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**MOVING TOWARD IMPLEMENTATION: AN EXAMINATION OF THE
ORGANIZATIONAL AND POLITICAL STRUCTURES OF
TRANSIT-ORIENTED DEVELOPMENT**

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ABSTRACT

The research explores the costs and impacts of Transit Oriented Development (TOD) and addresses the rationale for designing transit-oriented neighborhoods. It also documents the outcomes and the impacts of implementing such projects and examines the perspective of the TODs' genesis, whether by a public agency, a developer or the community. This assessment adds to the vast body of knowledge about TOD providing case studies of several sites around the United States.

EXECUTIVE SUMMARY

Transit Oriented Development (TOD) serves as a planning tool creating more livable, pedestrian-friendly communities, where people can reduce their use of single-occupancy vehicles by increasing the convenience of other mobile or non-motorized alternatives to include walking, bicycling, mass transit, vanpools and carpools. A central purpose of Transit Oriented Development is to reduce the use of single-occupancy vehicles by increasing the number of times people walk, bicycle, carpool, vanpool, or take a bus, street car or rail (TCRP, 2002).

Transit Oriented Development, if designed correctly, brings potential riders closer to transit facilities. This option of building closer as opposed to building further away from transit nodes brings the neighborhood together and facilitates its lesser dependence on roads and automobiles. If designed properly, TOD should not only help transit investments work more efficiently, but also reduce external trip making since residents have more options available within the TOD community.

While each transit designed community reviewed was different in design and basic components, they shared the central theme to encourage transit use, reduce dependency on automobiles and create more livable communities by better designing neighborhoods. Important TOD characteristics are as follows:

- Transport oriented communities each have distinctive characteristics, as well as commonalities.
- TOD neighborhoods typically include some type of public transit and may include parking features.
- Size is not an issue in the development of a TOD project. Large or small communities can benefit from implementing TOD. The smallest project in this research cost \$20 million and the largest \$2 billion.
- When considering implementing a TOD project, it is important that there are incentives to help make the TOD project more attainable.
- Tax incentives, grants, proactive planning and infrastructure construction are some of the strategies used by local governments to attract developers and interest them in TOD.
- Land use laws and policies must be considered when contemplating TOD and may or may not need revision.
- Successful TOD generally represents collaborative liaisons between public and private entities; a variety of funding sources may have been accumulated to fund the development.

Federal, state local officials continue to support transit-oriented and more livable communities. Residents, developers and public officials report satisfaction with the TODs assessed as part of this research.

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INTRODUCTION

Transit Oriented Development is a planning tool designed to create more livable, pedestrian-friendly communities, where people can reduce their use of single-occupancy vehicles by increasing the convenience of other mobile or non-motorized alternatives to include walking, bicycling, mass transit, vanpools and carpools. The main purpose of Transit Oriented Development is to reduce the use of single-occupancy vehicles by increasing the number of times people walk, bicycle, carpool, vanpool, or take a bus, street car or rail (TCRP, 2002).

Transit Oriented Development, if designed correctly, brings potential riders closer to transit facilities. This option of building closer as opposed to building further away from population centers brings the neighborhood together and allows it to become less- dependant on roads and automobiles. Additionally, if designed properly, TOD should reduce external trips and make transit investments work more efficiently. This occurs because the community has the option to choose alternative modes of travel as a means of transportation as opposed to each individual driving a single occupancy vehicle (SOV). The trade off would then be less congestion and less release of toxic fumes, as fewer automobiles would travel along the highway.

In order to reduce external trips however, TOD projects should be located in higher-density, mixed-use, urban pedestrian districts with high-quality transit service (Final Report, 2001). Once people have options to either walk or ride within and outside their community, external single occupancy vehicle trips (SOV) can be reduced. More alternatives are prevalent should a person decide to walk within a mixed-use urban district, as choices are varied and convenient for the community. For that reason, proponents argue that there is a need and purpose for the concept of Transit Oriented Development.

The general concept of Transit Oriented Development is an interesting one. If utilized properly, it can be a great motivator for changing the lifestyle of the community. For example, if a community sees the vision and takes hold of it, TOD could change the way one views the neighborhood environment and the natural structural design of our neighborhoods in general. For instance, generally in the average neighborhood, one would not consider having a center with a rail or bus station surrounded by relatively high-density development. However, in a transit oriented community that is exactly what may be seen. There may be a few multi-story residential buildings as well as commercial buildings within the same neighborhoods. More residential areas such as small-lot, larger lot housing, and townhomes could then possibly surround these areas. The design of the transit oriented neighborhood is typically one-quarter to one-half mile from the transit node (What is Traffic Calming? 2002). The built environment is designed for the benefit of the pedestrian. In this instance, the traveler can either walk or cycle with design elements sensitive to protecting from oncoming traffic; precautions have been taken to keep the individual safe.

Likewise, the neighborhood is designed with traffic calming features in order to control traffic speeds. Traffic calming, is an engineering measure created to help compel drivers to slow down. It is a combination of mainly physical measures that reduce the negative effects of motor

vehicle use, alter driver behavior, and improve conditions for non-motorized street users (Department of Transportation, n.d.).

An additional method of traffic calming is parking management. In order to reduce the amount of land developed and devoted to public parking, parking management is used as a form of Transit Oriented Development as well. Parking Management includes various strategies that result in more efficient use of parking resources, thereby creating a more efficient use of land and spatial units. The actual application of management of parking can help alleviate a wide range of transportation problems, as well as help to achieve a variety of development and design objectives.

TOD, however, is not a panacea to suburban or urban communities. There are downsides one must consider in the implementation of TOD projects. One consideration should be the cost of land to prospective purchasers. Potential homeowners seek value for their property and would like to get as much as possible for their dollar. That being the case, it must be noted that developed land is generally less expensive on the urban fringe where it is difficult to provide effective transit service. Moreover, American homeowners generally desire the spacious and other characteristics of suburbia. Additionally, in this vast economy, private transportation is available and affordable to the majority, which in itself negates the need for public transportation and pedestrian-friendly communities. In addition, there is inadequate transit service in many suburban communities, including a lack of sidewalks, bicycle facilities and other access features for transit and the cost to implement these facilities could be daunting (Downs, 2004; Building Transit Oriented Development in Established Communities, n.d.).

Zoning can also be a downside to the implementation of TOD. In the past, government at all levels has supported investment in the roadway network. And if that is not enough, zoning ordinances tend to favor suburban development patterns. Nearly all suburban communities have zoning ordinances that control the densities at which new homes can be built or existing ones redeveloped. Typically these ordinances severely limit the amount of land on which relatively high-density housing can be developed. That includes both multi-family housing and single-family housing on small lots. Affordable housing has clearly shown that suburban zoning often prevents the creation of higher density-and therefore relatively low-cost-housing.

Moreover, many suburban governments pass zoning ordinances deliberately designed to prevent lower cost housing within their communities. This is done intentionally because the residents of the local community fear lower-cost housing located nearby would reduce the market values of their own homes. Additionally, residents do not want to live near households of lower socioeconomic status. Therefore, laws are adopted that raise the cost of building new units, for example by requiring relatively low-density housing. Because of this factor, many of these residents of such exclusionary communities literally benefit from restrictions preventing the construction of lower-cost housing, and lower-income households. In this way, they also attain the kind of local socioeconomic mixtures they prefer (Downs, Anthony, 2004).

Research Objective

The objective of this research is to explore the cost and impacts of Transit Oriented Development. This work will address the rationale for designing transit-oriented neighborhoods and the outcomes and the impacts of implementing such a project. This assessment is intended to evaluate the significance of the existing controversy: 1) What does Transit Oriented Development mean to the community? and; 2) Are there benefits to becoming a community that is oriented around transit?

Research Focus

In order to be most effective, Transit Oriented Development should be “urban” even in a suburban environment (What’s TOD Got To Do With It?, n.d.). Urban environments are preferred and better utilized under TOD, because urban development supports transit. Typical suburban development tends not to support transit; therefore it does not support the Transit Oriented Development concept.

Transit design is an important issue to contemplate when one considers the design of a transit oriented neighborhood. The conflict of a suburban neighborhood becoming an urban one has a lot to do with the design debate. TOD, at least in theory, has taken this issue into consideration. TOD projects have been known to utilize the circular design option. Not all TOD projects make use of this design option, however. The circular design is structured with transit and the pedestrian in mind, with the focus being on the city center. It is designed with an emphasis on continuous pedestrian travel with open spaces, which allows for safety of the pedestrians and free movement for transit vehicles. The idea of Transit Oriented Development is more than effective as motivation for changing the urban scheme, as the community can easily embrace it. This is due in part to its mixed-use concept, and higher density scheme. However, Transit Oriented Development does have its pitfalls and that issue will be addressed later in this study. What is the exact purpose of Transit Oriented Development? Should our communities be built with transit options in mind? This research attempts to explore such questions by addressing the following questions:

- How is TOD utilized within the communities?
- What impacts does TOD have on a neighborhood?
- Should TOD be implemented as a design standard in neighborhoods?
- Is there a real need for pedestrian-friendly, walkable communities?

LITERATURE REVIEW

Transit Oriented Development Description

In the past few years, there has been a great deal written about Transit Oriented Development (TOD). A number of study efforts have provided detailed evaluations of successful Transit Oriented projects. These projects are varied and diverse in both type and locality, as TOD has emerged in a number of locations. Throughout the literature, Transit Oriented Development is referred to by more than a few names; all encompassing similar ideas. For example, Smart Growth, Location Efficient Development, New Urbanism, and Livable Communities are all concepts of TOD. TOD however, has been described to include:

- Higher density, residential mixed-use development along transportation corridors,
 - Projects generally within a half-mile of transit, or
 - Projects near rail or light rail projects.
- (TCRP, 2002; The History of Transit-Oriented Development, n.d.).

In concept, a TOD community is one that is compact, mixed-used and generally centered near a transit station (The History of Transit-Oriented Development, n.d.). Overall the transit oriented design serves to invite residents, workers and shoppers to drive their cars less and utilize mass transit or another form of mobility more. These communities are easily accessible with destinations and origins that are not too far from where residents and visitors plan to shop, live, or conduct business.

History of Transit Oriented Development

The first Transit Oriented Development projects in the United States were the railroad and streetcar suburbs of the late nineteenth and early twentieth centuries. The earliest known commuter rail lines were powered by steam engines that could achieve high sustained speeds efficiently, but were slow to accelerate and decelerate, and thus promoted the development of stations that were several miles apart. Although the stations were built miles apart due to speed issues, this design is believed to have been the very beginning stage of the earliest form of Transit Oriented Development.

Electric street railways were developed in the late 1880's. Electric streetcars picked up their power from an overhead electrical line using a trolley poll, and used the running rails as a ground. Although electric streetcars could not achieve the top speeds of the steam engines, they were cleaner, quieter, and could start and stop more efficiently, making them useful for interurban as well as commuter service. Construction of electric railway systems was typically privately funded, as developers built rail lines to outlying areas and used the railways to promote their real estate holdings (Vuchic, 1992; The History of Transit Oriented Development, n.d.).

According to the authors of Transit Villages in the 21st Century, the first electric streetcar was the Pacific Electric Railway in Southern California which, at its peak, served 50 communities with 1,164 miles of track and 270 trains a day. In the San Francisco Bay Area, the San Francisco, Oakland, and San Jose Railway, more commonly known as the "Key System," had developed a vast network of lines in the East Bay by the turn of the century. The extension

of Key System lines into previously undeveloped areas of the Berkeley-Oakland Hills led to the rapid settlement of new townships (Bernick and Cervero, 1997). By the early 1900s; electric streetcar systems had emerged in cities throughout the United States, replacing horse-drawn or cable-pulled systems. Some believe that more than any other development, the electric streetcars contributed to the growth of America's suburbs (Kalmback Publishing, 1967). This statement has great merit due to the fact that shortly after streetcar development, population growth followed car lines, as middle class households sought to escape crowded, dirty, and noisy inner-city living. Moreover, the success of the early streetcar suburbs was dependent on pedestrian access to transit for connection to downtown jobs and neighborhood services. Typical features of these early transit-neighborhoods included a transit depot and public space in the center of the neighborhood, small cottage-type houses, a street pattern and scale that allowed convenient walking distances to transit (Federal Transit Administration, 1993).

The sequencing showed the electric streetcars replaced the horse and buggy and cable pulled streetcar systems, and the early suburbs were dependent on pedestrian linkages to transit for access to their jobs and other locations. Even though the actual TOD name had yet to be created, the concept had been conceived.

Understanding Transit Oriented Development Terms

There are several terms that must be defined before one can truly comprehend Transit Oriented Development (TOD). Transit Oriented Development is an idea, a plan of design. Several terms discussed in the context of Transit Oriented Development are shown below. Most terms connote a design pattern structured to reduce use of motor vehicles. In contrast, urban sprawl encourages dependence on the automobile. Each term below is described more completely in the text that follows.

- Urban Sprawl,
- Smart Growth,
- New Urbanism,
- Pedestrian Transportation Improvements,
- Walkable Communities,
- Community Livability,
- Density, and
- Clustering

Urban Sprawl

Urban sprawl is generally defined as dispersed development outside of the compact urban and village centers along highways and in rural countryside, which is the antithesis of the concepts encouraged in a transit oriented environment (Sprawl Guide, 2001). In order to understand the concept of Transit Oriented Development and the need for such a planned design in the community, one must first grasp the big picture of urban sprawl and the relationship it has to land and land usage. In the May 1998 Transportation Research Conference, ten traits were reported to be associated with urban sprawl:

- Unlimited outward extension,
- Low-density residential and commercial settlements,
- Leapfrog development,
- Fragmentation of powers over land use among many small localities,
- Dominance of transportation by private automotive vehicles,
- No centralized planning or control of land-uses,
- Widespread strip commercial development,
- Great fiscal disparities among localities,
- Segregation of types of land uses in different zones, and
- Reliance mainly on the trickle-down or filtering process to provide housing to low-income households (Sprawl Guide, 2001).

Smart Growth

Transit Oriented Development is a progeny of Smart Growth. Smart Growth, (also known as new community design), is a general term for land use practices that create more resource efficient and livable communities (APA, June 23, 2000; Smart Growth More Efficient Land Use Practices, n.d.). By applying Smart Growth as a design structure for the neighborhood, these livable communities will likely have more easily accessible land use patterns that reduce the amount of mobility required to reach goods and services. The general idea is that Smart Growth can help achieve various strategic land use objectives, as it is an alternative to urban sprawl. If one were to compare urban sprawl to the concept of Smart Growth, which is the foundational concept of Transit Oriented Development, the differences would be quite apparent, as Smart Growth and Transit Oriented Development make better use of available land. There are obvious major differences between the two land use patterns. Table 1 compares the differences between smart growth and urban sprawl in various types of transportation schemes. In this table, it is easier to view the contrast that one term of art has to the other. Variables include density, land use mix, transportation and other general planning principles.

Table 1. Comparing Smart Growth (TOD) and Urban Sprawl

	Smart Growth	Urban Sprawl
Density	Higher-density.	Lower-density
Growth pattern	Infill (Brownfield) development.	Urban periphery (Greenfield) development.
Land use mix	Mixed land use.	Homogeneous land uses.
Scale	Human scale. Smaller buildings, blocks and roads. Careful detail, since people experience the landscape up close, as pedestrians.	Large scale. Larger buildings, blocks, wide roads. Less detail, since people experience the landscape at a distance, as motorists.
Transportation	Multi-modal transportation and land use patterns that support walking, cycling and public transit.	Automobile-oriented transportation and land use patterns, poorly suited for walking, cycling and transit.
Street design	Streets designed to accommodate a variety of activities. Traffic calming.	Streets designed to maximize motor vehicle traffic volume and speed.
Planning process	Planned and coordinated between jurisdictions and stakeholders.	Unplanned, with little coordination between jurisdictions and stakeholders.
Public space	Emphasis on the public realm (streetscapes, pedestrian environment, public parks, public facilities).	Emphasis on the private realm (yards, shopping malls, gated communities, private clubs).

Source: Evaluating Transportation Land Use Impacts, 2006.

New Urbanism

New Urbanism (also called New Community Design) is a set of development practices designed to help create more attractive and efficient communities. These designs can significantly improve accessibility and reduce per-capita automobile travel.

This type of community has a discernible center. There is often a plaza, square or green, and sometimes a busy or memorable intersection. Buildings at the center are placed close to sidewalks and to each other, creating an urban environment. Buildings toward the edges are placed further away and further apart from each other, creating a more rural-like environment. Most dwellings are within a five-minute walk from the center. Streets are designed for walking and cycling, with sidewalks on both sides, bike lanes where needed, good crossings, traffic calming features used to control motor vehicle traffic speeds, and other features to encourage non-motorized travel.

There are a variety of dwelling types. These take the form of houses, row houses, and apartments, such that younger and older, singles and families, the poorer and the wealthier can find places to live. There are places to work within and adjacent to the neighborhood, including shops, office buildings, and live-work units. Also, there are shops sufficiently varied to meet common household needs, such as convenience stores, a post office, a bank machine and a gym. Often there is a small ancillary building permitted within the backyard of houses. It may be used as a rental apartment, or as a place to work. The elementary school is close enough so that most children can walk from their dwelling, usually not more than one mile away. There are parks, trails and playgrounds near every dwelling. Thoroughfares within the neighborhood form a continuous network, providing a variety of itineraries and dispersing traffic.

The neighborhood has multiple access routes that connect to adjacent neighborhoods. Thoroughfares are relatively narrow and shaded by rows of trees that slow traffic and create an appropriate environment for pedestrian and bicyclist. Parking is usually relegated to the rear of the buildings and typically accessed by alleys or lanes. Certain prominent sites are reserved for public buildings. A building is customarily provided at the center for neighborhood meetings, and the neighborhood is generally self-governing, deciding on matters of maintenance, security, and physical evolution (New Urbanism, 2002).

Pedestrian Transportation Improvements

Pedestrian Transportation includes walking, small-wheeled transport such as skates, push scooters, hand-carts and wheelchair travel. These pedestrian-oriented modes of transportation provide the user both recreation and transportation access to goods and activities (Pedestrian Improvements Strategies to Make Walking Convenient, Safe and Pleasant, 2002, n.d.). There are many specific ways to improve pedestrian transportation, some of the major categories include:

- Improved sidewalks, crosswalks, and paths,
- Improved non-motorized facility management and maintenance, including reducing conflicts between users and maintaining cleanliness,
- Universal design (transportation systems that accommodate special needs, including people using wheelchairs, walkers, strollers, and hand carts),
- Develop pedestrian oriented land use and building design (New Urbanism),
- Street furniture (e.g., benches) and design features,
- Traffic calming, speed reductions and vehicle restrictions,
- Road space reallocation to increase the portion of public rights-of-way devoted to sidewalks,
- Encouragement programs,
- Address pedestrian security concerns

(Pedestrian Improvements Strategies to Make Walking Convenient, Safe and Pleasant, 2002, n.d.).

Walkability

Pedestrian transportation improvements increase walk-ability, which reflects the overall support for pedestrian travel in an area. Walkability takes into account the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security, and comfort for walking. Walkability is affected by the quality of pathways, building access ways and related facilities. Walkability at a street or neighborhood level is affected by the existence of sidewalks, crosswalks, and roadway conditions. Walkability at the community level is also affected by land use accessibility, such as the relative location of common destinations and the quality of connections between them (Pedestrian Improvements Strategies to Make Walking Convenient, Safe and Pleasant. 2002 n.d.).

A “walkable community” is designed with people in mind. The idea or concept is to emphasize people over cars. When people are placed as the priority; safe, secure, balanced, mixed, enjoyable, comfortable walking and bicycling human association is promoted. A walkable community is a community that returns rights to people, looks out especially for children, seniors, people with disabilities and takes aggressive action to reduce the negative impacts of sixty-plus years of auto-centric design. It is also a community that emphasizes economic recovery of central neighborhoods, promotes the concepts of recovering and transforming suburban sprawl into meaningful villages, and especially takes ownership and action to protect and preserving open space. A walkable community, smart growth community, or new urbanism community, turns a neighborhood, town, or city into a place where many people literally walk, ride bicycles and/or use transit to get to and from their destinations (Walkable Communities, 2002 n.d.).

Even if one is an advocate for automobile usage, the simplicity of this type of neighborhood cannot be ignored, as an avid car driver has the option to modify his or her behavior in the individual usage of an automobile. This way, no rights are taken from the rights

of those who wish to stay healthy and active by taking part in activities outside of their vehicles, and rights are not taken from those who wish to continue driving independently.

A walkable community tends to be historic, and well worn and newly restored. Walkable communities are neighborhoods that are often compact, environmentally stimulating and full of people. This is because in these types of communities, one can enjoy streets, parks, plazas, buildings, physical space and the overall beauty of the local environment.

Community Livability

Community Livability refers to the quality of life issues represented within a society. It is the social quality of an area as perceived by residents, employees, and visitors within the community. This includes safety, health, local environmental conditions, the quality of social interactions, opportunities for recreation and entertainment, aesthetics, and existence of unique cultural and environmental resources (TDM Encyclopedia Victoria Transport Policy Institute, 2002, n.d.).

Community livability is a phrase used to describe the direct benefits for people who live in, work in, or visit an area. Community livability is affected by public policy and planning decisions, as the concept is designed to increase property values and business activity.

Density

The guidelines for density are described in various ways. Density in a conceptual sense often reflects perspectives about development. Most western and southern cities are perceived to have low densities, although cities like Los Angeles and Houston have pockets of fairly dense residential and very dense employment. Therefore, the term must be considered in the context of the prevailing development densities and building heights within a municipality. Generally, density is utilized to define high, medium and low populated areas. Low residential density development refers to detached single-family residential development, or low-rise commercial or industrial development densities usually found in auto-oriented industrial parks, or highway-commercial strips. Medium density development refers to low-rise multi-family residential development or low-rise commercial/residential development usually found along a pedestrian-oriented street. High density development refers to the more concentrated development patterns typically found in the centers of urban areas (Ontario Glossary of Terms, 2002 n.d.).

Clustering

Clustering refers to land use patterns that have common destinations and are grouped closely together. Grouping closely together increases accessibility by reducing travel distances and by creating walkable centers that can be connected efficiently by public transit, ridesharing, and automobile travel. Clustering is extremely important to the concept of Transit Oriented Development, as it tends to facilitate pedestrian improvements and efficient transit. If clustering is located near transit stations or corridors, the result is Transit Oriented Development. Clustering can occur at various scales and in many different ways. Office buildings, campuses,

shopping malls, commercial districts, towns and cities are examples of clustering. On a small scale, clustering is related to building orientation. Specifically, buildings are positioned on their site relative to other buildings, sidewalks, driveways, and parking. Clustering at a neighborhood level however, with good pedestrian conditions creates multi-modal centers. These centers are suitable for walking, cycling, ridesharing and transit, as well as automobile transport. These are sometimes called urban villages or walkable centers (Clustered Land Use, 2002 n.d.).

Clustering can be implemented in urban, suburban, or rural conditions, either incrementally or as part of a master-planned development. Clusters can range from just a few small buildings (for example, a restaurant, a medical office, and a single retail store) to a large commercial center with hundreds of businesses. However, clustering is most effective at improving access if it includes complementary land uses. For example, increasing housing densities in a residential-only development may do little to improve access, but will improve access if common destinations such as schools and shops are also located in the cluster.

Clustering is most effective at reducing automobile use if it includes other strategies. For example, automobile commuting tends to decline if employment centers are clustered with shops, restaurants and daycare centers-destinations that employees want to visit during their breaks. If such areas have pedestrian improvements and transit improvements then a Transit Oriented Development is created. In its simplest terms, clustering is just building or bringing residential areas and the business community closer together. The concept is quite easy to comprehend if seen in a more visual pattern.

Clustering is illustrated in Figure 1. The chart below shows clustering in various forms, as there are several ways in which clustering can be designed to suit the needs of the residential or business community.

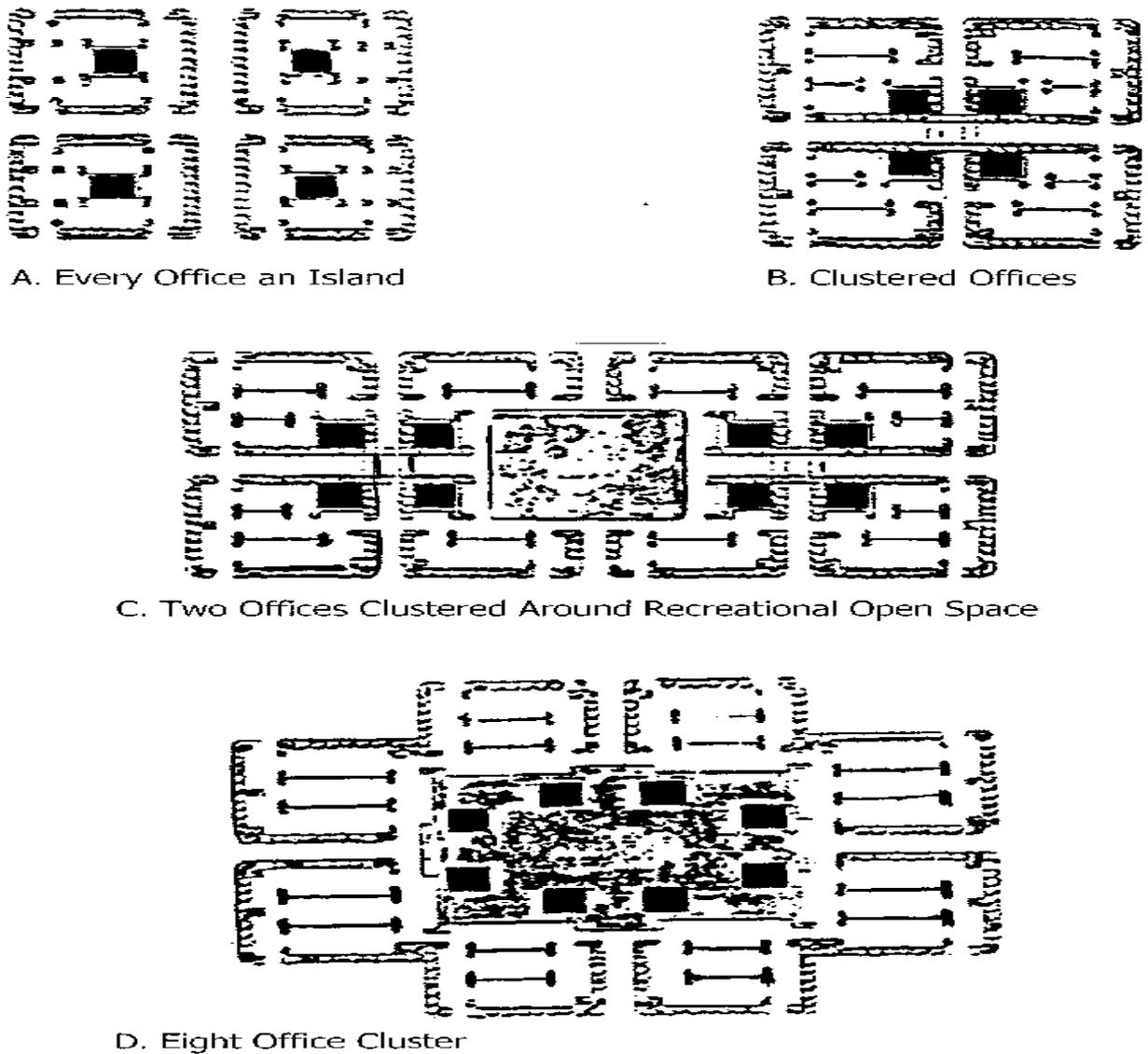


Figure 1. Clustering At the Building or Block

Source: Land Use Density and Clustering, 2005.

The terms above are very important in understanding the concept of Transit Oriented Development (TOD). The TOD design pattern refers to residential and commercial areas intended to maximize access by transit and non-motorized transportation. These terms serve as the very substance upon which the concept of TOD is based.

DESIGN OF THE STUDY

For the most part, the study and research for this thesis will rely on secondary data as the basis for evaluating the merits and shortcomings of TOD. Telephone and email surveys supplement the secondary data analysis. The theory of TOD is a relatively new premise gaining popularity in the 1990's and is being studied in various geographic localities. The assessment is in two basic parts. Part one examines four communities against the principles describing TOD and part two compares TOD initiated by the community with TOD begun by a developer. A substantial portion of the information is from internet sources and web pages to incorporate the most up-to date material about this subject.

Telephone surveys were designed to gain further insight and assess the workability of the concept from the opinion of persons involved with the planning process. Utilizing telephone surveys as a research tool allowed for establishing the actual impact of Transit Oriented Development on real people in real time. Questions were asked of each person contacted in each of the four cities chosen for this research. While telephone surveys may be limited in that they do not encompass everyone's ideas, they provide insight into the workability of transit oriented design from personal perspectives. Additionally, the telephone surveys serve as a structured interview process in order to provide primary data to update and confirm findings. The survey questions and answers are displayed in Appendix 1.

Secondarily, this research investigates community driven Transit Oriented Development along a corridor in Minnesota and Mockingbird Station in Dallas where the TOD was developer driven. These surveys were intended to get the professional aspect of these different TOD projects depending on the project's originator. The surveys reflect telephone and written responses from people who have successful experience with TOD in these cities. The survey and interview responses are reviewed along with the data and information gathered to gain a better understanding of TOD initiation and development.

Principle Screening

The literature shows that the definition of TOD varies across sources. As a result, in order to comprehend Transit Oriented Development, the actual meaning needs to be clarified because conceptually, the definition can be quite vague and ambiguous. After researching numerous characteristics of Transit Oriented Development and reviewing several communities, a clear and precise definition was established that at least in theory, encompasses the overall concept of transit oriented design. For purposes of this study the definition in *Transportation: Demand Management Encyclopedia* (2002) was used.

Evaluation

At the beginning of this work, eight cities were originally considered for evaluation. From these eight cities, four were identified as the focal point of this study. The four chosen were selected because the cities have successfully established a transit oriented community and are actively and progressively moving forward.

The case studies for evaluation are:

- Portland, Oregon
- Atlanta, Georgia
- Sylmar, California
- Redmond, Washington

At the end of this analysis, the pros and cons will be clearly defined. This will allow the reader the opportunity to consider both sides of the issue and determine whether or not future communities should be designed with Transit Oriented Development in mind. Specific tasks are as follows:

- Task 1: Literature Review
- Task 2: Data Collection
- Task 3: Develop and Conduct Telephone and Email Surveys
- Task 4: Analyze Data
- Task 5: Synthesize Survey Findings
- Task 6: Assimilate Data and Surveys
- Task 7: Develop Summary Conclusions and Recommendations

EVALUATION OF RESULTS AND DISCUSSION

Determining the Impacts of Transit Oriented Development

TOD is not just an urban phenomenon. The cycle of suburban growth has led to an ever-increasing demand for travel. Suburban growth was originally fueled by downtown workers who moved from the city centers to urban fringe to take advantage of lower land costs and greater social amenities. (Cambridge Systematics, Inc., 1999). In the past few years, however, businesses have moved to the suburbs to get closer to employees. Accordingly, transportation engineers and planners have developed a variety of design strategies to deal with the continued congestion; TOD is just one of those strategies. As stated earlier, TOD can take several different forms, designs, and structures, however, according to the Transit Cooperative Research Program, Transit Oriented Development projects should, at the very least, encourage the use of public transit by locating residential, commercial, office uses, or a combination of all three, close to a transit node (Washington, D.C. National Academy, 1997).

Transit Oriented Development should not only provide necessary transportation options but also improve the "livability" of the community. TOD should improve the adjacent neighborhoods as well, while successfully being integrated into the economic pattern of the area (Washington, D.C. National Academy, 1997). Transit Oriented Development should become part of the community; it should be considered in the land use patterns upon initial design.

Land use patterns at both origins and destinations affect travel behavior. Employees who work in areas with high employment densities, good pedestrian conditions and attractive urban environments with shops and restaurants nearby are more likely to commute by transit and rideshare use. Table 2 is an evaluative of how travel is impacted when a community is given alternative transit options (Davidson, 1994).

Table 2. Travel Impact Summary

Rating from 3 (very beneficial) to -3 (very harmful). A “0” indicates no impact or mixed impacts

Travel Impact	Rating	Comments
Reduces total traffic.	3	Reduces per capita vehicle travel.
Reduces peak period traffic.	2	Reduces per capita vehicle travel.
Shifts peak to off-peak periods.	0	Reduces per capita vehicle travel.
Shifts automobile travel to alternative modes.	3	Encourages transit and non-motorized travel.
Improves access, reduces the need for travel.	3	Increases density and land use mix.
Increased ridesharing.	0	Increases density and land use mix.
Increased public transit.	3	Increases density and land use mix.
Increased cycling.	2	Increases density and land use mix.
Increased walking.	3	Increases density and land use mix.
Increased telework.	0	Increases density and land use mix.
Reduced freight traffic.	0	Increases density and land use mix.

Source: [Transportation](#) Demand Management Encyclopedia, 2002.

The table above represents the impact of TOD to a community. According to the results of this evaluation, TOD is successful in actually reducing total traffic and increasing transit use over automobile use. An assessment of the impacts of TOD is required in order to determine whether or not TOD is a viable asset to a community in which it is implemented.

A variety of techniques can be used to measure different types of economic development impacts, including transportation-land use models, benefit-cost analysis, input-output models, economic forecasting models, econometric models, case studies, surveys, real estate market analysis and fiscal impact analysis (Lewis and Williams, 1999). Table 3 categorizes benefits and how they can be measured.

Table 3. Economic Development Impacts

Category	Description	How It Can Be Measured
Employment and Business Activity	Increased employment and business activity resulting from expenditures on transit services.	Local expenditures on transit services times an employment multiplier from a regional Input-Output table. Total “new” money brought into the region, such as state or federal funds that would otherwise not be available.
Shifted Consumer Expenditures	Consumer expenditures shifted from vehicles and fuel to more locally-produced goods.	Shifts in consumer expenditures that result from transit, evaluated based on a regional Input-Output table to determine net change in regional employment and business activity.
Economies of Agglomeration	Increased accessibility and land use clustering.	Some land use models track land values. Changes in property values around transit stations may indicate some agglomeration benefits.
Transportation System Efficiency	Reduced costs of providing transportation services.	Estimates of per capita transportation cost savings provided by public transit services.
Increased Property Values	Increased local property values due to improved community livability and accessibility.	Changes in property values near transit stations.
Subsidy Overhead Costs	Economic inefficiencies of tax subsidies for transit services.	Transit subsidy costs times a tax “deadweight” loss factor.

Source: [Transportation Demand Management Encyclopedia](#), 2002.

All the methods indicated in the table were not considered for the purposes of this investigation. In simple theory, if the cost exceeds the benefits brought to a community by TOD, then TOD may not be successful. However, if economic development is positively impacted by the TOD design, then TOD is more likely to be considered successful and the end justifies the means.

Communities Considered for Evaluation of TOD

The objective is to assess advantages and disadvantages of TOD in an impartial manner by evaluating various communities that have implemented the TOD concept as a way of life. This section identifies the communities considered in evaluation of the TOD design. Multiple communities were evaluated in order to determine if TOD additions and enhancements were effective as well as beneficial to the community for which it was designed. The initial stages

of this research showed that numerous cities attempted to alleviate urban sprawl by implementing some form of the transit oriented design. These cities were considered because they had already begun to integrate more pedestrian-oriented transportation improvements as a way of life. Some of the cities initially evaluated at the beginning of this research were still in the very early stages of development. Consequently, the information that was necessary for this work to be completed was not readily available. Therefore, not all cities originally considered were used for this particular TOD assessment. Table 4 lists the various communities primarily considered for the purpose of this research.

Table 4. Communities Considered for Evaluation of Transit Oriented Development

1. Portland, Oregon
2. Plano, Texas
3. Atlanta, Georgia
4. Sylmar, California
5. Redmond, Washington
6. Oakland, California
7. Englewood, Colorado
8. Arlington County, Virginia

Determining Variables for the Evaluation

It was difficult to choose from the many communities currently utilizing or in the process of implementing the concept of Transit Oriented Development. However, upon close evaluation of the individual communities, for the purposes of this analysis, four communities were chosen that would best suit this study. There were several variables used in order to narrow down the options. The variables are listed below:

- The population
- Cost of housing/implementation of TOD
- Impacts of Transit Oriented Development
- The resulting change to the urban scheme

First, the population was important to consider and the study included small cities as well as larger cities in order to show that TOD can be implemented despite the size of a community. Thus, population is an important factor to consider as an observation that TOD can be implemented in metropolitan areas of all sizes.

The second consideration was the cost of housing, and/or the cost to implement TOD. This criterion showed the variations in the cost of establishing such a neighborhood. The costs vary depending upon the needs of the community. These costs can range from hundreds of thousands of dollars to millions and beyond and depends upon what is necessary to build the designed community. For example, if it is an industrial site, is there a cost factor to consider for cleaning up the area before implementing the design (as was the case in the Atlantic Station development)? This information is important because it exemplifies the expenses involved with transit oriented design. The cost of housing is important as well because it provides a visual of the potential return that could or could not be expected upon completion of the community.

The third consideration involved the impacts of Transit Oriented Development. This issue was a determining variable because economics must be considered for development projects. This criterion is important because it shows that TOD design can bring various economic impacts to the community.

The resulting change to the urban scheme was the final criterion utilized as a determining variable for the four cities chosen. This was important because each community is individually different in what it brings to the TOD designed neighborhood. For example, in some cases, zoning changes were mandatory in order to establish the TOD environment. In others, it was not necessary to change the zoning requirements. However, each community brought a distinct change to the scheme. This variable indicates the diversity of the communities and the changes brought about by the TOD design. Table 5 below provides a more detailed description of the variables considered to narrow down the communities.

Table 5. Characteristics Considered for Evaluation of Transit Oriented Development *

Location of TOD Community	TOD Community	Characteristics Considered
1. Portland, Oregon	<i>Orenco Station</i>	Population: 1.9 million Cost to Implement TOD: \$200+ million Impacts of TOD: 2,000 housing units, 100,000 sq. ft. retail, office and entertainment space, single family cottage homes and attached town homes. Resulting change to the urban scheme: Commercial industrial park transformed to mixed use community.

2. Plano, Texas	<i>Eastside Village</i>	<p>Population: 220+ thousand Cost to Implement TOD: \$34+ million Impacts of TOD: 1,000 dwelling units and 50,000 sq. ft. retail use, improved park and streetscape, preserved historic buildings 325 seat courtyard theatre. Resulting change to the urban scheme: Forgotten commercial center of a farming community (Old cow town) transformed into townhouses and condominiums, reinvestment into historic downtown.</p>
3. Atlanta, Georgia	<i>Atlantic Station</i>	<p>Population: 470+ thousand Cost to Implement TOD: \$2 billion Impacts of TOD: 15 million square feet of retail, office, residential and hotel space, 11 acres of public parks. Resulting change to the urban scheme: Former Atlantic Steel Mill brownsfield cleanup converted to a mixed use development.</p>
4. Sylmar, California	<i>Montage at Village Green</i>	<p>Population: 80 thousand Cost to Implement TOD: \$20 million Impacts of TOD: 107 homes on 9 acre site. Resulting change to the urban scheme: Originally designed for single family residential housing.</p>
5. Redmond, Washington	<i>The Village at Overlake Station</i>	<p>Population: 46 thousand Cost to Implement TOD: \$38 million Impacts of TOD: 308 rental housing units, 2,400-square-foot child-care facility, open mall shopping area. Resulting change to the urban scheme: Major employment hub now houses a mass transit facility and child day care center.</p>
6. Oakland, California	<i>Fruitvale Transit Village</i>	<p>Population: 395+ thousand Cost to Implement TOD: \$100+ million Impacts of TOD: Over 45 thousand ft. retail facility/restaurant use, 54 thousand ft. non-profit health care clinic, 55 thousand ft. child care facility, 15 thousand ft. library, 45 thousand ft. executive housing and 68 units of HUD housing. Resulting change to the urban scheme: Originally planned as a multi-level parking facility adjacent to the Fruitvale BART station now mixed use dwelling.</p>

7. Englewood City, Colorado	<i>Englewood City Center</i>	Population: 41+ thousand Cost to implement TOD: \$45 million Impacts of TOD: 438 residential units, 700 thousand square feet of retail space. Resulting change to the urban scheme: Transformation of a failed 55 acre mall to a 1,000,000 square foot, mixed-use village.
8. Arlington County, Virginia	<i>Rosslyn-Ballston Metro Corridor</i>	Population: 200+ thousand Cost to implement TOD: Unable to determine. Impacts of TOD: Over 21 million square feet of office/retail/commercial space, 3,000+ hotel rooms, and 22,500 residential units creating vibrant “urban villages.” Resulting change to the urban scheme: 3 mile corridor commercial zone transformed into mixed used community.

* The shaded cities are the cities chosen for the purposes of this research.

Communities Identified for Evaluation of TOD

Of the eight communities originally considered for this research, four communities were identified for the purposes of this evaluation. The four are listed below in Table 6. These four cities were selected from the others because they reflected ranges in population from 46,000 to over 1 million, costs to implement the TOD community varied, and the impacts resulted in various changes to the urban scheme. Likewise, out of the eight communities, the chosen four were TOD communities with unique characteristics and designs that offered variation for this assessment, while still providing for similarities that are customary to transit oriented design.

Table 6. Communities Chosen for Evaluation

Location of TOD Community	TOD Community
1. Portland, Oregon	<i>Orenco Station</i>
2. Atlanta, Georgia	<i>Atlantic Station</i>
3. Sylmar, California	<i>Montage at Village Green</i>
4. Redmond, Washington	<i>The Village at Overlake Station</i>

Each city is reviewed in the following analysis based upon population, economic impact, change to the urban scheme, type of transit in the neighborhood and whether or not zoning changes were required. Other considerations are provided at the end of each case study

in a table that allows for a quick visual aid to the information obtained from each TOD community assessed for the purposes of this research.

Portland, Oregon's Orenco Station

Portland, Oregon is ranked as the nation's 25th largest metropolitan area. Additionally, it is the largest city in Oregon. Portland's population in the year 2000 was 1.9 million and was predicted to excel past 2 million by 2010 (Portland Fact Book, 2005 n.d.). Moreover, Portland was chosen because the state of Oregon is currently attempting to implement Transit Oriented Development as a way of life in various other communities.

Portland is known as a national leader in TOD; one of the city's most notable areas is Orenco Station, located in the town of Hillsboro just west of Portland, Oregon. Orenco Station was the first attempt by Oregon to implement a transit oriented community, and the state did not have a precedent to follow. This community appeared to be one of the most researched TOD communities in the available literature, as more information was accessible for Orenco Station than any of the four cities chosen. It was developed via a joint venture by Pacific Realty Associates L.P. (PacTrust) and Costa Pacific Homes (Portland Oregon home buying guide, n.d.).

The research indicated that Portland has been commended for its methodological transition and change to the urban scheme. Orenco Station was also a noted recipient of the Governor's livability award and the 1998 NAHB, Best Master Planned Community Award in 1999. Orenco Station was listed as America's community of the year (Mehaffy, M., n.d.). Further, Orenco Station has been labeled the "New American Hometown".

The project began in 1998, and offers real-world evidence of how the community has evolved and functioned as a transit oriented community. The information researched showed that the site for Orenco Station was originally planned to become a commercial-industrial park until zoning changed the land use to residential. Once the zoning was changed, it resulted in a mixed-use village which today has 2,000 housing units, retail and office space, and is adjacent to Portland's west side light rail line.

Orenco Station has attracted nationwide attention and is a design of new urbanism, another name for Transit Oriented Development. This is mainly in part to its application of "smart development" concepts. Orenco Station utilizes the general design concept of a transit oriented community. The nucleus of this community is a town center consisting of grocery stores, multiple shops, restaurants, and offices with loft residences above. Also, in the town center, are 28 live and/or work town homes with workspaces below and living spaces above and an extended stay hotel. Due to the design and the structure of the community, Orenco Station has attracted many different types of people. This broad range of personalities includes home buyers who are professional (singles and couples), as well as small families. Some of the traditional features of Orenco Station include:

- A large central park with two pavilions. These two pavilions serve as the focal centerpiece of the community.
- Homes that are closer to the streets, many with front porches in order to create a more pedestrian-friendly environment.
- Single family detached and attached homes integrated to help create the look and feel of a traditional neighborhood.
- Single family cottage homes and attached town homes that range in size from 1,200 to 2,500 square feet, with prices from the \$160,000s to the mid \$200,000s.
- On one side of each home, no eye level windows face the neighbors, providing homeowners more privacy to enjoy the side patio, yard, and inside living areas.
- Condominiums featuring balconies porches, lots of windows, gas fireplaces, vaulted ceilings and gabled roofs,
- Row-homes are a part of the design structure as well, featuring spacious lower levels that are perfect for a home office, guest suite, or media room (Orenco Station Newshttp, 1999). Figure 2 and 3 give a close view the condominiums and Row Houses in Orenco Station in Portland, Oregon.



Figure 2. Condominiums in Orenco Station
(Source: Orenco Station News, 2002).



Figure 3. Rowhouses in Orenco Station
(Source: Orenco Station News, 2002).

The review of Orenco Station showed although the residents were not typically riders of transit prior to living in the TOD community, according to Dan Zack, the author of “Don’t Pick on Portland”, after moving into Orenco Station, they ride the light rail quite frequently (Zack, Dan, 2002). Further, Orenco Station is designed with walkability in mind. It is designed so that every resident can reach the town center within a five-minute walk. As the residents travel to the town center, the walk is made interesting by the specialty shops, businesses and restaurants along the way. This makes Orenco Station a poster child for TOD, as it meets the precise definition of TOD. This once commercially planned community, is now a functional life-size replica of a mixed use community within walking distance of a transit stop.

An interview with the project manager for Orenco Station indicated that it cost over \$200 million to build the TOD community (Mehaffy, M., 2002). He stated further that because of the mixed use design, the cost of the community overall is in the range of 10% higher than a typical community in the area. In addition, higher density actually costs more per square foot to build, because of the features needed to maintain privacy and the greater emphasis on community amenities such as parks and recreation. The condominiums start in the \$180,000s to the low \$200,000s, and the row houses start at \$280,000. The cost of housing however, can exceed well over \$500,000. Table 7 summarizes key characteristics of Orenco Station.

Table 7. Summary of Orenco Station

<i>ORENCO STATION</i>	PORTLAND, OREGON
Large Metropolitan City	Yes
Population	1.9 million
Was this the state's first attempt at a TOD community?	Yes
Type of Transit	Light Rail
State implementing other TOD Projects	Yes
Project Genesis	1998
Project Completion	Virtually complete in 2004, but still adding to the community
Cost to Build	over \$200 million
Impact on City	Seemingly Positive
Awards	Governor's Livability
Developers	PacTrust and Costa Pacific Homes
Cost Range for Homes	\$160,000 - \$500,000+
Economic Impact	5 million year/annual property taxes
Town Center	Yes
Site-originally planned as	Commercial -Industrial Park
Zoning changes	Yes
Distance Town Center From Residents	Approx. 5 minutes
Gross Site Area	209-acres
Mixed-Use	Yes
Retail Space	70,000 sq. ft.
Office and Entertainment	30,000 sq. ft.
Residential Housing	40,000 sq. ft.
Hotel	1 Extended Stay Hotel
Green/Open Space	Abundance of Green Space
Project Distinction	Nationally recognized and most prominent, highly profiled TOD community.

In 2005, the city of Portland collected over \$321 million in property taxes (Portland, Oregon Comprehensive Annual Financial Report, June 30, 2005). Of that amount, Orenco Station contributed \$5 million to the total amount of property taxes collected within that tax year. Orenco Station was designed with 209 acres of land housing mixed-use development throughout the entire community. Given the project's 209 acres, the tax contribution in 2005 would have been \$23,923.00 per acre. (This is a general estimate, and the figures are a result of simple calculation without consideration of other factors. This calculation is not intended to reflect the exact results, as money is a concept of time and interest rates would need to be considered from the time invested to the time the taxes were collected).

In order to determine the workability of Orenco Station as a viable TOD community, a telephone survey was utilized. The former project manager for Orenco Station is now the current president of Structura Naturalis. Structura Naturalis is an urban design and consulting firm. When the former project manager was asked questions regarding Orenco Station, he did not hesitate to respond. The first question asked of him was if he believed TOD decreased traffic congestion, he answered yes. He did not believe that TOD had any adverse effects on the community instead he felt it created a better neighborhood. He believes that TOD communities are a wave of the future. (The survey and answers can be found in Appendix 1).

Atlanta, Georgia's Atlantic Station

Atlanta is the largest city in Georgia and the capital of the state. Atlanta has over four hundred seventy thousand residents according to the 2000 census and it is steadfastly growing. To help accommodate its large population, the city has many garden apartments spread over thousands of what used to be, suburban acreage. This manner of building and lifestyle in the locality, helped to infuse the growth of urban sprawl. Moreover, Atlanta is continually spreading and growing, as it houses four of the nation's ten fastest-growing counties (Tucker, Kathryn H., March 5, 2000).

Drivers in Atlanta commute an average of 35 miles a day, and this along with other causes has helped to contribute to the city's air pollution (Tucker, Kathryn H., March 5, 2000). Pollution in Atlanta is a serious problem. Pollution is such an issue in Atlanta that the federal government has threatened to cut off highway funds in the city unless ways to reduce traffic congestion are found. Accordingly, the city has looked into other alternatives for decreasing traffic congestion. Transit Oriented Development is just one of those considerations.

Atlantic Station was a TOD project identified for this research because the Atlantic Steel redevelopment was the nation's first Environmental Protection Agency (EPA) project for transportation and land use. Atlanta's failure to meet the clean air act regulations prevented them from accessing federal funds for new highway development, the EPA supported brownfield cleanup which would occur if the former steel mill were to be converted to a mixed use, pedestrian friendly development that would produce less transportation related pollution. Atlantic Station developers implemented a few design solutions from the EPA and a partnership was born. The EPA determined that Atlantic Station would produce less pollution than a new development on empty land and supported the project in its entirety.

Atlantic Station was also chosen, because unlike Orenco Station in Portland, Oregon, Atlantic Station is a fairly new community. It is a 138-acre environmental redevelopment of the former Atlantic Steel Mill in Midtown Atlanta. Atlantic Station is projected to include 15 million square feet of retail, office, residential and hotel space as well as 11 acres of public parks (Atlantic Station Fact Sheet, n.d.).

Atlantic Station is divided into three areas; the District, the Commons and the Village, which clearly defines the areas as they were designed for the community. The District, designed to be the heart of the community, serves what appears to be the city center, a common TOD design. The District provides shopping areas, movies, restaurants, office space, townhomes and other living options. The Commons, is just west of the District, and serves as the residential hub of the community. The Commons feature an amphitheatre, picnic area and artifacts to remind of the site's history. By contrast, the Village is far west of the redevelopment and includes apartments/lofts and is designed for more diverse or mixed incomes. It is adjacent to retail markets and easily accessible for all ages. Atlantic Station is considered a national model for smart growth and sustainable development (Atlantic Station, n.d.).

The Atlantic Station Tax Allocation District facilitated redevelopment in order to make use of alternative transportation modes, thereby minimizing congestion, improving air quality and connecting major activity centers. Atlantic Station's Tax Allocation District planned to have a 24-hour environment with live, work and play areas. A former steel mill site in midtown Atlanta was turned into a pedestrian-friendly community. The name "Atlantic Station," was decided about a year after the project had begun. Atlanta's serious pollution problem steered this project into existence. The main deciding factor for creating Atlantic Station was federal approval for construction of the 17th Street Bridge over the joint I-75 and I-85 highways despite Atlanta's non-compliance with federal clean air standards. The U.S. EPA made the exception because the developers promised to fund frequent bus shuttles to the nearby MARTA Arts Center Station and because it found that the high-density Atlantic Station would cut the area's overall air pollution by limiting sprawl and its associated inevitable car travel (Smart Growth News Online, n.d.).

Atlantic Station is designed to house a mix of apartment buildings, town homes and high-rise condominium towers. This diversity of lifestyle offers the opportunity to live in proximity to Atlantic Station's Retail and Office Districts, with easy access to the major attractions in Atlanta. Because of its mixed-use design, Atlantic Station is a TOD community and meets the definition of the term as well. Atlantic Station offers a town center and easily accessible transit modes. Atlantic Station has lots of open space and has designed the community such that it is convenient to travel by foot or by public transportation. Additionally, because of less automobile use, Atlanta, Georgia, expects to have less congestion and less release of toxic fumes in the air which is one of the trade offs in a TOD community. The Atlantic Station project includes:

- Environmentally-friendly central cooling system for retail and office buildings,
- Light-colored heat-proof roofs,
- Runoff monitoring wells,
- Separate storm-water and sewage outflows,
- An 11-acre park and

- A lake featuring fountains and a decorative bridge.

The cost to build the Atlantic Station project is listed at approximately \$2 billion, with the homes in the community costing approximately \$250,000 to \$650,000 (Atlanta Journal-Constitution, 2002). Below are illustrative photos of Atlantic Station, followed by table 8, which summarizes the key characteristics of the TOD community.



Figure 4. Illustration of Atlantic Station
(Source: Life Happens Here, 2005).

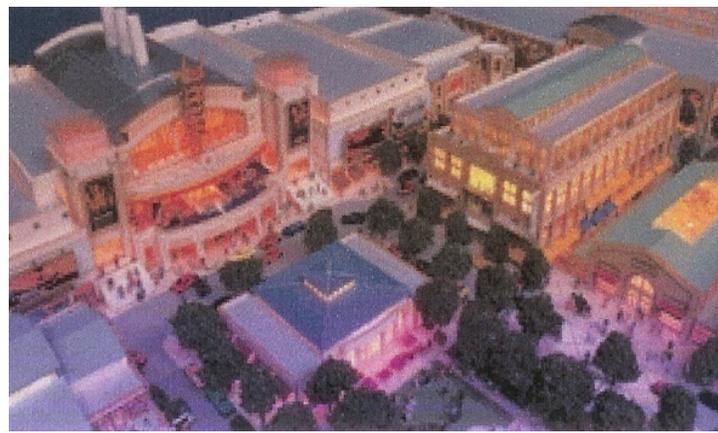


Figure 5. Atlantic Station in Atlanta, Georgia
(Source: Life Happens Here, 2005).

Table 8. Summary of Atlantic Station

ATLANTIC STATION	ATLANTA, GEORGIA
Large Metropolitan City	Yes
Population	470+ thousand
Type of Transit	Rapid Rail, bus
Was this the states first attempt at a TOD	No
State implementing other TOD Projects	Yes
Project Genesis	1999
Project Completion (Phase 1 and 2 complete)	2012 (phase 3)
Cost to Build	\$2 Billion
Impact on City	Seemingly Positive
Awards	National Model for Smart Growth and Sustainable Development
Developers	Jacoby Development
Cost Range for Homes	\$250,000 - \$650,000
Economic Impact	\$30 million (Annual property tax when complete and new jobs 20k+)
Town Center	Yes – the District serves as the town center
Site-originally planned as	Heavy Industrial (Formerly steel mill site)
Zoning changes	Yes
Distance Town Center From Residents	Proximate
Gross Site Area	138-acres
Mixed-Use	Yes
Retail Space	1.6 million sq. ft.
Office and Entertainment	6 million sq. ft.
Residential Housing Units	40,000
Hotel	1,150 Rooms
Green/Open Space	11-Acres
Distinction	EPA inspired project in order to help mitigate air pollution

In 2004, the city of Atlanta collected over \$181 million in property taxes (Atlanta, Georgia Comprehensive Annual Financial Report, December 31, 2004). Of that amount, upon

its completion, Atlantic Station is estimated to potentially contribute \$30 million per year to the total amount of property taxes collected. If the \$30 million tax goal is actually achieved, Atlantic Station would contribute approximately \$217,391.00 per acre. (This is a general estimate, and the figures are a result of simple calculation. This calculation is not intended to reflect the exact outcome, as other factors have not been considered. Additionally, money is a concept of time and interest rates would need to be considered from the time invested to the time the taxes were collected).

In order to determine the outcome of this TOD community, a telephone survey was utilized. This way, TOD could be assessed in its current environment. Edleman Public Relations Firm was contacted to assist with this research. As a public relations firm, Edleman helped to promote Atlantic Station by utilizing the media to spread the word about the new TOD community and the benefits it offered. Edleman also assisted with the grand opening events for Atlantic, Station. The account executive did not hesitate to respond to the questions. When asked if she believed a TOD made housing affordable for the average home buyer, she answered yes, and believed that TOD was beneficial to families as well as single person households. (The survey in its entirety can be found in Appendix 1).

Sylmar, California's The Montage at Village Green

According to the 2000 U.S. Census, the city of Sylmar, California only had a population of approximately 80,000. This number is relatively small compared to the other cities researched. However, the popularity of California, and this project's inclusion as one of the first Partnership for Advanced Housing Technology (PATH) national pilot projects, contributed to its identification in this research. Sylmar's TOD served as a model for the United States construction and housing industry (PATH, A Public-Private Partnership for Advancing Housing Technology, n.d.). The Montage at Village Green was begun in 1995 and was completed in 2000 at a cost of \$20 million.

Upon the initial creation of the project, the designers decided to help spawn incentives for those who purchased a home in the new urban area. The incentive for the community became a commuter incentive program; buy one Metrolink monthly commuter pass and get two free. This program operated as a motivation to draw people to the community, then to entice them to commute via rail or to utilize walking as opposed to single occupancy vehicles. Thusly, fewer vehicles are on the highway resulting in much less traffic congestion as well as less air pollution. This project is interestingly different from the other TOD communities examined.

What makes The Montage at Village Green different is that while it is a Transit Oriented Development, it does not have the same characteristics as the other communities. The plan and the design are conceptually different from the other TOD communities in this assessment. The focus in this community is environmental energy efficiency. There are 186 homes made with extra thick insulation, gas fired air cooling systems with no ozone destroying agents and solar electric roof panels that generate much of the electrical energy necessary to run the lighting and appliances. The homes were also made with special glass designed to block 87 percent of ultraviolet rays. Further, the homes were built with structural steel and engineered wood

products in order to reduce the amount of lumber needed. This design tactic would not only save lumber but would serve as a way to increase the heating and cooling of the home (PATH, A Public-Private Partnership for Advancing Housing Technology, n.d.).

This community is unique from other TOD communities, because although it is relatively close to transit, and has a park, picnic area and tot lot within the neighborhood, it was designed with homes in mind and does not serve as a “mixed use development.” It is a TOD community without a doubt, as there are transit benefits to living in this community. However, it does not have an employment center within the actual community design, nor does it have an entertainment or shopping complex within the actual community design. This particular TOD design does not have apartments within the community. It does not house a hotel or convention center within its town or city center. The Montage at Village Green does not include a shopping center or mall and it does not have a row of restaurants within its city center vicinity. This project however is none the less, a TOD community, as it is just a short walk to easily accessible transit modes. Further, because the Montage at Village Green is centrally located and transit is so convenient, the restaurants, employment centers and other types of commercial businesses, although not designed within the community, are considered conveniently accessible as well. This community almost did not cut the muster as a TOD community, as it falls a bit short of the definition however, because it is relatively close to transit with the commercial uses designed along the transit lines, it can be considered a TOD project because the residents have an alternative convenient mode of travel other than their automobiles.

The Montage at Village Green is also known as Village Green. It was developed as two projects. Each project sits on nine acres of land. Montage Development constructed 107 homes on its 9-acre site, while the Lee Group constructed 79 units. Village Green boasts that it has one of the most affordable prices for a five bedroom dwelling in California. The goal for this project was to redevelop neighborhoods while building up commercial values at the same time. While the design in this community does not allocate commercial property within the actual community, the commercial value is increased because the residents’ relative proximity to transit helps to promote the commercial business located within and on the transit line. The construction and the design of the project were directed towards commuters who lived in the San Fernando Valley, Burbank, Pasadena, Glendale, and Los Angeles.

Generally the homes in the area cost approximately \$214,000 for a single family home, which consists of four bedrooms and \$229,000 for the larger units (Los Angeles Times, July 14, 2001). The figure below is an illustration of the neighborhood as it is today. It is not designed with apartments and other mixed units, but is simply an area of various types of homes for different types of families, located near a transit mode. Figure 6 and 7 are illustrative images of The Montage at Village Green in Sylmar, California. Figure 6 and 7 are followed by table 9, which sums up the key characteristics of the Montage at Village Green.



Figure 6. Home in Village Green

(Source: California Transit Oriented Development Database, 2001).



Figure 7. Village Green Transit Oriented Community

(Source: California Transit Oriented Development Database, 2001).

At first glance one can see that the Montage at Village Green is different from the previous transit communities studied. The design is one of a typical neighborhood. However not far from the homes is an easily accessible commuter rail line which is accessed regularly by the residents of the community. Another major difference for this community, although it was designed as a transit oriented community, it did not have to address zoning issues. From the very beginning the area was reserved for single family residential zoning. The following table is a summary of the key characteristics of The Montage at Village Green in Sylmar, California. The Montage at Village Green Project includes:

- Environmentally-friendly cost saving materials and energy saving systems,
- Single family residential homes,
- Solar panels in each home,
- Gas air conditioning in each home and
- Close proximity to transit.

Table 9. Summary of The Montage at Village Green

THE MONTAGE AT VILLAGE GREEN	SYLMAR, CALIFORNIA
Large Metropolitan City	No
Population	80 thousand
Type of Transit	Commuter Rail
Was this the states first attempt at a TOD community?	No
State implementing other TOD Projects	Yes
Project Genesis	1995
Project Completed	2000
Cost to Build	\$20 million
Impact on City	Seemingly Positive
Awards	Praised by local and national officials (including former Pres. Clinton) as a model for environmentally sensitive housing at affordable prices.
Developers	Montage Development and the Lee Group
Cost Range for Homes	\$214,000 - \$229,000
Economic Impact	\$158,000 annual property taxes
Town Center	No
Site-originally planned as	Single family residential
Zoning changes	No
Distance Town Center From Residents	N/A
Gross Site Area	9-acres
Mixed-Use	No
Retail Space	None
Office and Entertainment	None
Residential Housing	186 homes
Hotel	None
Green/Open Space	27,000 sq. ft.
Distinction	Environmental friendly, cost savings material and Commuter Pass Discount

In 2001, Los Angeles collected a little over \$663 million in property taxes (Los Angeles, California Comprehensive Annual Financial Report, June 30, 2001). Of that amount, The Montage at Village Green in Sylmar, California (Part of Los Angeles) contributed \$158,000 to the total amount of taxes collected. Sylmar is relatively small considering the size of Los Angeles, so the tax collected is still a significant amount for the city. In fact, the amount of tax collected per acre would be \$17,556.00 in the year 2005. (These figures are simple math and do not take into consideration other factors. This is not to be taken literally as an exact result, as money is a concept of time and interest rates would need to be considered from the time invested to the time the taxes were collected).

In order to determine the true outcome of this particular TOD community, a telephone survey was utilized. In this manner TOD could be assessed in a real-time, real-world situation. CityView, a firm that helps to promote and finance new real estate projects and experienced homebuilders, was contacted for an interview. The Montage at Village Green was one of their projects. The Executive Assistant to the Vice President of Finance helped to answer a few questions for this analysis. Upon being asked if there was a real need for pedestrian-friendly, walkable communities she stated yes. She was also asked if TOD should be implemented as a design standard in neighborhoods. The answer again was yes. She believed that Transit Oriented Development helped to create a better neighborhood for her community and had a positive impact on the community (The survey and answers can be found in Appendix 1).

Redmond, Washington's The Village at Overlake Station

The Village at Overlake Station in Redmond, Washington was chosen for this analysis because according to King County Housing Authority, it was the first Transit Oriented Development of its kind in the country (King County Housing Authority, n.d.). Redmond is also a relatively small city with a population of approximately 46,000 residents. This community is subsidized and is designed for residents that are in need of low income housing. This type of community is a multi-family housing unit that is based around bus transit. As a TOD community, it offers integrated child-care facilities and a bus transit center. The project features reserved parking, controlled access, courtesy patrol and a playground. Much like the other transit oriented communities, the Village at Overlake Station is within walking distance of major employers and stores.

The Village at Overlake Station was designed by LMN Architects and Winmar Company. It was one of the first pilot projects for King County's Transit Oriented Development section to combine moderate-income rental housing, a day-care facility and a park-and-ride/transit center into a single integrated use. The first apartments opened to the public in December 2001. It includes two levels of covered parking and 308 rental housing units. Thirty of the housing units are barrier free and handicap accessible, and there is a 2,400-square-foot child-care facility for use by residents and park-and-ride users.

As an incentive to leave the automobile behind, a bus pass was provided to every apartment unit (this is no longer offered due to cost). The bus passes were originally given to the tenants in order to alleviate traffic congestion. Within a very short walking distance are grocery stores, restaurants, personal services, and major retail stores. The project was designed

specifically to focus on community activity, create urbanism in a suburban area and respect local environmental qualities. This development is believed to aid in changing the mindset of the community to more transitional neighborhood styles as opposed to the continuous traditional style of urban sprawl.

The town center concept was designed as a direct result of market trends. It is believed that the town center represents the way things are changing in our society. It is not only a design which makes it convenient for transit oriented neighborhoods, it has been acknowledged as somewhat symbolic of changing lifestyles. As with any TOD project, The Village at Overlake Station was designed with community livability in mind. The town center has shops for the residents. As an added bonus, the shops are on open streets, the parking is hidden, and the mall is on an open street to encourage shopping and social cohesion.

An open mall may not appear very relevant to some, however, if one of the goals of TOD is to bring together the community, then this project has left it open for the public to decide. The Village at Overlake Station, while it is a subsidized transit community, it is none the less a place where the community can enjoy the outdoors and shop while enjoying the surroundings instead of going inside.

In this community the town center blends in rather than standing apart from it. It is designed to involve an urban pattern of streets, plazas and buildings with pedestrian-oriented storefronts. Additionally, the town center buildings in Redmond are designed to be marketable, to facilitate future development changes and to respond to existing transit mode facilities. Local bus and light rail stations are regarded as opportunities for a town center project to accommodate the community. All the streets are designed to lead to the public plaza in Redmond Town Center.

Redmond Town Center is different from the average community in other ways as well. The design is structured so that it is divided into city-sized blocks with streets that connect to downtown Redmond's street network. The blocks contain individual buildings that are designed to support pedestrian activity. The street level facades have generous storefront windows, canopies, and rich materials. All are designed to encourage alternative modes of travel than just the single occupancy vehicle. The streets are built like typical urban streets with trees, decorative lighting, and curbside parking. Covered walkways and awnings also create their own intimate places that naturally invite visitors to stop for a conversation or closer look (The Seattle Daily Journal of Commerce, n.d.).

Redmond, Washington, succeeds in meeting the criteria for a TOD community, as it is clearly described in the definition of TOD. It is a mixed-use community within walking distance of a transit stop that mixes residential, retail, office, open space, and public uses in a way that makes it convenient to travel on foot or by public transportation instead of the everyday mundane automobile.

Additionally, according to the Seattle Daily Journal, due to the clustering of office buildings, and residential facilities, everything needed to make a community livable is reachable by just a 10 minute short walk. This clustering has caused the residents in the community to

recognize that this type of an easy commute can virtually eliminate the stress of the automobile (The Seattle Daily Journal of Commerce, n.d.). The Village at Overlake Station includes:

- Residential buildings with studio, one, two and three bedroom apartments,
- All apartments are for low income families,
- Green open space,
- Town center with open streets and
- 2,400 square foot child care facility.

Illustrations 8 and 9 are photos of The Village at Overlake Station. Following the illustrations is a summary table of key characteristics observed during this research process.



Figure 8. The Village at Overlake Station
(Source: Design 97, 1997).



Figure 9. The Village at Overlake Station Town Center
(Source: Design 97, 1997).

Table 10. Summary of the Village at Overlake Station

THE VILLAGE AT OVERLAKE STATION	REDMOND, WASHINGTON
Large Metropolitan City	No
Population	46 thousand
Type of Transit	Bus
Was this the states first attempt at a TOD community?	No
State implementing other TOD Projects	Yes
Project Genesis	1999
Project Completed	2002
Cost to Build	\$38 million
Impact on City	Seemingly positive
Awards	Excellence in design award for outstanding building ownership, architecture and landscaping Prestigious vision 2020
Developers	Langly Properties and King County Housing Authority
Cost Range for Apartments	\$525 - \$1,005 per month
Economic Impact	15,000 new jobs within ½ mile of the transit center
Town Center	Yes
Site-originally planned as	Manufacturing and Industrial
Zoning changes	Yes
Distance Town Center From Residents	Very short walking distance
Gross Site Area	5.2-acres
Mixed-Use	Yes
Retail Space	4,000 sq. ft.
Office and Entertainment	13,200 sq. ft.
Residential Apartments	308 units low and moderate income
Hotel	180 rooms
Green/Open Space	40 sq. ft.
Distinction	The first bus oriented transit in the nation. Also low income housing Day-care facility on property

In this particular chart, the economic impact is listed as 15,000 new jobs within ½ mile of the transit center, as opposed to annual property tax amount as listed in the other summary charts. This is primarily because The Village at Overlake Station is a low income housing community and the residents do not pay property taxes. That being the case, the economic impact is determined by the increase in jobs within the community and not actual property taxes gained, so there is not a benefit for dollar investment evaluation in this particular community.

In order to gain further insight into Transit Oriented Development, however, a telephone survey was utilized. In this manner TOD could be assessed in a real-time, real-world situation. The Village at Overlake Station Apartment Community is where the actual Transit Oriented Neighborhood has been developed. This apartment community houses the residents that live in the Transit Oriented Designed neighborhood. The leasing agent was able to answer a few of the questions listed in chapter one of this report. When she was asked if there was a real need for pedestrian-friendly, walkable communities she stated yes. She was also asked if TOD should be implemented as a design standard and the answer again was yes. She believed that Transit Oriented Development helped improve the quality of life in the community and helped to establish community cohesion. The entire survey and answers can be found in Appendix 1.

SYNTHESIS OF FINDINGS

An integral component of our society is the need for some form of transportation. As our highways continue to experience grid lock and populations continue to burst at the seams, the need for easily accessible transportation continues to grow. Such is the rationale for building and designing communities with transit in mind. To some, TOD is a wave of the future, while others consider it a concept of the past dating back to trolleys, rail cars and horse-drawn carriages. Whichever side of the issue one is on, it must be acknowledged that the existing controversy, cannot be easily addressed as the impacts of TOD vary depending upon the specific needs of each community.

Despite the controversy, however, there are notable benefits to transit oriented design. To a community TOD means savings; the residents need for an automobile can potentially diminish as the automobile becomes optional. This is due in large part to the walkable communities with easily accessible transit modes. TOD means that the residents that live in the area will have a better quality of life, because of the potential health benefits of walking and the aesthetics within the community. To a community, TOD means easier ingress and egress within and without the neighborhood. It means increased jobs with easier access to and from work. TOD can benefit the community because the nature of the design is to promote community livability as well as a sense of community cohesion.

Upon reviewing the four cities identified for this research, consensus characteristics were established. While each transit designed community was different in design and basic components, each community had a central theme to encourage transit use, reduce dependency on automobiles by decreasing traffic congestion and creating more livable communities by designing a neighborhood in proximity to alternative transit modes. A transit oriented community must have a mode of transportation that is convenient, as well as, easily accessible for the entire community. Below is a list of findings from the assessment of the four TOD communities examined for this research:

- Each transit oriented community has its own distinctive characteristics, in addition to commonalities.
- TOD neighborhoods typically include some type of public transit, as well as a parking design feature.
- A mixed-use community will generally have more than one real estate use, such as entertainment, office, retail and various types of housing.
- Size is not an issue in the development of a TOD project. Large or small communities can benefit from implementing TOD.
- When considering implementing a TOD project, it is important that there are incentives to help make the TOD project more attainable.
- Tax breaks, grants and infrastructure construction are some of the incentive strategies used by local governments to attract developers.
- A TOD community is not necessarily a mixed-use community, although it usually is.
- Zoning is a necessary factor to consider when contemplating TOD and may or may not need revision.

TOD Questionnaire for the Case Study Cities

In order to assess the effectiveness of TOD, telephone interviews were conducted for each individual community in this research to determine how TOD representatives perceive their particular transit oriented community. In this area, the workability of the TOD concept from the opinion of persons actually involved with the planning process and/or the lifestyle of the community is considered. While the interviews cannot determine the mindset of the entire community, they allow further insight into the impact of Transit Oriented Development by persons affiliated with the TOD. The next page has questions and responses from each individual community researched. The questions chosen for the table were selected from the list of interview questions that were asked of each representative of each transit community.

Transit Oriented Development: Developer Initiated and Civic Encouraged

The researchers were interested in whether the origin of the TOD affected the outcome of the product and chose to supplement the analysis above. A TOD that was conceived, planned and implemented by a developer is reviewed, as is a TOD that was requested by the community residents. Mockingbird Station in Dallas, TX, represents the developer driven TOD and a corridor in the Twin Cities of Minneapolis-St Paul, MN reflects the perspective of TOD requested by the community.

Mockingbird Station is a Dallas Area Rapid Transit (DART) light rail station located in north Dallas, Texas, at Mockingbird Lane and North Central Expressway, Since January 1997, a the light rail station has been serving residential and retail development off the Blue and Red rail lines. Mockingbird Station is the first light rail, multi-modal, transit-oriented retail development built in Texas. The project began as a former industrial site with an existing brick-clad warehouse built in the 1940s. The first floor of the warehouse building was converted to retail, with a connecting public passage from one end to the other, while the second and third levels were converted into lofts for rent.

Ken Hughes is the developer of Mockingbird Station. When asked about the goals to be accomplished through the Transit Oriented Development, Hughes stated, “We had no particular goals at the time we started the development. The transit station was an important addition to the development site, of course, and we did envision something positive as a result. But, most people and lenders were very skeptical about the potential success (i.e., probable failure) of the line. The mixed-use nature of the project evolved after we acquired the land.” As for any political leaders who played key roles in facilitating the development of the TOD, Hughes indicated the city council representative for that district was instrumental in getting approval for a left turn lane off the principal street. There were no civic organizations or other community groups involved in the TOD planning.

Hughes notes, “There was absolutely no opposition. However, it is important to point out that the site was already fully zoned for a mixed-use development.” Financing for the TOD was 100% pension fund equity and only after completion was permanent financing placed on the project. The Hughes Company invested approximately \$90 million and there were no federal initiatives that provided funding for the development. Also, there were no incentives (e.g.

zoning changes, tax incentives) provided to simulate development and since the opening of the TOD, the project area has experienced economic growth on par with similar non-TOD areas in the Dallas region. When asked about competition with the TOD, Hughes responded, “Nothing else that has a direct connection to the platform. However, this is a fully matured area that includes multi-family and commercial uses (retail and hotel)”. There are approximately 1,600 parking spaces. All parking for the retail component is free. Each bedroom in the apartments has one space in a limited access garage included in the rent. The office parking is reserved for tenants at \$100 per space per month.

The residential tenants pay the highest rents for this type of project in the city and have often renewed their leases. The exact percentage of residents that uses public transit to get to work is not known, but observation of the residential garage mid-day tells them about half the spaces are occupied, suggesting that those cars represent transit commuters. None of the residential units are affordable and there is no transit credit (for parking) in the city ordinances or development codes. This particular zoning is “MU-3”3” and allows all uses except heavy commercial and industrial and residential units can be used by the tenants as pure work or live/work.

Land use breakdown of Mockingbird Station is office, multi-family rental housing, retail, cinema, restaurants and retail. A list of the types of retail uses located near the stop includes cinema, restaurants, clothing, home furnishing, bank and a Starbucks. The area adjacent to the site is one of the highest income residential areas in Texas (Highland Park and University Park). Southern Methodist University is directly across the adjacent freeway (U.S. 75).

To gauge the Transit Oriented Development experience for the Twin Cities metropolitan area in Minneapolis and St Paul, Karen Lyons of the Metropolitan Council was selected to complete the survey. Lyons noted there are a number of communities in the Twin Cities metropolitan area where transit-supportive developments are being built. For a number of years, market interest in such development has been fueled due to a number of variables, including peoples’ desire to live and work in mixed use areas, initiation of the first new Light Rail line in the Twin Cities and funding incentives that encourage such development. Funding for higher density, mixed use and transit- and pedestrian-friendly developments has been available to local governments through a regional competitive grant program since 1996 when the Minnesota Legislature authorized the Metropolitan Council to provide funding for “Livable Communities Demonstration Account” projects.

Because of Lyon’s experience working with Minneapolis, Bloomington, and St Paul on LRT-related development, she chose to focus her answers primarily on land use and development around the Hiawatha LRT, which opened in 2003-04. There are other Twin Cities transit-supportive developments that may have quite different results than are reported here (e.g., around park/rides, commuter rail, which will open in 2009) and along bus routes.

Lyons noted that she translates the terms “transit-oriented and transit-supportive development” to mean both: a) smaller lot, single project, infill developments, and b) larger project, multiple parcel, area-wide developments within walking distance of the Hiawatha LRT stations.

When asked about the goals to be accomplished through the Transit Oriented Development, Lyons indicated the city of Minneapolis has proactive station area land use planning initiated 4-5 years before LRT was to be operational. The city developed a planning and policy framework with the active assistance and involvement of local neighborhoods by establishing Station Area Land Use Master Plans surrounding the six neighborhood stations. Also, an overall downtown Master Plan for stations at the eastern- and western-most portions of downtown was prepared. The master plans all called for a mix of residential and commercial land uses in higher intensity neighborhoods surrounding the stations, and transit- and pedestrian-friendly design features serving new and existing land uses, as well as affordable and life-cycle housing. A Transit-Oriented Development Market Study for the Hiawatha LRT Corridor was prepared in 1999 that envisioned 7,150 housing units by 2020. In Bloomington, initially the City envisioned additional office and commercial development, but a private developer, McGough, purchased the Health Partners headquarters office and 43 acres of property surrounding the Bloomington Central Station, and upon realizing the mixed use, community building potential of LRT, prepared an overall mixed use plan.

Although none of the station area master plans are as yet fully implemented, Lyons believes goals are being achieved. The market for multifamily housing has been stronger than anticipated by the corridor Market Study for 2000-2020 near Hiawatha LRT Stations. More than 8,000 multifamily housing units were built or in construction between 2000 and 2008, and another 6,300 housing units are on the drawing boards awaiting an improved real estate market. The development market has slowed somewhat regionally, and in the corridor, but there is still market interest in moving forward with housing developments along the Hiawatha LRT. Lyons noted there is some struggle getting financing, however, at this time.

One goal of the TOD master plans that is felt to be somewhat lacking is the creation of the transit and pedestrian-friendly environment surrounding the stations. Currently, the environment is a rather sterile highway right-of-way. Crossing Hiawatha Avenue is less than ideal for pedestrians because of the roadway width, speed of traffic and volume of cars. Improving the pedestrian crossings of the Hiawatha roadway, rail line and industrial land to and from the station was seen as an important design task that has not been entirely addressed. Funding and design guidelines for major roadways have hindered a more pedestrian-friendly streetscape. Individual developments, however, have generally provided adequate pedestrian features to their projects.

Lyons explained the role of political leaders, who assisted in facilitating the development of the TOD. She explained primary roles by City Council members during the development of the station area master plans and in supporting the development. Mayors of Bloomington and Minneapolis have also been key supporters of TOD. All of the city officials play leadership roles in guiding city planning efforts and in advocating for application of particular funding to support the TODs, when needed. Key county commissioners also supported LRT and TOD. Hennepin County, where LRT has been implemented, created a transit oriented development fund which has helped a number of Hiawatha corridor's TOD projects by funding critical infrastructure needs. Two other political leaders, Governor Jesse Ventura, and the Metropolitan Council Chair, Ted Mondale, contributed to moving the region's first LRT line forward, but had a more minor role in supporting TOD. The Minnesota Legislature created a new funding source

in 1996---the Livable Communities Account---where cities can apply to the Metropolitan Council for funding for development projects, including transit-supportive development. Individual citizens and businesses involved in active neighborhood organizations surrounding stations got involved in LRT planning and in neighborhood station area master planning.

Lyons discussed the community concerns and objections encountered while proposing the plan to the public. Initially, when LRT was first announced, there were fears of potential negative impact, such as noise and declining property values. When master planning began, people feared TOD and higher intensity developments because there were not many examples of the new development typology in Minneapolis. People feared that higher intensity development would bring higher traffic and other disadvantages to the neighborhoods. As people participated in the station area land use master planning and in station design and public art input sessions, more people became comfortable with the positive changes that LRT and associated development could bring the neighborhoods. Deliberate, on-going, steady-handed station area land use planning countered peoples' fears with trust building, familiarity to concepts, understanding the need for alternative housing choices and traditional neighborhood design. Initially, virtually all of the individual TOD projects were privately financed. These generally were the small parcel projects that were fairly easily accomplished, the low-hanging fruit. About half of the TOD projects include some public financing, with a variety of sources of public funds. Typically, the projects receiving public funds have to amass a variety of funding sources to make them work, including tax credits, county TOD funds, Metropolitan Council Livable Communities funds (which include polluted site clean-up, affordable housing and infrastructure funds), and other local, state and federal housing and business assistance funding. Project costs include property purchase and land assembly, site contamination cleanup, demolition, public amenities (such as small parks or gathering areas), public infrastructure and costs of affordable housing. Developments that receive public funding through the City and other public sources are required to include at least 20% of the units as affordable. In certain of the privately financed developments, some of the rental housing has remained affordable.

Before LRT was constructed, the Metropolitan Council created a Land Assembly Fund, using CMAQ (federal Congestion Mitigation Air Quality) dollars that were included in the federal ISTEA resources allocated to the Council. The federal government (FTA/FHWA) approved use of these funds for land assembly for transit oriented development as a demonstration pilot project along Hiawatha Corridor. With federal administrative staff changes, the FTA and its legal counsel was less supportive of previously granted approvals. Because it was so difficult to work with the federal authorities to make any proposed TOD project work with the federal funds, the Council decided to replace the federal funding with Hennepin County funds and avoid federal strings on the developments. Transit Oriented Zoning overlays were adopted around station areas and density bonuses are allowed as incentives to simulate development.

Lyons responded with a cautionary, "Yes" when asked whether project area proximate to TOD have seen more economic growth than similar non-TOD areas. The neighborhood segment of the line, where 6 stations have adopted station area master plans experienced development of new housing in an area where there was likely to be little new development until LRT began. In addition, a few entirely privately financed developments are still moving forward

along the line, even considering a weak regional development climate. Lyons is unaware of any measurement tools that have been implemented to assess resident satisfaction. Hiawatha TOD residents have not been surveyed to determine the percentage of residents that use public transit to get to work. There is evidence that the more transit supportive urban communities are experiencing success. In the city of Minneapolis, the typical rate of bus use for a typical household is .62 trips per day per household, compared to .26 per household for a typical suburban household. Weekday ridership, on average, has increased since LRTs first full year of operation – 25,000 in 2005; 27,000 in 2006, and 28,000 in 2007.

Parking is provided at the Fort Snelling Station and the 28th Avenue Station. Individual developments have parking available for the new housing underground or in structures. Retail generally has surface parking, but is required at reduced levels. Minneapolis enacted a Pedestrian Overlay Zone ordinance and the city of Bloomington enacted new land use regulations that include minimum Federal Acquisitions Regulations (FAR) around the LRT stations.

The land use breakdown of the development depends on the station area. The Bloomington Central Station has planned: 1,100 housing units (~1.1 million sq. ft. of residential); 2 million sq. ft. office, and 75,000 sq. ft. of retail. Only 267 housing units are currently constructed, along with a 1.6 acre central park. Lake Street/Midtown Station is a northwest quadrant of 8 acres that was formerly a run-down shopping center. The new owner reconfigured the retail portion, and gave the property a facelift. The developer also added a new store with condominium housing above, termed Corridor Flats. The land use breakdown is approximately 90 percent retail and 10 percent housing. Northeast of the Lake Street/Midtown Station is another shopping center with a Target and a Cub retail on what is known as Minnehaha Mall. On a portion of the parking lot, a new housing development called Hiawatha Commons was built with above the ground floor retail; again the retail represents the majority of the project. According to the city's Lake Street/Midtown Master Plan and Development objectives, over time a mix of uses are projected to fill in parking lots and underutilized properties with retail uses located near the stop. Near the Bloomington Central Station, there are no retail uses projected, only the Health Partners' Corporate Office building.

At Lake Street Station, retail uses include a grocery store, discount used store; hardware, pizza, liquor store and a number of other retailers. The strip of commercial that defines Lake Street generally is bordered by residential uses, most at low- to moderate- density. Some heavier industrial uses north of Lake Street, roughly beginning at 26th Street and continuing along Hiawatha, have served as an edge to the roadway.

The area near the 46th Street Station stop is largely single-family residential to the west with small commercial retail uses to the immediate east, including a Walgreens and a hospital clinic totaling 37,500 square feet. Industrial uses in the immediate vicinity provide some employment destinations, but do not exist in concentrated locations or high intensities. New housing, Hiawatha Flats and Hiawatha Oaks Station have first floor retail, which represent recent developments. In the immediate vicinity of the Minnehaha Park/50th Street station, single and two family residences are common with a few commercial uses scattered on 50th Street to the West and a park to the right of Hiawatha Street. Several housing developments have been built

near this station including, Olin Crossings and Minnehaha Place. Retail uses were not included as part of those developments.

In downtown Minneapolis, most of the residential neighborhoods that existed were on the middle to high-income spectrum. Since LRT was built in 2003-04, the housing market in downtown boomed due to the attractiveness of the Minneapolis riverfront and other downtown amenities, including transportation. The new housing has attracted an even higher income market. In contrast, from Cedar Riverside to Lake Street/Midtown Station, including the Franklin Station, the socioeconomic description of these neighborhoods is generally lower income, and particularly low at the higher density Cedar-Riverside Station. Many immigrants settle near the Cedar-Riverside Station when moving to the Twin Cities. Moderate to lower income neighborhoods are proximate to the 38th, 46th, and 50th Minnehaha Stations.

Prior to implementation of LRT, the corridor did not have a neighborhood or residential feel. Because Hiawatha LRT is the only existing LRT and the corridor is anchored by downtown Minneapolis and serves the Airport and Mall of America, its market for development is unique.

CONCLUSIONS AND RECOMMENDATIONS

Many communities have embraced planning for the future by creating communities with transit and walkability in mind. As with any endeavor, there must be balance between the goals and the desires of the developers, agencies, community and the economic realities. Parties must work together to create transit-oriented neighborhoods that are designed to improve livability and facilitate local and regional travel.

While each transit designed community was different in design and basic components, each community had a central theme to encourage transit use, reduce dependency on automobiles and create more livable communities by better designing neighborhoods. Important TOD characteristics are listed below:

- Transit oriented communities each have distinctive characteristics, as well as commonalities.
- TOD neighborhoods typically include some type of public transit, and may include parking features.
- Size is not an issue in the development of a TOD project. Large or small communities can benefit from implementing TOD. The smallest project in this research cost \$20 million and the largest \$2 billion.
- When considering implementing a TOD project, it is important that there are incentives to help make the TOD project more attainable.
- Tax incentives, grants, proactive planning and infrastructure construction are some of the strategies used by local governments to attract developers and interest them in TOD.
- Land use laws and policies must be considered when contemplating TOD and may or may not need revision.
- Successful TOD generally represents collaborative liaisons between public and private entities; a variety of funding sources may have been accumulated to fund the development.

The research noted that sometimes outcomes may be serendipitous, as developers may not be aware full potential of TOD at the project's inception. It should not be expected that economic benefits from TOD will exceed that of other developments; TOD should be pursued due to environmental and quality of life purposes. Favorable market conditions are necessary for economic success.

Transit oriented design must be considered as more than a planning exercise; when successful, major public investments and infrastructure are required for support and the market conditions must be conducive. Therefore, it is important to insure government, community and the developers buy in to the concepts.

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