

Investigation of Potential Local Area
Transportation Alternatives for an
Aging Population



Volusia County
Metropolitan Planning Organization

Final Report



Investigation of Potential Local Area Transportation Alternatives
for an Aging Population

Volusia County Metropolitan Planning Organization

Beverly Ward
Sr. Research Associate

Wendy Hathaway
Graduate Research Assistant
Department of Anthropology

Oliver Page
Graduate Research Assistant

Victoria Perk
Sr. Research Associate
Center for Urban Transportation Research
University of South Florida

November 2006

Table of Contents

Introduction	1
Review Socioeconomic and Demographic Characteristics of the Population	2
Census and Most Recent Population Estimates	3
Other Socioeconomic Characteristics That May Influence Travel Behavior.....	11
Additional Population Estimates	13
Population Projections 2010 through 2035	14
Population Estimates of Need for Transportation Alternatives and Driving Reduction or Cessation	14
Implications of Socioeconomic Characteristics and Driving Reduction/Cessation for the Future....	15
Literature Review	17
Mobility Concerns, Transportation Options, and Land Use and Other Considerations for an Aging Population.....	17
Mobility Concerns	17
Mobility, Health, Illness, and Impairment	19
Transportation Options	20
Land Use Considerations	21
Additional Considerations	22
Disasters and Emergencies.....	22
Ethnicity, Gender, and Race.....	22
Household Composition or Living Arrangements.....	23
Retirement Security	23
Implications for Volusia County Metropolitan Planning Organization.....	24
Recommended Strategies for the Study Area	25
Qualitative Data Collection and Findings	25
Group Discussions.....	25
HAVOC and Senior Centers Group Findings.....	25
HAVOC Transportation and Land Use Issues	26
HAVOC Solutions	27
Senior Centers Transportation and Land Use Issues	28
Senior Centers Findings	29
Coalition of Senior Center Directors Meeting Findings	30
Individual Interviews	30
Recommended Strategies	31
Review of Strategies.....	32
Specific Transportation Strategies from AARP's Livable Communities: An Evaluation Guide	33
Mobility Options	33
Fixed Route	33
Paratransit	34
Other Mobility Options	34
Driving	35
Walking.....	35

References	37
Appendix A	42
Appendix B	43
Handicapped Adults of Volusia County (HAVOC) Topic Guide	43
Senior Centers Topic Guide	45
Appendix C	46

List of Tables

Table 1. 2000 Census Estimates.....	5
Table 2. Additional Socioeconomic Characteristics.....	12
Table 3. 2005 Population Estimates.....	13
Table 4. Total Population Projections.....	14
Table 5. Population Estimates of Unlicensed Persons and Persons Who May Cease to Drive.....	15
Table 6. Selected Characteristics of Group Participants.....	26

List of Figures

Figure 1. Persons 35 Years and Over per Square Mile	3
Figure 2. Population Pyramid for the Total Study Area.....	6
Figure 3. Population Pyramid for Volusia County	7
Figure 4. Population Pyramid for the Town of Beverly Beach.....	8
Figure 5. Population Pyramid for the City of Flagler Beach	9
Figure 6. Population Pyramid for the City of Palm Coast.....	10
Figure A-1. Distribution of Persons Age 35 Years and Over per Square Mile by Planning Region	42

Introduction

The purpose of this study was to investigate the socioeconomic and demographic characteristics of the persons born post-World War II period from 1946 through 1964, also known as the Baby Boomers, who will reach age 65 years and older beginning in 2011 and persons who were age 65 years and older in 2000. Such a study of the travel, housing preferences, and other issues may aid in understanding of the resources that may be needed for the continued mobility of an aging population. The study identified and reviewed selected characteristics of the target population and the projected population through 2035 of Volusia County, and the Town of Beverly Beach, the City of Flagler Beach, and the City of Palm Coast in Flagler County. The study also provided an estimate of the percentage of the population that may cease to drive, reviewed transportation and land use options, and provided recommendations on resources and strategies to meet the mobility needs of an aging population.

There is some suggestion that the study area may already be experiencing the anticipated impacts of the Baby-Boom cohort. The concerns associated with these impacts are compounded by the rapid population growth taking place in the area. Other pressures such as increases in ad valorem taxes and homeowners' insurance may further exacerbate the ability of the population to age in place. These factors when combined with the physical and psychological changes that are associated with aging may create unprecedented demands on public services including transportation. Although the impact of the Baby Boomers is expected to peak in 2025, a better understanding of the anticipated impacts may serve to mitigate the effects.

Review Socioeconomic and Demographic Characteristics of the Population

Using data from the U.S. Census Bureau, the Florida Bureau of Economic and Business Research, the Florida Legislature, Office of Economic & Demographic Research, and local sources, an analysis of the socioeconomic and demographic characteristics of the current and projected population of Volusia County Metropolitan Planning Organization (MPO) and the City of Palm Coast in Flagler County was conducted. The planning area for the Volusia County MPO is currently limited to Volusia County, the Town of Beverly Beach, and the City of Flagler Beach. Flagler County's City of Palm Coast in Flagler County, which is not part of the Volusia County MPO planning area is located just northwest of Beverly Beach and is estimated to account for nearly two-thirds of the county's population. Consideration also was given to the fact that Flagler County is the fastest growing county in the U.S. According the U.S. Census Bureau, the county grew by 53 percent between 2000 and 2005 (Bernstein 2006) and more specifically grew by 10.7 percent between 2004 and 2005. In the interest of this study's contribution to Volusia County MPO's 2035 long range transportation plan, the City of Palm Coast was added to the analyses of socioeconomic characteristics.

The overall analysis focused on the age group that was 35 years old and over in 2000. Variables of interest include, but are not limited to:

- automobile ownership,
- educational attainment,
- ethnicity,
- gender,
- housing tenure,
- income,
- native or foreign born, and
- race.

The age variables have been segmented by five and ten year age breaks. A review of population growth trends and projections has been used to estimate the non-driving population and their characteristics through the MPO's 2035 planning horizon.

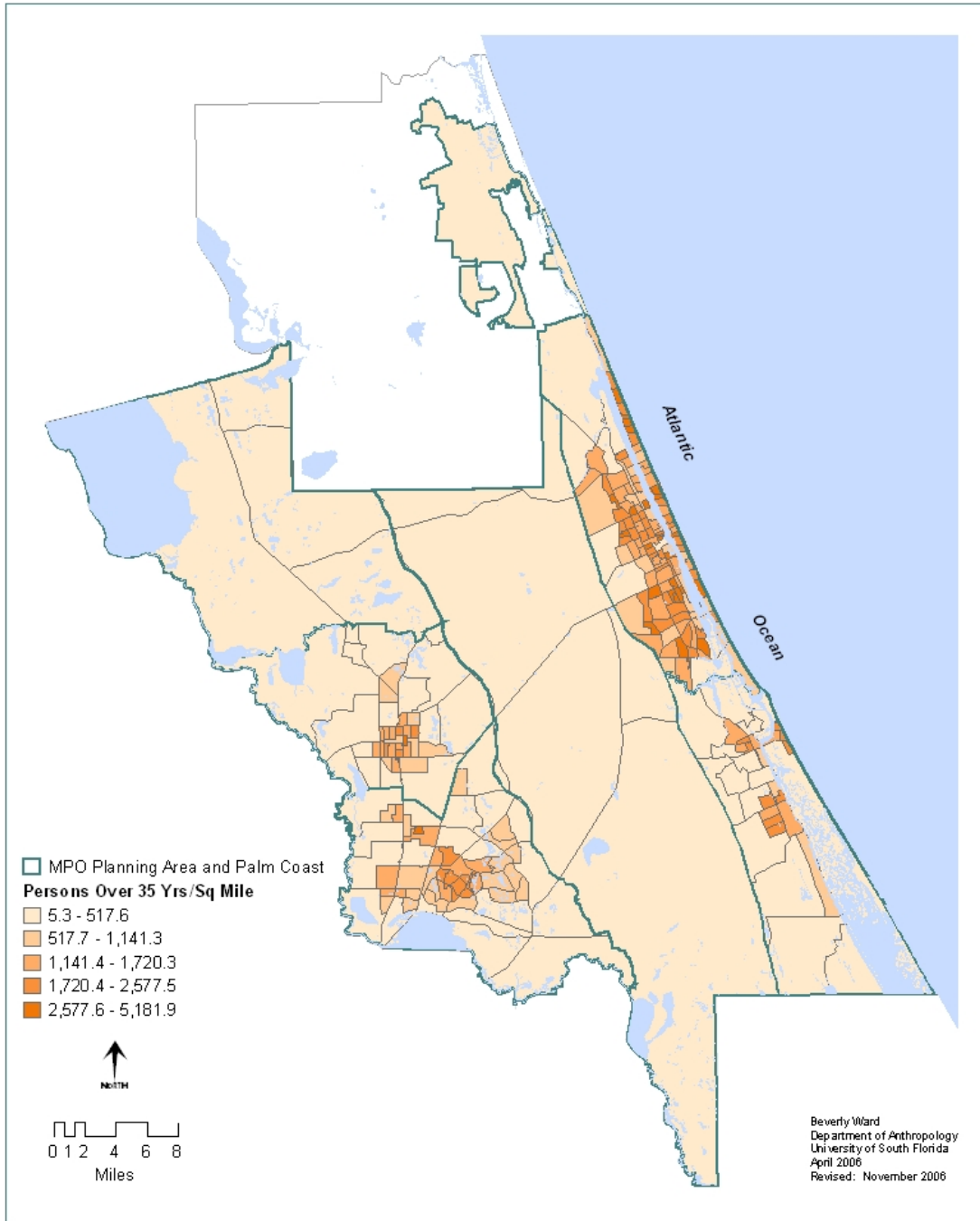


Figure 1: Persons 35 Years and Over per Square Mile

Census and Most Recent Population Estimates¹

Figure 1 shows the distribution of the study area population age 35 years and over in 2000. The population within Volusia County is shown by census block group per square mile. The populations of

¹ The U.S. Census Bureau uses population estimates to describe the total and sample counts for of the population in the decennial census and the American Community Survey. These estimates are used to project future population growth and are termed population projections.

Beverly Beach, Flagler Beach, and Palm Coast are shown by census place per square mile. (The census block groups for these areas were greater than the census places.) On average, there were 212.5 persons per square mile age 35 years and over in Volusia County in 2000. The majority of the segment of the population (62%) was concentrated in the northeast and southeast planning regions or portions of the county (see also Appendix A, Figure A-1). The distribution of persons age 35 years and over per square mile in Beverly Beach was 1,291.8; Flagler Beach, 944.3; and, Palm Coast, 435.2. As shown below and in Appendix A, there was considerable variation between the sub-areas in the distribution of persons age 35 years of age and older when the segment is further disaggregated by age breaks.

As shown in Table 1, the total population for the study area was estimated as 481,576 in 2000. (For many of the socioeconomic and demographic projections that will follow, the 2000 estimates are used as the base year.) The study area generally is more homogeneous ethnically and racially than the State and national averages, with the population of whites estimated as 86 percent. (The State and national estimates for whites were 78.0 percent and 75.1 percent, respectively.)

The median age for the four sub-areas within the study's boundaries were greater than the State and national estimates of 38.7 years and 35.5 years, respectively. Volusia County had the youngest median age of 42.4; Beverly Beach had the greatest, 62.6. These differences suggest that the study area is experiencing the anticipated impacts of the Baby Boom cohort roughly five years sooner than the State and the nation. (This may be a factor of immigration rather than aging-in-place, as suggested by the rapid growth.)

A total of 61.3 percent of the population, in the study area, was estimated to be age 35 years or older. The percentage of the population age 35 and over in Volusia County was estimated as 60.6 percent; Beverly Beach, 86.0 percent; Flagler Beach, 76.7 percent, and Palm Coast, 68.5 percent. Persons age 65 years and older were estimated to account for 22.8 percent of the population. The Volusia County estimate was 22.1 percent; Beverly Beach, 45.5 percent; Flagler Beach, 31.5 percent; and Palm Coast, 30.2 percent.

Although males and females accounted for 48.5 percent and 51.5, of the total population, respectively; males age 35 years of age and older only accounted for 28.5 percent of the population while females in this age group accounted for 32.5 percent. Similar differences in gender estimates are seen among the 65 years of age and older group, 10.0 percent and 14.2 percent, and almost double among the age group of persons 85 years of age and over, 1.7 percent and 3.2 percent. Gender differences in population estimates also were estimated to vary within the geographic areas with those areas with greater percentages of persons 65 years of age and older having a greater percentage of females in those age groups. These differences in the gender estimates are of particular interest because of women's earnings, travel behavior, and other factors.

Table 1: 2000 Census Estimates

Characteristic	2000							
	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	Flagler County	Florida	U.S
Total population	443,343	547	4,954	32,732	481,576	49,832	15,982,378	281,421,906
% White	86.1	97.9	94.8	86.3	86.2	87.3	78.0	75.1
% Black	9.3	1	2.7	11.0	9.3	8.8	14.6	12.3
% Hispanic	6.6	0.6	3.3	6.7	6.6	5.1	16.8	12.5
Age								
Median Age	42.4	62.6	53.1	51.2	N/A	50.4	38.7	35.3
% 35 to 44 years	14.4	7.3	12.6	11.4	14.2	12.3	15.5	16.0
% 45 to 54 years	13.3	14.4	17	12	13.3	13.2	12.9	13.4
% 55 to 59 years	5.5	9.7	7.7	6.8	5.6	7.1	9.8	8.6
% 60 to 64 years	5.3	9.1	7.9	8.1	5.5	8.0	4.6	3.8
% 65 to 74 years	11.3	24.7	18.7	17.7	11.8	17.1	9.1	6.5
% 75 to 84 years	8.2	17.7	10.8	10.4	8.4	9.6	6.4	4.4
% 85 years and over	2.6	3.1	2.0	2.1	2.6	1.9	2.1	1.5
Sex by Age								
% Male	48.6	47.2	48.1	47.5	48.5	47.9	48.8	49.1
% Male 35 years and over	28.2	38.8	36.1	31.7	28.5	32.4	52.2	23.8
% Male 65 years and over	9.6	20.5	14.6	14.5	10.0	13.7	7.6	5.1
% Male 85 years and over	1.7	1.9	1.9	1.6	1.7	0.7	0.7	0.4
% Female	51.4	52.8	51.9	52.5	51.5	52.1	51.2	50.9
% Female 35 years and over	32.4	47.3	40.5	31.7	32.5	36.8	29.6	26.7
% Female 65 years and over	12.5	25	16.9	37.1	14.2	14.9	10.0	7.3
% Female 85 years and over	3.3	4.2	2.1	2.6	3.2	1.2	1.4	1.1

(Source: 2000 Census Summary Files (SFs) 1 and 3)

The significance of these age cohorts is best illustrated by a review of the age composition of the population, using population pyramids. A "classic" pyramid with the youngest age groups at the bottom and the oldest at the top has a wider bottom and narrower top (He et alia 2005:14). By 1960s, the effect of the Baby Boom cohort created a bulge in U.S.'s population pyramid and the overall shape of the pyramid began to resemble a rectangle. He et alia state:

The Baby Boom cohorts' impact on the country's age structure will continue into the first half of the 21st century. By 2020 the Baby Boom cohorts will be aged 56 to 74 ... After 2030 the Baby Boom will become the oldest old, and the country's age structure is expected to resemble a rectangle that is extremely top-heavy ... This age structure is unprecedented in American history (2005:16).

As shown in Figure 2, the population pyramid for the study area does not have a classic shape. The Baby Boom cohort, highlighted in yellow, has the largest bulge, 27.5 percent of the total population. This is slightly less than the State estimate, 28.5 percent, and the national estimate, 29.4 percent. Persons 55 years of age and over in the study area were estimated to account for 33.9 percent of the population. The estimates for the State and nation were 31.9 percent and 24.9 percent. For those 55 years of age and over, in 2000, the population difference between the sexes is marked. Overall, the ratio of women-to-men over age 65 years was 128:100.

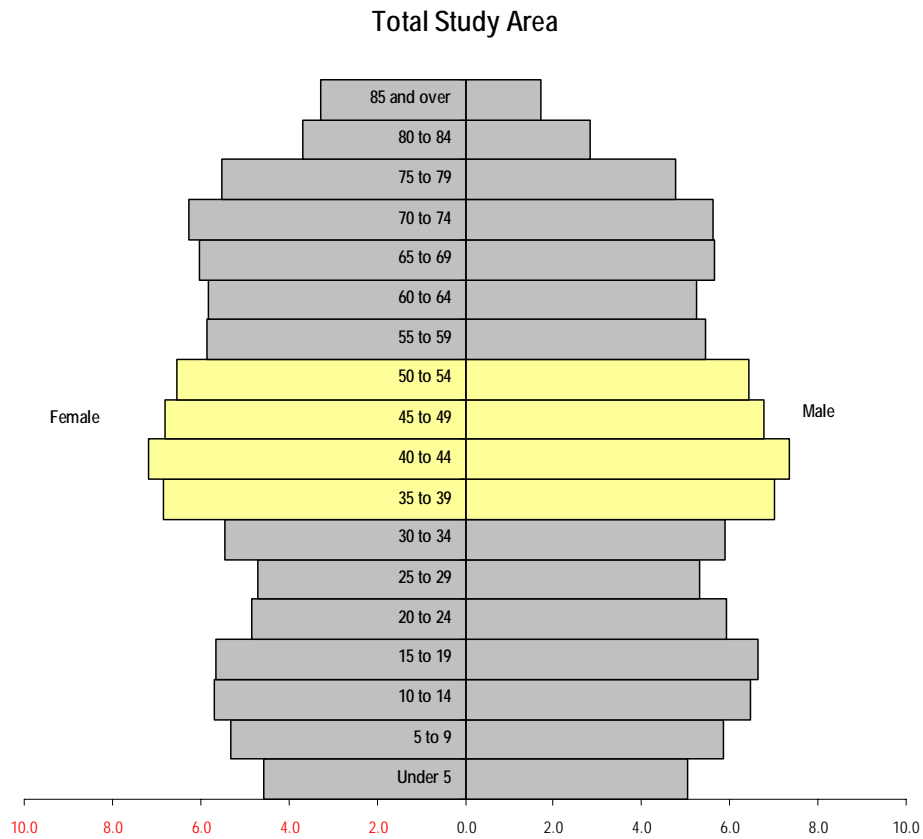


Figure 2: Population Pyramid for the Total Study Area
(Source: 2000 Census SF 1)

When the population is segmented by geographic area, the differences among the age cohorts become more dramatic. As expected, the population of Volusia County, shown in Figure 3, skews the population pyramid for the study area. This pyramid is almost identical to that of the total study area. (The population distribution of Palm Coast has a similar influence on the remainder of the study area.) As discussed above, nearly 61 percent of the population was age 35 and over in 2000. The Baby Boom cohort was estimated at 27.7 percent. The population over age 55 years was estimated as 32.9 percent. More than 24 percent of women were age 65 years and over. The ratio of women to men in this age cohort was estimated as 130:100.

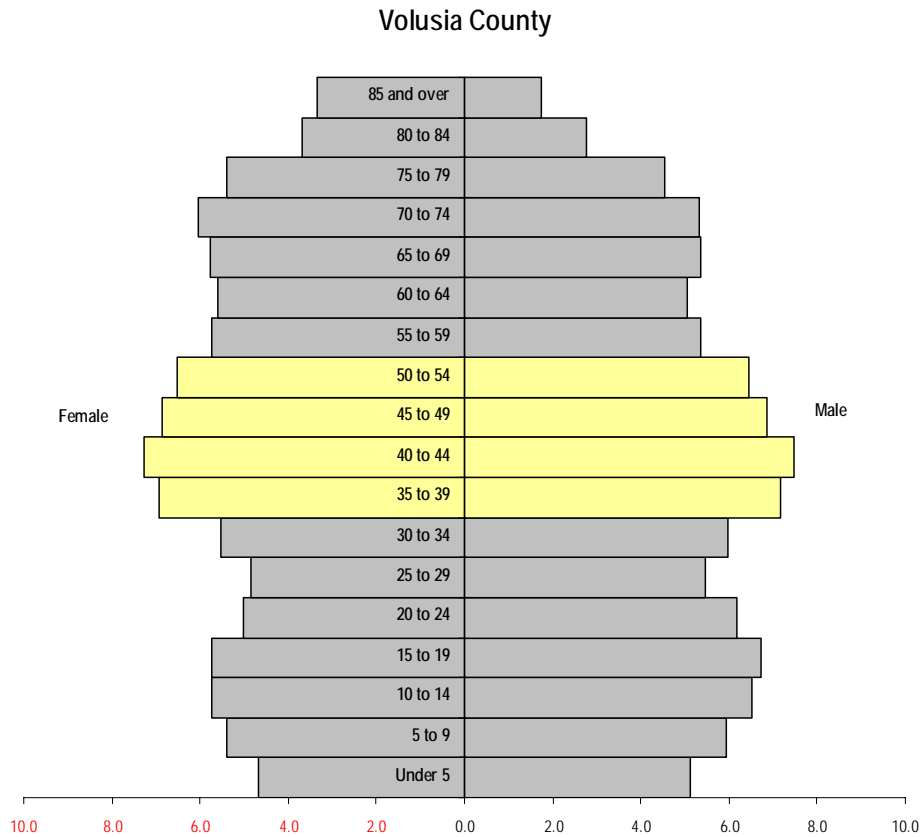


Figure 3: Population Pyramid for Volusia County
(Source: 2000 Census SF 1)

As suggested by the median age of Beverly Beach, the population composition is much more top-heavy than the total study area. The near inversion of the “classic” pyramid shape was expected because the city predominately is a “55+” or age-restricted community (Roseanne Renaldi, Beverly Beach City Council, personal communication). The largest age cohort is between the ages of 70 to 79 years (see Figure 4). The Baby Boom cohort represented 21.5 percent of the population; while slightly less than 65 percent of the population was age 55 years of age and over. More than 47 percent of women were estimated to be age 65 years and over. The ratio of females to males among this age cohort was estimated as 122:100.

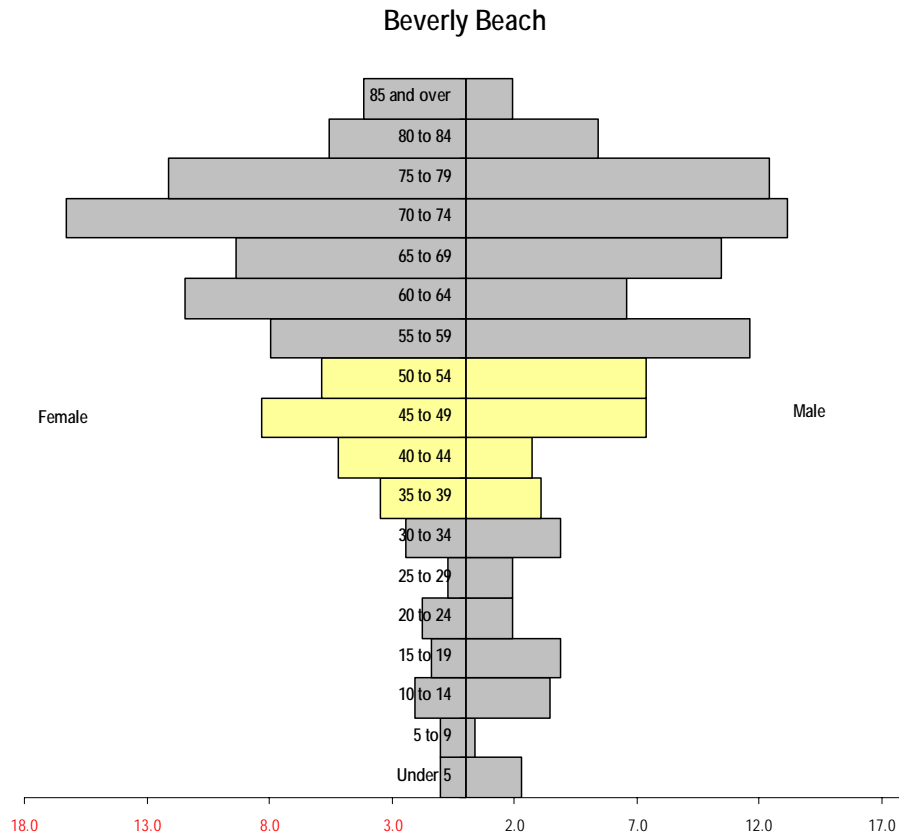


Figure 4: Population Pyramid for the Town of Beverly Beach
(Source: 2000 Census SF 1)

The population composition of the City of Flagler Beach, while not as striking as that of Beverly Beach, also shows an inversion of the classic shape (see Figure 5). The largest bulge was among those between the ages of 65 to 74 years; 18.7 percent of the population. Unlike Beverly Beach, the Baby Boom cohort was an estimated 29.6 percent of the population. The population estimate for those age 55 years and over was slightly more than 47 percent. Nearly one-third of the female population was age 65 years and over. The female-to-male ratio in this age cohort was estimated as 116:100.

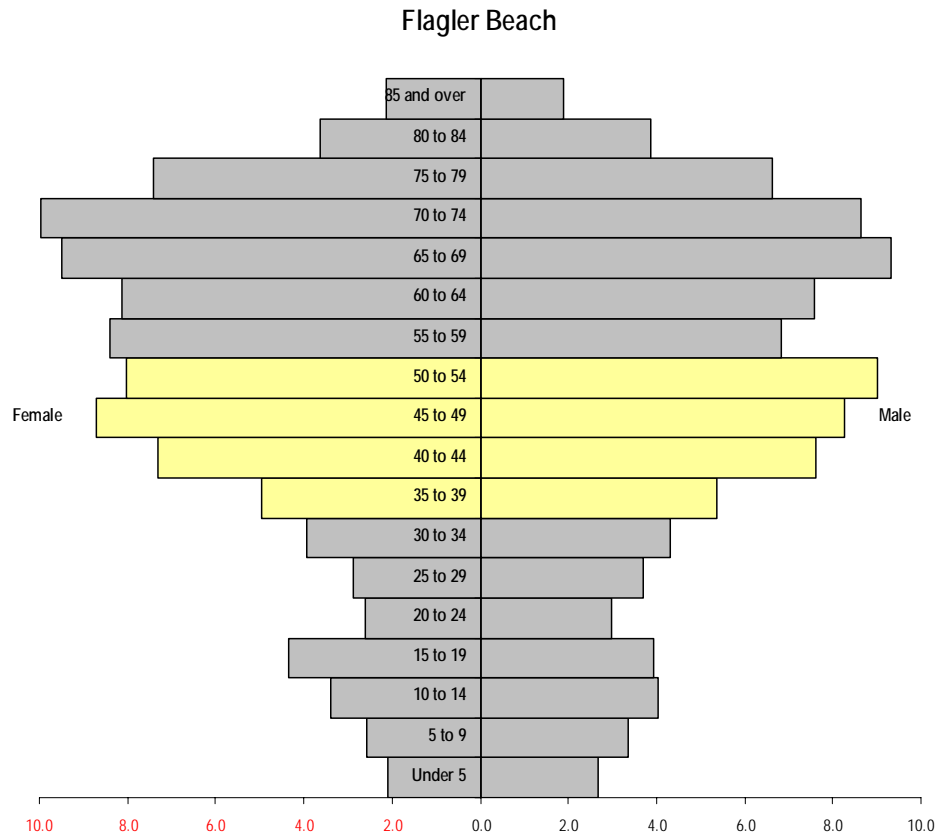


Figure 5: Population Pyramid for the City of Flagler Beach
 (Source: 2000 Census SF 1)

The City of Palm Coast has a population composition similar to that of Volusia County, however as shown in Figure 6, the shape also is inverted. The largest bulge was among those between the ages of 65 to 74 years; 17.7 percent of the population. The Baby Boom cohort was an estimated 23.4 percent of the population. Among those age 55 years and over, the estimate was slightly more than 44 percent. Thirty percent of the female population was age 65 years and over. The female-to-male ratio in this age cohort was estimated as 109:100.

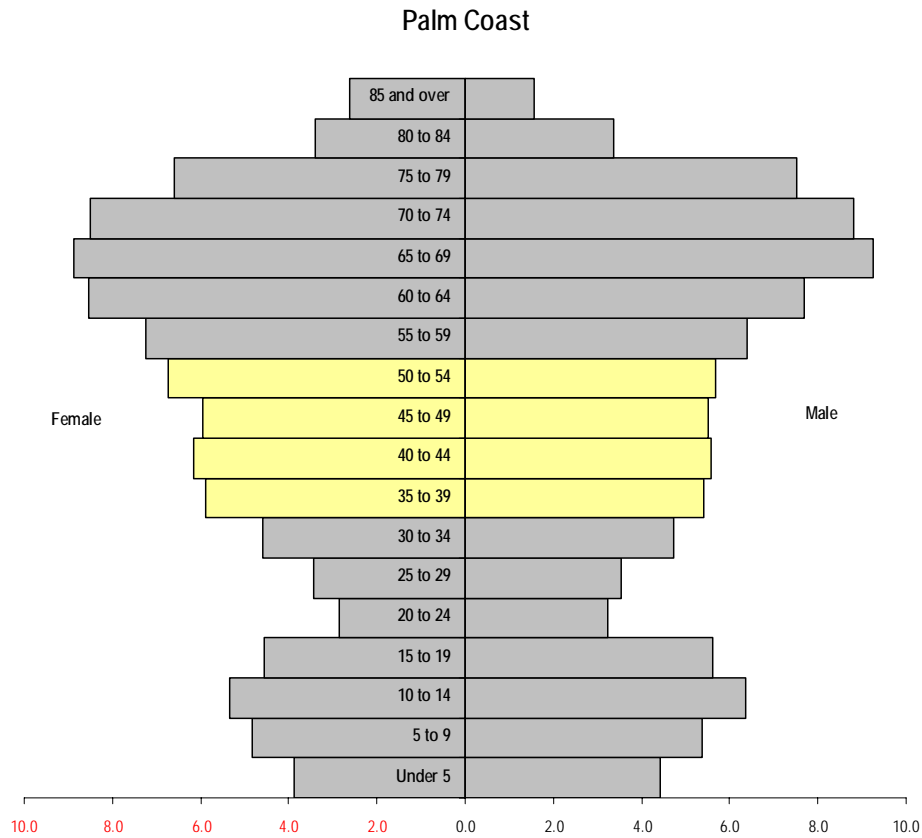


Figure 6: Population Pyramid for the City of Palm Coast
(Source: 2000 Census SF 1)

The 2000 age estimates and segmentation by cohorts and sub-areas of the study area provide a more nuanced analysis of population differences. Of significance are the differences between the median ages in the study area and the State and national estimates, which suggest that the study area is older and may already be experiencing the anticipated impacts of the Baby Boom cohort. This is reflected in the population composition, particularly when viewed by sub-area. While the female-to-male ratio for persons 65 years and over overall is similar to that of the State estimate, this ratio is important to consider when exploring other socioeconomic characteristics. The median age differences heighten the concern for the potential impacts of an aging population on transportation and land use alternatives. This may suggest that the short-term strategies provided in this study and the findings from the transportation development plan (TDP) and transportation disadvantaged service plan (TDSP) recently conducted by CUTR be given some priority in the area's unified planning work program (UPWP).

Specifically, the findings suggest that consideration should be given to expanding VOTRAN services into Flagler County. This is discussed further in relation to population projections for the study area.

Other Socioeconomic Characteristics That May Influence Travel Behavior

There are several socioeconomic characteristics or conditions that may directly or indirectly influence travel behavior, particularly the ability to own or operate an automobile. These characteristics also may influence a person's ability to "age in place." These characteristics include, but are not limited to, physical or mental impairment, educational attainment, household income, poverty status, and vehicle availability. Other characteristics, such as household tenure, household type, and marital status, have a less direct influence on travel behavior, but do have bearing on income security, the desire to age in place, and whether there is a friend or family member to provide transportation.

On average, the percent of persons with disabilities in the study area meet or exceed the State and national averages (see Table 2). Among the sub-areas, the 21 to 64 years cohort is near or, in the case of Palm Coast, well below the two averages. However, for those 65 years and over, the percentages exceed the two averages, and in the case of Beverly Beach, by as much as three times or greater. That is, in comparing those 65 years and over in the study area to the State and U.S. cohorts, the persons in the study area reported less functional ability.

Overall, the average household size of the study area is slightly smaller than the Florida and U.S. averages. There were an estimated 156,088 householders age 35 years and over in 2000. Owner-occupation exceeded the national average, and with the exception of Flagler Beach, the State average. (Among persons age 65 years and over, the average was 86.8 percent.) Nearly 90 percent of Beverly Beach householders were owners. While the State average of family households was about 67 percent, only Palm Coast exceeded this average. The average for the total study area, however, was 66 percent. The majority of family households, 54.2 percent, were married couples. Of the 34 percent of non-family households in the study area, nearly 86 percent of the householders lived alone. Although the area's percentage of mobile or manufactured homes is less than the State average, nearly 80 percent of the homes in Beverly Beach are this type. Among persons in group quarters, the percentage of persons in nursing homes in the area exceeds both the State and national averages. (Nursing home data for Beverly Beach and Flagler Beach was not available from the census at the place level.)

The percent of persons never married was below the State and national averages. Of the nearly two-thirds of the persons age 35 years and over who were married in 2000, nearly 95 percent had a spouse present. The percent of persons widowed, however, exceeded the Florida and U.S. averages. Both the State and study area average of divorced persons exceeded the national average. Palm Coast had the smallest percentage, 7.2.

The educational attainment of the study area exceeded the State and U.S. averages among those who were high school graduates or held associate or bachelor's degrees. Only Palm Coast exceeded the median income of the State, which was below the national median of \$41,994. Among those who lived below the federal poverty level, the percent persons in the study area over 18 years exceed the Florida and national averages. On average 41 percent of persons in the study area received Social Security income. However, more people had telephones and lived in households with a vehicle available, even among persons age 65 years and over.

Table 2: Additional Socioeconomic Characteristics

Characteristic	2000						
	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	Florida	U.S.
Persons with disabilities							
% 21 to 64 years	12.7	12.0	11.2	9.8	12.5	13.0	11.9
% 65 to 74 years	3.6	8.8	5.0	3.9	3.7	2.9	2.3
% 75 years and over	5.3	13.0	5.0	5.0	5.3	4.4	3.1
Average Household Size	2.3	1.8	2.0	2.4	N/A	2.5	2.6
Tenure by Household Type							
Population 35 years and over	156,088	284	2,367	12,493	171,232	5,140,178	82,048,521
% Owner-occupied	81.1	89.4	75.3	88.6	81.6	77.1	74.0
% Renter-occupied	18.9	10.6	24.7	11.4	18.4	22.9	26.0
% Family households	65.5	59.5	59.6	76.6	66.2	67.2	69.3
% Married couple family	53.0	51.1	50.6	69.0	54.2	53.1	54.6
% Other family	12.5	8.5	9.1	7.6	12.1	14.1	14.6
% Non-family households	34.5	40.5	42.4	23.4	33.8	32.8	30.7
% Living alone	29.5	34.2	36.3	20.1	28.9	28.1	27.2
% Not living alone	5.0	6.3	6.1	3.3	4.9	4.7	3.6
% Mobile homes	11.5	79.9	3.5	0.5	10.7	11.6	7.6
% Nursing homes (of persons in group quarters)	26.7	N/A	N/A	87.6	27.8	22.8	22.1
Marital Status for Population 35 Years and Over							
% Never married	7.0	1.8	6.2	3.7	6.7	8.1	9.3
% Now married	65.6	64.3	66.3	77.9	66.6	66.2	67.7
% Married, spouse present	61.1	59.9	62.5	75.0	62.2	60.8	62.5
% Married, spouse absent:	4.5	3.8	3.8	2.9	4.4	5.4	5.2
% Separated	1.8	1.9	1.9	1.1	1.8	2.5	2.4
% Other	2.7	1.9	1.9	1.8	2.6	2.9	2.8
% Widowed	12.7	14.1	14.1	11.2	12.6	11.3	10.1
% Divorced	14.8	13.4	13.4	7.2	14.2	14.4	12.8
Educational Attainment for the Population 25 Years and Over							
% < 9th grade	4.8	4.5	2.3	3.4	4.7	6.7	7.5
% 9th-12th grade	13.2	16.1	7.8	11.0	12.9	13.4	12.1
% High school graduate (includes equivalency)	32.2	39.3	26.8	32.6	32.2	28.7	28.6
% Some college, no degree	24.3	21.2	26.4	26.0	24.4	21.8	21.0
% Associate degree	7.9	2.5	5.7	7.5	7.8	7.0	6.3
% Bachelor's degree	11.6	10.0	19.4	12.3	11.7	14.3	15.5
% Graduate or professional degree	6.1	6.5	11.6	7.3	6.2	8.1	8.9
Household Income in 1999							
% Less than \$10,000	9.3	6.3	10.4	4.9	9.0	9.6	9.5
% \$10,000 to \$14,999	7.6	17.0	4.8	5.5	7.5	6.7	6.3
% \$15,000 to \$24,999	16.8	23.0	16.7	15.0	16.7	14.5	12.8
% \$25,000 to \$34,999	15.9	20.7	14.5	14.4	15.7	14.2	12.8
% \$35,000 to \$49,999	18.3	15.9	17.8	20.7	18.5	17.4	16.5
% \$50,000 to \$74,999	17.8	10.0	18.2	22.5	18.1	18.5	19.5
% \$75,000 to \$99,999	7.1	4.1	8.5	9.1	7.3	8.7	10.2

Characteristic	2000						
	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	Florida	U.S.
% \$100,000 to \$149,999	4.4	0.4	5.7	5.0	4.5	6.3	7.7
% \$150,000 to \$199,999	1.3	2.6	2.8	1.8	1.4	1.8	2.2
% \$200,000 or more	1.4	0.0	0.7	1.2	1.3	2.3	2.4
Median household income (\$s)	35,219	26,667	37,917	41,570	N/A	38,819	41,994
Poverty Status							
% 18 to 64 years	57.3	67.4	49.9	50.0	56.9	55.2	55.6
% 65 to 74 years	6.1	9.3	13.0	6.2	6.2	6.0	4.6
% 75 years and over	7.3	16.3	16.8	7.9	7.4	6.6	5.1
% Households With Social Security Income in 1999	39.9	79.6	44.4	52.2	40.8	32.7	25.7
% Households No Telephone Available	2.1	2.8	2.2	0.4	2	2.2	2.4
% Households No Vehicle Available	7.1	2.1	4.9	2.7	6.7	8.1	10.3

(Source: Census 2000 SFs 1 & 3)

Additional Population Estimates

As shown in Table 3, the most recent year for the study area population estimates, there was nearly a 15 percent increase in the population bringing the total to 554,043. (While there appears to be a decrease among the 35-to-44 years age cohort, this decrease may be caused by a drop in the cohort between 35-to-39 years. The age cohort of 40-to-44 years was estimated to represent 7.3 percent of the total population. This suggests that the population for those born before 1965 grew from 61.3 to 63.7 percent between 2000 and 2005.) More than 40 percent of the population was estimated as 55 years age or more. The population age 65 years and over was estimated as 23.4 percent or 112,689 persons. While this is an estimate of only three percent growth among persons in this age group, the percentage of persons age 85 years and over was nearly double. This age group is expected to continue to be a rapidly growing segment and also is of particular concern for this study.

Table 3: 2005 Population Estimates

Characteristic	2005					
	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	% Change 2000-2005
Total population	497,649	529	5,434	50,431	554,043	15.0
Age						
% 35 to 44 years	5.7	3.1	4.1	4.7	5.6	-60.54
% 45 to 54 years	14.4	7.3	12.6	11.4	14.1	6.50
% 55 to 59 years	13.3	14.4	17.0	12.0	13.2	135.47
% 60 to 64 years	5.5	9.7	7.7	6.8	5.6	2.15
% 65 to 74 years	5.3	9.1	7.9	8.1	5.6	-52.86
% 75 to 84 years	11.3	24.7	18.7	17.7	11.9	42.45
% 85 years and over	5.6	14.6	8.8	8.3	5.9	129.54

(Sources: Volusia County MPO and Florida Legislature, Office of Economic & Demographic Research)

Population Projections 2010 through 2035

As shown in Table 4, the population projections for the study area between 2010 and 2035 show an average growth rate of seven percent. If the growth rate among persons 65 years of age and over remains at three percent, a conservative estimate, by 2035, this age cohort could equal 249,266 or 27.9 percent. When giving consideration to the segment of this population that may cease to drive, consideration also must be given to an additional factor, those persons who may experience temporary disabilities. In a recent news article (Pennington 2006), it has been suggested that Baby Boomers may experience a greater incidence of orthopedic disabilities than older cohorts. These disabilities may give rise to a greater number of persons experiencing the temporary need for transportation alternatives rather than long term.

Table 4: Total Population Projections

Year	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	% Change from previous 5 years	Population 60 years and over
2010	537,787	667	6,842	61,038	606,334	n/a	221,496
2015	578,307	795	8,152	72,727	659,981	8.8	254,509
2020	618,620	924	9,477	84,546	713,567	8.1	274,392
2025	657,376	1,050	10,773	96,107	765,306	7.3	287,720
2030	705,700	1,170	11,997	107,028	825,894	7.9	224,305
2035	755,099	1,333	13,677	122,011	892,120	8.0	198,344

(Sources: Volusia County MPO and Florida Legislature, Office of Economic & Demographic Research)

Based on the total population projections for the years 2010 through 2035, population estimates for persons age 60 years and over were calculated. (Age 60 and over is used to aid in calculations of the transportation disadvantaged population.) Table 3 shows that between 2000 and 2005, the number of persons age 60 years and over in the study area grew by more than 18 percent. By 2010, this segment of the population is expected to grow by more than 37 percent, the largest expected increase. Growth will continue from 2015 through 2025, although at a slower rate. A 14.9 percent increase is estimated for 2015; a 7.8 percent increase in 2020; and, a 4.9 percent increase in 2025. Although the total population is expected to increase in 2030, a decrease of more than 20 percent among persons 60 years and over is estimated due to the "pinch" in the number of persons born after 1965. A smaller decrease, of 11.6 percent, is anticipated in 2035. Overall, the population of persons 60 years of age and over is expected to peak in 2025 at 287,720. This age cohort will represent 37.6 percent of the population in the MPO Planning Area (including Palm Coast).

Population Estimates of Need for Transportation Alternatives and Driving Reduction or Cessation

Using the population projections shown above, estimates of persons unlicensed to drive and those who may reduce or cease to drive were developed using a two-step process. First, the percentage of unlicensed persons age 35 years and older in 2000 were calculated using the Federal Highway Administration's (FHWA's) table, "Distribution of Licensed Drivers 2000 By Sex and Percentage In Each Age Group and Relation to Population" (U.S. Census, 2000a). Second, five-year assumed cessation probabilities for older persons by sex were calculated using the Waldorf and Pitfield (2005) calculations as cited in Page (2006). As shown in Table 5, 10-year estimates for 2010 through 2030 were calculated for the study area. By 2010, the total population is expected to be 606,334 persons, more than 40 percent of whom will have been born before 1965. Of this cohort, approximately 15 percent are

expected to be unlicensed persons. Another eight percent are expected to reduce or cease driving. It should be noted that the estimates for this period are heavily influenced by the median age of the population in the study area. The FHWA licensing rates are greater for men and women in the age group of 35 to 39 years and tend to decrease in subsequent age groups. This is true for both sexes, although the licensing rates for older women are much less than those of older men. Among persons age 85 years and more, licensing rates were 78 percent for men and 36 percent for women (U.S. Census, 2000a). This methodology provides a rather moderate estimate of persons who may need transportation alternatives to privately owned and operated automobiles. It is recognized that many persons who hold a license may not drive and that many persons who drive are not licensed (Levy 1995:461 cited in Page 2006). The estimate does not take into account access to transportation by family members or friends.

The median age partially explains the decline in the estimate for 2020 where, although the overall population is expected to increase to 713,567 and the percentage of those born before 1965 remains more than 40 percent of the population, the percentage of unlicensed persons is estimated to decrease to nine percent and the percent of the population expected to reduce or cease driving decreases to four percent of the total population. A second factor influencing these estimates is the “pinch” or decrease in the population projections for those born after 1964. By 2030, the Baby Boom cohort is expected to represent 27 percent of the total population. Eleven percent of the age group is expected to be unlicensed persons. Six percent of the cohort is expected to reduce or cease driving.

Table 5: Population Estimates of Unlicensed Persons and Persons Who May Cease to Drive

Year	Volusia County	Beverly Beach Town	Flagler Beach City	Palm Coast City	Total	Baby Boomers	Unlicensed BBs	DR/C	Estimate	% Total
2010	537,787	667	6,842	61,038	606,334	268,969	41,237	21,424	62,661	10.3
2020	618,620	924	9,477	84,546	713,567	309,225	27,798	12,988	40,786	5.7
2030	705,700	1,170	11,997	107,028	825,894	224,305	24,165	14,108	38,272	4.6

Implications of Socioeconomic Characteristics and Driving Reduction/Cessation for the Future

The most striking demographic characteristic is the projected growth in the study area, particularly in Flagler County. This is closely linked with age cohorts and the population pyramids. As mentioned above, the shapes of the pyramids in some sub areas of the study area are an inversion of the classic shape. The median age of the study area population is slightly older than the State and the U.S., which suggests that the area already may be experiencing the impacts of the Baby Boom cohort. This raises concerns regarding the availability of others to provide services as travel behavior changes. This concern is heightened in areas where people live alone, are widowed, or divorced. The relatively high percentage of homeowners, coupled with the median age, suggests that residents may want to continue to live in their homes. Although automobile ownership is greater in the study area than in Florida or the nation, the percentages of persons with disabilities, the median age, the projected population growth, and regional activities, as discussed later, suggest the need for increased transportation alternatives to the automobile and changes in land uses that will reduce the need for travel by private automobile.

The estimates of unlicensed persons and licensed drivers who may reduce or cease driving suggest that there is some urgency in considering these alternatives. These findings suggest that as soon as 2010, more than 10 percent of the total population in the study area may be unlicensed or may reduce or

cease driving. While this estimate declines in subsequent decades, a considerable portion of the population is anticipated to continue to need alternatives. Taking into consideration these estimates coupled with the other demographic and socioeconomic characteristics, Flagler County officials may want to consider connecting their citizens to the Volusia County transportation system, thus providing more regional options.

Literature Review

The U.S. population is aging, in part, due to declining birthrates and longer life expectancies. As of July 2005, approximately 37 million people were aged 65 or older or 12 percent of the total population. The percent of the population age 65 years and older is expected to increase by almost 150 percent between 2005 and 2050, to approximately 87 million, according to Census Bureau projections (2004a). By that year, as many as 1 in 5 Americans may be age 65 years of age or older. For the first time in its history, persons aged 65 and older will outnumber the young in the U.S.

Between the years 2010 and 2030, an unprecedented number of aging Americans (more than 50 million) will be using all modes of transportation in the United States. Demographic changes in the traveling public will require adjustments in transportation systems, vehicles, community-based services, housing and other land uses, and public policies. There currently is little agreement among experts on how the changes in population size and composition will influence the nation's policies and programs. Most agree, however, that as persons born between 1946 and 1964—Baby Boomers—age, the U.S. must prepare for a strain on the services and programs that will be required to provide safe mobility and access to goods and services.

According to demographers, Florida is a precursor of the population changes that await the nation and provides an opportunity to explore the political and social issues facing an aging society. When Baby Boomers start turning 65, the rest of the country will closely resemble present-day Florida. The median age of Floridians in 2004 was estimated as 39.3 and the percent of the population age 65 years and more was estimated as 17.6 percent (U.S. Census Bureau 2004b). By 2030, it is estimated that 27.1 percent of Florida's population will be 65 and older.

The most rapidly growing age group in the nation is those 85 years and older. In 2000, approximately 5.1 million persons were 85 and older. State population estimates show that, since 1990, the number of people over age 85 in Florida grew by 31.8 percent, to more than 270,000. The 2000 Census reported that there were more than 331,287 persons over age 85 in Florida (U.S. Census Bureau 2000). By 2010, this age cohort is projected to reach 537,846 persons, a 62.4 percent increase (U.S. Census Bureau 2005b).

A review of the relevant literature highlights a number of issues related to the mobility of an aging population. The issues include mobility concerns, transportation options or alternatives to the privately owned or operated automobile, land use considerations, and related socioeconomic factors—ethnicity, gender, income, race, etc. These highlights are not exhaustive and will continue to be explored during the remainder of the study. This review also discusses the implications for the study area.

Mobility Concerns, Transportation Options, and Land Use and Other Considerations for an Aging Population

Mobility Concerns

For nearly two decades, there have been increasing research and other efforts to understand the transportation needs of an aging population. Despite the increased attention to this issue, several knowledge gaps continue to exist. In 1999, the National Academies of Sciences, Transportation Research Board conference entitled, "Transportation in an Aging Society: A Decade of Experience" was held to determine the state-of-transportation knowledge. One result of the conference was a list of more than 50 potential research topics. Subsequent to the conference, an expert panel prioritized the topics.

While safety, as related to driving, e.g., retraining, screening and assessment tools, and detection of impaired drivers, was the primary research focus, mobility “[was] a strong second” (USDOT 2001).

The conference and several studies suggest that the knowledge gaps related to transportation alternatives to driving and mobility are quite complex. Foley et alia stated:

In summary, each year hundreds of thousands of older drivers across the country must face the reality of driving cessation and of becoming transportation dependent. This significant life event has been overlooked in much of the literature as a routine consequence of the aging process, particularly in the construct of instrumental [activities of daily living] ADLs... Among the oldest old (persons aged 85 years or older), the difference between driving and not driving typically reflects a sharp contrast in level of physical fitness and mental functioning. Although many of the women in this current generation of the Asset and Health Dynamics Among the Oldest Old [AHEAD] cohort never drove, younger women in the emerging “Baby Boom” cohort are as likely to be licensed to drive as men. Hence, it is appropriate to regard driving as a pervasive task of independence for both men and women that is subject to change in late life in association with age-related changes in health and functioning. The health and social consequences of driving cessation need to be recognized and addressed by health professionals, transportation planners, and policymakers. Failure to fully recognize the magnitude and importance of this transition among elderly adult drivers will compromise goals of improving the quality of life in old age, both now and in the foreseeable future (2002).

This study and others suggest that existing alternative transportation resources currently are inadequate or unsuitable to meet the mobility needs of an aging population (AARP 2003; Burkhardt 2003a; Burkhardt 2003b; Ritter 2002). This deficiency is expected to become more acute as Baby Boomers age. In addition to the anticipated increases in this subgroup of the population, there are other socioeconomic factors that contribute to this issue’s complexity.

Specifically, travel studies and other research suggest that older adults are a mobile, independent, and active group determined to maintain their quality of life and mobility. However, because the population is aging, an increasing number of persons have some type of disability or functional limitation that potentially impacts their use of various transportation modes. According to the 2000 Census, approximately 49.7 million Americans have a disability that interferes with important activities of daily living (Waldrop and Stern 2005). Disability rates vary by age, sex, race, and ethnicity. The overall disability rate for persons 65 years and older was 41.9 percent compared to 18.6 percent for persons 16 to 64 years old. Women constitute a larger share of older persons with a severe disability (43 percent) because of their overall longer life expectancy.

Many older Americans are subject to age-related declines in the abilities needed to live independently. Specifically, sensory and cognitive functions may deteriorate in later life. For example, 32 percent of persons 65 or older have a mobility limitation compared to 8 percent of those persons 16 to 64. Given the inevitability that driving skills will decline with age, it is important to consider how well transportation modes adapt to serve the travel needs of those persons when they can no longer drive.

As mentioned by Foley, Baby-Boom women are more likely to be licensed than their male counterparts and, consequently, not as likely to use public transportation. While African Americans tend to use public transit more than the general population, licensing among the subgroup also is increasing (Hill 1994). The number of immigrants to the U.S. over the last 50 years introduces additional cultural factors that

may influence travel behavior. And finally, changes in land use patterns, particularly suburbanization, further stresses the capacity of transportation alternatives to help people age in place.

Mobility, Health, Illness, and Impairment

Declining health is considered the chief contributing factor to driving cessation. It is estimated that in 2005, 80 percent of the population 65 and older had "...one chronic health condition and 50 percent [had] at least two" causing limited activity (He et alia). What is not understood is how driving cessation may be offset by assistive devices and advances in medical technology nor the extent to which driving cessation may be temporary for significant segments of the population? Several illnesses or impairments may contribute to activity limitations, including driving cessation (O'Neill and Dobbs 1999). Some of the leading conditions include:

- Obesity;
- Alzheimer's disease;
- Arthritis;
- Cancer;
- Diabetes;
- Heart disease and stroke;
- Hypertension
- Osteoporosis, and
- Sensory impairments.

Excess body weight and obesity recently have gained popular attention and an increase in the number of research studies. The conditions' roles as increased risk factors for coronary disease, cancer, diabetes, hypertension, and functional disabilities may contribute to driving cessation. Between 1999 and 2000, persons age 65 to 74 years of age were found to be more overweight and obese than their older counterparts (National Center for Health Statistics (NCHS) 2003). Educational attainment, ethnicity, and gender are associated with differences in obesity and excess body weight. These differences are favorably associated with dietary practices that decrease the risk factors (He et alia 2005).

The effects of Alzheimer's disease (AD) include gradual loss of brain cells, decreasing sufferers' capacity to perform activities of daily living (ADL). The risk and severity of AD increases with age, with persons age 85 years or more at the highest risk. (Again, this age cohort is the fastest growing segment of the population.) Because women live longer than men, more women are affected by AD and, consequently, have more years of impairment (National Institute on Aging (NIA) 2002).

The effects of arthritis on joints, surrounding and connective tissues has been cited as the leading cause of activity limitations among older persons (Centers for Disease Control and Prevention (CDC) 2003). There is, however, some indication that the activity limitations associated with arthritis are declining due to advances in medical and assistive technologies (Cutler 2001; Manton and Gu 2001).

Older men appear to be at greater risk than women to incidences of cancer, which may contribute to differences in longevity rates. There also are racial and ethnic differences, with non-Hispanic whites reporting more incidences (NCHS 2004). The debilitating effects of various cancers and cancer treatments contribute to activity limitations. Diabetes also limits activity among older adults. Both older Hispanics and blacks report higher incidences than their white counterparts.

Heart disease, hypertension, and stroke are chronic conditions found to increase with age and limit activity. Hypertension has been found to be greater among older women and blacks than men and whites (Blackman et alia 1999). Older blacks appear to have greater incidences of stroke than whites and Hispanics (NCHS 2004).

Osteoporosis or the loss of bone density may be a contributing factor to activity limitations because of the increased risk factor for disabling fractures. The loss of bone density is prevalent in both men and women; however appears to be greater in women, particularly among those 85 years and older. The incidence also appears to be greater among non-Hispanic whites than non-Hispanic blacks (CDC 2000).

Visual and hearing impairments can contribute to activity limitations. Among older adults the range is from 30 percent to 37 percent for hearing and visual impairments, respectively (Desai, Zhang, and Hennessy 1999). Both sensory losses are found to increase with age, with older men more having greater hearing difficulties than women and older whites having greater hearing losses than blacks. These sensory impairments may contribute to increased falls or associated with hypertension, heart disease or stroke. The impairments also have been associated with greater social isolation (Campbell et alia 1999).

Overall, it appears that American women have a longer and more active life expectancy than men. Technology, particularly in the form of medical and assistive devices, increasingly is reducing activity limitations. On the one hand, however, there is concern that “[t]he incidence of injury among Baby Boomers is likely to challenge the healthcare system as the population ages” (Meisler 2003). The rate of incidence is said to be second among doctor’s visits among Baby Boomers (Pennington 2006), suggesting that this age cohort may have more short-term disabilities rather than or in addition to chronic illnesses than their older counterparts. The short-term disabilities may increase the incidence of driving cessation, although short term, among this age cohort, thus increasing the need for transportation alternatives beyond their numbers.

Transportation Options

“Older Americans are now more dependent on the private car than at any time in U.S. history” (Rosenbloom 1999). If unable to drive, many older persons reported in one study that they would travel by car either with a friend or relative or by taxi (Rosenbloom 1999). Alternatives to automobile travel are limited by individuals’ functional abilities and geographic location. For persons who have activity limitations, their abilities to use fixed route transport or even paratransit may be restricted or prolonged due to difficulties in walking, standing, negotiating stairs, and paying fares. Geographic location also may limit the range of older persons due to the availability of public transport. Optimum solutions include a range of traditional fixed route services to flexible routes, community or service based programs, volunteer programs, taxis, walking, and bicycling—a “cafeteria” plan that is responsive to the lifecycle. There also is an educational component, which appears essential to the success of these options. Knowledge of and access to the options is important to aid older persons in maintaining mobility (Suen and Sen 1999).

According to Katherine Freund, Independent Transportation Network (ITN),

With modes set aside and transportation reduced to fundamental components, two primary elements emerge: resources and logistics. Resources are the economic means, in any form and from any source, to fund a transportation process. Logistics refers to the arrangement and connection between and among the events in a transportation process. Two primary forces—technology and policy—act on the two

primary elements. The three kinds of technology are mechanical, energy, and information. Policy, of course, guides all the above. The action of the twin forces of technology and policy on the primary elements of resources and logistics, within the context of consumer choice, produces transportation. All transportation may be understood in terms of these two primary elements and two primary forces within this context. Change any one of these four components of the transportation framework, or change consumer choice through marketing, and some or all of the other primary elements and forces change responsively. In combination, they form a useful heuristic device, a conceptual framework with which to understand both advancements and barriers in transportation, historically and predictively (2004).

Freund has developed a primarily volunteer-based, private transportation system that provides individual or shared-ride trips. Fares are charged by the mile, with discounts for advanced registration and ridesharing. Memberships also are provided to frequent users and businesses. There are four ITNs in the United States, with the latest franchise opening in Winter Park (FL), near Orlando. While ITN may not be a solution for every area, Freund's model of the components of the transportation process and system are useful in considering alternatives.

Land Use Considerations

According to Giuliano,

Empirical research on the relationship between land use and travel patterns among the elderly is almost nonexistent... Promoting more transit-friendly, mixed-use communities will increase local accessibility, but current preferences for automobile travel, low-density living environments, and the benefits of aging in place suggest that such strategies will play a limited role in addressing mobility problems of the elderly. (2004).

While there is little research on the relationship between land use and travel patterns among older persons, the literature does suggest that land use does affect travel behavior. Several studies have indicated that neighborhood design features, particularly pedestrian amenities may reduce automobile trips (Boarnet and Crane 2001; Parsons, Brinckerhoff, Quade, and Douglas, Inc. 1993; Handy 1996). Hendricks et alia found that transit-oriented development plays some positive role on public transit ridership (2005). Particular emphasis is given to roadway enhancements that improve safe driving and pedestrian uses (Staplin 2004; Oxley, Fildes, and Deway 2004). Williams and Seggerman have developed model regulations and plan amendments to promote multimodal transportation districts for the consideration of Florida communities (2004). (See also Appendix C.) Giuliano suggests that these strategies may have a limited role in meeting the mobility needs of an aging population, particularly in the near term. Therefore, consideration should be given to incorporating relevant design features from the FHWA's *Highway Design Handbook for Older Drivers and Pedestrians* (U.S. Department of Transportation 2000b). In addition, the State of Florida's Traffic Engineering and Operations Office provides a chapter on elder road users in its *Traffic Engineering Manual* that incorporates many of the design features suggested by FHWA's handbook. Among the design features that are suggested are:

- Six-inch-wide pavement markings for better visibility;
- Reflective pavement markings with 40-foot spacing, which is especially effective on rainy nights;
- Large overhead street signs at busy intersections;
- Advance street name signs;
- Improvements to pedestrian features at intersections; and

- Increased emphasis on effective traffic control through work zones.

Land use considerations are discussed in a broader context later under recommended strategies. The literature suggests, however, that consideration of land uses is essential to developing “livable communities.” As with multimodal planning, livable communities include the incorporation of the principles of universal design into existing and future homes and communities (Kihl et alia 2005). These considerations are heightened when fossil fuel consumption, the environment, safety, and income are added to the mix of factors.

Additional Considerations

Disasters and Emergencies

Chief among concerns for natural disasters and other emergencies is Florida’s coastal cities susceptibility to storm surge.

It is estimated that by the year 2010, Florida’s population will exceed, 20,000,000 people. Many of the new residents to Florida live in hurricane-prone stretches of coastline. Approximately 80 [percent] of Florida’s total population lives in 35 coastal counties, making Florida the leader in number of people at risk to a hurricane disaster. The problem is compounded by Florida’s demographics: 18.6% of Florida’s residents are 65 years of age or older...Wealthy retirees are increasingly opting for the newly built assisted-living communities throughout the [S]tate (Elsner and Kara 1999:404).

Whether natural or otherwise, the needs of an aging population must be considered in emergency planning. While the responsibility for emergency planning is beyond the scope of the MPO, past experiences both local and beyond indicate the need for multiple jurisdictions to partner in information sharing and other resources. The urgency of this need is compounded by the study area’s demographics and land uses. Of particular concern to this study is the anticipated growth, the percentage of persons living in nursing homes, manufactured homes, living alone, persons with disabilities, and others who may be more vulnerable to income, vehicle availability, and so forth.

Ethnicity, Gender, and Race

As mentioned above, the aging population is becoming more ethnically and racially diverse. In 2000, only 8 percent of blacks and 5 percent of Hispanics nationally were seniors, compared to over 15 percent of Whites. Significant changes are anticipated by 2050, when the number of older Black Americans is expected to triple; persons of Hispanic origin will represent 14 percent of those 65 or older; and a large proportion of the White population (23 percent) will be seniors (Hobbs and Damon 1996). Although interest in the travel patterns among older cohorts of different racial and ethnic backgrounds has grown, very little is known about the impact of such differences on the travel patterns.

A better understanding of gender differences is important because women tend to outlive men. In 2000, the overall ratio of men to women among persons 55 years of age and older was 81:100. This ratio has tended to decline to 50:100 for persons 85 years of age and older (U.S. Census Bureau 2001). There also is a spatial concerns related to the ratio of men to women, in some areas, e.g., central cities, the ratio of men to women at all ages may be as low or lower as that found among persons 55 year of age and older (Ward 2004). Several studies have indicated gender differences in travel behavior (Wallace and Franc n.d.). There are, however, special considerations related to these differences as the population ages. Although there has been a decline the licensing gap between men and women, research suggests that women tend to cease driving sooner than men and to drive fewer miles

(Burkhardt, Berger, and McGavock 1996; Marottoli et alia 1995). Whether this trend will continue with the women in the Baby-Boom cohort is unknown at this time.

Little also is understood on how housing, income, racial, and ethnic differences influence older women's travel behavior. The retirement security issues discussed below should be considered along with issues of ethnicity, gender, and race as income combined with ethnicity, gender, and/or race may adversely impact mobility and transportation options.

Household Composition or Living Arrangements

As suggested above, gender may influence travel behavior. Given the health outcomes for women and men, as the population ages, it is anticipated that there will be more women living alone. Although licensing among women is nearly equal to that of men, on average, women's trip-making continues to differ from men's. The implications of these differences for the Baby-Boomer cohort are not well-understood. Will women in this cohort make fewer trips and travel shorter distances than their older counterparts? Rosenbloom best frames these concerns:

Substantial increases in female employment will have perhaps contradictory influences on the activity and travel choices these women will make when older. Because of their presence in the labor force, they may develop more active and involved lifestyles than women who spent most of their lives as housewives. They may wish to continue these active lifestyles after they retire. On the other hand, they may have less personal income with which to do so, no spouse to share expenses, and no children to provide needed assistance.

If anything, a larger gap may be created between the activities they wish to engage in and their ability to do so in comparison with the gap faced by otherwise comparable older women today. When these women are elderly, they may do without, suffering relative deprivation, or they may act more like men do today and drive to meet their needs, even when they find driving difficult or dangerous (2004).

Retirement Security

Polivka suggests that there are many threats to income security for retirees. These include:

- Proposed cuts in Social Security;
- Stagnant pension coverage and market-based;
- Defined contribution pensions and decline of defined benefit plans;
- Increasing out-of-pocket costs for Medicare; beneficiaries;
- Stagnant wages;
- Increasing cost of living;
- Declining savings; and
- The private accounts campaign (2005)

While it is anticipated that Baby Boomers may have high incomes and greater wealth than current retirees, Polivka's research suggests that the projected retirement wealth among this cohort will not make them better off than their parents due to the above threats. The threats also may be greater for renters and single women.

Implications for Volusia County Metropolitan Planning Organization

When the study area's socioeconomic characteristics are combined with the findings from the literature review, the pressing issues are the older median age of the population coupled with a rapid growth in population. The median age suggests that the population in the study area, on average, is experiencing some of the mobility issues slightly ahead of the rest of the State and the nation. The impacts of the mobility issues are strained further by the rapid population growth. This may indicate that the ability to respond to the mobility needs of the aging population is competing with other needs to meet growth, e.g., schools, water, sewage, etc. There also is some suggestion that gender and income may combine to constrain individual mobility further, since women tend to live longer and persons living in low-income households tend to rely more on public transportation. Current land use practices, such as coastal development, manufactured home occupancy, and what one resident characterized as "county layout" also influence travel behavior. The concentration of the population on the east side of the county coincides with a concentration of goods and services. Cross-county travel, particularly for those who live on the westside who want to access the east coast may be difficult for some residents. The lack of sidewalks within or around manufactured home communities seemed to be of concern for personal safety for some focus group participants. Although the number of zero-vehicle households in the study area is lower than Florida and U.S. averages, it is not clear how much of the population age 35 years and over does and will continue to drive as they become older. As the Baby-Boom cohort ages, however, the rapid population growth is expected to raise additional concerns regarding mobility and traffic safety. These may include more self-limitation of driving due to fear for personal safety, which may contribute to decreased socialization, changes in health outcomes, and so forth.

There also are land use concerns regarding affordable housing, particularly as related to taxation and homeowners' insurance. Many current homeowners are "locked in" by current ad valorem tax caps that limit annual increases to three percent. If these homeowners wish to move to smaller homes as they age, the ad valorem taxes will be assessed at the full market rate. Therefore, persons wishing to move to a location that is more senior friendly may find it cost prohibitive. Recent homeowners' insurance increases also are of concern. These concerns are exacerbated by location, such as those who live along coastal areas, persons who live on fixed incomes, and so forth.

Recommended Strategies for the Study Area

To develop a set of transportation alternatives, the findings from the analysis of socioeconomic data and the literature review were supplemented by qualitative data collection from local government agencies and advocates for older persons on existing transportation options for older persons and related land use patterns. The qualitative data collection included face-to-face interviews, telephone interviews, and gray data, such as census reports, plans, newspapers, and so forth.

A review of the existing transportation options in Volusia County, the Town of Beverly Beach, and the City of Flagler Beach, in Flagler County, along with the funding sources that support transportation for seniors (Older Americans Act (OAA), TD, Americans with Disabilities Act (ADA) and others also was conducted. Information on service gaps, desired improvements, and less effective programs also was collected.

The recommended strategies include some suggestions for both near and long term transportation alternatives and land use options.

Qualitative Data Collection and Findings

Four group meetings were held with various groups in the study area. Three of the groups comprised persons with disabilities and older persons, including participants of Handicapped Adults of Volusia County (HAVOC), New Smyrna Beach Senior Center, and Orange City Senior Center. The fourth group was directors of a senior centers and representatives of the Volusia County Council on Aging. The group meetings were supplemented by face-to-face and telephone interviews with representatives of local governments, other agency representatives, and private individuals.

Group Discussions

With the exception of the senior center directors' meeting, recruitment for focus group participation was purposive. Consideration was given to accessible locations, time of day, and the age of participants. Topic guides were developed and used to conduct these three group meetings (see Appendix B). Due to the size of the group that participated in the HAVOC meeting, the topic guide was altered slightly.) The group meeting with the center directors was an open discussion that included information provided by a representative of VOTRAN and the Volusia County MPO.

HAVOC and Senior Centers Group Findings

A total of 35 persons from HAVOC and the two senior centers participated in group discussions. (There were 19 participants in the HAVOC meeting and eight in each of the senior citizen center meetings.) Table 4 shows selected socioeconomic characteristics among the group participants. On average, only 40 percent of participants hold a current drivers license or drive. All Orange City participants, however, held drivers licenses and continue to drive. About 70 percent of participants live in a household with someone who owns a car. Only about one-half of participants, however, said they had a friend or relative who could or did provide transportation. One participant said, "My daughter has a car, but she has to take care of her family." Only 40 percent of participants said they used VOTRAN's fixed route system. About 60 percent of participants used VOTRAN's Gold or paratransit services. None of the Orange City participants currently use the fixed route or paratransit system. One participant stated he had used VOTRAN Gold after being hospitalized, but had resumed driving. Less than 30 percent of participants used other forms of transportation, such as taxis. While the average age was 74, there was some variation. The oldest respondent was 94; the youngest, 48. HAVOC participants had the

youngest average age. Only one participant indicated a race or ethnicity other than white. Slightly more men than women participated in the group discussions; however, more women than men participated at the senior centers. The majority of participants had some college education, and the average income ranged from \$15,000 to \$24,999.

Table 6: Selected Characteristics of Group Participants

Site	% Current Driver's License	% Drive	% Car	% with Friend/Relative	% Use Fixed Route	% Use Paratransit	% Use Other Transport	Average Year Born	Average Education	Average Income
HAVOC	20	20	80	60	50	70	30	1939	Some college	\$15,000-\$24,999
NSB	10	10	30	40	70	80	40	1926	Some college	\$10,000-\$14,999
OC	100	100	100	50	0	0	20	1930	Associate degree	\$15,000-\$24,999
AVERAGE	40	40	70	50	40	60	30	1932	Some college	\$15,000-\$24,999

Due to the number of participants in the HAVOC group, a more structured discussion format was used. A number of group exercises, "Think-Pair-Share", snowballing, and prioritizing, were used to draw out responses. In the Think-Pair-Share exercise, participants were asked to think about their top three transportation issues, independently. Then, they shared the issues with a partner. Finally, the participants were asked to share these issues with the group. The issues or concerns were listed on a flipchart and discussed by the group. The group then snow-balled solutions for the issues. This exercise involved providing solutions for the issues or concerns identified without consideration to cost or other constraints. Next, the group was asked to prioritize the issues and solutions. A discussion followed. The research team summarized the findings and solicited individuals for interviews.

HAVOC Transportation and Land Use Issues

The top issues that were presented by the group included, in alpha-numeric order:

- 24/7 service—late night and weekend service;
- Customer costs, more passes, particularly recreational or social passes;
- County layout or land uses, difficulty traveling to facilities on the opposite side of the county or outside of the county;
- "Late" reservations;
- More coordination with other agencies;
- More frequent fixed-route service;
- More neighborhood or pedestrian information;
- Recreational/social transportation;
- Transportation amenities or facilities; and
- Transportation funding.

Although one-half of the HAVOC participants said they used the fixed route system, more than two-thirds used the paratransit system. (The total exceeds 100 percent because many participants said they used both.) Many of the issues focus on the paratransit system, such as more passes, late reservations, and facilities. During the discussion of the issues, participants expressed concern regarding the need for 24-hour advance reservation and the wait times (headways) for the paratransit and fixed route services. There also seemed to be some confusion among paratransit users that the system could not be used for recreational or social trips, although VOTRAN does not have a trip prioritization policy that prohibits such trips. The group also wanted more coordination between cities or communities on bus shelters, sidewalks, and other transportation amenities. Coordination issues also were related to outside of county travel and transportation information and awareness among agencies that provide services. As HAVOC represents persons with disabilities, there was rich discussion on accessibility. In addition to the amenities mentioned above, more passenger assistance on vehicles and the limitations on assistive devices, e.g., scooters on vehicles were issues also mentioned.

HAVOC Solutions

Using the snowballing technique, participants offered solutions to the issues identified above. Participants were given three votes each to select to prioritize the issues and solutions. These are shown in order of preference below.

- Facilities: more benches, shelters, sidewalks, etc. Facilities also should be standardized, including buses.
- "Late" reservations: same-day paratransit reservations. Also, extended service hours for paratransit.
- 24/7 service: weekend and late night service, both fixed route and paratransit. (There also was some concern expressed for emergency and disaster transportation.)
- Recreational or social transportation: extended service hours; more transportation to senior centers; and shared ride options (taxis).
- Customer costs: \$5.00 generic taxi trips; more VOTRAN gold passes; and passes for recreational or leisure trips.
- More neighborhood or pedestrian information: more information by telephone, internet, or e-mail; more information in neighborhoods, e.g., small travel agencies; route maps in the Penny Saver; and more information at other agencies and awareness.
- Fixed route service: more frequent service (reduce headways); more bus routes, specifically on Reed Canal.
- Transportation funding: more staff training and better knowledge of the area; more sensitivity training; conduct feasibility or needs study.
- Travel outside of county: more options; lower costs; travel to Orlando airport.
- Coordination with other agencies: better planning between cities and developers; better planning and scheduling of transportation services; better layout of services and goods throughout the county.

From the TD local coordinating board meeting attended in March 2006 by the research team and HAVOC's constituency, it was not surprising that facilities were a top priority. Sidewalks and other amenities were priority items at both meetings. There appears to be variation between the jurisdictions.

For example, there was an inquiry about signs placed "...in the [m]iddle of the sidewalk at Maitland High School." (It is not clear if the signs were placed by the school district or the city.) Although 24/7 service received the second highest ranking, it is related to recreational or social transportation and fixed route service. The solution is more, more, more. Longer hours, more days, greater frequency (fixed route), and reduced wait times (paratransit). Recreational or social transportation also is associated with customer costs. The ability to make recreational trips may be cost-prohibitive for some users. That is, users may be self-prioritizing trips giving priority to medical or shopping trips and deferring recreation trips due to income. Information both to the public and among agencies was an issue raised in all the group meetings. As mentioned earlier, there may be some misunderstanding about the use of paratransit services for social trips, despite costs. Also, some human agencies are not familiar with the public transit services available in the area. This is related to coordination with other agencies. Transportation funding evolved as a "catch-all" category. VOTRAN staff training was predominate, however, the issue of a feasibility or needs study was mentioned as a way to provide the public and agencies with data to facilitate planning. There also was desire for more options on travel outside the county. Although the MPO planning area includes Volusia County as well as Beverly Beach and Flagler Beach, participants felt that their options for travel between Flagler County, Orlando, and other surrounding areas were limited. This issue also is related to coordination with other agencies and travel within the county. The population growth in the county prompted a call for better planning.

Senior Centers Transportation and Land Use Issues

As noted above, there was variation in transportation mode use between the two senior centers. New Smyrna Beach participants licensing, driving habits, and use of fixed route and paratransit systems resembled that of HAVOC participants' more than Orange City participants'. New Smyrna Beach participants also were on average four years older than Orange City participants. One-half of the New Smyrna Beach participants were female; six of the eight Orange City participants were female. Only one of senior center participants indicated race or ethnicity other than white. The average New Smyrna Beach participant had some college education; the average Orange City participant had an associate degree. The income range for New Smyrna Beach participants was between \$10,000 to \$14,999; Orange City participants, \$15,000 to \$24,999.

New Smyrna Beach

The transportation concerns of New Smyrna Beach participants focused on the paratransit system. (Many of the participants used assistive devices, such as walkers, scooters, wheelchairs, canes, etc. One participant stated he was legally blind.) Most of the issues raised related to operations and vehicle maintenance, e.g., wait times, air conditioning on vehicles, and chair or scooter restraints. There was some concern with driver sensitivity, but overall, most participants found operators to be helpful and considerate. As with HAVOC participants, there was some misinformation regarding the use of the paratransit system for other than senior center, medical, or grocery shopping transportation. It should be noted that these participants reported the lowest percentage of family, friends, or neighbors who could provide transportation by private automobile. Among those who had family or friends with automobiles, some participants stated that they relied primarily on the paratransit system. One participant stated that she had a neighbor who gave her rides. When probed as to what she or her neighbor would do when her neighbor could no longer drive, the participant said, "She's young. She'll drive for a long time."

For those who used the fixed-route system, issues included more fixed-route service including weekends. One participant commented that VOTRAN fixed-route was the "Cadillac" service compared to VOTRAN Gold. This comparison related to vehicle maintenance, specifically air conditioning. One

participant stated that he used the fixed-route system as his primary mode of travel, including to the senior center. The fixed-route system travels within five blocks of the center and he walks the rest of the way. "It's good exercise," he said.

Other than weekend travel and the misunderstanding regarding trip priorities, the New Smyrna Beach participants did not express concerns with evening travel. This suggests that the participants have limited the number of trips they make. There also were few concerns expressed regarding transportation facilities or amenities, such as sidewalks, bus shelters, etc.

Orange City

As shown above, all the participants at the Orange City Senior City held current drivers' licenses, continued to drive, and had access to a car in the household. Although the average age was slightly younger than New Smyrna Beach participants, this did not appear to be a factor in travel behavior. (There was a 92-year-old among this group of participants.) Other modes of transportation included the use of golf carts, bicycles, and walking. One participant stated that she drove an automobile as little as possible, relying on a golf cart and riding as a passenger with her husband for transportation. There was some suggestion that participants had begun to limit their driving by not traveling "too far" and restricting night driving and driving in congested traffic.

Most of the participants were not familiar with the public transportation system. Only one participant had used the system, specifically VOTRAN Gold. (Currently, VOTRAN does not provide service to the Orange City Senior Center.) One participant stated that she had not used VOTRAN, but felt that she should become familiar with the system. Others stated that VOTRAN required too much waiting. Participants were not familiar enough with the system to state whether this applied to the fixed route or paratransit system. This group reported the lowest use of other forms of transportation, e.g., taxis. As expected, this group reported the highest rate of trip-making by private automobile either as the driver or passenger.

Participants stated that access to the area airports, Daytona Beach and Orlando, was sometimes problematic. There also was a desire expressed for private or charter bus service for trips. (This group appeared to be more active, in terms of long distance travel or the desire for the same, than the other two groups.)

Senior Centers Findings

Many of the focus group participants at the senior centers lived in mobile home parks. Overall, there was some concern with pedestrian facilities within the parks, e.g., lack of sidewalks, etc. Generally, New Smyrna Beach participants were more concerned with public transportation improvements than Orange City participants. For New Smyrna Beach participants more amenities on vehicles, beyond air conditioning, were desired. One notable suggestion was a "limousine" type service. This was suggested of a private automobile type service. When probed for interested in the train service proposed for 2009, there was little interest among New Smyrna Beach participants. Nor was there interest in high-speed rail. Other suggestions included opportunities for more shopping using VOTRAN, "no fare" days or zones, and weekend service. There also was interest in more public transportation to other senior centers. The Edgewater Senior Center was mentioned, specifically. When asked about changes in land uses that would improve mobility participants stated that there needed to be changes in zoning that would allow for more facilities and services within their communities.

Orange City participants suggested more roadway and automobile alternatives. These included “smart car” features, e.g., cars on cables, more computerization in automobiles, etc. Other improvements mentioned included:

- Better street signage;
- Improved street lighting, e.g., lighted signs; and
- Improved traffic signaling, e.g., longer times, blinking crosswalk signs, etc.

There also was interest in train travel, with specific mention of high-speed rail among Orange City participants. A concern was raised regarding a rezoning in Orange City, particularly the conversion of apartments or mobile home parks to condominiums. There was considerable discussion regarding the amount of growth that is taking place in the southern area. Participants expressed concern regarding the strain that new developments were making on the transportation network and other resources.

When asked about alternatives that participants might use and when, there was little discussion. Some participants stated that they felt it would be good to become familiar with VOTRAN, but there appeared to be little planning for driving cessation. It appeared that participants felt that this was a decision that could be delayed for some time.

Coalition of Senior Center Directors Meeting Findings

At the request of the Volusia County Council on Aging (VCCOA), the principal investigator met with a group of six senior center directors, the assistant general manager for VOTRAN, Gary Willoughby, and the Volusia County MPO transit planner, Carole M. Hinkley. (Many of the center directors were not familiar with VOTRAN or the MPO.) The meeting primarily was used to provide an overview of public transportation services in the county, the role of the MPO, and a description of this project. An important outcome of the meeting was a plan to provide VOTRAN travel training to the center directors. Printed materials, such as route maps, service descriptions, etc., also were provided.

Although demographic data was not collected, the center directors appeared to have been born before 1965. While some directors were familiar with VOTRAN, this knowledge was based on center participants’ use of the system rather than personal knowledge. There was considerable interest in more transportation options for their clients, particularly charter trips and travel at night and on weekends.

A general overview of mobility and access concerns among older persons was provided along with transportation options currently available and strategies planned for the near future and in use in other areas. Further outreach efforts by VOTRAN are planned beyond the travel training. In addition, the meeting with the center directors was used to recruit senior center sites for focus groups and individuals for face-to-face interviews.

Individual Interviews

The majority of individual interviews took place with persons who worked in city or other jurisdiction government, persons who were representatives on transportation or related committees, or other persons who provided services to older persons or persons with disabilities. While attempts were made to interview a representative sample, recruitment was based on recommendations from Volusia County MPO staff, interviewees, and self-selection. Opportunistic sampling also was used, i.e., while at senior centers or other meetings, individuals were asked to participate in interviews.

With few exceptions, the interviewees were born prior to 1965. Slightly more women than men were interviewed. The majority of individuals interviewed have current driver’s licenses, drive, and live in households with automobiles. Although these individuals are relatively informed about transportation

and aging, like the Orange City focus group participants, few said that they had considered or had plans for changes in their travel behavior. Likewise, those individuals who currently use VOTRAN reflected the focus group findings. Their concerns primarily focused on operations.

Among those interviewed who work in government or with human service agencies, additional transportation alternatives, population growth, and development were the predominate concerns. Residential displacement, particularly that of mobile home communities and public housing, was also a concern of the Orange City focus group. The issue here is the loss of affordable housing stock.

Suggested transportation alternatives also varied based on whether an individual was a user or government staff or service provider, with users focusing on near-term solutions. While government staff and service providers may not consider their personal alternatives, many did have suggestions for the study area. Most appreciated the limits of the VOTRAN's options in the near term. There was general consensus that more options were needed, included more options through the use of taxis. One respondent stated that community development block grants (CDBG) had been used in another area to help defray the general costs of providing additional public transportation services for older persons. Some individuals were familiar with ITN; however, there was some skepticism as to whether individual users could afford the costs. Government representatives also mentioned the need for roadway, pedestrian, and land use strategies. There was some speculation on whether recent changes in the Growth Management Act would have a positive effect.

Overall, respondents spoke about individuals' desire to remain independent as long as possible, which would include driving. When this is no longer possible or as individuals begin to limit driving, interviewees felt that a variety of transportation options and amenities should be in place.

Recommended Strategies

Referring to Freund's model mentioned earlier and the role of the MPO, the primary strategy should be influence on transportation policy. This influence should focus on ways to increase the use and access to public transportation; promotion of roadway designs that improve safety for older users, both drivers and pedestrians; increased funding opportunities for current public transportation services and future needs, and the promotion of amenities in communities that contribute to "livability" and aging in place. One of the recommendations that came from the conference, *Transportation in an Aging Society*, was the development of State and local safe-mobility action plans created by planning groups comprised of representatives of transportation, aging, motor vehicle, health, and housing organizations (Trilling and Eberhard 1999).

The focus on policy is anticipated to promote information exchange among those organizations concerned with providing services to older persons. Further, rather than competing for resources, this focus may foster collaboration and partnerships, new opportunities to leverage funding, share resources, etc. The foundation for such a planning group exists in the MPO in the existing committees. It may be necessary to appoint a taskforce charged with the specific task of developing a safe-mobility action plan.

A salient component of the action plan should be the promotion of universal design among the planning group members and as a stand-alone policy by member agencies. For the MPO, this would include the promotion of the roadway design features in the FHWA handbook, the recommendations of the Florida Elder Roadusers Program, and other transportation and land use practices that provide greater access and mobility.

A means of identifying needed design features could be an evaluation of the planning area's livability as described in the AARP's *Livable Communities* evaluation guide. While some of the evaluation criteria

extend beyond the purview of the MPO, it does provide useful mobility evaluation tools. It also may be useful as a data collection tool in the development of a safe-mobility action plan.

Having established a safe-mobility policy, either as a standalone entity or with other organizations, and evaluated the area's livability, a constituency, partners, and a more comprehensive understanding of the issues will have been developed. The MPO then should be able to move the elements of the action plan through the planning process. It also is anticipated that these activities will help to identify resources and opportunities for cooperation and collaboration among organizations. This process also may help to identify and transfer technology. Most important of all will be information sharing and outreach to other organizations and the public regarding the complexities of aging within the U.S. society.

One strategy that has not been mentioned earlier and may be implemented in the short-term, given the collaboration between the MPO and VOTRAN, is the development of an "elder mobility advisor" position or approach, which specifically addresses senior mobility. (Although VOTRAN currently fulfills the role of mobility manager for Volusia County, more emphasis may be needed on the needs of older persons. This may include acquiring and disseminating information provided by Flagler regarding transportation alternatives in their County.) Ideally, this is a "one-call-does-it-all" telephone number, web site, or individual that older persons, family members, service organizations, or caregivers contact or otherwise access to receive information on travel options in the planning area. (This is recommendation is not intended to suggest that VOTRAN's role as mobility manager be supplanted, but rather to emphasize to the community that VOTRAN can concurrently assist as the elderly mobility advisor. This is not to create a third tier, but rather a social marketing tool to help residents.) For example, this may include counseling or referrals on limiting driving, recommendations on transportation alternatives, coordination with other transportation providers. This may be of particular interest to those residents of Flagler County who are within the MPO's planning area. Many of the features of the mobility advisor approach already exist. What seems to be needed to implement the strategy, at this time, is the charge or policy to develop a resource dedicated to such an initiative.

The importance of considering these strategies within a geographic context cannot be overemphasized. Land use decision that support aging-in-place, including affordable housing; bicycle, pedestrian, and transit friendly design of communities; co-location of goods and services combined decrease the dependence on automobile travel for both the aging and general population.

Review of Strategies

The following is a listing of the recommended strategies that have been mentioned throughout the text or are specifically related transit operations. Many of the strategies are interrelated and intended to be flexible as local conditions warrant.

❖ Transit operations

- Regional transit system serving Flagler and Volusia counties (some service already exists to Orlando);
- Extended hours of operation;
- Reduced headways;
- Elder mobility management for planning;
- Special event transit services, particularly during Bike Week, spring break, and other peak tourist periods

❖ Roadway design, including bicyclists and pedestrians

Adoption of design features from Florida's Traffic Engineering and Operations Office chapter on elder road users, *Traffic Engineering Manual*, including, but not limited to:

- Six-inch-wide pavement markings for better visibility;
- Reflective pavement markings with 40-foot spacing, which is especially effective on rainy nights;
- Large overhead street signs at busy intersections;
- Advance street name signs;
- Improvements to pedestrian features at intersections; and
- Increased emphasis on effective traffic control through work zones.

❖ Other land use, infrastructure, and policy considerations

- Development of a safe-mobility action plan.
- Adoption and promotion of universal design principals as related to transportation:
 - Mixed-use development in new developments or in-fill;
 - Dissemination of information on multimodal land use and transit-oriented development;
 - Continued promotion and implementation of pedestrian and bicycle facilities; and
 - Support of affordable housing.
- Promotion of driving cessation counseling programs.

Specific Transportation Strategies from AARP's Livable Communities: An Evaluation Guide

Items from the *Evaluation Guide* have been extracted to suggest ways that mobility options, driving, and walking may be improved to help older persons in the service area age in place. Many of these items are drawn from the respective surveys. A full description of the surveys can be found in the *Evaluation Guide* (AARP 2005). These recommendations are not limited to transportation, but also include strategies for housing consistent with the Florida Department of Elder Affairs Elder Ready Communities. Surveys related to such communities also are included in the Guide.

Mobility Options

Fixed Route

- ❖ Bus stops located within a reasonable walking distance of residences of older persons;
- ❖ Well-maintained sidewalks that serve bus stops;
 - Shaded bus stops
 - Safe street crossings
- ❖ Bus system serves hospitals, clinics, shopping facilities, and other routine destinations of interest to older persons;
- ❖ Service available when older persons need to travel;
- ❖ Easy to read schedules and route maps;

- Schedules and route maps available in libraries, senior centers, medical facilities, shopping centers, and transit stops;
- ❖ Route and schedule information by telephone;
 - Information available for those who have difficulty hearing;
 - Information available in languages other than English in relation to population;
- ❖ Ease in transferring between buses or to other forms of public transportation;
- ❖ Information provided about transfers by drivers;
- ❖ Reduced fares for older residents;
- ❖ Transit stops well marked;
- ❖ Transit stops offer shade, seats, and shelter from the weather;
- ❖ Room for wheelchairs at transit stops;
- ❖ Routes and schedules clearly posted at stops;
- ❖ Information available for those with limited sight;
- ❖ Transit shelters well lighted in the evening;
- ❖ Preferred seating near the door for those who have difficulty walking or standing;
- ❖ Upcoming stops announced;
- ❖ Vehicles accessible to those traveling in wheeled mobility and other devices;
 - Accommodations made for those with vision or hearing impairments.

Paratransit

- ❖ Eligibility requirements clearly defined and easily understood;
- ❖ Service coverage areas available;
- ❖ Advance notice requirements well advertised;
 - "Late" reservations considered when feasible
- ❖ On-time arrival for pickups.

Other Mobility Options

- ❖ Increased taxi service;
- ❖ Van service provided by local organizations, e.g., such as senior centers, churches, or other groups) to meal sites, doctor's appointments, or special recreational excursions;
- ❖ Medical centers provide or purchase transportation service for dialysis and other regular medical needs;
- ❖ Communities provide vans to take residents shopping, to the doctor, and to cultural activities;
- ❖ Volunteer services.

Driving

- ❖ Street signs with letters large enough to be seen at a distance;
- ❖ Street signs legible at night;
- ❖ Streetlamps at regular intervals;
- ❖ Streets with turning arrows at intersections and dedicated left-turn lanes
- ❖ Dedicated left-turn lanes;
- ❖ Medians or other devices to minimize the glare from oncoming traffic at night on streets with heavy volume;
- ❖ Clear lane markings;
- ❖ Lane markings reinforced by reflectors;
- ❖ Clear travel patterns in parking lots;
- ❖ Parking spaces easy to use;
- ❖ Well-marked parking spaces for persons with disabilities;
- ❖ Parking spaces for persons with disabilities monitored and enforced;
- ❖ Safe walkways to stores from parking lots.

Walking

- ❖ Sidewalks throughout the community;
- ❖ Sidewalk surfaces flat with only minimal cracks and minimal separation between slabs;
- ❖ Visible curb-cuts
 - Easy to detect for persons with visual impairments and easy to use for persons with wheelchairs or walkers
- ❖ Sidewalks unobstructed by bushes, overhanging tree branches, trash cans, news stands, etc.;
- ❖ Sidewalks wide enough for at least two people to walk together (a minimum of four feet);
- ❖ Bicycle lanes for the use of nonpedestrians;
- ❖ Traffic signals at pedestrian crossings;
- ❖ Traffic signals provide adequate time for pedestrians to cross without feeling rushed;
- ❖ Traffic signals have push-to-walk buttons to stop traffic on busy streets;
- ❖ Mid-block crosswalks on long streets with no intersections;
- ❖ Well-marked crosswalks, e.g., striping, signage, caution lights, etc.,
- ❖ Sidewalks shaded by trees;
- ❖ Shaded resting places for pedestrians along sidewalks; and
- ❖ Signs provide clear directions for pedestrians.

These are a few of the items from the *Evaluation Guide* that could provide additional mobility options for persons as they age and others in the community. As discussed earlier, in developing its safe mobility plan, the MPO may wish to conduct the surveys for areas where there are high concentrations of older persons and Baby Boomers. This initial step would help to identify areas where resources will be needed in the near term and aid in future planning.

References

AARP

2003 The Policy Book: AARP Public Policies 2003, Transportation. Electronic document, <http://assets.aarp.org/www.aarp.org/articles/legislative/03ch10.pdf>.

Bernstein, Robert

2006 Florida's Flagler County Fastest-Growing Once Again. Electronic document, <http://www.census.gov/Press-Release/www/releases/archives/population/006563.html>.

Blackman, Donald K., Laurie A. Kamimoto, and Suzanne M. Smith

1999 Overview: Surveillance for Selected Public Health Indicators Affecting Older Adults—United States. *Morbidity and Mortality Weekly Report, Surveillance Summaries*, 48(SS08):1–6.

Boarnet, M. and R. Crane

2001 *Travel By Design: The Influence of Urban Form on Travel*. New York: Oxford University Press, Inc.

Burkhardt, Jon E.

2003a Critical Measures of Transit Service Quality in the Eyes of Older Travelers. *Transportation Research Record No. 1835*, pp 84-92.

2003b Better Transportation Services for Older Persons. *Transportation Research Record No. 1843:105-112*.

Burkhardt, Jon E., Arlene M. Berger and Adam T. McGavock

1996 The Mobility Consequences of the Reduction or Cessation of Driving by Older Women. In *Women's Travel Issues Second National Conference*. Baltimore: U.S. Department of Transportation, Federal Highway Administration.

Campbell, Vincent A., John E. Crews, David G. Moriarty, Matthew M. Zack, and Donald K. Blackman

1999 Surveillance for Sensory Impairment, Activity Limitation, and Health-Related Quality of Life Among Older Adults—United States, 1993-1997," *Morbidity and Mortality Weekly Report, Surveillance Summaries*, 48 (SS08):131–156.

Centers for Disease Control and Prevention

2000 Osteoporosis. *National Health and Nutrition Examination Survey*.

2003a Targeting Arthritis: The Nation's Leading Cause of Disability 2003. *At a Glance*, Department of Health and Human Services.

2003b Healthy Aging: Preventing Disease and Improving Quality of Life Among Older Americans 2003. *At a Glance*, Department of Health and Human Services.

Cutler, David M.

2001 The Reduction in Disability Among the Elderly. *Proceedings of the National Academy of Sciences*, 98(12):6546–6547.

- Desai, Mayur, Ping Zhang, and Catherine Hagan Hennessy
1999 Surveillance for Morbidity and Mortality Among Older Adults—United States, 1995–1996. *Morbidity and Mortality Weekly Report*, 48(SS-8).
- Elsner, James B. and A. Birol Kara
1999 *Hurricanes of the North Atlantic: Climate and Society*. New York: Oxford University Press.
- Foley, Daniel J., Harley K. Heimovitz, Jack M. Guralnik, and Dwight B. Brock
2002 Driving Life Expectancy of Persons Aged 70 Years and Older in the United States. *American Journal of Public Health*, 92(8):1284-1289.
- Freund, Katherine
1999 Surviving Without Driving: Policy for Safe Sustainable Senior Mobility. Paper presented at the Transportation in an Aging Society: A Decade of Experience Conference, 7-9 November, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.
- Giuliano, Genevieve
2004 Land Use and Travel Patterns Among the Elderly. Paper presented at the Transportation in an Aging Society: A Decade of Experience Conference, 7-9 November, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.
- Handy, Susan
1996 Urban Form and Pedestrian Choices: A Study of Austin Neighborhoods. *Transportation Research Record* 1522:135-144. Washington, DC: Transportation Research Board.
- He, Wan, Manisha Sengupta, Victoria A. Velkoff, and Kimberly A. DeBarros
2005 65+ in the United States: 2005, P23-209. *Current Population Reports, Special Studies*. Electronic document, <http://www.census.gov/prod/2006pubs/p23-209.pdf>.
- Hendricks, Sara J., Phil Winters, Francis Wambalaba, Sean Barbeau, Martin Catalá, and Keith Thomas
2005 Impacts of Transit Oriented Development on Public Transit Ridership. Final Report. Tampa: National Center for Transit Research and Florida Department of Transportation.
- Hill, Eric T.
1994 Assessing Travel Behavior by Blacks in the United States: A New Perspective. Final report. Washington, DC: Department of Transportation, University Research Institute Program and National Urban Transit Institute.
- Hobbs, Frank B. and Bonnie L. Damon
1996 65+ in the United States. *Current Population Reports, Special Studies*, P23-190. Electronic document, <http://www.census.gov/prod/1/pop/p23-190/p23-190.pdf>.
- Kihl, Mary, Dean Brennan, Neha Gabhawala, Jacqueline List, and Parul Mittal
2005 *Livable Communities: An Evaluation Guide*. Washington, DC: AARP.

Levy, D.T.

1995 The Relationship of Age and State License Renewal Policies to Driving Licensure Rates. *Accident Analysis and Prevention*, 27(4):461-467.

Marottoli, R.A., C.M. de Leon, C.W. Williams, L.F. Berkman and M.E. Tinetti

1995 Consequences of Driving Cessation among Elderly Individuals. *Journal of the American Geriatrics Society*, 43(6).

Manton, Kenneth G. and XiLiang Gu

2001 Changes in the Prevalence of Chronic Disability in the United States Black and Non-Black Population Above Age 65, from 1982 to 1999. *Proceedings of the National Academy of Sciences*, Vol. 98:6354-6359.

Meisler, Jodi Godfrey

2003 Toward Optimal Health: The Experts Discuss Fitness among Baby Boomers. *Journal of Women's Health*. 12(3):219-225.

National Center for Health Statistics

2003 Health, United States, 2002, Special Excerpt: Trend Tables on 65 and Older Population, Publication No. 03-1030. Centers for Disease Control and Prevention/National Center for Health Statistics, Department of Health and Human Services.

2004 National Health Interview Survey, 1997-2000, Prevalence of Selected Chronic Conditions by Age, Sex, Race, and Hispanic Origin: United States. Data Warehouse on Trends in Health and Aging. NHICO1c. Electronic document, <http://www.cdc.gov/nchs/agingact.htm>.

National Institute on Aging

2002 Alzheimer's Disease: Unraveling the Mystery. National Institutes of Health Publication No. 02-3782. Washington, DC: Department of Health and Human Services.

O'Neill, Desmond, and Bonnie M. Dobbs

1999 Age-Related Disease, Mobility, and Driving. *Proceedings of the Transportation in an Aging Society: A Decade of Experience*. 7-9 November 1999, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.

Oxley, Jennifer, Brian N. Fildes, and Robert E. Dewar

2004 Safety of Older Pedestrians. Paper presented at the *Transportation in an Aging Society: A Decade of Experience Conference*, 7-9 November, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.

Page, Oliver

2006 Transit Use Viability of Seniors Losing Driving Privileges. Ph.D. dissertation, Department of Civil and Environmental Engineering, University of South Florida.

Parsons Brinckerhoff Quade and Douglas, Inc.

1993 The Pedestrian Environment, LUTRAQ Project, Volume 4A. Portland: 1000 Friends of Oregon.

Pennington, Bill

2006 Baby Boomers Stay Active, and So Do Their Doctors. New York Times 16 April, Section 8, Column 1, Recreation Sport, p. 1.

Polivka, Larry

2005 The Future of Retirement Security. Paper presented to the University of South Florida Aging Policy Research Group 19 October. Tampa.

Ritter, Anita Sowell, Audrey Straight, and Edward L. Evans

2002 Understanding Senior Transportation: Report and Analysis of a Survey of Consumers Age 50+. Washington, DC: AARP, Public Policy Institute.

Rosenbloom, Sandra

1999 Mobility of the Elderly: Good News and Bad News. Proceedings of the Transportation in an Aging Society: A Decade of Experience. 7-9 November, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.

Staplin, Loren

1999 Highway Enhancements to Improve Safety and Mobility of Older Road Users: Practical Applications. Paper presented at the Transportation in an Aging Society: A Decade of Experience Conference, 8 November 1999, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.

Suen, S. Ling, and Lalitia Sen

1999 Mobility Options for Seniors. Proceedings of the Transportation in an Aging Society: A Decade of Experience. 7-9 November 1999, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf.

State of Florida Legislature, Office of Economic & Demographic Research

2005 EDR Population Page, Total County Population: April 1, 1970 – 2030. Electronic document, <http://edr.state.fl.us/population.htm>.

Trilling, Donald and John Eberhard

1999 Safe Mobility for a Maturing Society: A National Agenda. Proceedings of the Transportation in an Aging Society: A Decade of Experience. 7-9 November 1999, Bethesda, MD. Electronic document, http://onlinepubs.trb.org/onlinepubs/conf/reports/cp_27.pdf

U.S. Census Bureau

1997 Aging in the United States: Past, Present, and Future. Electronic document, <http://www.census.gov/ipc/prod/97agewc.pdf>.

2000a American FactFinder. Summary File 1. Electronic document, <http://factfinder.census.gov/servlet/DTable>.

2000b American FactFinder. Summary File 3. Electronic document, <http://factfinder.census.gov/servlet/DTable>.

2001 Table 21. Householders Age 55 Years and Over by Metropolitan-Nonmetropolitan Residence, Sex and Age: March 2000, Electronic document, <http://www.census.gov/population/www/socdemo/age/ppl-147.html>.

2004a U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin, Table 2a. Projected Population of the United States, by Age and Sex: 2000 to 2050. Electronic document, <http://www.census.gov/ipc/www/usinterimproj/natprojtab02a.xls>.

2004b American Community Survey. Florida: S0201. Selected Population Profile. Electronic document, <http://factfinder.census.gov/>.

2005a State Interim Population Projections by Age and Sex: 2004-2030. I. Highlights Table 5: Population under age 18 and 65 and older: 2000, 2010, and 2030. Electronic document, <http://www.census.gov/population/projections/PressTab5.xls>.

2005b State Interim Population Projections by Age and Sex: 2004-2030. V. Population Pyramids and Demographic Summary Indicators: States, Florida. Electronic document, <http://www.census.gov/population/projections/10PyrmFL1.xls>.

U.S. Department of Transportation

1996 Community Impact Assessment: A Quick Reference for Transportation. Washington, DC: Federal Highway Administration Office of Environment and Planning, with assistance from Apogee Research, Inc. and Parsons Brinckerhoff Quade Douglas, Inc. Electronic document, http://www.ciatrans.net/CIA_Quick_Reference/Purpose.html.

2000a Distribution of Licensed Drivers 2000 By Sex and Percentage In Each Age Group and Relation to Population. Electronic document, <http://www.fhwa.dot.gov/ohim/hs00/dl20.htm>.

2000b Traffic Safety Facts 2000: Older Population, DOT HS 809 328. Electronic document, <http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/ncsa/tsf2000/2000oldpop.pdf>.

2001 Older Road User Research Plan, DOT HS 809 322. Washington, DC: National Highway Traffic Safety Administration. Electronic document, <http://www.nhtsa.dot.gov/people/injury/olddrive/OlderRoad/index.htm#toc>.

Waldorf and Pitfield

2005 The Effect of Demographic Shifts on Non-Automobile Transportation Needs of the Elderly. *In* Social Dimensions of Sustainable Transport: Transatlantic Perspectives. Kieran Donaghy, Stefan Poppelreuter and Georg Rudinger, eds. Pp. 67-89. Burlington, VT: Ashgate.

Waldrop, Judith and Sharon M. Stern

2005 Disability Status: 2000 - Census 2000 Brief. Electronic document, <http://www.census.gov/prod/2003pubs/c2kbr-17.pdf>.

Wallace, Robert B. and Daniel Franc

n.d. Literature Review of the Status of Research on the Transportation and Mobility Needs of Older Women.

Electronic document, <http://www.nhtsa.dot.gov/people/injury/olddrive/nsrpt.html>.

Ward, Beverly G.

2004 Travel Patterns of Low Income Women (P04 0845), Session 665: How Women's Transportation Patterns Are Different from Men's and Why You Should Care. Transportation Research Board 83rd Annual Meeting, Washington, D.C., 14 January.

Williams, Kristine M. and Karen E. Seggerman

2004 Model Regulations and Plan Amendments for Multimodal Transportation Districts. Final Report. Tampa: National Center for Transit Research and Florida Department of Transportation.

Appendix A

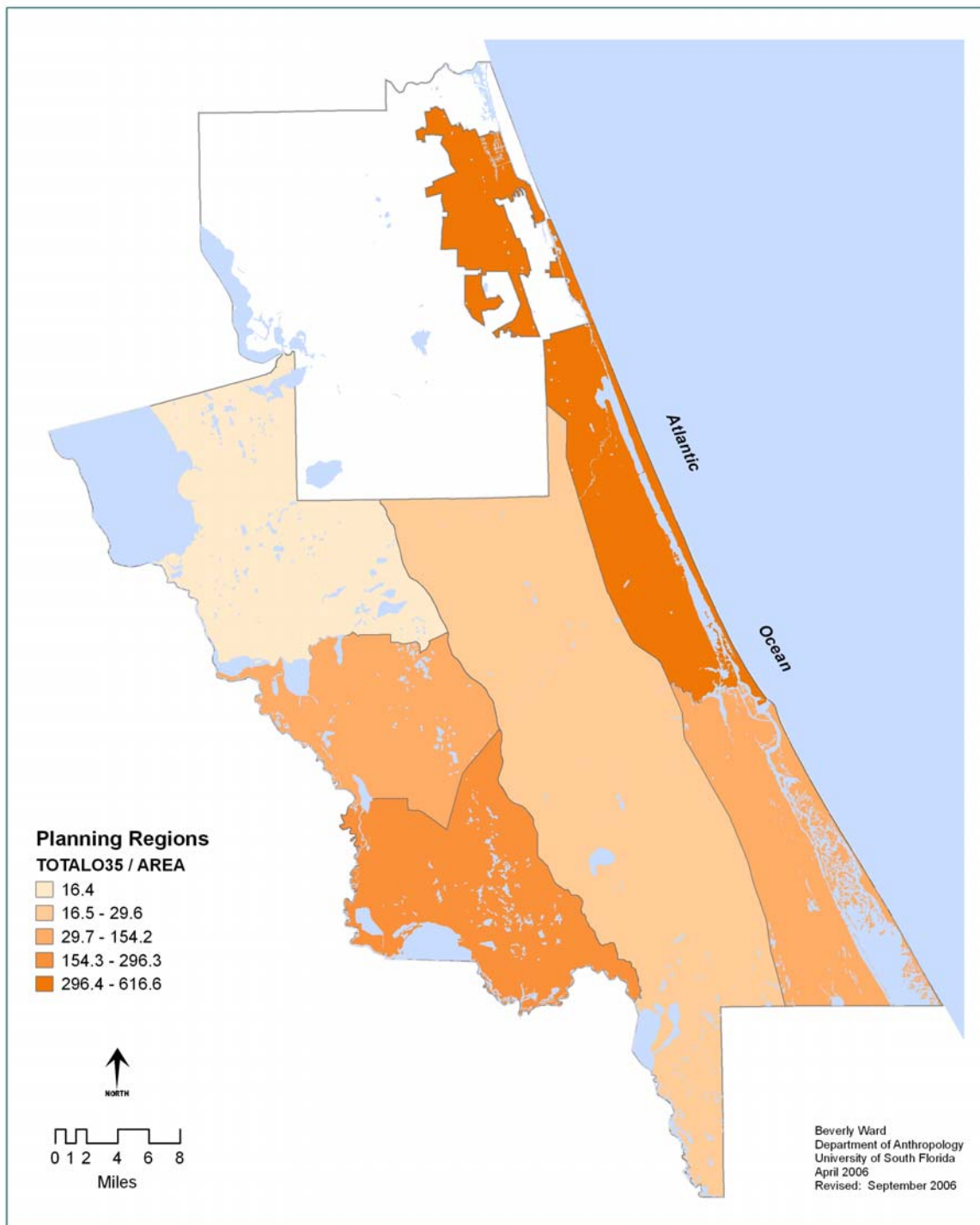


Figure 7: Figure A-1. Distribution of Persons Age 35 Years and Over per Square Mile by Planning Region

Appendix B

Handicapped Adults of Volusia County (HAVOC) Topic Guide

Opening by Beverly Ward

Overview of project

Group Exercise

Think-Pair-Share

Participants are asked to think about their top three transportation issues, independently. Then, participants are asked to share the issues with a partner. Finally, participants are asked to share these issues with the group.

Discussion of issues

Group Exercise

Snowball: Solutions for Issues

Group Exercise

Prioritize solutions

Discussion of solutions

Summary and Closing

Summarize findings

Solicit interviews

Handicapped Adults of Volusia County (HAVOC)
Think-Pair-Share

1. Think

Take a few minutes to think about your top three transportation issues or concerns, and then make a list of them below. (If you have more than three, jot them down also.)

2. Pair

Turn to someone beside you. Take a few minutes to compare and combine your lists.

3. Share

Share your transportation issues and concerns with the group.

Senior Centers Topic Guide

Opening by Beverly Ward

Overview of project and introductions

Opening Discussion: Private automobiles, taxis

Who has a license?

Who drives?

Who has a car in the home?

Family in the home? Nearby? Friends?

How do you buy groceries? Go to church? What about special occasions? **Probe for going out to eat, social events, night travel, weekends, etc.**

Transportation alternatives

Who uses taxis?

Who uses VOTRAN, fixed route, Gold, other providers

Who bicycles? Walking?

Probe for why or why not? Health? Sidewalks? Other?

Discussion of issues

What alternatives are desired

Probe those who do not use public transport for reasons. What would make travel easier? Who would walk? What is needed?

When would you use taxis? VOTRAN?

For those who drive, do you think you will stop? What will you do? Will you move? **Probe for desired land uses.**

Discussion of solutions

Prioritize solutions

Is cost a problem? What about volunteer drivers?

Summary and Closing

Summarize findings

Solicit interviews

Appendix C

The following regulations have been adapted from *Model Regulations and Plan Amendments for Multimodal Transportation Districts* (Williams and Seggerman 2004).

MODEL LAND DEVELOPMENT REGULATIONS

Article I. Multimodal Transportation Districts (MMTDs)

Section 1: General Requirements

1.1 Intent and Purpose

- (1) The intent of this Article is to implement multimodal transportation districts (MMTDs) that have been designated within the [local government] pursuant to Chapter 163.3180(15), F.S. and the Florida Department of Transportation Multimodal Handbook, for the purpose of creating safe, comfortable and attractive environments for pedestrians and bicyclists, with convenient access to transit. Specific purposes of this Article include:
 - a) Establish land use, community design and transportation network guidelines and standards that facilitate walking, bicycling and transit use as an alternative to driving;
 - b) Establish incentives for developers to advance multimodal objectives within the MMTD.

1.2 Relationship to the Comprehensive Plan

Multimodal Transportation Districts shall be designated according to the minimum criteria set forth in the [local government] Comprehensive Plan and delineated on the Future Land Use Map pursuant to Chapter 163.3180(15), F.S. and the Florida Department of Transportation "Multimodal Transportation District and Areawide Quality of Service Handbook". This Article provides regulations to implement the following Goal, Objectives and Policies contained in the [local government] Comprehensive Plan: [List multimodal Goal, Objectives and Policies].

1.3 Applicability

- (1) The provisions of this Article apply to all development proposals within areas designated as Multimodal Transportation Districts in the Comprehensive Plan, or to developments that request and are granted such designation pursuant to Chapter 163.3180(15), F.S. the [local government] Comprehensive Plan.
- (2) These regulations are intended to apply to all development including both public and private facilities within an MMTD. (3) Inconsistencies between other sections of the land development regulations and those pertaining to the MMTD shall be superseded by the MMTD regulations.

Section 2: Land Use

2.1 Land Use Mix Required

- (1) All development proposals shall contribute to accomplishing a mix of residential and non-residential uses.
- (2) Proposed developments should contribute to a mix of land uses that are compatible with the transit- and pedestrian-oriented nature of the MMTD.
- (3) Proposed development should contribute to a mix of land uses that promote activity during peak and non-peak hours.
- (4) Proposed development shall enhance the appropriate density and intensity of land uses within walking distance (1/4 mile) of transit stops.
- (5) Proposed commercial uses should have a floor area ratio in the range of 0.5 to 1, however not less than 0.25.
- (6) Proposed development within commercial and mixed-use zones of an MMTD shall provide retail and service uses at the street level to promote a pedestrian-oriented environment.
- (7) All proposed multi-level parking structures shall allow at least 50% of the ground-floor street frontage, excluding driveway entrances and elevators, to accommodate pedestrian-oriented uses such as retail or neighborhood services.
- (8) Auto-oriented uses such as auto sales and repair, commercial parking lots, and drive-through businesses are prohibited within the MMTD.
- (9) Drive-through service windows shall be limited to the rear of mid-block buildings and locations accessed via alleys provided they do not substantially disrupt pedestrian activity or surrounding uses. In addition, drive-through service windows shall be accessible by bicyclists.

Section 3: Street Network and Connectivity

3.1 General Requirements

- (1) The street network shall be designed to promote the overall connectivity of the system while avoiding excessive through-traffic in residential areas by including:
 - a) Multiple direct multi-modal connections to and between local destinations such as parks, schools, and shopping;
 - b) Inter-connections to multimodal transportation facilities and services within and outside the boundaries of the MMTD, including bus services, regional rail service, regional greenway and trail systems, the FIHS, and the regional aviation facilities;
 - c) Modified grid systems, T-intersections, roadway jogs, and other appropriate traffic calming measures as provided in [Section 4. Traffic Calming] to discourage the use of local streets for cut-through traffic; and
 - d) Additions or enhancements to improve the street network connectivity index as provided in [Policy 8 of the Model Comprehensive Plan Amendments].
- (2) All development plans shall contribute to developing and/or enhancing a street system that will allow access to and from the proposed development, as well as access to all existing and future development within a ¼ mile radius of the proposed

development, via at least three arterial or major collector streets upon development of remaining parcels within the ¼ mile radius.

3.2 Street Network Design

- (1) All development plans shall incorporate and continue all sub-arterial streets stubbed to the boundary of the development plan by previously approved development plans or existing development. Developers required to extend collector roads may be eligible for impact fee credits where such extension is not reasonably related to the impacts of the development. The requirements of this subsection do not apply if it is demonstrated that a connection cannot be made because of the existence of one or more of the following conditions:
 - a) Physical conditions preclude development of the connecting street; b) Buildings or other existing development on adjacent lands, including previously subdivided but vacant lots or parcels, physically preclude a connection now or in the future, considering the potential for redevelopment.
- (2) The street network within development plans shall provide for future public street connections to adjacent developable or redevelopable parcels, and shall include block lengths not in excess of 660 feet, except where additional spacing is required in conformance with FDOT or [local government] access management standards and unless the developer demonstrates that a block length must be greater due to the existence of one or more of the following conditions:
 - a) Physical conditions (e.g. topography), buildings or other existing development on adjacent lands physically preclude a block length 660 feet or less; or
 - b) An existing public street terminating at the boundary of the development site, has a block length exceeding 660 feet, or is situated such that the extension of the street(s) into the development site would create a block length exceeding 660 feet. In such cases, every effort shall be made to accomplish reasonable block lengths to maintain walkability.
- (3) Proposed office and commercial development plans for sites abutting an arterial or major collector street must include internal vehicle connections from the subject development site to each adjacent site, where applicable. Exceptions may be provided where abutting uses are clearly incompatible or where physical conditions or existing development on adjacent sites precludes such connection now or in the future considering the potential for redevelopment. Development plans shall include joint use driveways with adjacent sites wherever feasible.
- (4) Development plans shall provide or enhance a continuous service drive or alley extending the entire length of each block where it contributes to the street network. Where alleys have been vacated, development plans shall establish new alleys. Alleys shall be developed according to the following criteria:
 - a) Maintain a right-of-way width of [XX] feet, and a pavement width of no more than [XX] feet;
 - b) Differentiate the alley from through streets and sidewalks through the use of paving materials;

- c) Provide a low street wall between the alley and the parking area and a landscaped strip inside of the wall.
- (5) All cul-de-sacs shall be designed with a turnaround in accordance with [local ordinance section] and shall be no more than [XX] feet in length as measured from the centerline of the intersecting street to the radius point of the cul-de-sac.

Section 4: Traffic Calming

4.1 Local and Collector Streets

- (1) Collector and local streets shall include one or more of the following traffic calming measures to improve conditions for cyclists and pedestrians by altering driver behavior to reduce vehicle speed and traffic volume:
 - a) Volume control measures such as half, partial or one-way closures, diagonal deviators, median barriers, or forced turn islands;
 - b) Vertical speed control measures such as speed tables and raised intersections;
 - c) Horizontal speed controls such as mini-traffic circles, roundabouts, lateral shifts, chicanes, and realigned intersections;
 - d) Cartway narrowing such as neckdowns, gateways, chokers, and center island narrowings; and
 - e) Other measures such as on-street parking and marked and designated bike lanes.
- (2) New or reconstructed non-FIHS arterial and collector streets with more than three travel lanes shall include a landscaped median and appropriate design measures (e.g. neckdowns, pavement markings, etc.) to clearly delineate pedestrian crossing locations and improve conditions for crossing pedestrians.

Section 5: Parking

5.1 General Requirements

- (1) New developments shall provide no more than the minimum number of parking spaces required for the proposed land use by the underlying zoning district. The following shall also apply:
 - a) On-street parking spaces on the right-of-way between the two side lot lines of the site may be counted to satisfy the minimum off-street parking requirements.
 - b) Carpool/Vanpool Parking: New commercial and industrial developments with 20 or more employee parking spaces shall designate at least 5 percent of the employee parking spaces for carpool or vanpool parking. Employee carpool and vanpool parking shall be located closer to the building entrance or the employee entrance than other employee parking with the exception of handicap parking. The carpool/vanpool spaces shall be clearly marked "Reserved-Carpool/Vanpool Only."

5.2 Parking Credits

- (1) New development may be eligible for parking credits in exchange for transit facility placement, bicycle facilities, and/or monetary contribution toward public parking in accordance with the following criteria:

- a) The minimum parking requirement may be reduced by 10 percent if an adequate sheltered transit stop and related transit amenities are provided within the development.
- b) The minimum parking requirement may be reduced by up to 50 percent when the applicant can demonstrate, in a parking-traffic study prepared by a traffic engineer, that both of the following conditions exist:
 - i) The use of alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and minimum [local government] parking requirements.
 - ii) A Transportation Demand Management (TDM) Program has been approved by the [local government] that contains strategies for reducing vehicle use and parking demand generated by the development and establishes benchmarks by which the program's effectiveness will be measured bi-annually.

5.3 Shared Parking

- (1) Where it can be demonstrated that the demand for parking of the combined uses of two (2) or more buildings can be satisfied with the shared and jointly accessible off-street parking available to those buildings, then a special exception to these parking requirements may be granted by the [local government] to satisfy the minimum parking requirements pursuant to the following conditions:
 - a) The joint use of required facilities at different times may be allowed provided all of the following exist:
 - i) The applicant shows there will be no substantial conflict in the principal operating hours of the buildings or uses for which the joint parking use is proposed.
 - ii) The parking facility will be within 1/4 mile of buildings or uses it will serve.
 - iii) The parties involved in the joint parking facility agree to the joint use arrangement in a legal document that has been approved by the [local government] attorney and recorded in the [County of record] with a copy filed with the [local government permits office].
- (2) The simultaneous joint use of required facilities may be allowed provided all of the following exist:
 - a) No more than two (2) uses under separate ownership or occupancy shall be involved.
 - b) The uses will occur on the same development site.
 - c) It can be reasonably anticipated that a number of customers or clients will be served.

5.4 Fee in lieu of parking

- (1) An in-lieu parking fee may be submitted to the city for each required parking space that is not provided on site. The in-lieu parking fee shall be determined annually by the [local government] based on current land and construction costs. There is hereby created a special fund within the Office of the Treasurer-Controller into which in-lieu fees shall be deposited to be used only for the construction of public parking facilities.

5.5 Parking Lot Location and Size

- (1) To minimize the impact of large expanses of parking on the pedestrian environment, parking spaces shall be located to the rear and sides of buildings wherever feasible. No off-street parking shall be located between the front façade of any building(s) and the primary adjacent street.
- (2) Auto parking and maneuvering areas shall not be located between a primary building entrance and an abutting minor arterial or collector street, except where the applicant has demonstrated that no other alternative is available.
- (3) Auto parking lots and maneuvering areas located to the side of a building cannot occupy more than 50% of a site's frontage onto a minor arterial or collector street.
- (4) Wherever possible, auto parking lots and maneuvering areas on corner lots should not be located adjacent to intersections.
- (5) Individual parking areas may be no larger than [XX square feet in size]. Separation between individual parking areas may be achieved by the placement of internal accessways.
- (6) Bicycle parking facilities (bike racks) shall be provided in all vehicle parking lots as provided in [Section 8.2].
Section 6: Transit Facilities
 - (1) The following types of developments located along a transit route may be required to construct transit stops at the discretion of the [local government] or in collaboration with [local transit agency]:
 - a) Residential developments having an average automobile peak hour trip rate of [25 trips or greater].
 - b) Commercial and industrial developments other than office developments, having an average automobile peak hour trip rate of [100 trips or greater]. Office developments having an average peak hour trip rate of [50 trips or greater].
 - c) Institutional uses and public facilities, including churches, hospitals, middle schools, high schools, universities and colleges, public parks (other than neighborhood parks), libraries, post offices, and other institutional and public facilities having an average automobile peak hour trip rate of [100 trips or greater].
 - (2) Transit stop design shall be a clearly defined waiting area for transit riders, open to the public at large and equipped with amenities for bicyclists and pedestrians including adequate lighting, benches, weather protection, system information,

maps, trash bins, bicycle parking, and a land pad accessible to a disabled person. Plans shall include lifetime maintenance plans for the facility.

- (3) New buildings at or near transit stops shall provide for convenient pedestrian access to the transit stop by providing walkways connecting the new building entrances to sidewalks accessing the transit stop.

Section 7: Sidewalks and Pedestrian Facilities

7.1 General Requirements

- (1) New development shall provide safe and convenient facilities for pedestrians that are reasonably free from hazards and high levels of automobile traffic, and provide a reasonable and direct route of travel between destinations. This section shall apply to any new development that creates a new building entrance(s). Alteration or changes in use that do not involve any creation of a new building entrance are not subject to the provisions of this section.

- (2) Pedestrian facilities shall be provided on any new or reconstructed streets in accordance with the Florida Pedestrian Facilities Planning and Design Handbook.

- (3) Pedestrian facilities shall be designed with security considerations including street lighting, bushes no greater than two (2) feet in height, and tree branches no lower than six (6) feet in height. To provide clear visibility of pedestrians approaching intersection crosswalks at night, the approaches to and all street corners should be well-illuminated.

All intersection lighting should illuminate the crossing and waiting areas and/or create backlighting to make the pedestrian silhouette clearly visible on the approach.

- (4) Pedestrian facilities shall include shade trees where possible.

7.2 Pedestrian Connections

- (1) A sidewalk shall be provided between all new building entrances and all streets adjacent to the development site. The sidewalk shall provide a direct connection to existing public right-of-way and public sidewalks or transit stops.

- (2) A sidewalk shall be provided between any new building entrance and all other new or existing building entrances on the same development site. Entrances used for loading and unloading freight are not subject to this standard. Internal pedestrian paths provided in conformance with this subsection shall provide weather protection features such as awnings or arcades within 30 feet of all customer entrances.

- (3) A sidewalk shall be provided immediately adjacent to the exterior wall of a new building greater than 100 feet in length when the wall is located next to a street or parking lot. A pedestrian path shall also be provided along the entire length of the wall when the public entrance is located in that area. Exceptions to this standard include:

- a) If the edge of the building is within 20 feet of a public sidewalk and the building entrance is connected to the public sidewalk by an on-site pedestrian facility.
- b) If the edge of the building is bordered by a perimeter of landscaping that does not exceed 30 feet in width and an on-site pedestrian facility is constructed at the edge of the landscaped area.

- (4) A 20-foot wide bicycle/pedestrian easement shall be provided to connect cul-de-sacs, or to pass through blocks in excess of 660 feet.
- (5) Where needed for purposes of traffic safety or access to nearby schools, playgrounds, public parks, trails, shopping facilities, or other community facilities, new developments may be required to dedicate a public right of way for bicycles and pedestrians, not less than 20 feet in width.
- (6) Pedestrian access points at property edges and to adjacent lots shall be coordinated with existing development to provide pedestrian circulation between developments.
- (7) All on-site pedestrian walkways located in vehicle use areas shall be distinguished from driving surfaces through the use of durable, low maintenance smooth surface materials to enhance pedestrian safety and comfort, as well as the attractiveness of the walkways.
- (8) All non-residential buildings set back [fill in number] feet or more from the public right-of-way shall provide for direct pedestrian access from the building to buildings on adjacent lots.
- (9) Within multi-family residential development with three (3) or more units, on-site pedestrian facilities shall be constructed in the following locations:
 - a) From every unit to all other units within the residential development.
 - b) From every unit to all laundry, recreation and other community facilities in the residential development
 - c) From every building located within 40 feet of a public or private street to the street right-of-way line.

7.3 Accessible Pedestrian Facilities

- (1) Americans with Disabilities Act (ADA). To aid in the independent mobility of people who cannot drive, special accommodations should be provided in accordance with the ADA Accessibility Guidelines for Buildings and Facilities (<http://www.access-board.gov/adaag/html/adaag.htm>).

Section 8: Bicycle Facilities

8.1 Bicycle Lanes

- (1) Bicycle lanes shall be provided on new or reconstructed arterials and major collector roadways within the MMTD in accordance with the FDOT Bicycle Facilities Planning and Design Guidelines (Revised April 2002).
- (2) Restriping of arterial or major collector roadways under [local government] jurisdiction within the MMTD shall be considered any time the facility is scheduled for resurfacing allowing for a safe, dedicated space for bicycle travel.

8.2 Bicycle Boulevards

- (1) Installation of a Bicycle Boulevard may be required within residential developments that meet the following conditions:

- a) Existing low vehicle volumes;
 - b) Very little commercial frontage;
 - c) Roadway is parallel to a major arterial or a high-traffic collector street (within approximately 0.25 mile);
 - d) Not a transit or truck route;
 - e) Roadway is reasonably continuous, i.e. it extends over at least [two miles]; it should have few jogs with main segments at least 0.5 mile long.
- (2) The [local government] may require the following treatments on a residential or local street that has been designated as a bicycle boulevard to provide a safe and convenient circulation system for bicycles:
- a) Traffic control devices so that bicyclists on bike routes can easily cross major streets and arterials;
 - b) STOP signs are positioned so that the bicycle boulevard has the right of way in appropriate locations;
 - c) Traffic calming measures, such as traffic circles or semi-diverters, in selected locations to ensure that motor vehicles do not divert to the bicycle boulevard;
 - d) Forced right-turns along bicycle boulevards or other locations to discourage non-local motor vehicle traffic from using the roadway in question. A sign shall be placed at intersections indicating that cars must turn right, but bicyclists may proceed straight.

8.3 Bicycle Parking

- (1) Bicycle racks shall be located in convenient, visible, well-lit areas, with easy access, near main entrances. The racks should not interfere with pedestrian traffic and should be protected from potential damage by motor vehicles. They may be located within the public right-of-way with [local government] approval. The following requirements shall also apply:
- a) All vehicle parking facilities containing less than ten parking spaces shall provide one bicycle rack with no less than four (4) spaces (two high-quality inverted "U" racks).
 - b) For vehicle parking facilities containing more than ten parking spaces the applicant shall provide one bicycle rack with no less than four spaces plus two bicycle parking spaces for each additional ten parking spaces in the lot. No more than 20 bicycle parking spaces shall be required in any one parking facility.
 - c) One vehicle parking space may be eliminated for each four spaces of bicycle parking provided.
- (2) The [local government] and other affected agencies shall provide bicycle parking facilities at public uses such as schools, city hall, transit stations, park-and-ride lots, recreation facilities and libraries in accordance with the above standards.

Section 9: Amenities and Design

9.1 Pedestrian Amenities and Community Spaces

- (1) All development plans shall contribute to the establishment or enhancement of community and public spaces by providing a space where at least two of the following: patio-seating area, pedestrian plaza with benches, covered playground area, kiosk area, water feature, clock tower or other similar focal feature or amenity. Any such area shall have direct access to the public sidewalk network and be placed in a visible location that is convenient for use as a public gathering area. The review authority may find compliance with this standard if the proposed pedestrian amenities and community spaces are incorporated as part of the shopping street. Examples include wider sidewalks, special paving, ornamental lighting, planters, public benches and seating walls, and public art.

9.2 Building Orientation

- (1) All buildings on the site must be oriented to either a public street, a private drive, or a shopping street. The building orientation standard is met when the building is placed within the maximum setback established for the zone. The maximum setback may be exceeded if the area between the building and the street or private drive is landscaped or is an enhanced pedestrian space.
- (2) Private drives used to meet building orientation standards must incorporate street design elements. When private drives are used, the setback is measured from the back of the sidewalk.
- (3) On all buildings that meet the building orientation standard, building entries must be in compliance with this code.

9.3 Exterior Wall Articulation, Facades, and Ground Floor Windows

- (1) Exterior building walls shall not continue along an uninterrupted plane for more than 100 feet. An uninterrupted plane is a wall that has no variation in exterior surface along its length. Except for building walls facing an alley, ground floor facades 100 feet or greater in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three (3) percent of the length of the facade and extending at least 20 percent of the length of the facade.
- (2) Ground floor facades that face streets adjacent to the development site shall have arcades, colonnades, display windows, entry areas, awnings, or other such features along no less than 50 percent of their horizontal length.
- (3) Except for building walls facing an alley, ground floor walls shall contain windows (as stated below) at the ground level. The windows may extend a maximum sill height of four (4) feet above finished grade to any head height. The portion of window area meeting this standard is from the sill (bottom edge) to the head (top edge) including portions up to nine (9) feet above the finished grade. Alcoves, entryways, and extruding portions of the wall shall be treated by measuring through such areas as though along the flat wall of a building. Solid walls are prohibited along street frontages. This standard does not apply to parking structures.
- (4) General Standard. The windows in any walls that require windows shall occupy at least 50 percent of the length and 25 percent of the ground floor wall area.

Required window areas shall be either windows that allow views into working areas or lobbies, pedestrian entrances, or display windows. The bottom of the windows shall be no more than 4 feet above the finished grade.

- (5) Corner Lots. On corner lots, the general ground floor window standard stated in subsection (c) must be met on one street frontage only. On the other street(s), the requirement is ½ of the general standard. The applicant may choose on which street to apply the general standard.

Section 10: Application for Development in MMTDs

- (1) Any property owner who proposes to develop or redevelop land in an MMTD shall contact the reviewing jurisdiction to schedule a pre-application conference during which the applicant will be advised on applicable procedures and requirements. (2) The development application shall include the following information and supporting documentation in the development or plat application:
 - a) A legal description of the relevant parcel of land, including a separate description of the portion that lies within the MMTD, if applicable;
 - b) A statement of how the applicant proposes to subdivide or develop the affected property, including a plat or a site plan map at a scale sufficient to show the building location, access connections, street network and bicycle/pedestrian circulation, open space, parking, amenities and any other matter as may be required by the [local government] land development code;
 - c) A statement of how the proposed development is planned and designed to be consistent with the objectives and policies of the MMTD;
 - d) Requests, if any, for a variance from the provisions of [this Article].
- (3) Upon receiving the development or plat application, staff shall review the proposal and produce a written report for consideration by the [local government Development Review Committee] containing staff recommendations regarding the application including all supporting findings and conclusions regarding the consistency of the proposed project with the MMTD objectives and policies and proposed conditions of approval. The report may recommend one or more of the following:
 - a) Approval of the development as proposed, with or without conditions;
 - b) Denial of the development as proposed; c) Modification of the proposed development and the issuance of a development permit for the development as modified, with or without conditions.
- (4) Upon consideration of the staff report, the [local government development review committee] shall issue a final determination. Appeals to the determination of the [local government development review committee] shall be addressed in accordance with [local government code].

Section 11: Incentives

- (1) Expedited Development Review. Development applications within the MMTD shall be entitled to an Expedited Development Review Process. The Expedited Development Review Process entitles an applicant to be placed on a priority list,

established by the [local government official]. Expedited review is on a first-come, first-served basis of priority applications. The applicant must submit a technically complete application in order to be placed on the priority list for expedited development review.

- (2) Traffic Impact Fees. A reduction in the traffic impact fee for developments within the MMTD may be granted pursuant to this section