Chapter Five

Transportation

I. TRANSPORTATION AND THE CENTRAL FLORIDA REGIONAL VISION

The Central Florida Regional Vision (Chapter 1) foresees future growth in centers connected by corridors of higher density mixed uses served by multimodal transit. New or enlarged centers may need to be connected by as yet unplanned "aspirational" transportation corridors.

This Regional Vision implies a major shift in transportation planning from our recent history. Laying the groundwork for such a change in strategy needs answers to the following questions:

- What are the issues with our current transportation system?
- How do we plan for a balanced transportation system?
- What is our current transportation network?
- How can transportation and land use be integrated regionally?
- How can transit help our transportation network?
- What are other progressive regions doing?

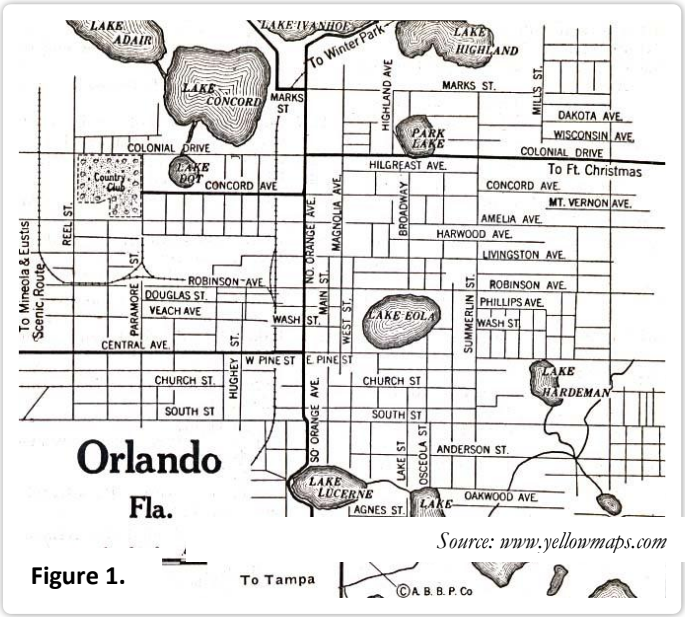
This Chapter will attempt to answer these six questions and derive transportation policies

II. REGIONAL TRANSPORTATION ISSUES

A. History

Transportation networks have shaped our communities from the earliest human settlements to the modern day metropolis. Streets in Florida's early settlements (St. Augustine, Pensacola, 1565) were patterned after the grid system prescribed by the King of Spain in 1573 (see Chapter 10).

Initially it was Native American canoes, then Spanish ships, and then riverboats on the St. Johns River - these were Central Florida's first transportation systems. Railroads opened Florida's east coast to new markets in the late 1800's, bringing in tourists and exporting cattle and citrus.



Source: www.yellowmaps.com

Figure 1.

Some of the prominent dates in our regions' transportation history are:

1880 The South Florida Railroad extended its line from Sanford to Orlando.

1890's Early cities of Sanford, Deland, Mount Dora, Kissimmee, and Orlando built a road network based on an interconnected grid. People lived, shopped and worked in these town centers, traveling short distances by foot, horseback, or train.

1962 Interstate 4 was completed through Central Florida.

1963 The Orlando Orange County Expressway Authority (OOCEA) was formed and began developing a 105 mile toll road network, ultimately including State Routes 528, 408, 417, 414, and 429.

1964 The Florida Turnpike was constructed through Central Florida.

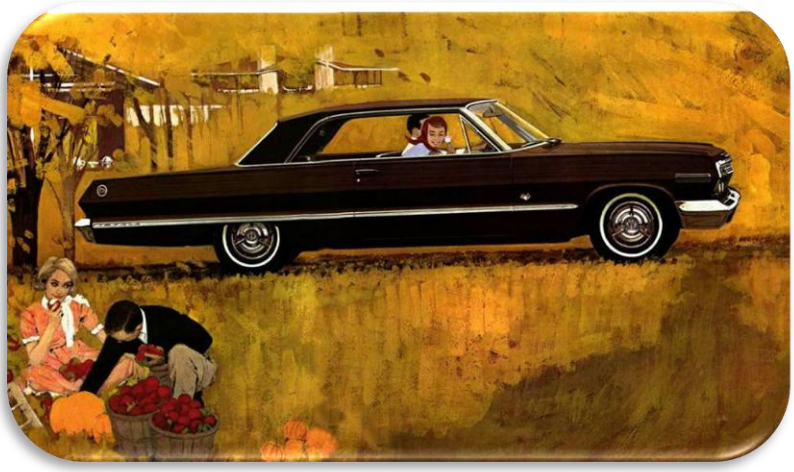
1968 Interstate 95 was principally completed along Florida's East Coast.

The interstate roadways connected the regional population centers of Daytona Beach, Orlando, Tampa, Miami, Melbourne, and Jacksonville and facilitated auto and truck travel to the states to the north. But the freeways also carved through historic downtown neighborhoods in order to empty the cities at 5:00 pm. Commuters drove home to the suburbs farther out of town where land was cheaper.

B. Growth Years

Central Florida's most rapid growth years were 1950-70 (Chapter 2) in the age of the automobile, and in response the region's major roads were built in that era. Automobiles of the 1950's and 60's were stylish, romantic, and liberating. They gave us mobility and freedom to travel. Their ads told us that if we just had the right car, life would be good.

Accordingly, our transportation system was influenced by auto-centric standards of the post WWII era.



Source: *General Motors Corp. original 1963 Chevrolet advertising*

- Neighborhood streets no longer connected like they did in the 1890's, often ending in cul de sacs. This disconnected local road network meant every travel trip forced cars out onto choked collector and arterial streets.
- Roadway efficiency was measured by vehicle counts and vehicle delay. These simple measures under-represented the full value of a balanced transportation network. As a result highway engineers widened the arterials in a repetitive cycle that added rush-hour capacity, only to see the congestion return in a few years.
- Pedestrians and bicyclists were largely ignored.
- Auto-centric transportation planning assumed every American wanted, could afford and could drive a car, and had access to cheap gasoline and free road capacity on a network that would take them where they wanted to go.

But things have changed in the 60 years since WWII.

- Gasoline is no longer cheap.
- Vast areas of land at the urban fringe have been developed, causing more and more vehicles on overcrowded arterial roads.
- What had once been an easy 30 minute suburban commute is often a stressful hour. From 1982-2005 the annual travel delay in the Orlando metro area increased by 36 hours, the 7th worst in the nation.

Figure 2 - Estimate of Excess Travel Due to Longer Travel Distances

Estimate of Excess Travel Due to Longer Travel Distances

Metropolitan Area	Excess Miles of Travel	Excess Hours of Travel	Cost of Excess Travel	Metro Total
3 million and over population				
Houston TX	1,533	66	767	1,711
Atlanta GA	1,389	60	695	1,647
Washington DC-VA-MD	1,386	61	693	1,507
Los Angeles-Long Beach-Santa Ana CA	1,281	53	641	4,468
Dallas-Fort Worth-Arlington TX	1,231	59	615	1,627
Detroit MI	1,231	71	616	1,396
Boston MA-NH-RI	960	48	480	1,015
San Francisco-Oakland CA	866	26	433	1,012
Phoenix AZ	859	31	430	786
New York-Newark NY-NJ-CT	723	3	361	3,109
Seattle WA	689	31	344	584
Philadelphia PA-NJ-DE-MD	355	14	177	522
Miami FL	125	14	63	194
Chicago IL-IN	[616]	-24	[308]	[-]
1 to 3 million population				
Raleigh-Durham NC	1,553	74	777	446
Orlando FL	1,222	70	611	481
San Antonio TX	1,041	43	521	423
Minneapolis-St. Paul MN	1,020	42	510	721
Columbus OH	978	37	489	336
San Diego CA	945	33	472	780
Charlotte NC-SC	765	40	383	229
San Jose CA	761	40	381	363
Baltimore MD	688	26	344	447
Riverside-San Bernardino CA	549	6	274	302
Providence RI-MA	538	40	269	184
Las Vegas NV	406	31	203	160
Denver-Aurora CO	260	30	130	177
Austin TX	45	13	22	13

Source: *CEOs for Cities, Driven Apart 2010*

1. Excess annual miles of peak period travel distance, per peak period traveler
2. Excess annual hours of peak period travel distance, per peak period traveler
3. Annual cost of excess travel distance, dollars per peak period traveler
4. Total cost of excess peak period travel distance, millions of dollars per year

Note: costs are computed relative to the 90th percentile. Negative values indicate savings, relative to 90th percentile. Metro areas with total costs of excess peak period travel of zero (column 4) perform in the 90th percentile or higher.

For years highway-orientated transportation studies have overlooked the role that variations in travel distance and land use patterns play in contributing to urban transportation problems. A new report, *Driven Apart*, from CEOs for Cities, criticize the methodology, conclusion and policy outcomes of basing urban transportation policy on the Texas Transportation Institute's Urban Mobility Report. *Driven Apart* argues that the Urban Mobility Report relies too heavily on the Travel Time Index (TTI), the ration of average peak hour travel times to average free flow travel times, which penalizes cities with shorter travel distances.

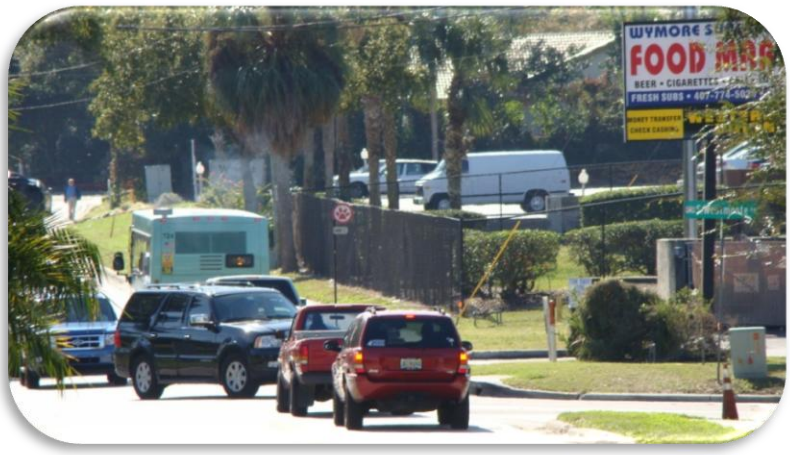
The report concludes that the solution to this problem has much more to do with how cities are built than how roads are built; compact development allows residents to take shorter trips, which minimizes "peak hour" travel. This means that residents can spend less time in traffic and municipalities can spend less money on highways. Methodology changes to improve the system of transportation data collection "should incorporate better and more precise data about speeds but also specifically track travel distances and land use patterns."

Other conclusions include:

- If every one of the top 50 metro areas achieved the same level of peak hour travel distances as the best performing cities, their residents would drive about 40 billion fewer miles per year and use two billion fewer gallons of fuel, at a savings of $31 billion annually.

- In the best performing cities the typical traveler spends 40 fewer hours per year in peak hour.

C. Primary Transportation System Issues



The major concerns with the region's urban and suburban transportation system include:

1. Streets are generally not safe for pedestrians or bicyclists. The streets are designed for cars. Many streets do not have sidewalks or bike lanes. There are gaps between sidewalks that force pedestrians into the roadway.

2. The region has a disconnected local street system, which does not distribute movement in all directions. Local streets fail to connect so traffic overloads the collectors and arterials.

3. Unrestricted strip commercial driveways along arterial increase conflicting turning movements, resulting in accidents and reduced capacity.

4. Overloaded arterials are widened in response to traffic, which attracts more traffic.

5. Wide arterials utilize multiple left turn lanes. Each widening makes the delays at signals worse, prompting 'red light runners' and causing accidents.

6. Widened arterial streets are dangerous and daunting for pedestrians to cross.

Proof of the pedestrian danger from our regional road network came from a 2009 report "Dangerous by Design", which named the Orlando metro area "**the most dangerous large city in America for pedestrians**". The study found that the pedestrian danger index was 214.7 in 2007-08 in the Orlando Metro area, **four times the national average**. Florida was the most dangerous state for pedestrians, with the four most dangerous large metro areas in the nation. By comparison, the four safest pedestrian metros, Minneapolis, Boston, New York, and Pittsburgh are larger and have significantly more pedestrians. We must provide safer pedestrian facilities.

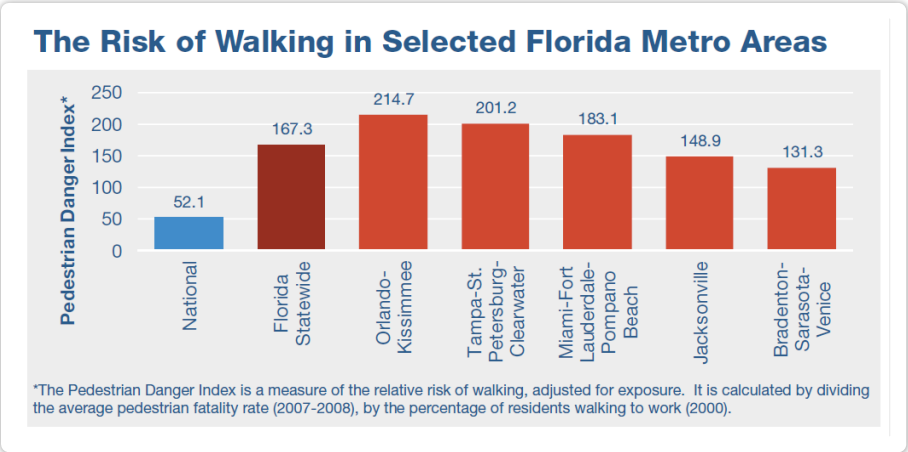


Figure 3: *Dangerous by Design, by Transportation for America*

The "Dangerous by Design" report recommends making transportation networks safer for pedestrians by incorporating four key elements: *traffic calming, *complete streets policies, *safe routes to schools programs, and *walkable neighborhoods. Modern roundabouts and transportation demand management (TDM) plans are two other strategies that can be utilized to improve network safety.

In summary, it is important to encourage neighborhood and roadway designs which form an interconnected network, including automobile, bicycle, and pedestrian routes that provide direct connections to local destinations. Local streets would provide for both intra- and inter-neighborhood connections and thus knit neighborhoods together, not form barriers between them.

Traffic Calming And Street Design

Photo courtesy of the National Complete Streets Campaign

Traffic calming includes a host of engineering techniques used to physically alter road design for the purpose of slowing traffic and improving safety for bicyclists and pedestrians. Beyond simply installing sidewalks, these improvements enhance safety through a focus on intersections with features such as pedestrian refuge medians, better road geometry, and signals that give pedestrians a "head start" when crossing roads. Depending on the type of measure implemented and speed reductions achieved, traffic calming has reduced collisions by 20 to 70 percent.

Modern Roundabouts

Glens Falls, New York Roundabout - Photo courtesy of http://isportacus.com/tag/ray-emery/page/2/

Modern roundabouts provide traffic calming as well as reduce vehicle related injuries and deaths from intersection collisions. A study by the Federal Highway Administration and Insurance Institute for Highway Safety found that roundabouts reduced fatality collisions by 90% at intersections where stop signs or signals were previously used for traffic control. Additional benefits include a 37% reduction in overall collisions, a 75% reduction in injury collisions, and a 40% reduction in pedestrian collisions. efficient traffic flow through intersections instead of th by traffic signals.

Complete Streets

Photo courtesy of www.completestreets.org

Complete Street design strategies ensure that future road projects consistently take into account the needs of all users, of all ages and abilities, particularly pedestrians and bicyclists. Complete Streets designs vary from place to place, but they might feature sidewalks, bicycle accommodations, comfortable bus stops, median islands, frequent crosswalks and pedestrian signals. Both the American Academy of Pediatrics and the Centers for Disease Control and Prevention recently endorsed the adoption of local and statewide Complete Streets policies as a strategy for improving safety and increasing physical activity among children and adults.

Safe Routes to School Programs

Staff Photo - Windermere, Florida

Safe Routes to School programs take a comprehensive approach to improving safety around schools for children walking and bicycling. The program funds engineering upgrades like sidewalks and crosswalks, improved traffic enforcement and bicycle and pedestrian safety education. The intent is to address parental concerns about traffic dangers and get more children walking and bicycling to school, which improves their physical fitness and health. From a handful of pilot efforts across the country, Safe Routes to School has grown into a federally-funded program providing more than $600 million over five years for thousands of projects nationwide. One of the key dangers to children walking to school is the requirement or provision of high walls surrounding single-family subdivisions. This prevents "eyes on the street" and makes for an unsafe walking environment for children.

Walkable Neighborhoods

Walkable communities are safe and inviting for walking and bicycling, while also featuring compact development and a variety of destinations, such as parks, public spaces, schools, workplaces and other amenities like restaurants and retail facilities. The tools to increase community livability by improving walkability go beyond investing in pedestrian infrastructure - residents and visitors must have convenient destinations they can walk to comfortably.

Transportation Demand Management

Transportation Demand Management (TDM) is a series of strategies and policies aimed to reduce travel demand by single-occupancy vehicles. One TDM strategy is Parking Cash Out, a program in which an employer offers employees the option to take cash instead of a free or subsidized parking space at work. This encourages employees to carpool, walk, bike or take transit to work, a goal of all TDM applications. Besides more money in the employee's pocket, the benefits from this commuter finance incentive include a reduction in traffic and emissions. Employers enjoy decreased parking costs as well as the opportunity to accommodate business growth, to lease or sell the excess parking, or to use the land for other business purposes. Other TDM strategies include an Employer Transit Pass Program, Bicycle and Pedestrian Support, Traffic Calming, Ridesharing, and other activities that reduce or redistribute transportation demand in space and time. (**Sources:** *http://www.vtpi.org/tdm/tdm8.htm and http://www.bestworkplaces.org/pdf/ParkingCashout07.pdf*)

D. Auto-centric Development and Health

Emerging research suggests that auto-centric development/sprawl contributes to obesity because we drive everywhere, and walking is discouraged by lack of safe sidewalks.

Additionally, doctors are finding that other health related issues, such as chronic heart disease, are more prevalent in suburban settings. One could conclude that sprawling suburban growth, coupled with auto-dependency comes at a high cost, not only in the form of infrastructure and long-term maintenance, but also in the form of higher health care premiums, worker's compensation benefits, and other health related costs.

Proper compact urban form, with interconnected streets lined with wide shaded sidewalks, street trees and shops and offices near our homes would increase walking and help to reduce obesity and improve health.

Proper community design not only helps reduce greenhouse gases, but improves public health and quality of life (see also Chapter 10).

III. MEASURING A BALANCED TRANSPORTATION SYSTEM

Future transportation policies must take into account the networks that are already built, their strengths and weaknesses, and how to better measure transportation success.

According to Jeffrey Tumlin at Nelson-Nygaard Consulting Engineers[1], transportation is not an end. It is a means by which we support larger goals. Land use is the end, and transportation is a means to that end. Land use and transportation policies must balance the objectives of government related to mobility and accessibility.

- **Mobility** means traveling easily where you want to go, reducing roadway congestion, increasing transit frequency, reliability and speed, and creating bicycle accommodations and complete sidewalks.
- **Accessibility** means getting the goods and services you need, bringing people, goods and services closer together, mixing land uses and using technology to delivery transportation services.

How do we measure transportation efficiency and success?

The American Association of State Highway and Transportation Officials (AASHTO) Highway Manual (known as the "Green Book") measures automobile mobility using vehicle delay as Level of

[1] Transportation, Land Use and Green Urbanism, APA Seminar, November 7, 2009

Service (LOS). The assumption is made that as vehicle delay increases, additional lanes are needed. FDOT used future growth scenarios (Chapter 1) to model congested roads (LOS F) in 2005 and 2050 in the figures below:

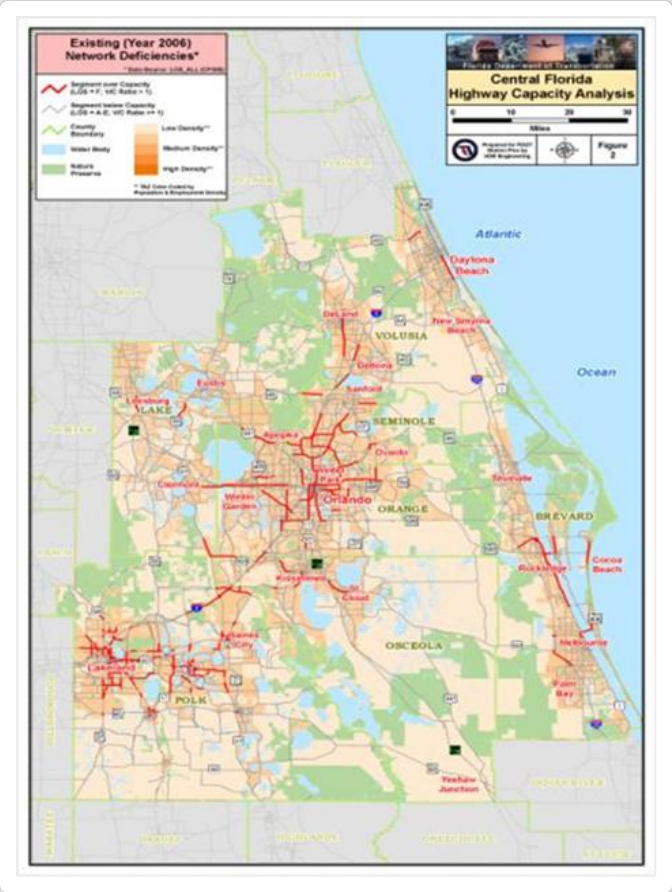


Figure 4: *2005 Congested Roads – FDOT*

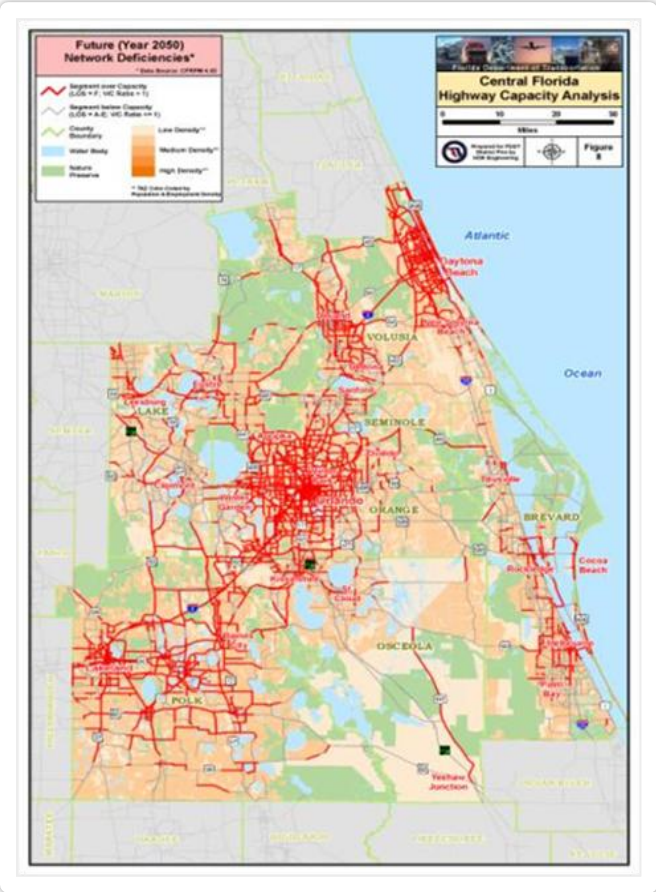


Figure 5: *2050 Congested Roads - FDOT*

From a quick glance at Figures 4 and 5, it is apparent the region has congestion problems and they are going to get far worse if we keep growing the way we have in the past.

But the good news is, we are currently in a slow period of growth (November, 2009).

We should use this opportunity to shift our development patterns so when growth resumes, we can balance our transportation system to avoid the outcome in Figure 5.

Before we assume that we must continue to widen roads, we need to realize that LOS is often a simple measuring tool. It has shortcomings.

Automobile Level of Service (LOS) shortcomings:

- LOS does not properly consider any other mode of transportation- just vehicles.

- LOS does not consider corridor travel time
- LOS undercounts the value of transit. A single occupant car is 40 times more "valuable" than a passenger in a fully loaded 40 passenger bus. This is because traffic counters measure buses as 1 dual-axle vehicle even though it is potentially carrying forty single occupants in the vehicle.

LOS	Seconds of Delay
A	< 10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

50 years of auto-centric planning based on LOS measurements has not given us good results.

Other transportation policy objectives, such as community quality of life, economic development, environmental impact or other modes of transportation should be considered before we make major regional transportation investments.

Progressive regions like San Francisco, California, Bellingham, Washington, and the United Kingdom have incorporated more policy objectives as measurements of transportation success into their planning. What do they measure?

Figure 6 shows how the San Francisco Metro Area uses a broad based scale of indicators to evaluate the benefit of new transportation investments.

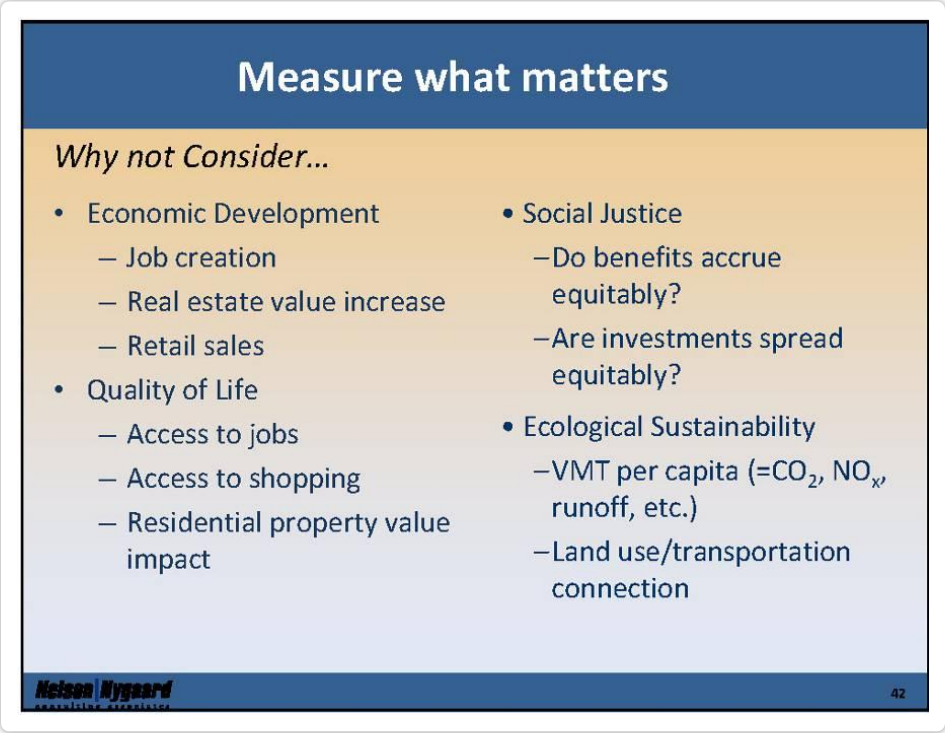


Figure 6: *Jeffery Tumlin, Nelson Nygard, APA Seminar Transportation and Land Use, November 6, 2009*

The United Kingdom has also adopted a new way to measure the benefits of a proposed transportation investment, the intent being to assure investments that result in a balanced transportation system. In this "New Approach to [transportation system] Appraisal", capacity and vehicle delay represent just two of more than 60 indicators to be measured before investing in transportation improvements. This kind of transportation planning is not driven by congestion relief but rather by the overall impacts and benefits of balanced transportation system.

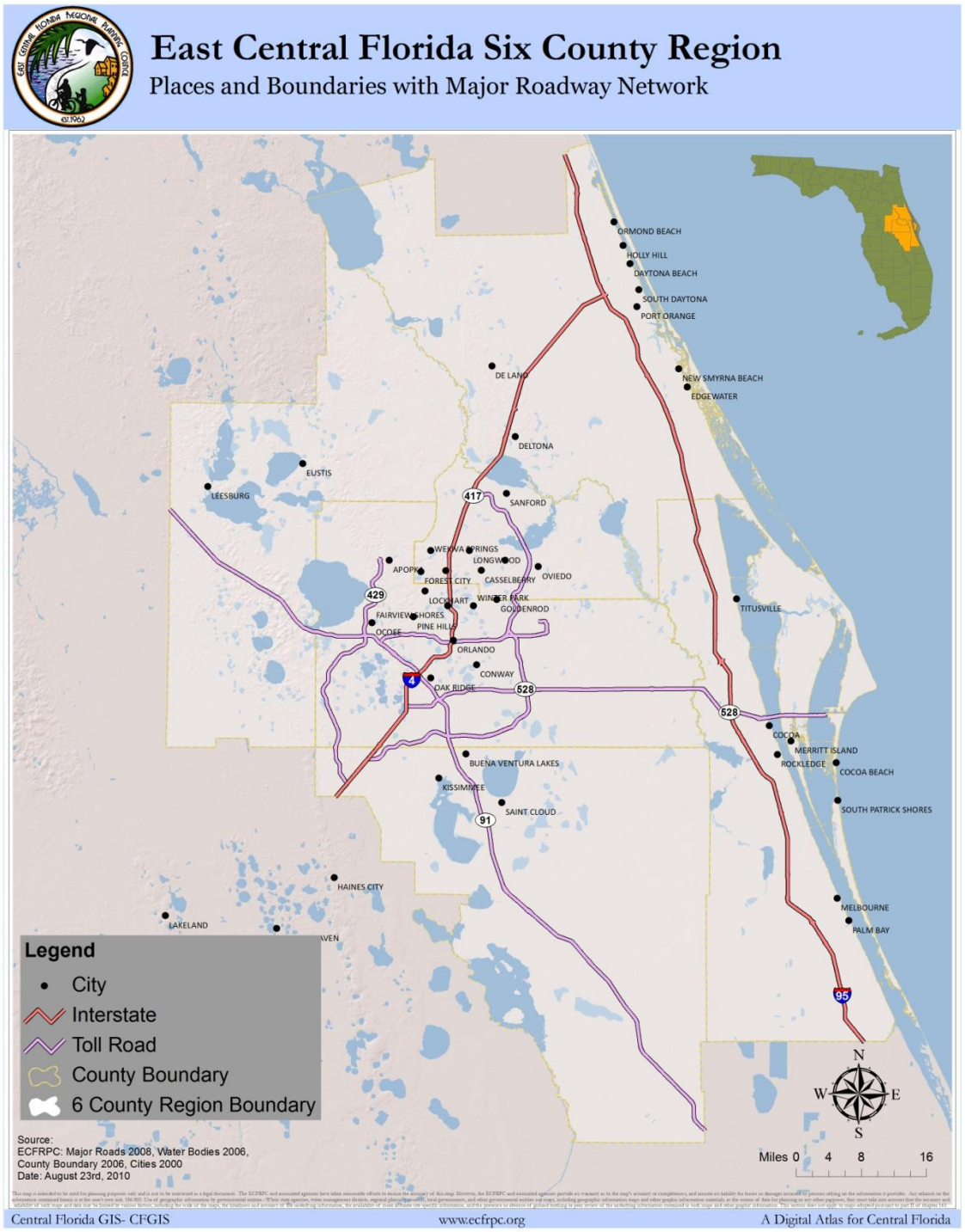
Our region should evaluate major transportation improvements by measuring the overall goals of a complimentary land use and transportation system, including its impacts on quality of life for residents and potential for economic development.

To balance our regional transportation system there must be consideration for land use reform, infrastructure reinvestment, and transit.

If we can shift from being an auto-centric region to one with a balanced transportation system that values accessibility, safety, community design, economic development, and quality of life more than vehicle speed then we could someday be a 21st century "winner" region like Portland (Oregon), Arlington (Virginia), and Charlotte (North Carolina). They are using superb transportation systems to stimulate their economies, provide accessibility, reduce sprawl, and improve the quality of life.

The good news is that MetroPlan Orlando, Lake Sumter, and Volusia Metropolitan Planning Organizations recently selected a Long Range Transportation Plan (LRTP) future transportation system with more emphasis on a balanced multi modal transportation system that will consider the benefits of both transit and a more compact, mixed-use development pattern. This is a good first step, but more needs to be done.

Figure 7. Major Roads and Railroads



IV. CURRENT TRANSPORTATION NETWORK

A. Roads - Central Florida has a number of vital arterial roadway systems.

Table 1. Road Name	Description
Interstate 4	• Serves Osceola, Orange, Seminole, and Volusia Counties • First Interstate constructed in the state of Florida
Florida Turnpike	• Serves Osceola, Orange, and Lake Counties • Runs through 11 counties in the State of Florida
Osceola Parkway	• Serves Osceola and Orange Counties • Connects Florida Turnpike with the Disney World and the attractions
US Highway 1	• Serves Brevard and Volusia Counties • Runs from Key West, Florida to Fort Kent, Maine
US Highways 17 and 92	• Serves Osceola, Orange, Seminole, and Volusia Counties • 2 highways form a major known locally as "17-92"
US Highway 192	• Serves Brevard, Lake, and Osceola Counties • Runs east and west across the center of Florida from Lake County past Walt Disney World to Indialantic
State Road 50	• Serves Lake, Orange, and Brevard Counties • Runs across the center of Florida through Orlando in Orange County
State Road 408	• Serves Orange County • 25 mile toll road that extends from the Florida Turnpike in Ocoee through downtown Orlando to end at State Road 50
State Road 414	• Serves Orange County • Toll Road that runs east and west connecting SR 429 and US 441
State Road 417	• A 55 mile toll road that Serves Orange, Osceola, and Seminole Counties • Eastern Beltway around City of Orlando, key commuter link that serves the University of Central Florida and Research Park
State Route 429	• A 33 mile toll road from US 441 in Apopka to I-4 near the attractions
State Route 528	• A 41-mile toll road expressway that serves as a connector between Interstate 4, the Orlando International Airport, and the Atlantic Coastline

(***Source:*** *http://www.dot.state.fl.us/planning/policy/costs/costs-D5.pdf*).

B. Roadway Costs and Funding

Costs for roadway improvements are increasing. According to the March, 2007 FDOT publication entitled "Long Range Estimates District Five Centerline Mile Costs", construction of

a typical two lane rural roadway can cost upwards of $3.4 million per mile, while an urban four lane roadway can run over $9 million per mile. Interchanges can run from $16 to more than $165 million, depending on location. Widening a two lane road to four lanes will run just under $5 million per mile, while widening from four to six lanes runs from $5 to $17 million per mile.

C. Bus - The region is served by four public bus systems. In addition, there are several private companies catering primarily to the tourist industry.

Table 2.

System Name	Primary Area Served	Fleet	Dedicated funding	Yearly Ridership	Number of Routes	Annual Budget	Approximate Coverage
LYNX Est. 1931	Seminole Orange Osceola	290 buses	No	26.1 million	65	$113.8 million	2,500 square miles
Votran Est. 1975	Volusia	53 buses	No	3.4 million	26	$20.5 million	1,200 square miles
Space Coast Area Transit Est. 1974	Brevard	58 buses	No	1.2 million	26	$4.5 million	720 square miles
Lake County Connection / Lake Xpress Est. 2007	Lake	8 buses	No	105,253	6	$1.678 million	71 square miles

<u>LYNX</u>

LYNX serves Orange, Seminole and Osceola counties. It includes a service area of more than 2,500 square miles. A fleet of 290 buses cover 65 daily routes. Ridership has steadily risen in recent years. Recent declines in revenue have had an impact, resulting in a drop in service. It is expected that revenues will increase in the coming years to adequately feed riders to and from the recently approved SunRail system.

While LYNX is primarily a fixed-route operator, Flex Bus service is currently being evaluated. This concept is relatively new and would offer a semi-fixed route offering flexibility for picks-ups and drops at designated stops. Flex Bus service typically utilizes smaller vehicles and provides on-demand operation. The system responds to user requests, and can be pre-scheduled. Stations are

usually at activity centers and the route can deviate to pick up or drop off passengers. The City of Altamonte Springs is planning for a Flex Bus system to complement the new commuter rail line (SunRail). Currently, the engineering is complete and some right-of-way has been acquired.

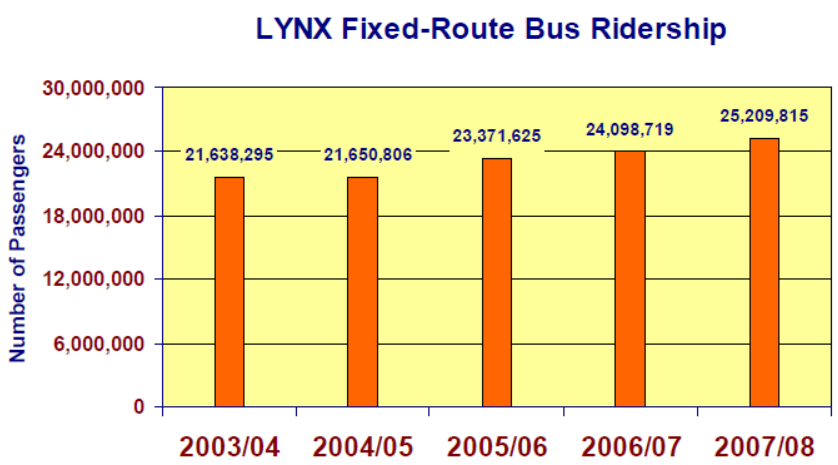
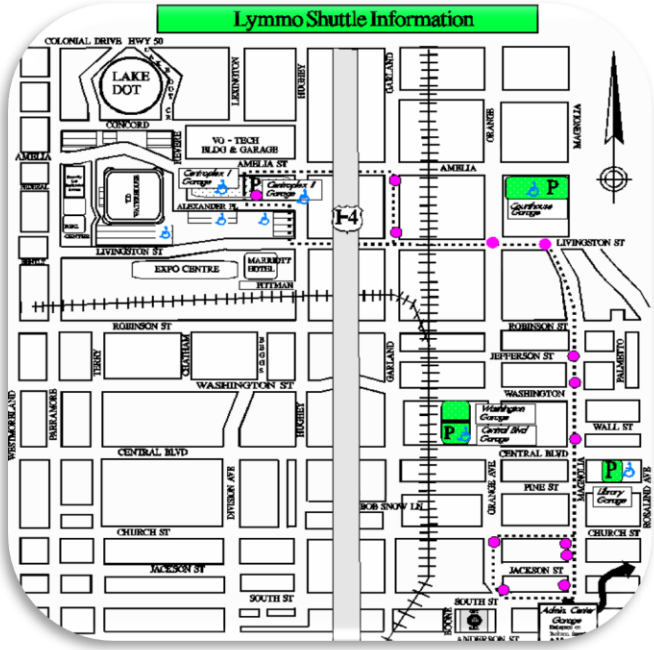


Figure 8: *Lynx/MetroPlan*

In addition, LYNX offers a downtown Orlando circulator service known as LYMMO. This system operates on a five-minute headway (frequency) during office hours and ten-minute headway for the rest of the day. It is a free service operating within an exclusive lane, thereby avoiding most congestion. Plans for expansion to Florida Hospital Orlando to the north and the Orlando Regional Medical Center to the south will be implemented in the near future. Connections to future passenger rail are also anticipated in order to move riders to their final downtown destination. The LYMMO system exemplifies how transit can reduce Vehicle Miles Traveled (VMT).



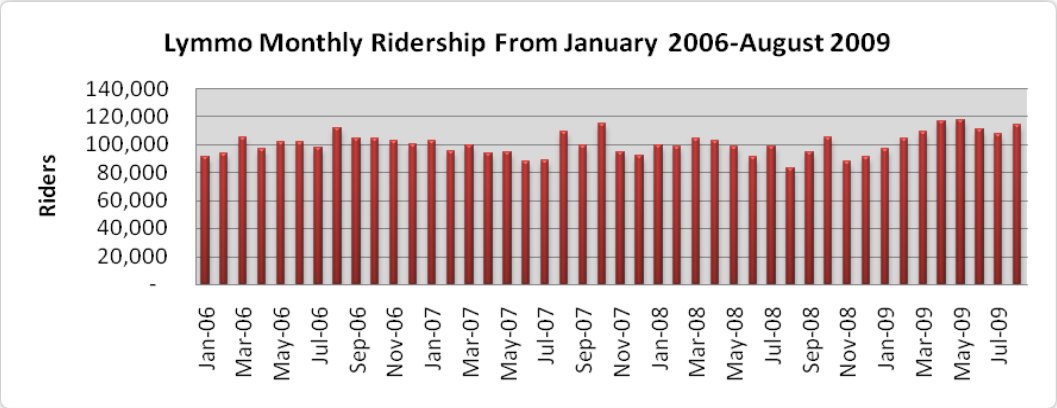


Figure 9: Lymmo Ridership

VOTRAN

Votran is Volusia County's bus service owned by Volusia County Government. It provides transportation to urban areas of the county with a fleet of 55 fixed route buses, four trackless trolleys, and 44 paratransit vehicles for people with disabilities. Additional service is provided through contracts. McDonald Transit, a professional transportation management firm based in Ft. Worth, Texas, currently contracts with Volusia County to manage the system.

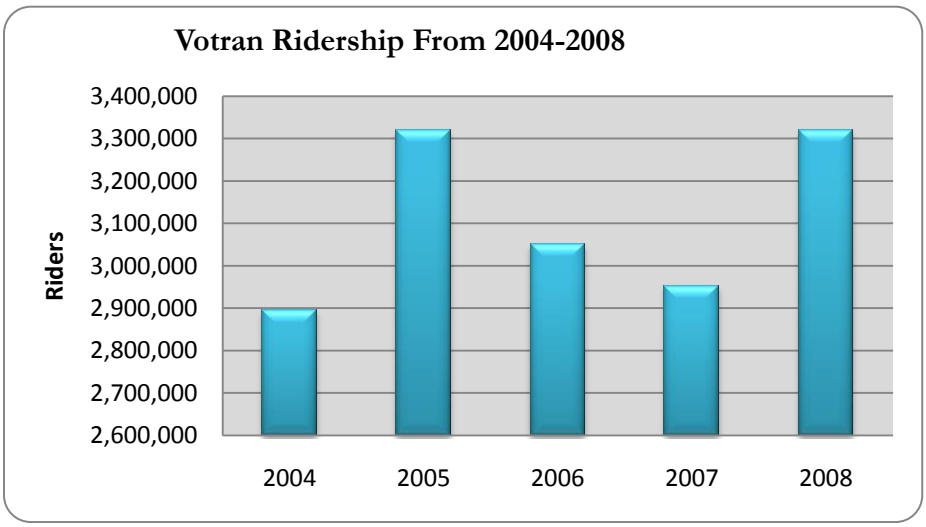


Figure 10: *Votran Ridership*

SCAT

Space Coast Area Transit is Brevard County's bus service. The following description comes from SCAT: "By combining a unique mix of fixed route and paratransit service, car and vanpooling, telecommuting and using volunteers, Space Coast Area Transit is committed to combining their resources with emerging technology to ensure Brevard's current and future transportation needs are addressed. In 2007, SCAT launched new services including an interactive trip planner, evening service on most routes, and Saturday service on every route."

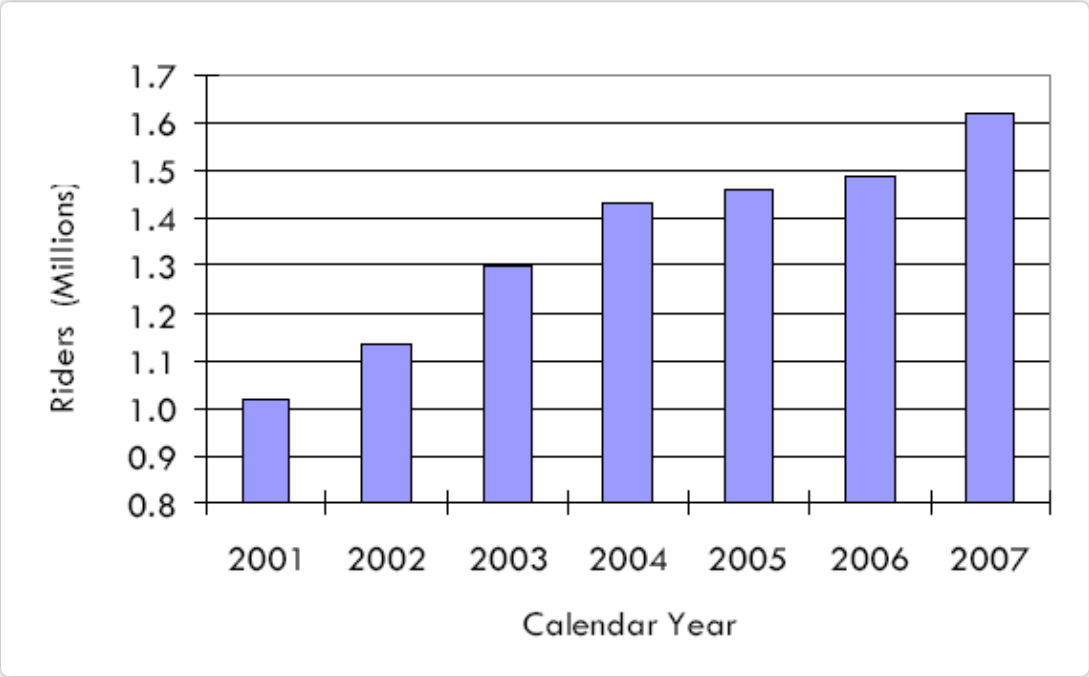


Figure 11: *Scat Annual Ridership*
Source: Brevard TPO rider-ship for Brevard County.

LAKE XPRESS

LakeXpress is Lake County's fixed route bus service, which began in May 2007. Bus service runs every hour from Lady Lake to Mount Dora with circulator routes in the cities of Leesburg and Mount Dora.

The fixed-route service was designed to improve commutes along U.S. Highway 441. The service will be expanded to other urban areas of the County in the future.

Figure 12: *Source Lake County Growth Management*

D. Passenger Rail

Amtrak was congressionally chartered in 1970 and operates four (4) long-distance trains in Florida, all of which pass through Central Florida. These lines include the Auto Train (daily Lorton, Virginia-Sanford, Florida), the Silver Meteor (New York-Orlando-Miami), the Silver Star (daily New York-Orlando-Tampa-Miami), and the Sunset Limited (tri-weekly Los Angeles-Orlando via New Orleans, Pensacola and Jacksonville). A proposed expansion of Amtrak service along the Florida East Coast (FEC) corridor would increase service and connectivity from Jacksonville and points north to South Florida. The East Central Florida RPC is working with and assisting the Treasure Coast RPC to reintroduce passenger service on 326 miles of FEC railway between Jacksonville and Miami. The project is expected to create 2,100 jobs through 2012 and includes four station stops in the ECFRPC region including Cocoa, Melbourne, Titusville, and Daytona.

E. Commuter Rail System

On December 8, 2009, the Florida legislature approved the necessary insurance liability guidelines for a new central Florida Commuter Rail system called SunRail to begin service from Deland to Orlando in 2013.

SunRail will utilize the existing CSX freight rail line running 61 miles from Deland in Volusia County through Poinciana in Osceola County.

This SunRail corridor offers the opportunity to:

- connect urban centers,
- create redevelopment opportunities, and
- relieve automobile trips from Interstate 4.

Figure 13. SunRail FDOT

The total construction cost of the system is estimated at $615 million.

The four counties that will be served by SunRail supported the initiative and all of the proposed seventeen (17) stations are at some level of design.

SunRail is the spine of the transportation system of the future, and one of the most critically important transportation legs of the Regional Vision. It has been supported by the 2030 and 2035 Long Range Transportation Plans for the four counties it will serve.

SunRail could work as a catalyst for intense economic growth around commuter rail stops by promoting higher densities and mixed uses, redirecting growth towards areas served by transit.

F. Regional Airports

The East Central Florida Region is home to four international airports:

Orlando International Airport (OIA)

Orlando International Airport (OIA) is the twenty-second busiest airport in the world, the eleventh busiest in the United States, and the busiest in Florida. In 2008, OIA moved over 35 million passengers and coordinated more than 390,000 aircraft operations. OIA is home to more than 60 airline companies, which utilize four major runways ranging from 9,000 feet to 12,000 feet in length. The airport occupies a site of 13,297 acres and is located in southeast Orlando.

Photo courtesy of www.orlandoairports.net

Daytona Beach International Airport (DBIA)

Daytona Beach International Airport (DBIA) was established at its current location in 1928 and serves the Volusia County area. The airport is situated on 2,023 acres and features a 10,500 foot runway. In 2008, the airport served more than 588,000 passengers and coordinated 258,616 aircraft operations. The airport is serviced by Delta, US Air, and one general aviation company.

Photo courtesy of google earth

Orlando Sanford International Airport (SFB)

Orlando Sanford International Airport (SFB) in Sanford is situated on approximately 2,000 acres and caters to international charter flights. Four airlines have regularly scheduled flights and three are charter only. Additionally, nine smaller companies are based at the airport, including aviation schools and avionic research companies. Sanford moved approximately 1,837,247 people in 2008.

Photo courtesy of www.orlandosanfordairport.com

Melbourne International Airport (KMLB)

Melbourne International Airport (KMLB) was established in 1928 and serves the Brevard County area. The 2,800 acre airport is served by Delta Airlines and 4 general aviation airline companies. The airport moved approximately 400,000 passengers in 2008 and had 163,867 aircraft operations.

Photo courtesy of google earth

In addition to the major airports listed above, the region is further served by approximately more than 60 general aviation airports and more than 40 heliports.

Airports are primary economic engines to the region. More than 70 million tourists visit Florida every year and roughly 70% (50 million) make their way to Central Florida. Of those, it is estimated that 50% of our visitors arrive by air, with 6% arriving from international destinations. Disney World, Sea World, Universal Studios and the Orange County Convention Center are just some of the major local tourist attractions that depend on convenient air travel to book customers. Central Florida airports are also used to import and export goods to South America.

Other Airports Within The Region

Kissimmee Gateway Airport (KISM)

Source: *commons.wikimedia.org*

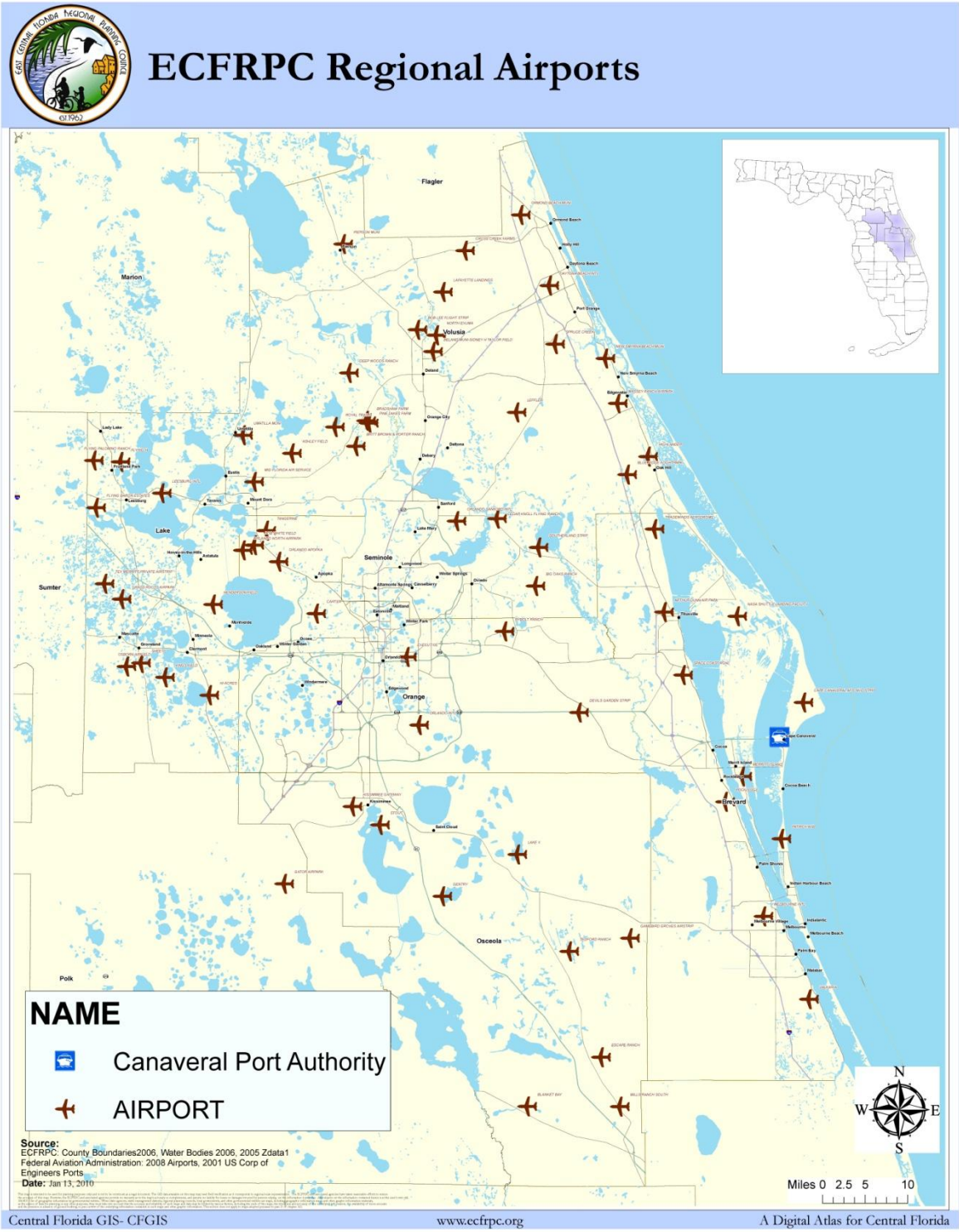
Titusville-Cocoa Beach Airport (TIX)

Source: *www.flickr.com*

Orlando Executive Airport (ORL)

Source: *www.orlandoairports.net*

Figure 14. Regional Airports



G. Sea Ports

Canaveral Port Authority

In 1520 Spanish ship Captain Francisco Gordillo named Cape Canaveral for the natives who used arrows made from cane. (Source: Staying the Course: Port Canaveral the first Fifty Years, 2003, Canaveral Port Authority). This site has been one of the most historically important locations in our regional transportation system for almost 500 years.

Port Canaveral was dedicated by a Special Act of the Florida state legislature in 1953 and opened as primarily a commercial fishing port. Initially, growth was related to shipping military cargo, citrus and freight. Passenger cruise ships and a coast guard station began service in 1963. In 1979 Trident submarine basins were constructed, and an expansion of passenger cruises began in the early 1980s.

Today, Port Canaveral is the world's second-busiest cruise port, with 4.3 million annual cruise passengers. Port Canaveral is a major home port for Disney, Carnival and Royal Caribbean Cruise Lines.

Port Canaveral

Currently the port handles 4.5 million tons of bulk and break-bulk cargo; however, with the completion of a new mega petroleum products storage/distribution complex in early 2010, cargo tonnage is expected to jump.

The port generates 50,000 jobs in central Florida, with a $2.3 billion annual regional economic impact (Source: Fishkind & Assoc. 2006 Port Canaveral Annual Report). Since ports nationwide carry up to 95% of all exports and imports by tonnage, Port Canaveral gives central Florida a potential transportation cost advantage.

There is a growing cluster of ocean and coastal research and technology facilities in Brevard County including Dynamac Corp., Florida Institute of Technology (FIT), Hubbs-Sea World Research Institute, Florida Fish and Wildlife Conservation Commission. Port Canaveral, Melbourne International Airport and Space Coast Regional Airport all lie within Foreign Trade Zone 136, enabling qualified businesses to defer or eliminate U.S. Customs' duties on imported goods. Operated by Canaveral Port Authority, Foreign Trade Zone 136 has now been expanded to a total of 4,160 acres, making it one of the largest (in area) general-purpose public foreign trade zones in the country.

Port Canaveral also supports both civilian and military missile test programs with infrastructure located on the northeast corner of the port. Finally, the combination of commercial and recreational fishing facilities at the port, a "restaurant row" on the water, plus three major parks make this Port more than just a marine transportation facility- it is a destination and major economic engine. While several transit companies ferry cruise customers between Orlando International and the Port, additional transportation connections may be necessary to move people and freight between the port, airports, and other distribution points more efficiently.

H. Waterways

Surface Water Navigation.

Surface water navigation is one of the oldest modes of transportation and is still significant to Central Florida today. According to the University of Florida's, more than 2 million tons of goods each year are transported through Florida's inland fresh-waterways (2001). That represents 90,000 truck loads that otherwise might be carried on our highways.

In addition, the utilization of an "ocean highway" to help reduce truck traffic and accommodate the

growing volume of cargo containers moving on the Atlantic seaboard is forecasted. Development of "short sea shipping" stopping at Port Canaveral will be necessary if Central Florida's economic competitive edge is to be maintained.

"Blueways" are marked water trails generally designated for recreational users, including canoeists and kayakers. Physical and geo-positioned markers guide trail users through the waterways. Blueways are important as a valuable means of transportation, eco-tourism, recreation, and as preservation of ecosystems.

The following is a list of significant surface water resources in East Central Florida:

- St. Johns River

  The St. John's River is the longest river in Florida, used mostly for pleasure crafts and some barge navigation in East Central Florida. It begins its headwaters near Palm Bay in Brevard County and empties into the Atlantic Ocean at Jacksonville approximately 350 miles to the north. As perhaps our most significant inland water feature in Central Florida, this river has been utilized as a means of transportation for hundreds of years.

- Kissimmee River

  The Kissimmee River Watershed covers 3,054 square miles from South Orlando to Lake Okeechobee. This river is mostly utilized for recreational boating and it contributes to the headwaters of the Everglades.

- Withlacoochee River System

  The Withlacoochee River is a black water river originating within the Green Swamp in Central Florida. The 157 mile long Withlacoochee River is mostly utilized for recreational boating.

- The Wekiva River

  Derived from Seminole words meaning "flowing water," the Wekiva River is mostly utilized for recreational boating. It is both a state and national scenic river.

- Indian River Lagoon and Halifax River

  The Indian River Lagoon is 155 miles long and is utilized for recreational boating, navigation and shipping, as well as commercial and sport fishing.

I. Space Port

Central Florida is home to NASA's John F. Kennedy Space Center (KSC), which is the United States' gateway to space exploration. KSC is the world's premier spaceport and is the current launch site of the nation's Space Shuttle program. NASA and Kennedy Space Center's next challenge is the Constellation Program, which calls for the return of human explorers to the moon and beyond. KSC will be the assembly, test and launch site for the next generation of crew and cargo vehicles.

The economic impact on Florida of all NASA/KSC activities in fiscal year 2006 has been estimated at $3.6 billion in output, $1.8 billion in household income and over 34,000 jobs.

The Constellation program is expected to start in 2013, three years after the end of the Shuttle program. This three year gap between programs represents a major economic threat to the regional economy.

J. National Defense Systems

The 45th Space Wing includes Patrick Air Force Base (PAFB), Cape Canaveral Air Force Station (CCAFS), Florida instrumentation stations and the island stations of the Eastern Range, which is the busiest launch range in the world and the nation's primary launch site for commercial space programs. In 2006, the 45th Space Wing exerted a total economic impact on Brevard County of close to $1.1 billion.

The Naval Ordnance Test Unit (NOTU), an Echelon III Department of the United States Navy located in Cape Canaveral, supports the mission capability and readiness of the United States Navy's Trident Submarines by testing sea-based weapons. NOTU also operates the Navy Port at Port Canaveral, supporting submarines and surface ships of the U.S. Atlantic Fleet and foreign navies.

K. Florida Strategic Intermodal System (SIS)

The Florida Department of Transportation's Strategic Intermodal System (SIS) is a statewide network of high-priority transportation facilities, including Florida's largest and most significant commercial service airports, spaceport, deepwater seaports, freight rail terminals, passenger rail, and intercity bus terminals, rail corridors, waterways, and highways. These facilities are the backbone of Florida's transportation system, carrying more than 99 percent of all commercial air passengers,

virtually all waterborne freight tonnage, almost all rail freight, more than 68 percent of all truck traffic, and 54 percent of total traffic on the State Highway System.

The state's objective is to strengthen the competitiveness of Florida's economy by focusing resources on the transportation facilities and services that support critical interregional, interstate, and international trips. Toward this end, the Florida Department of Transportation plans to allocate about 75% of its funding for new capacity to the SIS.

While it is recognized that the SIS is important for commerce, based on the policies at the end of this chapter FDOT should consider reallocation of some of this funding to support transit, pedestrians, bicyclists, and an interconnected local street network. Additional information pertaining to the SIS network is available at http://www.dot.state.fl.us/planning/sis/.

Photo courtesy of www.floridaits.com
Additional FSIS information can be found at www.dot.state.fl.us/planning/sis

V. TRANSPORTATION AND LAND USE

A. Vehicle Miles Traveled (VMT)

The average daily Vehicle Miles Traveled (VMT) in 2007 for the Orlando metropolitan area was 55,493,469. This represented a 3.1 percent increase from 2006.

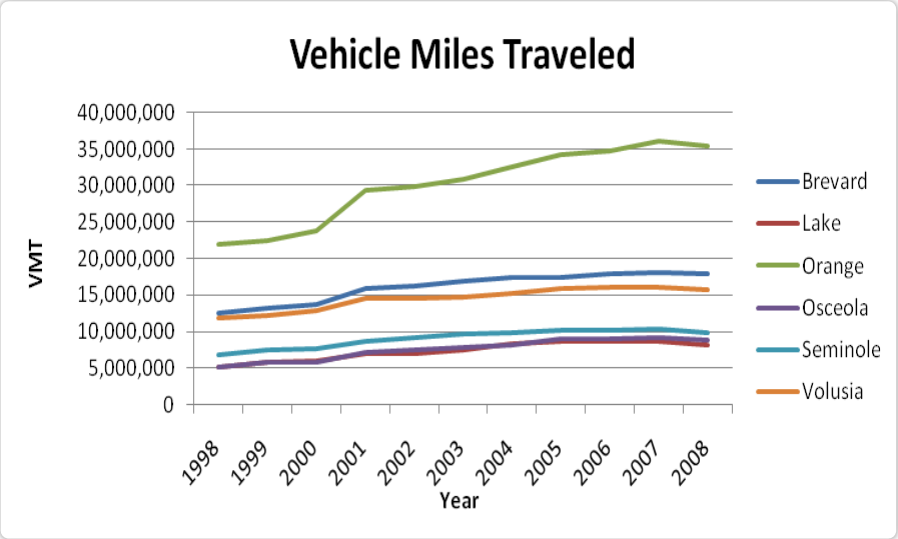


Figure 15: *Source: MetroPlan, Space Coast TPO, Volusia TPO, and Lake-Sumter MPO*

Vehicle Miles Traveled have increased because of:

- the region's low density residential land use patterns
- almost exclusive reliance on automobiles
- separation of uses, disconnected street patterns, and strip commercial development

In 2005, each person in the region spent an average of 20 minutes per person per day in the car. If current growth patterns continue, by 2050 each person will spend an average of 90 minutes per person per day in the car (Source: FDOT, HNTB, modeling from "How Shall We Grow", 2006).

Figures 16 and 17 show that we tend to live far from where we work. This is a result of separating land uses (putting residential in separate and remote neighborhoods, commercial along the corridors and jobs in traditional job centers). This increases Vehicle Miles Traveled (VMT), congestion and greenhouse gas (GHG) production.

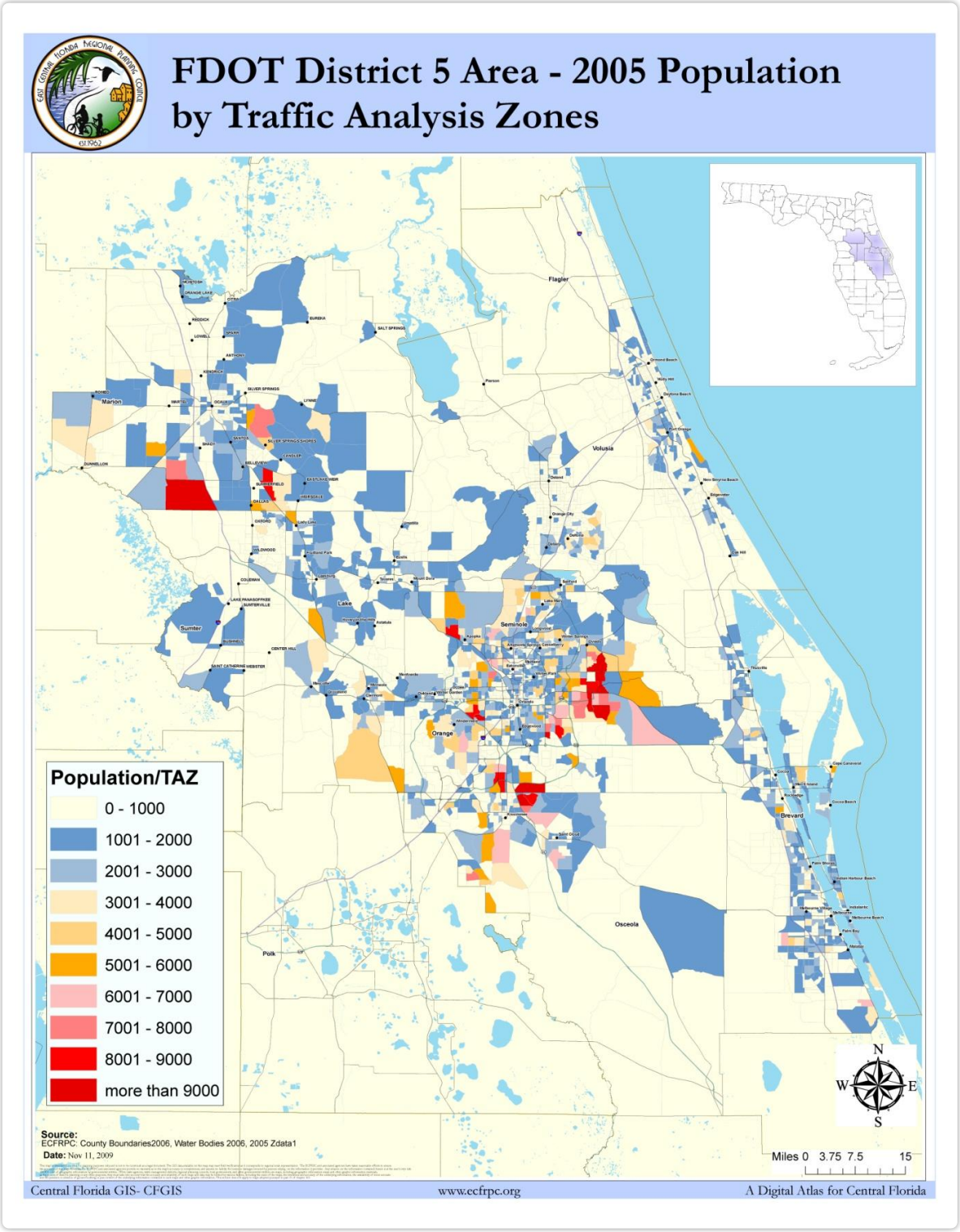


Figure 16: *Population Located by Traffic Analysis Zones, 2005 ECFRPC*

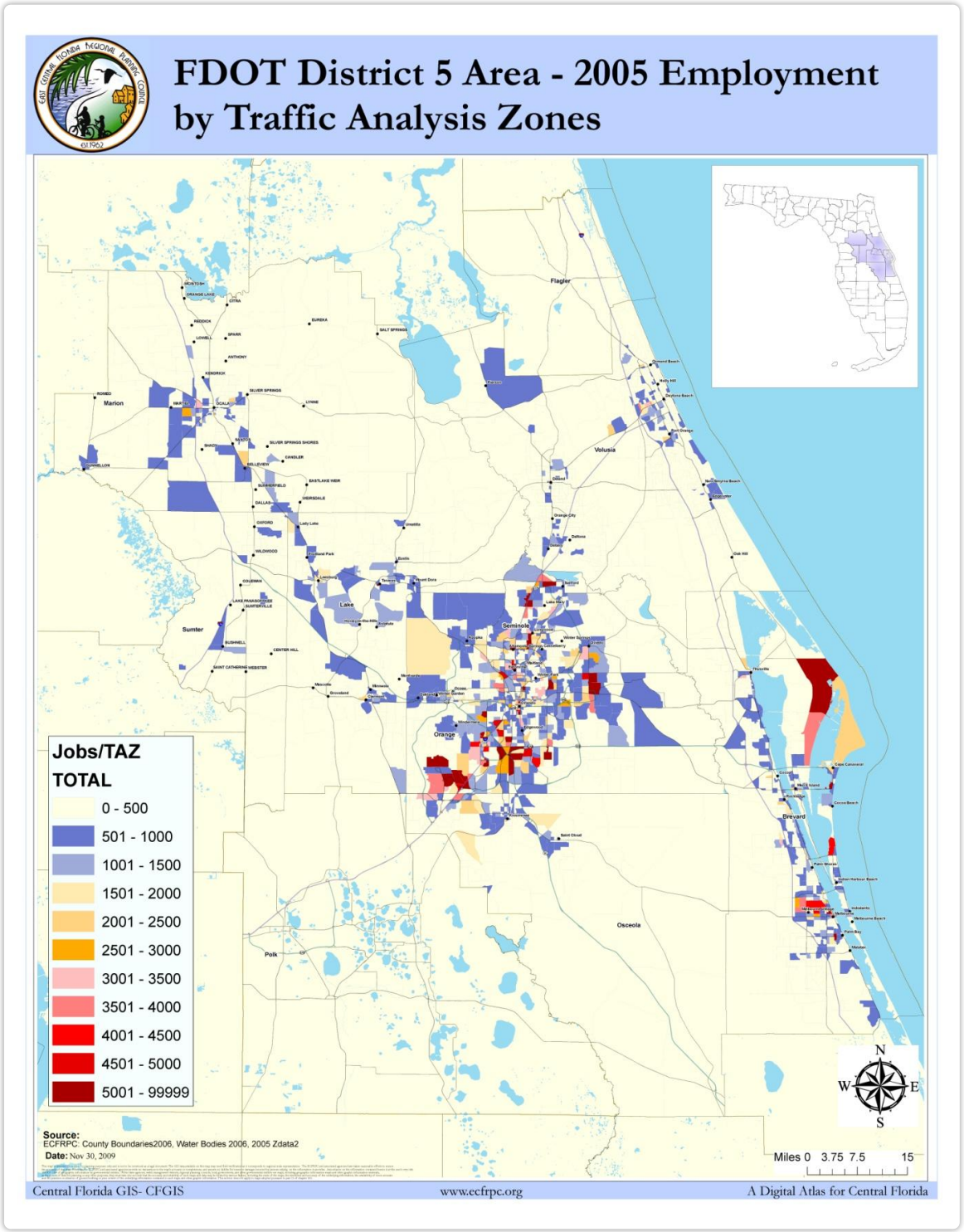


Figure 17: *Employment by Traffic Analysis Zone 2005, ECFRPC*

B. Reducing Vehicle Miles Traveled (VMT)

There are several ways to reduce VMT

1. We can reduce VMT by designing an interconnected street network.

More small connected streets distribute traffic better than fewer bigger ones. The "connected" street network in the illustrations below has 12-15% less VMT than the "conventional" (sprawl) street network.

Conventional Street Network **Connected Street Network**

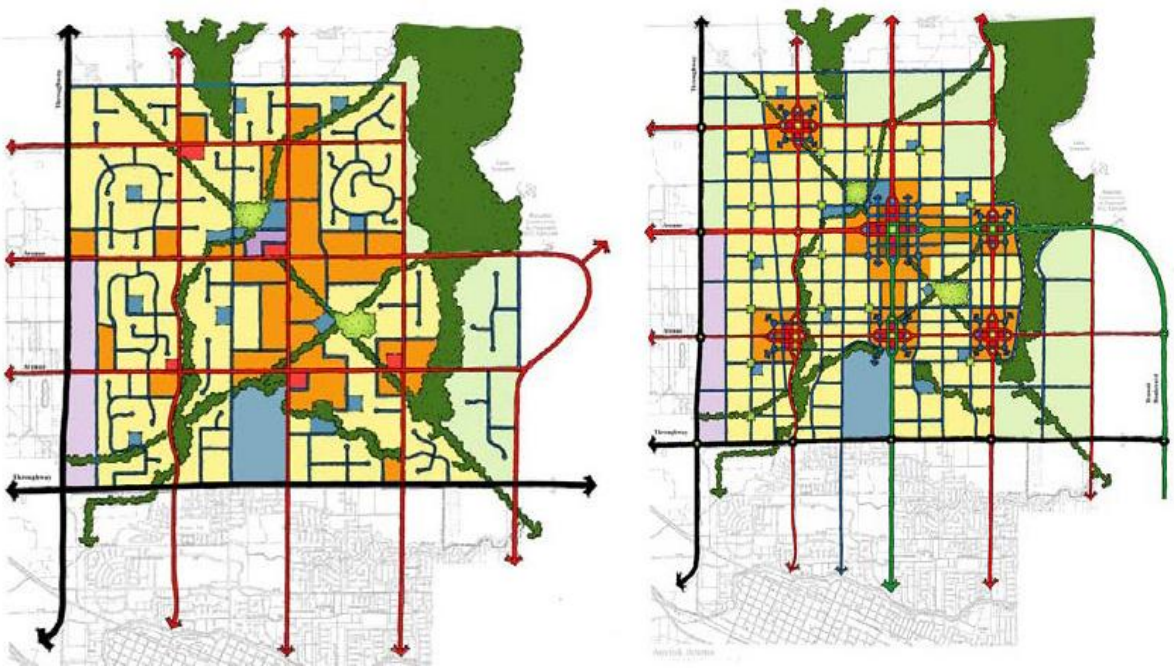


Figure 18 and 19: *Dr. Robert Cervero, University of California Transportation and Land Use Seminar, 11.06.09*

- Avenues and Boulevards for regional travel
- "Connector" streets link neighborhoods to centers
- Traffic calming along local streets
- Special intersection treatments
- Reduces VMT by 12-15% compared to conventional network

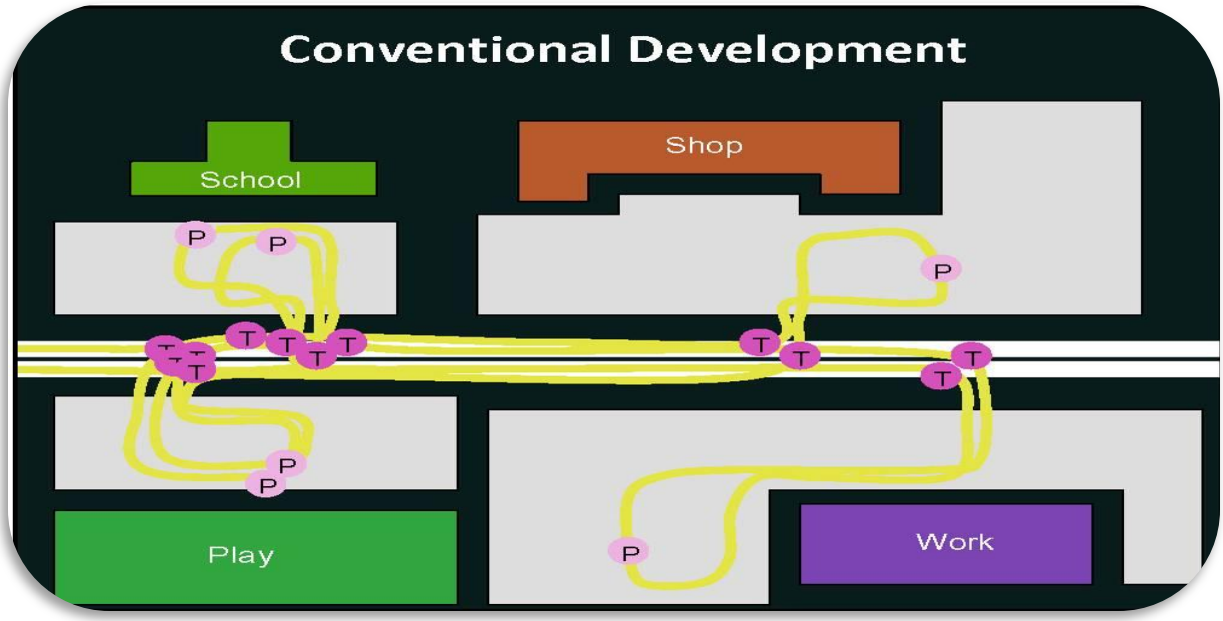
Vancouver, Canada refused to allow urban freeways to invade its core downtown. It relies instead on an interconnected grid network of collector streets that allow all traffic to move in all directions. This network of more, smaller streets can flow 70,000 vehicles per hour, which is TWICE the capacity of an urban freeway. Furthermore, the interconnected road network contributes to the high quality of urban life in Vancouver, often ranked one of the most livable cities in North America.

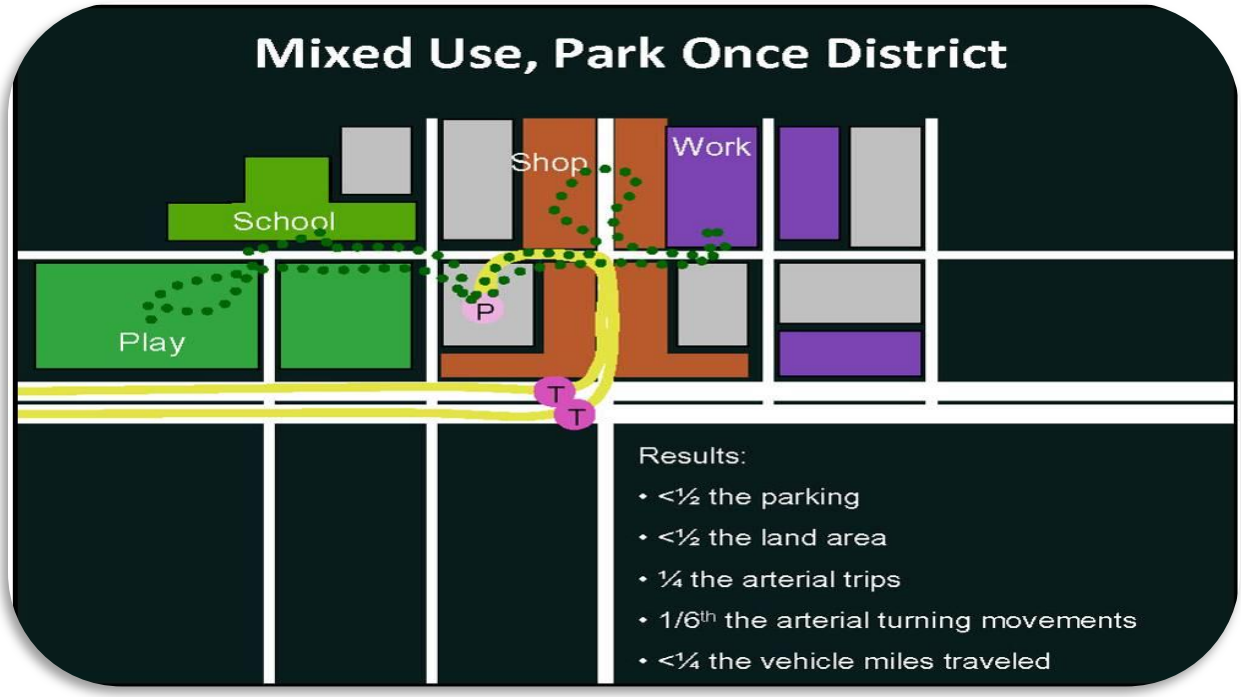
The State of Virginia banned cul de sac streets in new subdivisions (March 2009) because of their detrimental effect of a local disconnected street network on the overall transportation network. They also narrowed local streets from 40 feet down to 24-29 feet to slow and calm traffic. Their goal is an interconnected pattern of local streets to act as distributors of traffic in all directions modeled after Vancouver's grid pattern.

Figure 20: *Jeffrey Tumlin; Ibid.*

2. We can reduce VMT by mixing residential/office/commercial land uses along transit-served corridors and in centers.

This will shorten and reduce vehicle trips, and encourage more walking and bicycling. If designed correctly, drivers can park once and walk to many locations (see **Figures 21 and 22.** *Jeffrey Tumlin, Ibid*).





3. We can reduce VMT by building more compact, walkable neighborhoods.

New communities should be designed to be compact, with mixed uses. For existing "conventional" communities with strip commercial areas and no actual town centers or downtowns, one way to create walkable downtowns may be to reduce traffic lanes with "road diets". Road diets can tame higher speed multi-lane roadways by reducing the number of lanes in a roadway system. An example of a road diet would be a four-lane road reduced to two road lanes, with the other lane space converted into additional parking, bike lanes, or sidewalks. A reduction in vehicle lanes also reduces the speed of cars traveling on the roadway, which leads to safer conditions for pedestrians and drivers alike.

4. Finally, we can reduce VMT by building more transit options throughout the region.

VI. MAKING TRANSIT WORK

The ingredients for successful transit are the same as any other transportation mode:

- Travel time
- Reliability
- Dignity

The choice of the type of transit, the route it takes, and the development patterns and densities along those routes are critical to developing ridership and making transit work. Transit also is most likely to be successful if it is installed when the community is growing and there is opportunity for investment and redistribution of growth along the transit corridor.

A. Bus

A bus system utilizes the existing roadway network, which means it is flexible and can change depending on existing and projected future demand. Additionally, a bus system can connect riders from one mode of transportation to another. Its disadvantage is that its route can be changed, so it is not seen as permanent. Also, buses are stuck in the same traffic as automobiles, so they are not a priority transit, and are often stereotyped as the transportation choice of the poor.

Downtown Orlando's LYMMO operated by LYNX is a dedicated-lane bus service that emulates bust rapid transit but has more frequent stops. LYMMO amenities include:

- Specialized paint scheme and shelters
- Separate logo for signs at stops
- Free service
- 3-mile loop
- Priority signalization

B. Bus Rapid Transit (BRT)

Bus Rapid Transit is characterized by the use of a dedicated roadway or restricted usage lanes, and a limited number of stops, typically a maximum of one per mile. The advantage is that it costs less to implement in comparison to light rail or commuter rail. The busses are more 'rail like' than a traditional city bus. One disadvantage to bus rapid transit is that it is not necessarily fixed and routes can be modified, which provides for uncertainty when trying to concentrate development around station sites. However, a successful BRT system can evolve into a Light Rail system.

Staff Photo

C. Rail Transit

Rail service usually demands a relatively high investment but the ability of rail systems to service large numbers of travelers with a low cost per passenger make it an ideal system for dense urban areas. Various types of rail systems and examples include light rail, commuter rail, high-speed rail, and freight rail. These different systems are discussed in this section.

http://www.vivanext.com/light_rail - Eugene, OR LRT

1. <u>Light Rail</u> (includes streetcar, tramway, and trolley):

   a) Charlotte NC has an 11 miles light rail system that opened in 2007. It operates from the south suburbs to downtown, with 16 stops, running on the former Southern Railway tracks. By encouraging higher densities and mixed uses around the stops, Charlotte has seen a boom in their urban real estate market and rider-ship the first years was 18,000, or 1,636 passengers per guide-way mile, double expectations. Maximum one day rider-ship was 90,000 during the NCAA tournament.

Charlotte Light Rail
Photos by Philip Laurien, ECFRPC, July 2008

b) San Francisco's F line opened in 1995 as the most successful streetcar startup in America, with first year average daily rider-ship of 20,000 passengers/day and 11.6 miles of track. This translated to 1,724 passengers per guide-way mile. The line uses refurbished vintage "modern cars" built after 1920.

F Line Electric Streetcar, San Francisco

D. Heavy Rail

Miami Metrorail is the principal rapid transit system operated by Miami-Dade Transit in Miami, Florida, serving the immediate Miami metropolitan area.

The system operates on 22.4 miles of rail line and is one of only two heavy rail rapid transit systems in the Southeastern United States. There are 22 accessible stations, one about every 1.25 miles.

Year	**Rail**
FY 03	14,306,084
FY 04	16,010,189
FY 05	17,034,513
FY 06	17,234,964
FY 07	17,501,283
FY 08	18,522,752

Metrorail's rider-ship has been increasing over the last six years. Providing this example can give us a glimpse of the type of ridership we may be able to expect here in Central Florida as our population grows, highways become increasingly congested and fuel costs continue to rise.

E. Commuter Rail

Music City Star is a commuter rail service running between Nashville and Lebanon, Tennessee. Service began in September of 2006 and the line currently has six stops covering 32 miles.

This is a "starter" project intended to demonstrate the effectiveness of commuter rail service and expansion plans include as many as six additional lines. As of September, 2008, the average rider-ship for the single line of the Music City Star was 900 passengers per day, with a record 1,012 passengers on September 24, 2008. The train has a seating capacity of 750 passengers. The first "starter line" cost $41 million, or just under $1.3 million per mile, which made it the most cost efficient commuter rail start-up in the nation on a per mile basis. Still, with only 900 passengers per day, this is not removing significant vehicles from area roadways and at a startup cost of over $45,000 per rider it is twice the price of Charlotte's light rail, serving 18,000 a day in its first year of service, with a startup cost of $463 million, or $25,700 per rider. The system is new, however, and the stations do not host significant development. Over the years transit oriented development should improve access and increase ridership.

F. High Speed Rail (HSR)

High speed rail involves trains traveling at top speeds of 90 to 300 mph. This service typically demands separate, dedicated tracks and "sealed" corridors in which grade crossings have been eliminated, either through closure or through the construction of highway underpasses or overpasses.

Example: High Speed Rail – AVE Train in Spain and Thalys Train in France

Photos courtesy of www.dolceguide.com and www.stephenfung.net

Thalys International provides high speed rail passenger service to Paris, Brussels, Amsterdam, and Cologne. The primary route of service is between Brussels and Paris. Thalys operates as an international joint operation with service beginning in 1996. Thalys has 26 stations along its route from Amsterdam to Paris. The distance from Brussels to Paris is 190 miles and it takes 1 hour and 22 minutes at a peak speed of 190 mph on high speed rail. *High Speed Rail photo courtesy of dc.streetsblog.org/…/01/route_map_all_a.gif.*

Beyond Brussels, the main cities that Thalys High Speed Trains reach are Antwerp, The Hague, Rotterdam, Amsterdam, Bruges, and Cologne. 52% of Thalys Customers use high speed rail for leisure, while 48% are business travelers and commuters. Thalys operates with an 87% customer's satisfaction rate and 90% of trains run within fifteen minutes of their scheduled time for departure and arrival. The AVE provides service from Malaga, Spain to Madrid, Spain in 2 hours and 47 minutes. The same trip would take nearly 6 hours to drive.

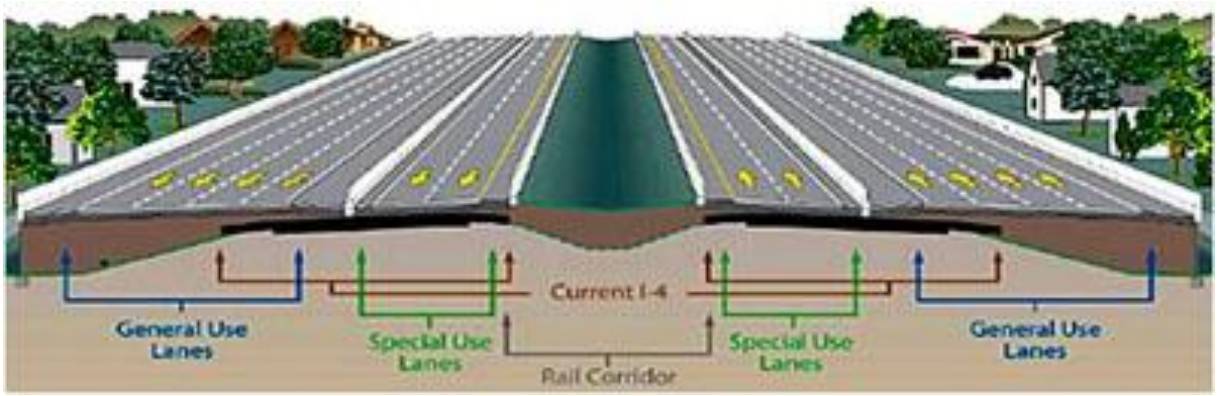
High Speed Rail in East Central Florida

High Speed Rail (HSR) service has been planned between Tampa and Orlando. Trains are projected to reach speeds of at least 168mph.

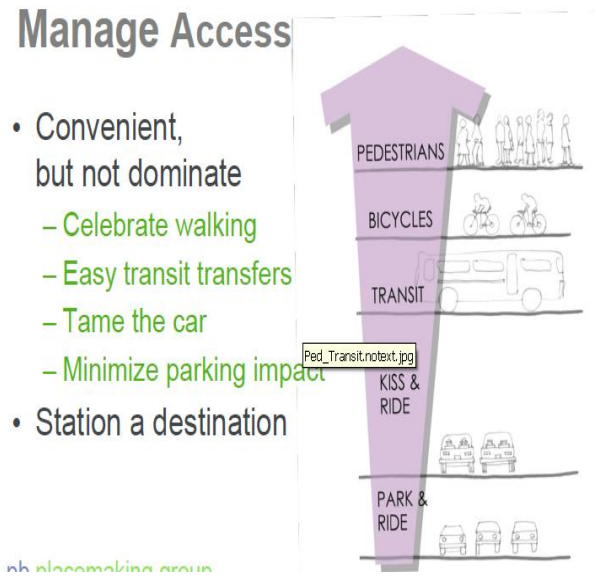
The Florida High Speed Rail Commission has been studying High Speed Rail since 1976. In 1992, President Bush selected Tampa-Orlando-Miami as one of the nation's first federally-designated HSR corridors. In April 2009, the federal government unveiled 'A New Vision for High Speed Rail' in America that called for new investments in intercity passenger rail. This included a commitment of $11.5 billion in federal funding over a three-year period.

On October 2, 2009, Florida Governor Charlie Crist applied for funding to build Phase 1 (Tampa to Orlando line) and on January 28, 2010, President Obama announced Florida was awarded $1.25 billion in American Recovery and Reinvestment Act funds. Additional federal funding awards have followed including $800,000,000 in October, 2010, and $342,000,000 in December of 2010. These federal funds, if actually awarded to Florida and accepted by a federally designated recipient, would nearly cover the entire project cost, which was projected to be $2.7 billion.

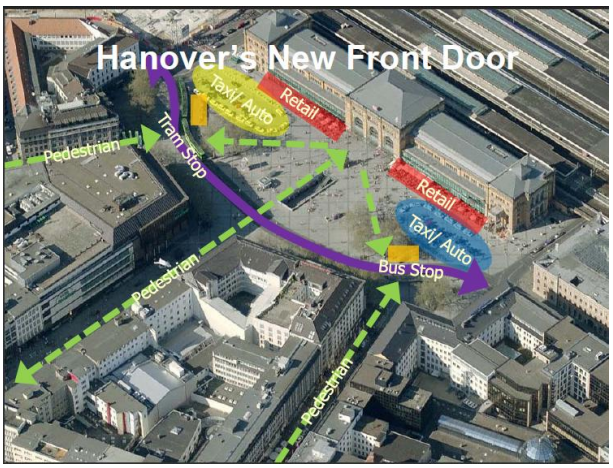
The Tampa-Orlando line would run 84 miles from downtown Tampa to Orlando International Airport. Passengers would connect to high speed trains at stations in Tampa, Lakeland, Walt Disney World resorts, International Drive and Orlando International Airport. Each of these stations would have parking facilities, rental cars, bus, and light rail or commuter rail transit connections. The project would be built in the median of Interstate 4, where a 44-foot envelope has been preserved for this purpose.



Sensitive Station Design



Sensitive High Speed Rail (HSR) station design will serve to fully integrate the activity into the community. The larger scale and higher volumes differentiates HSR from other rail types including commuter rail. The opportunity and the considerations for design are, therefore, very different. Proper HSR design should include a very walkable compact form, a mix of uses, an active face to the station district, pedestrian routes that will become value corridors, liner buildings for parking, and an 18 to 24 hour visible activity zone. The Hanover, Germany station below offers an example of sensitive High Speed Rail design.



Graphics are courtesy of pb placemaking group (from presentation at 2010 Florida Department of Community Affairs annual conference presentation) and www.britannica.com

G. Freight Rail

Freight rail has existed in Central Florida for over a hundred years. This was one of the early modern means for transporting goods in and out of our region before the construction of the interstate highway system. Freight rail systems still exist in our area today and provide an excellent option for shipping and receiving bulk quantities of goods at an economical rate. If fuel costs continue to rise, it will be an advantage to our region to utilize rail as an alternative to trucking.

CSX and the Florida East Coast Railway (FEC) currently serve the Central Florida region. FEC operates 351 miles of mainline track along the East Coast of Florida and moves major carload commodities of aggregate, automobiles, lumber, farm products, food and kindred, machinery, pulp and paper, petroleum products, stone, clay, and glass. FEC serves five (5) inter-modal terminals and offers a drayage leg to inter-modal customers. This has proven to be a very attractive alternative for retail customers looking for one-stop shopping in their transportation service needs.

Photo Courtesy of www.trainnet.org

H. Making Transit Work- Recommending Densities

It is important to increase densities within corridors served by transit. Figure 23 shows the Transit Oriented Design minimum recommended densities used in three other cities.

Recommended Residential Density Thresholds for TODs

City/Source	TOD Type	Minimum Residential Densities (Dwelling Units/acre)
San Diego TOD Guidelines	*Urban TOD* (LRT served)	25
	Neighborhood TOD (Bus served)	18
Washington County, Oregon (LUTRAQ Study)	*Urban TOD* (LRT served)	15
	Neighborhood TOD (Bus served)	8
Portland Trip Met, TOD Guidelines	*LRT Served TOD*	30: 0-1/8 mi; 24: 1/8-1/4 mi; 12: 1/4-1/2 mi
	Bus Served TOD	24: 0-1/8 mi; 12: 1/8-1/4 mi

Figure 23: *TOD Densities, Dr. Robert Cervero, Ibid*

I. Regional Planning Councils Recommend Minimum Densities In Transit Corridors

The Florida Administrative Code, Chapter, 27E-5.004, RULES OF PRACTICE AND PROCEDURE PERTAINING TO STRATEGIC REGIONAL POLICY PLANS - Content and Format, Section (b) - Regional Transportation, states the following:

> *"The plan may recommend minimum density guidelines for development along designated public transportation corridors and identify investment strategies for providing transportation infrastructure where growth is desired, rather than focusing primarily on relieving congestion in areas where growth is discouraged. This provision is not intended to inhibit regional or local mass transit activities and efforts to revitalize urban areas."*

Transit development is important to the Regional Vision and a balanced transportation system for several reasons including:

- providing an alternative to congested roadways;
- providing transportation to those who cannot travel via automobile for economic social, and/or health reasons;
- lowering the total number of vehicles on the roadway and the associated green house gas loadings;
- providing for the more efficient movement of people and goods;
- stimulating redevelopment along the corridors by opening a new segment of the urban real estate market- mixed use transit oriented developments;
- improving the quality of urban life

For these reasons, the East Central Florida Regional Planning Council recommends that minimum densities be consistently established for corridors planned for public transit to incentivize ridership and reinvestment. The amount of density and the timing of redevelopment are contextual (location, type of transit, date of transit service start-up, etc). For the purposes of this study, the minimum Transit Oriented Development densities noted in Figure 24 are recommended as guidelines for the approved SunRail corridor and for further consideration, discussion, and adjustment as applied to other future planned transit corridors.

These corridors were designated in conjunction with the Volusia, Lake-Sumter and MetroPlan Metropolitan Planning Organizations.

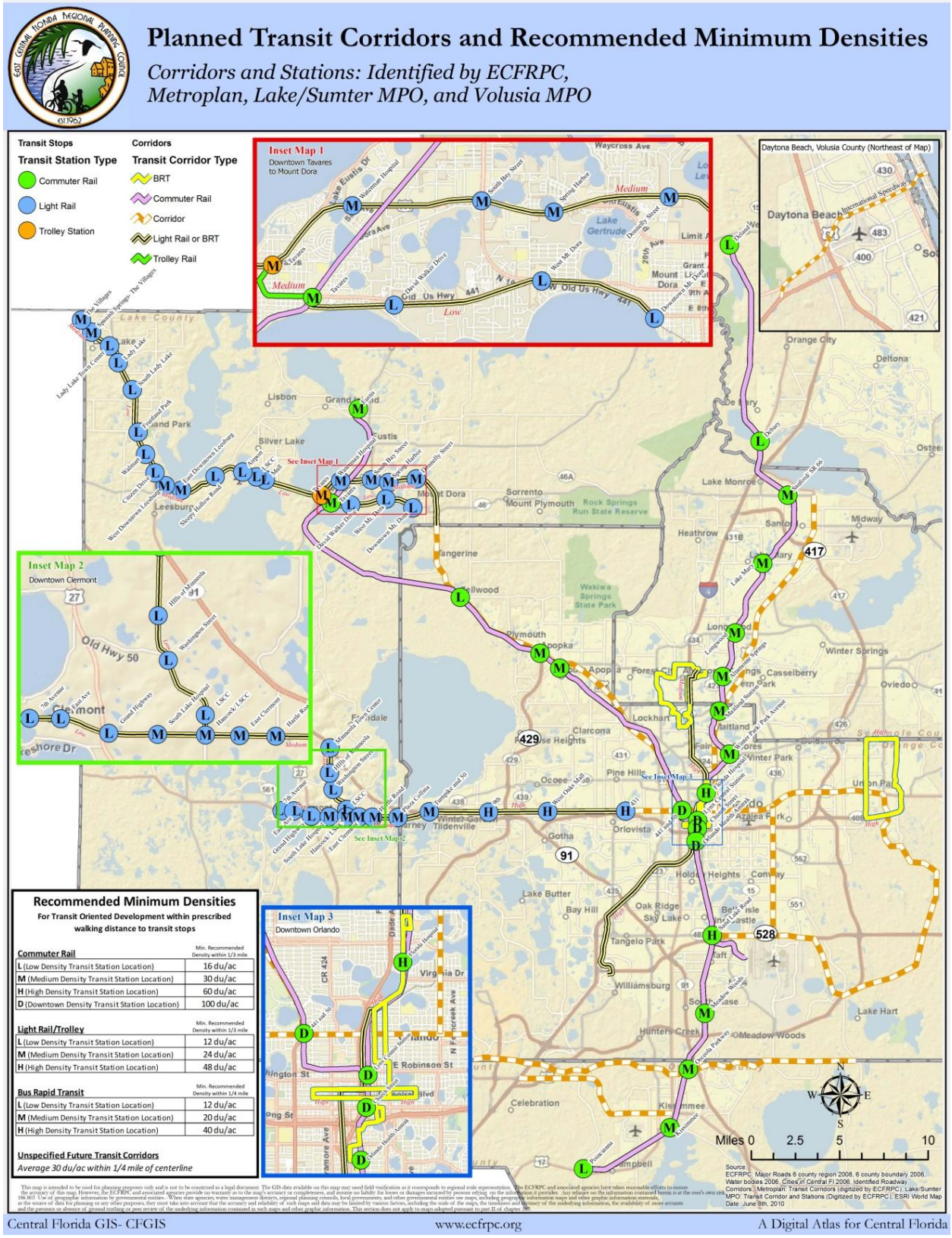


Figure 24: *Recommended Minimum Density in East Central Florida Planned Transit Corridors - The minimum Transit Oriented Development densities noted in Figure 24 are recommended as guidelines for the approved SunRail corridor and for further consideration, discussion, and adjustment as applied to other future planned transit corridors.*

VII. USING RAIL TRANSIT TO STIMULATE ECONOMIC DEVELOPMENT

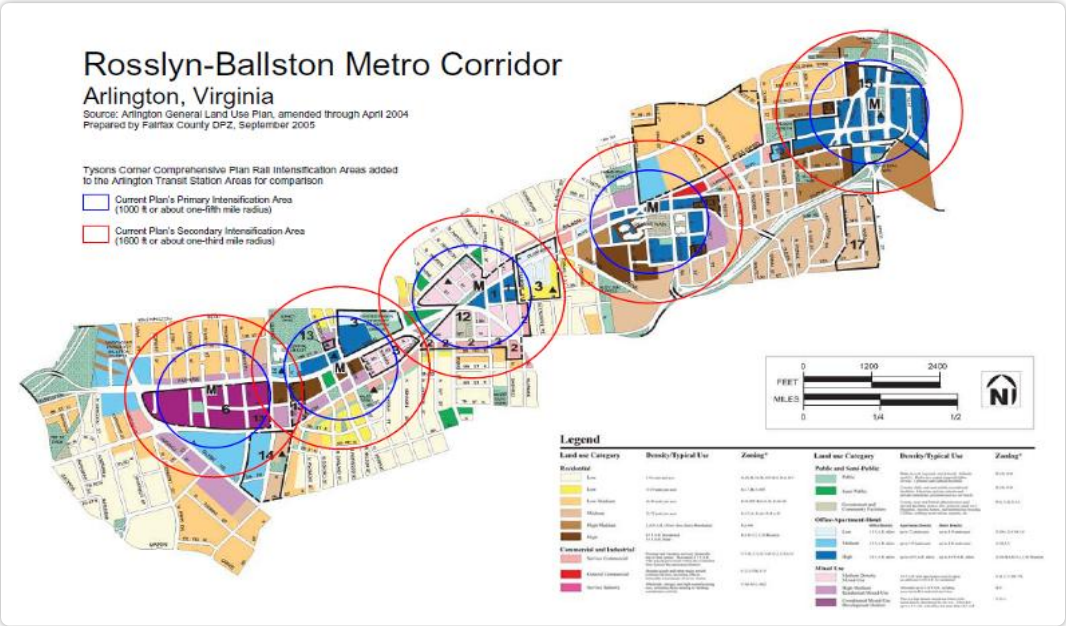
In 2010, Central Florida is the home headquarters to four Fortune 500 companies (International Assets Holding – $43.6 Billion; Darden Restaurants - $7.2 Billion; Harris - $5.6 Billion; and Publix Supermarkets - $24.5 Billion). Would the region have more Fortune 500 companies if it had a better transit system? Probably yes, according to experts in corporate relocation from Core Net Global, who held a conference in Orlando in 2008. One of the top priorities for major companies is reliable transit.

Three other regions have recently initiated rail transit, and business and private investment have responded positively in the rail corridors. Central Florida should pay careful attention to these three successful rail transit case studies, because there are also other examples of rail transit startups that have not significantly stimulated economic development.

A. Rosslyn-Ballston Metro Corridor-Arlington, VA

The Rosslyn-Ballston Metro Corridor is a mixed use Transit Oriented Development (TOD) project that Arlington County Government initiated in 1976 to revitalize a corridor that was declining due to the effect of rapid suburbanization. The existing corridor was comprised of low density commercial uses and residential neighborhoods on the edges. The county analyzed how transit and TOD could be used to redevelop the corridor, leading to numerous concepts and a series of white papers. The City of Arlington adopted a General Land Use Plan (GLUP) that permitted higher densities, but required site plan review and participation in stakeholder negotiations. The county decided to use the "bull's eye" concept, focusing on the most intense development around the center of the five metro stations along the corridor, with development densities and heights reduction as development approaches the existing residential neighborhoods.

Figure 25.



Rosslyn-Ballston Metro Corridor, Arlington, Virginia

Figure 26. Rosslyn-Ballston Floor Area Ratios-2.5-10 depending on location; overall FAR 1.31

Land Use Category	Floor Area Ratio (FAR) / Density
High Residential	4.8 Residential; 3.8 Hotel
High-Medium Residential	3.24 FAR Residential
High-Medium Residential Mixed-Use	<3.24 with associated office & retail activities
High Residential (High Res. / HOA)	4.8 Residential; 3.8 Hotel
Medium Density Mixed-Use	3.0 (add 1.0 FAR Residential with specific provisions)
High-Office-Apartment-Hotel	3.8 Office, <4.8 Apartment, <3.8 Hotel
Medium Office-Apartment-Hotel	2.5 Office,<115 du/ac Apartment, <180 du/ac Hotel
Low Office-Apartment-Hotel	1.5 Office, <72 du/ac Apartment, <110 du/ac Hotel
Medium Residential	32-72 du/ac
Low-Medium Residential	16-36 du/ac
Low Residential	1-10 du/ac
Service Commercial/Industrial	1-4 stories

The Rosslyn-Ballston Metro Corridor is considered a successful corridor redevelopment project that continues to have high occupancy rates, strong commercial base and overall convenience to shops and other services without the use of personal transportation. According to a recent article (October 8, 2008) in the Washington Business Journal, 20% of residents in the City of Arlington do not own a car and 50% use other forms of transit to get to work. The area continues to be a corridor redevelopment that promotes transit oriented development and other Smart Growth principles. The US Environmental Protection Agency awarded Arlington County the 2002 Smart Growth Award for Overall Excellence in Smart Growth.

Figure 27.

Transit Impacts in Rosslyn Ballston corridor since 1980

- Corridor now valued at $9 billion, contains 7.6% of county land area, but produces 33% of all county property taxes.
- 73,000 jobs within 1/3 mile walking distance of the transit line
- 18,000 housing units
- 35,000 residents
- 1.5 million sq. ft. commercial space
- 14 million sq. ft. office
- 20% residents do not own a car; 50% of residents use transit to get to work.

Transit has reduced VMT

Source: 2003 New Urban News; Washington Business Journal

Figure 28 shows that VMT has been reduced well below the national average for both multi-family and office space within the Rosslyn-Ballston corridor.

Rosslyn-Ballston is now considered one of the most successful transit and economic development corridors in the USA. The principles that helped to guide the redevelopment are:

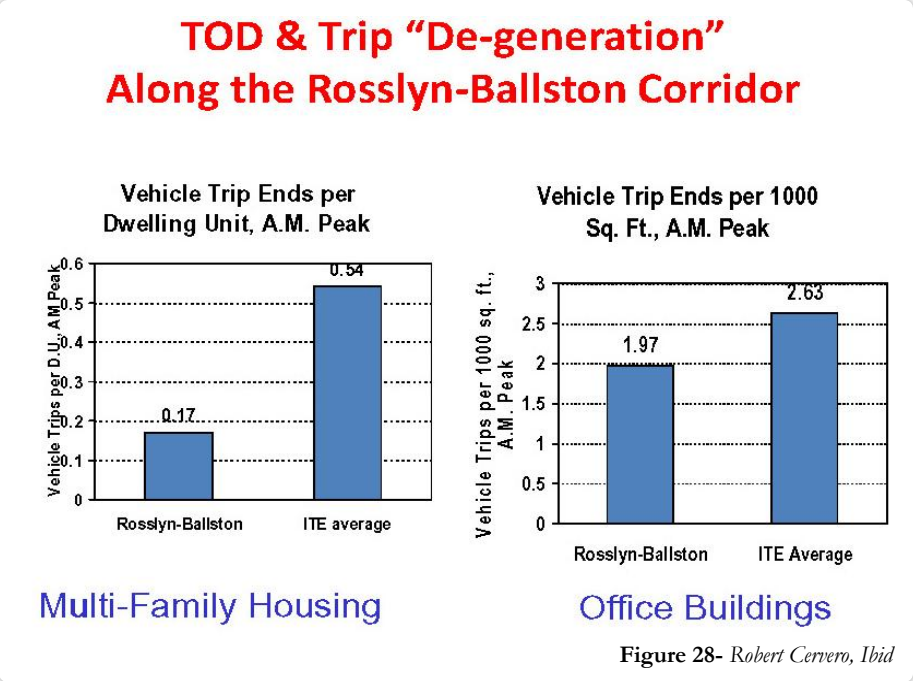


Figure 28- *Robert Cervero, Ibid*

<u>Rosslyn-Ballston Planning Principles</u>

- The corridor had clear boundaries
- Major increases in density would occur, with almost all on residential acreage around the metro stations subjected to redevelopment.
- Higher density and intensity is concentrated within walking distance of metro stations, with densities tapering as development occurred near single family residential neighborhoods.
- Mixed use development is required, and site design guidelines were required to create energetic pedestrian environments.
- Single family neighborhoods and apartment complexes would be preserved and improved.
- Commercial properties undergoing revitalization would go through parcel redevelopment.
- Each of the five metro stations has a unique function and a well defined identity (i.e. government center, urban village).
- Minor adjustments were made to the street system. Design standards (i.e. building setbacks, signage, landscaping) were set to achieve visual environments.
- Rail stops should <u>not be surrounded by park and ride lots</u>.

Rosslyn-Ballston Developer's Role

- Paid for significant improvements to public infrastructure projects, which included underground utilities, redesign and signalizations, and provisions of wide sidewalks.

Rosslyn-Ballston Lessons Learned

- Transit investments can be used as a catalyst to reshape communities.
- Concentrating density and mixed use development at transit stations can yield substantial transportation benefits.
- Good urban design and an attractive and functional pedestrian environment are important.
- A clear/consistent planning and policy framework is important for all parties.
- Sector plans are essential to providing more detailed guidance area-specific redevelopment.
- Broad public education and participation in the redevelopment process is essential and must be maintained over time.

B. Lynx Blue Line-Charlotte, NC

Charlotte NC passed a ½ cent sales tax in 1998 to fund operation expenses of bus and rail transit and make transportation improvements. Federal Transit money built the Blue Line Light Rail system, which went into service in 2007.

The total transit system system has 80% of its trips on buses, and 20% on the light rail. Part of the system's phenomenal success is treating all transit riders with dignity, evidenced by the hundreds of bus shelters built in the city.

1.) Charlotte's South End Experience

The spine of Charlotte's transit system is the 11-mile Blue Line light rail service located on the former Southern railroad tracks from I-485 south of the city to the downtown. South End is one of the 16 stops on the line, and has a historic trolley that serves that smaller corridor and feeds the modern Blue Line. South End is a pedestrian oriented, urban district with TOD. The concept of South End was focused around a multi-modal transportation corridor with bus transit, trolley and light rail, office, residential, retail and civic development, which would "maximize the potential for an integrated urban center in contrast to single building strip development" (South End Pedscape/Transit Station Area Plan,

2004). The South End will contain three Lynx light rail stations and six trolley stops. The spine transit system links to the existing bus routes as well. A new pedestrian and bicycle path was constructed through the South End in 2003 as part of the Trolley Project.

The existing corridor, at the time of the South End Pedscape/Transit Station Area Plan in 2004, consisted of approximately 20% industrial uses. Mixed use development has been replacing much of the industrial uses in the corridor, especially along the rail line. Less than 10% of the corridor was undeveloped, while less than 10% was used for single family or institutional land uses. The revitalization of South End was fueled by the restored trolley line and the promise of light rail. The City invested in the area's public infrastructure while private investors began to redevelop old industrial sites to some of the mixed use developments of today, helping to create an intense market for redevelopment. Buses, trolley and light rail, along with a multi use trail, created a successful multimodal connection between two core business, entertainment and residential centers. Redevelopment projects in South End, such as Camden Square, are creating job opportunities and an enhanced local economy. It is estimated that the Camden Square development will create approximately 350 jobs over 3-5 years

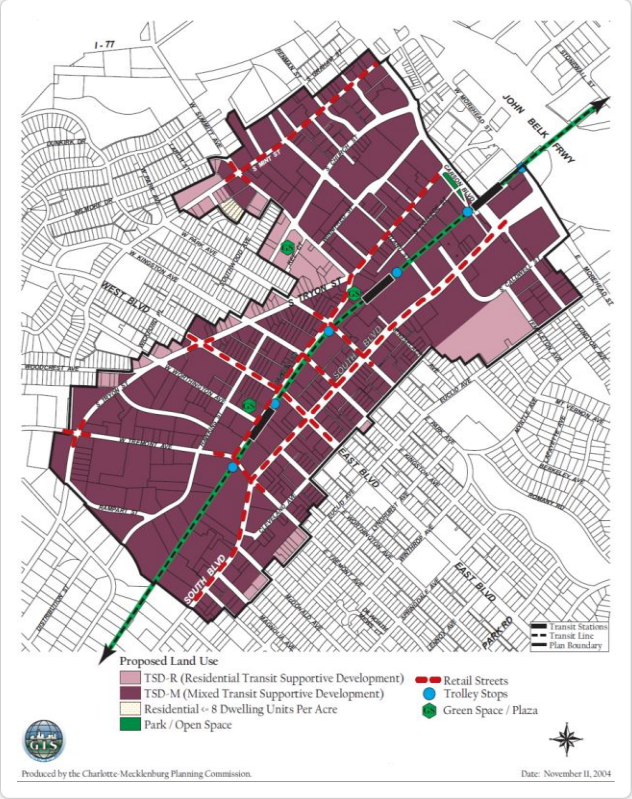


Figure 29: *(www.ncbrownfields.org).*

2.) <u>Financing Charlotte Area Transit Service (CATS)</u>

The ½ cent sales tax is the dedicated funding source to Charlotte Area Transit System (CATS). This equates to 11-13 cents a day per family. Revenues were as high as $75 million, but have dropped to $61 million due to the 2009 recession. Approximately 66% of the ½ cent sales tax revenue goes to bus service, the remainder to light rail.

Figure 30.

Lynx Blue Line Light Rail Impacts – 1st Three Years

- Ridership is 18,000/day, double expectations
- Special events ridership as high as 90,000/day
- 5.5 million rides Year One
- Blue Line increased mobility for a range of the population
- Bike, Bus, and Blue Line Connectivity
- Total bus and light rail rider-ship up 197% since 1998
- 88,000 total transit riders/day
- 217 new shelters 546 bus and rail vehicles
- All buses have bike racks, bike storage at stops
- Bikes allowed on train
- 265 acres zoned TOD
- 7,581 new housing units
- $1.5 billion in private redevelopment investment within 3 years within ¼ miles of the tracks

Source: CATS website; Charlotte Mayor McCrory speech January 14, 2009 to Central Florida Partnership visiting group

Due to its rapid success, current plans are underway for expansion of the system in the 2030 Transit Corridor System Plan adopted in 2006 by Metropolitan Transit Commission (MTC). This is an encouraging sign for a new light rail system, which indicates that there is increasing demand for this mode of transportation. The Charlotte-Gastonia-Concord Metropolitan Statistical Area (MSA) has an estimated population of 1,701,799 and a density of 444 people per square mile according to the U.S. Census Bureau's estimates. By comparison, the Orlando-Kissimmee MSA has an estimated population 2,054,574 and a density of 471 people per square mile.

C. Portland Streetcar-Portland, OR

In 2001 Portland began operation of the first modern streetcar in the nation. This streetcar corridor is the centerpiece of significant new development and increased density in Portland's central city. Several extensions of the original line have been completed and an additional extension, known as the Portland Streetcar Loop project, is planned to the eastside of the central city. The line is 8 miles (4 miles in each direction) with 46 stops and a 12-minute headway (time between trolleys). This is a key element of future mobility and the ability to accommodate increased density and maintain livability in the central city. (*Source: Portland Streetcar System Concept Plan*)

Figure 31.

Contemporary land use planning in the Portland region consistent with Metro's "Region 2040 Growth Concept" envisions higher density, mixed-use, pedestrian-friendly activity centers that are connected by high-capacity transit. This long range plan identifies a hierarchy of activity centers and main streets as focal points to accommodate projected growth and promote sustainable development within the designated Urban Growth Boundary. The City of Portland views future streetcar corridors as a significant opportunity for organizing future development to accommodate the expected growth.

The Portland Development Commission was created by voters in 1958 as a special purpose government governed by five citizens appointed by the mayor and approved by city council. PDC's urban

renewal work is funded primarily by tax increment financing.

The PDC created the River District in 2000 on 70 acres of abandoned rail yards that have been named the Pearl. The Pearl has a mix of new housing and commercial development, interspersed with parks and open space. The city removed and overhead ramp called Lovejoy Viaduct which then made a 40 acre parcel accessible and desirable for redevelopment. In exchange the developer had to develop at a minimum of 87 units per acre, which would increased to 109 units per acre if the city chose a street car alignment that ran adjacent to the developer's property.

Figure 32.

Impacts of Portland Light Rail since 2000

- Attracted $2.3 billion (100 projects) in 5 years within two blocks of line.
- 7,248 housing units, and 4.6 million sq. ft office and retail.
- 5,000 new jobs
- Proximity to mass transit reduces parking need.
- Ridership tripled projections, 3.9 million annual rides in FY2009-2010

VIII. TRANSIT ORIENTED DESIGN

A. Definitions

Transit Oriented Development (TOD) promotes dense development around transit stations and that offers a range of destinations within walking distance, usually including multifamily homes, shops and workplaces.

Transit Ready Development (TRD) promotes suitable higher density mixed use development in anticipation of future transit service.

Transit Oriented Development, done right, enhances the livability of a city or region by:

- Improved air quality
- Less gasoline consumption
- Increased mobility choices for residents (pedestrian, bicycle, and increased access to multi modal transportation options)
- Decrease in congestion and length of commute
- Better health and public safety (pollution and traffic accidents)
- Better economic health (income and employment)
- Stimulating redistributed urban development into transit corridors, thus reducing sprawl and its related infrastructure costs.

Proper TOD generally follows the transect descriptions below.

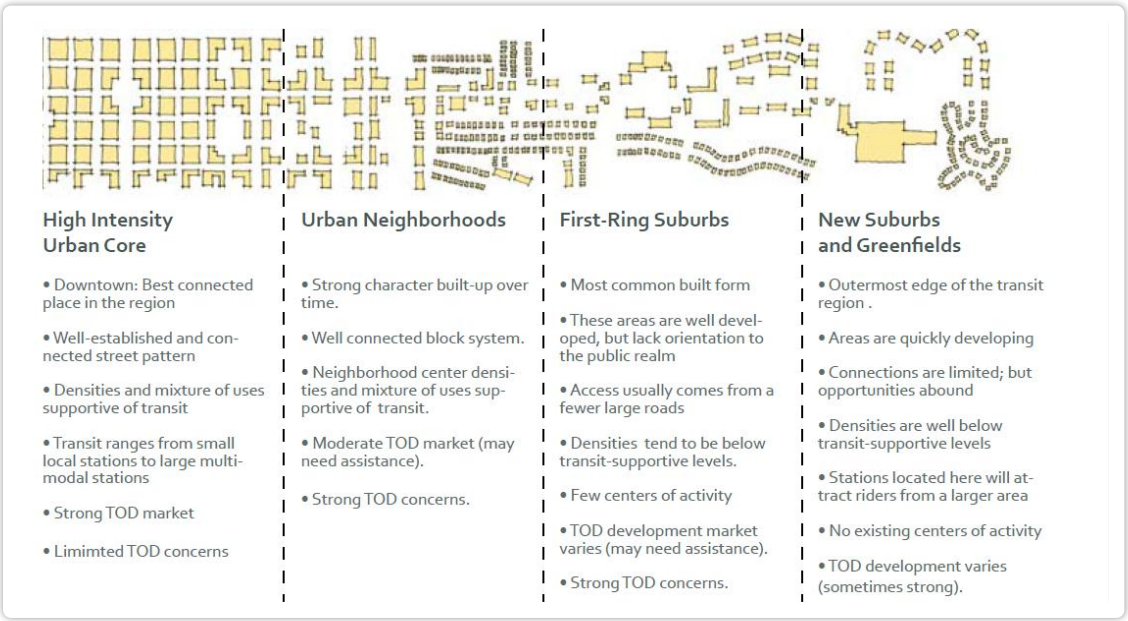


Figure 33: *Transit Oriented Transect*

B. High Intensity Urban Core

<u>The Urban Core And Urban Neighborhoods</u> (Light Rail, Bus Rapid, Commuter Rail)

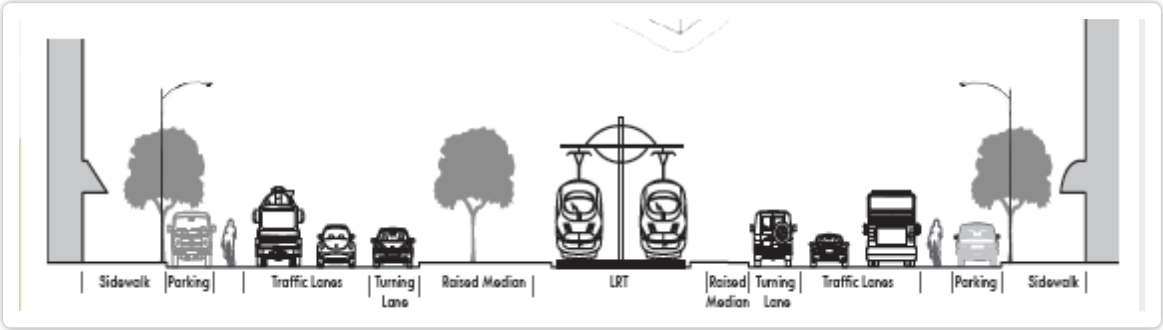


Figure 34: *Transit Oriented Transect Urban core*

Transit stations typically locate in existing or emerging urban centers. These areas could be activity centers that include traditional retail crossroads, malls, and/or existing neighborhood centers. Typically, the sphere of influence reaches a half-mile from the transit station, offering a short and convenient walk or bicycle ride.

Urban neighborhoods are typically designed pursuant to a traditional grid pattern that provides for connectivity and promotes walkablity to both the urban core and other neighboring locations.

C. First Ring Suburbs Streetscape

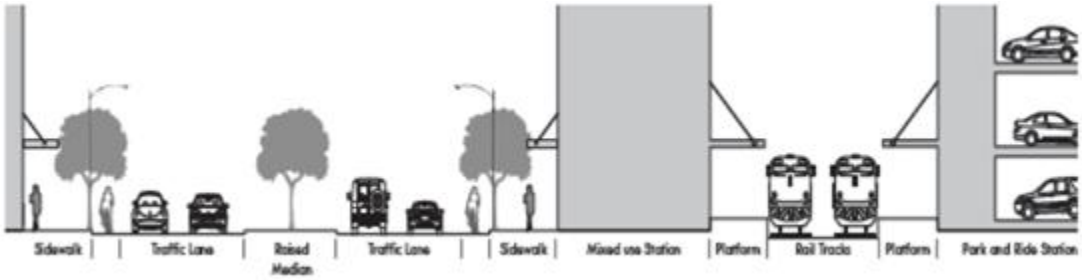


Figure 35: *Transit Oriented Transect First Ring Suburbs*
Above: Example of suburban streetscape with light rail, traffic lanes, parking, and sidewalk.

A primary consideration in this station area type is the protection of existing neighborhoods and the transition from higher to lower density.

Examples of mixed use suburban development and light rail stations. Suburban streetscapes can support Light Rail, Bus Rapid Transit, and Commuter Rail.

D. New Suburbs Streetscape

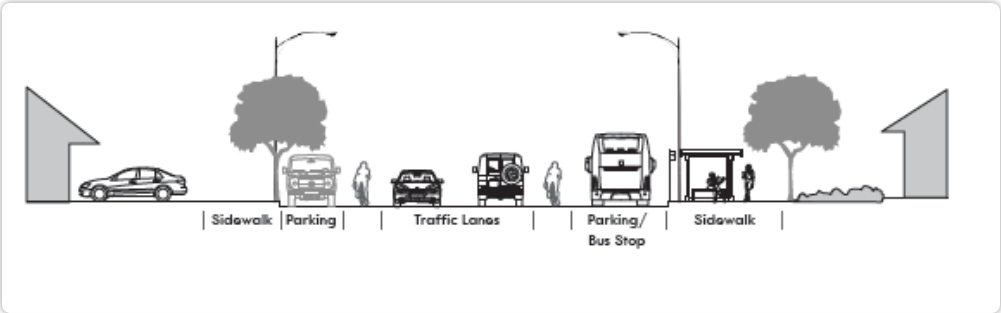


Figure 36.

E. Pedestrian

Pedestrian facilities primarily take the form of wide sidewalks along streets, however trail systems can also accommodate pedestrians and provide an alternative mode of transportation. According to pedestrian studies, such as "How Far Will People Walk to Facilities in Their Local Neighborhoods" by T J Pikora, B Giles-Corti, R Donovan, it has been shown that people will generally walk approximately one-quarter mile, or about five minutes, to community services and one-half mile, or about 10 minutes to major transport stops without considering driving. However, this general rule can fluctuate depending on the environment the pedestrian is in. Sidewalks play a critical safety role to provide separation from motor vehicles, particularly around schools. For example, when people

are more comfortable walking in a pedestrian friendly environment they would likely be more comfortable walking longer distances. The opposite is true when walking adjacent to high speed automobile traffic big box retail stores.

F. Bicycle

Bicycle travel occurs on sidewalks, roadways, and trails in Central Florida. The region has constructed hundreds of miles of bicycle accommodations over the last ten years, many of which can also accommodate pedestrians. There is still much more to accomplish, especially with respect to interconnectivity. Many roads still lack bicycle accommodations and many facilities lack adequate parking and storage.

One of the best examples of regional bike path interconnectivity is the West Orange Trail, which runs from Apopka south to Winter Garden and then west to Lake County. The West Orange Trail then connects with Lake County's bike path system which continues on through Minneola. A significant bike trail connection is planned to connect the West Orange Trail with the Seminole County Trail system. The City of Kissimmee also maintains a local network of bicycle and pedestrian accommodations with extensive interconnectivity.

G. Parking

As transit is introduced into a corridor, there is less need for off street parking, so parking requirements must be either reduced or abolished. By grouping uses closer and more densely, off street parking can be shared.

Many communities abolish off street parking requirements to enhance the value affordability of urban living with transit (urban parking spaces can cost $20,000 per space). With transit comes a lower incidence of auto ownership so parking standards should be cut in half or eliminated.

Figure 37: *Jeffrey Tumlin, Nelson-Nygard, Ibid*

H. SAFETEA-LU

The Safe, Accountable, Flexible, Efficient, Transportation Equity Act-A Legacy for Users (SAFETEA-LU) became federal law in August 2005. It confirms the relationship between land use and transportation in eight planning factors (see 23 USC 134 (h) (1), one of which states:

> "(E) Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development."

This federal policy direction highlights the importance of coordination and is intended to trickle down through states and into local and regional planning efforts. It is important to ensure that all relevant organizations coordinate their efforts to ensure consistency between transportation and land use planning.

I. Transportation and the Economy

Without the ability to transport goods and people within our region or to other regions, the local economy will become constrained. Having an efficient transportation network is not only important to the existing economic activity in our region but it is also necessary to attract new business. Central Florida once had a competitive transportation system with its interstate highway access, rail service, airports, and a shipping port. However, traffic congestion has eroded the functionality of the region's transportation system.

Most people today are familiar with the term "Global Economy". This refers to the concept that people and goods need to be able to transport quickly and efficiently between regions and across the world. Having a good infrastructure makes it easier for businesses to move people and goods and therefore more competitive to those places that do not place an emphasis on the existing or future transportation planning. A failing and deteriorating infrastructure may deter future businesses from locating in an area and may even cause existing ones to relocate in areas that offer a better transportation system.

J. Jobs/Housing/Commuting

A jobs to housing balance that includes affordable housing proximate to nearby job markets should be a foremost goal in the region to reduce commuting distances. Ideally, housing would be available within a short commute and transportation options would be conveniently available. The main benefit of a mixed use development is that daily trips can be satisfied more efficiently and often by bicycles or walking.

K. Future Opportunities

This ECFRPC Strategic Regional Policy Plan emphasizes the role that multi-modal transportation corridors will play in the future. If the plan is fulfilled, Central Florida will shift from a region overwhelmingly dependant on cars and trucks to one that offers a broad range of travel options. How will the region make this transition?

As we have seen in data from Portland, Oregon, Charlotte, NC, London, England and other growing urban regions, transportation investments significantly affect urban form and quality of life.

If East Central Florida wants to wean itself from sprawl, it must build a transit system more like those of Arlington VA, Charlotte NC, or Portland OR. These investments in transit must be matched by changes in urban form to support transit and to make a better quality of urban life.

RESOURCES and REFERENCES:

Several excellent resources exist that promote the goals of shorter trip lengths, safe and comfortable pedestrian and bicycle usage and for the context and character of the community. Some reference documents are:

1. Smart Transportation Guidebook, Planning and Designing Highways and Streets that Support Sustainable and Livable Communities, NJDOT and Penn Dot, March 2008.

2. Florida Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways' Traditional Neighborhood Development, 2009.

3. Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, Version II, 2008.

4. Traditional Neighborhood Development, (Topic #625-000-015, Manual of Uniform Minimum Standards for Design, Constructions and Maintenance for Streets and Highways, FDOT, February, 2009)

5. Smart Transportation Guidebook, Planning and Designing Highways and Streets that Support Sustainable and Livable communities, (NJDOT and Penn DOT, March 2008).

6. Sprawl Costs: Economic Impacts of Unchecked Development, Burchell, Downs, McCann & Mukherji Island Press, Washington DC. (2005).

7. Cooper, Mary. (2004) Smart Growth: Can Managed Growth Reduce Urban Sprawl?

8. The CQ Researcher, 14 (20) 469-492.

9. Dr. Robert Cervero, Professor of City and Regional Planning, University of California, Berkeley; APA Planners Training Seminar: Transportation, Land Use and Green Urbanism, San Francisco, November 6, 2009; www.planning.org.

10. Jeffrey Tumlin, Nelson-Nygard Planners and Engineers, APA Planners Training Seminar: Transportation, Land Use and Green Urbanism, San Francisco, November 7, 2009; www.planning.org.

11. Street Smart: Street Cars and Cities in the Twenty First Century, edited by Gloria Ohland and Shelley Poticha, published by Reconnecting America, Oakland CA,; www.reconnectingamerica.org.

12. Residential Streets, Third Edition, Walter M. Kulash, published by ULI; www.uli.org, ULI Order #R38.

CHAPTER 5: TRANSPORTATION	
Goal	Develop a balanced multi-modal transportation network that connects compact centers of development with mixed use transit-served corridors.
Policy 5.1	Encourage an interconnected street network for all future local roads.
Policy 5.2	Encourage the prohibition of cul-de-sacs unless a natural barrier exists that cannot be crossed.
Policy 5.3	Promote a multi-modal transportation system that provides for the safe, efficient, and cost effective movement of people and goods.
Policy 5.4	Support passenger rail transit (i.e. light rail, commuter rail, street-car, and high-speed rail) in select corridors to connect population centers.
Policy 5.5	Recommend minimum densities and mixed uses within walking distance of rail stops and along transit-served corridors (See Chapter 5, Figure 24).
Policy 5.6	Include bicycle and pedestrian accommodations on roadways, utility easements where feasible, and mass transit stations.
Policy 5.7	Plan for multi-modal connections from airports and seaports to job and tourist centers.
Policy 5.8	Establish a goal-based measurement system for new transportation options. Goals should be based on accessibility, cost, user benefits, environmental impacts, and social equity. a. Make accessibility more important than mobility by creating a "scorecard" of public policy objectives to grade transportation projects according to overall impacts and benefits.
Policy 5.9	Promote compact, mixed-use development that reduces vehicle miles traveled.
Policy 5.10	Encourage public buildings (i.e. schools, post office, church, city hall) to locate in urban centers that become the 'heart' of the community.
Policy 5.11	Encourage transit-oriented and transit-ready developments proximate to transit stations.
Policy 5.12	Multi-modal design options should take precedence over the expansion of existing roads or the construction of new roads where feasible.

Policy 5.13	In transit served corridors, as transit is introduced, move toward reducing off street parking requirements, consider parking maximums, encourage shared parking, and consider placing retail on the ground floor of parking structures where feasible.
Policy 5.14	Ensure that the transportation network, especially public transportation, supports the emergency evacuation needs of the region.
Policy 5.15	Support the development of an interconnected regional trail system.
Policy 5.16	Include Safe Routes to School guidelines and *'Complete Street'* strategies in local comprehensive plans, school designs, transportation improvements, and land use planning.
Policy 5.17	Encourage the removal of requirements for walls around residential neighborhoods along streets where children walk to school.
Policy 5.18	Promote transportation systems and technologies that minimize impacts to air and water quality.
Policy 5.19	Ensure that transportation facilities and ancillary development are located and designed in a manner that prevents habitat fragmentation and protects the functional integrity of ecosystems and corridors for wildlife movement.
Policy 5.20	Accept some congestion in urban centers as a sign of a healthy community rather than using road speed and capacity as the primary indicators of the road's health.
Policy 5.21	Build new arterial roads and widen existing roads only when clearly in conformance with other policy objectives of accessibility.
Policy 5.22	Promote transportation services aimed to increase the mobility of elderly and disabled persons.
Policy 5.23	Encourage transit ready design elements, such as right-of-way acquisition, consistent with local and regional transportation plans to optimize network connectivity and efficiency.
Policy 5.24	Encourage the development of sidewalks to establish greater connectivity.
Policy 5.25	Non-urban arterial roads should be protected by access management policies that limit curb cuts to preserve their capacity.

CHAPTER 5: TRANSPORTATION INDICATORS

Total vehicle miles traveled by county

Baseline:

	2004	2005	2006	2007	2008
Brevard	17,400,151	17,460,618	18,009,541	18,144,771	17,893,256
Lake	8,319,741	8,614,899	8,605,081	8,620,150	8,124,673
Orange	32,560,124	34,117,461	34,663,274	36,029,040	35,436,426
Osceola	8,198,137	8,949,500	8,961,895	9,139,112	8,836,800
Seminole	9,793,058	10,167,856	10,211,094	10,325,317	9,866,475
Volusia	15,156,009	15,818,622	15,983,717	15,967,879	15,586,786

Source: Metroplan Orlando MPO; Lake-Sumter MPO; Volusia MPO; Space Coast TPO

Average commute times by county

Baseline:

Area	Estimated Work Trip Time in Minutes
Central Florida Average	26.3
Lake County	27.9
Osceola County	30.8
Orange County	26.1
Volusia County	23.9
Seminole	25.8
Brevard	23.3

Source (2008): U.S. Census Bureau

Number of pedestrian and bicycle fatalities, 5-year average

Baseline: 2004-2008 average

	Bicycle	Pedestrian
East Central Florida Regional Average	3.5	14.9
Brevard County	3.6	15.6
Lake	1.8	7.2
Orange	10.2	36.6
Osceola	1.6	6.8
Seminole	2	7.4
Volusia	2	15.8

Source: 2008 Florida Traffic Crash Statistics

Number of passenger rail transit track miles	Baseline: 99.16 (Amtrak) Source: ECFRPC GIS
Number of recreational trail miles	Baseline: 642.5 miles Source (April 2009): University of Florida Geo Plan Center

The ECFRPC would like to extend a special thanks to all those who participated in developing this chapter including those listed below:

TRANSPORTATION SOUNDING BOARD
MPO Alliance – Metroplan Orlando MPO; Lake-Sumter MPO; Space Coast TPO; Volusia MPO (January16, 2009)
The Central Florida Partnership, Central Florida Transportation Corridor Taskforce (October 21, 2008)
Transportation & Land Use Working Group (February 20, 2009)