— for the costs of growth.

Local governments across the country have considered a range of remedies. These solutions include the application of an adequate public facilities ordinance, charging development impact fees, preserving open space and rural lands, creating transit-oriented developments and mixed-use centers. Guiding growth towards a compact form of development is a continuing effort and requires experimentation with new and innovative tools such as eminent domain, congestion pricing, land banking, and infrastructure funds; tradable development rights, mechanisms to offset developer’s upfront costs, and varying exactions by distance.

In this literature review staff surveyed selected research on the costs of low-density development, i.e., the impacts of sprawl on journey-to-work travel patterns and public health; the provision of public services and infrastructure; land prices and housing affordability. Much of the work on the costs of growth/costs of sprawl is anecdotal, case-specific, contested, or lacks a causal link. More robust analytical studies are required. Only two of the articles surveyed show a significant relationship between increasing density and lower per capita costs.

This review is organized into five sections: growth and density; sprawl as market failure; the physical, fiscal, and socio-economic costs; summary of potential remedies; and bibliography

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## **1. Growth and Density**

A cornucopia of journal articles, literature reviews, working papers, and books have defined, described, or characterized sprawl (Galster, et.al 2001; Wagner, et.al 2005; Ewing, et.al 2005). Common to all this established research: the density of development. Research shows that in a multi-nucleated region or polycentric city, the density gradient falls with distance from the central business district and from inner ring suburbs to developments (i.e. sub-centers) further out because of the large tracts of undeveloped land between them. Mieszkowski and Smith (1991) find that as sub-centers relocate to the edge of established settlements they promote scattered development patterns resulting in heavy economic and social costs— the unintended consequences of growth.

## **1.1 Unintended consequences of rapid growth:**

Robert Freilich in his 1999 text, *From Sprawl to Smart Growth*, discusses the battle that local governments wage against unbridled growth, against low-density development. He describes these costs of sprawl in terms of their socio-economic impacts: segregation of the population into discrete enclaves by race or income, the spatial mismatch in jobs, and the rising price of land and housing; fiscal impacts: the costs to local governments of expanding road service, installing new sewer and water lines, locating police stations and fire stations, and building schools—all for new residential and commercial developments located beyond already established settlements; and its physical impacts as experienced by residents through traffic congestion, slow decline in environmental quality, and chronic illnesses.

Loudoun County, in the Washington DC region, illustrates the unintended consequences of rapid growth. County supervisor Jim Burton in a series of presentations across Virginia reported that due to an unprecedented burst of population growth—a 50 percent increase between 2000 and 2007, and an additional 14 percent expected increase between 2007 and 2010— Loudoun County faced the following:

- A sharp but sudden increase in debt.
- 60 percent increase in school enrollments between 2000 and 2007: from 30,000 to 50,000.
- Unprecedented school construction activity. The County spent \$839 million on nearly 40 schools between 1993 and 2007. The County has budgeted \$1.38 billion in school construction for the 2007-2010 cycle: 27 new schools.
- An increase in property taxes: 200 percent increase between 1994 and 2007.
- Traffic congestion.
- Decline in air and water quality.
- Demand for higher levels of service.

Sprawl, however, is not simply a function rapid population growth. There are urban areas, especially in the Northeast and Midwest, where population has declined but land consumption increased: undeveloped and/or agricultural lands were converted to urban uses (Kolankiewicz and Beck 2001). This outcome is explained, in part, by push factors; factors such as crime, poor quality schools, and unresponsive public services that push residents from the urban core and inner suburbs to the periphery.

There are also cases where population has increased but the amount of land consumed per capita has declined. This outcome may be explained by economic conditions, physical and political barriers to expansion, or land use controls.

Although the rate of per capita land conversion may have slowed or even reversed in some jurisdictions, in absolute terms open space, wetlands, and agricultural lands are still being lost to urban uses. For example, (Heimlich 2001; Sierra Club 1998):

- Between 1982 and 1992, according to the USDA's National Resources Inventory, 89,000 wetlands were lost. Wetlands serve as "natural sponges that soak up and store rain and run-off." With fewer wetlands, floods, flood deaths, and property damages caused by flooding would increase. Floods caused \$4.3 billion in damage each year from 1988 to 1997.
- In the state of Maine, unfettered development activity has harmed 200 of the state's 2700 lakes and placed another 300 at risk.
- Low-density development patterns impact water quality. Groundwater recharge diminishes because of paved surfaces. Underground water supplies decline because of increased demand. McAllen Texas, for example, experienced a 40 percent increase in population between 1990 and 1996, thus exerting pressure on its already scarce water resources.
- Water quality in rural areas suffers from the development of residential subdivisions. In many cases, public sewer service is not available in rural areas, prompting private developers to provide septic systems which soon become inadequate to meet demands. Development activity—that is neither managed nor controlled— could generate bacteria, suspended solids, nitrogen and phosphorous run-off, and sediment in nearby lakes, rivers, streams, or aquifers.
- An even more tangible consequence for local governments is the impact on the tax base. The cost to government from expanding roads, laying water and sewer lines, building schools, and providing police and fire protection and emergency medical services for people who live far from existing infrastructure is greater than the taxes, fees, and surcharges it collects. New developments at the urban periphery do not pay for themselves.

How do jurisdictions manage land conversions and their resulting consequences? Jim Burton, the Loudoun County supervisor, explains that in their case, state courts and the Virginia legislature rejected nearly all of the planning department's proposals to control unbridled growth: No to a building moratorium, an adequate public facilities

ordinance, developer impact fees, and to using an affordability index. The Board of Supervisors was directed to apply tools already available in the zoning toolbox.

Ewing, Pendall and Chen (2005) in their article for Smart Growth America, and the Sierra Club (1998) in *Sprawl: the Dark Side of the American Dream* call for an array of measures including:

- Agricultural Zoning
- Conservation Easements
- Clustering
- Tax-base sharing
- Transit-Oriented Development
- Infill Redevelopment
- Rehabilitate abandoned or obsolete properties
- Create Mixed-Use Activity Centers

The difference between the options Loudoun initially considered and those recommended by the Sierra Club and Smart Growth America is the difference between growth control and growth management. Vicki Been (2005), in her review of the literature on impact fees and housing affordability, describes the difference:

Growth control refers to efforts to stop or limit growth through traditional regulatory tools such as growth caps or indefinite moratoria not tied to a particular goal, such as completing a comprehensive plan. Growth management means efforts to channel (but not stop or limit) growth into particular areas. Growth management may also take the form of concurrency requirements that seek to direct growth to areas in which infrastructure is already made available or planned, rather than allowing it to occur without regard to the availability of infrastructure (page 154).

The distinction between control and management is important because it influences how business, developers and bankers, government, and residents perceive sprawl: “low-density, automobile-dependent development beyond the edge of service and employment areas [sprawl] is ubiquitous and its effects are impacting the quality of life in every region of America, in our large cities and small towns” (Sierra Club 1998).

## **1.2 Sprawl: for it or against it?**

The debate has been waged in peer-reviewed journals, working paper series, white papers, and the blogosphere. Researchers have buttressed their respective positions with conceptual models as did the Real Estate Research Corporation. Many have followed a case study approach showing the cost savings from implementing growth management measures or conversely cost burdens from maintaining conventional growth

patterns— for instance Khe’s analysis of Bakersfield (2002) and Coyne’s of the Denver-Boulder region (2003). Still others have examined large data sets to make cross comparisons between sprawling counties and compact counties (e.g., Burchell 1998; McCann and Ewing 2003). Few have analyzed the explanatory relationship between urban form and the cost of public services (Carruthers and Ulfarsson 2003/2006; Solle-Olle and Rico 2006).

Among the first set of studies to make a case against low density development was a 1974 report by the Chicago-based Real Estate Research Corporation (RERC). Their report was commissioned by the U.S. Department of Housing and Urban Development and the Environmental Protection Agency. The authors of the study considered the typical costs involved in developing a 1,000 unit residential subdivision. The RERC team measured the costs of development, operation and maintenance under three scenarios (traditional low-density subdivision, combination, and dense development). Each scenario is based on a mix of housing unit types—single family, townhomes, and multi-family (walk-up or high-rise apartments). They defined costs as land and capital, streets and roads, utilities (sewer, stormwater, gas, electric, telephone), public services (police, fire, sanitation), public facilities (library, health care, churches, government), environmental effects (air pollution, water pollution), and personal costs (travel time, traffic accidents, and crime). The RERC study concludes that costs are 44 percent lower at higher densities. Under all three scenarios, land costs are constant and there is no significant change in the cost of building public facilities and schools. However, construction costs and infrastructure costs are highest for the traditional development pattern and lowest under the high-density pattern.

The RERC study has been criticized on three issues: first, it is a conceptual model and thus one cannot generalize from it— the findings may not apply to real world conditions; second, the assumptions about construction standards are wrong; and lastly it makes statements on socioeconomic status that are unfounded (Najafi and Mohamed 2006). What is important about the RERC study, however, is that thirty years later researchers continue to measure the association between low-density development and costs using almost the same set of variables.

The Transportation Research Board commissioned a study group to revisit the costs of sprawl. Burchell (1998) and his team measured the per-unit costs of (1) the conversion of land to residential and non-residential uses, (2) providing infrastructure, (3) providing public services and facilities, and (4) the journey-to-work under conventional (sprawl) versus managed development patterns. The *Costs of Sprawl, Revisited* differs from previous works in its scale: 742 counties across all four regions of the nation. Data indicate that these 742 would experience significant sprawl in the next 25 years; so what

costs would accrue under a managed growth scenario and what costs would accrue under the conventional (sprawl) scenario. Some findings from the study group are listed below:

- Developing a non-residential project in managed or compact setting results in a one percent cost-saving. (This finding applied in all four regions except the Northeast where it was 2 percent).
- Developing a residential subdivision in a region where growth is managed could result in a savings of \$13,000 per unit.
- Adopting managed growth policies could save the nation nearly \$110 billion in road expansion and ten percent in road –lane miles over the next 25 years.
- Managed growth scenario could bring \$12.6 billion in infrastructure (water and sewer) savings. Regionally, the West would experience the largest savings-- \$5.5 billion; the Northeast only \$1.3 billion.
- Assuming local governments adopt a managed growth scenario, after 2025, municipal budgets could see a ten percent increase in annual savings.

The numbers are quite large. Critics of the study claim that these large savings, which come after a 25-year period, are reported for impact. If the savings were reported on an annual basis, critics claim, the savings would be negligible. Cox and Utt (2004) hold that the assumptions and remedies laid out in *Costs of Sprawl* are wrong with respect to higher densities: higher densities do not result in lower per capita service costs.

Myers and Kitsuse (2001) writing for the Lincoln Land Policy Institute, are particularly interested in the debate, within the planning and development community, on the future of density. They review two sets of competing arguments: First, the academic debate between Ewing's support of compact development against Gordon and Richardson's implicit support of scattered development (see the 1997 Winter issue of the *Journal of the American Planning Association*); and second, the views of the Bank of America on compact sustainable development against those of Wells Fargo that supports conventional development patterns. Their review of the competing bank reports is notable because the development community, in general, has stood against most land use and regulatory controls.

The Bank of America report, *Beyond Sprawl: New Patterns of Growth to Fit the New California*, has a worthy goal: urging Californians to support sustainable communities. Unfortunately, according to Myers and Kitsuse, the Bank report never makes a case—one supported by data and analysis—for compact development and not continuing the status quo. Moreover, the report offers no concrete policy prescriptions. It neither challenges developers and builders nor calls them to action. The document does

trace development trends in California since the 1970s and acknowledges that such trends had a negative impact on the state's eco-system. Bank of America should be credited for recognizing the impact "low-density single-use development that is removed from the central city and inner suburbs" has on economic growth and quality of life.

As a rebuttal to the Bank of America document, Wells Fargo prepared the report, *Preserving the American Dream*. Unlike the Bank of American report, Wells Fargo has peppered its document with academic research supporting its positions that

- Conventional development patterns are adequate.
- The market is in a better position to respond to any negative externalities
- Changing to a compact development pattern would raise land prices and housing costs which could perpetuate an affordability crisis.

Wells Fargo's manuscript is presented as a rebuttal to the Bank of America document; however, does Wells Fargo accept the other's definition of sprawl? This is unclear. Myers and Kitsuse further suggest that the authors of *Preserving the Dream* are trapped in a 1950's time warp. The team assumes that consumer's choice of housing type and location has not changed in fifty years: people still want to move out to the urban edge and live in replicas of Levittown-- single-family detached homes. They also assume a mono-centric type model of the metropolitan area. While they note that journey-to-work is no longer from just suburb to city center and that the majority of such trips are from suburb to suburb, they fail to recognize the complexity of a multinucleated region and polycentric cities.

Well Fargo does not take into account the problems of traffic congestion, environmental costs and health costs—all negative externalities that the market has not corrected. They dismiss any link between sprawl and infrastructure costs as inconclusive. The team argues that mass transit is inefficient which begs the question is congestion efficient? They hold that suburban and exurban development benefits the inner city because as affluent residents leave the urban core for the suburbs, lower-income residents now have an opportunity to purchase those homes, thus achieving the dream of homeownership. However, what they fail to mention is that the exodus of medium and high income residents and business establishments means that the local government cannot provide the same level of service or maintain existing infrastructure because of a falling tax base. Lower-income populations are worse-off than before because of disinvestment in the urban core. Wells Fargo also asserts that open space is not affected by conversion of land to urban uses: 42 percent of California is forestland. The state's population is projected to increase at significant rates, thus placing pressure on land and environment. Finally, the team contends that leapfrog development will eventually lead to higher infill densities. Wells Fargo views development activity that stretches linear

miles on end as acceptable because it would be dense; their assessment does not consider the amenity value of open space.

Wells Fargo claimed that the relationship between sprawl and infrastructure costs was inconclusive. Cox and Utt (2004) tried to put that doubt to rest. These researchers analyzed the statistical relationship between expenditures and growth across 700 municipalities. Expenditures were restricted to total municipal spending, water and wastewater utility charges. Growth was measured in terms of 12 variables including population density. Model results showed that 71 percent of the variation in total municipal expenditures could not be explained by growth.

In concert with the authors of the Wells Fargo document, there is a chorus who defend low-density development: sprawl is a symptom of consumer preference and any attempt to manage or control “sprawl” would result in a decline in American’s standard of living (O’Toole 2007; Brueckner 2000). Gordon and Richardson (2000) considered the arguments favoring smart growth and those against. They conclude: “smart-growth prescriptions weaken property rights and limit the power of markets to deliver growth.” Yet, perhaps, it is the advocates of sprawl who miss the mark. Land use and zoning bring certainty to the markets and strengthen a market’s ability to deliver growth.

## **2. Sprawl as Market Failure**

Dense development— represented by a multinucleated or polycentric urban form— is more the rule than the exception in an efficient market economy. This is so because developers are more likely to economize on the use of land at expensive locations. They do so by substituting townhomes and multi-family units for single-family homes, and by constructing office buildings with higher floor area ratios (Bertaud and Malpezzi 2009). Market-oriented approaches to growth, however, are not always optimal. Sub-optimal choices include ‘satisficing’ by developers and hold-outs by land owners (Miceli and Sirmans 2004; Mohamed 2009).

### **2.1 Inefficient Allocation of Resources**

Poor and inefficient allocation of resources occur, for example, when (1) residents do not account for all the costs associated with the journey-to-work choosing to drive and at peak times although other cost-saving commuter options are available; (2) local government must bear the costs for the public services and infrastructure required by new developments located far from established centers, and (3) the intangible benefits of open spaces are lost (Ewing 1995; Brueckner 2000; Ciscel 2001; Hernandez-Murillo 2001).



Bertaud and Malpezzi (2009) measured the relationship between urban form and population density for 48 large cities in twenty countries— eight are American cities. These researchers found that in market-oriented economies, density gradients flatten with income, population, and falling transportation costs. In other words, as people gain the ability to move away from the urban core they do so thus creating a low-density development pattern. However, low-density development patterns, “from an economic point of view, [are] deficient.” Bertaud and Malpezzi would argue, based on a review of the literature, that the density gradient and price gradient follow one another up to a point. After that critical value, the price gradient begins climbing. A deficient spatial structure fragments labor and consumer markets; as the distance between people and places increases, the length of city infrastructure must increase which in turn increases capital and operating costs.

Even if we accept that the ‘market’ makes sub-optimal choices in urban development, Staley (2001) cautions against a top-down approach. An approach where local government does not take into account consumer preferences could lead to a situation where a jurisdiction’s tools to manage sprawl inadvertently cause consumers to “vote with their feet” and exacerbate the very problem they were trying to solve. This is an example of regulatory failure— the public equivalent of market failure. Bertaud and Malpezzi find that regulatory failure is the reason for sprawl in such centrally-planned economies as Eastern Europe and China.

Some of these sub-optimal market choices include ‘satisficing’ by real estate developers and hold-outs by land-owners for more money. Mohamed (2009) in a narrowly crafted analysis addresses the question: Why do residential developers prefer large exurban lots? Because of poor market information and the desire to reduce costs and increase profits, small-scale developers will satisfice. This behavior, Mohamed contends, results in metro area’s having low-density and leap-frog development patterns. While land use and zoning reduce the risk of uncertainty, they do nothing to reduce the upfront costs that a developer would have to spend when building in dense areas. Mohamed (2009) suggests that municipalities bear the burden of upfront costs “for certain on-site infrastructures and be reimbursed by developers for these capital and interest costs when the lots are sold.”

A problem similar to and perhaps a subset of satisficing is the hold-out problem. Miceli and Sirmans (2004) contend that, because of the hold-out problem, large-scale projects such as housing developments and shopping centers will be under-produced in the urban core and inner suburbs. In the urbanized parts of metro areas, especially, land assembly requires negotiations with owners of multiple parcels. If any one of those small landowners should hold-out, the entire deal may fail. In contrast, developments at the urban fringe, more often than not, require negotiating with one large landowner. The hold-out problem appears to explain—in part—the reluctance of manufacturers and other

industrial producers from locating in Montgomery County: Developers of industrial properties and brokers for industrial owners in the Washington region cite dearth of large parcels in the County. To solve the hold-out problem, Miceli and Sirmans list a number of remedies all of them well-known but for one which calls on local governments to use their power of eminent domain to facilitate efficient development through urban renewal.

### **3. Physical, Fiscal, and Socio-Economic Costs**

#### **3.1 Traffic Congestion**

Ewing, Pendall, and Chen (2005) compared travel times between most sprawling metros and least sprawling metros. Residential density strongly influences the amount of driving per person. For example, workers in Atlanta, which has a high sprawl index, travel 34 miles daily per capita compared to New Orleans which has a low sprawl index and workers travel 15 miles daily per capita. Reid and others also found that in the most sprawling metros

- People drive more and own more cars
- Fewer people get to work by taking public transit and walking
- Increased incidence of accidents and fatal crashes

The Surface Transportation Policy project analyzed congestion in 70 metropolitan areas over a fifteen year period. They concluded that areas investing heavily in road capacity fared no better than those that did not in easing congestion (Cervero 2001). Cervero in a 2001 study had two objectives:

- To dissuade environmentalists and other critics of road investments from making the dubious claim that there is some cause – effect rationale between highways and sprawl: congestion is a negative externality from the use of roads not from the road itself.
- Call for more research on road expansion, urban growth and induced travel using a path model.

Cervero's long-term path model acknowledges that the benefits of supplying a road lane are an increase in roadway speed and development activity. These benefits create a demand-- more vehicle miles travelled (VMT). His study found that, at least in California, it takes between 2 and 3 years for development activity to respond to road

expansion and another three years for VMT to respond to development activity. Growth in VMT, of course, feeds back into freeway investment several years later. His model explains 55 percent of the relationship between road expansion and VMT.

While a road building program is unlikely to erase traffic congestion, Cervero discovered that Houston has come closer to that goal than other jurisdictions – fifteen years and billions of dollars later. Cervero concedes that investment in roads will invariably create land use shifts and increased VMT, so the question is how to minimize negative externalities from land use decisions and maximize scarce transportation resources. He suggests that we should consider building more bus rapid transit systems, applying ‘value-pricing’ on current carpool lanes, and account for the social costs and benefits of the transportation-land use nexus.

William Coyne (2003), in his case study of Colorado and the Denver metro area, found that building local roads costs 25 percent less in compact cities than in low-density communities. Following a smart growth strategy could save the metro area \$4.0 billion in road and highway construction over 25 years.

### **3.2 Effects of Urban Sprawl on Health**

Staff at the USDA’s Economic Research Service, writing on *Development at the Urban Fringe and Beyond*, cites that one impact of traffic congestion is air pollution. Air pollution in turn increases smog and other pollutants which translate into respiratory problems such as asthma for some. Frumpkin (2002) argues that there is a relationship between sprawl and public health. Low residential density, low employment density, low connectivity, is associated with less walking and bicycling and with more automobile travel. Twenty-five percent of all trips in the U.S. are shorter than one mile; however 75 percent of us make that trip by car. A sedentary lifestyle is responsible for obesity and other vascular problems.

McCann and Ewing summarize the findings from a 2003 national study of 83 metro areas and their counties. Based on their review of the literature on the health effects of sprawl, McCann and Ewing conclude that community design influences how people travel and how physically active they are in the course of a day. In the 2003 national study, researchers measure urban form in terms of residential density and street connectivity. Physical activity is measured in terms of hypertension rates, obesity, and body-mass-index. To increase physical activity, McCann and Ewing recommend that jurisdictions narrow streets at intersections, create raised crosswalks, install traffic circles, and lay bicycle and pedestrian infrastructure.

Some of the findings:

- Hypertension rates are 3.3 points lower in compact counties than in sprawling counties.
- 71 percent of the parents of school age children walked or biked to school when they were young but only 18 percent of their children walk or bike to school
- 19 percent of adults in a sample of compact counties were obese compared to 22 percent of adults in sprawling counties
- A state-by-state analysis, conducted in 2001, showed that Colorado has fewer obese adults: 10-14 percent. In nearly a fifth of the states (including Maryland and Virginia) 15-19 percent of the adult population is obese. In the vast majority of states, 20-24 percent obese. Mississippi's adult obesity rate is over 24 percent.
- In the state of Maryland, Montgomery County, Prince George's County, and Baltimore City are compact.
- In a sample of 83 metro areas, 2 percent of the population in sprawling metro areas chose to commute by transit compared to 7 percent in compact metro areas.

### **3.3 Infrastructure Costs and Public Services Provision**

It is the fiscal argument that perhaps provides the best support for growth management measures. Cox and Utt (2004) tried but, according to Litman (2004), fail to prove that developments at the fringe of urban settlements have a positive impact on local budgets. Litman focused in on their claim that the savings from smart growth are trivial. Cox and Utt only looked at water and wastewater charges when they should have examined the full range of public services: including the costs of providing electricity, sanitation, schools, and roads. In the second place, their unit of analysis was not properly specified. Cox and Utt measured municipal expenditures. Most "sprawl" occurs outside of existing municipal boundaries.

Heimlich and Anderson (2001) reviewed five case studies of managed growth in New Jersey, Michigan, South Carolina, Kentucky and Delaware. In all instances, low-density development generally resulted in greater public capital and operating costs for infrastructure:

- 25 percent higher for local roads than in planned developments
- 20 percent higher for utilities than in planned communities
- 5 percent higher for schools than in planned communities

Snyder and Baird (1998) in their report to the U.S. Department of Energy contend that: (1) the true costs of low-density development are hidden; (2) sprawl is being subsidized by federal and state programs; (3) new developments rarely if ever generate sufficient tax revenues to pay for the additional demand they put on public services. These authors recommend implementing fair-share costing methods (to be discussed in a later section).

From a developer's perspective dense developments may be more expensive than a low-density scenario. This is true only if the hard and soft costs of construction are considered. If vehicle miles travelled and driving subsidies are taken into account, as Snyder and Baird suggest, the balance sheet favors higher densities.

Snyder and Baird's argument in favor of fair-share costing is supported by cost studies prepared by an ever increasing number of local governments. Coyne (2003), in his case study of the Denver metro area, examined the potential net cost savings, over a five year period (2000-2005), from providing services to new subdivisions under four development patterns. As shown in the table below, if the metro area develops at higher densities, local governments could experience greater savings: 81.0 million over five years or an average 16.0 million per year..

Development Pattern	Cost Savings
Sprawl	\$0
Land Protection	\$17,000,000
Rural Clusters	\$22,000,000
Urban Growth	\$81,000,000

With the passage of California's Senate Bill 375, that state's 18 metropolitan planning organizations are in effect requiring their local jurisdictions to analyze the costs associated with current development patterns versus alternative development scenarios. Calthorpe Associates (2009) prepared a statewide analysis showing how much California jurisdictions, in aggregate, would spend on infrastructure by 2020 and 2050. The modeling effort considered three development scenarios.

Development Pattern	2020	2050
Current Trend	\$147.0 bill	\$450.0 bill
Smart Low Alternative	\$93.0 bill.	\$285.0 bill.
Smart High Alternative	\$68.0 bill.	\$209.0 bill.

The California analysis shows that the state would save between \$5.4 and \$7.9 billion annually by 2020 depending on which compact development alternative was adopted by all jurisdictions. More importantly what is emphasized by Snyder and Baird (1998), Calthorpe (2009), Coyne (2003) and others is that local governments ought to require fiscal impact analysis as part of the development review and/or master plan process. Knowing the costs of growth under current and alternative development patterns could help local governments guide and manage that growth.

Case studies have shown that per unit costs of providing public services (particularly infrastructure) decreases with higher densities. However statistical analyses by Ladd and Yinger (1991) and Ladd (1994) turned that argument up-side down. They found that the relationship between density and cost may be U-shaped: At some tipping point, higher densities lead to the diseconomies of scale—with infrastructure costs 43 percent higher in increasingly dense counties.

Carruthers and Ulfarrson (2003) were skeptical of Professor Ladd's conclusion. They developed a set of ordinary least squares regressions to test the following hypothesis: low-density, spatially expansive development patterns lead to greater costs because of the large investments required to extend roads and other types of infrastructure long distances to reach relatively fewer numbers of people. Their statistical analysis, based on a sample of 283 metro areas, does confirm that as density increases government spending per capita decreases, generally. The finding also holds true for spending per capita on capital facilities, roadways, police protection, and education. For example, suppose that in jurisdiction X which has a population of 100,000 the current cost of per capita spending on capital facilities were \$1000 per person or \$100,000,000 annually. Further suppose that density increases by one percent—an additional 1000 persons. Under the Carruthers-Ulfarrson theory, spending per capita decreases 0.03 percent for every one percent increase in density

Population	Per Capita Spending	Total Cost
100,000	\$1000	\$100,000,000
101,000	\$999.7	\$100,969,700
109,370	\$997.3	\$109,073,586

Sole-Olle and Rico (2008) followed up on the work of Carruthers and Ulfarrson. Rico and her colleague examined the relationship between urban sprawl and cost of public services for the Spanish situation. The results from this study are informative to the extent that we recognize that urban sprawl is a global phenomena and that conditions in western European countries, are not too drastically different from the United States. Furthermore, the more robust methodological approach

followed by the Spanish team should be replicated by researchers in this county. Unlike Carruthers and his associate who analyzed metro areas, Solle-Olle and Rico examine municipalities—a sample size of 2,500. Also, they do not follow a simple regression model but a piecewise linear function. Lastly, while much focus has been given to density as a proxy for urban sprawl, this research team uses per capita urbanized land area as the proxy. Next they delineated a range of “densities” that constitute a compact development pattern and a sprawl pattern. Note, if the Carruthers-Ulfarson model were applied it to say Montgomery County, the density measure would take into account the Agricultural reserve and other rural areas. Solle-Olle and Rico only measure the density of developed areas thus allowing one to compare compact and dispersed patterns. Their analysis indicates that while government spending on services and infrastructure increases under both development patterns, the increase is less under the compact pattern.

Development Pattern	Increase in urbanized area	Increase in Spending
Compact	10%	0.8%
Sprawl	10%	1.5%

Carruthers and Ulfarson (2008) returned to the question five years after their first study. In this second look they analyze per capita expenditure by local governments in all 3,075 counties. They measure the impact of density on spending as well as the impact of percent developed on spending. Based on the results from this study, they are able to monetize the impacts of density on local government spending: “With a population of 88,000 and per capita total direct expenditures of about \$3200, the average county would save an annual \$1.18 million if it were 25 percent more dense; \$2.36 million in savings if it were 50 percent more dense.”

### **3.4 Socio-Economic Costs of Low Density Development**

Been (2005) reviewed the literature on the cost of smart growth-- specifically the influence of impact fees on housing affordability. It is her assessment, and one echoed by others, that impact fees have a negligible impact on housing affordability and that more importantly they are an effective growth management tool. Fees are predictable and more likely to be accepted by the development community. Perhaps for this reason, development fees have little effect on the rate of new construction.

Impact fees certainly increase the price of housing. Waddell and Blanco (2004) conducted a least-squares regression analysis measuring the influence of impact fees on the sales price of new single family homes in King County, Washington. They found that a \$1 increase in impact fees is correlated with a \$1.66 increase in house price. With respect to high quality housing, a \$1 increase in fees leads to a \$3.58 increase in house price.

Been also reviewed work by Ihlandfeldt and Shaughnessy (2004) showing that impact fees reduced the property tax rate after a 3-year lag. They analyzed the impact fee home sales relationship in Miami-Dade County Florida. Land prices also declined by eight percent due to the use of impact fees.

One critique of impact fees is that they are regressive. Been cites work showing that basing impact fees on housing type and unit size reduces the regressive character of the fee.

As a counterpoint to Been's 2005 piece, is a 1982 article by Dowall and Landis "Land-Use Controls and Housing Costs: An examination of San Francisco Bay Area Communities". Dowall and Landis find that land use controls particularly those that encourage higher densities have an inflationary effect on land values, and restrict new development. Dowall and Landis urge local governments that are committed to reducing housing costs to loosen density restrictions and/or other controls that inhibit the flow of new housing on the market. In their analysis they appear not to take into account the cost of infrastructure or the cost of providing other public services.



#### 4. Remedies

How can jurisdictions minimize or reduce the costs of low-density development? Research presented in the published articles and working papers reviewed offer solutions that are similar to those already pursued in Montgomery County: the application of an adequate public facilities ordinance, charging development impact fees, preserving open space and rural lands, creating transit-oriented developments and mixed-use centers. Tools that the County has not used include urban growth boundaries, varying fees by distance and development type, eminent domain, congestion pricing, land banking, infrastructure funds, and mechanisms to assume or offset a developer's upfront costs.

- The Urban Growth Boundary (UGB), first used in Portland Oregon, has emerged in other jurisdictions: Boulder Colorado, Minneapolis-St. Paul, Virginia Beach, Lexington Kentucky, San Jose California, and Miami-Dade Florida. Growth boundaries, however, have not proven effective in all settings. Knox County Tennessee instituted a UGB but a recent evaluation by researchers at the University of Minnesota found that Knox County's UGB was unable to effectively prevent sprawl. There are no examples of a UGB or USB (urban service boundary) in the Washington DC region. It may not even be necessary for Montgomery County where its agricultural reserve serves as a boundary. Moreover, the County has other tools directing growth and density to its central business districts and activity centers.
- Varying exactions by distance and development type. In Lancaster, California, the impact fee charged a developer varies based on distance from the urban core. For example the fee charged developments within a 2-mile radius of a CBD may be negligible but the further a development is from that designated bubble, the greater the fee; the fee would have to increase by some increment. Boulder Colorado charges an excise tax based not on distance but type of development. Issuing higher excise tax for new single family residential developments and less for new multifamily (Snyder and Bird 1998).
- Applying the power of eminent domain to direct development activity to already dense centers. Although the method is controversial, the courts have weighed in favor—see *Kelo v. City of New London*, *Housing Authority of Hawaii v. Midkiff*, and *Poletown Neighborhood Council v. City of Detroit*.
- Congestion Pricing. If roads are not being used efficiently then congestion pricing or congestion tolls could correct for this problem (Bogart 1998). The theory is that congestion pricing gives consumers the true cost of the journey-to-work and thus allows them to consider alternative modes of travel: bicycle,

bus, rail, foot. The Montgomery County *Businesses Gazette* in a May 21, 2008 issue, noted that although its use was rejected in New York, other cities have adopted this technique: London and Singapore have congestion pricing for business districts. San Diego, Orange County California and Lee County Florida have congestion pricing for individual facilities. The Intercounty Connector will use congestion pricing and the Planning Board supported its use in managing the expansion of I-270 in its report on a locally preferred alternative to the County Council in July.

- Land Banks. The concept of land banking has been around since the 1960s. The objective is for local governments to acquire abandoned, surplus, vacant, or brownfield properties and convert them to productive use or hold them for long term strategic public purposes. Thus, it is a tool that could be used to great effect for planning and economic development purposes. The land bank could acquire foreclosed properties, for instance, and turn them over to some non-profit to sell or manage as affordable housing (Alexander 2008). The land bank could acquire vacant and abandoned land with expectation that a non-profit or for profit entity could develop it as a mixed use project. It could also serve as custodian preserving a greenfield. The state of Maryland through legislation has permitted the city of Baltimore to create a land bank. Other communities with land bank authority include Buffalo, San Diego, Houston, and Dallas. The Brookings Institution has even suggested that a federal or state land bank could specialize in managing market distortions by purchasing an excess supply of properties.

The costs of any kind of growth include both the costs to construct, and then to maintain, the supporting public facilities and services. The Planning Board supports further study, in conjunction with the Executive branch, of the fiscal sustainability of different types of growth specific to Montgomery County as part of the 2011-2013 Growth Policy.

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## Growth Policy Study: Appendix Q –Public Outreach

Lead Staff: Pam Dunn

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### Summary:

Over the past nine months, planning staff has engaged in numerous public outreach efforts to encourage public participation in the 2009-2011 Growth Policy. In fall 2008, four community meetings were held across the county. Also in the fall, an on-line survey was launched and comments were collected throughout the winter. Following a meeting with the Planning Board in March 2009, two additional public outreach sessions were conducted in May where staff provided preliminary recommendations on the Growth Policy and collected comment cards in response. Last, a public hearing was held on June 22nd on the staff draft of the 2009-2011 Growth Policy. In response to public testimony, both oral and written, staff has summarized the main areas of concern in the testimony.

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### **Fall 2008 Community Meetings and On-line Survey Results:**

Last fall staff launched a public outreach campaign to inform interested stakeholders about Growth Policy and to elicit opinions on growth from County residents. To kick off this effort, a booth at the Silver Spring Fall Festival was staffed with planners who engaged the public in conversation about growth and development. At the festival, residents were provided the opportunity to answer an on-line survey and were offered information on upcoming meetings to be held regarding Growth Policy.

Following extensive public notification through press release, website posting, flyer distribution, and news articles, four community meetings were held in November and early December. The meetings were held in different areas of the County and at different days and times. This was done in an effort to increase participation and provide various opportunities for attendance. In addition to these meetings, an on-going effort is underway to publicize and encourage participation in the on-line survey.

At each of the four community meetings, staff made a presentation summarizing growth policy and introducing new concepts under consideration for inclusion in 2009-2011 Growth Policy. Following the presentation residents were asked to participate in guided discussions grouped into four categories: connections, diversity, design and environment. During each discussion, residents were asked to assess the relative value they place on various amenities related to each category.

Provided the prompts below participants were given a number of votes (less than the number of available prompts). Participants were instructed to place their votes on the amenities they value most, allowing for multiple votes per amenity. Below are the results:

Connections	Percentage of Total Votes Cast
Neighborhood parks easily accessible by bike or walking	7%
Stores, libraries, schools or other public facilities accessible by walking, biking or taking transit	21%
Access to transit like Metrorail, Metro bus, or Ride-On nearby	15%
Improved sidewalks, biking and walking trails	29%
Access to jobs by transit, walking or biking	11%
Universal Wi-Fi access	9%
Development of a bus rapid transit system	10%

Diversity	Percentage of Total Votes Cast
Varied housing-type choices such as apartments, single-family homes, senior-living, etc...	15%
Varied housing choices for different income levels	9%
Attracting and accommodating people of all ages, abilities, incomes and cultures	22%
Increasing transportation choices	27%
Creating a mix of homes, jobs, shopping and public places	24%
Neighborhoods with a range of building heights, materials and uses	3%

Design	Percentage of Total Votes Cast
Commercial and residential centers with stores and restaurants that	24%

encourage walking	
Sidewalks, building entrances and public spaces accessible to everyone	10%
Beautiful public gathering places with green and active uses	19%
Fewer surface parking lots; replaced with structured parking or renovated for developed use	15%
Quality projects that contribute to a positive perception of our community	10%
Recognize neighborhood character to retain or encourage community identity	22%

Environment	Percentage of Total Votes Cast
Energy efficiency and energy producing buildings	22%
Improved air quality	7%
Re-use of historic, existing and structurally sound buildings	10%
Compact development to reduce environmental impacts	10%
Restore and preserve wetlands, forests and sensitive habitats	23%
Reduce impervious surfaces such as surface parking lots to reduce storm water runoff	18%
Use existing infrastructure more intensively instead of building more (roads, water and sewer lines)	10%

In addition to voting, comments from the discussions were noted by staff. Most of the comments were additional amenities that the residents thought should be added to the list, or an elaboration on why a certain amenity had value. With regard to *connections*, several residents commented that pedestrian safety and lighting should be noted as another amenity of value. Several other residents suggested their desire to see Metro expansion brought to Germantown and/or Clarksburg, as well as expanded MARC service in the form of extended hours and weekend days. Although the majority of residents participating support an increase in transit, a few residents commented that they hoped major routes in the current road system would not lose lanes or shrink in lane width.

Under *diversity* it was noted that residents desire a variety in senior-housing – more mixed-use rather than campus setting. A common remark heard in this discussion was the need to protect local businesses in the face of expansion and redevelopment. Several residents remarked on the importance of neighborhood character and identity in both the *diversity* and *design* discussions.

With respect to *design*, a common remark was the need to integrate the landscape and natural environment into the project design. In addition, access for cyclists was also mentioned as a priority for design. Under *environment*, a few residents suggested providing incentives for green development through the provision of tax credits and regulation of greenhouse gas emissions was also requested.

The on-line survey is similar in design to the set of prompts presented at the community meetings. The survey is organized into the same four categories. Respondents are asked to rank from *least important* (a value of 1) to *most important* (a value of 7) a list of amenities almost identical to the list provided at the public meetings. One difference is that survey respondents could score every amenity as being *most important*. So far, over 150 surveys have been completed. Given most of the prompts are positive in nature, a majority of the prompts have received a ranking of 5, 6 or 7 by over 80% of the respondents.

Two questions were added to the on-line survey to gauge residents' valuation of the potential trade-off between (increased) traffic congestion (in the short-term) in exchange for increased transit or more energy-efficient design. For the first question, "Longer commute by car OK if you know transit is coming in a few years" approximately 39% of the responses were in the "*least important*" categories (scoring 1,2 or 3) compared to 38% rating it in the "*most important*" categories (scoring 5,6 or 7). For the second question, "Longer commute by car OK if you know new development will feature energy-efficient, walkable communities" the response was similar, 45% rating it in the "*least important*" categories compared to 47% in the "*most important*" categories.

Although these two questions did not receive an 80% or greater "approval rating" as did the other survey questions, the response was still positive. Overall, reception to the Growth Policy presentation and the discussions on growth were met with enthusiasm. Residents welcomed the opportunity to discuss growth and its implications in a framework broadened to include concepts related to diversity, design and the environment.

### **May 2009 Public Outreach Sessions:**

Following staff discussion with the Board in March, two additional public outreach sessions were conducted. One was held at the Planning Department on May 11th, the second was held at the Shady Grove Training Center on May 18th. These meetings were structured in an "open-house" format; residents were provided with wide-ranging information on Growth Policy and the opportunity to share their concerns and questions with staff one-on-one. To facilitate the discussion, staff prepared several presentation boards covering a range of topics from the basics of Growth Policy to the preliminary recommendations, discussed with the Planning Board on March 20th. Staff collected comment cards from residents as well as recorded comments from personal discussions.

A few of the recurring comments received by staff include:

- Residents would like to see more bikeways connecting residential areas to other areas.
- Residents are eager to learn more about the plans for the Corridor Cities Transitway, and encourage its development as soon as possible.
- Dense development near transit is acceptable as long as there is transitioning to lower density against existing neighborhoods.
- There is concern that the transit system cannot keep pace with the increase in demand generated by intensified development near metro.
- Timing is important for implementation; plans should have staging that limits development until specific improvements are made.
- Historic preservation should be respected in concurrence with policies to incentivize growth.

### **June 2009 Summary of Public Hearing Testimony:**

A public hearing on the 2009-2011 Growth Policy was held on June 22, 2009. Twenty-two Montgomery County residents testified before the Planning Board. The public record was held open for a week following the hearing; an additional twenty-four residents provided written comments. Of the twenty-four written responses, twenty-three were provided by residents of Kensington or Garrett Park. Of these twenty-three, twelve wrote in response to the following question posed by the Chairman, "Should we let growth occur only where there is adequate infrastructure?" There was agreement amongst the respondents that growth should only occur where there is infrastructure to support it. Nine other written submissions were directly related to the White Flint sector plan; seven of these expressed unease over the level of growth proposed in the White Flint plan. One resident wrote in opposition to the use of the Growth Policy public hearing for expression of White Flint specific issues, stating that this misuse was unfair to residents participating in the White Flint process who did not testify.

Of the twenty-two residents who spoke before the Board, almost half voiced concern with the White Flint sector plan; a few residents expressed concern over school crowding that could result from the increased density proposed in the plan, while a majority of those who spoke stated their opposition to a separate implementation authority proposed to manage transportation infrastructure. With respect to schools in general, the concerns were split. Several residents spoke out against an increase in the School Facility Payment threshold, while an equal number expressed dismay over the moratorium threshold, suggesting that it is set too low. With respect to the Smart Growth Criteria, several residents were critical of the PAMR offset, citing concern over a possible reduction in mitigation while a couple individuals associated with the building industry expressed concern over the practical ability of development to make use of this alternative. Lastly, the Board heard testimony from the development community that PAMR should be replaced with a payment-in-lieu fee for trip mitigation.

The following questions were posed by staff as a representation of the concerns voiced through public testimony. Staff provided these questions and answers for the Planning Board to use as a guide for discussion.

**1. Should the threshold for moratorium on residential subdivisions be 120%?**

The Planning Board and the Montgomery County School Board recommended a 110 percent School Facility Payment threshold during the 2007-2009 Growth Policy deliberations. Both Boards also proposed a 135 percent capacity ceiling. The Growth Policy Resolution adopted by the County Council set the threshold for moratorium at 120 percent. Staff does not recommend changing the threshold for moratorium at this time.

Prior to the 2007-2009 Growth Policy school capacity was based on "Growth Policy capacity". "Growth Policy capacity" set the number of students per grade per classroom at a specific level (22 students for all-day kindergarten, 25 students for grades 1-6, and 22.5 students per classroom at the secondary level). School cluster capacity was then calculated based on these particular capacity figures – regardless of how many students were programmed for each classroom (such as 17 per classroom for grades 1 and 2 where class-size reduction programs for reading are in place). In the 2007-2009 Growth Policy, the measurement of school capacity changed to "program capacity". "Program capacity" is the number of students per grade per classroom as determined by Montgomery County Public School (MCPS) programming specifications. Switching from "Growth Policy capacity" to "program capacity" created a tighter test on school adequacy as "Growth Policy capacity" is, over-all, greater than "program capacity".

In moving to a stricter test on capacity, the Planning Board and the School Board recommended increasing the threshold at which a school facility payment is required as well as increasing the threshold for moratorium. Basically, the recommendation was to equate the capacity level at which a school facility payment would be required or a moratorium triggered under the prior (growth policy) capacity level to an equivalent threshold at the new capacity level. Thus, the recommendation for the school facility payment threshold moved from 100 percent of "growth policy capacity" to 110 percent of "program capacity" and the moratorium threshold increased from 110 percent of "growth policy capacity" to 135 percent of "program capacity".

The County Council supported the switch from "Growth Policy" capacity to "program capacity" but did not agree with the school facility payment threshold or the threshold for moratorium. The Council's concern with the moratorium threshold was that at its equivalent level under "Growth Policy" capacity, the test was rarely failed. The Council had one member who voted to accept the moratorium threshold at 135 percent, but had another member that advocated a threshold of 115 percent. The eventual compromise landed the threshold at 120 percent. Staff does not have any a priori reason to recommend a change in the threshold for moratorium at this time, but recognizes that the choice of such a parameter is as much "art" as "science".

Some of the testimony supplied for the public hearing indicated a desire for the Planning Board to consider returning to "Growth Policy" capacity as a measure of adequacy. Staff does not believe that this would be a better measure than the "program capacity" currently in use. If, in fact, the Board would

consider such a change, staff would recommend a re-evaluation of the previous thresholds – the 100 percent for application of the school facility payment and 110 percent for moratorium. One thing to note, a return to “Growth Policy” capacity and adoption of the previous thresholds would still place the Bethesda-Chevy Chase cluster in moratorium due to a projected utilization rate of approximately 129 percent under “Growth Policy” capacity.

**2. Should the threshold for application of the School Facility Payment be 110%?**

A primary concern in the public testimony involving the school recommendation is that easing the threshold for application of the school facility payment will increase overcrowding and reduce revenue for facility needs. Staff concurs that raising the threshold at which a school facility payment is required would reduce revenue to the County. Yet, staff believes that the 110 percent threshold is a better representation of the threshold at which the Montgomery County Public School (MCPS) system recognizes a capacity issue within a cluster and begins the process of evaluation for remediation.

Given periodic shifts in enrollment trends within clusters, either through new development, changes in neighborhood demographics or changes in the birthrate, it is fairly common to have utilization rates between 5 and 10 percent over or under capacity. Facility planning occurs in response to individual school capacity; the level at which an individual school requires additional infrastructure is an approximately 6 classroom deficit. For the average high school (1,600 student capacity) this would be equivalent to approximately 150 students over capacity; a utilization rate of 109.4 percent. Staff recommends that the test for the adequacy of public school facilities be revised so that the threshold that triggers a School Facilities Payment is 110 percent of MCPS program capacity.

Staff does not recommend any changes to School Facility Payment rate. For FY2010, the costs per unit type are shown in Table 1:

**Table 1. School Facility Payment Rates for FY 2010**

Cost per unit by housing type	Elementary	Middle	High
Single-family detached	\$6,245	\$3,659	\$3,734
Single-family attached	\$4,118	\$3,100	\$3,050
Multi-family garden apt.	\$2,986	\$1,423	\$2,081
High-rise; low-rise w/structured parking	\$820	\$991	\$941

**3. Should grandfathering of completed applications be considered?**

Another concern voiced during the public testimony involves the administration of the annual school test. The most recent school test placed three school clusters into moratorium for residential subdivision approvals. Within these clusters development applications have been submitted and reviewed over the past few months to a year. A school queue was instituted as a result the last Growth Policy; it was meant to monitor school clusters as development applications are completed in order to gauge how quickly any one cluster is approaching either a School Facility Payment or a moratorium. The school queue did not predict the moratorium placed on the B-CC and Seneca Valley clusters.

One significant reason for this is that new development contributes only a small portion to the enrollment changes occurring in most school clusters. In the B-CC cluster, most of the over-crowding has been attributed to the unexpected rise in kindergarten enrollment. This is due, in part to the recent shift to all-day kindergarten, changes in the neighborhood demographics and partly due to an increase in households choosing public education over private.

The APFO directs the Planning Board to approve preliminary plans of subdivision only after finding that public facilities will be adequate to serve the subdivision. For applicants that have completed their application and have engaged in discussions with Planning staff about requirements to proceed to Board approval, the imposition of a moratorium near the end of this process is extremely frustrating and costly.

One alternative would be to grandfather all applications completed within a 6, 9 or 12 month period preceding the moratorium. For B-CC, four completed applications have been submitted between July 1, 2008 and July 1, 2009. Two of these projects have been approved by the Planning Board. The other two projects cannot move forward until the cluster moves out of moratorium.

#### **4. Should trading APF capacity within a School Cluster be allowed?**

In the Staff Draft, the concept of trading transportation APF approvals for projects was introduced to both streamline the provision of transportation capacity and, over time, reduce the unused backlog of pipeline capacity that requires new development entering the queue to reflect the growth of the approved development already in the queue ahead of them.

Staff recommends extending the trading concept to trading school APF approvals as well. There are two general issues to be addressed:

- The geographic areas between which APF validity could be traded, and
- The administrative methods to exchange the validity

#### **Geographic Areas**

Staff recommends that APF validity should be transferable only within a school cluster. So, for instance, a site in the B-CC cluster with a valid APF approval but no plans to construct within the APF validity period could trade that APF capacity to another site within the B-CC cluster.



The transfer of APF would be based on an equivalent number of students generated by both sending and receiving sites. For example if the sending location has been tested and obtained an APF approval for a development that generates 10 elementary students, 8 middle school students and 7 high school students, the new location or receiving location within the cluster will receive approval for the number of dwelling units at the receiving site that generate the same number of students or a lower number of students. If the planned project receiving the APF approvals generates the same or fewer students at each school level then the transfer can proceed.

### **Administrative Mechanisms**

The recommended APF transfer process would require both sending and receiving sites to concur on a joint set of preliminary plan applications to simultaneously “expire” the APF approval from the sending site and grant the equivalent APF approval for the receiving site. A validity period of the transferred APF may be extended as part of the transfer, but not more than 5 years including whatever validity remains from the test for the sending area. The applicants would need to agree on the fair market value of the transfer without any intervention from the public sector.

### **Transportation:**

The primary concerns in the public testimony are that the proposed changes to Policy Area Mobility Review (PAMR) would:

- result in greater levels of traffic congestion and not improve transit system performance,
- provide fewer mitigation resources that would result in lower levels of trip mitigation associated with new development.

Staff concurs that the recommendation to adopt a “symmetrical LOS” policy would change the County’s policy to allow more congestion in the distant future, but only when and where transit services have improved dramatically. Staff believes that this approach best utilizes scarce transportation resources by recognizing that in urban areas, maximum system throughput occurs at densities (LOS E) that reflect delay to individual users. In the interim, however, the effect would only be on the definition of PAMR mitigation for areas with partial mitigation.

Staff does not concur that the changes proposed in the Growth Policy would provide fewer mitigation resources in total. Rather, the reduction in the likelihood of any applicant requiring PAMR mitigation would be more than offset by the proposed increase in mitigation cost for those applicants who must mitigate trips. Planning Board support for the \$11,000 per vehicle trip mitigation will help ensure that total transportation system resources are increased, rather than decreased, by the staff proposals. Both the traffic congestion and mitigation resource aspects of this tradeoff are discussed further in the following paragraphs.

### **5. Should we allow additional congestion in our most urban areas?**

The definition of transportation system adequacy continues to be an area where there is a lack of consensus regarding customer expectations. There is, notably, already an established County Council policy on the matter of acceptable conditions in the current Growth Policy, although it differs from the position of Department staff.

The primary focus of the disagreement has to do with expectations for auto travel speeds in areas with high levels of transit service. The discussion of different expectations has been reviewed several times with both Planning Board and County Council members:

- The definitions of the PAMR process are incorporated in Sections TP2 and TP3 of the Growth Policy resolution, included as Attachment X to this report
- A comparison of the current Growth Policy LOS standards and the proposed “symmetrical” LOS standards are described on pages 2 through 7 of the Growth Policy Appendix M.

The focal point of the disagreement relates to the level of transportation service appropriate when the relative transit mobility reaches LOS B or better. For FY 2010, no policy area has LOS B transit service.

Staff has inserted the LOS letter grades on the PAMR chart, as requested by the Planning Board members, to help provide clarity regarding the derivation and definition of the “stairsteps” on the chart. The chart on page 33 of the 6.15.09 Draft has a typographical error in that the Relative Transit Mobility grades need to be changed from A through E (as one reads from left to right) to the correct values from F to B (as transit mobility improves as one moves to the right along the horizontal axis).

The use of the letter grades improves clarity but requires continuing education regarding the fact that grades based on customer service are do not have the same values as grades based on transportation system efficiency. An “E” is a bad grade in the classroom. An “E” is also a sign that individual travelers experience some delay and discomfort in a transportation facility. However, an “E” is also a sign that the system is operating at peak capacity for person-throughput, which in urban areas is usually the most efficient use of scarce resources such as right-of-way and capital and operating costs. From a transportation planner’s perspective “E” can stand for “efficient”.

The difference between letter grades and system performance was evident in the County Council review of the BRAC intersection projects on June 30. Several Council members expressed concern that the state was designing intersection solutions that would operate at Level of Service E rather than at Level of Service F, a seemingly minor improvement. The value of the projects was more accurately conveyed by the information that at MD 355 and Cedar Lane, the delay experienced by each traveler during rush hour would be cut by more than half, from more than two minutes to less than one minute.

#### **6. Should the net effect of PAMR changes result in a reduction of transportation system resources?**

As described in Appendix M, the “symmetrical LOS” proposal would reduce PAMR mitigation requirements for a fairly large geographic area of the County, but these areas (most notably the Georgia Avenue Corridor) are not where the future growth of the County lies. Staff has prepared a cursory

examination of the “lost mitigation” due to the symmetrical LOS proposal by comparing the amount of job growth from 2010 through 2030 by policy area. Under the current Growth Policy PAMR mitigation, the average PAMR mitigation percentage, weighted by 2010-2030 job growth, is 36%. Under the “symmetrical LOS” proposal, the average PAMR mitigation percentage weighted by the same job growth is 28% percent. In other words, under the staff proposal, we might expect to lose about a quarter (the ratio difference between 28% and 36%) of trips requiring mitigation due to the “relaxed” congestion standards.

The sum total of the changes to PAMR are expected to actually increase, rather than decrease the total amount of mitigation, because three different proposals have offsetting effects on the amount of expected mitigation:

- The proposal to adopt **symmetrical LOS standards** would substantially reduce the number of proposals for which mitigation is required. In FY 10, the effect of reduced mitigation is greatest in the Georgia Avenue corridor, where substantial growth is not expected.
- The proposal to base mitigation on **\$11,000 per vehicle trip** in mitigation would substantially increase the average amount of mitigation per trip for those applications requiring mitigation, including in the I-270 corridor, where substantial growth is expected.
- The proposal to consider PAMR offsets for **Smart Growth criteria** would encourage development with lower trip generation characteristics

#### **7. Should PAMR be strengthened to ensure mitigation proposals provide value?**

The current PAMR requirements, building upon the previously adopted LATR Guidelines, have resulted in a variety of mitigation techniques. The LATR/PAMR Guidelines are designed to encourage flexibility in mitigation approaches so that they can be tailored to the needs of each applicant. Ironically, the same flexibility that allows applicants to propose creative approaches to their mitigation is sometimes a burden in gaining regulatory review agency approval of the same creative approaches.

The \$11,000 value per vehicle trip value is based on a summer 2008 review of a range of capital project costs and benefits as well as sample payment-in-lieu-of-construction practices in other jurisdictions, summarized in Exhibit 1. This report (part of Growth Policy study “F4”) was discussed with the Planning Board on July 21, 2008 and is available at:

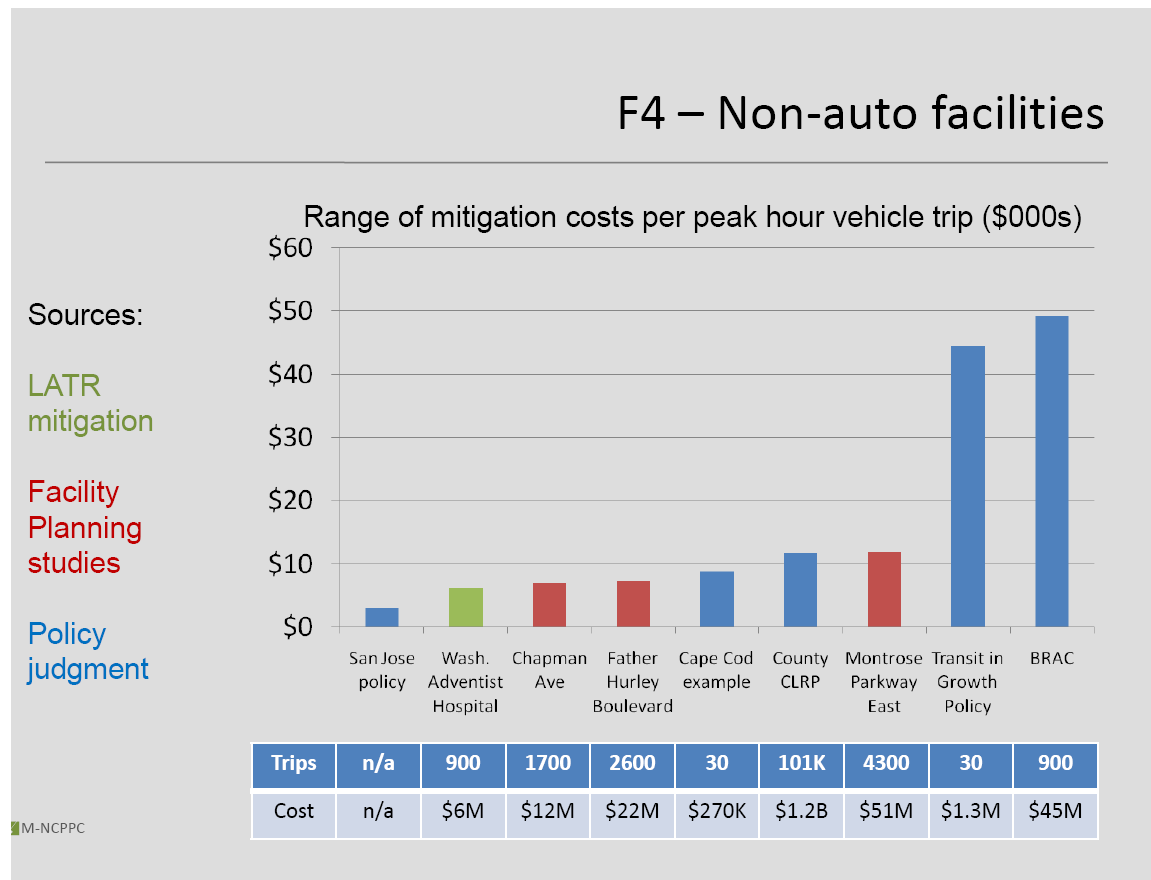
[http://www.montgomeryplanningboard.org/agenda/2008/documents/20080721\\_growth\\_studies\\_all.pdf](http://www.montgomeryplanningboard.org/agenda/2008/documents/20080721_growth_studies_all.pdf)

In October 2008, the Planning Board revised the LATR/PAMR Guidelines to allow applicants to directly pursue payment to the County of an \$11,000 per vehicle trip mitigation fee for applications requiring mitigation of fewer than 30 peak hour vehicle trips. This was a response in part to cases such as the Wheaton Hills building permit (#470270) in which staff estimated approximately 55 hours in coordination was spent to implement two handicap ramps, an estimated total value of about \$1,500 of mitigation. The staff report for that Planning Board action is available at:

[http://www.montgomeryplanningboard.org/agenda/2008/documents/20081002\\_pamr\\_mitigation\\_print.pdf](http://www.montgomeryplanningboard.org/agenda/2008/documents/20081002_pamr_mitigation_print.pdf)

The current LATR and PAMR Guidelines indicate that the \$11,000 value should escalate automatically for any fiscal year during which a new value is not established. Given the current economic climate, staff recommends retaining the \$11,000 value established by the Planning Board unchanged for both FY 10 and FY 11.

**Exhibit 1. Range of mitigation costs per peak hour vehicle trip**



The County Executive is not supportive of this approach to proceed directly to payment-in-lieu at any level of mitigation. The fact that handicap ramps are overvalued in the current LATR/PAMR Guidelines is the latest manifestation of the “whimsical bus bench” critique the Planning Board heard in Growth Policy testimony during 2007.

However, other PAMR mitigation cases have resulted in substantial success, including two cases heard by the Planning Board in June 2009:

- The Montgomery General Hospital special exception case (CBA-2521-J) needed to mitigate 45 trips. To mitigate these trips, the applicant will build a transit center at an estimated cost of \$959,526; or about \$21,000 per trip.
- The Wendy's Colesville preliminary plan amendment case (12002056A) needed to mitigate 20 trips. To mitigate these trips, the applicant will fully construct a portion of Vital Way, a master plan business street, at an estimated cost of \$200,000; or about \$10,000 per trip.

Also in June 2009, the Planning Board approved the Fishers Place at Twinbrook Metro preliminary plan (11999043C) amendment. The applicant needed to mitigate 127 LATR trips and proposed a means to satisfy the requirements by installing transit kiosks and other non-auto amenities per the LATR/PAMR Guidelines that would have a value of \$261,000, or about \$2,050 per trip. Instead, the Planning Board conditioned the contribution of \$261,000 toward our CIP Project No. 048703, the Rock Creek Trail Pedestrian Bridge over Veirs Mill Road.

In another pending case, an applicant is working with WMATA to install additional real-time transit information signs in the Metrorail system. Given the differences between the transit information signs used by WMATA for Metrorail and those associated with a DOT bus shelter, the WMATA cost may work out to less than \$1,000 per vehicle trip, demonstrating that the Table 5 per-trip equivalencies are subject to a wide range of interpretation.

On average, staff estimates that PAMR mitigation may have averaged about \$3,000 per trip since the 2007 Growth Policy was adopted. Our sense is that there is a positive relationship between predictability, speed, and dollar values; some applicants will accept a higher dollar value associated with mitigation if it can be readily determined.

Staff estimates that the net effect of the three proposed (and offsetting) policy changes described above are likely to increase, rather than decrease, the value of total mitigation associated with PAMR, as:

- The average mitigation cost per trip might be expected to triple
- The number of trips requiring mitigation might be expected to be cut by about one-third
- The combined effect would be a doubling of resources for PAMR mitigation countywide.

#### **8. Will the Smart Growth Criteria actually incentivize Smart Growth?**

The assessment of offset PAMR impacts is complicated by the fact that the Smart Growth Criteria is designed to change both the FAR of the development and the mixed use component of it. Therefore, a project that diverts 50% of the PAMR mitigation resource toward affordable housing and gets credit for the other 50% is actually still reducing trips somewhat by virtue of a presumed shift from commercial to residential. The amount of the shift will always be unknown as the applicant is not required to submit a "non-Smart Growth" project as postulated in the examples presented in Appendix N.

The ability of the market to utilize the Smart Growth criteria is untested. Testimony from stakeholders suggested that very few applicants would use the PAMR offset process due to the cost of providing affordable housing, even with the PAMR offset, and the inability to mix residential and commercial uses on many sites. Staff does not recommend changes to make the Smart Growth criteria more attractive to the development community but rather recommends that we let the option be available for the next growth policy cycle and gauge its success two years from now. In the meantime, this offset process and other Alternative Review Procedures have been proposed to provide options to promote smart growth in smart growth locations.

Staff would consider the Smart Growth criteria a success if even 5% of the square footage approved in a given time period applied under this process. Staff does not expect that more than 10% of the square footage would be incentivized to use the process.

#### **9. Should the PAMR payment-in-lieu provision apply to sites with more than 30 trips?**

The development community is interested in the speed and predictability provided by the payment-in-lieu provision. The residential community is generally interested in seeing results of traffic mitigation on the ground in a timely manner. The Executive Branch representatives generally support having the development community implement projects, sharing both the residential community interest in results and the reduction of administrative overhead (the private sector can often construct improvements faster than the public sector can and the \$11,000 per trip does not include management costs). These interests are primarily why the “pay-and-go” approach to Growth Policy in 1999 was short-lived.

Staff recommends that the 30 peak hour vehicle trip boundary remains appropriate for moving directly to payment-in-lieu of construction; essentially a \$330,000 fee for 30 trips. Options would include:

- Moving directly to pay-and-go at \$11,000 per trip for all PAMR mitigation
- Establishing an escalated scale; mitigation at \$11,000 per trip if implemented by the development community or doubled (i.e., \$22,000 per trip) under a pay-and-go approach.