TRAVEL IN NEW URBANIST AND TRADITIONAL COMMUNITIES: A CASE STUDY OF DOWNTOWN ORLANDO

VOLUME I: FINAL REPORT AND APPENDIX A

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For

The Florida Department of Transportation,
Office of Policy Planning
under Contract No. BC-354-15

September 2000

ACKNOWLEDGEMENT

The project team would like to acknowledge the Florida Department of Transportation (FDOT) for their financial support and assistance in defining the scope of this research. We would also like to acknowledge planning officials in the Orlando area, including: Danny Pleasant, Dan Gallagher, Pedro Leon, Paul Lewis, Marcia Hope Goodwin, Susan Denton, Matt Halon, and Michelle Neely of the city of Orlando; Richard Bernhardt, Former Community Development Director of the city of Orlando; Mighk Wilson and Dennis Hooker of MetroPlan Orlando; Jennifer Stults and Randy Farwell of Lynx; Joyce Sellin of the Downtown Development Board (DDB); and Lara Turner of Glatting Jackson, Kerscher, Aglin, Lopez and Rinehart, for their assistance in providing information and answering questions on planning issues in downtown Orlando. The following neighborhood association representatives assisted us in data collection and conducting focus groups in their monthly neighborhood association meetings: John Sharkey of Colonialtown North, Mighk Wilson of Lake Davis, Ray Cox and Jeff Thompson of Lake Eola Heights, Chris Mack of Park Lake/Highland, and Bill Sevlie of Colonialtown South. We thank them for their cooperation. We would also like to thank the hundreds of residents and workers of downtown Orlando who answered informal questions, responded to surveys and allowed us to observe their activities. We acknowledge the assistance of Michael Scicchitano, Tracy Johns, and all of the anonymous telephone callers of the Florida Survey Research Center for their assistance in completing the telephone surveys. Finally, we thank Rob Magee, Dave Blodgett and Martin Guttenplan of the FDOT for their comments and feedback throughout the project.

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation. This document was prepared in cooperation with the Florida Department of Transportation.

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FGDL 1999 – University of Florida Geographic Data Library
OPWD 2000 – Orlando Public Works Department
OCPD 2000 – Orange County Planning Department
Lynx 1999 – Lynx Block Group Data
Lynx 1997 – Lynx Traffic Analysis Zone Data
DDB 2000a – Orlando Downtown Development Board
OGMB 1999b – Orlando Growth Management Bureau
CRA 2000 – Community Redevelopment Agency
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AAA 2000 – Triple-A 2000-1 Orlando-South Street Map

* - Maps taken directly from official documents.
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EXECUTIVE SUMMARY

In recent years, a group of architects, planners, developers, environmentalists, and policy makers have advocated a return to traditional neighborhood development (TND) with higher densities, mixed uses, pedestrian amenities, and transit service to reduce automobile dependence for work, shopping, and other trips. The critics of the so-called New Urbanism have countered that proximity only partly explains destination and mode choice; however, they draw evidence for their claims from auto-dominated locations, not traditional or New Urbanist ones. Therefore, this research considers the travel behaviors of medium- to high-income residents in the downtown Orlando neighborhoods who also work in the downtown. Downtown Orlando was selected as a case study because it has many characteristics that are believed to support non-automobile travel, such as a grid street network, widely available transit service, a large and expanding job market, several neighborhoods within close proximity to downtown employment, and city programs that support a high quality of life in neighborhoods, encourage TND in existing neighborhoods and new development, improve the bicycle and pedestrian environment, and increase the number of downtown housing units. The results of this research will begin to clarify if the Florida Department of Transportation (FDOT) should, as a matter of policy, support such development and if so, what other policies should be in place to make it more effective.

Objectives

The primary objective of this research is to understand the travel patterns of residents of downtown Orlando neighborhoods, especially travel to and from work during peak travel periods. A secondary objective is to determine if residents living in these traditional neighborhoods walk, ride bicycles, or use transit where the amenities and the facilities are provided to facilitate the use of alternative modes of transportation for non-work travel. The research was conducted through a variety of research techniques including: (1) review of transportation and land use planning documents; (2) interviews of planning officials involved in Orlando; (3) attendance at relevant meetings; (4) selection of case study neighborhoods; (5) observations of pedestrians and users of Lymmo; (6) a telephone survey comprised of two samples, downtown residents who also work downtown and downtown residents who are either not employed or who work elsewhere, and (7) focus groups and surveys of downtown neighborhood associations.

Findings

After studying work and non-work travel in downtown Orlando TND, it is estimated that between 5% and 10% of downtown residents who also work downtown walk as a primary mode to employment in downtown. This is comparable to the 1990 Census but with a population that is wealthier and more likely to own an automobile. These walkers show a diversity of choice in their mode of transportation to work. Forty-two of 59, or just over 70%, of all users of multiple modes use walking as one of the modes, and 42 of 45, or 93%, of all walkers combine walking with other modes for work trips. Walkers choose their mode of travel to work based upon convenience, the need for an automobile, and for exercise or as a part of a healthy lifestyle. In contrast, non-walkers, most of whom primarily drive, do so for convenience and because of the travel time. This suggests that while some people may choose to live downtown and work

downtown, they never really consider the alternatives to driving to work especially when parking is generally available at relatively little or no cost. Among downtown residents who also work downtown, 62% made stops on their way to work during the previous month and 85% made stops on their way home from work.

For non-work trips in the neighborhood, downtown residents appear to walk in higher percentages for some destinations than they do for the work trip, with greater than 10% of all groups of respondents walking to park and recreation areas, neighborhood convenience stores, community events, fitness centers, and restaurants. Among specific groups, greater than 10% walk to visit family and friends, to the bank or credit union, and to their child's school. Downtown workers who walk to work are more likely to walk to a greater variety of destinations in their neighborhood and in the downtown during the workday than their non-walking neighbors.

Recommendations

Based on this research, it is recommended that the FDOT support many of the activities the city of Orlando has incorporated into its Comprehensive Plan, Downtown Outlook Plan, and Land Development Regulations. In particular, the FDOT, in conjunction with local communities, should develop urban roadway standards and provide these amenities as a rule in support of multiple modes of transportation. The proposed highway underpass, or portal, design standards should be adopted to accommodate the needs of pedestrians and bicyclists. The Orlando portal standards should be tested in the redesign of I-4 through the downtown. For cities that are looking to promote downtown revitalization, infill development, and urban redevelopment, Orlando presents a model of how to use the TCEA to tie redevelopment goals with transportation policy. The FDOT should consider the number of trips, the distance traveled (in VMT), and the mode of travel when measuring the transportation impact of development. The connectivity index as developed by the city of Orlando, with a modification for block size, should be adopted to measure the impact of redevelopment in a TCEA, for suburban roadway retrofits, and greenfield development. Multi-modal planning requires a long-term, comprehensive, and incremental planning approach to improve the current system while regulating future development of the multi-modal networks. Orlando's approach to pedestrian planning, and to the expansion of Lymmo, presents an excellent example for other communities throughout Florida. Continued research is necessary to determine the impact and measurement of different transportation land-use patterns in TND and New Urbanist development. Current methods are targeted at suburban development and automobile use, not TND and the promotion of multi-modalism. The FDOT should continue monitoring cities such as Orlando who implement policies to incorporate multi-modalism and New Urbanist development in redevelopment. Already Orlando shows signs of movement into new downtown development projects, increased multi-modalism, and revitalization of the downtown. The level of walking and the increased number of downtown housing units suggest that the policies and strategies implemented by Orlando to utilize the grid street network and develop New Urbanist development standards are beginning to improve multi-modal travel. However, long-term monitoring of Orlando is necessary before more conclusive results can be reached. Hence, it is recommended that the FDOT use Orlando as a case study for other municipalities while it continues to monitor the outcome of long-term plans for the downtown, the Naval Training Center, and the Southeast Sector.

INTRODUCTION

Motivation for Research

In recent years, a group of architects, planners, developers, environmentalists, and policy makers have advocated a return to traditional neighborhood development (TND) with higher densities, mixed uses, pedestrian amenities, and transit service, to reduce automobile dependence for work, shopping, and other trips. The critics of this so-called New Urbanism suggest that proximity only partly explains destination and mode choice. However, they have tended to draw evidence for their claims from auto-dominated locations, not traditional or New Urbanist, ones. Examples of New Urbanism can be found throughout Florida, from Celebration to Seaside. Approximately 20% (25 out of 124 projects) of all TND projects nationally are under construction in Florida (The Town Paper 2000). In addition, many well-established, traditional neighborhoods with many of the characteristics that the New Urbanists are attempting to mimic are located throughout Florida. These include Riverside and Avondale in Jacksonville; Hyde Park in Tampa; Winter Park, College Park, Thornton Park and neighborhoods near downtown Orlando; South Miami; and many cities in the Main Street Program, like Ft. Pierce, Delray Beach, Ft. Myers, Miami Beach, Naples, and Vero Beach.

Many policy makers and developers in Florida would like to accept the premise that changes in land use reduce the overall level of traffic through the internal capture of trips and a shift to alternative modes. In the meetings of the Land Use and Transportation Study Committee in 1999, there were extensive discussions about the importance of community design and traditional and New Urbanist development in reducing the level of travel. There exists wide support for a New Urbanist model of development, a well as evidence that households with low incomes drive less. However, there is less empirical research to support the claims of reduced automobile travel in New Urbanist and traditional neighborhoods, especially among members of households that own and operate automobiles. The real questions that have not been answered in the Florida context are, do people who live in traditional and New Urbanist neighborhoods walk or ride bicycles, and, do they combine transit with walking where transit is convenient and available? Furthermore, do they use alternative modes of transportation for trips to and from work and during peak hours?

The claim that traditional urban forms reduce the level of automobile dependence, especially for trips to and from work and during the peak travel time, is examined in this research. While it would be ideal to consider New Urbanist communities, it is widely accepted that they have not reached the maturity necessary to allow them to be considered. Thus, this research considers the travel of residents who choose to live in traditional neighborhoods that afford the use of a range of transportation options. Downtown Orlando, including its adjacent neighborhoods, has been chosen as the location of this research because it appears to have the characteristics that encourage non-automobile travel. The downtown is built on a grid street network. Transit service is widely available. Many jobs are available in downtown Orlando. The city of Orlando's policies support a high quality of life in neighborhoods and encourage TND in existing neighborhoods and the new development within the Naval Training Center Plan and Southeast Sector Plan. Many people who live in downtown Orlando have an income high enough to allow them the full options of transportation services, including automobile

ownership. Thus, this research characterizes the travel of medium to high-income residents of the neighborhoods of downtown Orlando. The results of this research will begin to clarify whether the Florida Department of Transportation (FDOT), as a matter of policy, should support such development, and, if so, what other policies should be in place to make it more effective.

Summary of Findings

It is estimated that between 5% and 12% of downtown residents who also work downtown walk as a primary mode of travel to employment. This is comparable to the mode share for walking under the 1990 Census except the current population is wealthier and much more likely to own an automobile. These walkers show a diversity of choice in their mode of transportation for work. Forty-two of 59, or just over 70%, of all users of multiple modes use walking as one of the modes, and 42 of 45, or 93%, of all walkers combine walking with other modes for work trips. Given the diversity of travel choices among downtown residents who walk to work, improvements in the sidewalk network could increase the frequency with which they walk to work and could also induce their neighbors to walk to work and other destinations in the neighborhood.

Walkers choose their mode of travel to work based upon convenience, the need for an automobile, and for exercise or as a part of a healthy lifestyle. In contrast, non-walkers, most of whom only drive, do so for convenience and because of the travel time. This suggests that while some people may choose to live downtown and work downtown, they may not consider the alternatives to driving to work especially when parking is generally available at little or no costs. Among downtown employees who also live downtown, 62% made stops on their way to work during the previous month while 85% made stops on their way home from work. Walkers are as likely as non-walkers to make stops during the commute trip, except for trips to the gas station.

For non-work trips in the neighborhood, downtown residents walk in higher percentages to specific destinations than they do for the work trip. About two thirds walk to the park or recreation area, one third walk to the neighborhood convenience store and over 10% walk to community events, the fitness center, and restaurants. Among specific groups, greater than 10% also walk to visit family and friends, to the bank or credit union, and to their child's school. Downtown workers who walk to work are more likely to walk to a greater variety of destinations in their neighborhood and in the downtown during the workday than their neighbors who drive to work.

The City of Orlando has developed plans and programs that encourage TND, greater activity in the downtown and increased multi-modalism that has had a positive impact on the downtown. The city's Downtown Outlook Plan continues the efforts to improve the environment for bicyclists and pedestrians. These plans include the planting of shade trees, the development of a sidewalk and pedestrian facility inventory, and the establishment of priorities for developing a continuous and safe pedestrian network. The City and agencies involved in redevelopment have been proactive in trying to bring new upscale multi-family housing into the downtown. Approximately 1,400 new using are being built within walking downtown employment. With the success of these initial units additional units are likely to be built. With the planned expansion of the Lymmo service in the downtown approximately 25% of downtown residents could be within convenient distance to many employment locations throughout the Central Business District (CBD).

ORLANDO AND ITS DOWNTOWN NEIGHBORHOODS

Study Area Context

Orange, Seminole, and Osceola counties make up the Tri-County Area, located in east central Florida, and contain the greater metropolitan area of Orlando. Orange County lies between Seminole County to the north and Osceola County to the south (see Map A-1 in Appendix A). The county has an estimated population of 846,328 (BEBR 1999: 15). Orlando is the dominant city in Orange County, with a population of 184,639 (BEBR 1999). The cities of Maitland and Winter Park are located just to the north, Edgewood and Belle Isle directly to the south of Orlando, Ocoee and Winter Gardens to the west, Apopka to the northwest, and Bay Lake, Reedy Creek, and Lake Buena Vista to the southwest (see Map A-2 in Appendix A). After Orlando, the next largest cities in Orange County are Winter Park (24,967 residents), Ocoee (22,746 residents), and Apopka (22,724 residents) (BEBR 1999:37). All three of these cities are considerably smaller in population than Orlando, but Ocoee and Apopka are growing at much faster rates – 78.0% and 67.0%, respectively – than the 12.1% growth rate of the city of Orlando (BEBR 1999: 36-37). Orange County has increased its population by 24.9% from 1990 to 1999, a faster rate than the 18.4% population growth in Florida as a whole (BEBR 1999: 24-25).

The city of Orlando is located at the center of Orange County (see Map A-3 in Appendix A). The city limits include over 100 square miles and were recently expanded to include the Orlando International Airport and surrounding areas to the southeast. Orlando and Central Florida are well served by limited access facilities that connect important cities throughout Florida and major destinations within the region. Interstate 4 (I-4) and the Sunshine State Parkway (also known as the Florida Turnpike) connect the metropolitan Orlando region to I-75 and I-95. The Central Florida Greenway, when completed, will form an eastern beltway from near the Osceola-Orange county line at I-4 to Maitland. The western beltway will eventually connect from I-4 in Osceola County to Orange Blossom Trail (US 441) to the north. The Beeline Expressway, which is located in southern Orange County, connects the International Dr. corridor, the theme parks, the Orange County Convention Center and the Orlando International Airport to I-4 and I-95. The East-West Expressway starts at the Florida Turnpike to the west, runs through downtown, and converges with SR 50 near the University of Central Florida. The Orlando area is served by several major State Roads (SR 50 and 19) and US roadways (US 441, 27, and 17/92).

Downtown Orlando is located around I-4, in the north central part of the city and within the traditional city limits of Orlando. Accessibility is the most important aspect of downtown Orlando – major freeways and arterial streets converge in downtown, making it an easy commute within the region. Downtown Orlando is located 9 miles from Orlando International Airport, 18 miles from Walt Disney World, 3 miles from the Orlando Executive Airport, 15 miles from the University of Central Florida, 9 miles from Universal Studios Florida, and 8 miles from Altamonte Springs Raceway (DDB 2000b).

The study area includes the CBD and the areas to the east of I-4. The areas to the west of the CBD were excluded from the study because the population of these neighborhoods is of lower income than the regional average. The CBD of Orlando covers a ½-mile wide area to the east of I-4 and is bordered on the north by Lake Ivanhoe and on the south by the East-West Expressway. Colonial Dr. (State Rd. 50) to the north and the

East-West Expressway to the south separate the CBD from surrounding neighborhoods (see Map A-4 in Appendix A). Orange Ave., Magnolia Ave., and Rosalind Ave. are major thoroughfares, running though the CBD from north to south. The thirteen neighborhoods selected for the case study surround the CBD to the east and south, within a 1 ½- to 2-mile radius (see Map 1 on the following page for location of neighborhoods and Maps A-5 through A-10, in Appendix A, for detailed maps of each neighborhood). Mills Ave., Bumby Ave. also run through the downtown neighborhoods.

Demographics and Employment

Downtown Orlando is at the center of one of the fastest growing metropolitan regions in the United States. Metropolitan Orlando, with a population of 1.5 million people, is projected to be the nation's second-fastest growing population and employment region through 2008, according to a recent publication by Woods & Poole (EDC 2000). A survey of 45 major U.S. markets ranks Metropolitan Orlando first in annual population growth, annual household growth, total employment growth, wholesale and retail employment growth, Finance, Insurance, and Real Estate (F.I.R.E.) employment growth, and annual employment growth (EDC 2000). Table 1 shows how Metropolitan Orlando compares to other urban areas in several demographic and employment categories.

Table 1. Rankings of Metropolitan Orlando Compared to 45 Major Metropolitan Areas for Selected Characteristics, 1994-2004

Demographic and Employment Characteristic	1994-1999 Rankings	1994-1999 Annual Growth Rate (%)	Projected 1999-2004 Rankings	Projected 1999-2004 Annual Growth Rate (%)
Population	4	2.4	1	2.7
Household	5	2.7	1	3.1
Total Employment	3	4.5	1	3.9
Mfg. Employment	13	1.5	5	2.3
Wholesale Employment	6	4.8	1	5.6
Retail Employment	3	5.0	1	4.0
F.I.R.E. Employment	10	4.0	1	4.0
Service Employment	4	6.7	1	4.6

Source: Viewpoint 1999; Valuation Network, Inc. (EDC 2000).

Orange County ranks fourth in total population, first in projected population growth, and is tied for first in average annual growth rate for the last decade among the largest Florida counties (see Table 2). Only Lee County, with a much smaller population, has maintained a higher growth rate from 1970 to 2005 than Orange County. Between 1999 and 2005, Orange County is projected to have the highest percentage increase in population among Florida's populous counties and only Dade, Broward, and Palm Beach Counties are projected to have greater gains in total population between 1999 and 2005 (BEBR 1999).

Map 1

Table 2. Population Growth Rates for Florida Counties with Populations Over 400,000, 1970-2005					
	Total Growth Rate Projected From 1999 To 2005 (%)	Average Annual Percent Change Projected From 1999 To 2005	Average Annual Percent Change From 1990 To 1999	Average Annual Percent Change From 1980 To 1990	Average Annual Percent Change From 1970 To 1980
FLORIDA	**9.0**	**1.6**	**1.9**	**2.9**	**3.7**
Brevard	11.0	1.9	1.9	3.9	1.7
Broward	8.0	1.3	1.9	2.1	5.1
Duval	7.0	1.1	1.4	1.7	0.8
Hillsborough	7.0	1.2	1.7	2.6	2.8
Lee	12.0	1.9	2.5	5.0	6.9
Miami-Dade	7.0	1.1	1.0	1.8	2.5
Orange	**13.0**	**2.1**	**2.5**	**3.7**	**3.2**
Palm Beach	12.0	2.0	2.1	4.1	5.2
Pinellas	4.0	0.7	0.6	1.6	3.4
Polk	8.0	1.4	1.8	2.3	3.5
Volusia	10.0	1.7	1.6	3.7	4.3
Source: BEBR 1999					

The city of Orlando's population has increased at a consistent rate since 1980 (see Table 3). This rate is expected to increase over the next decades, as residents start moving into downtown, the Naval Training Center redevelopment, and the Southeast Sector.

Table 3. Actual and Projected Population for the City of Orlando, 1980-2010						
Year	1980	1990	1997	1999	2000 (Projected)	2010 (Projected)
Population	128,291	164,674	176,373	184,639	194,031	224,508
Source: BEBR 1999, EDC 2000, and OPPD 1998						

The largest employer in Orange County is Disney, which employs over 50,000 workers for its theme parks and other operations (see Table 4). The Florida Hospital, located north of the CBD, and Orlando Regional Healthcare, located south of the CBD, are the region's second and third largest employers. Among the major employers, Orange County government, Central Florida Investments, AT&T Wireless, Sun Trust, and the city of Orlando government have large numbers of employees in the downtown. These totals do not reflect the new employment at Disney's Animal Kingdom, and Universal Studio's Islands of Adventure, City Walk, and Portifino Bay Resort Complex.

Table 4. Twelve Largest Employers in Orange County, 1998	
Employer	Number of Employees
Walt Disney World	50,000
Florida Hospital	9,078
Orlando Regional Healthcare	8,300
Universal Studios Florida	7,000

Orange County	6,910
Lockheed Martin	6,829
Central Florida Investments	6,000
Publix Supermarkets	4,852
University of Central Florida	4,844
AT&T Wireless	3,928
SunTrust	3,216
City of Orlando	1,850
Source: OPPD 1998, OCHD 2000, and OHRD 2000	

Despite the major increases in employment in other areas of the region, the downtown remains a hub of office and commercial activity. Downtown contains 77% of the top businesses and 91% of leasable buildings over 200,000 feet in the greater metropolitan area (DDB 2000b). Over 50,000 employees work in downtown and it is the headquarters to federal, state, county, and city government offices (Lynx 1997). Within a 5-mile radius of downtown Orlando, there are 255,000 residents and 100,000 households (OPDD 1998). The workforce in the Orlando CBD was estimated at approximately 52,000 in 1996 (Lynx 1997), and was projected to increase to 53,000 by 2000 and 70,000 by 2010 (OPDD 1998).

The demographics of the study areas are based on traffic analysis zones (TAZs), updated block group data, and 1990 Census data. The neighborhoods within the study area roughly coincide with the block groups and TAZs. A few of the block groups and TAZs extend slightly outside of the neighborhood boundaries with neither extending in the same place. Because neither block groups nor TAZs define neighborhood boundaries, some overlap and extension outside of the study area is inevitable (see Map A-11 and A-12 in Appendix A). By combining the neighborhoods into three separate areas, the overlap between those neighborhoods is eliminated. Colonial Dr. and the East-West Expressway divide the downtown neighborhoods into three areas, with I-4 forming the western boundary. The north area, north of Colonial Dr., is composed of the Uptown, Park Lake/Highland, and Colonialtown North neighborhoods. Although the Uptown neighborhood is presently part of the CBD, it is being distinguished as a separate neighborhood for demographic purposes and to be consistent with the Downtown Outlook Plan. The central area, between Colonial Dr. to the north and the East-West Expressway to the south, includes the CBD, Lake Eola Heights, South Eola, Thornton Park, Colonialtown South, and Lawsona/Ferncreek. The south area includes the neighborhoods south of the East-West Expressway: Lake Copeland, Lake Cherokee, Lake Davis/Greenwood, Delaney Park, and Lake Weldona. Several demographic categories are developed at the individual TAZs or Census block groups because averaging the data in either the north, central, or south areas diminishes the differences within each. As such, these categories – population density, employment density, total units per acre, households per acre, and median household income – are represented graphically (see Maps A13 – A19 in Appendix A).

Many of the downtown neighborhoods and the CBD have undergone significant revitalization over the last seven years. The Census block group data from 1990 is now ten years old; therefore, it does not adequately represent the characteristics of the study area. It is still useful for comparative purposes. The Central Florida Regional Transit Authority (Lynx) updated the demographic data by TAZ for 1996 and for several categories by block group in 1998 for transit planning and modeling. The 1990 Census

data consist of travel time to work, mode of travel to work, 1990 households, population, race, gender, age distributions, household types, and marital status.

The total population of the study area increased by an estimated 1,474 residents, or 12%, from 1990, with an average rate of growth of 1.4% per year from 1990 to 1998 (see Table 5). The total population of the study area is projected to grow by 1,299, almost 15%, an average annual growth rate of almost 3%, from 1998 to 2003.

Table 5. Population in Downtown Area for 1990, 1998, and Projected for 2003

	North	Central	South	Total
Total Population 1990	4,553	8,674	4,257	17,484
Total Population 1998	5,277	9,284	4,397	18,958
Projected Total Pop. 2003	5,779	10,035	4,713	20,257
Source: Lynx 1998				

The total number of households in the study area increased by an estimated 485 households, or roughly 18%, with an average annual rate of growth of 2.3% from 1990 to 1998 (see Table 6). The total number of households is projected to grow by 694, or almost 14%, an average annual growth rate of 2.7%, from 1998 to 2003.

Table 6. Households in Downtown Area for 1990, 1998, and Projected for 2003

	North	Central	South	Total
Households 1990	2,117	4,535	2,190	8,842
Households 1998	2,386	4,750	2,227	9,327
Projected Households 2003	2,591	5,100	2,330	10,021
Source: Lynx 1998				

Median household income has increased steadily since 1990 (see Map A-13 in Appendix A). The southern part of the Park Lake/Highland neighborhood and parts of Delaney Park, Lake Davis, and Lake Weldona have the highest incomes among downtown neighborhoods. The CBD has the lowest median household income and the lowest number of households. This is likely to change because of the construction of high-end and luxury apartments within the CBD and Uptown. The Lake Weldona and Delaney Park border also shows the highest growth in median household income between 1990 and 1998, followed by the Park Lake/Highland neighborhood (see Map A-14 in Appendix A).

The northern neighborhoods have the highest percentage of residents living in single-family units. The central neighborhoods have more residents living in multi-family than in single-family housing. The central neighborhoods include the CBD, have a large number of multi-family units south of Lake Eola, and a higher overall population density than the southern or northern neighborhoods (see Map A-15 in Appendix A and Table 7). The southern neighborhoods have a balanced mix of residents living in single-family and multi-family housing. The number of multi-family residents in the north and central neighborhoods will increase as residential projects now under construction are completed.

The highest population density within the study area occurs along the border between the CBD and the South Eola neighborhood with between 15 and 20 persons per gross acre and over 30 persons per net acre (see Maps A-15 and A-16 in Appendix A and Table 7). The average population density is about 6.8 persons per gross acre and 13.8

persons per net acre in the central neighborhoods. The densities in the other areas are lower with the density in the northern neighborhoods around 5.4 persons per gross acre and 8.0 persons per net acre. The southern neighborhoods have an overall population density of 6.1 persons per gross acre and 11.2 persons per net acre with higher densities toward the CBD (see Map A-15 and A-16 in Appendix A). The CBD and Uptown neighborhoods should show an increase in population and population density over the next few years as more housing units are developed

Table 7. Single-Family vs. Multi-Family Residents by Area in Downtown, 1996

Type of Residents	North	Central	South	Total
Single-Family Residents	3,706	3,971	2,964	10,641
Multi-Family Residents	910	4,880	2,005	7,795
Total Number of Residents	4,616	8,851	4,969	18,436
Gross Population Density (persons per gross acre)	5.4	6.8	6.1	6.2
Net Population Density (persons per net acre)	8.0	13.8	11.2	11.1

Source: Lynx 1997

The total number of acres by area is shown in Table 8. These acreages are used to determine densities per acre for employment, total units, population, and households. The residential acreage was estimated by excluding all non-residential zoning categories (like public buildings, conservation, and exclusively commercial areas) from the acreage in the TAZs.

Table 8. Acres by Area in Downtown, 1996

	North	Central	South	Total
Acres	857.7	1,297.9	819.8	2,975.4
Residential Acreage*	582.4	641.7	440.8	1,664.9

Note: * - Residential acreage was estimated by excluding non-residential land uses.
Source: Lynx 1997

A total of 12,504 residential units are located within the study area (see Table 9). Again, the central neighborhoods show the highest percentage of multi-family units. Within the southern neighborhoods, there are slightly more multi-family units than single-family units, many of which are located in residential towers for senior citizens. Often senior living facilities only house one individual per unit while other types of multi-family housing will have more than two persons per unit. This explains why even though there are more multi-family units than single-family units in the southern neighborhoods, there are far more residents living in single-family units than in multi-family units. Another indication of this difference is shown in the number of persons per dwelling unit, which is lower in the southern than in the northern neighborhoods. The central neighborhood has the lowest number of persons per household. The number of multi-family units for the north and central neighborhoods will increase as the multi-family projects now being constructed are completed. As of this date, no multi-family projects are proposed or under construction in the southern neighborhoods.

The number of hotel units within downtown Orlando is very small, compared to

other parts of Orange County that serve tourists and conventioneers. Within the central neighborhoods, the number of hotel rooms will increase as the Grand Bohemian and Embassy Suites hotels are completed and the Downtown Development Board (DDB) actively pursues its goal of bringing more tourists to downtown.

The highest density of housing occurs in the CBD and South Eola neighborhoods, with an average density of more than 10 units per gross acre and over 20 units per net acre (see Maps A-17 and A-18 in Appendix A). The CBD and Uptown neighborhoods should witness an increase in density because of new residential construction; currently few people live there. The central neighborhoods have the highest overall density of housing units per gross and net acre because of the large number of persons and the low number of persons per dwelling unit (see Table 9).

Table 9. Types of Units and Unit Density by Area in Downtown, 1996

Type of Units	North	Central	South	Total
Single-Family Units	1,718	3,988	1,363	7,069
Multi-Family Units	596	3,414	1,425	5,435
Total Residential Units	2,314	7,402	2,788	12,504
Gross Density of Dwelling Unit	2.7	5.7	3.4	4.2
Net Density of Dwelling Unit	4.0	11.5	6.3	7.5
Persons Per Dwelling Unit	2.0	1.2	1.8	1.5
Hotel Units	143	395	22	560

Source: Lynx 1997

The central neighborhoods have the largest employment base within the study area, as it includes the CBD (see Map A-19 in Appendix A). Within the study area, there was an estimated total employment of 51,669 in 1996. Orlando Regional Medical Center and the Florida Regional Hospital and associated facilities provide employment for an additional 20,000 employees. The CBD has several TAZs with employment densities greater than 100 an acre and several with 50 to 100 employees per acre. The highest employment densities outside of the CBD are directly adjacent to it in the South Eola, Lake Eola Heights, Thornton Park, and Colonialtown South neighborhoods. A majority of employees in downtown are in the service sector (see Table 10). School enrollment is highest in the northern neighborhoods.

Table 10. Type of Employment and School Enrollment by Area in Downtown, 1996

Type of Employment	North	Central	South	Total
Industrial	424	2,205	59	2,688
Commercial	1,229	2,987	149	4,365
Service	8,263	34,992	1,361	44,616
Total Employment	9,916	40,184	1,569	51,669
School Enrollment	2,023	1,123	120	3,266

Source: Lynx 1997

According to the 1990 Census, more women than men live in the downtown Orlando neighborhoods. Approximately 53% of the residents of the downtown neighborhoods are women (see Table 11). This compares to approximately 51% in all of Orange County.

Table 11. Sex by Area in Downtown, 1990				
Gender	North	Central	South	Total
Male	2,200	4,535	2,190	8,336
Female	2,353	4,132	2,004	9,148
Source: Census 1990b				

The study area consists primarily of a white population (see Table 12). Almost 90% of all residents are white, with residents of Hispanic origin totaling almost 9% of the population. The north neighborhoods have the highest percentage of whites at 94.3%, while the central neighborhoods account for the highest percentage of blacks and Hispanics, with 7.1% and 10.6%, respectively.

Table 12. Race by Area in Downtown, 1990								
	North		Central		South		Total	
Race	Number	Percent	Number	Percent	Number	Percent	Number	Percent
White	4,294	94.3	7,548	87.0	3,858	90.6	15,700	89.8
Black	102	2.2	616	7.1	242	5.7	960	5.5
American Indian	6	0.1	34	0.4	5	0.12	45	0.3
Asian	81	1.8	211	2.4	57	1.3	349	2.0
Other Ethnic	70	1.5	265	3.1	95	2.2	430	2.5
Total	4,814	100.0	9,595	100.0	4,607	100.0	19,016	100.0
Hispanic Origin	261	5.7	921	10.6	350	8.2	1,532	8.8
Note: Total excludes persons of Hispanic origin because they also specify another race. Source: Census 1990b								

Downtown Orlando had a lower percentage of children and a higher percentage of elderly than the state of Florida in 1990 (see Table 13). The percentage of persons under age 18 represented 16.3% of the population compared to about 22.3% statewide (BEBR 1999: 31-34). Similarly, the population over age 65 was 21.7% in the downtown neighborhoods compared to 18.2% statewide and 10.6% in Orange County. In 1990, downtown Orlando had a higher percentage of population in the age range 18 to 29 and 30 to 49. Since this data is ten years old, it is difficult to predict the age trends in downtown. Orange County is younger than the rest of the state with 24.3% of the population under age 17, compared to 22.4% statewide, and 10.9% age 65 and older, compared to 18.3% statewide. Based upon focus groups and discussions with city officials, there is some evidence of young singles and couples moving into the downtown as the older population either passes away or moves back with family or to elderly care facilities. However, the downtown still appears to have a smaller proportion of households with children than other parts of Orlando.

Table 13. Age By Area in Downtown, 1990								
	North		Central		South		Total	
Age	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Age under 5	290	6.4	429	5.0	279	6.6	998	5.7
Age 5 to 17	489	10.7	913	10.5	453	10.6	1,855	10.6
Age 18 to 29	1,013	22.3	1,842	21.2	875	20.6	3,730	21.3
Age 30 to 49	1,412	31.0	2,584	29.8	1,373	32.3	5,369	30.7
Age 50 to 64	478	10.5	844	9.7	410	9.6	1,732	9.9
Age 65 to 79	701	15.4	1,122	12.9	553	13.0	2,376	13.6
Age 80 and Above	170	3.7	940	10.8	314	7.4	1,424	8.1
Total	4,553	100.0	8,674	99.9	4,257	100.1	17,484	99.9
Note: Percentages may not total to100.0 due to rounding. Source: Census 1990a								

Residents of the central neighborhoods are less likely to be married than residents of the north or south neighborhoods (see Table 14). Similarly, they are more likely to be widowed or single. This pattern is consistent with the pattern of multi-family housing that is more dominant in the central neighborhoods than in the south or north.

Table 14. Marital Status of Adults by Area in Downtown, 1990								
	North		Central		South		Total	
Marital Status	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Single, Never Married	1,072	27.9	2,476	33.4	968	27.0	4,516	30.4
Married	1,735	45.2	2,532	34.1	1,530	42.6	5,797	39.0
Separated	99	2.6	232	3.1	79	2.2	410	2.8
Widowed	272	7.1	1,009	13.6	567	15.8	1,848	12.4
Divorced	660	17.2	1172	15.8	447	12.4	2,279	15.3
Total	3,838	100.0	7,421	100.0	3,591	100.0	14,850	99.9
Note: Percentages may not total to 100.0 due to rounding. Source: Census 1990a								

When the residents are considered by the type of household in which they live, the predominant type of household includes persons who are not living with relatives or who are single; who have never been married; or who are divorced, widowed, or separated (see Table 15). Among families, the predominant household type in all areas of the downtown is a married couple without children.

Table 15. Household Type by Area in Downtown, 1990								
	North		Central		South		Total	
Household Type	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Single w/ Children	87	4.1	134	3.0	56	2.6	277	3.1
Single w/o Children	168	7.9	311	6.9	144	6.6	623	7.0
Married w/ Children	123	5.8	143	3.2	90	4.1	356	4.0
Married w/o Children	728	34.4	1113	24.5	679	31.0	2,520	28.5

Single living alone/ with non-relatives	1,011	47.8	2,834	62.5	1,221	55.8	5,066	57.3
Total	2,117	100.0	4,535	100.1	2,190	100.1	8,842	99.9
Note: Percentages may not total to 100.0 due to rounding. Source: Census 1990a								

A large majority of the workers from the downtown neighborhoods commute less than 30 minutes to work due to proximity of the downtown to much of the employment in the region (see Table 16). Just over 50% of downtown residents have a commute of less than 20 minutes compared to 46% statewide (CUTR 1993).

Table 16. Commute Time of Workers by Area in Downtown, 1990

	North		Central		South		Total	
Commute Time	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Commute less than 5 min	100	3.9	279	6.5	48	2.1	427	4.7
Commute 5 to 9 min	369	14.5	641	15.0	370	15.8	1,380	15.1
Commute 10 to 14 min	440	17.3	587	13.7	456	19.5	1,483	16.2
Commute 15 to 19 min	365	14.4	516	12.1	438	18.7	1,319	14.4
Commute 20 to 24 min	381	15.0	834	19.5	322	13.8	1,537	16.8
Commute 25 to 29 min	155	6.1	264	6.2	178	7.6	597	6.5
Commute 30 to 34 min	296	11.7	566	13.2	294	12.6	1,156	12.6
Commute 35 to 39 min	73	2.9	110	2.6	42	1.8	225	2.5
Commute 40 to 44 min	76	3.0	70	1.6	18	0.77	164	1.8
Commute 45 to 59 min	67	2.6	165	3.9	31	1.3	263	2.9
Commute 60 to 89 min	68	2.7	108	2.5	48	2.1	224	2.5
Commute greater than 90 min	33	1.3	51	1.2	12	0.51	96	1.1
Work at Home	115	4.5	91	2.1	84	3.6	290	3.2
Total Workers	2,538	100.0	4,282	100.0	2,341	100.0	9,161	100.0
Source: Census 1990a								

Like most of Florida, residents of downtown Orlando have high rates of driving alone to work (see Table 17). However, residents used alternative modes in the central neighborhoods at higher rates than the state average. The highest rates of transit usage are found in Lake Eola Heights and South Eola where transit is most accessible (see Map A-20 in Appendix A). These neighborhoods also show high rates of walking to work with the highest percentages concentrated in the CBD and the Uptown neighborhoods (see Map A-21 in Appendix A). The pattern of walking to work is in many ways predictable because the percentages decrease with distance from the CBD. This pattern also likely reflects differences in income with the central neighborhoods having the lowest median income of the three areas and the highest transit share. There is no visible systematic pattern of bicycle usage (see Map A-22 in Appendix A).

Table 17. Usual Mode Choice for Commute Trips by Area In Downtown, 1990								
	North		Central		South		Total	
Mode Choice	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Drive Alone	1,915	75.5	2,895	67.6	1,846	78.9	6,656	72.7
Carpool	242	9.5	471	11.0	271	11.6	984	10.7
Bus	60	2.4	312	7.3	45	1.9	417	4.6
Taxicab	0	0.0	0	0.0	12	0.5	12	0.1
Motorcycle	0	0.0	40	0.9	18	0.8	58	0.6
Bicycle	60	2.4	125	2.9	35	1.5	220	2.4
Walked	146	5.6	324	7.6	23	1.0	493	5.4
Other	0	0.0	24	0.6	7	0.3	31	0.3
Work at Home	115	4.5	91	2.1	84	3.6	290	3.2
Total Workers	2,538	100.0	4,282	100.0	2,341	100.0	9,161	100.0
Source: Census 1990a								

Residents in the central neighborhoods are mostly likely to not own a car, with about 30% in the category (see Table 18). Residents of the northern neighborhoods are most likely to own more than one car. This pattern is consistent with the density of population and housing, the number of persons per dwelling unit, the age of the residents, and the distance from the CBD.

Table 18. Type of Household and Number of Autos for Residents by Area in Downtown, 1996				
Type of Household by Number of Autos	North	Central	South	Total
Households 0 autos	292	1,421	457	2,170
Single-Family 0 autos	217	447	123	787
Multi-Family 0 autos	75	974	334	1,383
Households with 0 autos (%)	12.4	30.4	17.4	22.8
Households 1 auto	1,318	2,337	1,468	5,123
Single-Family 1 auto	983	849	718	2,550
Multi-Family 1 auto	335	1488	750	2,573
Households with 1 auto (%)	55.9	50.0	56.0	53.9
Households 2+ autos	598	917	697	2,212
Single-Family 2+ autos	446	411	452	1,309
Multi-Family 2+ autos	152	506	245	903
Households with 2+ autos (%)	31.7	19.6	26.6	23.3
Total Percent	100.0	100.0	100.0	100.0
Source: Lynx 1997				

Just over half of the employed downtown residents leave for work during the morning peak period from 7:00 to 9:00 am (see Table 19). The percentage of workers who leave for work between the 6:00 am and 8:00 am is lower at 42.4% than the state average of 51.2% and the percentage leaving for work between 6:00 am and 9:00 am is slightly lower at 65.8% than the statewide rate of 69.6% (CUTR 1993).

Table 19. Time Leaving to go to Work by Area in Downtown, 1990								
	North		Central		South		Total	
Time Leaving	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Before 6:00 am	117	4.6	370	8.6	120	5.1	607	6.6
6:00 to 7:00 am	425	16.8	582	13.6	357	15.3	1,364	14.9
7:00 to 8:00 am	667	26.3	1,173	27.4	681	29.1	2,521	27.5
8:00 to 9:00 am	621	24.5	912	21.3	607	25.9	2,140	23.4
9:00 to 10:00 am	205	8.1	242	5.7	158	6.8	605	6.6
10:00 am to 4:00 pm	270	10.6	549	12.8	214	9.1	1,033	11.3
After 4:00 pm	118	4.7	363	8.5	120	5.1	601	6.6
Work at Home	115	4.5	91	2.1	84	3.6	290	3.2
Total	2,538	100.1	4,282	100.0	2,341	100.0	9,161	100.1
Note: Percentages may not total to 100.0 due to rounding. Source: Census 1990a								

History of Orlando

The city of Orlando developed in three distinct phases: the Traditional City, Post-World War II neighborhoods, and new growth areas. The Traditional City has mixed-use neighborhoods, mature street trees, a grid street pattern, and many neighborhood connections (OGMD 1999a). The majority of areas outside of the Traditional City have developed since the end of World War II in a pattern characterized by homes on large lots, large areas of homogeneous and separated land uses, few employment centers or areas for social interaction near homes, and reliance upon the automobile as the sole mode of transportation. For new development, the city encourages a pattern similar to the traditional city. Before beginning an in-depth discussion of development policies and planning principles, it is useful to understand the history of downtown Orlando and the planning context for the development of the downtown and its adjacent neighborhoods.

Orlando's history dates back to 1838, the height of the Seminole Wars, when the U.S. Army built Fort Gatlin just south of the present-day city limits to protect settlers from Indian attacks. By the time of its incorporation in 1875, the Town of Orlando had a population of 75 and corporate limits of one square mile. By the turn of the century, Orlando had a population of 9,282. In 1908, Orlando officially added "The City Beautiful" to its name to reflect a commitment to the urban design ideals of Frederick Law Olmstead and the new town planning ideals of Daniel Burnham (OGMD 1999a: 2).

The downtown historic districts exemplify the early development of the neighborhoods with the interconnected streets, the mix of housing, and the overall design. The five historic districts in the study area include the Downtown Historic District, Lake Eola, Lake Lawsona, Lake Cherokee, and Lake Davis (see Map A-23 in Appendix A). The Downtown Historic District, which encompasses eight square blocks of approximately 80 buildings constructed from the 1880s until the early 1940s, is a cohesive collection of buildings that reflects the commercial and governmental history of Orlando. The Lake Eola Heights Historic District encompasses approximately 38 blocks with an eclectic mix of architectural styles for its homes, educational and religious institutions, and commercial buildings, most of which developed during the period from 1905 to 1925. The Lake Lawsona Historic District encompasses parts of the Lawsona/Fern Creek and Thornton Park neighborhoods and features a mix of residential, commercial, and educational structures that were built between 1911 and the 1950s. The Lake Cherokee District

reflects the historical development of Orlando through the presence of representative architecture from virtually every significant period of the city's history. The Lake Copeland Historic District contains approximately 110 residences, many of which were constructed during the 1920s (OPDD 2000a).

After World War II, downtown Orlando suffered the same fate as other downtowns across the United States. Retailers and service providers started leaving downtown to serve the growing suburban population. Flight out of the city accelerated throughout the 1960s. By the early 1970s, when Walt Disney began to develop his theme park southwest of Orlando, the once prosperous downtown was deserted, rundown, and blighted (DDB and CRA 1997).

In 1972, a group of concerned citizens began the resurrection of downtown Orlando by organizing and passing a referendum to create a special tax district in downtown, which led to the formation of the DDB. A new central city plan was enacted in 1973 to promote redevelopment in the downtown (DDB and CRA 1999).

Throughout the 1980s, the city took a proactive approach to increasing mobility within the downtown, creating streetscape guidelines to promote pedestrian circulation and developing the Meter Eater, which eventually became the highly successful Lymmo downtown circulator. The Bob Carr Performing Arts Center, Marriott, and the O-rena, home to the NBA's Orlando Magic, began the revitalization of the downtown west of I-4. Church St. Station, which became a major tourist attraction, was the catalyst of the subsequent boom in development that was to occur in the 1990s. In 1982, the Community Redevelopment Plan was adopted, creating a tax increment trust fund and forming the Community Redevelopment Agency (CRA). During the 1980s, the city enacted a Comprehensive Land Development Code, undertook a $4 million facelift of Lake Eola, and developed a weekly Farmer's Market in order to transform downtown into a place where people wanted to go (DDB and CRA 1999, CRA 1990).

In the 1990s downtown Orlando had the most prosperous period since the 1920s. The 1990 Downtown Orlando Redevelopment Plan, adopted by the city, the DDB, and the Community Redevelopment Board, established an overall vision of the city, and adopted policies to promote redevelopment of multiple planning areas. In 1991, the city of Orlando passed its Growth Management Plan. The principles incorporated into this plan and the subsequent plan, which was adopted in 1999, will be discussed in greater detail below. Downtown neighborhoods such as Lake Eola, Lawsona/Ferncreek, Thornton Park, Lake Davis, and Lake Cherokee witnessed impressive revitalization, with a neighborhood-scale mixed-use retail and restaurant district being created on Washington St. in the Thornton Park neighborhood. The 1990s also witnessed a boom in the construction of new governmental and office buildings in the downtown including the City Hall; Orange County Government Center, School Board, and Courthouse; SunTrust; Nations Bank (now Bank of America); First Union; CNL; and Capital Plaza.

The end of the 1990s brought continued development in to downtown, including up-scale and luxury multi-family housing. The DDB's website now boasts about 38 different construction projects occurring in downtown, including multi-family developments, mixed-use office, residential, two new hotels, retail centers, renovations and expansions of existing churches, and the creation of a downtown cultural district (CRA 2000). The city, the DDB, and CRA have been actively recruiting new residential development (see Table 20 for a description of these residential projects and Map 2 on the

following page for their location). These projects would provide an additional 1,428 new and renovated units of housing in downtown Orlando.

Table 20. New Residential Developments in Downtown Orlando, 2000

Development	Number of units	Location
Echelon at Cheney Place	303 unit upscale apartment complex	Uptown: Orange Ave and Cheney Pl.
Waverly Place Apartment Tower Developer ZOM Inc.	Two residential towers, one 24 stories, the other 16 stories, both with four floors of parking: total of 230 residential units	South of Lake Eola: Central Blvd. to the north, Lake Ave. to the east, and Pine St. to the south
Parkside By Post Developer Post Proprieties	135,000 square feet of new construction. 123 new residential units and renovation of 121 residential units, 15,000 square feet of non-residential development	South of Lake Eola: On both sides of Central Blvd., east of Lake Ave., East and West of Osceola Dr. and West of Eola Dr.
Lincoln At Delaney Square Developer The Apartment Group	364 unit residential apartment complex with garage	Intersection of Rosalind Ave. and South St.
Echelon Uptown Developer Echelon Residential	224 unit mission style residential apartments	Marks St. and Orange Ave.
Thornton Park Central Developer Thornton Park Central, LLC	40,000 square feet of professional office space, 24,000 square feet of retail, 56 residential lofts	Block of Washington Ave., Summerlin Ave, Central Blvd. and Eola St.
The Livingston Commons Office and Ruth Court Residences Developer Livingston Dev. Inc.	4 office buildings and seven units of housing	Corner of East Livingston St. and Ruth Lane

Source: DDB 2000a

The city has recently updated its Comprehensive Plan. A new plan, Downtown Outlook, is currently under review, and the city is working on several projects as part of its designation as a sustainable community by the Florida Department of Community Affairs (FDCA). The designation seeks to further the following six principles of sustainability in four neighborhoods throughout the city: restoring key ecosystems; achieving a cleaner, healthier environment; limiting urban sprawl; protecting wildlife and natural areas; advancing the efficient use of land and other resources; and creating quality communities and jobs (OPDD 1996). While sustainable community designation does not directly affect the downtown neighborhoods, it is of interest to this study because the standards established could be used in the downtown, and two neighborhoods included in the designation, Parramore Heritage and the Naval Training Center, are adjacent to downtown. The city is consistent throughout these documents in planning using the principles of sustainability, TND, and the promotion of a multi-modal transportation system. The city's commitment to the coordination of land use and transportation would enhance the ability of downtown residents to walk to employment sites in the downtown. In the next section, the planning principles of the city will be discussed with reference to the city's Land Development Regulations and Comprehensive Plan, and in particular, the Transportation, Land Use and Urban Design Elements and the Zoning Code. Then the

Map 2

downtown Outlook Plan and its goals and objectives are discussed.

The city of Orlando makes extensive use of the Internet as a means for the public to gain access to government documents. The following section is a summary of the city's planning documents and is not intended to duplicate the documents themselves. For the interested reader, most of the documents cited in this document can be found on the Internet. Citations to the websites are included in the References.

THE COMPREHENSIVE PLAN AND LAND DEVELOPMENT REGULATIONS

The city of Orlando has built its Comprehensive Plan based upon the principles of TND, which builds the development patterns of pre-World War II neighborhoods, like many that are located in downtown Orlando. The following are TND principles that the city has adopted to form the basis of the city of Orlando's planning policies:

1. Development in the form of coherent and compact interconnected districts and neighborhoods with clearly defined centers and edges and a diverse mix of activities (residences, shops, schools, parks, etc.) located to minimize the use of the automobile;
2. Mixed and multiple use integrated districts providing residential and employment opportunities and a variety of shops, services, eating and drinking establishments, and civic activities that serve the needs of surrounding neighborhoods;
3. Diverse, compact (typically no more than one quarter (1/4) mile from center to edge) neighborhoods, which encourage pedestrian activity;
4. Neighborhoods with a wide spectrum of housing options that enable people with a broad range of incomes, ages, and family types to live within a single neighborhood or district;
5. A balanced transportation system providing equal access to transit, pedestrian, and bicycle mobility to reduce reliance on automobiles. Streets laid out as an interconnected network, forming coherent blocks where building entrances front the street rather than parking lots. Bicycle and pedestrian connections are provided as necessary to directly connect to nearby uses. Public transit is available to connect neighborhoods to each other and the surrounding region;
6. The celebration of public space. Civic buildings, such as government offices, community or neighborhood centers, houses of worship, and libraries shall be sited in prominent locations that are accessible to the pedestrian. Open spaces, such as parks, playgrounds, squares, and greenbelts shall be located at accessible locations throughout a neighborhood.
7. Cohesive urban design, which builds civic pride, enhances community identity, and reinforces the culture of democracy (OGMD 1999a: 7)

Land Uses

Orlando's primary future land use goal is to promote quality mixed-use development and accommodate growth while enhancing and protecting neighborhoods. The city incorporates a set of standards that apply these principles throughout the city within the traditional city, suburbs, and newly developing areas (OGMD 1999a).

Orlando bases its development on the concept of activity centers interconnected by

mixed-use corridors (see Appendix B-1 for a description of land use classifications in Orlando). Activity centers and mixed-use corridors promote the development of intense and dense developments within existing and planned communities.

The city has supported activity center development since its first Growth Management Plan in 1991. The activity center designation depends on geographical location, surrounding land uses, future growth areas, areas in need of redevelopment and urban infill, and transportation access and infrastructure. The city has four distinct activity center designations: metropolitan, urban, community, and neighborhood activity centers. Each type of activity center varies according to intensity, density, mixture of land uses, accessibility to transportation, and service area. The highest levels of intensity, density, and mixture of land uses occur within the Metropolitan activity centers, with access to major roadways and mass transit decreasing among types of activity centers. Metropolitan activity centers, like the downtown, are intended to serve all of Metropolitan Orlando. The urban metropolitan activity centers serve a sub region of Orlando. Community activity centers are intended to serve several adjacent neighborhoods, while neighborhood activity centers are intended to serve a single neighborhood (OGMD 1999a). See Map 3 on the following page for the location of future land uses in the downtown.

Mixed-use corridors are composed of commercial, office, services, industrial, institutional, and residential development. The mixed-use corridors within the city are those areas along streets that connect activity centers. The goal of the city is to concentrate a mixture of land uses, primarily office and residential, along these corridors. Commercial, institutional, recreational, retail, and conservation uses are allowed in mixed-use corridors as long as the uses are compatible and consistent with the mixed-use corridor and surrounding land uses. Two kinds of mixed-use corridors are shown on the Future Land Use Map – medium intensity corridors and high intensity corridors. Medium intensity mixed-use corridors are intended to provide for a variety of uses at intensities compatible with those of adjacent neighborhoods. They are oriented to arterial and four lane collectors along corridors where transit service is available or programmed. High-intensity mixed-use corridors are intended to provide for a mixture of residential and office uses at intensities significantly higher than in adjacent neighborhoods. High-intensity mixed-use corridors have the goal of promoting transit-oriented development and as such are intended to be located in areas with high levels of transportation accessibility, specifically along arterials and mass transit corridors (OGMD 1999a).

According to the Future Land Use Map, the downtown is dominated by two land use categories: downtown activity center and residential low density (see Map 3). Other dominant land uses categories are residential medium density, public, recreation, institutional, and conservation. The remaining land uses within the downtown are commercial activity center; mixed-use high and medium corridors; neighborhood activity center; office high, medium, and low density; and residential high density.

The Future Land Use Map shows a decrease in intensity and density of land use radiating from the downtown activity center. The downtown activity center land use, which allows high intensity and density residential, office, entertainment, hospitality, and commercial development, encompasses the entire CBD (see discussion of Downtown Outlook Plan, below). A community activity center, which is currently home to a Publix supermarket and a newly opened Eckerd's drug store, is located at the intersection of Mills Ave. and Colonial Dr. This community activity center directly serves the Park

Map 3

Lake/Highland, Lake Eola Heights, and Colonialtown North and South neighborhoods. A neighborhood activity center, which includes mixed-use retail and restaurants and serves an area greater than Thornton Park, is located along East Washington St. (see Map 3).

Two high-intensity mixed-use corridors are located in the study area. One is located along Orange Ave., south of the East-West Expressway, and serves the southern neighborhoods and the Orlando Regional Medical Center. The other high-intensity mixed-use corridor is located along Colonial Dr., between Mills Ave. and Colonial Town Plaza Mall and serves the Colonialtown North and South neighborhoods (see Map 3). Two medium-intensity mixed-use corridors are located in the study area. The first is along Colonial Dr., between Mills Ave. and I-4, primarily serving the Park Lake/Highland and Lake Eola Heights neighborhoods. The other medium-intensity mixed-use corridor extends along Mills Ave., between the Park Lake/Highland and Colonialtown North neighborhoods (see Map 3).

The Future Land Use Element has enacted office categories, in high-, medium-, and low-density, that allow primarily office uses, but a mixture of land uses, especially residential and retail, are encouraged. High- and medium-density office land uses are generally located adjacent to the downtown activity center (OGMD 1999a). Low-density office land uses are found throughout the study area. An office corridor runs along Robinson St. and north along Mills Ave. and Ferncreek Ave., within the Park Lake/Highland neighborhood, between the South Eola and Thornton Park neighborhoods, and along Orange Ave. adjacent to the Lake Cherokee and Lake Copeland neighborhoods (see Map 3).

High-density residential land uses are concentrated along Osceola Ave. south of Lake Eola and along Magnolia Ave. within the Uptown neighborhood, adjacent to the downtown activity center. Medium density residential developments occur in the Lake Eola Heights neighborhood, along the border between South Eola and Thornton Park, and along Mills Ave. between the Lake Cherokee and Lake Davis/Greenwood neighborhoods. Lower density residential areas constitute the largest land use within the remainder of the study area. Conservation, public, recreation, and institutional land uses occur throughout the study area (see Map 3).

Zoning

The city of Orlando has enacted land development regulations and zoning categories that are consistent with its land use categories. These categories allow a mixture of housing styles and types; retail, commercial, and office uses; a variety of setback and lot requirements; and design standards that promote development oriented to the pedestrian and other non-automobile modes of transportation. Existing zoning district regulations allow multi-family residences to be located next to single-family, all within walking distance of retail, office, and commercial uses that feature second and third story residences. Tandem housing and zero-lot line regulations allow smaller residential lots to be developed. Several zoning districts have been created that allow and actively promote combining offices and residences in the same building (OCPB 2000).

The Official Zoning Map is generally consistent with the Future Land Use Map, with a few exceptions as noted below. The zoning code includes activity centers, mixed-use corridors, and office districts that have different levels of intensity and density of development consistent with the land use categories. One neighborhood activity center,

located at the intersection of Mills Ave. and Virginia Dr. between the Park Lake/Highland and Colonialtown North neighborhoods, is reclassified as a mixed-use district on the Land Use Map. Several mixed-use office and residential districts fall within either residential or office land use classifications in the Future Land Use Map. These districts are located along Osceola Dr., south of Lake Eola, in various locations along Colonial Dr., Magnolia Ave., and Livingston Blvd. surrounding the Lake Eola Heights neighborhood and along Magnolia Ave. in the Uptown neighborhood (see Map A-24 in Appendix A).

Four types of overlay districts, which are used to enact different regulations and require additional standards over and above the basic zoning district, are incorporated into the zoning code. Overlay districts are denoted by a letter (T, AR, SP, HP) representing the district: T- Traditional City, AR- Appearance Review, SP- Special Planned, and HP- Historic Preservation. The special planned overlay district is used like a Planned Unit Development and is of minor importance in the study area.

The purpose of the T – Traditional City Overlay District, which covers all zoning districts in the study area, is to establish urban design standards in accordance with design patterns that were common in Pre-World War II developments (see Map A-25 in Appendix A). The standards promote characteristics in common with traditional TND including: (1) the maintenance of the grid street network; (2) allowing higher density residential development on lots as small as 4,000 square feet, with ancillary apartments, or through tandem housing; and (3) improving the pedestrian environment thorough the mass and scale of buildings, the use of façade and materials, orienting the building towards the street, using transparent surfaces on walls facing the street, and locating parking to the side or the rear of the building (see Appendix B-2) (OCPB 2000).

The Appearance Review (AR) overlay district standards are applicable to all low-density office districts, the East Washington/Thornton Park activity center, and mixed office and residential districts within the Traditional City. The district establishes additional design standards above and beyond the TND in the following categories: height, scale, massing, directional expression, entries, roof shapes, age, facade materials, landscaping, accessory structures, windows and doors, blank walls, awnings and canopies, lighting, signs, orientation toward street, parking, and architecture of parking garages on all pedestrian streets. A complete description of the design standards that accompany each of the above categories can be found in Appendix B-3 (OCPB 2000).

The purpose of the HP- Historic Preservation Overlay District is to promote the educational, cultural, and economic welfare of the city by preserving and protecting historic structures, sites, monuments, streets, areas, and neighborhoods that serve as visible reminders of the history and cultural heritage of the city, state, or nation (OCPB 2000).

The Transportation Network

Roadways

Through its Transportation Element of the Growth Management Plan, the city takes a proactive approach to promoting a multi-modal transportation system. The first goal of the Transportation Element emphasizes this approach: "To develop a balanced transportation system that supports building a livable community and improves access and travel choices through enhancement of roads, public transit, bicycle and pedestrian systems, inter-modal facilities, demand management programs, and traffic management

techniques (OGMD 1999b: 2)." As discussed above, the activity centers and mixed-use corridors coordinate higher density and mixed-use development with transit service and the promotion of other alternative modes of transportation. The Transportation Element sets an objective that by 2015, 5% of work trips shall be by public transit and that within metropolitan activity centers, 20% of non-home based internal trips will be via means of transportation other than the single-occupant motor vehicle (OGMD 1999b).

The city has established access management classes for arterials, which determine the roadway's ability to be expanded, to handle through traffic, to support specific speeds, to accommodate points and frequency of access, to allow access to land uses, and to support medians. Appendix B-4 describes each of the access classes, numbered 2 to 8, with 2 being a limited access facility, with maximum allowable speeds and through traffic with ample land to be built out, and 8 being roadways within downtown Orlando that have achieved maximum build out and support multiple modes of transportation.

The study area has several major thoroughfares that form the backbone of an extensive grid network that runs through the downtown (see Table 21). Some are also designated as arterials by the city. Roadways in Parramore Heritage have been included due to their role in downtown circulation. North-south roadways are listed from east to west, while east-west roadways are listed from north to south (see Map A-26 in Appendix A).

Table 21. Major Downtown Thoroughfares

North-South Roadways	East-West Roadways
Westmoreland Dr.*	Lake Ivanhoe Dr./Virginia Dr.
Parramore Ave.*	Marks St.
Division Ave.*	Colonial Dr./SR 50#
Hughey Ave.*	Lake Highland Dr.
I-4	Amelia St.
Garland Ave.	Corrine Dr.
Orange Ave.#	Livingston St.
Magnolia Ave.#	Robinson St.#
Rosalind Ave.#	Washington St.
Summerlin Ave.	Central Blvd.
Highland Ave.	Pine St.
Mills Ave.#	Church St.
Thornton Park Ave.	South St.
Bumby Ave.	East-West Expressway
Osceola Ave.	Anderson St.
Delaney Ave.	Gore St.#
Fern Creek Ave.	Kaley St.#
Virginia Dr.#	Curry Ford Road
	Michigan St.#

Notes: * - Located in Parramore Heritage, # - Roadway is also designated as an arterial.
Some portions of Orange Ave., Magnolia Ave., Mills Ave., Virginia Dr., and Kaley St. are not arterials.
Source: Orlando: GMD 1999b

Appendix B-5 characterizes the major thoroughfares within the study area including: the roadway segment, city functional classification, segment direction, access class, signals per mile, number of lanes, functional class, average daily traffic (ADT), and level of service (LOS). Roadways designated as arterials are shown on Table 21, above. While many arterials cross the study area, none of those roadways consist of more than four lanes and many of the roadways consist of exactly four lanes.

Within the study area, two roadways have average ADT over 40,000: Colonial Dr. and Mills Ave. Four roadways average ADT over 30,000: Orange Ave., Corrine Dr., Virginia Dr., and Bumby Ave. Five roadways average ADT over 20,000: Anderson St., Magnolia Ave., Rosalind Ave., South St., and Michigan St.

Transportation Policies in Support of Redevelopment and TND

The city has adopted policies that have the potential to promote development and redevelopment consistent with the goals of the Comprehensive Plan: the Transportation Concurrency Exception Area (TCEA) and a Transportation Impact Fee Reduction Methodology. The TCEA was enacted to exempt development from meeting level-of-service standards within the downtown in exchange for development that promotes infill in a manner that supports the provision of more efficient transportation alternatives (see Map A-27 in Appendix A).[1] The city established the TCEA on the following basis: (1) urbanized areas generally display a more efficient use of transportation infrastructure; (2) a greater diversity of travel choices such as transit, bicycling, and walking can be supported in urbanized areas; and (3) urbanized areas have greater proximity of a mixture of land uses to residential locations (OTPB 1999b).

The city is currently reviewing a Transportation Impact Fee Reduction Methodology that would lower the transportation impact fees for developers who build according to TND standards and within designated transportation areas of the city (OTPB 1999b). The justification for the impact fee reduction is similar to that of the TCEA – TND promotes and makes accessible the use of alternative modes of transportation and is a more efficient use of public facilities and services (OTPB 1998a). Development in the CBD and the Traditional City would receive the largest reduction in impact fees ((see Maps 1 (CBD) above and A-25 (Traditional City) in Appendix A**).** Developers can base TND on the city's Land Development Code, the Southeast Sector Plan, the Naval Training Center Plan, or other professionally accepted TND standards such as those espoused by Andres Duany and Walter Kulash (OPTB 1998a).

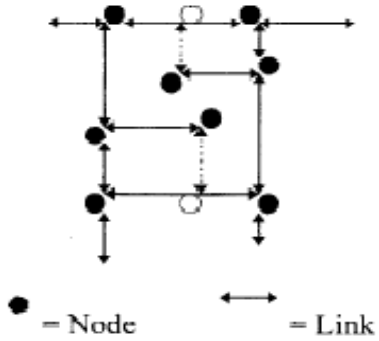
The city is employing another methodology for measuring if a development is eligible for an impact fee reduction. The Connectivity Index measures the interconnectivity of streets within a development, with the ideal development pattern being based on a perfect grid. Originally designed for the Southeast Sector Plan, the city is planning to make the Connectivity Index applicable to all development seeking a reduction in transportation impact fees (OPTB 1999a). A simple measure of connectivity for a development is to divide the number of street links by the number of nodes or link ends (including cul-de-sac heads). The more links connected to nodes, the more connectivity for the development. The city policy establishes a connectivity index of 1.4 to

[1] The map is misleading about the boundaries of the TCEA, which extends only to the city limits. The boundaries on the map are based upon the TAZs, some of which extend into other jurisdictions.

1.8 as an acceptable street network, with the optimal connectivity index for a perfect grid network being a 2.5 (OPTB 1999a). The connectivity index is calculated as follows (OCPB 1998):

1. Count the number of nodes. Nodes are any point of intersection of two or more roads or any cul-de-sac ends. There are 8 nodes in the example (counting only the black nodes).
2. Count the number of links. Links are the segments of road connecting nodes. To properly calculate the connectivity index, you must include the first link beyond the last nodes. There are 12 links in the example (ignoring the dashed lines).
3. Use the following formula to calculate the connectivity index: *links/ nodes = connectivity inde*x. The connectivity index of the example is 12/8 = 1.5.

The connectivity index can be improved by connecting more line segments to the nodes, thus achieving a grid pattern. If just two more four line segments are added, the score increase to 1.75, thus representing a more interconnected street network.



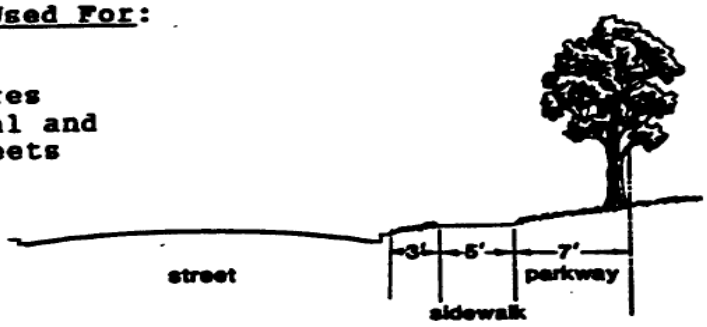
The policy of the city of Orlando as stated in the Transportation Element is a city-wide minimum travel lane width of twelve feet for all roadways, however interviews with planners suggest a preference for 10- or 11-foot lane width. For example, Mills Ave. and Livingston St. have 10-foot lanes and Robinson St. has 9-foot lanes. Narrower widths are allowed when bike lanes are added to existing roadways (OGMD 1999b). Within the Southeast Sector Plan and the Naval Training Center Plan, the maximum travel lane width is twelve feet, with the majority of planned roads being between eight feet and eleven feet (see Appendices B-6 and B-7). The city has adopted the following roadway cross-sections for roadways within the city, excluding the Southeast Sector Plan and Naval Training Center Plan areas (OCPB 2000):

Cross-Section A - Used For:

1. Minor Local Residential Streets
2. One-way Local Residential Streets
3. Principal Local Residential Streets

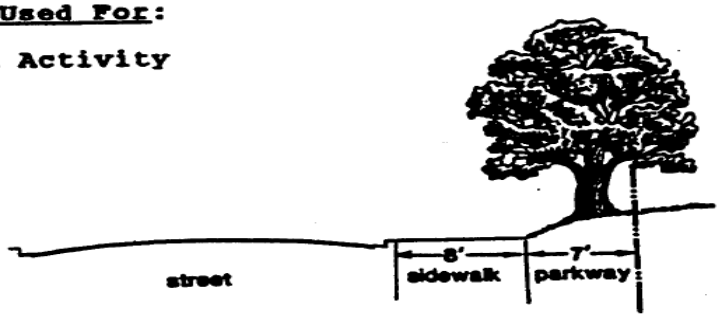
Cross-Section B - Used For:

1. All Collectors
2. All Thoroughfares
3. Local Commercial and Industrial Streets



Cross-Section C - Used For:

1. All Streets in Activity Core Districts

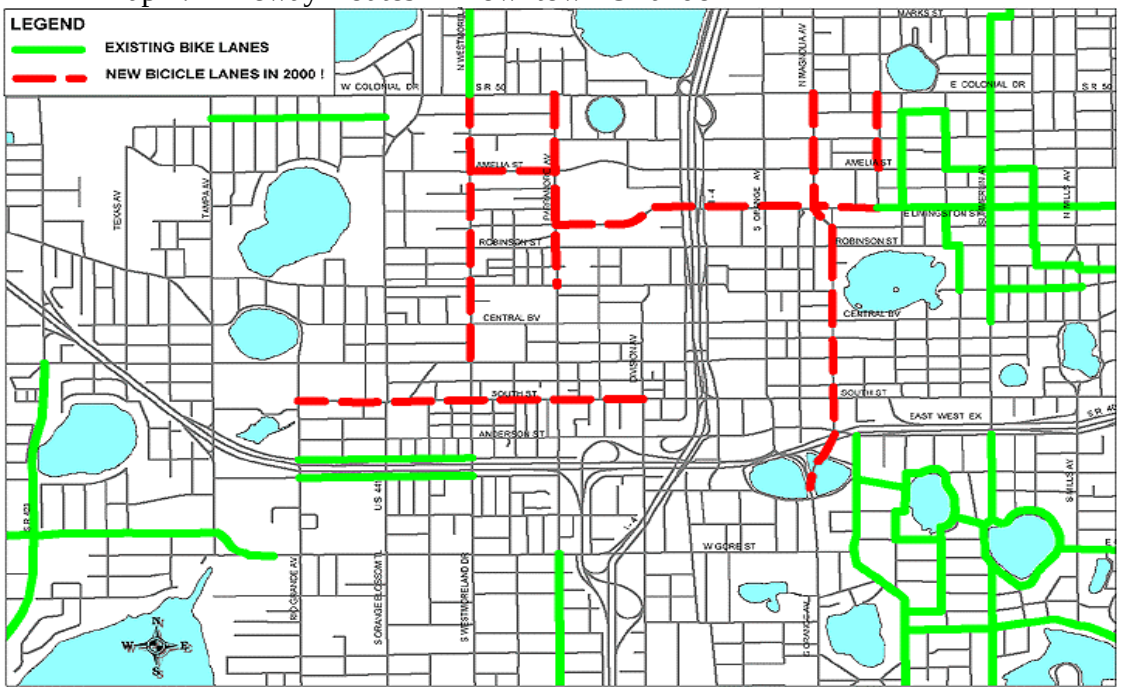


Bikeways

Improvement of bike facilities is a major goal for Mayor Glenda Hood, who made it a priority in 1996 to create 100 miles of bikeways in Orlando by 2000 and incorporated that goal into the Transportation Element of the Growth Management Plan. The city met this goal via the creation of bicycle lanes and signed bicycle routes (OTPB 2000a).

Within the study area, the following roadways will have bike lanes added to them: (1) Rosalind Ave., from Orange Ave. at Lake Lucerne north to Livingston St.'s new bicycle lanes, (2) Magnolia Ave., from Colonial Dr. south to Livingston St., (3) Livingston St., from Rosalind Ave. west past the Courthouse through the Centroplex to Parramore St., and (5) Highland Ave., from Colonial Dr. south to Amelia St. (OTPB 2000a). Map 4 shows the proposed new routes and the existing routes within the downtown.

Map 4. Bikeway Routes in Downtown Orlando



The Transportation Element adopts several policies that seek to increase the number of bike lanes within the city. The Transportation Element adopts a minimum bike lane width standard of four feet and dual use bicycle/pedestrian facilities with a minimum of ten-foot width (OGMB 1999b). The adopted policies also provide that selected major thoroughfares be stripped with four foot bike lanes as part of the resurfacing program by narrowing traffic lanes to ten feet (OGMB 1999b).

Sidewalks and Pedestrian Ways

The Transportation Element states that the city will undertake a pedestrian facilities inventory throughout the city by 2000. The project will include identification, location, and condition of sidewalks, buffers, crosswalks, trees, and other variables as needed. The project will identify gaps in the sidewalk system and areas in need of pedestrian signalization and intersection improvement.

Within the downtown, the sidewalk network is fairly extensive, with a majority of roadways containing sidewalks (see Map A-28 in Appendix A). The downtown was built upon the traditional grid pattern, and therefore, has excellent connectivity between roads and places, by which pedestrians and bicyclists can reach a number of destinations. The city's policies reinforce the idea of the grid as the desired pattern of roadway design. The Downtown Outlook Plan section of this report contains a more detailed description of the existing and planned pedestrian improvements.

Transit

Lynx, which is also known as the Central Florida Regional Transportation Authority, is the regional provider system for Orange, Seminole, and Osceola Counties: an area of approximately 2,500 square miles with a resident population of more than 1.3 million people (Lynx 2000). Lynx has a total fleet size of 235 buses running on 56

different routes. According to Lynx, a total of 20.7 million passengers used the system in fiscal year 1999, which represents a 7.3% increase over fiscal year 1998 (Lynx 2000). The downtown is well served by transit, with a majority of all Lynx routes converging at the transit station on Pine St. (see Map A-29 in Appendix A).

Downtown Orlando is also served by Lymmo, a circulator system using buses on a dedicated right-of-way that travels a three-mile route from the Centroplex garage near the O-rena to City Hall (see Map 5 on following page). Ten buses run along the Lymmo route at four-minute headways during the morning, midday, and evening peaks and during special events; six-minute headways during non-peak weekday hours; ten-minute headways on Saturdays; and fifteen-minute headways on Sundays (Stults 2000). Lymmo's hours of operation are 6 am to 10 pm Monday through Thursday, 6 am to 12 am (midnight) on Friday, 10 am to 12 am (midnight) on Saturday, 10 am to 10 pm on Sundays, and extended hours for special events (Stults 2000). Eleven stops are lit, covered, and feature a Global Positioning System (GPS) that tracks the location of buses along the route. With GPS and the frequent service, passengers know that a bus will arrive with only a short delay.

The ridership of Lymmo/Freebee has increased significantly every year it has been in operation (see Table 22). The ridership increased significantly when the Freebee circulator was discontinued and Lymmo service was introduced in 1997. Lymmo averaged 3,882 weekday passengers from 1997-1999 and is projected to average a daily ridership of 5,123 in 2000 (OTPB 2000b: 11)

Table 22. Lymmo Ridership, 1994 – 1999

Year	Ridership
1994/1995*	493,976
1995/1996*	544,921
1996/1997*	578,304
1997/1998	1,091,871
1998/1999	1,149,415

Note: * - Freebee Circulator was in use up to 1997, Lymmo started mid 1997.
Source: DDB and CRA 1997, 1998, 1999

Parking

Parking in downtown Orlando consists of on-street parking, 7 surface parking lots, and 10 parking garages. On-street metered parking is available on roadways throughout the downtown. According to the Transportation Element of the city of Orlando's Growth Management Plan, 5,932 public parking spaces are located in parking garages, of which 1,910 are long-term lease agreements with private developers. There are 1,577 parking units within surface parking lots and a total of 1,000-metered spaces, giving a total of 8,509 public parking spaces available in downtown Orlando (see Map A-26 in Appendix A) (OGMD 1999b). Including these public parking spaces, there are a total of approximately 35,000 parking spaces in the downtown redevelopment district (Vennaro 2000).

The city's parking policies have generally been restrictive in an attempt to reduce the automobile traffic in downtown. The city does not allow parking as a separated land use in downtown; it is allowed only as ancillary to other land uses. The city had attempted

Map 5

to limit the number of parking spaces in downtown to 3 spaces per 1,000 square feet of office development, with one space being placed in the public supply and the other two spaces for use by the private sector. The Lymmo system was developed in part to support shared use of the Centroplex parking garages, which are located near the O-rena and the Bob Carr Performing Arts Center west of I-4. The Lymmo system has been successful at reducing the impact of automobile traffic in the core of the downtown, as evidenced by the increase in daytime utilization of the Centroplex parking garages from about 30% to 75% (Vennero 2000).

However, the city has backed away from its restrictive parking policies in downtown because of competitive pressures (Pleasant 2000; Vennaro 2000). Simply stated, developers and leasing agents indicated to the city that they would not develop there until the parking restrictions were lifted. The Downtown Outlook Plan recommends "that the City amend the Land Development Code to allow more flexible minimum parking provisions for mixed-use projects, including considering counting on-street parking for commercial uses (CRA 2000: 13-8)." The Outlook Plan also recommends that the city allow unlimited parking in the downtown parking program area "subject to compliance with design guidelines that ensure a quality pedestrian atmosphere" (CRA 2000: 5-7). The cost of public parking in downtown Orlando is between $30 and $90 per month or a maximum of $7 per day (OPWD 2000).

Downtown Outlook Plan

Going into the 21st century, the Orlando business leaders, local government officials, downtown residents, the DDB, and the CRA, have sought to build a strong vision for the city as a place where people can live, work, and play. The Downtown Outlook Plan, which is currently under review, is a revision of the 1990 Redevelopment Plan. The new plan incorporates many of the trends that have been occurring in the downtown over the last decade.

Downtown Planning Districts

One of the major features of the new plan was to simplify the plan from twelve to four distinct planning districts within downtown: Uptown, Parramore Heritage, Central Business District (CBD), and Eola (see Map A-30 in Appendix A). The boundaries of the Redevelopment district were expanded to incorporate the following new areas: west of the Parramore district to Westmoreland Dr., the East Washington St. Retail District, the remainder of the Lake Eola Heights neighborhood from Summerlin Ave. to the east and to Colonial Dr. on the north, and the area north of Lake Highland (see Map A-31 in Appendix A). The expansion of the Community Redevelopment Area is a way for the city to create a more cohesive downtown environment and to assist underserved areas. Parramore Heritage is not a part of this research, but its proximity to the downtown and the plans for revitalization of residential areas offer the potential for even more downtown workers to live downtown. The following is a summary of the goals and vision established for each planning district according to the Downtown Outlook Plan.

Uptown

The vision for the Uptown neighborhood is more than just an extension of the CBD. It is a self-sustaining neighborhood with a mixture of office, commercial,

employment, and residential uses. The highest intensity developments will occur between I-4 and Magnolia Ave., with lower intensities as the neighborhood goes east of Magnolia Ave. The Park Lake St. area is envisioned as a mixed-use corridor acting as a focal point for the Uptown neighborhood and serving as the northern gateway to the cultural corridor and the new linear, open space park that connects with a system of urban greenways and pocket parks (see Map A-32 in Appendix A) (CRA 2000).

Parramore Heritage

Parramore Heritage has experienced the least redevelopment of all areas within the downtown. The goal for the area is an improvement of the quality of life through increased community policing; implementation of crime-prevention through environmental design standards; creation of a neighborhood school and a system of parks and urban greenways; increased presence of cultural, entertainment, and arts amenities; development of mixed-use corridors; and the enhancement of employment opportunities (see Map A-32 in Appendix A) (CRA 2000).

Central Business District

Creation of a twenty-four hour downtown is the key vision for the CBD. The creation and enhancement of cultural facilities, parks and urban greenways, retail services, entertainment and restaurant options, residential housing, and pedestrian, bike, and transit facilities are all goals for the CBD. The CBD of the future is envisioned to be a premier family oriented downtown, consisting of high-rise office, residential, and hotel establishments, a cultural corridor extending from the Uptown neighborhood to the East-West Expressway, and a variety of retail and entertainment uses to serve residents and tourists alike. The downtown is also envisioned as the multi-modal transfer point within Central Florida, serving as the hub of light rail transit, commuter rail, Lynx, and Lymmo and is connected to the CBD by pedestrian and bicycle friendly streets: all of which promote and provide alternatives to the use of the automobile. The expansion of Lymmo into the Eola, Parramore Heritage, and Uptown neighborhoods will provide for greater interconnectivity between the neighborhoods and the CBD (see Map A-32 in Appendix A) (CRA 2000).

Eola

Lake Eola is the jewel of the downtown. It is a vital urban park that attracts visitors, employees, and residents alike. The creation of a pedestrian-oriented, mixed-use corridor along Osceola Ave. is the key goal for the Eola Planning District. The vision for the Eola Planning District is to create an interconnected, pedestrian-friendly environment. Connections will be made across the East-West Expressway to the Lake Cherokee neighborhood and to the South Eola, Lake Eola Heights, and the Thornton Park neighborhoods in a continuous mixed-use corridor extending from the southern portions of Osceola Ave. to the East Washington St. shopping district. Most of the new residential construction is occurring in the Eola Planning District and, as such, this area is envisioned as a mixed-use urban community with a healthy variety of housing styles and options, retail, office, entertainment, employment, and commercial uses (see Map A-32 in Appendix A) (CRA 2000).

Guiding Principles

The Downtown Outlook Plan incorporates the principles of sustainability and livability as essential building blocks by evoking the ideals of a balanced community that equally accommodates development and the environment, commerce and society, and the essential balance between the past and the future. The following are the six principles, as adopted by the Downtown Orlando Outlook Plan that will guide future development within Orlando:

Sense of Place: For downtown Orlando to thrive, people need a reason to be there, and they need to believe they are in a special place. The Plan will celebrate downtown's entrances, open spaces, streets, and buildings.

Integrated Land Uses: Downtown will be a sustainable community where people are present 24 hours a day, 7 days a week. Integrating land uses, such as encouraging residences above shops and offices, will provide opportunities for this type of interaction downtown.

Transportation Connectivity: To be a sustainable community, downtown must be fully accessible. The existing grid street pattern provides a high degree of accessibility. The plan will address improving vehicular circulation, as well as ensure adequate pedestrian, transit, and bicycle access to houses, jobs, shopping, and entertainment.

Scale of Development: Downtown Orlando must continue to be a people-sized place. Streets should be wide enough to accommodate vehicles, but not so wide that pedestrians are afraid to cross. Buildings should be designed to accommodate the privacy of their inhabitants, but not so private that they isolate themselves from the people outside.

Pedestrian Orientation: Development should be oriented to the pedestrian and accommodate the automobile. A pedestrian-oriented community provides more opportunities for social interaction than an automobile-oriented community.

Working Toward the Vision: A sustainable community is one that develops and improves over time. Communities are not built overnight; they are built over many years, and each individual action should contribute to the overall vision. To achieve the community's goals, government and private developers will need to be vigilant in ensuring that short-term decisions contribute to the long-range vision for downtown. (CRA 2000: E.S.2)

Both short and long-term goals and implementation strategies have been incorporated in this plan to achieve the community vision of creating "a place for families and individuals to live, work, and enjoy" (CRA 2000: E.S. 1).

Redevelopment Themes

The Downtown Outlook Plan uses a framework that incorporates the guiding principles into four redevelopment themes, the first three of which are explored below.

Community Character: Several elements work together to form a community's character: the look and feel of a place, the memories it invokes and the collage of individuals that compose it. Elements that will determine the character of downtown range from safety and security to the quality of education and design integrity.

Family Connections: In 2020, downtown Orlando will be alive with parks, cultural entertainment activities, and civic facilities that provide the gathering places for people of all ages and types. The Downtown Outlook Plan strives to connect amenities, thereby connecting neighborhoods, families and individuals.

Getting Around: Access to downtown and the ability to move around comfortably and safely is critical to the success of the urban experience. Essential to the Plan is its mission to enhance downtown's transportation network by improving the balance between cars and alternative modes of transportation such as transit, rail, bicycles, and pedestrians.

Market Potential: Defining market opportunities and strategies to encourage development of residential, office, retail, and hospitality uses, and providing for a vibrant mixed-use community with employment opportunities are central components to downtown Orlando's success. (CRA 2000: 2.6)

Community Character

The Downtown Outlook Plan establishes maximum height requirements to gradually reduce the intensity and density of development from the downtown core out to the surrounding neighborhoods and to accommodate the needs of the Federal Aviation Administration (FAA) for safe flight paths for the Orlando Executive Airport. Seven different height classifications are found in downtown Orlando (see Map A-33 in Appendix A). The highest buildings are located within the CBD and west of I-4 to Parramore Ave. between the East-West Expressway and Colonial Dr. and are limited in height only by the FAA. Decisions are made on a development-by-development basis regarding the height of the structure within the CBD. The next step down in height requirements limits building heights to 200 feet; these areas are adjacent to the CBD, primarily next to Lake Eola. The third height category has a maximum height requirement of 120 feet and is located primarily within the Uptown district. The fourth height district sets a maximum height of 75 feet and is located primarily within Parramore Heritage and surrounding the CBD. The fifth height district is the area south of Lake Eola, where the new Osceola Ave. mixed-use corridor is planned, with a maximum height of 55 feet for offices and 120 feet for residential buildings. A sixth height district is located along Colonial Dr. and within the Uptown planning district, with a maximum height of 55 feet. The seventh and final height district is for primarily residential areas and lower intensity mixed-use areas, with a maximum height of 35 feet.

The Downtown Outlook Plan has developed six general "character districts" that recognize the unique characteristics of individual neighborhoods while building on the similarities that they may have with other downtown neighborhoods. The character districts are: Downtown Core, Downtown Edge, Neighborhood Mixed-Use, Neighborhood General, Neighborhood Residential, and Business Enterprise. The regulations pertinent to existing and future land uses and zoning were explained above in the Growth Management Plan and Zoning discussion. See Map A-32 in Appendix A for the location of each of

these character districts.

Downtown Core. The downtown core will contain the highest floor area ratios (FAR), density, and intensity of any area in either the city or the Central Florida region, with building heights being limited only by the Federal Aviation Administration (FAA). The core will be dominated by high-rise buildings; with the ground floor being pedestrian oriented and containing personal service, retail, hospitality, entertainment, and commercial uses. Streets within the core will be pedestrian friendly with sidewalks, street trees, lights, and furniture, along with special pavement treatments for pedestrian crossings (CRA 2000)

Downtown Edge. The downtown edge is intended to be a transition zone between the downtown core and surrounding residential neighborhoods with a step down in FAR, density, and intensity from the downtown core to the surrounding neighborhoods. The downtown edge district will feature office and commercial uses mixed with high-density residential development (CRA 2000)

Neighborhood Mixed-Use. The neighborhood mixed-use character district provides for a mixture of land uses at a much lower FAR, density, and intensity than the downtown core or edge. Retail, commercial, office, civic, and hospitality uses should be neighborhood serving and form neighborhood centers (CRA 2000).

Neighborhood General. The neighborhood general character district is intended to provide an area of predominantly residential development. The district is applicable to areas of higher density residential development, which provide a mixture of housing, including single-family attached and detached, townhouses, and multi-family apartments. Where a mixture of land uses are present, a limited amount of use will be continued and encouraged, whereas in predominantly residential areas a mixture of uses will be discouraged (CRA 2000).

Neighborhood Residential. The neighborhood residential district applies to traditional neighborhoods characterized primarily by single- and two-family residential uses. This district will preserve the low-intensity character of the neighborhood while allowing civic based land uses, and if existing zoning permits, for infill units such as ancillary garage apartments, guest cottages, and accessory apartments (CRA 2000).

Business Enterprise. The business enterprise character district is intended for areas that contain existing industrial uses, both heavy and light, in close proximity to or within residential neighborhoods. The business enterprise is located in the eastern area of Parramore Heritage and south of the East-West Expressway along I-4 (CRA 2000).

Family Connections Network

The Family Connections Network, which is a series of green connections between parks, the public library, schools, churches, and cultural amenities, is an important feature in the city's attempt to create a family-oriented downtown. Radiating from Lake Eola Park, the green links connect with Lake Lawsona Park to the east, Lake Cherokee Park to the south, Lake Ivanhoe and Lake Highland parks to the north, and the several new parks planned for Parramore Heritage (see Map A-34 in Appendix A). The Outlook Plan calls for the creation of ten new parks within downtown along with the six parks that presently exist. The green links are the same streets as the designated pedestrian streets.

Another major feature of the Family Connections Network is the creation of the Downtown Arts District and the Cultural Corridor. The Downtown Arts District and the Cultural Corridor currently consist of several art galleries, the Orlando Public Library, several historic churches, the Dr. Phillips Performing Arts Center, the Bob Carr Performing Arts Center, and Church St. Station (CRA 2000). Several more amenities are planned that will enhance the Downtown Arts District and Cultural Corridor. The Cultural Corridor follows the existing Lymmo route along Magnolia Ave. to the Centroplex Garage, O-rena and the Bob Carr Performing Arts Center west of I-4 and would be expanded to include the proposed extension of the Lymmo route into Uptown.

Getting Around

Getting around downtown by Lymmo, as a pedestrian, and by other modes, and connecting between modes is another major feature of the redevelopment theme. Lymmo is so successful that the city is planning to establish an East-West circulator into the Eola planning district and an Uptown circulator by 2010 and a North-South circulator into Parramore Heritage by 2020. Map 5 above shows the existing Lymmo route and the proposed routes in the Downtown Outlook Plan. Table 23 shows the projected ridership on the new routes. The number of weekday passengers for the proposed East-West and Uptown circulators are projected to exceed those of the current Lymmo route by 2020.

Table 23. Projected Average Weekday Passengers for Expanded Circulator System

	2010	2020
Lymmo	4,618	4,916
East-West Circulator	3,522	6,024
Uptown Circulator	1,797	5,749
North-South Circulator	*	2,334

Note : * - No projections are shown for the North-South Circulator because service is not scheduled to begin until after 2010.
Source: TRB 2000c:11

Improvement of the pedestrian environment is also a major goal of the Outlook Plan. The Outlook Plan has created three classifications that are applicable to all roadways within the four planning districts: residential character, primary pedestrian, and secondary pedestrian. Each of these pedestrian streets consists of two subgroups that address different environments and consist of various design standards (see Appendix B-8 and Map A-35 in Appendix A).

Residential Character. These streets run through predominantly residential neighborhoods or areas of mixed residential and office use at a lower scale than typical commercial areas. The simple streetscape of concrete sidewalks, street trees, parkways, and streetlights complements the larger setbacks and residential setting (CRA 2000: 11.5). The Residential Character (RC) classification has two types of pedestrian streets: light corridors and typical residential streets (see Tables 24). Light corridors are proposed to be tree lined, with street lighting, sidewalks on both sides, on-street parking, and priority for the re-bricking program. Typical residential streets have standards in the Downtown Outlook Plan to which private property owners along these streets conform. The following light corridors are proposed under the Downtown Outlook Plan (see Table 24).

Table 24. Proposed Light Corridor		
Proposed Light Corridor		
Street	*From*	*To*
Jackson St.	Osceola Ave.	Summerlin Ave.
Summerlin Ave.	Jackson St.	Palmer St.
Palmer St.	Lake Ave.	Summerlin Ave.
Lake Ave.	Ponce De Leon Pl.	Palmer St.
Delaney Ave.	Anderson St.	Gore Ave.
South St.	Westmoreland Dr.	Hughey Ave.
Amelia St.	Westmoreland Dr.	Parramore Ave.
Broadway Ave.	Robinson St.	Hillcrest St.
Highland Ave.	Hillcrest St.	Colonial Dr.
Hillcrest St.	Broadway Ave.	Highland Ave.
Highland Ave.	Colonial Dr.	Orange Ave.
Park Lake St.	Orange Ave.	Highland Ave.
Source: CRA 2000:11.30a, AAA 2000		

Primary Pedestrian. This classification includes key connections between downtown and other neighborhoods, the CBD, and major cultural destinations. While many of these streets also provide major vehicular connections, pedestrians are given a higher priority on these streets both through the design of the streetscape and the massing, scale, and orientation of buildings abutting these streets (CRA 2000: 11.5).

Primary pedestrian streets are designated as type I or type II, both of which feature wide sidewalks with specialty paving, pedestrian scale street-lighting, pedestrian furniture, heavy street tree canopy, brick streets, on-street parking, and traffic calming devices at intersections. Type I streets are designated for areas of high pedestrian activity. Three new primary pedestrian streets are proposed for downtown, to go along with the four that already exist (see Table 25). Several type II primary pedestrian streets are already designated (see Table 26).

Table 25. Pedestrian Street Designations—Downtown		
Existing Primary Pedestrian Streets: Type 1		
Street	*From*	*To*
Washington St.	James Ave.	North Eola Dr.
Central Blvd.	Rosalind Ave.	Magnolia Ave.
Church St.	Garland Ave.	Orange Ave.
Church St.	Division Ave.	Terry Ave.
Proposed Primary Pedestrian Streets: Type 1		
Osceola Ave.	Lake Eola Park	South St.
Washington St.	½ block west of Orange Ave.	Rosalind Ave.
Park Lake St.	Orange Ave.	Highland Ave.
Source: CRA 2000:11.30a, AAA 2000		

Table 26. Existing Primary Pedestrian Streets: Type II Primary		
Existing Primary Pedestrian Streets: Type II		
Street	*From*	*To*
Central Blvd.	Garland Ave.	Magnolia Ave.
Church St.	Orange Ave.	Magnolia Ave.
Court Ave.	Central Blvd.	Church St.
Jackson St.	Magnolia Ave.	Orange Ave.
Pine St.	Hughey Ave.	Rosalind Ave.
Orange Ave.	East Jefferson St.	Jackson St.
Magnolia Ave.	Jackson St.	Livingston Ave.
Orange Ave.	Gore St.	Lucerne Cir.
Livingston St.	Parramore Ave.	Rosalind Ave.
Church St.	Division Ave.	Garland Ave.
Garland Ave.	Church Street	Central Blvd.
Amelia St.	Parramore Ave.	Magnolia Ave.
Central Blvd.	Parramore Ave.	Garland Ave.
Washington St.	Garland Ave.	Rosalind Ave.
Washington St.	Division Ave.	Garland Ave.
Amelia St.	Orange Ave.	Magnolia Ave.
Court Ave.	Church St.	Central Blvd.
Source: CRA 2000:11.30a, AAA 2000		

Several type II pedestrian streets are proposed within the downtown, the vast majority of which are located in Parramore Heritage (see Table 27). The Uptown and Eola planning districts are also targeted for new pedestrian streets. The proposed pedestrian streets will provide a continuous pedestrian network throughout the CBD.

Table 27. Primary Pedestrian Streets: Type II Proposed		
Proposed Primary Pedestrian Streets: Type I1		
Street	*From*	*To*
Amelia St.	Westmoreland Dr.	Centroplex Parking Garage
Parramore Ave.	Colonial Dr.	Gore St.
Westmoreland Dr.	Amelia St.	South St.
Division Ave.	Robinson St.	South St.
West Washington St.	Garland Ave.	Division Ave.
Magnolia Ave.	Amelia St.	Ivanhoe Blvd.
Orange Ave.	Amelia St.	Northern Boundary of CRA
Rosalind Ave.	Church St.	Livingston Ave.
Robinson St.	Westmoreland Dr.	Hyer Ave.
Central Blvd.	Westmoreland Dr.	Garland Ave.
Central Blvd.	Rosalind Ave.	James Ave.
Parramore Ave.	Colonial Dr.	Gore St.
Westmoreland Dr.	Amelia St.	South St.
Division Ave.	Robinson St.	South St.
West Washington St.	Garland Ave.	Division Ave.

Orange Ave.	East-West Expwy	South St.
Rosalind Ave.	Anderson St.	South St.
South St.	Rosalind Ave.	Magnolia Ave.
Source: CRA 2000:11.30a, AAA 2000		

The Land Development Code also designates several areas as pedestrian malls (see Table 28). These areas are generally located next to office towers.

Table 28. Pedestrian Malls		
Pedestrian Malls		
Barnett Plaza	Sun Bank Plaza	City Commons
DuPont Plaza	Magnolia Plaza	
Orange County Administration Building Plaza		
Wall St., from Orange Ave. to Court Ave.		
Source: OCPB 2000		

Secondary Pedestrian. The main function of these streets is vehicular access and service access to private property. While pedestrian access and connections are secondary on these streets, the quality of the pedestrian experience is still important, even though it is often interrupted by driveway and service drives. (CRA 2000: 11.5) The secondary pedestrian street classification recognizes two types of pedestrian streets: secondary pedestrian, and major thoroughfares (see Table 29 and 30). The primary purpose of these roads is for the movement of automobiles. Secondary pedestrian streets include seven to ten foot wide sidewalks, with street trees, and pedestrian scale street lighting. The proposed major thoroughfares are aimed at creating more pedestrian-friendly environments along major vehicular routes. These streets will feature five- to seven-foot sidewalks, a green buffer with landscaping and trees, and vehicular scale street lighting.

Table 29. Secondary Pedestrian Streets: Type I Existing and Proposed		
Existing Secondary Pedestrian Streets: Type I		
None		
Proposed Secondary Pedestrian Streets: Type I		
Lake Ivanhoe Blvd	From I-4	To Orange Ave
Source: CRA 2000:11.30a, AAA 2000		

Table 30. Proposed Major Thoroughfares		
Proposed Major Thoroughfares		
Street	*From*	*To*
Hughey Ave.	Colonial Dr.	Hughey Place
Garland Ave.	Orange Ave.	South St.
South St.	Hughey Ave.	Summerlin Ave.
Anderson St.	Parramore Ave.	Summerlin Ave.
Colonial Dr.	Westmoreland Dr.	Summerlin Ave.
Source: CRA 2000:11.30a, AAA 2000		

The Downtown Outlook Plan establishes a time frame and financing for most of the transportation projects. The funding cycles are in five-year increments covering the next twenty years. Within the next five years, several improvements to the pedestrian environment are proposed: Orange Ave. and Magnolia Ave. are slated for lane reductions and sidewalk widening in the Uptown neighborhood; within the CBD, Central Blvd. will receive streetscape improvements, the intersection of Robinson St. and Broadway Ave. will receive pedestrian improvements, and the Green Links Streetscape projects are planned for areas throughout the downtown. Within the five to nine year time frame, improvements to Colonial Dr. and the underpasses along I-4 and the East-West Expressway are to be completed. The placement of utilities underground, streetscape improvements, and greenlink streetscape projects will be undertaken throughout the twenty-year time frame of the plan. The schedule and projected funding for the projects in the Downtown Outlook Plan are shown in Appendix B-9.

Highway Portals. The creation of pedestrian and bicycle portals underneath I-4 and the East-West Expressway are important steps towards improvement of the pedestrian environment in downtown. Portals are the underpasses that run under limited access facilities. In the study area, the portals are located along I-4 at Colonial Dr., Concord Ave., Amelia Ave., Livingston Dr., Robinson St., Washington St., Central Blvd., Church St., South St. and the East-West Expressway. Along the East-West Expressway portals are located at Orange Ave., Rosalind Ave., Summerlin Ave., Mills Ave., and Bumby Ave. These limited access facilities have bisected the traditional neighborhoods of the downtown. The Outlook Plan calls for the FDOT to undertake improvements to the portals that are consistent with the vision of a pedestrian- and bicycle-friendly environment that provides a seamless connection between downtown neighborhoods. The following are specific design guidelines developed by the Downtown Outlook Plan to serve as a guide for negotiation with the FDOT:

- The portals should be designed to encourage pedestrian and bicycle connections while eliminating the use of the underpasses as transient and homeless encampments.
- The underpasses should have a clean, angular form incorporating rounded arches and keystones similar to a 1930s public works project.
- The structure should display art that is appropriate with DOT infrastructure—" The Structure as Art."
- Concrete should be finished and stained to resemble limestone.
- The underpasses should have a clean, open design that draws people through to the other side.
- The underpasses should be well lit with overhead lighting and lights mounted on column forms. Lighting should be at a pedestrian scale.
- Bollards or railings should be incorporated into the design, clearly delineating the

pedestrian and vehicular use areas of the underpass and protecting pedestrians and bicyclists.

- The physical form should not create areas for birds to perch under support beams or ledges.
- The physical form should not create areas to harbor transients or allow them to sleep and hide.
- Sidewalks should be wider than on other local streets to emphasize the pedestrian connection. (CRA 2000: 11.20-21)

The Downtown Outlook Plan provides a vision for Orlando's image and function in the future. The projects of the plan are consistent with the city's Growth Management Plan, Land Development Code, Southeast Sector Plan, and the Naval Training Center Plan. The consistent theme throughout all of these plans is that development with the city of Orlando will be based on the principles of sustainability and TND.

METHODOLOGY

Several tasks were completed as a part of this study: (1) review of planning documents; (2) interviews; (3) attendance at meetings concerning the downtown; (4) selection of neighborhoods for study; (5) observations of pedestrians at selected locations; (6) counts of pedestrians; (7) telephone surveys of residents of downtown; and (8) focus groups in selected neighborhoods. City planning documents and other transportation planning documents were reviewed as a part of this project. Interviews were conducted with policy makers and planners involved with or knowledgeable about land use and transportation issues in downtown Orlando. After reviewing the relevant documents and geographic information systems (GIS) data, thirteen neighborhoods adjacent to the downtown were selected for further study. Observations of pedestrians, counts of pedestrians, a telephone survey of downtown residents and workers, and focus group surveys and sessions were conducted in selected locations in these thirteen neighborhoods. A detailed discussion of the methodology used for each of the components of the research is contained in Appendix C. Based upon these eight tasks, research findings are made and recommendations on the implementation of New Urbanist ideas are developed.

RESULTS

The results of the research are presented in a series of themes that explore various aspects of the New Urbanist argument as well as the concerns of their critics. First, the downtown residents who work downtown are profiled and compared to downtown residents who do not work downtown and to available census and other planning data. The reasons why people live downtown are next explored. The relationship between work and home of downtown residents is explored by considering the work location, and the distance, time, and choice of mode to work. The activities of persons who use alternative modes for work are explored next. Other factors, like stops on the way to and from work, are explored. Then, travel in downtown during the daytime is considered through questions on walking in downtown and the use of Lymmo. Finally, non-work activity in the neighborhoods is considered. The results weave together the telephone survey, the focus group discussion and surveys, observations and activity counts, formal

interviews with local government officials, and informal discussion with residents and employees in downtown Orlando.

Profile of Survey Respondents

The population of downtown residents who also work downtown is different from the population of residents of the neighborhood, who work elsewhere or do not work, and both of these groups differ from the population in the downtown neighborhoods in 1990. These populations differ because all of the downtown workers are, by definition, employed, while the downtown residents include a sample of the general population and exclude those who work downtown. The average downtown resident who does not work downtown is older, of lower income, less likely to be married, owns fewer vehicles, and is less likely to have children in the household than the downtown worker who also lives downtown (see Tables 31 and 32). Both groups are comprised of a largely white population with more females than males. Females may be over-represented because women are more likely to answer the telephone than men. Respondents who live and work downtown have significantly higher incomes than the population estimated by Lynx and, even when adjusted for inflation, than the 1990 Census. Over 35% have incomes over $70,000 and over half are between the ages of 30 and 49. Both groups own motor vehicles at higher rates than estimated by Lynx in 1997, with 67.3% and 53.4%, respectively owning two or more vehicles (see Tables 33 and 18). The higher automobile ownership could be related to higher incomes and likely reflects the movement of young professionals and young married couples, with and without children, into the downtown neighborhoods. The survey respondents include a smaller percentage of 18-29 years olds than reported in the 1990 Census. This age group is either underrepresented in the sample or less likely to live downtown because of the high cost of owning or renting housing in the area.

Table 31. Demographic Characteristics of Survey Respondents (Percentage)

	Live and Work Downtown	Not Employed or Work Elsewhere
Sex		
Male	43.3	45.7
Female	56.7	54.3
Household Income		
Below $35,000	3.0	11.7
Over $35,000	17.8	13.6
Under $20,000	3.6	9.7
$20,000-$34,999	7.7	15.6
$35,000-$49,999	16.0	13.6
$50,000-$69,999	14.2	13.6
$70,000 or More	37.9	21.1
Employment Status		
Employed Full-time	92.7	57.1
Employed Part-time	7.8	9.6
Retired	0.0	28.2
Not Employed	0.0	5.1

Age		
18-29 Years	24.4	17.1
30-49 Years	51.8	37.1
50-64 Years	19.8	15.9
65+ Years	4.1	30.0
Race and Hispanic Ancestry		
Black/African American	2.3	2.3
White	92.7	93.1
Asian	1.7	0.0
Other	3.4	4.6
Hispanic Ancestry	4.0	5.2
Marital Status		
Married	42.1	31.0
Single	44.4	41.4
Divorced/Separated	11.8	12.6
Widowed	1.7	14.9
Household Type		
Married, with Children	15.2	8.0
Married, No Children	27.0	23.0
Single Adult with Child(ren)	2.2	3.4
Single Person Household	27.0	36.8
Households with 2+ Adults and No Children	28.7	28.7
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

Table 32. Demographic Characteristics of Survey Respondents (Average)

	Live and Work Downtown	Not Employed or Work Elsewhere
Persons Per Household	2.19	1.98
Children Per Household	.28	.22
Licensed Drivers Per Household**	1.88	1.63
Motor Vehicles Per Household**	1.93	1.61
Employees Per Household***	1.71	1.21
Vehicles per Licensed Driver**	1.02	0.90
Age***	40.1	50.5

Statistics: (T-tests for independent samples comparing downtown workers to downtown residents) *** - $p < .001$, ** - $p < .01$, * - $p < .05$
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 33. Automobile Ownership of Survey Respondents (Percentage)		
	Live and Work Downtown	Not Employed or Work Elsewhere
Households with 0 Motor Vehicles	2.2	13.6
Households with 1 Motor Vehicles	30.2	33.3
Households with 2 Motor Vehicles	45.3	36.7
Households with 3 Motor Vehicles	17.9	12.4
Households with 4+ Motor Vehicles	4.5	4.0
Total	100.1	100.0
Note: Percentages may not total to 100.0 due to rounding. Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

Three neighborhoods, Colonialtown South, Lake Eola Heights and Lawsona/Fern Creek, have over 9% of the respondents to the telephone survey among both residents who live and work downtown, and residents who either don't work or work elsewhere (see Table 34). The central neighborhoods, including Colonialtown South, the CBD, Thornton Park, Lake Eola Heights, and South Eola may have the best coverage of neighborhoods in the sample of telephone numbers because they are the most centrally located of the sample. Respondents to the survey were to identify their neighborhood. Respondents were asked to indicate their neighborhood and their street and cross street. The address information was mapped and compared to the neighborhood, then adjusted accordingly. Overall, about 62% of respondents provided a street coordinate that is consistent with their identified neighborhood. Only about 20% of the residents of Uptown correctly indicate they live there; this result is not surprising because Uptown is often included as a part of the CBD. About 38% of the residents of the CBD correctly identified their neighborhood; many respondents, who have addresses not in the 14 downtown neighborhoods, incorrectly identified the CBD as their neighborhood. Residents of the five neighborhoods in which we completed focus group sessions were most likely to correctly identify their neighborhood. For example, residents of Park Lake Highland correctly identified their neighborhood almost 95% of the time, while residents of the other four focus group neighborhoods correctly identified their neighborhood between 70% and 75% of the time. This higher rate of correct identification likely reflects a greater level of activity by the neighborhood associations that results in residents being more aware of the where they live.

A total of 44 responses were excluded from the analysis based on the home location of the respondents, leaving 357 responses out of 401 completed surveys. All survey respondents who live within approximately two miles of the CBD and east of I-4 were included to account for the arbitrary nature of the neighborhood boundaries. The two-mile radius was established based upon the greatest distance from the CBD to the outer boundary of the thirteen neighborhoods (in this case, Colonialtown North) that were to have constituted the sample. Residents west of I-4 were excluded even if they live within 2 miles of the CBD because the sample excludes these residents. Map A-36 in Appendix A shows the home location of respondents to the survey according to which group they belong: residents who live and work downtown (categorized as work downtown) and residents who do not work or do not work downtown (categorized as live downtown). Respondents who live within 2 miles of the CBD but outside of the downtown neighborhoods are included in the other neighborhoods.

The tables throughout the rest of this section show the responses of the 357 survey respondents. Some tables reflect the responses of the 180 respondents who both live and work in downtown Orlando. Residents of Colonialtown North, Colonialtown South, Lake Eola Heights, Park Lake/Highland and Lake Davis/Greenwood responded to the focus group questionnaire.

Table 34. Home Location of Downtown Respondents to Survey (Percentage)

	Live and Work Downtown	Not Employed or Work Elsewhere
Neighborhood		
Central Business District	3.9	8.5
Park Lake/Highland	5.6	6.2
Colonialtown North	3.3	8.5
Colonialtown South	10.0	12.4
Lake Eola Heights	17.8	10.7
South Eola	3.9	7.3
Thornton Park	8.3	7.3
Lawsona/Fern Creek	9.4	12.4
Lake Copeland	3.3	1.7
Lake Cherokee	7.8	5.6
Lake Davis/Greenwood	7.8	8.5
Lake Weldona	2.2	1.1
Delaney Park	7.2	2.3
Uptown	2.2	1.7
Other Neighborhoods	7.2	5.6
Total	99.9	99.8

Note: Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Reasons for Living Downtown

Residents of downtown neighborhoods chose to live there for a set of related factors, the most important of which do not relate directly to transportation characteristics of the neighborhood (see Tables 35 through 37, and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). Two factors, a safe neighborhood and a neighborhood with character, rank highest among respondents to both surveys; and combined they rate as the most important factor influencing the decision to live in the neighborhood for approximately 60% of respondents to the telephone survey.

The transportation characteristics downtown residents value most highly are living in a walkable and bikeable neighborhood and, for downtown residents who also work downtown, living close to work. This preference for a good walking and bicycling environment does not translate into the desire to walk or bike to work, which is ranked near the bottom in both surveys**.** None of the respondents to the phone survey indicate that living in a neighborhood from which s/he can bike or walk to work is the most important factor influencing the decision to live in the current neighborhood. Another transportation characteristic, location near a bus stop, is consistently ranked low in both surveys. The desire to be close to work is of importance to downtown workers in both surveys, while accessibility to the interstate is more important to workers in locations

other than downtown who responded to the focus group survey (see Table 37). Respondents to the telephone survey were not asked about how they value accessibility to the interstate. These findings are consistent with the expectations; people who live and work downtown are more likely to be interested in being close to their work, while people who work elsewhere may be concerned about accessibility to the interstate. Some participants in the focus groups indicated a preference for living downtown because of the reverse commute, which is facilitated by the proximity of downtown to both I-4 and the East-West Expressway.

Table 35. Factors Affecting Current Neighborhood Choice by Mean Level of Importance

Factors Affecting Current Neighborhood Choice	Mean Level of Importance (Scaled from 1 to 5)	
	Live and Work Downtown	Do Not Work Downtown
Safe Neighborhood	4.79	4.68
Neighborhood with Character*	4.52	4.32
Walkable/Bikeable Environment	4.43	4.31
Close to Work***	4.36	3.16
Quiet Neighborhood	4.35	4.21
Convenient to Shopping	4.13	4.03
I Can Bike or Walk to Work***	3.43	2.60
Neighborhood with Good Schools	3.28	3.15
Near a Bus Stop	2.63	2.81

Statistics: (T-test for independent samples comparing downtown to downtown residents) *** - $p < .001$, ** - $p < .01$, * - $p < .05$
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 36. Most Important Factor Affecting Current Neighborhood Choice (Percentage)

Factors Affecting Current Neighborhood Choice	Percentage Indicating the Factor is Most Important	
	Live and Work Downtown	Do Not Work Downtown
Safe Neighborhood	40.0	39.5
Neighborhood with Character	20.0	22.0
Close to Work	13.9	3.4
Walkable/Bikeable Environment	6.1	9.0
Quiet Neighborhood	6.1	6.2
Convenient to Shopping	6.0	5.6
Neighborhood with Good Schools	1.7	1.7
Near a Bus Stop	1.1	2.8
I Can Bike or Walk to Work	0.0	0.0
Other Reasons	5.0	9.0
Total	99.9	99.2

Note: Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 37. Factors Affecting Current Neighborhood Choice by Mean Level of Importance (Scaled from 1 to 5)			
Factors Affecting Current Neighborhood Choice	Mean Level of Importance	Mean Level of Importance for Downtown Workers	Mean Level of Importance for Workers in other Locations
Safety	4.43	4.43	4.47
Neighborhood With Character	4.38	4.49	4.34
Walkable/Bikeable Environment	4.25	4.13	4.32
Quiet Neighborhood	4.15	4.20	4.19
Convenience to Shopping and Services*	4.04	3.82	4.18
Accessibility to Interstate**	3.56	3.18	3.78
Close to Work***	3.49	4.09	3.14
Neighborhood Schools	2.58	2.62	2.49
Walk or Bike to Work**	2.27	2.80	2.01
Near Bus Stop	2.14	1.91	2.27
Statistics: (T-test for independent samples comparing downtown workers to persons who do not work or work elsewhere) *** - p < .001, ** - p < .01, * - p < .05 Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaires			

Work Location

Among respondents to the telephone survey approximately 6% (200 out of 1,498 households contacted) indicate they work downtown. The actual percentage may be higher because downtown workers may be over-represented among the non-respondents. Among respondents to the focus group survey, approximately 28% work downtown (see Table 39 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). When the work location is adjusted to account for the respondents who are not working or who are retired, approximately 38% of respondents work downtown. Downtown workers may be over-represented in the focus group survey because they may have more spare time or be more willing to attend neighborhood meetings than residents who commute longer distances. The percentage of downtown workers among telephone survey respondents is roughly consistent with the 1995 survey of downtown workers in which 22% lived within 5 miles of downtown (DOTMA 1995: 9). When the survey is scaled down from a 5-mile range to the one to two mile range of the telephone survey, the 6% is a reasonable rate.

Furthermore, the responses to both surveys show a trend among downtown residents to live there because of the reverse commute to employment in all directions within the region (see Tables 38 and 39). In particular, just over 40% of workers in both surveys work either north or south of downtown in locations to which workers would commute along the congested I-4 corridor or nearby major arterials.

Table 38. Work Location of Downtown Residents Who Do Not Work Downtown (Number and Percentage)		
Work Location	Number	Percent
Downtown Orlando*	0	0.0

Near Downtown	16	9.0
South of Downtown	43	24.3
East of Downtown	11	6.2
North of Downtown	28	15.8
West of Downtown	4	2.3
Other	6	3.4
Not Working/Retired	66	37.3
Non-responses	3	1.7
Total	177	100.0

Note: Percentages may not total to 100.0 due to rounding. * - By definition these respondents do not work downtown.
Source: Travel in Traditional Orlando Telephone Survey

Table 39. Work Location of Respondents to Focus Group Survey (Number and Percentage)

Work Location	Number	Percent
Downtown Orlando	46	33.6
Theme Park	13	9.5
Orlando International Airport	6	4.4
International Dr. Area	14	10.2
UCF/ East Orlando	4	2.9
North of Downtown Orlando	18	13.1
West of Downtown	4	2.9
Retired/Not Working	16	11.7
Near Downtown	7	5.1
Other Locations	9	6.6
Total	137	100.0

Note: Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaire

Distance and Time to Work

Among respondents to the telephone survey, almost 36% live within one mile of where they work (see Table 40). This represents the population from which most walkers are drawn. The walkers are dispersed throughout the downtown neighborhoods with a concentration in the CBD and Lake Eola Heights (see Map A-37 in Appendix A). The number of walkers in the southern neighborhoods represents a higher percentage of respondents than in the 1990 Census (see Table 17). Thirteen percent indicate they travel greater than 6 miles to work; these respondents either chain trips or they define downtown employment differently than the definition used in the research. The average travel time for downtown workers who responded to the telephone survey is about 11 minutes for the journey to work (see Table 41). The time it takes to get to and from work varies depending upon the mode used, as is shown by the results from the focus group survey (See Table 42 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire).

Table 40. Distance to Work Among Residents Who Live and Work Downtown (Number and Percentage)

Distance	Number	Percent
One Mile or Less	65	36.5
Greater than One Mile to Three Miles	64	36.0
Greater than Three Miles to Six Miles	33	18.5
Greater than Six Miles	16	9.0
Total	178	100.0
Mean	3.09	
Mode	1.0	

Note: Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 41. Travel Time To and From Work for Residents Who Live and Work Downtown (Number and Percentage)

Travel Time	Home to Work		Work to Home	
	Number	Percent	Number	Percent
Less than 5 Minutes	21	11.7	21	11.7
At Least 5 to Less Than 10 Minutes	64	35.8	61	34.1
At Least 10 to Less than 15 Minutes	49	27.4	42	23.5
At Least 15 to Less than 20 Minutes	25	14.0	26	14.5
At Least 20 to Less than 29 Minutes	13	7.3	20	11.2
30 or More Minutes	7	3.9	9	5.0
Total	179	100.1	179	100.0
Mean (in minutes)	10.92		11.63	
Mode (in minutes)	10.00		10.00	

Note: Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 42. Mean Travel Distance, Mean Travel Time, and Mode Choice for Two Most Frequently Used Modes for Downtown Residents

Mode	Distance (Miles)	Time (Minutes)	1st Most Frequently Used Mode		2nd Most Frequently Used Mode	
			Number	Percent	Number	Percent
From Home to Work						
Drive	8.5	18.7	104	95.4	4	28.6
Walk	1.8	9.2	3	2.8	8	57.1
Bike	4.3	25.0	2	1.8	2	14.3
All Modes	8.2	17.7	109	100.0	14	100.0
From Work to Home						
Drive	8.3	21.8	105	98.1	2	15.4
Walk	1.7	13.4	2	1.9	9	69.2
Bike	5.3	37.5	0	0.0	2	15.4
Total	8.2	21.3	107	100.0	13	100.0

Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaire

About three quarters of respondents to the telephone survey work five days per week (see Table 43). Most of the downtown workers begin their workday between 7:00 and 9:00 am (see Table 44). These hours are fairly typical for downtown employees and are consistent with Orlando's peak period of 7:00 to 9:00 am, which is later than some urban areas where the peak is from 6:00 to 8:00 am. The ending time for work is a bit more dispersed than the start time, reflecting longer working hours for some employees. The afternoon peak in Orlando is from 4:00 to 6:00 pm even though almost a quarter of downtown employees end their workday between 6 pm and 7 pm. An explanation for this may be that they are adjusting their work hours to avoid traveling during the peak.

Table 43. Number of Days Worked Per Week by Respondents Who Work Downtown (Number and Percentage)

	Number	Percent
One	0	0.0
Two	2	1.1
Three	9	5.0
Four	11	6.1
Five	136	75.6
Six	11	6.1
Seven	11	6.1
Total	180	100.0

Note: Includes only respondents who live and work in downtown Orlando.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 44. Time at Which Respondents Who Work Downtown Begin and End Work (Number and Percentage)

	Number	Percent
Begin Work		
12:00 am – 5:59 am	5	2.8
6:00 am – 6:59 am	10	5.6
7:00 am – 7:59 am	32	18.0
8:00 am – 8:59 am	83	46.6
9:00 am – 9:59 am	28	15.7
10:00 am – 3:59 pm	15	8.4
4:00 pm – 11:59 pm	5	2.8
Total	178	99.9
End Work		
12:00 pm – 3:59 pm	18	10.1
4:00 pm – 4:59 pm	29	16.2
5:00 pm – 5:59 pm	53	29.6
6:00 pm – 6:59 pm	47	26.3
7:00 pm – 9:59 pm	16	8.9
10:00 pm – 11:59 pm	6	3.3
12:00 am – 11:59 am	10	5.6
Total	179	100.0

Note: Includes only respondents who live and work in downtown Orlando. Percentages may not total to 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Mode Choice to Work

Downtown workers show a great diversity of mode choices to work. While almost nine out of ten downtown workers used their automobile to get to work more than 10 times in the last year (see Table 45), 25% walked more than 10 times during the year. Respondents who live and work downtown show a diversity of travel choices with over a third indicating that they use more that one mode of transportation at least ten times within the last year (see Table 46). Among all respondents, almost 60% use their single occupant vehicle as the only means of getting to work, and a total of about 65% use an automobile either as the only occupant or as a member of a carpool (see Table 47).

Table 45. Mode Choice of Respondents Who Work Downtown (All Modes Specified)

	Number	Percent
Walk	45	25.0
Lymmo	10	5.6
Lynx	8	4.4
Carpool	20	11.1
Motorcycle/moped	3	1.7
Single Occupant in Private Automobile	161	89.4
Bicycle	24	13.3
Total Respondents	180	

Note: Includes only respondents who live and work in downtown Orlando. Percentages may not total 100.0 due to multiple responses.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 46. Number of Modes of Travel Used by Respondents Who Work Downtown (Number and Percentage)

	Number	Percent
One	121	67.2
Two	36	20.0
Three	17	9.4
Four	3	1.7
Five	3	1.7
Total	180	100.0

Note: Includes only respondents who live and work in downtown Orlando. Percentage may not total 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 47. Mode Choice of Respondents Who Work Downtown by Single Mode vs. Multiple Modes

	Number	Percentage
Single Mode		
Single Occupant in Private Auto	107	59.4
Walk	3	1.7
Bike	1	0.6
Carpool	5	2.8
Lynx	2	1.1
Lymmo	1	0.6

Motorcycle/moped	2	1.1
Total Using Single Mode	121	67.2
Multiple Modes		
Auto and Walk	18	10.0
Auto and Bike	7	3.8
Auto and Carpool	5	2.8
Auto and Lymmo	3	1.7
Walk and Carpool	2	1.1
Walk and Bike	1	0.6
Auto, Walk and Bike	10	5.6
Auto, Walk and Carpool	2	1.1
Auto, Walk and Lymmo	1	0.6
Auto, Bike and Carpool	1	0.6
Auto, Lymmo and Carpool	1	0.6
Walk, Lymmo and Lynx	1	0.6
Walk, Lynx and Carpool	1	0.6
Auto, Walk, Bike and Lymmo	1	0.6
Auto, Walk, Bike and Lynx	1	0.6
Auto, Walk, Carpool and Lynx	1	0.6
Auto, Walk, Bike, Carpool and Lymmo	1	0.6
Auto, Walk, Bike, Carpool and Lynx	1	0.6
Auto, Walk, Lymmo, Lynx and Motorcycle/Moped	1	0.6
Total Using Multiple Modes	59	32.8
Total Respondents	180	100.0
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

Approximately 6% of respondents use only alternative modes of transportation. However, walkers are over-represented among respondents likely to use multiple modes to get to work with 42 out of 59, or 71%, combining walking with other modes. Forty-two out of 45 walkers, or 93%, combine walking with other modes. The two most common combinations are walking and driving alone with 10%, and walking, driving, and biking with 5.6% of residents who live and work downtown combining these modes (see Table 47).

A question was added to the survey after several dozen surveys had been completed in which users of multiple modes were asked which mode they considered to be their primary mode of transportation (see Table 48). Only 21 out of 59 of the users of multiple modes responded to this question. The responses are consistent with mode choices as indicated above. The automobile dominates, with about 81% indicating single occupant vehicle or carpool as their primary mode. Another 9.5% consider walking their primary mode. The two respondents who indicate automobile or bicycle as their primary mode were not willing to make a choice of a single mode.

Table 48. Primary Mode Used by Respondents Who Use Multiple Modes		
Mode	Number	Percentage
Walk	2	9.5
Carpool	1	4.8
Single Occupant in Automobile	16	76.2
Automobile or Bicycle	2	9.5
Total	21	100.0
Note: Only 21 of 59 users of multi-modes responded to this question. Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

Establishing an estimate of the preference among users of multiple modes, and ultimately the mode split for work, of residents who live and work downtown can be difficult because of the small size of the sample, however, two different estimates can be derived based upon the information in the survey. Using the estimates of 80.9% to 85.7% for users of multiple modes who prefer to use the automobile as the sole occupant or as part of a carpool (see Table 48; the two respondents who refused to choose between automobile and bicycle split evenly into the two categories) between 87.8% and 89.4% of those respondents use the automobile as their preferred mode of transportation for work (see Table 49). The other 10% to 12% use an alternative mode as their primary mode of transportation. Using the 1.7% from the larger sample who walk as their sole mode of transportation, plus the 9.5%, which is based upon a small sample, the estimated percentage of walkers to downtown Orlando from adjacent neighborhoods is between 4% and 12%. The percentage is likely not as high as 12% because at least 1 respondent chose bicycling and driving over walking when given a choice. The percentage of walkers is likely higher than 4 % because walking is the second most frequently chosen mode and a minimum of 11% use alternative modes. Furthermore, a third of the respondents who both walk and drive prefer to walk. Based upon this choice between auto and walk, the percentage who walks is at least 5%. A second analysis similar to that shown in Table 49 was conducted using the 65 residents who live within one mile of their place of employment (see Table 50) since the usual range for walking is within one mile or less. Based upon this analysis, an estimated 9.2% of the downtown residents who work within one mile of their work walk there. Given these two estimates, the total percentage of walkers to downtown employment is comparable to the 5.4% who indicate walking as their usual mode of transportation in the 1990 Census (see Table 17) and the almost 12% of residents of the CBD who walked to work in 1990. The rate of walking to work is also comparatively high when we consider the higher income and higher rate of automobile ownership among the respondents to the survey than the respondents to the 1990 Census.

Table 49. Calculation of Percentage of Residents Who Live and Work Downtown Who Also Prefer to Use the Automobile and Walking for the Work Trip		
	Number Used in Calculation	Percentage of Respondents
User of Automobile		
User of Single Mode Who Use Single Occupant in Automobile	107	59.4
Users of Single Mode Who Use Carpool	5	2.8

Users of Multiple Modes Who Use Automobile or Carpool*	57	
Percentage Who Prefer Single Occupant Automobile or Carpool among Users of Multiple Modes (range)	80.9-85.7	
Estimate of Multiple Users Who Prefer Automobile as Primary Mode (57 * .809/.857)	46/49	25.6-27.2
Estimate of Users of Automobile as Primary Mode for Work Trips	158-161	87.8-89.4
Walker		
User of Single Mode Who Walk	3	1.7
Users of Multiple Modes Who Walk	42	
Percentage Who Prefer Walking among Users of Multiple Modes	9.5	
Estimate of Total Walk as Primary Mode (57 * .809)	4	2.2
Estimate of Walking as Primary Mode for Work Trips	7	3.8

Note: Only 21 of 59 users of multi-modes responded to this question. Percentages are out of 180 valid responses to survey who live and work in Downtown Orlando.
* - This excludes respondents who combine the alternative modes: walking and biking, and walk, Lymmo or Lynx.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 50. Estimate of Mode Split for Downtown Residents Who Live Within One Mile of Their Place o Employment (Percentage)

	Number	Percentage
Users of Automobile as Primary Mode		
Users of Automobile or Carpool	35	53.8
Users of Automobile as Primary Mode Among Multiple Modes (Estimate)	19	29.2
Automobile Users	54	83.0
Users of Alternatives as Primary Mode		0.0
Walking as Primary Mode	3	4.6
Other Alternative as Primary Mode	3	4.6
Users of Walking as Primary Mode Among Multiple Modes (Estimate)	3	4.6
Users of Other Alternative Mode as Primary Mode Among Multiple Modes (Estimate)	2	3.0
Users of Alternative Modes	11	16.8
Total	65	99.8

Note: Responses include 65 respondents who work within one mile of place of residence.
Percentage may not total to 100 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

The majority of respondents to the focus group survey indicate they drive to work, with almost 98% indicating this as their dominant mode (see Table 42 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). Among respondents, about 10% specify a second mode choice to and

from work. About 8% indicate they walk to work either as their first or second choice of modes. This question was asked in an open-ended format; so presumably, the respondents could have indicated usage of carpool or other modes to work. These responses likely reflect the modes that respondents use most frequently.

The research attempted to identify how individuals chose between walking and other modes. However, because of the small number of walkers, it is difficult to generalize about their behavior. Persons who indicated they used more than one mode of transportation to work were asked if the mode they used changed by the day of the week and the summer and winter. If a respondent indicated they changed their travel behavior by the day of the week or the season of the year, they were then asked to indicate which day or season they use a specific mode of transportation. Only 6 out of the 59 respondents who use multiple modes, 3 of whom walk, indicate a change in mode based upon the day of the week. Twenty out of the 59 users of multiple modes, 15 of whom walk, indicate that they use different modes in summer and winter. Five of these 15 walk in winter, 3 walk in both summer and winter and 6 walk only in summer. Although it is difficult to generalize from such a small sample, this result is contrary to what was expected based upon interviews and focus group discussion; fewer people walk during the summer because of the heat. Ridership on Lymmo is also higher in summer; this increased ridership is attributed to a substitution of Lymmo usage for walking in the downtown.

Characteristics of Walkers

Walkers are of higher income, with only about 12% earning under $35,000 year compared to almost 19% of non-walkers (see Table 51). While the average age is not significantly different, walkers are less likely to be under 30 or over 49. Walkers are equally likely to be married, but more likely to be widowed, separated, or divorced. Their dominant household type is a single person household. They have significantly fewer motor vehicles per household, with the highest percentage having one vehicle per household compared to two vehicles for non-walkers (see Tables 52 and 53). They also have a significantly lower ratio of vehicles per licensed drivers.

Table 51. Demographic Characteristics of Walkers and Non-Walkers (Percentage)

	Walkers	Non-Walkers
Sex		
Male	46.7	42.2
Female	53.3	57.8
Household Income		
Below $35,000	7.0	1.6
Over $35,000	14.0	19.0
Under $20,000	7.0	2.4
$20,000-$34,999	4.7	8.7
$35,000-$49,999	18.6	15.1
$50,000-$69,999	18.6	12.7
$70,000 or More	30.2	40.5
Employment Status		
Employed Full-time	95.5	91.1
Employed Part-time	4.5	8.9

Age		
18-29 Years	19.0	26.2
30-49 Years	59.6	49.2
50-64 Years	14.3	21.5
65+ Years	7.1	3.1
Race and Hispanic Ancestry		
Black/African American	0.0	3.0
White	90.9	93.2
Asian	6.8	0.0
Other	2.3	3.8
Hispanic Ancestry	4.5	3.8
Marital Status		
Married	40.9	42.5
Single	38.6	46.3
Divorced/Separated	15.9	10.4
Widowed	4.5	0.7
Household Type		
Married, with Children	13.6	15.7
Married, No Children	27.3	26.9
Single Adult with Child(ren)	0.0	3.0
Single Person Household	40.9	22.4
Households with 2+ Adults and No Children	18.2	32.1
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

Table 52. Demographic Characteristics of Walkers and Non-Walkers (Average)

Characteristics	Walkers	Non-Walkers
Persons Per Household	1.93	2.27
Children Per Household	.18	.31
Licensed Drivers Per Household	1.70	1.94
Motor Vehicles Per Household**	1.64	2.03
Employees Per Household	1.66	1.72
Vehicles Per Licensed Driver*	0.94	1.04
Age	41.0	39.8

Statistics: (T-test for independent samples comparing walkers to non-walkers) *** - $p < .001$, ** - $p < .01$, * - $p < .05$
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 53. Automobile Ownership of Walkers and Non-Walkers (Percentage)

Number of Autos	Walkers	Non-Walkers
Households with 0 Motor Vehicles	4.5	1.5
Households with 1 Motor Vehicles	45.5	25.2
Households with 2 Motor Vehicles	36.4	48.1
Households with 3 Motor Vehicles	11.4	20.0
Households with 4+ Motor Vehicles	2.3	5.1
Total	100.1	99.9

Note: Percentages may not total 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

The most important factor in mode choice to work is convenience, especially among respondents who do not walk (see Table 54). Convenience has the highest overall average response and the highest percentage of respondents who consider it to be the most important factor influencing their mode of transportation. Convenience is significantly more important among non-walkers than walkers, and travel time is the second most important factor for non-walkers. In contrast, about a third of walkers consider convenience as the most important factor in mode choice, and a quarter of walkers cite the need for an automobile for work or errands. Walkers are significantly more likely to consider exercise or lifestyle as an important factor than non-walkers. Although a significantly higher percentage of walkers than non-walkers consider the cost of commuting to be less important, a higher percentage consider the cost of commuting to be the most important factor affecting their mode choice.

Table 54. Factors that Influence Mode of Transportation to Work (Average; "1" is Unimportant, "3" is Very Important)

	Walkers		Non-Walkers	
Factors	Average	Most Important (%)	Average	Most Important (%)
Convenience**	2.60	33.3	2.84	56.3
Safety	2.40	11.1	2.54	8.9
Travel Time	2.38	6.7	2.47	11.1
Need Car for Work Requirements or Errands	2.16	24.4	2.38	9.6
Exercise or Lifestyle**	2.18	11.1	1.75	1.5
Guaranteed Way Home***	2.13	0.0	2.64	3.0
Availability of Parking (available or not available)	1.93	2.2	2.09	1.5
Dress Code at Work	1.71	2.2	1.67	1.5
Cost of Commuting*	1.53	2.2	1.88	0.7
Other		6.7		3.0
Total		99.9		97.1

Note: Percentages may not total to 100 due to non-responses.
Statistics: (T-test for independent samples comparing average rating between walkers to non-walkers)
*** - $p < .001$, ** - $p < .01$, * - $p < .05$
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

When downtown workers are asked about what factors would change their travel choices, a majority agree that most of the options offered in the survey are not important to them (see Table 55). Walkers rank each of the choices slightly higher. Only sidewalks for walkers, with an average of 2.2 out of 3, ranks above being somewhat important and are significantly more important to walkers than non-walkers. To the extent that the people who indicate that improved sidewalks are an important factor in their travel choice already walk, this response suggests that better sidewalks might increase the frequency with which they choose to walk or it may make their walk more pleasant. Overall, these results may suggest that most respondents are satisfied with their current travel choices; those who drive enjoy driving and may not consider other alternatives while those who walk can enjoy the diversity of travel choices the downtown offers.

Table 55. Importance of Factors in Changing Travel Choices by Mode Choice to Work for Respondents Who Work Downtown (Average; "1" is Unimportant, "3" is Very Important)		
Factors	Walkers	Non-Walkers
Increased Sidewalks***	2.22	1.60
Increased Bike Lanes	1.91	1.67
Increased Parking Costs	1.77	1.68
Public Transit Closer to Home	1.67	1.62
Lymmo Closer to Home	1.73	1.64
Employer Sponsored Carpool	1.37	1.33
Statistics: (T-test for independent samples comparing walkers and non-walkers) *** - p < .001, ** - p < .01, * - p < .05 Source: Travel in Traditional Orlando Neighborhoods Telephone Survey		

The level of pedestrian activity in the downtown was measured by taking traffic counts on a sunny day in March (see Tables D-2A through D-2E in Appendix D for summary of activity). The day in which the counts were taken would be an optimal time for someone to walk to work almost anywhere. Because downtown Orlando has a dispersed pattern of pedestrian activity, the counts do not show a high level of walking as would be expected in a downtown. The highest levels of activity for a 10-minute period were 52 pedestrians at Rosalind Ave. and Central Blvd., and 48 pedestrians at Rosalind Ave. and Robinson St. during the afternoon peak (see Table D-2A). The four intersections at which counts were taken, which are located along a major dividing line between downtown and the residential neighborhoods to the east, averaged between 3.64 and 21.33 pedestrians during the morning peak from 7:00 to 9:00 am, and between 3.73 and 25.83 during the afternoon peak from 4:00 to 6:00 pm. The level of pedestrian activity increases during the morning peak hour beginning at about 7:40 and continues at a high level throughout the day. In contrast, the pedestrian traffic was steady throughout the afternoon commute.

Other Factors Influencing Mode Choice for Work Trips

The number and types of stops workers makes on their way to and from work may influence the choice of mode. To understand this behavior, downtown employees were asked how many times they stopped for specific reasons within the previous month. Downtown workers make more stops on the way home from work, with 85% doing so in the preceding month, than on the way to work, with 62% making stops (see Table 56). Over half of downtown workers made stops on the way home from work at the grocery store, the retail store, or for personal services and errands. The mean number of stops for the shopping and personal services in the afternoon is higher than on the way to work. The mean number of stops for picking up and dropping off children is the highest because parents with childcare responsibilities make the stops on an almost daily basis, while all other stops are made on a less regular basis. The number of stops made by walkers is not significantly different from non-walkers except walkers are, not surprisingly, less likely to stop for gas on the way home from work.

Table 56. Number of Stops Made on the Way To and From Work During Previous Month by Respondents Who Live and Work Downtown			
Type of Stop	Making One or More Stops (%)	Mean for All Workers	Mean for Respondents Making Stops
Stops on Way To Work			
At Gas Station	39.0	1.52	3.90
For Personal Errands/Services	32.4	1.85	5.70
Picked Up or Dropped Off Children	25.0	3.94	15.78
Held a Business Meeting	22.6	1.14	5.05
At a Restaurant or for Fast Food	19.4	1.43	7.35
At a Grocery Store	12.6	0.43	3.41
At a Retail Store or Did Other Shopping	6.9	0.19	2.83
Total-All Stops	61.7	7.87	12.76
Stops on Way From Work			
For Personal Errands/Services	69.3	5.52	7.97
At a Grocery Store	63.8	3.93	6.11
At Gas Station	50.6	1.64	3.24
At a Retail Store or Did Other Shopping	46.9	2.20	4.70
At a Restaurant or for Fast Food	42.5	3.13	7.36
Picked Up or Dropped Off Children	26.7	4.81	18.05
Held a Business Meeting	18.8	1.18	6.26
Totals – All Stops	85.0	18.64	22.08
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey			

Respondents to the focus group survey had similar responses to the types of stops made to and from work (see Table 57 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). Respondents are most likely to make stops for retail shopping and, where applicable, taking children to child care or school. Like the telephone survey, respondents with responsibility for taking children to and from school constitute a small percentage of the respondents but make these stops more frequently.

Table 57. Frequency of Stops Made on Way To or From Work (Percentage)							
Type of Stop	Never	1-3 Times Per Month	1-2 Times Per Week	3-4 Times Per Week	5-6 Times Per Week	Every Day	Total
Gas Station	9.2	45.4	41.2	2.5	1.7	0.0	100.0
Grocery Shopping	10.8	30.8	43.3	8.3	4.2	2.5	99.9
Retail Shopping	12.8	48.7	23.9	1.7	12.0	0.9	100.0
Restaurant/Fast Food	12.9	33.6	24.1	22.4	5.2	1.7	99.9
Bank	16.1	42.4	38.1	1.7	1.7	0.0	100.0
Doctor/Dentist Office	25.4	70.2	3.5	0.9	0.0	0.0	100.0
Dry Cleaners	41.4	39.7	19.0	0.0	0.0	0.0	100.1

Business Meeting	43.6	35.9	12.9	4.3	2.6	0.9	100.2
Fitness Center/Gym	55.6	9.4	14.5	12.8	5.1	2.6	100.0
Place of Worship	58.6	20.7	18.9	1.8	0.0	0.0	100.0
Kids to School	80.9	3.6	0.9	2.7	6.4	5.5	100.0
Child Care	91.8	0.9	0.9	1.8	1.8	2.7	99.9

Note: Percentages may not total 100.0 due to rounding.
Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaire

Pedestrians were counted in the neighborhoods near the downtown (see Table 58), in Lake Eola Heights, South Eola, and Thornton Park during one afternoon commute period. The highest count of pedestrians was recorded at Summerlin Ave. and Washington St., which is the location of the highly successful Thornton Park shopping district. Residents of Lake Davis, Colonialtown South, Park Lake/Highland and Lake Eola Heights, spoke about walking to this shopping district during the focus group session.

Table 58. Pedestrian and Bicycle Counts at Main Intersections in Thornton Park and Lake Eola (Number and Average for PM Peak)

Intersection		5:00 -5:10 pm	5:10 -5:20 pm	5:20-5:30 pm	Total	Average/ Per 10 min
Central Blvd. & Eola Dr.	Pedestrians	9	3	1	13	4.3
	Bicyclists	3	4	1	8	2.7
Central Blvd. & Summerlin Ave.	Pedestrians	6	8	2	16	5.3
	Bicyclists	2	3	4	9	3.0
Summerlin Ave. & Washington St.	Pedestrians	28	24	18	70	23.3
	Bicyclists	6	1	0	7	2.3
Summerlin Ave. & Robinson St.	Pedestrians	3	7	5	15	5.0
	Bicyclists	2	0	1	3	1.0
Summerlin Ave. & Livingston St	Pedestrians	2	5	4	11	3.7
	Bicyclists	1	1	2	4	1.3
Livingston St. & Broadway Ave.	Pedestrians	13	9	1	23	7.7
	Bicyclists	3	2	0	5	1.7
Broadway Ave. & Robinson St.	Pedestrians	4	1	5	10	3.3
	Bicyclists	2	1	0	1	3

Source: Travel in Traditional Neighborhoods Pedestrian and Bicycle Counts, 3/30/00

Travel in Downtown During the Daytime

The project team theorized, based upon observations during the morning peak, mid-day and evening peak, that Lymmo was a major mode of transportation for downtown workers during the daytime. While downtown workers might drive to work, they would park their car once and then get around downtown with Lymmo (see Table 22). This theory was bolstered by other factors in the research. Lymmo has shown dramatic increases in ridership, with almost twice as many passengers as predicted. The ridership on Lymmo is higher in summer than in winter (Stults 2000). Based upon this evidence, the project team completed counts on Lymmo during the lunch hour on the days that counts were made at intersections along Rosalind Ave. during the morning and evening peak. These counts suggest a high level of usage of Lymmo, in particular along Magnolia Ave. The stations with high levels of activity include the Central Garage, Orange Ave. at

Church St. (which is the main station in the system) and Livingston St. and Magnolia Ave., at the Orange County Courthouse (see Appendix D-3).

The responses to the telephone survey were not as overwhelmingly supportive of the use of Lymmo as ridership and discussions in the focus group suggested. Only about 13% of downtown employees indicate that they used Lymmo in the month preceding the survey, with the most respondents using it for errands or for other personal services (see Table 59). While the rates of usage between walkers and non-walkers appear to differ, none of the differences are statistically significant because of the small sample size.

Table 59. Average Number of Times Using Lymmo During the Past Month by Purpose by Mode Choice to Work

Purpose	Walk to Work Downtown	Do Not Walk to Work Downtown	Respondents Who Live and Work Downtown
To get to or from a parking lot or garage to where you work	0.00	0.02	0.02
To Run a Personal Errand or Go for other Services	0.91	0.26	0.42
To Get to or From a Carpool Drop-off or Bus Station/Stop	0.09	0.01	0.03
To Attend a Business Meeting	0.42	0.44	0.44
To Do Shopping	0.45	0.02	0.13
To Get Something to Eat at a Restaurant	0.47	0.21	0.27
Percentage of Respondents Using Lymmo in Previous Month	17.8	11.1	12.8

Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

A significantly higher percentage of residents who live and work downtown indicate that they walked during the daytime, with 57% doing so in the previous month, compared to those who use Lymmo, at 18% (see Table 59 and 60). While Lymmo has frequent service, it still serves only a fixed route in downtown. In contrast, downtown pedestrians can walk easily from one location to another and to a greater variety of destinations. A common reason for walking is to get from the parking garage to the place of employment, which surprisingly does not differ much between those who walk to work downtown and those who do not. The high rate of walking from the parking lot to the office among respondents who indicate that they sometimes walk to work supports the conclusion that most of the respondents who combine walking with other modes drive much of the time (see Tables 48 through 50). Almost three quarters of respondents who walked to work also walked in the downtown during the work day during the previous month, compared to just over half of those who did not walk to work. Those who walk to work are significantly more likely to walk to do shopping or to get something to eat during their walks in the downtown than their neighbors who do not walk to work.

Table 60. Average Number of Times Walking in Downtown During the Past Month by Purpose by Mode Choice to Work			
Purpose	Walk to Work Downtown	Do Not Walk to Work Downtown	Respondents Who Live and Work Downtown
To get to or from a parking lot or garage to where you work	5.55	5.21	5.30
To Run a Personal Errand or Go for other Services	3.40	2.36	2.61
To Get to or From a Carpool Drop-off or Bus Station/Stop	0.60	0.15	0.26
To Attend a Business Meeting	1.58	0.87	1.04
To Do Shopping**	2.00	0.33	0.74
To Get Something to Eat at a Restaurant**	6.67	3.56	4.34
Percentage Walking in Downtown in Previous Month	73.3	51.1	56.7
Statistics: (T-test for independent samples comparing walkers to non-walkers) ***- p < .001, ** - p < .01, * - p < ..05 Source: Travel in Traditional Orlando Neighborhoods Telephone Survey			

Cordon counts were taken in two locations in the downtown to understand the extent to which persons dressed in business attire, as opposed to more casual, tourist or athletic attire were walking during various times of the day (see Table D-2F through D-2H). In Lake Eola the level of activity increases in the park as the day progresses, but the number of persons in business attire is relatively low during the afternoon commute period compared to the period between 11:45 am and 1:00 pm. At Church St. Station the number of persons in business attire is much higher compared to tourists and more casually dressed persons. This suggests the role of Church St. as a destination for lunch instead of a place for getting exercise like Lake Eola. The level of activity in Church Street Station was higher during the midday period, from approximately 11:00 am to 1:00 pm – than on the streets leading into downtown during the morning peak periods – with an average of 81.4 pedestrians per 10-minute period, and a peak of 113 pedestrians. This level of pedestrian activity is higher than the 10-minute counts at one location, and comparable to two other locations in downtown San Francisco (Jacobs 1993: 316-317).

Travel to Non-Work Destinations in Downtown Neighborhoods

While evidence suggests that a small percentage of downtown residents who live and work in downtown walk to work, other evidence suggests that downtown residents walk in higher percentages to certain destinations within their neighborhoods. Respondents to both surveys were asked about their mode choice to five specific destinations within the neighborhood: the grocery store, retail shopping center, park and recreation area, convenience store, and schools (see Tables 60 and 61 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). Residents, irrespective of where they work, indicate walking as the dominant mode to the park and recreation area, and a major mode to the convenience store. Among respondents to the focus group questionnaire, who were allowed to list multiple modes, over 40% indicate they also walk their child to school. Only a small

percentage of the respondents to both surveys were willing to walk to the grocery store or the retail shopping center, which are located an average distance of 1.4 and 2.8 miles, respectively, from home for respondents to the focus group survey. These results are consistent with studies in the San Francisco Bay area, wherein residents were less likely to walk if they were grocery shopping than if they were stopping for a small number of items, or convenience shopping and services (Steiner 1996).

Table 61. Mode of Transportation Used Most Often to Neighborhood Destinations (Percentage)

Destination	Walk	Bicycle	Lynx	Motorcycle	Automobile	Lymmo
Live Downtown But Do Not Work Downtown						
Grocery Store	2.9	1.1	4.0	0.6	90.3	0.6
Retail Shopping Center	3.5	0.6	4.0	0.6	90.2	0.6
Park or Recreation Area	63.5	3.4	0.7	0.7	31.1	0.0
Convenience Store	34.5	2.7	1.4	1.4	59.5	0.7
Child's School	21.1	0.0	10.5	0.0	68.4	0.0
Live and Work Downtown						
Grocery Store	2.8	0.0	1.7	0.0	95.0	0.0
Retail Shopping Center	1.7	1.1	1.7	0.0	95.5	0.0
Park or Recreation Area	65.7	2.4	0.0	0.0	31.9	0.0
Convenience Store	30.9	0.6	0.0	0.0	68.7	0.0
Child's School	9.4	0.0	0.0	0.0	90.6	0.0

Note: For residents, 0.6% use carpool to the grocery store, and the retail shopping center, 0.7% for trips to the park or recreation area. School trips are a carpool for at least one direction of the trip even though respondents indicate that they drive.
Source: Travel in Traditional Orlando Neighborhoods Telephone Survey

Table 62. Mean Travel Distance, Mean Travel Time, and Frequency of Mode Choice to Neighborhood Destinations

Mode	Number	Percent	Mean Distance (Miles)	Mean Time (Minutes)
Grocery Store				
Drive	131	95.6	1.4	5.9
Walk	18	13.1	0.8	6.9
Bike	10	7.2	1.5	6.5
All Responses	137		1.4	6.1
Retail Shopping Center				
Drive	126	97.6	2.5	9.3
Walk	5	3.9	1.0	13.0
Bike	4	3.1	3.5	12.5
All Responses	129		2.8	9.5
Park or Recreation Area				
Drive	40	32.3	2.4	7.0
Walk	89	71.8	0.5	5.8
Bike	11	8.9	1.0	6.8
All Responses	124		1.1	6.2

Convenience Store				
Drive	75	59.5	0.9	4.1
Walk	62	49.2	0.4	5.1
Bike	9	7.1	0.7	4.5
All Responses	126		0.7	4.6
Child's School				
Drive	24	75.0	2.8	8.5
Walk	10	41.7	0.6	10.0
Bike	3	9.4	0.8	5.0
All Responses	32		2.3	9.3
Note: Percentages may not total to 100.0 due to use of multiple modes. Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaire				

Respondents who walk to work downtown also walk to destinations in the neighborhood, such as the park or recreation area and the convenience store, at higher rates than their neighbors, who do not walk to downtown employment. The percentage of respondents walking a child to school does not show this pattern because of a small sample of residents who live and work downtown who also have children under the age of 18 (see Tables 62 and 49).

Table 63. Mode Used Most Frequently to Neighborhood Destinations By Mode Choice to Work for Respondents Who Work Downtown (Percentage)

Mode	Walk	Lynx	Automobile	Bicycle	Total
Walk to Work in Downtown					
Grocery Store	4.4	2.2	91.1	2.2	99.9
Retail Shopping Center	2.2	2.2	93.3	2.2	99.9
Park or Recreation Area	70.5	0.0	27.3	2.3	100.1
Convenience Store	45.0	0.0	55.0	0.0	100.0
Child's School	0.0	0.0	100.0	0.0	100.0
Do Not Walk to Work in Downtown					
Grocery Store	2.2	1.5	96.3	0.0	100.0
Retail Shopping Center	1.5	1.5	96.3	0.7	100.0
Park or Recreation Area	63.9	0.0	33.6	2.5	100.0
Convenience Store	26.2	0.0	73.0	0.8	100.0
Child's School	11.1	0.0	88.9	0.0	100.0
Note: Percentage may not total to 100.0 due to rounding. Source: Travel in Traditional Orlando Neighborhoods Telephone Survey					

Participants in the survey were also asked to indicate the mode used to get to specific destinations that are frequently located in neighborhoods (see Table 63 and 64 and Appendix D-1 for differences between the questions asked in the telephone survey and the focus group questionnaire). These results suggest that a high percentage of downtown residents are likely to walk – at least occasionally – to restaurants, to visit friends, to go to a bar or lounge, and to participate in community events. The focus group questionnaire allowed multiple responses while the telephone survey asked for the most frequently used mode. Thus, while walking may not be the primary mode, it is sometimes used. The small percentage of respondents who drop off children at daycare reflects the demographics of the respondents (see Table 49). Residents who live and work downtown

are generally more active than residents who do not work or who work outside of the downtown (see Table 63). Again this could reflect the demographic characteristics of each group; the average age of respondents who do not work or would outside downtown is older. Respondents who walk to work downtown show a propensity to walk, for a variety of non-work activities varying from the fitness center, to the bar/lounge and the bank or credit union than their neighbors who do not walk to work (see Table 65).

Table 64. Most Frequently Used Mode of Travel to Familiar Places

Location	Never Go To (%)	Bike (%)	Walk (%)	Bus (%)	Drive (%)	Total (%)
Residents Who Live and Work Downtown						
Community Events	16.1	2.2	23.3	1.1	56.7	99.4
Fitness Center/Gym	43.9	3.3	15.0	0.6	37.2	100.0
Bar/Lounge	39.3	0.6	13.5	0.6	43.8	97.8
Restaurant	2.8	0.0	11.7	1.1	84.4	100.0
To Visit Family/Friends	4.4	1.7	11.7	1.1	81.1	100.0
Bank/Credit Union	7.2	0.6	10.0	1.1	81.1	100.0
Child Care Center	90.5	0.0	1.7	0.0	7.8	100.0
Movies	11.1	0.0	1.1	1.1	86.7	100.0
Video Rental Store	23.3	1.1	1.1	0.6	73.9	100.0
Dry Cleaners	30.6	0.0	1.1	0.0	68.3	100.0
Residents Who Do Not Work Downtown						
Community Events	21.0	1.7	23.9	2.8	50.6	100.0
Fitness Center/Gym	50.8	2.8	11.3	0.0	35.0	99.9
Restaurant	6.8	0.6	10.7	2.8	79.1	100.0
Bar/Lounge	50.8	0.0	7.9	0.6	39.0	98.3
Bank/Credit Union	9.6	0.0	7.9	2.8	79.1	99.4
To Visit Family/Friends	10.2	0.0	7.3	3.4	79.1	100.0
Dry Cleaners	37.9	0.0	2.8	1.1	58.2	100.0
Child Care Center	90.9	0.0	1.7	0.6	6.3	99.5
Movies	32.2	0.6	0.6	1.7	65.0	100.1
Video Rental Store	42.4	0.6	0.0	0.0	57.1	100.1

Note: Percentages may not total 100.0 due to rounding. Among residents who live and work downtown, 0.6% use Lymmo to get to community events, and 1.1% each use Lymmo and taxi to get to the bar/lounge. Among residents who do not work downtown, 0.6% use Lymmo to get to the bank or credit union, 1.1% use Lymmo to get to the bar/lounge, and 0.6% use Lymmo to get to the childcare center.
Source: Travel in Orlando Neighborhoods Telephone Survey

Table 65. Frequency to Familiar Places by Mode Choice (Percentage)

Location	Never Go To (%)	Seldom Go to (%)	Bike (%)	Walk (%)	Bus (%)	Drive (%)	Total (%)
Community Event	4.7	9.3	14.7	42.6	0.8	74.4	100.0
Visit Friends	0.7	5.2	19.4	42.5	0.7	86.6	100.0
Restaurant	1.0	6.3	6.7	26.4	0.4	59.1	100.0
Bar/Lounge	39.8	12.5	6.3	24.2	0.8	45.3	100.0
Gym	43.5	5.8	8.0	12.3	0.0	44.9	100.0

Bank	17.9	7.7	8.3	8.9	0.0	73.2	100.0
Place of Worship	22.7	15.2	3.0	8.3	0.0	62.1	100.0
Doctor/Dentist	1.4	8.7	2.2	5.8	0.0	94.9	100.0
Video Store	21.8	33.8	2.8	3.5	0.0	62.7	100.0
Dry Cleaners	17.7	23.4	0.7	3.5	0.0	70.9	100.0
Childcare	79.1	5.5	2.7	2.7	0.0	17.3	100.0
Movies	11.7	19.7	1.5	1.5	0.0	78.8	100.0
Source: Travel in Traditional Orlando Neighborhoods Focus Group Questionnaire							

Table 66. Most Frequently Used Mode of Travel to Familiar Places by Mode Choice for Residents Who Live and Work Downtown by Mode Choice to Work

Location	Never Go To (%)	Bike (%)	Walk (%)	Bus (%)	Drive (%)	Total (%)
Walk to Downtown Employment						
Fitness Center/Gym	40.0	6.7	31.1	2.2	20.0	100.0
Community Events	20.0	4.4	26.7	4.4	44.4	99.9
To Visit Family/Friends	0.0	2.2	17.8	4.4	75.6	100.0
Restaurant	0.0	0.0	17.8	2.2	80.0	100.0
Bank/Credit Union	6.7	2.2	15.6	2.2	73.3	100.0
Bar/Lounge*	48.9	2.2	15.6	2.2	28.9	97.8
Child Care Center	91.1	0.0	4.4	0.0	4.4	99.9
Dry Cleaners	31.1	0.0	2.2	0.0	66.7	100.0
Movies	8.9	0.0	2.2	2.2	86.7	100.0
Video Rental Store	33.3	0.0	0.0	2.2	64.4	99.9
Do Not Walk to Downtown Employment						
Community Events	14.8	1.5	22.2	0.0	60.7	99.2
Bar/Lounge	36.1	0.0	12.8	0.0	48.9	97.8
Fitness Center/Gym	45.2	2.2	9.6	0.0	43.0	100.0
To Visit Family/Friends	5.9	1.5	9.6	0.0	83.0	100.0
Restaurant	3.7	0.0	9.6	0.7	85.9	99.9
Bank/Credit Union	7.4	0.0	8.1	0.7	83.7	99.9
Video Rental Store	20.0	1.5	1.5	0.0	77.0	100.0
Dry Cleaners	30.4	0.0	0.7	0.0	68.9	100.0
Movies	11.9	0.0	0.7	0.7	86.7	100.0
Child Care Center	90.3	0.0	0.7	0.0	9.0	100.0

Note: Percentages may not total 100.0 due to rounding. Mode choice for bar and lounge includes 0.8% by Lymmo and 1.5% by taxi, and 0.7% by Lymmo to community events for respondents who do not walk to work. Among walkers, 2.2% use Lymmo to go to the bar/lounge.
Source: Travel in Orlando Neighborhoods Telephone Survey

DISCUSSION

A fundamental claim of the New Urbanists is that development including high-density and mixed-use on a grid street network in a hierarchy of activity centers will result in reduced reliance on the automobile for work and non-work trips. The results in Orlando lend partial support to this claim. There is some limited evidence that downtown residents currently use alternative modes, especially walking, for trips to and from work.

The downtown TND has its own advantages for traffic during the peak hour. Downtown Orlando has a high level of highway accessibility within the region because of I-4 and the East-West Expressway. In the downtown, workers have the option of taking any number of streets to their employment location, thus the gridded street system has the advantage of reducing the impact on a single roadway. However, the existence of such an extensive grid street network has unintended consequences. Crane (1996) shows that enhanced accessibility may increase tripmaking by reducing the cost per trip. Since the number of trips was not directly tested in this research, this claim cannot be confirmed or denied. The grid network has led to conflicts between neighborhood residents, who bear the burden of the higher level of traffic at higher speeds by commuters who are attempting to avoid congestion on major arterials or the payment of a toll. The city has worked to reduce the traffic speed in partnership with neighborhood residents, who pay half the cost, by converting the streets back from asphalt to a natural traffic calming brick.

To understand the impact of travel on the transportation system it is necessary to consider not only the mode of travel, but also the number of trips and the distance traveled. When the trip lengths of downtown workers are compared to other workers, and the resultant impact on the transportation network is considered, the evidence suggests that the overall impact on the system is lessened because of reduced vehicle miles of travel (VMT). Downtown workers are making shorter trips to employment in downtown, and as their neighbors travel to employment outside of the downtown, they are making a reverse commute that more fully utilizes the roadway capacity.

When non-work trips and work-related trips are considered, the evidence suggests TND can reduce the reliance on the automobile. In particular, residents of downtown appear to be using other modes of transportation, especially walking, to take advantage of the mix of uses in the downtown and the adjacent neighborhoods. People who walk to downtown employment make a similar number of stops on the way to and from work as their counterparts who do not walk, except for purchasing gas. Similarly, residents who live and work downtown are walking and using Lymmo in the downtown for trips during the workday that would usually be made by a single-occupant vehicle in a suburban location. Residents of downtown neighborhoods also walk and use Lymmo for trips in the downtown when they do not want to face the frustration of parking in downtown. In their neighborhoods, residents take advantage of their proximity to services by walking. In the next section, the implication of these results will be discussed for work trips followed by work-related and non-work trips.

Work Travel in Downtown Orlando

New Urbanism connects mixed land uses in a hierarchy of activity centers in a manner that takes advantage of investments in the transportation system. The city of Orlando has considered the importance of the scale of the transportation system in the development of its intermodal transportation network. At the neighborhood level and in the CBD, the city has proposed major improvements to the pedestrian environment and has connected other modes to the pedestrian system. In the downtown, the city has invested in the three-mile Lymmo route for distances that are longer than the average person can comfortably walk. The Lynx system converges on downtown, and together with an improved bicycle network, allows workers access to downtown from distances of 3 to 5 miles. For longer trips, the city proposed a light rail system that would replace

many of the trips parallel to the congested I-4 corridor. Although the light rail will not be built for one or more decades, the city is still pursing commuter rail for downtown. The downtown activity center is the focal point for transportation systems in Orlando. A proposed intermodal center will accentuate the accessibility to I-4 and the East-West Expressway, while capitalizing on downtown parking, good pedestrian circulation, Lynx, Lymmo and other multi-modal components.

In the Downtown Outlook Plan, the city includes a step-down of intensity and density of development from the core of downtown to adjacent neighborhoods, with less dense centers located along the major arterials in the neighborhoods. Another factor in making employment more accessible to downtown residents is the relatively dispersed pattern of development in the downtown. Many high-rise office buildings are dispersed among a lower intensity development and mixed-use activity center along some of the major arterials, like Mills Ave. and Summerlin Ave. Both arterials provide office employment where residents of adjacent neighborhoods can walk to work.

The city has established aggressive goals with respect to the use of alternative modes of transportation. It has set an objective of 5% of work trips to the downtown by public transit, and 20% of non-home-based internal trips to be by modes other than the single-occupant vehicle within the downtown. The downtown development of regional impact (DRI) includes a provision that the peak hour traffic be reduced and transit usage increased as a condition of continued development. The city is evaluating a methodology to lower impact fees, based on location within the city and the design and connectivity within the development.

Despite doing many of the right things, the percentage of travel by alternative modes in downtown Orlando is lower than anticipated at the start of this project. There are several factors that may be working against the use of alternative modes for work in downtown Orlando, each of which is discussed below: (1) weather; (2) demographics; (3) transportation choices; (4) parking policies; (5) downtown housing; and (5) jobs-housing balance.

Weather

Weather may be a factor in the decision to drive to work. The average monthly high in Orlando exceeds 85 degrees from April through October (Weather Channel 1999; see Table 66). It is difficult to assess the impact of the high temperature and humidity on commuters. Focus group interviews with residents suggest that some walk or bike during the winter while others drive all year round because their work requires them to wear business attire and they do not want to arrive in sweaty clothes. Among people who walked to work downtown more than 10 times in the previous year, almost half walked more than a mile. This is a long distance to walk when it is close to 90 degrees, even if one is in the shade. Observations of intersections near downtown and in Eola Park in February, March, and April showed few people dressed for work. Results from the telephone survey were not able to confirm weather as an important factor in mode choice. Respondents overall rated dress code among the least important factors in their mode choice. Walkers, who consider exercise important in their decision about mode choice, were as likely to walk in summer as in winter.

Table 67. Average High and Low Temperatures for Orlando, FL			
Month	Low (8F)	High (8F)	Rain (inches)
January	49	72	2.10
February	49	75	2.83
March	57	80	3.20
April	58	86	2.19
May	63	90	3.96
June	69	91	7.39
July	73	92	7.78
August	73	92	6.32
September	70	91	5.62
October	61	87	2.82
November	54	76	1.78
December	51	75	1.83
Source: Weather Channel Orlando City Almanac (6/99)			

Demographics

The population in downtown Orlando is changing as more young singles and married couples, with and without children, replace the older population that was there a decade ago. The income and automobile ownership rates are much higher than in 1990 and also higher than estimated by Lynx in 1997. The higher rate of automobile ownership has the potential to increase usage for all types of trips.

The rate of growth in population and employment in the downtown is high compared to many other urban areas and compared to historical trends; however, the rate of growth in the unincorporated Orange County and other communities continues at an even more rapid rate. Ocoee and Apopka have been growing at a much more rapid rate than the city of Orlando. Similarly, Disney and Universal Studios will increase the suburban employment at a rate higher than downtown's employment. The investment in the western and eastern beltways will likely fuel even greater sprawl in the Orlando region. The city will provide greater transportation choices, but the increasing population throughout the region may cause even greater congestion in downtown Orlando, especially along major arterials and limited access roadways, due to its central location in the region. Thus, while downtown Orlando can provide greater transportation options for residents in the downtown neighborhoods, it will need to continue to compete with other locations within the region for residential and employment growth. While the city of Orlando is doing an exemplary job of attracting new development, the downtown still cannot compete against the suburban job locations, especially without incentives that create a more favorable environment for downtown revitalization rather than new greenfields development.

Transportation Choices

The city of Orlando acclaims the virtues of its multi-modal transportation system, yet there are gaps in both the perception of the network and the network itself. Walking as a mode of transportation is reasonable when the distance is less than one-half mile. As is discussed below, the number of residents within close distance to the CBD is limited. What is noteworthy about the walkers and other users of alternative modes is the extent to

which they combine modes. A third of the respondents to the phone survey use multiple modes and over seven in ten combine walking with other modes. The use of multiple modes in the downtown area is in sharp contrast to most suburban locations that offer few alternatives to driving to many locations.

A cautionary note on transportation choices is necessary. Realistically, the transportation choices are limited in downtown Orlando. Walking to work is reasonable for the small percentage living very close to downtown employment. Lymmo is available for workers to get around a limited area of downtown. While Lynx routes are concentrated in the downtown, most of the routes have service no more frequent than once or twice per hour, far below a high standard of service. To the extent that more single persons live downtown, carpooling is more difficult to arrange especially for short trips to work. A 1995 survey suggests that 70% of the 238 downtown employers were open to trying various ridesharing options. Yet shortly after the survey was completed, the Downtown Transportation Management Association folded. Many ridesharing options may not be applicable to downtown residents who work downtown because they are less likely to carpool than workers who drive longer distances. The city worked hard to bring light rail into the downtown, but their attempt failed because of the lack of support from other legislators in the region. However, they are continuing to evaluate the role of commuter rail in the region (Damron 2000; Colarossi 2000). While the bicycle facilities have improved in downtown in recent years, they do not provide a complete network. Herein lies one of the dilemmas of bicycle planning and, in particular, within the New Urbanist context. Some New Urbanists would argue that traffic in downtowns should be calmed to a level such that bicyclists feel comfortable riding with the flow of automobile traffic or on a separate parallel bicycle lane. Others would argue that the bicyclist should be accommodated by off-road facilities. Participants in the focus groups suggest that the bicyclist is still not being accommodated in the downtown. On the streets that have been reverted back to brick as a means of traffic calming, bicyclists are faced with a bumpy ride or the interference of automobile drivers who use paved lanes where provided, as on Livingston St. The city does not have an extensive off-road trail system for less experienced bicyclists.

Parking Policies

Contrary to the ideals of the New Urbanists, parking is usually free and readily available in downtown Orlando. The 1995 Commuter Survey reports that 75% of the 238 employers in the survey provided free parking for all employees, while only 7% make no provisions for employee parking (DOTMA 1995: 5). Similarly, 81% of employees reported that they did not pay for parking and 79% reported that they parked at the worksite (DOTMA 1995: 16). The average cost of parking, where paid, was an inexpensive $58 per month. Respondents to the telephone survey indicate that the availability of parking is only somewhat important in their mode choice for work.

While some downtown employers, including the city of Orlando, are reducing demand by providing a cash-out of parking to remove the incentive for employees to park, the city has not been as successful at reducing the requirements for parking. The city has backed away from a policy of having developers provide only three parking places per 1,000 square feet of commercial space, because developers had little interest in office development until the city was willing to negotiate for more downtown parking.

Downtown development interests could not compete for development when other outlying suburban offices provide 8 parking spaces per 1,000 square feet of office space (Pleasant 2000).

Housing in Downtown

The use of walking as a primary mode of transportation for work generally requires close proximity between home and work. At the present time, the number of people who live close to downtown employment is relatively small (see discussion below on Jobs-Housing Balance). As a result, the market for downtown housing in Orlando can be seen as an untested market. The city has been pro-active in trying to bring additional multi-family housing into the downtown, especially in Uptown, and in the transition areas near the downtown. The DDB and the CRA, in cooperation with the city of Orlando, have provided developers with a profit gap protection to ensure an adequate return on investment (Sellen 2000). The profit gap protection is an assurance that if the developers do not reach their projected profit levels, then the city and the DDB will pay the difference between the profits the developers made and the expected profits from the development – therefore substantially reducing the risk to developers and lenders. In this manner, all parties benefit: the city gets additional downtown housing, and the developers and lenders have reduced the risk associated with development in a relatively new and untested market. The response to the city's actions has been favorable. Over 1,400 new units are proposed or under construction in downtown Orlando and most of them are multi-family units within walking distance of a variety of employment locations (see Map 2 above).

The city's attempts to increase density are working in the transition areas near the downtown, however, they are meeting resistance in the surrounding neighborhoods. Presently, the density of housing in much of downtown is medium density, with only areas of Thornton Park, Lake Eola Heights and Lake Cherokee exceeding 10 units per net acre and two TAZs in South Eola and the CBD exceeding 20. For example, Calthorpe (1993: 58) suggests that average minimum densities of 10 dwelling units per net acre are necessary to support local bus service while higher densities are necessary for light rail and express bus service.

The city includes the option of tandem housing, or multiple units on the same lot, and accessory apartments as a means to increase the density within downtown neighborhoods and to provide a greater mix of housing types. Residents of several neighborhoods, in particular, Lake Eola Heights, Colonialtown North, and Colonialtown South, oppose increased density in their neighborhoods.

Jobs-Housing Balance

Despite the new housing being built in downtown Orlando, there is much more employment than housing in the downtown. An ideal jobs housing balance is considered to be between 0.75 and 1.50 (Cervero 1989, 1996). The jobs-housing balance was calculated using estimated population and housing for three different geographic areas: the 13 neighborhoods within one to two miles of the CBD, within a mile of the CBD, and within a half-mile of the CBD (See Map A-38 in Appendix A). At each of these scales and with between 1.2 and 1.7 employees per household (see Table 32), if all persons who live in the downtown also worked in the downtown, the jobs-housing ratio would be greater than 3:1 (see Table 67).

However, a significant proportion of the residents of downtown do not work downtown. Among downtown workers, only 22% live within 5 miles of their place of employment according to a survey of approximately 6,500 downtown workers (DOTMA 1995). Based upon the results of a random survey of downtown residents, the number of downtown residents who also work there is a much smaller; the telephone survey suggests it could be as low as 6%. Thus, the percentage of workers who live in the neighborhoods adjacent to the downtown is likely much lower. If more people who live downtown also worked downtown, the number of trips that could be served by alternative modes of transportation could be increased. However, the decision to live in downtown Orlando is based upon lifestyle factors other than a close distance to work. Some downtown residents value the reverse commute. These considerations suggest, along with support from focus group interviews, that there are major weaknesses in the jobs-housing balance argument.

Table 68. Estimated Employment and Workers Within One-Half and One-Mile of the Central Business District

Category	In 13 Case Study Neighborhoods	Within One-Half Mile	Within One Mile
Employment	50,000	64,761	84,579
Population	18,958	16,470	32,956
Total Housing Units	9,327	8,814	15,997
Number of Workers (1.2 Per Household)	11,192	10,576	19,196
Number of Workers (1.7 Per Household)	15,856	14,984	27,195
Jobs-Housing Ratio (Range)	3.15-4.47	4.32-6.12	3.11-4.41

Source: Travel in Traditional Orlando Neighborhood Calculated Using Lynx TAZ data and GIS

Attempts to increase the number of residents downtown should improve the jobs-housing ratio and have the potential to increase the number of residents who live within a reasonable walking distance of downtown employment. However, the city is also attempting to attract even more jobs to downtown, which will have the effect of worsening that ratio. The location of new residential housing in the downtown is ideal because most of it is located in the transition zone between downtown and the existing residential neighborhoods of South Eola and Uptown.

The expansion of Lymmo has the potential to provide an alternative to walking and expand the commute shed for walking for downtown residents who work downtown (see Maps 6 and 7 on following pages for the quarter- and half-mile walking distances to the existing and proposed Lymmo routes). Currently, approximately 2,000 persons live within a quarter-mile of Lymmo and approximately 9,000 live within a half-mile (see Table 68). The proposed Lymmo expansion will increase the number of people living within a quarter-mile of Lymmo to approximately 10,300 persons; and to approximately 20,500 within a half-mile including the area west of I-4. This translates into an increase of approximately 6,000 workers within a quarter-mile and 8,500 within a half-mile. If only 6% of these new residents work downtown and all of them ride Lymmo, the number of

work trips by Lymmo would increase by approximately 360-510 per day. This compares to the approximately 500 persons who walked to work and the 417 who used transit as their usual mode to work in 1990 (see Table 17).

Table 69. Estimated Employment and Workers within Quarter-Mile and Half - Mile of Lymmo

Category	Within One-Quarter Mile	Within One-Half Mile
Existing Lymmo Service		
Employment	38,445	49,726
Population	2,002	8.986
Total Housing Units	1,212	4,661
Number of Workers (1.2 Per Household)	1,454	5,593
Number of Worker (1.7 Per Household)	2,060	7,924
Expanded Lymmo Service		
Employment	51,463	65,417
Population	10,264	20,514
Total Housing Units	4,699	9,684
Number of Workers (1.2 Per Household)	5,639	11,621
Number of Worker (1.7 Per Household)	7,988	16,463
Source: Travel in Traditional Orlando Neighborhood Calculated Using Lynx TAZ data and GIS		

Non-Work Travel in Downtown Orlando

For non-work trips the advantages of New Urbanist designs become more apparent because the use of alternative modes for these trips is available to a larger segment of the population, not just those who work nearby. The city's policy of locating activity centers along the major arterials offers the opportunity for more people to walk to these locations. Unlike work trips, neighborhood residents have greater opportunity to walk. They need not worry about what they wear to the store, and the temperatures are cooler at night to make the walk more pleasant. Indeed the results of this research suggest that for specific activities, downtown residents walk in higher percentages than they do for the work trip. Among all groups of respondents to both surveys, greater than 10% walk to the park and recreation area, the convenience store, community events, the fitness center and restaurants. Among specific population groups, greater than 10% also walk to visit family and friends, to the bank or credit union, and to their child's school. Additionally, people who work downtown also make stops during their workday and on their way to and from work.

Map 6

Map 7

Thus, two policies of the city related to location of activities in neighborhoods appear to have the desired effect of allowing the use of non-automobile modes of transportation. The location of the mixed-use activity centers supports walking for shopping and other convenience services. Residents of Colonialtown South, Lake Eola Heights, Lake Davis/Greenwood, and Park Lake/Highland all suggest that they walk to the Thornton Park shopping area to go to restaurants or other activities there. The policy of the city to locate parks throughout neighborhoods appears to encourage walking in neighborhoods. For example, in Colonialtown North, the city took an underutilized parcel and made a small pocket park that is well utilized by neighborhood residents. They have similar plans to create a park in Park Lake/Highland. For most other neighborhoods, the park is in very close proximity because it surrounds the many lakes in the downtown neighborhoods.

Businesses in the shopping areas also show high rates of walking among their patrons. In 1996, the city completed surveys of shoppers in the East Washington St. shopping district in Thornton Park. Using surveys during weekdays at four establishments –Thornton Park Café, Burton's Bar, Eola Laundromat, and Twisted Sister Hair Salon – the city found walk rates of 13.5%, 40%, 26.5% and 14% respectively. The laundromat and the bar also had 12% and 2.5%, respectively, arrive by bicycle (Kimley-Horn 1996).

While the city has been successful in developing the neighborhood and community activity centers, these concerns exist with respect to their ability to produce non-automobile trips. The following three concerns are discussed below: (1) getting across major arterials; (2) the adequacy of pedestrian facilities; and (3) the availability of services in neighborhood activity centers. While these are of some concern for work trips, they are of greater importance for non-work trips.

Getting Across Major Arterials

The concentration of automobile traffic along a few major east-west roadways, such as Colonial Dr. and Robinson Ave, has the effect of creating a barrier to pedestrian movement. The north-south roadways that go through the CBD are less of a barrier because the city has improved the pedestrian environment by installing brick pavement, signals with short cycles and other improvements. To the extent that downtown residents are involved in a greater variety of activities in their neighborhoods, the concentration of traffic along the arterials provides a more important barrier to pedestrian movement. Participants in the focus groups in Colonialtown North and South and Park Lake/Highland all commented on the difficulty of walking across Colonial Drive to get to goods and services that are in close proximity to their residences. Residents of Park Lake/Highland also suggested that Colonial Dr. also presented a barrier to access to the CBD. Similarly, along Robinson Ave., there are no traffic signals for the length of Eola Park. Throughout the research we observed pedestrians, including parents with young children, who were walking at mid-block across the four lanes of Robinson Ave. without the protection of a crosswalk or a pedestrian signal. They were crossing at their own risk amidst traffic traveling at speeds in excess of 35 miles per hour.

Adequacy of Pedestrian Facilities

The Downtown Outlook Plan and its predecessor, the Downtown Redevelopment Plan, have included an extensive set of improvements to the pedestrian environment in the

CBD. Most of the planned and proposed pedestrian improvements are on the major arterials and close to the CBD rather than within residential neighborhoods. Furthermore, the Downtown Outlook Plan requires implementation of the streetscape projects and sidewalk improvements by agreement of the private property owner rather than by action of the city. Respondents to the telephone survey who walk to work were significantly more likely to say that more sidewalks would change their mode choice to work. Since they already indicate that they walk to work, at least sometimes, any improvements to the sidewalk network could increase the frequency with which they walk to work. To the extent that many residential neighborhoods do not have a complete sidewalk network, this may prevent some residents from walking even a short distance to the nearest neighborhood activity center.

Availability of Services in Neighborhood Activity Centers

The city has, through its regulation, created the incentives for mixed-use activity centers to support the downtown residents. They have been successful in creating and expanding a neighborhood center in Thornton Park. They have also allowed convenience stores to remain a vital part of residential neighborhoods. The surveys confirm that residents of downtown neighborhoods walk to a variety of destinations in their neighborhood and in higher percentages than they do to downtown employment. The focus group discussions suggest the success in bringing these services back into neighborhoods. In Lake Eola Heights, the residents suggested the importance of the corner convenience store in providing items that reduced the need to go to Colonial Town Plaza or other more distant locations. Residents in Lake Davis indicated that they walk to the Thornton Park neighborhood activity center. Residents in Park Lake/ Highland and Lake Eola Heights commented on the shortage of items of everyday use in the CBD. Thus, while the CBD is not providing for their daily needs, the success in bringing convenience services to the neighborhood and in enhancing options in Thornton Park has created the opportunity for residents of downtown neighborhoods to walk to find goods and services for their daily needs.

One note of caution on shopping in the Thornton Park area is advised. Based upon interviews with residents of nearby neighborhoods and personal observations, Thornton Park may become a regional shopping destination rather than simply being a neighborhood-shopping district. It has good regional accessibility characteristics, and depending upon how it evolves, has the potential to become a generator of automobile traffic in a manner that could eventually detract from the pedestrian environment (Steiner 1998). It is similar to Hyde Park in Tampa, which attracts residents of nearby neighborhoods along with shoppers from the broader region.

RECOMMENDATIONS

The city of Orlando has actively created and adopted policies that support sustainability, incorporate TND standards, support choice in transportation mode, have the potential to improve pedestrian mobility for both work and non-work trips, and make transit, especially Lymmo, a viable transportation alternative. While the scope of this research has focused on the downtown, some of the recommendations can be applied to New Urbanist communities that are being built in less urban, and more suburban, contexts within Florida. The FDOT can incorporate these recommendations into their own policies and use them to inform their review of local government planning decisions. As a result

of this research, recommendations can be made in the following general areas: (1) design of state highways in urbanized areas; (2) design of state highway underpasses (portals); (3) Transportation Concurrency Exception Area (TCEA); (4) vehicle miles of travel (VMT) as a measurement of traffic impact (5) connectivity and grid street networks; (6) multi-modal transportation planning; (7) measurement of the impact of different transportation-land use patterns; and (8) New Urbanist design and planning.

Design of State Highways in Urban Areas

Roadways within heavily urbanized areas like Orlando's downtown should be designed to urban standards for all modes of transportation, and not to suburban throughway standards that almost exclusively serve the automobile. Many new and existing roadways are developed for the singular purpose of moving traffic through an area as quickly as possible. While this is consistent with the goal of the state highway systems of moving traffic *between* regions rather than *within* regions, the current function of roadways in urban areas should be considered within a broader context. Highways that are designed with wide travel lanes encourage throughput of automobiles at the expense of accessibility to local business and to other users of the transportation system. Twelve- to fourteen-foot travel lanes are reasonable for limited access roadway facilities where only automobiles are allowed, or in rural or sparsely populated suburban areas where pedestrian and bicycle activity are relatively non-existent. However, in urbanized areas with heavy pedestrian and bicycle activity, or where land uses and transit service produce walking trips, these travel lane widths may present an obstacle to pedestrians and bicyclist alike. Likewise, six lane roadways are appropriate for limited access facilities or even in suburban areas where the dominant mode of transportation is the automobile. Yet, six lanes of traffic in urbanized areas, especially downtowns and other densely populated areas with high potential for pedestrian traffic, greatly impede pedestrian mobility. The use of medians has the potential to improve the safety for pedestrians crossing major arterials. However, if the speed of traffic is not reduced to a reasonable level the effectiveness of the medians is reduced. For example, even though Colonial Drive (State Rd. 50) is limited to just 4 lanes, residents of the Park Lake/Highland and Colonialtown neighborhoods suggest that they could not easily cross it.

The city of Orlando has several policies that support the use of the transportation system by all modes. Most roadways in downtown Orlando have been limited to four lanes in the urbanized areas and widen to six lanes in the more suburban section to the east of Bumby Ave. and west of I-4. The city has developed pedestrian-friendly roadway standards for the Naval Training Center Plan and the Southeast Sector Plan (see Appendix B-6 and B-7). The city has returned many of the residential streets to the original brick as a part of a neighborhood traffic-calming program. Some of the traffic that had cut through neighborhoods now uses the major arterial that is the preferred location for traffic.

The FDOT should adopt a standard that state highways and roadways in urbanized areas exhibiting the potential for pedestrian activity, such as Mills Ave. and Colonial Dr., be limited to four traffic lanes, with a maximum of 12-foot lane widths and even eleven-foot lane widths where appropriate. The streets should include some of the following amenities that support alternative modes of transportation: street trees, medians with mid-block crossings, maximum speeds of 35 mph, pedestrian-scale lighting, landscape buffers between the sidewalk and the roadway, intersection bulb-outs, pavement treatments for

crosswalks, integration (where possible) of bicycle lanes, and right-of-ways reserved for bus turn-in bays where transit service is provided or programmed. The FDOT should also evaluate the roadway designs used in the Naval Training Center Plan and the Southeast Sector Plan for their applicability to major arterials, residential streets, and collectors in communities throughout the state. The FDOT should also evaluate whether roadways through downtowns and other dense urban areas are appropriate for designation as state highways. For example, through traffic along Colonial Dr. may be accommodated more appropriately along the East-West Expressway or other less urban state highways.

Highway Underpass Design (Portals)

Limited access roadways serve an appropriate function in providing capacity for automobile traffic traveling long distances within and between regions. However, the design of underpasses needs to accommodate pedestrians and bicyclists. The Downtown Outlook Plan includes detailed underpass standards that could be used to improve the portals along the limited access roadways in downtown, I-4 and the East-West Expressway. The underpasses could be improved with the removal of chain link fencing; introduction of more natural light and adequate decorative lighting; provision of sidewalks, bike lanes, or facilities wide enough to accommodate both; the planting of an abundance of landscaping; the removal of areas for people to hide; the use of signage appropriate to the location; the use of mural and other artwork to beautify the underpass; and the provision of a continuous network of sidewalks and crosswalks to connect to the adjacent neighborhoods.

FDOT should promote connectivity between urbanized areas divided by limited access facilities through the use of highway portals. In particular, the proposed standards in the Downtown Outlook Plan should become a part of the redesign of I-4 through downtown Orlando. These standards should also be considered for the design of limited access roadways in urban areas throughout the state of Florida

Transportation Concurrency Exception Area (TCEA)

The city of Orlando has developed its Transportation Concurrency Exception Area (TCEA) in a manner that is consistent with the intent of the TCEA and the rules in FAC 9J-5. They have incorporated policies in both their Comprehensive Plan and the Downtown Outlook Plan that fulfill the requirements of the TCEA designation for: urban infill, urban redevelopment, downtown revitalization, and the promotion of public transit. They have transitioned from mere implementation of the TCEA as a tool to allow continued development, to using the TCEA in conjunction with a cost-feasible plan and a capital improvements plan, with the goal of creating a better environment for users of alternative modes of transportation. As such, Orlando provides a model of the appropriate use of a TCEA for other communities throughout the state of Florida. The FDOT should work with local governments to appropriately enact TCEAs within urbanized areas where a local government is committed to the promotion of infill development, urban redevelopment, and the promotion of downtown redevelopment.

Vehicle Miles of Travel (VMT) as a Measurement of Traffic Impact

As a part of their concurrency management system, the city of Orlando has adopted the usage of vehicle miles of travel (VMT) as a standard to measure the traffic

impacts of development proposals rather than simply using trip generation rates. Their analysis of the traffic to the Thornton Park shopping district suggests that the impact of this development is less than in similar uses in more suburban locations, because fewer trips are by automobile and the distance traveled to the location is lower (Kimley-Horn and Associates 1996). Thus, the traffic impact is a combination of the number of trips, the distance, and the mode of travel used by the persons accessing that land use. The trip generation of TND is not widely documented, nor is the trip generation in New Urbanist communities (Steiner 1998). As such, it is recommended that FDOT support efforts to document the trip generation characteristics and the vehicle miles of travel associated with TND and New Urbanist development.

Connectivity and Grid Street Networks

The city of Orlando recognizes the importance and the benefits of a grid street network. The grid street network allows greater dispersal of traffic, is a more efficient use of the transportation system, and is more supportive of multiple modes of transportation. It provides interconnectivity of destinations and a number of alternative routes and choices for all modes of transportation. Grid street networks provide emergency vehicles more routes and access in cases of emergencies. Automobile drivers can choose different routes to avoid accidents or traffic. Pedestrian and bicycle distances traveled are reduced through the number of connections and possible routes to various destinations found within grid networks. Unlike typical suburban roadways where all traffic is directed towards collectors and arterials, thus causing traffic congestion, grid street networks disperse traffic. The disadvantage of a grid street network is that it allows automobile traffic to cut through residential areas. The city of Orlando has addressed this concern by rebricking the streets and installing other forms of traffic calming. The Southeast Sector Plan and the Naval Training Center Plan also incorporate roadway design guidelines based on a grid street network.

The city of Orlando has developed a connectivity index for describing and measuring grid street networks as a part of measuring the impact of development on roadway systems. The measure is an effective indicator of interconnectivity for roadway systems and could also be adapted for measurement of mixed-use recreational trails. As currently developed, the connectivity index needs to be modified to incorporate the size of blocks into the calculation in order to encourage pedestrian-scale development through the use of small blocks that are the building block of traditional neighborhoods. The structure of the connectivity index provides the opportunity for the FDOT and local governments to illustrate to developers how a more extensive roadway network can increase the interconnectivity of the development and reduce the level of traffic on a single roadway. The index is also a useful tool to measure claims made by developers that a development would generate less traffic because it is based on TND standards. For the developer to validate this claim, the development would have to obtain a certain connectivity score.

It is recommended that the connectivity index be adopted by the FDOT, with a modification for block size, as a means to measure the impact of traffic of new developments on the adjacent roadway system. The connectivity index could be used as a part of the assessment of areas in a TCEA, for suburban roadway retrofits, for DRIs, or for greenfield development or redevelopment based upon TND standards.

Multi-Modal Transportation Planning

The city of Orlando provides an excellent example of a community that is working to develop a true multi-modal transportation system with connections between the modes. These improvements have been made gradually through a series of planned strategic investments that will slowly improve on the existing system and establish regulations so that future development addresses the needs of a multi-modal transportation system. Major improvements to the pedestrian environment have been completed in recent decades. In the Downtown Outlook Plan, the city outlines priorities to continue the improvement of the pedestrian environment. The city has increased the number of miles of bicycle routes to 100 over the last five years. The Lymmo system is a major part of downtown circulation. The city and Lynx plan to make improvements to pedestrian access to transit. Lynx plans to move the bus transfer station to an intermodal center east of I-4 on Livingston St.

The Lymmo system is the showpiece of downtown transportation in Orlando because it successfully reduces automobile traffic in the CBD. While it does not currently constitute a major part of the transportation mix for work trips, the planned extensions have the potential to make transit use easier for downtown residents who work downtown, and for residents to access downtown for non-work trips. A Lymmo-type system is compatible with a light-rail or commuter-rail system and also has the advantage of not having the negative reputation usually associated with buses. The use of a designated right-of-way enables Lymmo to move independently of traffic, and it is a highly efficient mode of transportation within the CBD and for the surrounding neighborhoods.

The success of Lymmo leads to the recommendation that the FDOT promote the use and creation of Lymmo-type systems in other downtowns throughout Florida. A Lymmo-style system, if properly planned and implemented, can allow automobile access to the downtown while reducing the impact of automobiles within the downtown. Downtown Tampa, St. Petersburg, Ft. Lauderdale, and Jacksonville could easily support a system similar to Lymmo. To the extent that Orlando has been successful in connecting modes of transportation through a better pedestrian environment and other strategies, the FDOT can use it as a model statewide for inter-modal and multi-modal planning.

Measurement of the Impact of Different Transportation-Land Use Patterns

Transportation planning models and other tools that measure the impact of specific land uses on the transportation system are based largely upon assumptions embedded in the suburban style of development. Trip generation rates usually only consider automobile traffic and often consider segregated land uses. Transportation models focus primarily on the work trip during peak hours and usually only trips by automobile and transit. Walking trips are often not included in transportation models because they occur within a single traffic analysis zone.

New Urbanism and TND are based upon fundamentally different assumptions about land use, transportation, and the connection between them. Throughout the country, transportation models have been updated to consider different land use and transportation configurations, and the use of non-motorized transportation modes (Parsons Brinckerhoff *et al.* 1999). The elaboration of the transportation models generally increases the cost of modeling, but it also may more accurately model the relationships within the transportation system and lead to a more strategic allocation of transportation funding.

The Orlando MPO has explored using DRAM/EMPAL to model land uses as a part of their transportation planning process. The region does not currently model walking trips (Hooker 2000).

The Orlando region has developed other tools that address certain aspects of the land use-transportation connection. The VMT measurement and the connectivity index are two tools that begin to address the need for measures that are sensitive to different assumptions about land development patterns. However, the connectivity index shows the potential for reduction in trip generation and, as discussed above, needs to be adjusted for size of block. The VMT measure has yet to be adopted by the city of Orlando. Although its empirical basis is sound when data is collected from specific sites, the generalizability of the measure using trip distances from models that are not sensitive to differences in land use patterns is suspect.

The FDOT has been conducting research, in collaboration with Reynolds, Smith and Hills, on the use of multi-modal transportation districts (MMTDs) in downtown Orlando neighborhoods. This research will develop new tools to be used throughout the state to measure activity in MMTDs.

It is recommended that the FDOT continue to conduct research that addresses the difference in impacts between TND and typical suburban development. This research needs to address differences in trip generation and internal trip capture between TND development and redevelopment, and typical suburban development. The FDOT should enhance its transportation models so that the inputs to the models more realistically reflect the differences in land use configurations. It is also recommended that the city of Orlando consider the use of MMTDs as a part of its TCEA.

New Urbanist Design and Planning

The city of Orlando, with its Comprehensive Plan, sustainability initiative and Downtown Outlook Plan, provides an example of a planning and redevelopment according to TND principles. The city has taken comprehensive and incremental steps toward redevelopment of the downtown by using the benefits of a grid street network. Activity centers and mixed-use corridors bring together strategic investments by both the private and public sector. The public sector is determined to put through traffic onto arterials, to connect residential areas of downtown with the Lymmo system, to leverage investment by private homeowners in the rebricking of residential streets to improve traffic calming measures, and to create a better bicycle and pedestrian environment through landscaping and other facility modifications. Likewise, the private sector is determined to serve the needs of everyday life by developing clusters and mixes of employment, retail and residential land uses. The city is also beginning to create a level playing field for redevelopment of the downtown by charging impact fees based upon the transportation impact of a specific development. Orlando is also attempting to change the rules on suburban development with the Southeast Sector Plan, the Naval Training Center Plan, and their design standards.

Older urban areas in Florida, like Tampa, Jacksonville, and Miami have an extensive grid network like Orlando. The policies incorporated into the downtown revitalization plan and the TCEA in Orlando can serve as a model for redevelopment of downtowns and older neighborhoods in other urban centers in Florida. Similarly, the standards adopted by the city of Orlando for the Naval Training Center and the Southeast Sector Plan can serve as models for new development in other communities throughout

the state.

This research suggests that the actions taken by the city of Orlando have had the desired effect of creating better transportation choices among downtown residents. Downtown residents are walking, bicycling, and using their automobiles for both work and non-work trips. When downtown housing is completed and Lymmo is extended into the neighborhoods, even more downtown residents will have greater travel options for work. While many residents of communities throughout the United States and Florida will continue to demand typical suburban development, many will also choose to live in New Urbanist communities (Duany 2000). To the extent that the New Urbanist style of development provides better transportation access at a lower public cost and in a more efficient land use pattern, the impact fees paid for development should reflect the differences in these long-term public costs.

There are still many unanswered questions about whether New Urbanist developments have lower trip generation rates and a higher rate of internal capture of trips. If the projects in the Downtown Outlook Plan, the Southeast Sector Plan and the Naval Training Center Plan are developed as planned, they offer a prime location for additional research to answer these questions in the near future. The FDOT should monitor the success of the city of Orlando in implementing its New Urbanist goals. This would afford an opportunity to test the impact of various strategies aimed at offering greater transportation choice; such as, new high-density downtown housing, the developments at the Naval Training Center and Southeast Sector Plan, and the response of new and existing downtown residents to improvements in the pedestrian environment and expanded Lymmo service. It is also recommended that local governments throughout Florida, who are seeking to promote infill redevelopment and urban revitalization, adopt strategies such as the connectivity index, the use of activity centers and mixed-use corridors, TND, and the use of multi-modal transportation system.

CONCLUSIONS

The objectives of this research were to answer the questions: "Do people living in traditional neighborhoods use alternative modes of transportation for trips to and from work and during peak hours?" and, "Do residents in traditional and New Urbanist communities walk, bike, or use transit when convenient and available for non-work trips?" Recognizing the need to coordinate transportation and land use planning as a part of the revitalization of downtown, Orlando city officials and planners set forth specific goals and implementation methods to promote and manage growth while maintaining pedestrian-friendly streets and a multi-modal transportation system. Utilizing the grid street network and the traditional pattern of development throughout the downtown and proximal neighborhoods, the city of Orlando has been able to develop plans consistent with the ideals of New Urbanism and TND in their downtown, in the Southeast Sector Plan, and in the redevelopment of the Naval Training Center. New Urbanists postulate that TND reduces the reliance on the automobile for work and non-work trips; however, the results in Orlando only partially justify the claim.

There is some limited evidence that downtown residents currently use alternative modes for trips to and from work, with approximately 40% using other modes for at least 10 days in the previous year. The grid street network affords alternative travel routes, lessening direct vehicular traffic on single roadways. To understand the full impact of

travel on the transportation network, consideration must be given to mode choice, number of trips, and distance traveled. Downtown residents who also work downtown have lower VMT compared to other trip makers, thus reducing the overall impact on the transportation system. Downtown residents who work elsewhere often take advantage of the excess capacity in the roadways system because they are commuting in the opposite direction of most workers. Even when downtown workers use single occupancy vehicles to go to and from work they are likely to use the available Lymmo services to move around during the workday, which reduces the number of vehicles in the downtown. Likewise, downtown residents, whether they live or work downtown, are using alternative modes of transportation, particularly walking, to access the variety of destinations located in the downtown.

However, the existence of the grid street network has unintended effects on the neighborhoods in the form of increased cut-through traffic flows at higher than posted speeds, and may actually generate more trips due to a reduced cost per trip. In either case, the residents may demand even more effective traffic calming. The population in downtown Orlando is currently undergoing a change as more young, single and married, adults move into the downtown. Higher incomes and higher rates of car ownership may lead to greater usage of the automobile. Many people who live downtown do not take advantage of the multiple mode choices that are available in the area.

The population throughout the region is rapidly increasing, but most of that growth in occurring outside of downtown Orlando in more suburban locations. Though the downtown is capable of providing greater mode choices to downtown residents, it will continue to compete with other regions for residential and employment growth. Without proper incentives provided by the government, the downtown is unable to compete with suburban employment locations.

Orlando has aggressively pursued the use of alternative transportation. The city set goals of 5% of work trips downtown via transit and 20% of non-home based internal trips by modes other than single occupancy vehicles. The Lymmo system in combination with the proposed light rail system would assist the city in reaching these goals. The city is discussing an impact fee reduction based on design and connectivity that would give even greater benefit to locations with TND characteristics. To entice development in the largely untested market for downtown housing, the city provides a profit gap protection for developers willing to build in the downtown. Developers have responded favorably to these actions and over 1,400 units are proposed or under construction in the transition area between downtown and the surrounding neighborhoods. Efforts to increase density throughout residential neighborhoods have been more difficult because residents actively resist new residential development in their neighborhoods.

Realistically, mode choice to work may be limited in downtown Orlando for many reasons: walking to work is viable for only a small percentage who live close to their employment, weather conditions may limit the use of anything but the automobile for workers who dress in business attire, transit service is generally available but on a limited frequency on certain routes, carpooling is impractical for single persons, and the bicycle network is incomplete. Parking in downtown is widely available at a relatively low cost to most employees. Efforts to limit the number of parking spaces have failed because developers and lease agents would not build until the city was willing to allow more parking downtown.

Despite efforts to create higher housing densities in the downtown, employment opportunities greatly outnumber housing possibilities. Thus, the downtown would need to increase the downtown population substantially to achieve a better jobs-housing balance. In the survey of downtown residents, only 6% of respondents also work in the downtown. While it is difficult to confirm this percentage, it is consistent with a 1996 survey with a much larger sample of downtown employees that found less than 25% of downtown workers living within 5 miles of their place of employment. The survey also shows that factors other than close proximity to work, such as the character of the neighborhood, safety and reverse commute, influence the decision to reside downtown.

Non-work trips better display the advantages of TND and New Urbanism than work trips. A larger population is able to utilize network connectivity, proximity of retail and other services, and multiple mode choices. The use of alternative modes of transportation for non-work trips may be associated with the lack of dress code, recreation or exercise fulfillment, fairer weather, and a greater diversity of activities. Mixed land use fosters greater attraction for residents and perpetuates walking in higher percentages, particularly to parks, convenience stores, community events, fitness centers, and restaurants. Underlying the positive influences of TND are the concerns for crossing major arterials, adequacy of pedestrian facilities, and availability of services in activity centers.

Though results of this study only lend partial support to New Urbanism, they do reflect changes in the attitudes of certain users, exhibit positive benefits of downtown transit service for limiting vehicle miles traveled within the work day, and emphasize the importance of connectivity, proximity, and mixed-use for work and non-work trips. Time is a major dictator in the success of progressive planning practices such as those undertaken by the city of Orlando. Although the city of Orlando has been implementing the concepts of TND for almost a decade, the market has only recently begun to respond.

The city's commitment to positive growth, development, and revitalization should be applauded and used by the FDOT as an exemplary methodology for other communities tackling the issues of downtown revitalization and the prevention of sprawl. Several aspects of Orlando's planning and land development regulations should be incorporated into the policies of the FDOT, or used by other local governments throughout the state of Florida. These include: the design of state highways and highway underpasses, planning with the TCEA, the use of VMT to measure traffic impact, the use of the connectivity index and the grid street network, the planning for the multi-modal transportation network, the measurement of various land use-transportation configurations, and the incorporation of New Urbanist design standards for downtown revitalization and new development. Downtown Orlando should continue to be monitored so that planners can better understand the dynamics of New Urbanist development in an auto-dominated environment.

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