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**TRANSIT ORIENTED DEVELOPMENT:  
MOVING FROM RHETORIC TO REALITY**

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## FOREWORD

Three major trends characterize metropolitan America at the beginning of the 21<sup>st</sup> Century. The first trend is the resurgence of investment in America's downtown areas. We are seeing a re-inhabitation of our urban centers at a level that has not been experienced since the World War II. Data from the 2000 Census and analysis by the Brookings Institution Urban Center and the Fannie Mae Foundation show that this urban rebirth is a function both of people moving back to cities, and of immigrants choosing cities as destinations. Urban centers are once again seen as attractive, lively places to live and work, and as centers of intellectual and creative capacity.

The second equally powerful trend is the continuing growth and emerging maturity of America's suburbs, many of which are struggling to become cities in their own right. Suburban areas are increasingly diverse in race, ethnicity and income, and increasingly experiencing the travails of rapid growth. These growth issues include the need to diversify land uses to build more solid revenue bases, the need to create urban centers, and the growing problem of traffic congestion along overtaxed suburban arterials, compounded by the many cul de sac neighborhoods. Suburbs are increasingly vital and also increasingly challenged to become more than bedroom communities.

The third trend is a renewed interest in transit use and transit investment. Virtually every major city in America is planning some form of urban rail or rapid bus system, and states across the country are joining together to plan and build high-speed rail systems linking metropolitan regions in the West, the Midwest, the Northeast and the South. In fact, the wait for federal mass transit funding for a new project is estimated at almost fifty years. New rail or rapid bus systems have opened in the past ten years in such nontraditional places as Dallas, Denver, St. Louis, San Diego, Sacramento, Los Angeles and Salt Lake City, with substantial system expansions underway in virtually every traditional rail city.

At the convergence of these three trends is the realization that a substantial market exists for a new form of walkable, mixed-use urban development around these new rail or rapid bus stations and transit stops. Changing demographics are creating a need for a diversification of real estate projects, and for the type of development known variously as transit villages or transit-oriented development is beginning to receive serious attention in real estate markets as diverse as the San Francisco Bay area, suburban New Jersey, Atlanta, Dallas and Chicago. These transit-oriented developments have the potential to provide residents with improved quality of life and reduced household transportation expenses while providing the region with stable mixed income neighborhoods that reduce environmental impacts and provide real alternatives to traffic congestion. New research clearly shows that this kind of development can reduce household transportation costs, thereby making housing more affordable.

Sadly, a review of the projects emerging across the country reveals that many of the first phases of the new transit towns fail to meet these objectives. Most often they have conventional suburban single use development patterns, with conventional parking requirements, so that the development is actually transit-*adjacent*, not transit-*oriented*. Failures of design and planning abound, with many projects being traditional suburban developments that are simply located near transit. Institutional issues include unfriendly zoning codes and parking ordinances. Difficulties in dealing with the institutional complexities are prevalent, with much confusion resulting from the conflicting roles of local jurisdictions and transit agencies. Financing is difficult as well, given the current lack of consensus on how to fund mixed-use projects being one key issue and the lack of assistance available to non-profits and localities pursuing transit-oriented development that include affordable housing and minority owned business.

In short, the amount of hype around transit-oriented development far exceeds the progress to date, with many transit proponents selling new transit investments on the basis of land-use changes yet to come. The result has been that transit opponents have begun to brand transit-oriented development a failure by critiquing the performance of flawed projects.

This paper is an attempt to bring clarity to the debate around transit-oriented development by placing current projects in a historic continuum, by creating a performance oriented definition, and by analyzing the challenges encountered in attempting transit-oriented development around the country. The research, which has been sponsored by the Great American Station Foundation as part of its National Initiative on Transit-Oriented Development, takes an initial step toward bringing transit-oriented development to scale as a recognized real estate product in the United States. The project seeks first to understand the challenges faced, then to document the state of the practice, and finally to assemble the resources necessary to assist cities, transit operators and community groups who wish to undertake these kinds of projects. A manual for practitioners is also planned.

In our view, transit-oriented development must be mixed-use, walkable, location-efficient development that balances the need for sufficient density to support convenient transit service with the scale of the adjacent community. The project strives to develop techniques to assure that transit-oriented development incorporates a range of income levels.

This paper was written by Dena Belzer and Gerald Autler of Strategic Economics, but it is the result of a collaborative intellectual effort of a team of people, all of whom are partners in the National Initiative. Core team members include Scott Bernstein, Jacky Grimshaw, Sharon Feigon and Bill Eyring of Chicago's Center for Neighborhood Technology, Gloria Ohland and Janice Varela at the Great American Station Foundation, Judith Espinosa and Matt Baca at the Alliance for Transportation Research Institute of the University of New Mexico and Shelley Poticha at the Congress for the New Urbanism. The Surdna Foundation, the Turner Foundation, and the Environmental Protection Agency provided critical funding support. The paper benefited from the support of Bruce Katz and the incisive comments of Rob Puentes at the Brookings Urban Center, and we learned a lot from Mary Nelson, Josh Simon, Rich Juarez, Daniel Hernandez, G.B. Arrington and a host of people around the country who submitted to our interviews. All work on transit-

oriented development stands on the shoulders of Peter Calthorpe's ground-breaking practice and Bob Cervero's research.

Hank Dittmar  
President & CEO  
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# TRANSIT-ORIENTED DEVELOPMENT: MOVING FROM RHETORIC TO REALITY

## I. INTRODUCTION

A number of factors have begun to bring about a reconsideration of our metropolitan landscapes. Commuters in many regions of the country are increasingly frustrated with congestion and arduous commutes. Concern over sprawl and the loss of open space is growing. Air pollution, greenhouse gas emissions, and pressure on foreign and domestic oil supplies are in the public spotlight. Disillusionment with auto-dependent suburbs is on the rise, at least anecdotally, especially among parents frustrated by the need to shuttle their children to activities. And rising housing prices in many metropolitan areas have limited the residential choices and homeownership opportunities of a large part of the population, including many who are solidly in the middle class.

Although many neighborhoods offer residents the opportunity to spend less time in their cars and to experience the vitality of a mixed-use area, these are still the exception rather than the rule. However, there is growing interest in retrofitting existing neighborhoods – and creating new ones – to give residents more options in terms of the type of housing they buy, the mode of transportation they use, and the places they shop. Transit-oriented development (TOD) – intense, comprehensive development around transit stations – has garnered attention as a logical place to start.<sup>1</sup>

Transit-oriented development is not a panacea. However, at its best it has the potential to contribute to improvements in all the areas mentioned above. More intensive mixed-use development alone can allow an increase in walking and bicycling within the neighborhood; when a transit connection is added to the mix then auto-free travel to other parts of the metropolitan area become more feasible. Less automobile use means less consumption of fossil fuels, less air pollution, and lower spending on transportation. When the characteristics of a particular place are recognized as supportive of lower personal transportation costs, the monetary benefits can be captured by both individuals (in the form of greater mortgage borrowing power) and the community (in the form of lower development costs stemming from reduced need to build expensive parking). In short, transit-oriented development can be a central part of a development paradigm that is more environmentally sustainable and more socially just, and that contributes to both economic development and quality of life.

If the benefits of transit-oriented development are so compelling, why is the number of transit-oriented development projects still relatively small? And why do many of those projects seem to fall short of their potential? This report argues that although transit-oriented development is now starting to be recognized as a viable type of development, there is still a widespread lack of

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<sup>1</sup> Although transit-oriented development can be based on bus transit as well as rail, particularly when systems such as bus rapid transit are used, this paper focuses primarily on development around rail transit, and within that category primarily on high-frequency systems, i.e. light rail and metro-type heavy rail, as opposed to commuter rail. Nevertheless, the conclusions are valid for all types of transit and the framework presented is meant to encompass a variety of different contexts.

understanding of its nature, its potential, the challenges it faces, and the tools needed to overcome these challenges.

This report represents a synthesis of the ideas gleaned from several main sources of information. The first is a review of the literature on transit-oriented development (as well as other relevant literature). An annotated bibliography at the end of this paper describes the most important literature reviewed. While there is an extensive body of literature about transit-oriented development, much of it is more descriptive than analytical. Relatively little attention has been focused on the issue of why TOD is not more solidly in the mainstream and on the barriers, obstacles, and challenges confronting these projects, and there is even less information available about the best ways to overcome these challenges.

Second, interviews with key actors, including transit agency and municipal staff, developers, community development groups, and academic researchers have provided additional information. Nearly 30 interviews (and a number of other less formal conversations) were conducted with people in various regions of the country that possess a range of transit systems, including Chicago, with one of the oldest transit systems in the country; places like Atlanta, Miami, Portland, San Diego, the Bay Area, and the Washington D.C. area, which built transit systems in the 1970s; regions such as Dallas where rail systems were built relatively recently; and communities that are just now planning for new light-rail systems, such as Seattle.<sup>2</sup>

Finally, two workshops and regional conferences organized in Chicago and the San Francisco Bay Area as part of this project were valuable in the process of testing and refining the ideas in this paper.

The paper proceeds as follows. The next section places transit-oriented development within a broad historical setting and shows why traditional “barriers” discussion yield few insights into why TOD has not fulfilled its potential in the United States. It also offers an expanded definition of transit-oriented development that focuses primarily on functions and outcomes rather than on physical form and project configuration. Section 3 identifies the main challenges that must be addressed to achieve optimal TOD projects. Section 4 provides recommended actions that each key actor in the TOD process can undertake to ensure that more TOD projects are built and that these projects will be more viable and effective than their predecessors. A conclusion and annotated bibliography follow at the end.

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<sup>2</sup> A list of interviewees is included in the full version of this paper which can be found at <http://www.transittown.org>.

## II. DEFINING TRANSIT-ORIENTED DEVELOPMENT FOR THE 21<sup>ST</sup> CENTURY

In order to understand why transit-oriented development is not more prevalent, we must first consider what it means. One of the first things that becomes apparent with a scan of the literature and interviews is that there is no universally accepted premise about exactly what TOD should accomplish. Many projects that fail to provide the full range of synergies and benefits made possible by TOD are proclaimed successes because there is no standard benchmark for success. For example, some developments are labeled TOD by virtue of their proximity to a transit station, regardless of how well they capitalize on that proximity.

The following discussion of transit-oriented development presents a framework that can be used for planning and analysis of projects. Specifically, it creates a framework that allows the following:

1. **A focus on the desired functional outcomes of TOD, not just physical characteristics.** Although appropriate physical qualities (e.g. density, distance, and urban form) are essential for making TOD work, an exclusive focus on these characteristics can obscure the main goal of transit-oriented development, which is not to create a particular physical form but to create places that function differently from traditional development. TOD projects should capitalize on the synergy that results from a functional integration of land use and transit, such as reduced auto dependency, which in turn leads to other benefits. Physical characteristics are a means of achieving those desired ends, not ends in and of themselves.
2. **Acknowledgement of a continuum of success.** The degree to which a TOD project achieves desired functional outcomes can vary depending on the quality of the project and the characteristics of the place. This provides criteria that can be used as performance measures to assess *how well* projects fulfill certain goals. A high-density development within one quarter mile of a transit station may fail to take advantage of the full range of synergies made possible by TOD, even if it is better in some ways (e.g. mode split<sup>3</sup>) than more conventional development. Focusing on functional outcomes allows such a project to be labeled a partial success rather than wholly labeling it TOD on the basis of physical characteristics.
3. **Adaptation to different locations and situations.** Transit systems and locations vary greatly in their characteristics and their suitability for TOD. We should not expect the same results from a project in the core of a metropolitan area and one in the distant suburbs, just as we cannot necessarily hope for the same outcome in Dallas as in Chicago. Focusing on quantifiable functional outcomes accounts for both different degrees of success and the uniqueness of individual places. Just as a project can be judged as more or less successful TOD, so two projects with the same functional outcomes in very different places can be assessed within the context of those places.

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<sup>3</sup> Mode split refers to the percentage of travelers who use different travel methods (e.g., car, bus, walk, etc.) and can be measured by a variety of means and groups.

A theme that is evident throughout the history of transit that proves equally important to understanding the challenges facing TOD today is the distinction between *places* and *nodes*. The role of transit in creating a link between individual places and the broader region means that transit-oriented development, unlike other forms of development, should explicitly perform a dual function as both a *node* within a larger regional or metropolitan system *and* a good *place* in its own right.<sup>4</sup> Station areas must provide access to transportation services and in many cases function as regional trip destinations, but the same areas must also serve as trip origins and, ideally, as coherent neighborhoods that do more than simply serve the station. While this is, on the surface, a relatively simple insight, it proves powerful when it comes to understanding some of the reasons that transit-oriented development can yield unsatisfactory outcomes.

In the context of transit-oriented development, a good place can be defined on the basis of measurable functional characteristics such as a choice of transportation modes, housing types, and lifestyles; access to jobs and services; fewer negative impacts of the automobile; and a high degree of satisfaction in residents and visitors.

## **A. Transit-Oriented Development: A Historical Context**

It is helpful to trace the history of the relationship between transit and development in order to see how the place and node equation has evolved over time. For purposes of this discussion, different names have been given to each historical TOD phase to distinguish past from present and future. For the remainder of the report the term transit-oriented development will be reserved for the ideal TOD of the future rather than past or present examples. Most of what is called "transit-oriented development" today actually falls short of its full potential, and therefore should not be confused with the more ambitious concept to be defined shortly.

### **1. The Early 20th Century: Development-Oriented Transit**

The streetcar suburbs at the turn of the last century evolved in a setting that no longer exists today. Typically, the streetcar lines and their adjacent residential communities were developed by a single owner who built transit to add value to the residential development by providing a link between jobs in an urban center and housing at the periphery. Indeed, the phrase "development-oriented transit" more aptly describes these places than does "transit-oriented development," since private developers built transit to serve their development rather than vice-versa. As part of this formula, streetcar stops often had small retail clusters to serve commuters as well as local residents. These small commercial districts are, to some extent, the precursor of modern TOD and represent a good balance between place and node.

However, the interdependence between housing, jobs, and transit inherent to the early streetcar suburbs was broken apart by the automobile. Starting in the 1930s, roads, including

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<sup>4</sup> See: Bertolini Luca and Tejo Spit. 1998. Cities on Rails: Cities on Rails: The Development of Railway Stations & Their Surroundings. London: Routledge.

highways, became the preferred transportation infrastructure in America. Development was no longer dependent on transit, the link between transit and development was severed, and developers got out of the business of building transportation systems.

## **2. *The Post-War Years: Auto-Oriented Transit***

The post-World War II period saw a precipitous decline in transit use and the dismantlement and abandonment of many rail systems. To the extent transit was still in operation, it relied much more heavily on buses as the primary mode in most regions. Bus systems were subservient to the automobile, using the same streets and experiencing the same congestion, and in most cases bus service had less influence on land-use patterns than fixed-rail transit. With the exception of some of the commuter suburbs around older cities such as Boston, New York, and Chicago, which continued to function reasonably well as transit-based communities, most transit had become a last resort rather than a reliable transportation option tied to development.

As congestion worsened, a new generation of transit systems was planned and built. The San Francisco Bay Area Rapid Transit (BART) system, MARTA in Atlanta, and Metro in the Washington, D.C. area were opened in the 1970s. These systems were built with an entirely different rationale than their predecessors. They were built primarily to relieve congestion, funding was provided entirely by the public sector, and little or no additional land was purchased by the transit agencies to ensure that there would be any link between current transit investments and future development patterns.

These systems were also designed explicitly to work with the automobile, with the assumption that most people would drive to suburban stations rather than walking, biking, or riding feeder-bus systems. In this case, these systems were viewed as primarily serving a regional purpose, and the stations were considered nodes within this larger system, with little regard for the local place where each station was located. Because of the philosophy with which they were built, many stations are now characterized by large amounts of entrenched parking rather than intimate connections to vibrant neighborhoods. Large expanses of surface parking or parking structures create barriers between the station and the surrounding community.

While these systems all play an important role – it is difficult to imagine Washington, D.C. without the Metro or the San Francisco Bay Area without BART – they are showing their limitations. Although these systems undoubtedly can claim real successes, they fall short of providing the full range of benefits that transit can potentially stimulate. In general, they do not contribute to neighborhood revitalization along all its stations as much as they should, reduce automobile dependency to the extent that they could, or encourage more efficient regional land-use patterns as well as they might. Land-ownership patterns remain fragmented, and the idea that development should be linked to transit does not generally prevail, even when transit infrastructure is already present.

### **3. *Today: Transit-Related Development***

Rail systems generally create value for adjacent land, and transit agencies and the federal government see large-scale real estate development on transit agency owned property as a way to “capture” some of that value. While this return is not necessarily sufficient to pay the total cost of the rail investment, it represents at least a partial reimbursement to public coffers. For this reason, transit agencies and the federal government have an interest in promoting intense development around transit stations. This “joint development” approach has been used successfully in some notable locations around the country including downtown San Diego, Washington, D.C., and Portland, although there are other examples of attempts that have not succeeded.

This form of transit-related development is problematic because it almost inevitably leads to a narrow definition of the relationship between transit and development. The emphasis of most joint development projects – which until the 1990s were virtually the only form of “transit-oriented development” that was pursued – has generally been on dense, profitable real estate development aimed at generating revenue for the transit agency and the federal government. Projects were predicated on a purely financial rationale rather than a broad vision of how transit could work in tandem with surrounding development. As later sections will explain, the goal of maximizing revenue from ground rents often works at cross-purposes to other goals of transit-oriented development. In other words, the “highest and best use” in financial terms is not always the best in transit or neighborhood terms.

Recently, interest in TOD has broadened beyond the possibility of financial return. Increasing evidence now exists that transit-oriented development can yield many more benefits than merely increased land value. The last decade saw subtle but promising shifts in the landscape of transit and development, with the convergence of a number of trends: growing transit ridership, increased investment in transit (even in traditionally auto-dominated cities like Los Angeles and Dallas), frustration with congestion and sprawl, the smart growth and new urbanism movements, and a generally greater recognition of the advantages of linking development and transit.

Despite these encouraging trends, a closer look at “transit-oriented development” projects around the country shows that most still fall short of their full potential. Projects that clearly could take advantage of being adjacent to transit to reduce parking still use standard parking ratios, indicating an underlying assumption that these projects will be primarily auto-oriented. Projects that contain a variety of uses still lack an “appropriate” mix of uses that generates an internal synergism as well as responds to market conditions. And, in other cases, residential projects fail to include units targeted at a mix of income groups or household sizes, but focus solely on one particular market segment, be it subsidized dwellings targeted at lower income households or luxury units for young singles and empty nesters.

Many of the examples examined in this paper constitute good projects. Most of them are significantly better than traditional development. However, the interviews conducted over the course of this project suggest that there is little understanding of the full range of benefits that can be

achieved with transit-oriented development. This is reflected in both the combination of land uses included in most built projects and their physical design. Many projects are relatively unambitious in what they hope to accomplish, or overly narrow in their view of the potential impacts of TOD. Even when the aims are broader, the fact that modern transit and development are built by several different actors – unlike the old streetcar suburbs – introduces several additional layers of complexity.

The goal of this project is to bring transit-oriented development up to scale not just in name but in terms of the impact it can have on cities, the environment, communities, and individual lives. For this reason we must set the bar high and describe a vision of transit-oriented development that is ambitious without being unrealistic. Most current projects fall short of this vision, and as a result we have chosen to call them transit-related development, a name that acknowledges the connection they have made between transit and development while still recognizing their shortcomings. Not all projects in all places will or even can meet the standard by which true transit-oriented development should be defined. But without a benchmark there will be no way to judge the quality of projects or even to think clearly about the tradeoffs that must be made when pursuing a project.

#### **4. *Tomorrow: Transit-Oriented Development***

Transit-oriented development can realize its full potential only if it emerges as a new paradigm of development rather than a series of marginal improvements. TOD cannot be and should not be a utopian vision: It must operate within the constraints of the market and realistic expectations of behavior and lifestyle patterns. However, the market and lifestyle patterns can and do change as a result of both policy choices and socio-cultural trends. The automobile was not always the dominant form of transportation, and suburban living was not always the lifestyle of choice. These changes in American life have been fostered in part by government policy such as the mortgage interest tax deduction and generous subsidies to road infrastructure at the expense of alternative forms of transportation.

Already there are clear signs that these trends are not permanent. Growth in transit ridership and renewed interest in urban living are two indicators that preferences may be changing. Federal legislation in the 1990s<sup>5</sup> has helped shift government investment priorities away from the automobile. Transit-oriented development can respond to these changes by offering an alternative that is at once viable in the marketplace and socially beneficial. Transit-oriented development in the 21st century can be a central part of the solution to a range of social and environmental problems.

“Transit-oriented development” may seem like a remarkably prosaic and unevocative term given such lofty goals. A label like “people-oriented neighborhoods” comes closer to capturing the goals outlined in this paper. Moreover, the term transit-oriented development raises problems because it already enjoys wide currency, but refers to a wide range of projects that have little in common with each other or with a more rounded vision of TOD. However, it makes more sense to

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<sup>5</sup> Specifically, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and its successor, the Transportation Equity Act for the 21st Century (TEA-21).

clearly define a term that has already acquired significant currency than to introduce yet another phrase into an already expansive jargon, and for this reason we will continue to use the term transit-oriented development.

As the environmental, social, commuting, and land-use trends described above progress, it is likely that the type of neighborhoods we envision will become increasingly attractive. But although defining a vision of transit and development that function complementarily is a crucial first step toward advancing that agenda, it is not enough. The next step is to move that vision – in concept and reality – into the mainstream of real estate development. This requires an understanding of why relatively few projects get built, and why so many of those that do get built fall short of their potential.

The remainder of this report will clearly define a vision of TOD, examine the challenges facing that vision, and recommend specific actions. Collectively, these steps will provide a starting point for bridging the gap between ideal and real projects.

## **B. Defining Transit-Oriented Development for the 21<sup>st</sup> Century**

Transit stations offer a unique opportunity for development to be simultaneously locally and regionally oriented. This powerful combination is fundamental to what makes distinguishes transit-oriented development from other types of urban infill projects. However, it is not always clear how best to create synergy between these two functions.

Definitions of transit-oriented development often focus on built form. For example, Bernick and Cervero (1996) emphasize the role of the “three Ds” (density, diversity, and design) in the success of TOD. Although proper built form is a necessary element, that alone is not sufficient for achieving all the benefits of TOD. For example, units per acre is a measure of physical form that tells us very little about the way a place functions: a high-density area can easily be less pedestrian-friendly than a low-density one. In contrast, the ability of residents to make fewer trips, own fewer cars, breathe cleaner air, and enjoy more parks are all functional outcomes that can be measured.

Because most definitions of TOD focus on built form, many projects that are billed as successful transit-oriented development don’t function very well. They may have overcome the main barriers to creating dense mixed-use development next to a transit station, but they fall short when measured by performance rather than physical characteristics. A focus on outcomes allows a better benchmark of success and a better measure of the tradeoffs that most projects must make. It permits a subtler assessment of projects that judges them as more or less successful in different areas rather than simply built or not built.

This section presents a definition in the form of six performance criteria that can be used to evaluate project function and outcomes. The major departure from previous thought on TOD is not so much the novelty of these performance areas, since many have been addressed in one way or another, but rather the emphasis on their use as a planning tool.

The six performance areas contain significant overlap, but have been separated into distinct discussions in order to emphasize the core principles that organize this vision of TOD. Probably no single project can excel in all these areas. Complex projects involving multiple actors often generate conflicting and irreconcilable goals, and are subject to the constraints of the particular location and circumstances. However, with this comprehensive and ambitious definition as a starting point, it will be possible to distinguish necessary tradeoffs from sub-optimal outcomes that result from other causes, identify other challenges confronting TOD, and formulate a meaningful set of recommendations that will truly impact the future of TOD in this country.

## **1. *Location Efficiency***

Ample evidence demonstrates that, on average, residents of denser urban neighborhoods own fewer cars, drive less, and walk and ride transit more than residents of suburban areas (see "Travel Patterns and Behavior" subsection of Appendix). This is true even when controlling for income. This suggests that reduced auto dependency will result from an effective blending of convenient and efficient transportation links (node functions) with enhancements of the ability to carry out most everyday tasks close to home (place functions).

This connection can be captured in the concept of location efficiency. Simply put, location efficiency converts driving from a necessity into an option. This permits households that take advantage of the characteristics of the neighborhood to spend less on transportation by driving less or even by owning fewer cars. The concept of location efficiency has been incorporated into the location-efficient mortgage program, which allows homebuyers who spend less on transportation by choosing a location-efficient neighborhood to borrow more money than they would qualify for under conventional mortgage lending practice.

Location efficiency requires neighborhoods that provide high-quality transit, a mix of uses, and pedestrian-friendly design. Proximity to transit is just one of several key variables that determine the location efficiency of a neighborhood. Other critical factors include net residential density, transit frequency and quality, access to community amenities, and a good quality pedestrian environment (good sidewalks, safety, reasonable topography). Location efficiency can be enhanced by the introduction of additional mobility choices such as car sharing, which makes it even more feasible for residents not to own a car.

Even with all these features, however, it is probably not realistic to expect suburban residents to develop the same travel patterns as urban residents no matter what type of neighborhood they live in. Although there has been little comprehensive research on the ability of location-efficient design to affect overall travel behavior, a number of studies have focused on retail behavior. These studies make clear that not all residents of location-efficient neighborhoods will own fewer cars per family or give up car ownership entirely. Not all will work within walking distance of home or do all their shopping locally.

However, none of these findings undercut the logic of transit-oriented development or the desirability of building location-efficient neighborhoods. The key idea remains choice: Location-efficient neighborhoods make these choices possible and even encourage them whereas most standard development types do not. The very presence of this choice is a positive contribution of this development type, and many residents in walkable or location-efficient neighborhoods cite the existence of mobility choices as a quality of life feature and an important factor in their choice of neighborhood (see, e.g., Handy and Clifton 2000).

Location-efficient neighborhoods can provide the following types of outcomes:

- Increased mobility choices (walking and bicycling as well as transit).
- Increased transit ridership.
- Good transit connections to the rest of the city and region.
- Reduced auto use and reduced auto ownership.
- Reduced transportation costs to individuals and households.
- Sufficient retail development (quantity, quality, and diversity) to satisfy the basic daily needs of residents and employees working in the area.
- Ability to live, work, and shop within the same neighborhood.

## **2. Value Recapture**

The benefits of location efficiency can translate into direct savings for individuals, households, regions, and nations. It seems intuitive – and it has been demonstrated – that residents of denser, transit-rich neighborhoods spend less on automobile transportation than people in auto-dependent areas. This same effect is visible at the metropolitan level. Average household spending in auto-dependent metropolitan areas such as Houston, Atlanta, and Dallas was over \$8,000, compared to less than \$6,000 in New York, Boston, and Chicago and slightly over \$7,000 in Washington, D.C. and San Francisco. Equally striking was the difference in transportation spending as a percentage of total household expenditures, which ranged from less than 15 percent to over 20 percent. The cities where households spent the highest percentage of their income on transportation were Houston, Atlanta, Dallas, and Miami, while the lowest spending was in Washington, D.C., Boston, San Francisco, Chicago, Baltimore, New York, and Honolulu (Surface Transportation Policy Project and Center for Neighborhood Technology 2000).

Overall, residents of denser, more transit-rich metropolitan areas pay less for transportation than their counterparts in auto-dependent metropolitan regions – even when the cost of public investments in transit is included in the calculation. In 1990, American cities spent 13.2 percent of gross regional product on transportation, compared to 8.1 percent in European cities and 4.8 percent in wealthy Asian cities (Kenworthy and Laube 1999). Every dollar invested in transit can move far more people-if land use is supportive-than a dollar spent on automobile transportation. Remember that the full cost of automobile transportation includes not only household expenditures but also public spending on roads and bridges, public and private spending on parking (for example, the construction of hundreds or thousands of free parking spaces at a shopping center), and such

hidden subsidies as public land given over to automobiles rather than higher-value development. Despite high household spending on automobile transportation, households are only paying a portion of the total cost of driving directly; the rest is paid for indirectly through public funds. These calculations do not even include the cost of externalities such as the health effects of air pollution, the economic impact of traffic accidents (more than 40,000 deaths and hundreds of thousands of injuries every year in the United States), and so on. It is clear, then, that reduced automobile dependence could yield significant savings for individuals and for society as a whole. The question is not just how to reduce that spending, but also how to capture the value of the savings.

Some methods for doing so have appeared in recent years. The disparities in transportation spending among different locations have been recognized in the form of a new financial instrument called a location efficient mortgage (LEM). LEMs are underwritten by Fannie Mae and are currently available in Chicago, Seattle, Los Angeles, and the San Francisco Bay Area. They allow people who live in location-efficient neighborhoods and who take advantage of that fact to reduce their spending on transportation by owning no cars or fewer cars. Savings on transportation allows qualified borrowers to obtain a larger loan than they would be eligible for under the standard underwriting formula. For many, this can make the difference between being able to buy a home or not, or at least the difference between an adequate home and one that is too small for the family's needs.

The location efficient mortgage is the most explicit way of capturing the value from reducing automobile dependence, but there are others. Parking is a significant but generally under-recognized component of high spending on transportation. However, the cost of parking is not always reflected in the cost of driving; rather, parking is often paid for indirectly. The financial analysis in the section on financial return below shows that reducing parking requirements can have a significant impact on housing costs. In San Francisco, a 700-square-foot unit that would sell for \$320,000 with parking would sell for roughly \$280,000 without parking. This is in line with empirical research that has found that the average increase in the price of a housing unit with a parking space in San Francisco was \$39,000 to \$46,000 (Jia and Wachs 1997). While it is not feasible in most cases to eliminate parking altogether, individuals can still reap benefits if they can choose whether or not to purchase or rent a parking space. This involves "unbundling" parking from housing and creating a separate market for it.

These savings from reduced parking costs (whether in residential units or other development) can be captured by households, developers, and local governments. They can be invested in assets, like housing, that appreciate in value over time and allow for individual household wealth accumulation. Collectively, they can be investment in better design and place-making amenities, parks, and other elements that improve the quality of development and the built environment overall.

Measurable outcomes associated with value recapture include:

- Increased homeownership rates or more adequate housing, especially among borderline income groups. This can be accomplished through:
  - Increased use of location efficient mortgages.
  - Creation of housing units with lower-than-average parking ratios where the cost savings from parking reductions are passed on to consumers.
- Reduced individual and community spending on transportation and therefore greater discretionary individual and community spending. This can include spending a portion of the collective savings on enhanced public amenities such as streetscaping, parks, or better transit.

### **3. *Livability***

At its core, transit-oriented development strives to make places work well for people. While to some livability may conjure up the idea of vague and unimportant concepts irrelevant to such “nuts and bolts” issues as prosperity, in fact livability and quality of life are increasingly viewed as closely connected to economic development. Moreover, much evidence indicates that many people are increasingly frustrated with air pollution, long commutes, traffic congestion, and the difficulty of running errands. Quality of life has emerged as a critical concern for its own sake (see "Quality of Life and Livability" subsection of Appendix).

Livability is subjective and defies easy definition. No definition can be completely “objective” or value free. Nevertheless, it is possible to arrive at a definition of livability that is based on collective subjectivity rather than the values of a particular individual. Numerous attempts have been made to define, measure, and track the livability of places over time using indexes defined by citizens on the basis of what they feel is important. These indexes focus on livability or quality of life generally rather than TOD specifically. Nevertheless, they usually contain a variety of criteria that are directly or closely related to land use and transportation issues

This paper’s focus on the functional qualities of TOD rather than on form ties in well with standard livability indicators. Many of the central outcomes of TOD as defined herein would contribute directly to improvements in livability as defined elsewhere. For example, decreased auto use would help improve air quality, decrease gasoline consumption, and reduce congestion. Well-designed, balanced neighborhoods with good transit would improve mobility, access to retail and services, and the ability of children and adolescents to participate in activities without the constant assistance of their parents.

TOD may take different forms in different places. Ultimately, though, the question becomes: Can, or does, TOD help improve the quality of life?

Measures of livability that relate directly or indirectly to transit-oriented development include the following:

- Improved air quality and gasoline consumption.

- Increased mobility choices (pedestrian friendliness, access to public transportation).
- Decreased congestion/commute burden.
- Improved access to retail, services, recreational, and cultural opportunities (including opportunities for youth to get involved in extra-curricular activities within the neighborhood).
- Improved access to public spaces, including parks and plazas.
- Better health and public safety (pollution-related illnesses, traffic accidents).
- Better economic health (income, employment).

#### **4. *Financial Return***

Successful TOD projects typically mix of public and private development projects. The public sector generally builds the transit station and the surrounding streets and public spaces, while private development may include housing, office buildings, and retail. Parking garages may be built by either the public or private sector. In some instances non-profits or other quasi-public entities can also own facilities such as day care centers, and both public and private landowners can lease space to private and non-profit tenants.

All investors, whether public or private, expect some type of return. While the public agencies, including transit agencies and local and federal government, may not require a full or even a direct monetary return on their investment, no private sector project will get built unless it yields an appropriate return on investment or receives a public subsidy to compensate for underperformance. Thus, planning for TOD projects requires understanding what type of return each of the public and private participants expects and ensuring that certain return thresholds can be met. But, while this means that TOD projects must be responsive to the discipline of market and financial realities, it does not mean that all development at transit-oriented locations should always strive to achieve the “highest and best” use for the site. This approach often tilts a development program away from a diverse land-use mix and towards more office and commercial product. Assuming that each use within the program yields an acceptable rate of return, a mixed-use strategy can be more advantageous for the developer than a single-use project because it allows for greater flexibility in responding to various market cycles, protects against market volatility, and holds value over time. In addition, it may be easier to finance smaller increments of different development products than one large single use because the project risk is spread among a wider variety of lenders and equity investors.

While TOD projects may require more complex financing strategies, the potential exists for increased return, particularly if projects are designed to take advantage of the benefits provided by location efficiency. Evidence abounds that under the right circumstances (i.e., in a strong real estate market) light rail can lead to rent premiums in surrounding commercial properties (e.g., Weinberger 2000). Higher potential return can be used as an incentive for developers and it can also be captured for public benefit in various ways, either by requiring that developers spend a portion on place-making amenities or through taxes.

The public sector – governments and transit agencies – can also reap financial rewards from TOD, although they may have different criteria than private investors. The public sector can and should have a more patient attitude and be willing to wait longer for investments to yield a return. Moreover, these actors should not necessarily define return in the narrow financial sense. Although all public investments should be justifiable, that justification can be based as much on notions of social return (greater equity, better affordable housing, better quality of life) as on financial return.

Even businesses that choose to locate at TOD sites may receive a return in some cases. They may be willing to pay somewhat more to locate at transit stops, or they may subsidize their employees' transit passes, but the benefits may outweigh the costs through reduced costs of providing parking or less employee time lost to traffic and long commutes (not to mention better employee morale). BellSouth's decision to consolidate its facilities at transit stops in Atlanta reflected this rationale.

All TOD projects should be evaluated in terms of the total return to public as well as private investors so as to assist in making decisions about the trade-offs involved in potential public subsidies for various uses. Financial outcomes should include:

- For local governments: higher tax revenues from increased retail sales and property values.
- For the transit agency: increased fare box revenues and potential ground lease and other joint development revenues. It is possible that in some cases increases in land value could cover a significant portion of the cost of transit investments.
- For the developer: higher return on investment.
- For employers: shorter and more predictable commute times, easier employee access.
- A balance between financial return and other goals of TOD so that projects are not judged purely on their monetary return.

## **5. Choice**

One of the problems with standard suburban development is the lack of choice. Residents have few options in terms of housing types, places to shop, and modes of transportation. Meanwhile, people in a broad range of different contexts have emphasized the desire to have more transportation options in many of the livability indexes cited above. In other words, many people's idea of a good place includes the notion of choice.

Those who don't understand TOD sometimes describe it as an attempt to "force" people to live in high-density apartments and take transit. This is simply not the case. TOD involves function far more than form, meaning that no particular housing type needs to dominate TOD projects. In fact, most projects will work better if they include a range of types, from apartments to townhouses to single-family detached houses (albeit on relatively small lots). Although a certain minimum overall density is certainly a prerequisite for making TOD work, it is not true that TOD will necessarily require everyone to live at higher densities than they already do. In many parts of the country, notably in California, there has been a proliferation of medium-density housing (apartments,

condominiums, townhouses) that is not connected to transit and that incorporates none of the mixed-use or internal mobility of TOD. These projects function as high-density auto-oriented suburbs, with all of the disadvantages of density and none of the advantages of choices that TOD can offer. Yet they are fully viable in the marketplace. TOD does not necessarily require higher densities than many projects already being built; it requires instead that projects be built differently.

What leaves few options for residents in terms of housing type or mode of transportation are current patterns of suburban development, not TOD. TOD is intended to supplement, not replace, the current choices. Transit-oriented development projects can provide a much broader range of options by offering internal diversity and by simply adding a new type of development into the metropolitan area. Rather than leaving residents with no choice but to live in a single-family house, shop at auto-oriented retail centers, drive to work, and drive their children to activities, transit-oriented development can a wide variety of options to local residents. TOD can make available apartments, townhouses, and single-family homes to accommodate most family structures, income levels, and life stages. It can offer a choice of small, unique specialty shops and larger retail outlets; the opportunity to get around on foot, by bicycle, or on transit; and greatly enhanced mobility for children and seniors. Even studies that cast doubt on the ability of traditional neighborhood design to significantly reduce driving for shopping purposes (e.g., Handy and Clifton 2000) find that residents of walkable neighborhoods with nearby retail value the option to walk and, in many cases, have chosen their residence in part because they want that option.

TOD is about expanding rather than circumscribing options. Lower-income people with less money to spend on transportation, first-time homebuyers, and others inadequately served by most currently available housing options may particularly value the location efficiency offered by TOD. For that reason, a commitment to providing high-quality affordable housing in TOD projects seems particularly important. While this can involve public subsidies of various kinds, housing affordability can also be enhanced through other tools, such as density bonuses that allow developers to build at higher densities in exchange for the subsidization of some of the units. Removing parking from the cost of housing, as noted above, can also make market-rate projects more affordable. Finally, the use of location-efficient mortgages can expand homeownership opportunities. All of these tools in conjunction can increase housing choices.

Enhanced choice may entail:

- A diversity of housing types that reflects the regional mix of incomes and family structures.
- A greater range of affordable housing options.
- A diversity of retail types. Diversity will necessarily be limited by the market area and the particular desires of the residents; however, this outcome could be measured in terms of how well the retail mix meets the needs and desires of the residents as they themselves define them.
- A balance of transportation choices.

## 6. *Efficient Regional Land-use Patterns*

Most metropolitan areas in the United States have been urbanizing new land at a faster rate than they have added new residents. Some areas have continued to consume land even as their populations have shrunk.<sup>6</sup> The causes of this trend are complex, but the results are quite clear: less open space, more area given over to roads, longer commutes, significantly unequal provision of services such as education across the metropolitan area, more air pollution, and so forth. Not all of these ills can be blamed exclusively on sprawl, but sprawl is a factor in all of them.

Transit-oriented development can foster much more efficient patterns and cut down on traffic generation. For example, near the Pleasant Hill BART station in suburban San Francisco, residential development generates 52 percent fewer peak period auto trips than ITE Trip Generation Manual projections of typical residential development. Equally importantly, those trips are shorter since services are immediately at hand and the station is located immediately adjacent to a regional freeway. Office development at the station generates 25 percent fewer trips than typical office development.<sup>7</sup> These trips are also shorter. The fact that this development is concentrated around a transit station means that it consumes less land, generates less traffic, contributes much less to congestion and air pollution than more typical suburban development.

Yet the efficacy of such projects is limited by the fact that they remain relatively isolated examples that are not necessarily tied into a cohesive regional system. When a significant number of origins and destinations in the region are well-linked to a station, transit becomes a much more viable option. At the same time, transit-oriented development is one of the most important tools for creating more efficient regional land-use patterns. The more growth that can be accommodated in station areas, the less sprawl will be the automatic result of growth.

Smart growth measures such as the ones that have proliferated in recent years must do more than simply curtail growth if they are to be truly effective. They must channel growth to the places that are best suited for it. As frustration with sprawl and its consequences grows, more and more regions will look to a coordinated set of land-use policies and transportation investments to alleviate some of the problems. Transit-oriented development embodies these goals. Neither transit nor transit-oriented development promise a panacea for the problems associated with accommodating future growth, but both are important components of creating healthier, more livable cities, towns, and regions.

Outcomes of this efficient regional patterns include:

- Less loss of farmland and open space.
- More suitable regional and subregional balance between jobs and housing.

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<sup>6</sup> See: Fulton, William et al. 2001. "Who Sprawls Most? How Growth Patterns Differ Across the U.S." Brookings Institution Center on Urban and Metropolitan Policy: Washington, D.C..

<sup>7</sup> Personal communication from Jeffrey Tumlin, Nelson/Nygaard (transportation consultants for the Pleasant Hill BART project.)

- Shorter commutes.
- Less traffic and air pollution.
- Station areas as that can serve as destinations as well as origins.

### III. CHALLENGES FOR TRANSIT-ORIENTED DEVELOPMENT

The factors that keep TOD projects from succeeding, meanwhile, are rarely examined. This is because, as noted earlier, TOD is normally declared successful or unsuccessful without comparing the actual outcomes or functional aspects of a project to a fixed performance standard. If the project is built, it is deemed successful, and if it is not built, that is generally attributed to any one of a variety of problems. In this fashion, the literature focusing on the difficulties of building TOD projects tends to focus on a limited number of barriers to success. These barriers include: local neighbors' fears new TOD will harm the character of their neighborhood or depress property values; developers' and lenders' perceptions that TOD entails higher risks and costs; the failure of existing land-use patterns to support TOD; a lack of a market for it; difficulties of financing; poor transit design; and an unsupportive regulatory framework.

These barriers suggest the range of factors that can stop a project from being built. They are less useful for explaining why many of the projects billed as transit-oriented development fall short of their potential. Moreover, although all of these barriers represent significant issues, few are specific to transit-oriented development. Most apply to any form of urban infill and as such they do not necessarily reflect the special challenges and opportunities of transit-oriented development. Finally, they reflect a focus on built form (e.g., dense mixed-use projects adjacent to transit) rather than outcomes, such as the level of internal trip capture, increased mode splits, and so on. Thus, the barriers people associate with TOD tend to parallel the barriers associated with building all types of high-density infill projects, regardless of proximity to transit.

This approach ultimately does not explain why many of the projects billed as transit-oriented development fall short of their potential. Even if all of the above barriers were removed, it is highly likely that future TOD projects would still fail to capture the full range of benefits offered by a transit-oriented location. A project that achieves high densities does not necessarily achieve the outcomes of TOD described above. To discover why, we must look beyond the barriers to building high density.

Consider the following example from Miami. A developer bills his project as transit-oriented development. The development is next to a Miami-Dade Transportation Authority (MDTA) rail station, buses come right into the property, and the developer has taken advantage of the location to build at a higher density than would be possible elsewhere, given zoning laws. In other words, the project has some of the attributes of transit-oriented development, and certainly is different than standard suburban development.

When asked about the barriers his project had faced, the developer was hard-pressed to name any: His overall sense was that the project had gone smoothly. This may be true, but upon closer inspection it turns out that the project resembles *transit-related* development more than the comprehensive *transit-oriented* development as described in Section 2. Parking standards have been reduced slightly, but there are still 3.3 spaces per 1,000 square feet of development – a fairly typical level for suburban development that reflects what the developer felt the market would

demand for any office development. The development contains a supermarket with 200 surface parking spaces, clearly intended to accommodate heavy automobile traffic. Moreover, the project puts a lower priority on housing than on office or retail and therefore does not constitute a truly location-efficient neighborhood. In other words, using even moderately ambitious performance standards, we can see the project's shortcomings, but the developer cited an absence of barriers to building TOD because his definition was based more on a physical definition (density next to transit) than a functional one. The barriers were minimal and the project was built, but ultimately the project must be viewed as only a modest improvement over standard development. We must look deeper to find the reasons why.

By shifting the emphasis from the physical characteristics of a project to its functional outcomes, a somewhat different list of major "challenges" to implementing this development emerges. Barriers to TOD constrain projects subtly by making it difficult for them to live up to their full potential: A project may still get built, but may be less effective as a result of the challenges faced. This is important to keep in mind when thinking about the challenges discussed below. Their impact has been not simply on the existence of projects, but also (perhaps more so) on their quality. If all the barriers to TOD were overcome, there would still be no guarantee of high-quality projects. However, if these challenges can be dealt with and overcome, it is likely that both the overall number and quality of such projects would be greatly increased.

**A. No universal working definition of transit-oriented development exists. Often, the actors engaged in TOD projects bring different goals to the table, pursue strategies that work at cross-purposes to each other, and lack unifying policy objectives.**

It should come as no surprise that any project that brings together the range of actors typically involved in transit-oriented development will engender disagreement. In today's typical TOD project the public sector builds the transit (often with the involvement of multiple agencies), local governments try to control development, and developers look for opportunities to make profits. Transit agencies also become involved as property owners in joint development projects. All of these entities-not to mention transit riders, neighbors, and the public at large-have different ideas about what the project should accomplish.

This lack of clarity in the definition of TOD may exacerbate legitimate disagreements about what constitutes "good" TOD. Should TOD aim to maximize revenue to the transit agency through lucrative ground leases or seek to minimize the use of automobiles? Should TOD be designed to maximize ridership or to help revitalize the station area? Should it try to maximize economic success or urban values? All of these are legitimate but sometimes mutually incompatible goals that may result in policies that work at cross-purposes to one another. And resolving them is made harder by the lack of a settled framework for assessment.

For example, in the Miami case the MDTA placed a greater emphasis on maximizing its revenue stream from ground leases than on creating a location-efficient place. Because location

efficiency is not a universally recognized goal of TOD, not all actors involved in a project consider the impact of their priorities on location efficiency.

Table 1 shows a number of possible goals associated with each of the actors involved in TOD projects. Many of these goals-such as maintaining a high level of station parking and maximizing pedestrian access to the station-conflict. Even a single actor may have goals that are incompatible, or at the very least, that require careful balancing if they are to be reconciled. Many of the incompatibilities reflect the basic tension between place and node.

<b>Table 1:TOD Actors and Goals</b>	
<b>Actor</b>	<b>Possible Goals</b>
Transit Agency	<ul style="list-style-type: none"> <li>• Maximize monetary return on land.</li> <li>• Maximize ridership.</li> <li>• Capture value in the long term.</li> </ul>
Riders	<ul style="list-style-type: none"> <li>• Create/maintain high level of parking.</li> <li>• Improve transit service and station access.</li> <li>• Increase mobility choices.</li> <li>• Develop convenient mix of uses near station.</li> </ul>
Neighbors	<ul style="list-style-type: none"> <li>• Maintain/increase property values.</li> <li>• Minimize traffic impact.</li> <li>• Increase mobility choices.</li> <li>• Improve access to transit, services, jobs.</li> <li>• Enhance neighborhood livability.</li> <li>• Foster redevelopment.</li> </ul>
Local Government	<ul style="list-style-type: none"> <li>• Maximize tax revenues.</li> <li>• Foster economic vitality.</li> <li>• Please constituents.</li> <li>• Redevelop underutilized land.</li> </ul>
Federal Government	<ul style="list-style-type: none"> <li>• Protect “public interest” and set limits on how federally-funded investments can be used.</li> </ul>
Developer/Lender	<ul style="list-style-type: none"> <li>• Maximize return on investment.</li> <li>• Minimize risk, complexity.</li> <li>• Ensure value in long term.</li> </ul>

Properly addressed, these tensions do not necessarily have to engender conflict or sub-optimal outcomes. A station’s role as a node can be strengthened if it also becomes a viable place. But interviews suggest that disparate goals, and divergent definitions of TOD, are often not recognized explicitly, and the actors do not necessarily think through the impact of a particular goal.

Too often, in sum, projects are implemented without a clear vision of the desired outcomes, the different goals of the actors, and the ways in which those goals may work at cross-purposes and lead to a project that, while perhaps superior to traditional development, falls short of the potential of TOD.

**B. Transit-oriented development must deal with the tension between node and place. That is, it must achieve a functional integration of transit and the surrounding uses.**

The need for transit-oriented development to function as both node and place affects virtually every aspect of the station area, from physical layout and design to the appropriate development program. Yet as the discussion of the first challenge makes clear, the multitude of actors and goals to be found in any TOD project makes integration of node and place extremely difficult. Some actors see their interests as closely connected to the role of a station area as a node while others are more concerned about the quality of the place. All too often there are few or no advocates (and little or no money) to keep the idea of place on the agenda.

Over and over, actors involved in TOD projects complain that the attitude of many transit agencies is that “they run the trains” and no more. Most transit agencies have little interest in stations as anything but nodes. As discussed above, even when transit agencies participate as property owners, they are generally working within a narrow agenda. Other actors may be more divided, but they too have trouble balancing these different needs. Citizens who clamor for more parking at stations (a node function) may be at odds with others who complain about increased traffic in their neighborhood (a quality of place concern).

Parking is perhaps the clearest illustration of this. The way in which the seemingly mundane issue of parking is handled turns out to be one of the most crucial issues in transit-oriented development. Parking is tied to a station’s role as a node in a larger regional system, and there is tremendous pressure on transit agencies to provide ample parking for riders. Parking can become a political, financial, and design issue, and the goal of providing parking conflicts with place-related goals in many ways.

In addition to the financial burden and its effects on the development program, parking and the associated access roads present a design issue, since it is difficult to accommodate large numbers of cars and create a pedestrian-friendly environment. Higher densities around transit stations will be largely offset by high parking ratios, since all the additional square footage will also require parking and roads to accommodate additional cars. In this way, parking, whether it serves the transit station itself or the surrounding uses, reduces the efficacy of transit-oriented development as a place.

Because transit-oriented development provides an alternative to automobile travel for commuters, shoppers, and residents alike, development should not be expected to provide parking at the same level as elsewhere. Both the local government and the transit agency have the ability to try to limit parking, but this is not always a priority. For example, despite the fact that Dallas Area Rapid Transit (DART) has been in operation for a number of years now, the Dallas parking code is only now adding a credit for mass transit accessibility. Even if such a provision exists, developers, financial institutions, or the public are sometimes reluctant to see the level of parking reduced.

In the case of a system undergoing rapid increases in ridership, such as BART, the public perception of the need for parking is even stronger given the difficulty of finding a space at the station. Not only is any proposal to reduce the number of spaces seen as unworkable, but strong pressure exists to increase the amount of parking. In the planning process for transit-oriented development at the Pleasant Hill BART station, many participants expressed their view that adequate parking for BART riders was the top priority. The following, taken from a letter to the editor, is typical of many comments: “The last plan I saw had, among other things, a 12-story office building and a seven-story garage. Wrong. It should be a seven-story office building and a 12-story garage. And all those apartments...”<sup>8</sup> In effect, these comments assume that the station’s role as a node is more important than its role as a place and, moreover, that the node should favor riders who drive to the station over riders (real and potential) who would arrive on foot, by bicycle, or on feeder bus routes.

Many of the shortcomings of TOD projects can be better understood when those projects are viewed through the lens of place and node. There is not necessarily a single correct way to balance these two roles; however, achieving the best possible outcomes in any given case requires an understanding of the way in which this tension shapes projects and forces trade-offs.

**C. Planners have few guidelines for translating the concept of location efficiency into concrete prescriptions for TOD in different settings. What makes a place has not been codified.**

The previous challenge dealt with the tension between node and place. Making the *place* work is another challenge. All too often there are few or no advocates (and little or no money) to keep the idea of place on the agenda. Furthermore, little information exists about how to make good places.

Effective transit-oriented development cannot be defined by physical form alone. For example, while residents of dense urban areas like San Francisco clearly drive less than suburban residents, those of many relatively high-density areas do not achieve particularly good outcomes in terms of reducing driving. The difference lies in the way that many San Francisco neighborhoods combine density with appropriate street patterns, access to transit, neighborhood amenities, and an adequate mix of retail in close proximity, as well as in the demographic composition. This contrasts housing developments in many other cities (parts of San Diego or Fremont, California are prime examples) that, while achieving similar densities, sit behind walls with only one entrance. Residents have no choice when they leave home but to travel on major arterials and shop at auto-oriented retail centers. Density is clearly not the only important factor.

Although a fairly rich literature probes the individual elements that determine location efficiency, little work has been done to integrate these individual lines of inquiry. The impact of density on transit use, retail viability, and auto use has been studied, but it is not clear to what extent

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<sup>8</sup> Pleasant Hill/Martinez Record, Thursday, March 15, 2001.

density must be accompanied by other features in order to provide mobility choices, nor what role a neighborhood's socioeconomic status plays. Likewise, even research that suggests that a grid street pattern encourages walking more than a system of cul-de-sacs and major arterials does not necessarily offer much insight into how that layout interacts with factors such as street design, proximity to transit, and the mix of retail offerings. Thus, although many planners and TOD advocates have a clear conceptual understanding of the factors that contribute to the desired outcomes, little understanding—and even fewer guidelines—exists about how to turn those concepts into plans.<sup>9</sup>

Retail elements clearly point up another problem. In contrast to other mixed-use projects, which do not necessarily attempt to satisfy all needs, TOD projects aiming to maximize location efficiency must, by definition, strive to serve as many of the daily needs of the residents as possible. Designing a project to serve those needs requires precise information on the services that shoppers (residents, employees, visitors) need and want, the way people choose where to shop and how to get there, and the conditions (e.g. demographics, retail mix) necessary for different retail services to be viable.

While much of the work that has been done on retail services is excellent and sheds light on particular questions, little research exists to guide planners making decisions about the most desirable retail mix for transit-oriented development projects. What types of retail services are least likely to generate car trips, and do these match the services that are most important to making a neighborhood location efficient? How do density, mix of uses, and demographics interact? Residents' propensity to walk to retail varies not only with distance, density, and street design but also with the age, number of children, and income of shoppers. Affluent older parents are less likely to forgo driving than young, middle-income singles. Given a particular location and feasible density, it needs to be asked what mix of retail uses is most suitable, what density of population is needed to support that, and what demographics are most compatible with transit-oriented development.

The picture grows even more complicated when planners begin to look beyond retail. Different types of employers and occupations are likely to generate different levels of transit use. What types of employers or real estate types are best suited to being located near transit? Can the role of a station area as an employment center be reconciled with its role as a neighborhood? What types of employment mesh best with retail?

This general problem of information shortfalls is made more acute by the fact that most of the research in these areas does not focus on transit-oriented development specifically. But mixed-use represents less a particular species of mixed-use development than a special case entirely.

Finally, the appropriate density, mix of uses, amount of parking, level of bus service, and other aspects of station area program and design will necessarily vary depending on the scale and

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<sup>9</sup> It should be noted that there is conflicting evidence about many of the relationships mentioned as part of the argument on location efficiency, such as the relationship between density and auto use. Some of the literature cited in the bibliography examines the research to date.

type of place in question, as well as the particular characteristics of the place. Yet again, there are few guidelines for planners.

**D. TOD requires synergy among many different uses and functions, but this synergy is extremely difficult to achieve. As a result, TOD almost always involves more complexity, greater uncertainty, and higher costs than other forms of infill development.**

Because of their need to fulfill both place and node functions, TOD projects require all their component parts – the transit system, station access routes (buses, taxis, cars, bicycles, and pedestrians infrastructure), and the surrounding development – to interface with each other. While it is the synergism among these functions that allows TOD to achieve location efficiency and other desired outcomes, the process necessary to link all these parts together into a single well-functioning place remains extremely complex. Even if a successful strategy is devised to finance all the basic components of the project a clearly identifiable funding source rarely is available to pay for many of the extra “place making” features that smooth the transition between place and node and encourage location.

As a relatively new real estate product that is still largely undefined and still outside the mainstream, TOD lacks a standard approach. Most TOD projects are experiments that try to negotiate unfamiliar regulatory, physical, political and financial terrain simultaneously. This fact, combined with the inherent complexity of good TOD projects, often means greater delays, conflicts, confusion, and costs. Even when developers are not deterred by this prospect, they and the other actors may not succeed in maximizing the potential synergies of the project.

The challenges are particularly acute given that, with few exceptions, no single actor can completely set the agenda. Transit agencies run the trains and have some control over development on their land, but they are still subject to constraints from local governments, and they have no control over the larger station area. Local governments often have to push transit agencies to make their station designs more accommodating to surrounding development. Developers may be reluctant to build appropriate buildings, or if willing, they may have problems getting financing or even getting the necessary assistance from the local government.

Not all problems result from such an obvious lack of coordination. The cost and complexity of good TOD projects is greater in part because of the very nature of the projects. In order to achieve the goals laid out above, TOD projects must have a complex mix of uses. This is even true within any given real estate type: Ideally there should be a choice of housing types (single- and multi-family, rental and ownership), retail choices, and so on. Yet different real estate types have different levels of risk and require different financing strategies. Different lenders, investors, and financing parameters may be necessary for each real estate type, which requires “parsing” the different components of the project. Yet this can require significant expertise and technical knowledge outside the realm of experience of most developers and transit agencies.

The problems can be seen especially clearly in suburban locations where land is relatively inexpensive. There, neither local governments nor transit agencies have an incentive to build expensive parking garages even though structured parking might make for better and more efficient places. Other features, such as attendant-operated bike parking stations, small urban parks, community facilities, or even small-scale retail might all contribute to location efficiency in a TOD. Equally importantly, truly functional TOD depends on high-quality design and planning. However, place-making amenities and high-quality design are too often viewed as secondary or irrelevant. Even when this is not the case, there is usually no source of financing to pay for these important components of the project. None of the actors necessarily see it as their role, and although the local government is usually in the best position to create the conditions for good planning and design, there is often a lack of understanding or leadership on that front.

**E. Transit-oriented development typically occurs in a very fragmented regulatory and policy environment. There is often no comprehensive plan or vision, and many local governments suffer from a significant leadership gap.**

Given the inherent complexity of transit-oriented development and the need for synergy among many disparate elements, the lack of an overall vision and a streamlined regulatory structure is an enormous challenge. Projects must move forward in an environment of complex and sometimes contradictory regulations, lack of coordination among different actors, and the absence of a clear vision and the leadership necessary to implement it.

While TOD requires the coordination of many actors, local governments occupy the best position of any of them to create and sustain the vision necessary for TOD and to assist with critical aspects of the development process such as entitlements, land assembly, investment in key infrastructure and place-making amenities, and so on. Unfortunately, many local governments – even some that view TOD as a desirable goal – do not well understand the benefits of planning or clearly envision the role that they can play as facilitators. When these are lacking, projects can fall short. Provision of infrastructure and amenities is another key role for local government activism. Without a visible program of investment in basic infrastructure, streetscaping, and so on, developers may lack confidence that the public sector is making a commitment to the area. Unfortunately, the two most critical actors in the TOD process – transit agencies and local government – often fail to work together effectively to establish a unified and comprehensive vision for TOD.

Developers nearly unanimously stress the importance of a good plan for providing a predictable environment for development. Without such a plan, no guarantee exists that the community will accept a proposed development, or that there is any agreement on the future evolution of the area. Delays and uncertainty can be higher and as a result the cost of pre-development work may increase. If this is the case, the developer will require a higher return-on-investment and the scope and creativity of the project will be constrained.

In nearby Plano, Texas, in contrast, the city has played a much different role in the redevelopment of its downtown, where a new station of the Dallas Area Rapid Transit (DART)

system is being built. The city aggressively courted the DART system, assigned a full-time staff member to transit and TOD issues (in addition to other knowledgeable and active staff members), produced a downtown parking management plan, and developed a comprehensive plan to guide development downtown. This active leadership on the part of the city government played a key role in assembling both the transit and the development. The developer of two downtown housing projects states that he would not have been interested in downtown Plano, even with DART, had it not been for the city's downtown plan, its willingness to finance infrastructure and public improvements, and its efforts to assemble land for development.<sup>10</sup>

Finally, the local government can play a key role in land assembly by purchasing land, facilitating deals, coordinating different entities, and so on. True transit-oriented development cannot occur on a single parcel, but ownership of land is nearly always fragmented and assembly of multiple parcels can be difficult. If the local government does not play a leadership role then the development program surrounding the transit station is unlikely to be of sufficient scope to be truly effective as TOD.

Market forces are not always strong enough to support good TOD by themselves. When they may not, local government becomes an even more critical actor in the TOD process and strong public policy provides an important tool for overcoming a neighborhood's disadvantages and creating a place that is suitable for high-quality development. A local government that plays an active role in developing an area plan, providing infrastructure, and ensuring land supply can significantly alter the perceived market conditions in an area. In the end, the most successful TOD projects will be those which involve a partnership between the public and private sectors.

#### **F. Transit alone does not drive real estate investment when other conditions – particularly market conditions – are not supportive.**

Much evidence confirms that transit can have a positive impact on land values, commercial rents, and development trends. Still, transit agencies and policymakers sometimes overestimate the impact of a transit line on development.

Part of the problem lies in the confusion between, on the one hand, increased land values stemming from transit investments and, on the other hand, market demand for particular real estate products close to transit. In economic terms, the impact of transit on land values is follows from the fact that transit renders the land effectively less "distant" from key locations (i.e. the "cost" of transportation, whether in monetary or non-monetary terms, decreases). Given that, all other things being equal, users will be willing to pay more to locate there. From the developer's perspective, the

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<sup>10</sup> The two residential projects incorporate only modest reductions in parking ratios but they treat parking in an adequate way from a design standpoint, replace surface parking spaces lost on the land developed with garage spaces (thereby facilitating intensification of development), and incorporate retail into the buildings. While they can certainly be critiqued for falling short of the goals of full TOD, they represent a very positive first step towards injecting life into the downtown real estate market and laying the groundwork for future TOD.

value of what can be built on the land increases, and therefore the market value of the land increases.

Even with transit, however, any given site must still compete with every other site in the region for development. Since transit is only one of many factors driving development, many other sites may prove more attractive to developers. To be sure, the public sector – most notably local government – can elevate market demand at a site by working to create more of the necessary conditions for development. But without strong existing demand or coordinated policies to help create it, transit alone will not drive appropriate development even if it leads to increases in land costs.

This can make transit-oriented development a particular challenge in low-income areas, where the real estate market is usually weak. Real or perceived problems such as crime, social problems, and deteriorated physical conditions deter investment. Either investment will simply not occur or the quality of the development will be compromised. As a result, new development in transit-rich low-income neighborhoods is very difficult to achieve and often lacks the full set of features, such as appropriate site design and pedestrian connectivity that would maximize location efficiency. Under these conditions well-planned transit investments can constitute a key piece of an economic development or revitalization package, but a host of supporting policies, incentives, and investments are also necessary.

In addition to the site's location within the region, local factors also shape market conditions. Some places may be more amenable to high density than others. The demographic composition surrounding a site may be more or less favorable to TOD. Even when real estate investment occurs, it is not necessarily supportive of the goals of transit-oriented development. For example, the construction of suburban style housing in neighborhoods with good transit connections may undermine the location efficiency of those neighborhoods. While in theory development parameters can be set with zoning and other tools, there is no guarantee that the market will provide the desired development. Buyers may want something different in that location, and lenders and developers may balk at providing a product of which they are uncertain.

In short, real estate investment decisions are made on the basis of many criteria, and although transit can help catalyze development, transit alone is not sufficient when market conditions are not supportive. Node – as defined by the connection to the transportation system – and place – as viewed by the market and defined by other qualities and policies – must work together to generate investment.

#### **IV. RECOMMENDED ACTIONS**

The demand for more “urban style” development will likely increase over the next several years. Whether in revitalizing cities like Washington, D.C., outer-ring suburbs like Lenexa, Kansas, or the increasingly dense “boomburg” suburbs of Orange County, California, places with proximity to fixed-guideway transit systems will become increasingly valuable development sites in any region dealing with growth. TOD can help address the urban growth problems of these places if it is recognized as a mainstream development product. The challenge is to recognize the full extent of the opportunity offered by such sites and push for real transit-oriented development, rather than settling for sub-optimal projects that will provide considerably fewer benefits over the long run.

Transit-oriented development should be both place-based and market-oriented. It needs to work for communities and for people, for employers and for employees, and for all those who are keeping an eye on the future such as planners, civic and community leaders, and politicians. Like all other place-based assets, no single agency or interest can make it work by itself. In order to fulfill its potential, then, TOD needs to have the benefit of conditions, resources and policies that are highly, dependably, and accountably aligned around the task at hand. There must also be a high degree of flexibility during the planning and development process to embrace different approaches depending on the particular context, whether it be light rail or commuter rail, low-density or high-density areas, strong or weak real estate markets.

TOD offers an opportunity to put the place back into marketplace, but it cannot happen if there's a sense of delusion about what works and what doesn't, or a lack of realistic strategies for building on success. Seizing this opportunity therefore requires that the many actors who influence the shape of transit-oriented development projects change the way they have traditionally done business. All parties must better understand what TOD projects can and should accomplish, how those goals can dovetail with each actor's own interests, and the role of each actor within the larger decision-making and development process. The "jointness" in joint development has to be real and based on the recognition that in the case of TOD doing things together is better than doing them separately.

In addition to the main actors – transit agencies, local government, developers, and lenders – there is room for other actors to serve as TOD intermediaries. Such groups could include both local activist organizations and national entities. The former groups should focus on advancing specific TOD projects, while the latter can play a key role by collecting and disseminating information on good projects and strategies, providing or facilitating funding, and working to turn TOD into a mainstream real estate product recognized by developers and lenders.

The following recommended actions include various ways in which each of these stakeholders can work to reform the current process so as to achieve optimal transit-oriented development.

## A. TOD-Related Development Intermediary

Broad-based education, information, and advocacy about the challenges and opportunities of transit-oriented development needs to be undertaken. To be sure, this is beyond the scope of most local governments and transit agencies. But certain state and federal government agencies can be involved in meeting this need, and public interest groups can and should also play a role. The Congress for the New Urbanism has also pursued education and advocacy to introduce a new type of real estate development onto the market, and the growth in the number of new urbanist development demonstrates success in this regard: The annual number of projects built or in planning has quadrupled since 1996.<sup>11</sup> Transit-oriented development needs its own champions to move it into the mainstream.

TOD intermediaries can play a critical role in meeting this challenge by conducting research and disseminating the results, helping to build community support, working to shape public policy, educating actors in the TOD process, and developing toolkits for TOD implementation.

The following are the most important actions to be taken.

### 1. ***Action 1(a): Establish a “TOD Fund” to financially support TOD projects that cannot obtain conventional financing.***

Although lenders and developers are undertaking more innovative urban infill projects, including some types of TOD, many situations remain in which lenders in particular are unwilling to assume the risk of certain elements of a particular project, or to make loans in certain types of neighborhoods, especially inner-city communities with lower income households. A TOD fund administered by a TOD intermediary could provide a critically needed source of money for grants, loans, equity investments, loan guarantees, and other types of financial support for such projects that have strong market support but that for other reasons lack support from conventional financial institutions.

Such a fund might offer predevelopment assistance, revolving loans, funds for equity investment, or linkage to existing sources of capital such as tax credits or other equity funds. Such funds could be established independently on a national scale, deployed regionally, or developed in cooperation with existing community development capital sources.

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<sup>11</sup> New urbanism encompasses a broad range of ideas, but it generally refers to the concept of neo-traditional neighborhood planning for walkable, compact, and integrated mixed-use communities. See Calthorpe, Peter and William Fulton. The Regional City. Island Pres. Washington, D.C.: 2001 (Appendix).

**2. Action 1(b): Provide technical assistance to local governments, transit agencies, and developers implementing TOD projects.**

As a non-standard product, TOD is unfamiliar to most local actors. Education and technical assistance can help them avoid pitfalls and achieve optimal outcomes. The following are the most important agendas:

- Assist the planning process, especially with technical information on appropriate densities, mix of uses, design, and so on.
- Develop a typology of places and successful strategies that can give local actors models and examples on which to base TOD efforts in different places. See Action 1(c).
- Help devise standard real estate products that can be used in TOD projects and that are recognized by developers and lenders as tested and viable.
- Identify the full range of financing tools that can be used for TOD and help develop others that take into account the specific needs of TOD. This includes training in structuring financing packages from multiple sources and separate financing targeted to different pieces of the development in order to mix different types of financing.
- Advocate creative solutions to dealing with parking. See Action 1(e) and Action 3(b).

**3. Action 1(c): Create a typology of TOD projects appropriate for different types of stations in different contexts, as well as performance criteria for each project type.**

TOD must respond to the characteristics of the site in question rather than adhering to a rigid formula. However, it may be possible to develop a general typology of places to account for a variety of different scales (large city, small city, town), locations in the metropolitan area (central city, peripheral city, commuter town), transit type (commuter rail, frequent light rail), and other key attributes. Specific topics that should be addressed include:

- What mixtures of uses will optimize effective mixed-use development and support location efficiency under specific conditions (for example, in areas with different levels of income and density)?
- How can theoretical location efficiency be translated into real improvements in mode split, VMT, and other measures of location efficiency in different contexts? What densities and level of transit service are necessary?

**4. Action 1(d): Develop and disseminate materials to showcase examples of the benefits of these TOD goals and the ways in which they can be realized.**

Develop educational materials for the public, financial institutions, transit agencies, developers, and local governments covering the following:

- Illustrate effective examples of projects or processes that have overcome conflicts between different TOD goals to create great projects with lasting value as both nodes and places.
- Provide a framework to help develop an optimal program for a TOD.

- Investigate and document the impacts of physical layout on the success of TOD projects.
- Explore and promote creative financing strategies and approaches to realizing optimal TOD.
- Prepare educational materials on ground leases for TOD.
- Use conferences, specialized press, and large developers to promote TOD.

**5. *Action 1(e) Help develop and promote appropriate parking standards and educate actors about parking reduction strategies.***

Parking is one of the biggest stumbling blocks for TOD, and many developers, lenders, and local governments do not consider the option of reducing parking or other strategies to achieve that goal. Lenders may not finance a project if it doesn't contain a standard parking ratio, but standard ratios may not accurately reflect the local conditions. The most important areas of action for the TOD intermediary are:

- As part of the typology of places, develop parking and trip generation standards for TOD at different scales and in different types of places based on empirical research.
- Examine strategies for unbundling parking from other land uses.
- Actively promote these standards and strategies to standards agencies, lenders, and local governments.

**5. *Action 1(f) Work with lenders and secondary markets to understand ways to standardize lending strategies for TOD.***

There is a need for standard lending strategies that recognize the viability – as well as the potential greater return – of TOD projects. In the same way that Fannie Mae has agreed to serve as a secondary market for location-efficient mortgages, it or another organization could support a form of lending tailored to TOD projects.

**B. Transit Agencies**

Transit agencies often take the lead in stimulating transit-oriented development because they own land adjacent to their own stations and view joint development as a tool for meeting goals ranging from increasing ridership to generating ground lease revenues. Transit agencies can play an important facilitating role, and coordination between the transit agency and entities doing station area planning is always crucial to successful TOD.

**1. *Action 2(a): Participate in planning for both transit agency property and the wider station area with the aim of fostering long-term rather than short-term value. Use transit agency resources to support this long-term value.***

As public entities and landowners, transit agencies should be able and willing to support a long-term vision for a site in a way that most other actors cannot sustain. This involves addressing

current financial realities, evaluating impacts on existing conditions, and creating a useful public participation process.

- 2. *Action 2(b): Create station-access plans that recognize the critical link between the station and its adjacent land uses, as well as the need for the station to be an integral part of a larger area.***

Plans should be developed with a focus on all of the desired outcomes for transit-oriented development, including great accessibility and interconnection, the creation of a vital place, high levels of ridership, the maximization of land around the station and strong financial performance.

- 3. *Action 2(c) Plan for TOD at the system-wide scale, assessing opportunities at each station site and thinking regionally about the interplay between land uses around each station and the way they can affect system-wide ridership.***

Although each individual station must balance node and place functions to some extent, the value of the system as a whole can be enhanced if there is some degree of specialization. In addition, from a market perspective it does not make sense to try to force a mix of uses that is radically different from what is in demand. Goals of TOD can sometimes be enhanced more at the regional level than at the local level.

Thus, many of the stations along the extension will be fairly specialized, but the line as a whole will provide a reasonable mix of jobs, housing, retail, and commuter parking. While the details of the development along the line can be criticized, the overall concept of specialization works well. Even when specialization is not carried to the same extent as in this example, any TOD project will be made more effective if it is planned with other station areas in mind.

## **C. Local Government**

Local government has the broadest mandate of any of the actors: promoting the public good. While the public good can be defined in many different ways, the local government will almost always be the actor best positioned to advocate the broadest and most long-term vision for development sites and as such is the actor best able to take a leadership role in creating great places.

- 1. *Action 3(a): Establish transit-oriented development area plans around all transit stations.***

TOD area plans should be informed by whatever research and guidelines are available to help planners and should do the following:

- Present a conceptual land-use diagram and program.
- Identify key opportunity sites.

- Present design guidelines and a streetscape plan.
- Designate investment priorities for infrastructure and place-making amenities.
- Present an action plan and financing strategy. The latter should discuss how value will be captured and how it will be spent.
- Set high design standards, ensure careful design review at all stages of process, and enforce standards strictly. Create strict guidelines around parking design and vehicular circulation so that cars do not interfere with pedestrian and bicyclist access to the station or make the station unpleasant for non-drivers.
- Take a comprehensive view of mobility.
- Formulate an anti-gentrification strategy where appropriate.
- Incorporate essential services such as day care facilities into transit-oriented development.
- Tie federal/state/local funds for provision of key infrastructure (transit facilities, bridges, etc.) to requirements for transit-supportive design (plan implementation).

**2. *Action 3(b): Develop a process for interagency coordination with the transit operator(s) who will be involved in transit-oriented development projects to ensure that such projects will both achieve the goals of transit-oriented development and move forward expeditiously.***

As described above, municipalities and transit agencies need to work together to identify the goals of every transit-oriented development project before physical planning begins or developers are involved. These goals should include outcomes such as a high level of accessibility and interconnection, an attractive and well-used place, high levels of ridership, the reduction of congestion and commute times, the intensification of land-use around the station, and strong financial performance. Local government, in cooperation with the transit agency or agencies, should identify a timeframe and process for initial goal setting, the involvement of the public, and the selection of a developer. Strong support from local government and an ongoing facilitating role in the development process is essential for proper land assembly and other aspects of creating effective TOD.

**3. *Action 3(c): Create comprehensive parking strategies for TOD projects that include comprehensive management and that “unbundle” parking from other land-uses.***

In coordination with the other actors, local governments should create comprehensive parking strategies for TOD projects that accomplish the following:

- Create area parking management plans for TOD projects.
- Link parking requirements to actual parking utilization and vehicle ownership levels.
- Set parking ratios that reflect the area’s transit service that enable people to live or work here without owning a car, or by owning fewer cars per household than would be feasible in a more suburban location.

- Encourage and facilitate car-sharing, local shuttle service to employment centers as well as to neighborhood shopping centers (or beyond), and other strategies as part of a comprehensive strategy.
- “Unbundle” parking from other land uses like housing, financially and perhaps physically, and create a separate market for parking so that people pay for parking separately from other uses.

**4. *Action 3(d): Provide financial and land assembly assistance to transit agencies and/or developers as an incentive for creating optimal TOD projects, including identifying new revenues streams to support bond financing.***

Local governments may need to invest their own resources to ensure that TOD projects get implemented properly. Land assembly is one of the most important roles that local governments can play, since high land costs and fragmented ownership patterns are often an impediment to any type of infill development. Also, by paying for market studies and/or predevelopment activities, public investment can help to encourage developers by proving project feasibility.

**5. *Action 3(e): Establish explicit policies for incorporating mixed-income housing in TOD projects.***

The creation of mixed-income housing should be an explicit goal from the beginning of the project, and specific policies to create affordable units should be incorporated into the planning process from an early date.

Local governments should set explicit standards, such as TOD-specific inclusionary housing ordinances, for accommodating a range of income groups within TOD projects instead of allowing projects to build housing targeted at only a narrow band of incomes. In addition to whatever subsidies may be provided, local governments can use a range of techniques to capture the additional value in TOD projects and direct a portion of it to internally subsidize below market rate housing.

In the same way that local governments can use density bonuses that allow developers to build more intensively (and therefore more profitably) on the condition they use some of the additional profits to subsidize affordable units, parking reductions made possible by the nature of the project can yield cost savings that can then be invested in affordable units.

**D. *Developers & Lending Institutions***

Developers and lenders provide the private capital and resources required to build transit-oriented development projects. While developers share the local government’s primary focus on place, they do not have a mandate to promote the public good. Their mandate is to meet the financial requirements of their investors and lenders. The outcomes they focus on are phasing, costs, revenues, income, marketability, property values, and overall return numbers.

Lending institutions, while critical to the process of developing a TOD, are less directly involved than the other actors. Their focus is not on the TOD itself, but on how a loan fits into their loan portfolio and its marketability on the secondary market. As a result, they are less interested in the unique benefits of the project as either a place or a node. Instead, they are concerned primarily with the performance of the loan and how well it matches standard underwriting criteria. They rely on underwriting criteria such as the debt coverage ratio, the loan to value, the track record of the developer, and parking ratios. These criteria direct the lender to hone in on outcomes such as the net operating income, the value of the project, and invested equity as well as physical details such as square footage and parking spaces.

**1. *Action 4(a): Become educated about the financial structure and performance of existing TOD and appropriate mixed-use projects.***

With the help of TOD intermediaries and other advocates, developers and lenders can learn about some of the many strategies that lead to successful TOD projects. For instance, there are many built examples of both vertical and horizontal mixed-use projects all over the country. One strategy for vertical mixed use is to limit retail to less than 15 percent of the overall building square footage, thus enabling compliance with existing single-use loan types. Or, for horizontal mixed use, each part of the project can be “parsed” and treated independently for financing, phasing, ownership and disposition purposes. By learning from such examples, the developer is likely to save time and money in the development process as well as achieve a better product.

**2. *Action 4(b): Use phasing and design flexibility into projects in order to demonstrate market viability, examine assumptions, and allow for the evolution of TOD over time.***

Phasing can work as a critical tool to examine assumptions and demonstrate market viability as well as respond to market change and limit risk. For instance, as the viability of reduced parking is proven and as the project matures to the point where transit gains a greater share of mode split, parking in subsequent phases can be reduced. Use phasing to test unknown markets, such as higher density housing in otherwise low-density areas. Build other portions of the project for which there is known demand, and that may spark demand for less tested products like higher density housing.

Designing for future flexibility enables the TOD to react to market demands created by both the evolution of the TOD itself as well as more macroeconomic changes in the community and region. For example, as the TOD becomes more of a recognized place and destination, lively with people and activity, the demand for retail should grow. Building design should be able to accommodate more retail by changing the use of some of the existing spaces when tenants leave, through conversion of ground floor commercial offices to storefronts.

**3. Action 4(c): Revise underwriting practices that require standard parking ratios for TOD projects.**

Lenders need to revise parking ratios to account for the reduced need for parking spaces at TOD projects due to their location efficiency. Applying the same parking ratios to a project that is only accessible by car to one that is accessible via many forms of transportation makes little sense. For example, if the lender parking ratios for suburban office development were applied to office buildings in downtown San Francisco or Manhattan, there would have been no loans made in these very profitable markets. The same case can be made for TOD. Those lenders who do not revise their parking ratios to account for location efficiency will fail to capitalize on this potentially very profitable and growing market segment.

**4. Action 4(d): Create loan guarantee pools to help transit-oriented retail projects get financing, especially those in revitalizing or inner city areas.**

Retail projects in lower income areas may have great difficulty in securing the tenancy of a chain anchor tenant, due to strict demographics requirements around minimum area median income. Without the security of revenue and credit that a chain tenant provides, lenders are often reluctant to finance new retail development. Loan guarantees should fill in the gap in the event of tenant turnover, slow lease out, or missing rent and can eliminate the need for a major-credit tenant.

**E. Community Organizations**

**1. Action 5(a) Become active in planning activities sponsored by local governments and transit agencies around transit stations.**

Community organizations are important sources of local knowledge and important allies in any development project. By being active in planning activities, community groups can push for better projects, help keep the political focus and momentum on TOD projects and potential projects, and ensure that the needs of residents are well served.

**2. Action 5(b) Advocate for mixed-income housing and recognize the benefits of mixed use and location efficiency as part of an affordable housing strategy.**

Community organizations in all neighborhoods should be involved in advocating for mixed-income housing. This may include participating in housing action coalitions or otherwise building relationships with affordable housing advocates or other public interest groups who may not yet have realized the potential benefits of TOD for their particular constituency. Groups that focus on affordable housing issues may not realize the ways in which transit-oriented development can further their agendas.

## V. CONCLUSIONS

This paper has argued that transit-oriented development can help alleviate a wide range of urban and metropolitan problems, from traffic congestion and air pollution to sprawl, long commutes, and shortages of affordable housing. TOD can enhance quality of life and at the same time provide benefits for individuals, communities, and developers.

The paper also argues that it is important to focus not only on whether or not ostensibly transit-oriented projects are built, but on the quality of those projects as measured by the functional outcomes of projects. The three main goals of TOD projects – location efficiency; mobility, housing and shopping choices; and value-recapture and value-return – can be measured and quantified. The definition presented herein avoids a purely physical view of TOD and acknowledges a continuum of success. This allows a more nuanced evaluation of projects, in contrast to the common practice of labeling any project with certain features a success, regardless of how well or poorly it actually achieves the three main goals of TOD.

A focus on functional outcomes leads to a different view of why TOD projects are not living up to their potential than has been presented elsewhere in the literature. Instead of focusing on the barriers to getting projects built, this paper examines why the projects that get built so often do not live up to the full potential of TOD. It finds that that:

- No working definition of TOD exists
- Projects fail to resolve the tension between “node” and “place”
- Planners lack guidelines about what makes a place work
- Unleashing synergy is complicated
- The regulatory and policy environment is fragmented
- The market may not be supportive

Such challenges do not necessarily derail projects entirely, but they do keep them from taking advantage of the full range of synergies made possible by TOD.

With this analysis, it is possible to evaluate TOD projects in a new light, and to take a different approach to improving them. The paper has laid out a series of recommendations for doing so, focusing on the roles that can be played by five main actors. Given the lack of consistent information and the disparate goals that often cause actors to work at cross-purposes, a national-level TOD-related intermediary can play a key role in bringing TOD up to scale. An understanding of the reasons that many projects labeled TOD fail to live up to their potential combined with a willingness to grapple with the tension between node and place and a realistic assessment of what we do and don't know about planning for location efficiency can help in the planning process. Enhanced ability of the actors to work together, with the information and facilitation provided by an experienced intermediary, can ensure that well-planned projects are properly implemented.

Such a mix of understanding, information, cooperation, and intermediation can both improve individual TOD projects and help move TOD into the mainstream of real estate products. TOD, to be sure, offers only one part of the solution to our urban problems. However, if brought up to scale, TOD can play a central role in creating more livable, sustainable, and socially just cities and regions.

## ANNOTATED BIBLIOGRAPHY OF KEY SOURCES

This bibliography is not intended to be complete, but rather to present key examples of the main categories of literature that are relevant to understanding the potential of transit-oriented development as well as the challenges that lead to sub-optimal outcomes.

### Barriers

Little literature deals primarily with the “barriers” or “obstacles” to transit-oriented development. To the extent barriers are discussed, they are generally very similar to those named in studies of mixed-use and high-density development: financing issues, neighborhood opposition, difficulty of land assembly, cumbersome or inflexible regulations, poor timing, lack of market support, etc. There is little to suggest what makes transit-oriented development different.

Boarnet, Marlon G. and Randall Crane (1995). “Public Finance and Transit-Oriented Planning: New Evidence from Southern California.” Working Paper number 1995-36. Irvine, California: University of California at Irvine, Department of Urban and Regional Planning.

Boarnet, Marlon and Nicholas S. Compin (1996). “Transit-Oriented Development in San Diego County: Incrementally Implementing a Comprehensive Idea.” University of California Transportation Center Working Paper No. 343, University of California at Berkeley.

Boarnet, Marlon G. and Randall Crane (1997). “L.A. Story: A Reality Check for Transit-Based Housing.” *Journal of the American Planning Association* Vol. 63, pp. 189-204, Spring 1997.

Cervero, Robert, Michael Bernick and Jill Gilbert (1994). “Market Opportunities and Barriers to Transit-Based Development in California.” University of California Transportation Center Working Paper No. 223, University of California at Berkeley.

*The most important barriers outlined in these papers (as summarized in the last of these publications) are:*

- *Existing land-use patterns near rail transit stations constrain the opportunities for TOD.*
- *Difficulties in assembling large parcels of land limit TOD opportunities.*
- *The private land market is at times unable to sustain new development projects.*
- *The local economic and fiscal impacts of TOD projects might discourage localities from pursuing such projects.*
- *Local officials might not be adequately educated in both the regional advantages and local impacts of TOD.*

Loukaitou-Sideris, Anastasia and Tridib Banerjee (2000). "The Blue Line Blues: Why the Vision of Transit Village May not Materialize Despite Impressive Growth in Transit Ridership." Berkeley: University of California Transportation Center Working Paper.

*This paper examines the failure of the Blue Line light rail from downtown Los Angeles to Long Beach to generate significant economic development in the poor neighborhoods through which it passes. The authors argue that a range of pre-conditions necessary for economic development generally and transit-oriented development specifically were absent. Problems include:*

- *Ineffective alignment of the rail corridor and poor placement of stations given regional and local land-use patterns. This stems in large part from the decision to use an existing right-of-way in order to minimize costs, expedite development of the line, and break the political "impasse" over the development of rail transit in Los Angeles.*
- *Deteriorated urban landscape that suggests crime, poverty, and an unfavorable environment for development. This may be as much perception as reality, but it is perception of risk that drives investment decisions.*
- *Regulatory barriers that either complicate the development process or fail to adequately take into account the potential benefits of transit. The authors cite, among other things, antiquated zoning and subdivision regulations and the lack of lower parking requirements for affordable or transit-oriented housing in the inner city.*
- *High cost of land.*
- *Lack of institutional commitment, political will, and lack of community involvement.*

In addition to academic papers, there are resources compiled by city and county agencies that discuss barriers to transit-oriented development. These resources tend to echo the types of barriers cited above. Two examples, both available on the Internet, are:

Arapahoe County, Colorado. "Transportation Plan: Transit Oriented Development." Littleton, CO.  
<http://www.co.arapahoe.co.us/DSIM/Comprehensive%20Plan/TransportationPlan/TransitDevelopment/Barriers.htm>.

Puget Sound Regional Council. "What are Transit Station Communities?" Seattle, WA.  
<http://www.toD.C.ommunities.org/Basics.htm>.

### **Economics of Transportation and Transit**

Camph, Donald (1997). "Dollars and Sense: The Economic Case for Public Transportation in America." Report for the Campaign for Efficient Passenger Transportation.

Jia, Wenyu and Martin Wachs. 1997. "Parking and Affordable Housing". *Access*, Vol. 13, No. 3:22-25.

Surface Transportation Policy Project and Center for Neighborhood Technology (2000). "Driven to Spend". Principal authors include Ryan Tracey Moody, Barbara McCann, Reid Ewing, Michelle Grant, and Scott Bernstein.

## **General Transit-Oriented Development**

Bernick, Michael and Robert Cervero (1996). Transit Villages in the 21<sup>st</sup> Century. McGraw-Hill.

*A review of many of the main issues surrounding transit villages and their development. Many valuable tools, strategies, examples, and suggestions, as well as solid justifications of the rationale for transit-oriented development. Emphasizes the role of the "three Ds" – density, diversity, and design – in the success of TOD. However, stops short of discussing performance criteria or setting goals for outcomes. Probably the most comprehensive review of literature and cases.*

Porter, Douglas (1997). Transit-Focused Development: A Synthesis of Transit Practice. TCRP Synthesis 20. Transportation Research Board, National Research Council. Washington, D.C.: National Academy Press.

*A thorough review of many of the issues surrounding transit-oriented development, including land- use/transit connections, government policies, and a number of short case studies.*

Niles, John and Dick Nelson (1999). "Measuring the Success of Transit-Oriented Development: Retail Market Dynamics and Other Key Determinants." APA National Planning Conference Proceedings.

Niles, John and Dick Nelson (1999). "Market Dynamics and Nonwork Travel Patterns: Obstacles to Transit-Oriented Development?" Accepted for publication by Transportation Research Board.

Niles, John and Dick Nelson (1999). "Enhancing Understanding of Non-Work Trip Making: Data Needs for the Determination of TOD Benefits."

*Collectively, these three documents by Niles and Nelson cover ground not dealt with in most other studies. For example, they identify trends in the retail sector (e.g., the ever-larger scale of some retail operations) that may call into question the ability of TOD to capture enough non-work trips to be viable. They also emphasize the need to distinguish between local and regional impacts of TOD, and are skeptical about the ability of TOD as currently carried out to have a significant impact at the regional level.*

*Niles and Nelson identify 16 different variables affecting the success of TOD: number of TODs/extent of transit investment, transit quality, transit technology, street pattern, station-area parking, employment and housing density, commercial mix, retail siting criteria, regional market*

*structure, consumer activity patterns, travel behavior, zoning flexibility, resident reactions, housing type preference, residential self-selection, and government policies. The exact impact of each of these factors is not known, so they advocate additional research and more systematic and coordinated data collection to better understand how TOD projects can respond to market conditions.*

## **TOD Case Studies**

Boarnet, Marlon G., and Nicholas S. Compin (1999). "Transit-Oriented Development in San Diego County: The incremental Implementation of a Planning Idea". *Journal of the American Planning Association* Vol. 65, No. 1, pp. 80-93.

Bragado, N.S. (1999). "Transit Joint Development in San Diego: Policies and Practices". *Transportation Research Record* 1669, pg. 22-29. Transportation Research Board, National Research Council.

Lefaver, Scott (1997). "Public Land with Private Partnerships for Transit Based Development." IISTPS Report 97-1. San Jose: Mineta Institute.

Porter, Douglas (1997). Transit-Focused Development: A Synthesis of Transit Practice. TCRP Synthesis 20. Transportation Research Board, National Research Council. Washington, D.C.: National Academy Press.

## **Transit and Real Estate Markets**

The publications listed here represent only a few of the studies that have been completed. Most studies find a positive impact on land and real estate values near rail stations, although residential properties may not exhibit this effect when they are immediately adjacent (presumably because of noise and other disamenities). However, it bears remembering that land values and real estate demand do follow parallel trends. Land values can sometimes rise even in the absence of sufficient demand for development that would justify construction on relatively expensive land.

Cervero, Robert (1994). "Rail Transit and Joint Development: Land Market Impacts in Washington D.C. and Atlanta." *Journal of the American Planning Association*, Vol. 60, No.4, pp. 83-94.

Gruen Gruen +Associates (1997). "The Effect of CTA and Metra Stations on Residential Property Values." A Report to the Regional Transportation Authority (Chicago).

Weinberger, Rachel (2000). "Commercial Rents and Transportation Improvements: Case of Santa Clara County's Light Rail." Lincoln Institute of Land Policy Working Paper.

Weinstein, Bernard and Terry Clower (1999). "The Initial Economic Impacts of the DART LRT System." Prepared for Dallas Area Rapid Transit.

## Travel Patterns and Behavior

One of the key premises on which transit-oriented development is based – and therefore one of the main areas of debate – is that density, proximity of services, street patterns, and other physical factors influence travel patterns. This notion is generally summed up by Cervero and Bernick's three Ds. Although there is ample evidence to support this premise, there is an ongoing debate about the validity of the studies, which often do not look at a full range of variables in order to control for income, household type, and other characteristics that may be correlated with density. Also, it is unclear to what extent location choice is endogenous – that is, to what extent individuals who prefer transit, walkability, and density move to neighborhoods that provide them.

Handy, Susan and Kelly J. Clifton (2001). "Local Shopping as a Strategy for Reducing Automobile Travel." *Transportation*. Vol. 28 No. 4.

Kenworthy, Jeff, Felix Laube, Peter Newman, and Paul Barter (1997). "Indicators of Transport Efficiency in 37 Global Cities." Report for the World Bank. Institute for Science and Technology Policy, Murdoch University, Australia.

Kenworthy, Jeffrey R., and Felix B. Laube (1999) An International Sourcebook of Automobile Dependence in Cities, 1960-1990. Boulder: University Press of Colorado.

Steiner, Ruth (1994). "Residential Density and Travel Patterns: Review of the Literature." In Issues in Land Use and Transportation Planning, Models, and Applications. *Transportation Research Record* No. 1466. Transportation Research Board. Washington, D.C.: National Academy Press.

*This is a good short review of existing literature that supports claims of a link between higher density and shorter trips, less auto use, more transit, and walking. However, most of the literature examines aggregate data and does not account for the possibility that density could be correlated with other variables such as income, life-cycle characteristics, age, and so on. More research is necessary to determine the exact causal relationships, as well as the hedonic relationships that govern choices.*

Steiner, Ruth (1997). Traditional Neighborhood Shopping Districts: Patterns of Use and Modes of Access. Monograph 54, Institute of Urban and Regional Development, University of California at Berkeley.

*This furnishes an in-depth study of customer characteristics, patterns of use, and modes of access in six traditional shopping areas in the East Bay region of the San Francisco Bay Area. The primary aim is to examine the validity of the new urbanist assumption that traditional neighborhood development (higher densities, mixed uses, pedestrian amenities, and transit access) can reduce auto dependence. The study looks at the degree to which people shop in their own neighborhood and the degree to which shopping areas serve local residents, and consequently the degree to*

which implementing new urbanist recommendations can result in reduction of automobile trips. This study also provides a good review of relevant literature. Key findings (from the literature and the study itself) are as follows:

- People do not always shop at the nearest center. Many factors other than proximity go into choices.
- Mode choice is also the result of complex factors rather than simple proximity, although distance is a key factor.
- Despite the lack of a clear linear relationship between proximity and choice of shopping location, the study presents evidence that a neighborhood that combines density, accessibility, proper design, and an adequate mix of uses can result in a reasonably favorable modal split. Two Bay Area shopping districts – Rockridge and El Cerrito Plaza – show significantly different rates of driving. In the former, just over half the shoppers drove, whereas in the latter the figure was 80 percent. Both areas are centered on a BART station, but significantly more shoppers took BART to Rockridge. The rate of walking was much higher in Rockridge (30 to 40 percent) than in El Cerrito Plaza (10 percent).
- The problem with a successful, accessible shopping area like Rockridge is that it attracts shoppers from outside the neighborhood. The resulting traffic and parking demand can threaten the very qualities, such as pedestrian friendliness, that allow the neighborhood to achieve its favorable modal split.
- Walkers differ from non-walkers. Specifically, walkers are younger, have lower incomes, are more likely to live in multi-family housing, and own fewer automobiles. This finding has important implications for TOD because it suggests the need to carefully consider the existing and anticipated demographic mix of station area development.
- Pattern of stops and goods purchased differs depending on mode of travel. Drivers make fewer trips but tend to make more complex chained trips, whereas walkers are more likely to make more simple, unchained trips. Walkers are more likely than drivers to stop at coffee shops but less likely to go grocery shopping. Although it seems clear that residents of the more pedestrian-friendly shopping areas are more likely to walk, the factors underlying mode choice are complex and should not be ignored when planning TOD.
- Only a small percentage of BART users also make shopping trips. In other words, the presence of a transit station does not appear to significantly affect the viability of retail, at least directly.

Frank, Lawrence and Gary Pivo (1994). "Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single-Occupant Vehicle, Transit, and Walking." In Issues in Land Use and Transportation Planning, Models, and Applications. *Transportation Research Record* No. 1466. Transportation Research Board. Washington, D.C.: National Academy Press.

*This research found that average gross population density at trip origins and destinations for shopping trips correlated highly with mode choice. However, the biggest reductions in single-occupancy vehicles were correlated with greater employment densities. Moreover, the relationship between mode choice and employment density is non-linear, with significant improvements resulting*

*mostly from raising density above two key thresholds: between 20 and 50 employees per acre at the low end and 75 employees per acre at the high end.*

Friedman, Bruce, Stephen Gordon, and John Peers (1994). "Effect of Neotraditional Neighborhood Design on Travel Characteristics." In Issues in Land Use and Transportation Planning, Models, and Applications. *Transportation Research Record* No. 1466. Transportation Research Board. Washington, D.C.: National Academy Press.

*Compares traditional (mostly pre-World War II, interconnecting street grid, mixture of land uses) and suburban (post-World War II, hierarchy of roads, major arterials, little transit, segregated land uses) communities in the San Francisco Bay Area. Concludes that residents of traditional communities make fewer trips per day, and travel by transit and on foot more. Does not adequately control for household size, income, and so on.*

Ewing, Reid, Padma Haliyur, and G. William Page (1994). "Getting Around a Traditional City, a Suburban Planned Unit Development, and Everything in Between." In Issues in Land Use and Transportation Planning, Models, and Applications. *Transportation Research Record* No. 1466. Transportation Research Board. Washington, D.C.: National Academy Press.

*Finds significantly more in-vehicle hours of travel among residents of sprawling suburbs than comparable households in a traditional city. Recommends that communities, even auto-dominated communities, internalize as many facilities and services as possible in order to encourage and facilitate trip chaining.*

## **Neighborhood Services**

Banerjee, Tridib, and William C. Baer (1984). *Beyond the Neighborhood Unit: Residential Environments and Public Policy*. Plenum Press.

*Contains the results of surveys that indicated that, with few exceptions, people in all income and ethnic groups desired the following uses close to home: drug store, food market, gas station, post office, specialty food shop, bank, medical and dental office, dry cleaner, barber shop/beauty salon. However, the survey did not examine the physical form that people had in mind.*

Alexander, Christopher, Sara Ishikawa, Murray Silverstein, et al., 1977. A Pattern Language: Towns, Buildings, Construction. New York: Oxford University Press.

*Contains, among much other material, one of the few attempts to generalize about the density of population in a neighborhood needed to support neighborhood services.*

California Center for Land Recycling (1999). "Making the Case for Greater Urban Density." San Francisco, CA.

*An excellent review of a number of topics related to the benefits of urban density, including the link between density and auto dependence and density and retail services. Also examines public perceptions of density and factors that increase public acceptance.*

### **Quality of Life and Livability**

The following are just three examples of the quality of life indexes that have been produced in recent years. All contain indicators related to land use and transportation and confirm that when asked to define quality of life people consistently include such criteria.

Jacksonville Community Council, Inc. "Quality of Life in Jacksonville: Indicators for Progress."  
Jacksonville, FL: 2001. <http://www.jcci.org/qol/qol.htm>.

Rogue Valley Civic League and Southern Oregon Regional Services Institute at Southern Oregon University. "Southern Oregon Quality of Life Index." Medford, OR.  
<http://www.rvcl.org/SOQ.pdf>.

University of North Carolina-Charlotte Urban Institute. "Charlotte Neighborhood Quality of Life Study." Charlotte, NC: 2000. <http://www.charmeck.nc.us/cindev/qol>.