BEST PRACTICES GUIDE

TRANSPORTATION PLANNING IN SMALL FLORIDA CITIES

Center for Building Better Communities
Department of Urban & Regional Planning
University of Florida
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Table of Contents

INTRODUCTION

Purpose and Background Statement

The purpose of this project is to assist small local governments in developing short-range and long-range transportation plans to assist in updating their local government comprehensive plans and concurrency management systems to meet the requirements of the 2005 growth management legislation.

The 2005 changes to the growth management legislation directed the Florida Department of Transportation (FDOT) to develop "*a model transportation concurrency management ordinance with methodologies for assessing proportionate fair-share mitigation options*" by December 1, 2005. Local governments were required to adopt such an ordinance as part of their concurrency management system by December 1, 2006. Additionally, local governments are required to have amended their comprehensive plan to include a "financially feasible" capital improvements element by December 1, 2007.

This legislative mandate will be implemented by Florida's 67 counties and 414 cities. The task will be especially challenging for small cities. Recent population estimates by the Bureau of Economic and Business Research (BEBR) at the University of Florida indicate that about 70% (290) of these cities have less than 15,000 residents. More than half (58%), or 239 cities, have populations of less than 7,500, and 48%, or 200 cities, have fewer than 5,000 residents. About 110 of these small municipalities are outside established Metropolitan Planning Organization (MPO) boundaries.

The legislative requirements will create a need for more comprehensive short term (5-year) and long term (10-year) transportation planning at the local level. Small cities may face obstacles to effective transportation planning not encountered by larger cities and counties:

1. **Florida's smaller cities have limited resources** both in terms of dollars and access to professional advice and assistance. These limitations are most acute in the very small municipalities, especially those with less than 5,000 residents;

2. **Concurrency management is unevenly applied and implemented.** While most cities include concurrency management in their comprehensive plans and LDRs, these systems are often very rudimentary and inconsistently implemented. The updated legislation requires local governments to reexamine these concurrency management systems in virtually all cases, potentially resulting in extensive revamping of these systems to better implement proportionate share;

3. **Transportation plans are often inadequate.** The long-range transportation plan contained in the comprehensive plan of most small cities relies on state and major county roads with only minimal attention to a supporting collector system and a more comprehensive county and regional system. For those small cities that are facing increased growth demands, an expansion of the roadway network subject to long-term land use needs, concurrency, and to proportionate-share mitigation options will be necessary.

Objectives and Supporting Tasks

Florida's small cities require specific attention as models and methodologies for long-range transportation planning and concurrency management are being developed and refined. The models and methodologies developed for complex urbanized environments should be adapted for a more generalized application by small local governments. This objective can be advanced by the development of "best practice" guides for small municipalities that are (1) adaptations of adopted models and methodologies, (2) sufficiently reliable to be applied in a comprehensive planning context and (3) cost affordable.

This applied research project builds upon the work of the FDOT and the Department of Community Affairs including:

- Florida Statutes and Rules pertaining to transportation planning and concurrency management;
- FDOT, 2002 Quality / Level of Service Handbook, Florida Department of Transportation;
- FDCA, Transportation Concurrency Requirements and Best Practices: Guidelines for Developing and Maintaining An Effective Transportation Concurrency Management System, September 2006;
- FDOT, Multimodal Transportation Districts And Areawide Quality of Service Handbook; November 2003
- FDOT, LOSPLAN 2002
- FDOT, Generalized LOS Tables
- FDCA, Capital Improvements Element Best Practices Manual
- FDCA, Transportation Concurrency Exception Areas, A Model for the Creation and Evaluation of, (in progress)

- FDOT, Transportation Concurrency: Model Proportionate Fair-Share Ordinance (http://www.dot.state.fl.us/planning/gm/pfso/draft120105.pdf)

- FDCA, Transportation Concurrency: LOS Methodologies (Best Practices Manual for Common Level of Service Standards and Local Methodologies for Roads that Cross Jurisdictions and Model Interlocal Agreement) (in progress)

- FDCA, Transportation Concurrency: Model Interlocal Agreement for Development of Regional Impact Exemptions (in progress)

The research will also seek to identify other transportation methodologies and techniques that may be especially suited ~~to~~ for application in small cities while maintaining consistency with Florida statutes and rules and with the methods and techniques cited above.

Florida has long been one of the nation's fastest growing states. This rapid growth is expected to continue over the next two decades and by 2025, it is anticipated that:[1]

- The state's population will grow to 24.4 million residents, an increase of 40 percent over 2004 levels or over 900 new residents per day;

- The population over the age of 65 will grow to 5.8 million residents, an increase of 92 percent over 2004 levels and a dramatic increase in the need for specialized mobility options; The state's employment base will grow to more than 11.6 million jobs, an increase of 45 percent over 2004 levels;

- The number of interstate and international visitors to Florida will exceed more than 92 million per year, an increase of 23 percent over 2003 levels; and

- The volume of domestic and international freight moving to, from, and within Florida will increase to 1.5 million tons per year, an increase of 78 percent from 2001 levels.

[1] 2025 Florida Transportation Plan, Adopted 2005

CHAPTER ONE: TRANSPORTATION PLANNING IN FLORIDA

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Transportation planning in Florida is mandated by Florida statute and is an integral part of the comprehensive planning process. The diagram below shows the connection between the State, Regional and Local comprehensive plans for both transportation planning (left side of diagram) and water planning (right side of diagram). This document addresses the left side of the diagram.

State Comprehensive Plan

Mission

The mission of the State Comprehensive Plan is to provide a guide for the state on how to manage social, economic, and physical growth. It is a document that sets the direction of the state through polices that are implemented when fiscally possible.
http://www.flsenate.gov/Statutes/index.cfm?App_mode=Display_Index&Title_Request=XIV#TitleXIV

Guiding Principles

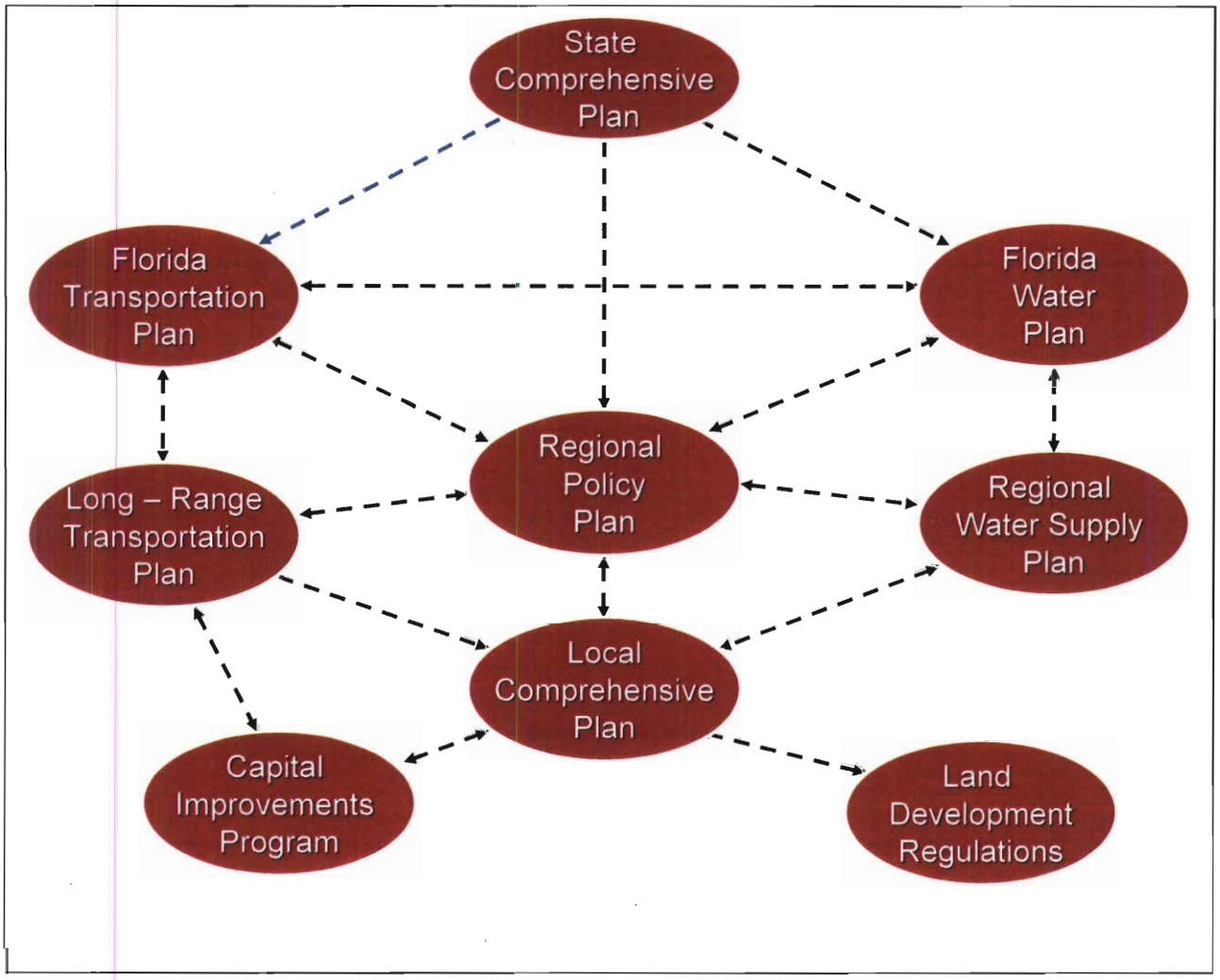
The concept of a comprehensive plan came out of the late 19th, early 20th centuries. The United States Department of Commerce Advisory Committee on Planning and Zoning addressed the issue of comprehensive plans for the first time in the Standard City Planning Enabling Act (SCPEA) of 1928. http://www.wcedc.org/CP/ The document stated "such regulations shall be made in accordance with a well-considered plan" and then it was changed to "comprehensive plan" by Harland Bartholomew (one of the draft reviewers).
http://www.planning.org/growingsmart/pdf/LULZDFeb96.pdf

The State Comprehensive Plan is prepared and maintained by the Executive Office of the Governor. The Executive Office creates the goals, objectives, and polices for state wide issues. These issues include economic opportunities, agriculture, employment, safety, education, health, soil welfare, environmental, historic preservation, transportation, housing issues, and governmental direction and services. The goals, objectives and policies must be simple to understand and be consistent with the comprehensive plan. The Executive Office of the Governor in preparing the state Comprehensive plan must also be aware of the problems and needs of the state at the present and in the future, especially focusing on land use, water resources, and transportation system development.

Regional Policy Plan

The strategic regional policy plan contains regional goals and policies that shall address affordable housing, economic development, emergency preparedness, natural resources of regional significance, and regional transportation; and they identify and address significant regional resources and facilities. The Strategic Regional Policy Plan may also address other subjects that relate to the particular needs and circumstances of the region as determined by the Regional Planning Council. Strategic regional plans must be consistent with the state comprehensive plan. The local government comprehensive plan must be consistent with the

Strategic Regional Policy Plan.


State Comprehensive Plan
Florida Transportation Plan
Florida Water Plan
Regional Policy Plan
Long – Range Transportation Plan
Regional Water Supply Plan
Local Comprehensive Plan
Capital Improvements Program
Land Development Regulations

Transportation Planning Responsibilities

Florida Department of Transportation

The Florida Department of Transportation (FDOT) is an executive agency of the state government. The FDOT's main duties and responsibilities are to coordinate the planning of the state's transportation system and assure compatibility among all the modes and components of the system and among levels of transportation agencies. As such, they work with the Department of Community Affairs to manage the connections between the state's highway system and the local transportation systems and local land use planning. At the regional level, they coordinate with the District offices of FDOT, the Regional Planning Councils (RPCs), and where applicable, with the regional Metropolitan Transportation Planning organizations (MPOs). In this section, each of these organizations that are involved in the transportation process is described and their respective responsibilities are outlined.

State Office

The FDOT describes its mission as follows:

> "It is our vision to improve transportation decision making in a way that protects our natural and human environmental resources. It is our goal that we, as environmental resource and transportation agencies, establish a systematic approach that integrates land use, social, economic, environmental, and transportation considerations. This approach will include the active participation of federal, state, and local agencies, and the public. It will lead to decisions that provide the highest quality of life and an optimal level of mobility for the public we serve."

In summary, FDOT's mission is to provide a safe statewide transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities.

The guiding principles that accomplish their mission are preservation (which protects the transportation infrastructure), economic competitiveness (which makes sure the state understands the consequences and effects of the transportation system on the economy), and mobility (which ensures an effective statewide interconnected transportation system).

The FDOT is empowered under Florida statutes to:[1]

- Purchase, lease, or otherwise acquire property and materials;
- Exercise Eminent Domain;
- Enter into contracts and agreements;
- Establish a numbering system for public roads, to functionally classify such roads, and to assign jurisdictional responsibility;

[1] http://www.flsenate.gov/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0334/SEC046.HTM&Title=->2005->Ch0334->Section%20046#0334.046

- Coordinate planning of public transportation facilities;
- Designate existing and to plan proposed transportation facilities as part of the State Highway System, and to construct, maintain, and operate such facilities;
- Operate toll facilities;
- Establish and maintain bicycle and pedestrian ways;
- Encourage multimodal transportation alternatives;
- Cooperate with and assist local governments in the development of a statewide transportation system and in the development of the individual components of the system;
- Obtain, and administer all federal funds available to the department for all transportation purposes; and
- Operate an information disseminating telephone directory (511).

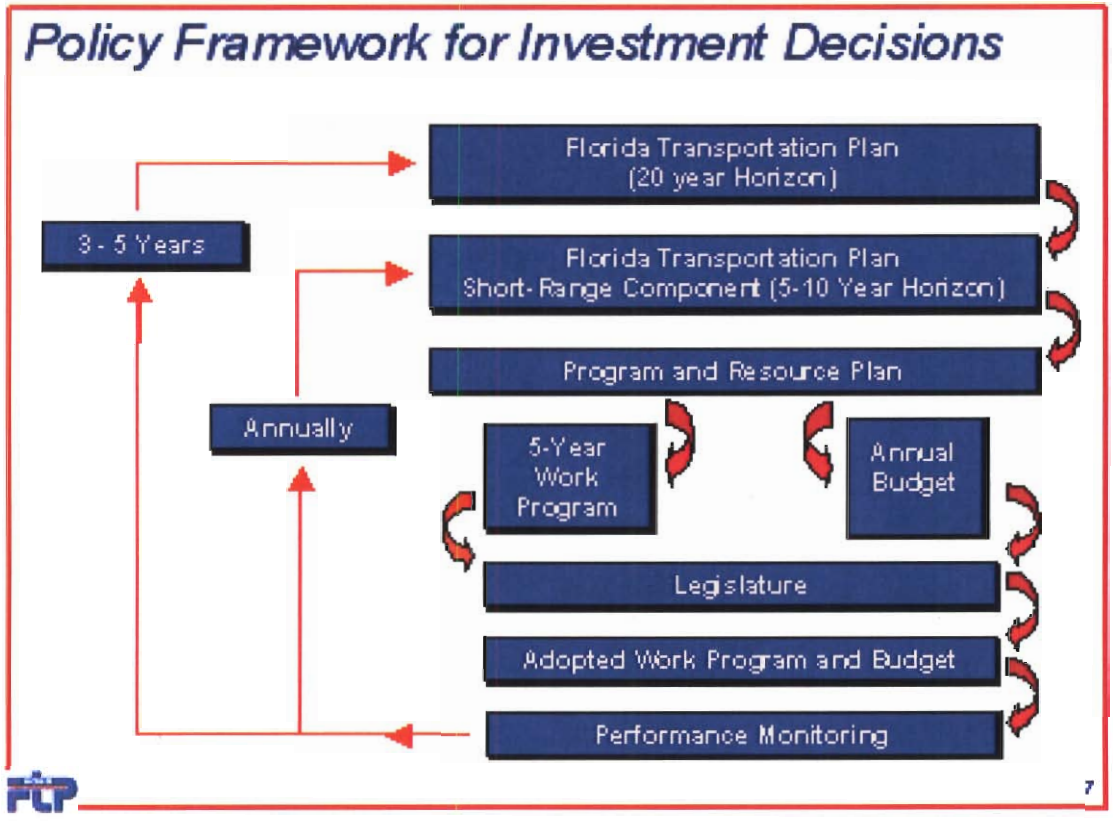


Diagram XXX above summarizes the planning processes used to determine transportation investment decisions made by the FDOT. This process incorporates three timeframes into the decision-making process: (1) a long-term plan, which covers an approximately twenty-year planning horizon; (2) a short-range component, which covers the next five to ten year planning horizon; and (3) an annual process that is tied into the budget process. These planning processes are coordinated with each other. The longer planning processes providing the stability to ensure that the long-term vision is achieved while the shorter planning horizons can address unexpected changes in long-term vision – from emergency

expenditures to cost-overruns on specific projects. The Florida Transportation Plan is the major guiding document for transportation investments in the state. It contains two components – the long-range transportation plan and the short-term component, which outlines the highest priority projects to be completed under a given plan. The long-range plan becomes the basis for the development of the program and resource plans that are completed on an annual basis. These plans form the foundation for the 5-year work program and the annual budget, which are revised and reviewed by the Legislature each year. Projects in the first five years are reviewed to determine if the budgets and timing of expenditures are accurate, while new projects are generally only added to the last year of the Five-year work program. The Legislature finalizes a Work Program and Budget each year.

The Five-year Workplan is largely implemented at the regional level either through the activities of the FDOT District Offices or through the MPOs. Below, each of these organizations has separate areas of responsibility but the agencies work closely to coordinate the building of transportation facilities. The MPO plans are reviewed by the District Office and incorporated into the Statewide Five-year work plans.

District Offices

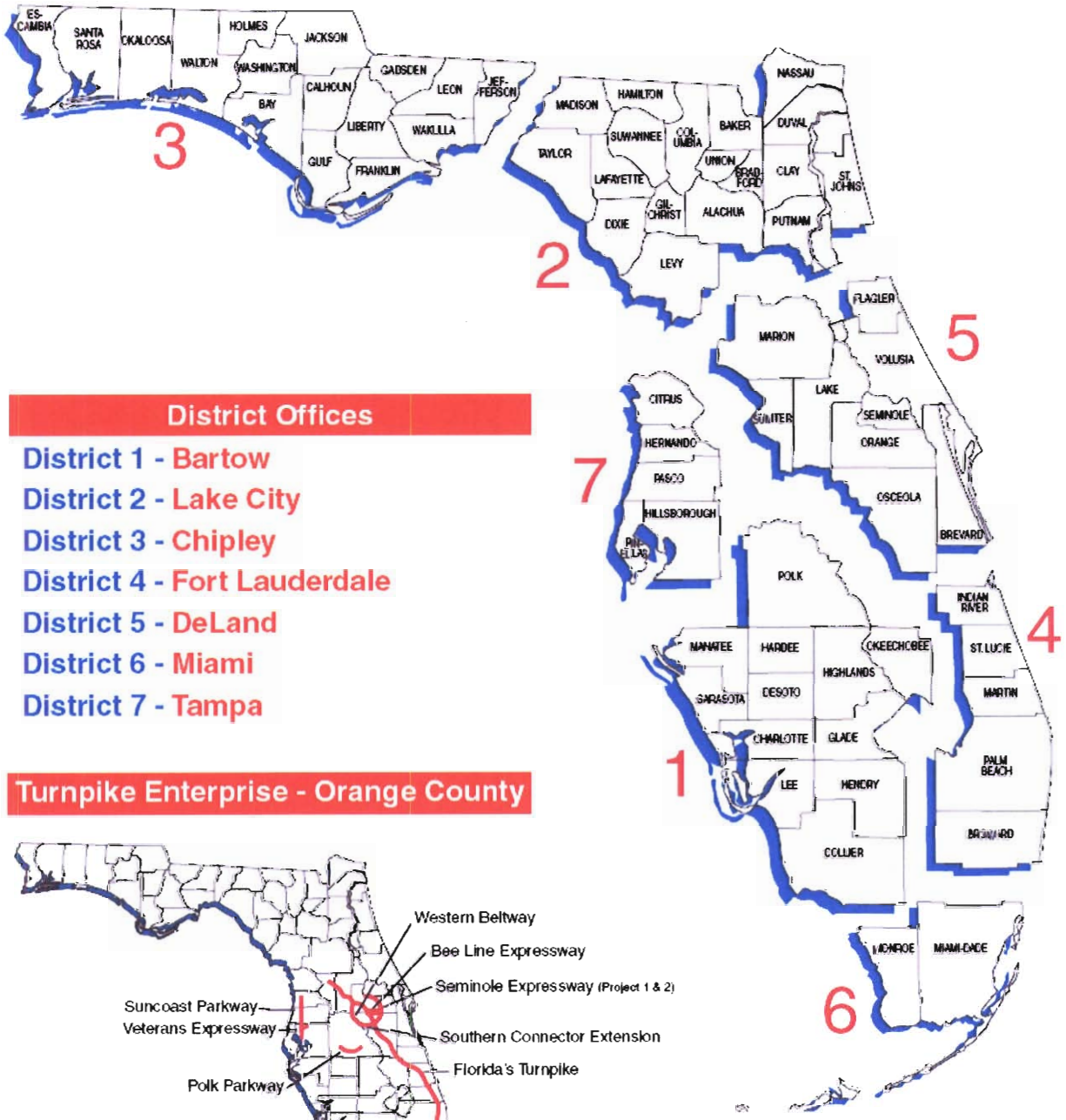
The Florida Department of Transportation (FDOT) is decentralized into seven districts which area managed by district secretaries. The districts then have their own organizational structure with major divisions for administration, planning, production and operations. They also have a public information office and a general counsel office. The following is a list of the responsibilities and major units of the district DOTs:[2] Figure XXX shows the location of the seven FDOT District Offices.

- Budget
- Construction
- Consultant Management
- Contractual/Professional Services
- Design
- Environmental Management
- Facilities Management/Office Services
- Financial Services
- General Counsel
- Human Services
- Information Services

- Maintenance
- Materials
- Planning
- Production Management
- The Office of Work Program
- Public Information
- Public Transportation
- Procurement
- Right-of-Way Administration
- Safety
- Surveying and Mapping
- Traffic Operations

[2] http://www.dot.state.fl.us/publicinformationoffice/moreDOT/mission.htm#fdot

FDOT DISTRICTS



District Offices

District 1 - Bartow
District 2 - Lake City
District 3 - Chipley
District 4 - Fort Lauderdale
District 5 - DeLand
District 6 - Miami
District 7 - Tampa

Turnpike Enterprise - Orange County

Metropolitan Planning Organizations (MPOs)

A metropolitan planning organization (MPO) is a transportation policy-making organization that is made up of representatives from local government and transportation authorities. In the early 1970s, the United States Congress passed legislation that required the formation of an MPO for any Urbanized Area (UZA) with a population greater than 50,000. Congress created MPOs in order to make sure that all future transportation projects and programs are based on the concept of "3-C" – continuing, cooperative, and comprehensive – planning. Federal funding for transportation projects and programs in urbanized areas are channeled through the MPO planning process. For communities located outside of MPO areas, the District FDOT office ~~has~~ develops the comparable planning process. As of 2005, there are 385 MPOs in the U.S., 26 of which are in the state of Florida. Figure XXX shows the location of the MPOs in Florida.

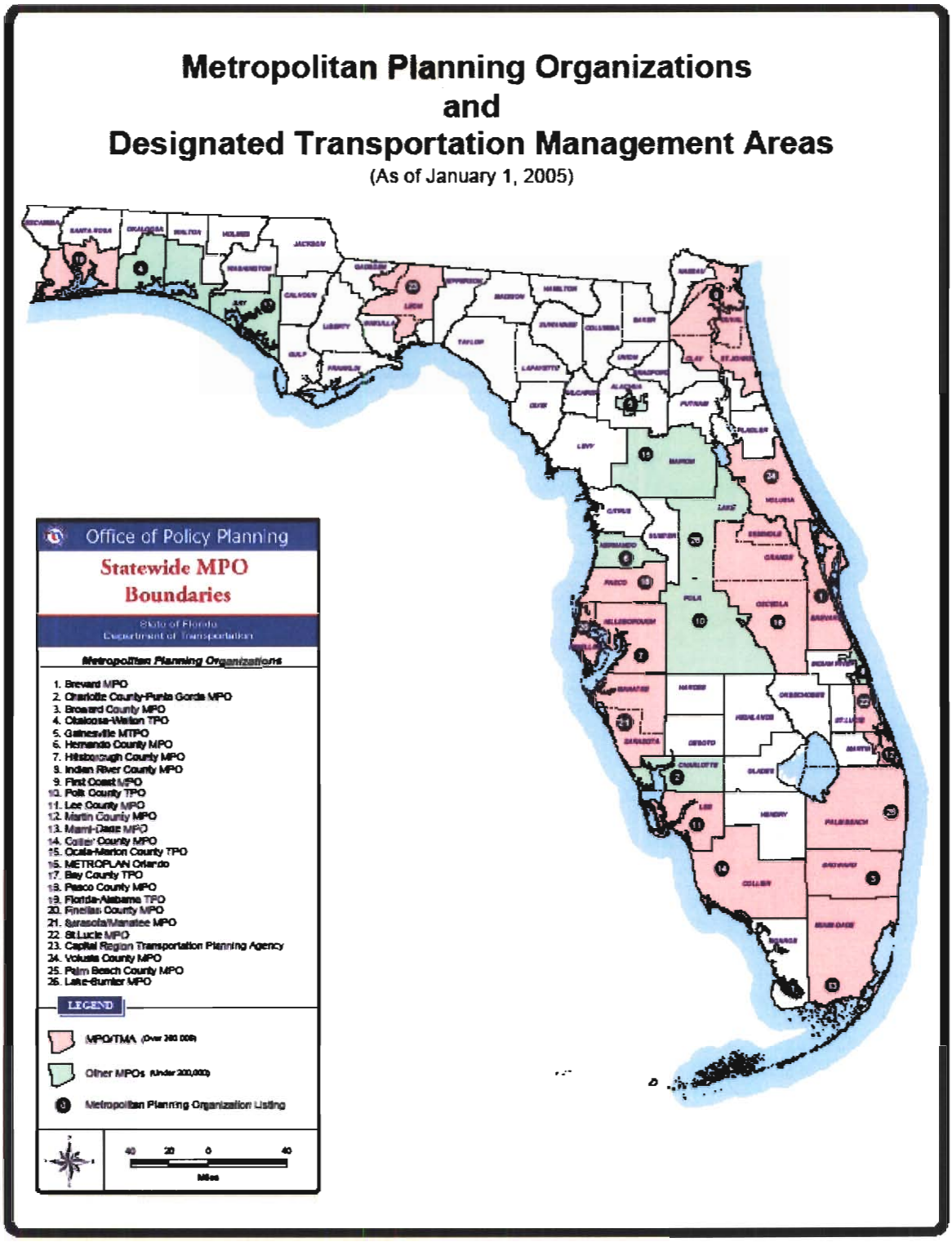
An MPO has a governing structure that includes committees and a professional staff. The top-level decision making body is the "Policy Committee." The composition of this committee is determined locally and can be made up of elected or appointed officials, representatives, and state agencies. They are responsible for the adoption of the Long-range Transportation Plan (20-year time horizon), Transportation Improvement Program, and the annual planning work program and budget. The activities of the MPO are coordinated and supported by a professional staff, whose responsibility is to ensure an effective and efficient planning process.

MPOs are required to have two advisory committees – a Technical Advisory Committee (TAC) and a Citizens Advisory Committee (CAC) – who review plans and make recommendations to the MPO. The TAC is generally comprised of professional planners who work for local planning and transportation agencies (e.g., transit operators, port and airport agencies). The CAC is comprised of citizens and representatives of organizations that are interested in transportation planning. Many MPOs also have other committees, such as Bicycle and Pedestrian Advisory Boards, and Transit Advisory Boards that advise the members of the MPO. All these groups come together to accomplish the main functions of an MPO.

The MPO has five core functions:

1. Establish a setting: Establish and manage a fair and impartial setting for effective regional decision-making in the metropolitan area.
2. Evaluate alternatives: Evaluate transportation alternatives, scaled to the size and complexity of the region, to the nature of its transportation issues, and to the realistically available options.
3. Maintain a Long-Range Transportation Plan (LRTP): Develop and update a fiscally-constrained long-range transportation plan for the metropolitan area covering a planning horizon of at least 20 years that fosters
    - 3.1. mobility and access for people and goods,
    - 3.2. efficient system performance and preservation, and
    - 3.3. quality of life.
4. Develop a Transportation Improvement Program (TIP): Develop a fiscally-constrained program based on the long-range transportation plan and designed to serve the area's goals, using spending, regulating, operating, management, and financial tools.
5. Involve the public: Involve the general public and all the significantly affected sub-groups in the four essential functions listed above.

Presently, most MPOs have no authority to raise revenues (e.g., levy taxes) on their own; their funding comes from a combination of federal transportation funds and required matching funds from state and local governments.



Source: Florida Department of Transportation

Programs & Initiatives

In this section, the current plans of the FDOT are described. Because each of the FDOT District Offices and MPOs will have additional initiatives, local governments are encouraged to review the plans of their respective regional planning agency. Following a review of the State plans and guiding policies, the responsibilities of local governments are reviewed.

As described above, the FDOT prepares a State Transportation Plan every three to five years. This plan includes the vision for the state's transportation expenditures for the next twenty years. The current state transportation plan applies to the 2025 planning horizon. In addition to the State Transportation Plan, other plans that have been developed in recent years, but which have not been completed, are described below. Three State Transportation facility plans that may affect local transportation plans are described: (1) the Strategic Intermodal System (SIS); (2) the Florida Intrastate Highway System (FIHS); and (3) the Transportation Regional Incentive Program (TRIPS).

2025 Florida Transportation Plan

As was discussed in the Introduction, Florida's population is expected to continue to increase at a similar pace to the last several decades. This increase in population creates a challenge to ensure that the transportation infrastructure is adequate to accommodate that growth. Florida is responding to the projections of sustained growth with a concerted effort to ensure that the next few decades are a period of economic prosperity and high quality of life. Public and private initiatives envision how Florida could create:[3]

A globally competitive economy.

Florida's Strategic Plan for Economic Development envisions Florida becoming the "innovation hub of the Americas," creating high-paying jobs in service, information, and technology industries. These types of businesses typically demand faster and more reliable transportation options. More businesses are serving global markets, a trend expected to accelerate because of recent and planned free trade agreements. The value of international imports and exports moving to or from Florida is expected to more than double by 2025, reaching nearly $200 billion per year. Florida's economy will benefit if all economic regions – urban, transitioning, and rural – can connect to national and global markets.

A sustainable environment.

[3] 2025 Florida Transportation Plan

New development is consuming land and resources faster than the rate of population growth. From 1964 to 1997, nearly 5 million acres of agricultural land were converted to other uses and the amount of land in urban areas increased from 1.2 million to more than 5 million acres, according to the Urban Land Institute. If current trends continue, more than 2.6 million additional acres will be converted to urban uses by 2020. While urban infill and village concepts are becoming more common, much development has been in a sprawling pattern that increases transportation demand. Development also increasingly encroaches into important wildlife habitats, recreation areas, and other environmentally sensitive land. Regional cooperation on a range of issues from transportation to land use to water resources is critical to ensuring that future growth is balanced with environmental sustainability.

More livable communities.

Today's workers and retirees are the most mobile in history, and increasingly are choosing to locate where the quality of life is highest. New residents and visitors increasingly are attracted to Florida's vibrant urban areas, well-planned suburban communities, and authentic rural villages – particularly those places where transportation systems support community visions.

Strategic Intermodal System (SIS)

http://www.dot.state.fl.us/planning/SIS/aboutsis.asp

The SIS is a statewide network of high-priority transportation facilities that includes the state'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. Emphasis is placed on statewide and interregional systems and corridor-level planning that coordinates multimodal improvements of many types of facilities involving many partners.

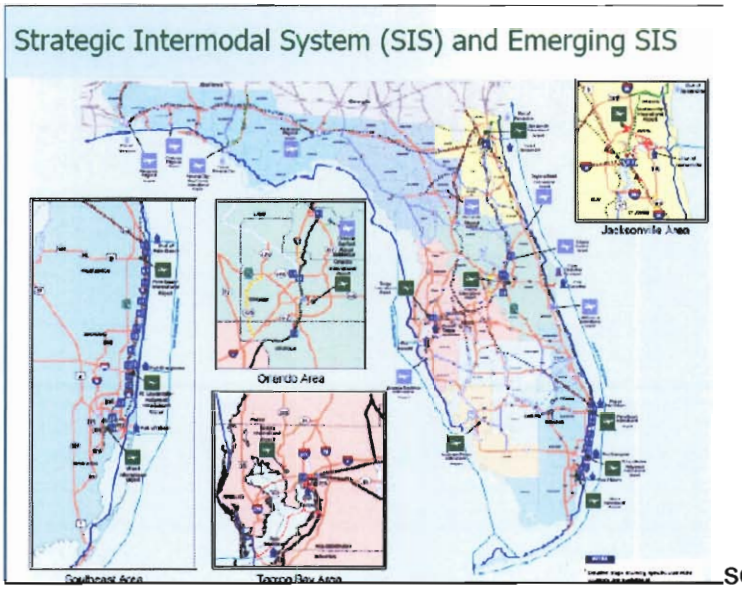
The SIS includes three different types of facilities, each of which forms one component of an interconnected transportation system.

- Hubs are ports and terminals that move goods or people between Florida regions or between Florida and other origin/destination markets in the United States and the rest of the world. These include commercial service airports, deepwater seaports, spaceports, interregional rail and bus terminals and freight rail terminals.
- Corridors are highways, rail lines, waterways and other exclusive-use facilities that connect major origin/destination markets within Florida or between Florida and other states or nations.
- Intermodal connectors are highways, rail lines or waterways that connect hubs and corridors.

(FDOT 2007)

Florida's Strategic Intermodal System (SIS) was established in 2003 to enhance Florida's economic competitiveness by focusing limited state resources on those transportation facilities that are critical to Florida's economy and quality of life.

Once fully developed, the SIS could help Florida respond to several key trends that are shaping the state's economy, and therefore, the use of the transportation system. These trends include a strong population and economic growth, a shift toward regional economic centers, lagging economic performance of rural areas, a shift toward service and information industries, and continued concerns about growth management and environmental quality.



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The SIS provides a foundation for a new way of planning and managing Florida's transportation system. The table below shows the key changes in perspective reflected the SIS strategy.

Table 1. Strategic Intermodal System Perspective Change

From ...	To ...
Individual modes and facilities	Complete end-to-end trip
Individual jurisdictions	Economic regions and trade corridors
Facility design standards	User-oriented service standards
Capacity and throughput	Reliability and bottlenecks
Travel time and vehicle operating costs	Business logistics and economic competitiveness
Reacting to economic growth and community and environmental impacts	Proactive planning for economic, community and environmental goals

http://images.google.com/imgres?imgurl=http://www.planning.dot.gov/Peer/Michigan/lans05_fig3.gif&imgrefurl=http://www.planning.dot.gov/Peer/Michigan/lansing_2005.htm&h=307&w=417&sz=8&hl=en&start=0&um=1&tbnid=GRzd4fjY-trF_M:&tbnh=92&tbnw=125&prev=/images%3Fq%3DFlorida%2BMPOs%26svnum%3D10%26um%3D1%26hl%3Den%26rlz%3D1T4DMUS_enUS207US211

FSHS

The Florida Intrastate Highway System Section develops and maintains the network of highways that combined make up the intrastate system. The Florida Intrastate Highway System (FIHS), created in 1990 by the Florida Legislature, is composed of interconnected limited- and controlled-access roadways including:

1. Interstate highways
2. Florida's Turnpike System
3. Selected urban expressways
4. Existing major interregional and intercity arterial highways to be upgraded to higher controlled access standards
5. New limited access facilities.

It is a statewide transportation network that provides for high-speed and high-volume traffic movements within the state. The system also accommodates High-Occupancy Vehicles (HOVs), express bus transit and, in some corridors, passenger rail service. The primary function of the system is to serve interstate and regional commerce and long-distance trips.

TRIPS

Transportation Regional Incentive Program (TRIP) is a program that provides funds for the improvement of important transportation facilities in great need for improvement, to encourage regional level planning, and to link investment to growth management. The main policy of this program is increase capacity of the transportation program. The funding comes from the motor fuel tax collections and the state matching. The Florida Department of Transportation (FDOT) will pay for 50 percent of project costs, or up to 50 percent of the nonfederal share of project costs for public transportation facility projects.
http://www.dot.state.fl.us/planning/trip/guidance.pdf

To be eligible for TRIPS are that all partners need to have interlocal agreements, the regional area must have a regional transportation plan, the level of service standards must be adopted by FDOT and the projects adopted into the capital improvements schedule, and lastly all the projects must serve a national or regional function, must be consistent with SIS, must be compliant with the local corridor management polices and have local, regional, or private matching funds.
http://www.dot.state.fl.us/planning/trip/brochure-071505.pdf

Relationship between State, Regional and Local Transportation Planning

The SIS, FIHS and TRIPS facilities form the backbone of the transportation system that supports global, statewide, intercity and regional travel. As such, local governments need to

understand if their community has any of these types of facilities and, to the greatest extent possible, plan their local network to accommodate local travel in a manner that does not compromise the capacity of these facilities. If any of these facilities traverses through a community, the local government will need to coordinate their local planning efforts with those of the District and State DOT offices. To accomplish this, local governments need to develop their own local transportation system.

Paying for Roads

Florida collects more than $1 billion annually in federal transportation taxes. However, hundreds of millions of these dollars are being used to finance transportation projects in other states. Florida is therefore termed a "donor" state. While this funding may have been reasonable for developing a national infrastructure, it has long ago served its purpose. The interstate system is complete, and the antiquated funding formulas put large, rapidly growing states like Florida at an extreme disadvantage in providing needed transportation projects. They are funded with special taxes, such as the federal, state and local taxes on highway fuels. The theory behind these special taxes is simple: the users of the transportation system should help pay for it. So each time we purchase gas for our car, truck, or RV, buy a plane ticket, rent or purchase an automobile, we pay taxes that help fund federal, state, and local transportation projects.

With a combined annual operating and capital budget of over $3.1 billion, FDOT funds state transportation projects from a variety of sources.

- Fuel taxes, motor vehicle fees and aviation fuel taxes all contribute nearly half of Florida's transportation revenues.
- Turnpike operations are, for the most part, self-financed, functioning primarily from toll revenues. Turnpike expansion projects are partially funded from revenue bonds backed by future toll proceeds (see Turnpike Financing page 9).
- In 1921, Florida began charging a 1 cent per gallon fuel tax. Since that time, the state imposed tax for fuel has increased to its current 17.6 cents per gallon.
- Of that amount, four cents are distributed to local governments and 91 percent of the remaining 13.6 cents is distributed to FDOT for transportation projects. The remainder is allocated to general revenues and other trust funds.
- Motor vehicle related charges such as license taxes and title fees, rental car surcharges, registration fees and vehicle impact fees comprise nearly a quarter of the state tax portion.
- General obligation bond financing also plays an important role in addressing Florida's total transportation financial needs. These bonds are used to purchase land for road projects and to finance bridge construction.

Local Option Taxes.

Until recently, the state did not allow local governments to levy certain taxes. However, as a result of population growth and inflation in the early 60s and 70s, new demands

placed on local governments were greater than their ability to raise capital for local transportation projects.

Therefore, in the early 1970s, certain counties were authorized by the legislature to "piggyback," or add to, the state's tax on highway fuels. Today, all counties are authorized to collect another 12 cents per gallon at the pump and to authorize a voter-approved local option sales tax for infrastructure. These local taxes must be approved at the county level and the proceeds from the taxes are shared between the county and cities based upon agreed-upon formulas. These locally-raised taxes may be spent on local or state transportation projects that local officials have incorporated into local plans.

First, funding policy is set by the 2020 Florida Transportation Plan. It determines how to spend state and federal transportation funds managed by the department by outlining long-range goals for transportation expenditures.

Then FDOT, working with local governments through their county commissions and metropolitan planning organizations, incorporates priority projects into FDOT's 5-year work program. The work program, a prioritized list of projects to be funded over the next five years, defines how Florida's state transportation objectives are met. Almost two-thirds of the department's 5-year work program is identified as "product." Product consists of those tangible items that are the end results of FDOT's efforts.

The remaining third of the work program is the direct support of product programs. This includes planning and engineering operations of the transportation systems (including routine maintenance and toll operation activities), and administration. It is important to note that some federal funds flow directly to local agencies. In addition to federal funds, monies generated from local taxes and bonds remain at the local level for meeting community transportation needs. No matter how you slice it, transportation funds are carefully allocated among the many competing projects and programs throughout Florida. Decisions are primarily made at the local level through community input and guidance from local governments. FDOT's 5-year work program reflects that involvement.

The FDOT 5-year work program is the means by which transportation projects travel from concept to completion. Updated annually, the work program contains the specific transportation projects and services to be undertaken during each of the next five fiscal years. How many projects are eligible to enter the work program is determined by estimates of available funding. FDOT then matches funding to specific projects, which are then scheduled or "programmed."

At the local level, the program is used to plan and develop the capital improvement elements of the local government comprehensive plans. Development of the work program can be summarized into three distinct phases: Priority Project List, Tentative and Adopted. A new project added in the new fifth year takes about eight years to complete. What this means is that a project identified as a priority today may not be fully

constructed until 13 or 14 years later. By design, the work program process allows transportation officials to forecast more accurately. The 5-year work program brings stability to projects as they progress toward completion by applying sound financial planning and setting realistic production schedules.

Responsibilities of Local Government

The most important role of a local government, with respect to the development of a transportation network, is to develop and implement a comprehensive plan. The comprehensive plan establishes a blueprint for the land development of the community and communicates with adjacent cities and counties, regional planning agencies, and the State about the vision of the community. Without a comprehensive plan, other levels of government not be informed of, nor will they adhere to, your wants or needs. If a local government has a legally-adopted comprehensive plan, and it is reviewed by the county, district offices of state agencies, and state agency. As a result, the plan is taken into consideration at all the level of planning.

The Florida Growth Management Act of 1985 requires local government to engage in a comprehensive planning process to develop a comprehensive plan. Local governments are also required to develop Land Development Regulations, which address what is necessary for the issuance of development orders (DOs). The Land Development Regulations implement the goals, objectives and policies of the Comprehensive Plan and establish rules for the zoning of land in the community. The comprehensive plan must address the following topics (called elements): Of greatest relevance to transportation planning are the land use, traffic circulation, and the capital improvements element. The Growth Management legislation also establishes minimum requirements for public notices and hearings so that citizens of the community and interested persons can express their opinion on issue affecting their community.

In this section, the legislation and the administrative rules that govern transportation planning are reviewed. These include: (1) Chapter 163, Part II and Chapter 380 of the Florida Statutes (Growth Policy; County And Municipal Planning; Land Development Regulation); (2) Rule 9J-5 of the Florida Administrative Rules; and (3) guidance that has been developed in response to the 2005 legislation requiring a stronger connection between the comprehensive plan and its implementation. Chapter 163, Part II of the Florida Statutes details the requirements for local governments to develop their comprehensive plan. Chapter 380 of the Florida Statutes details the requirements for Developments of Regional Impact (DRIs), which are defined as projects that have an impact on the region – areas larger than a single county. Rule 9J-5 of the Florida Administrative Rules establishes minimum criteria for the evaluation of local government comprehensive plans.

Legislation & Rules

State legislation requires all local governments to include the following elements: land use, traffic circulation, general sanitary sewer, solid waste, drainage, potable water, and natural groundwater recharge, conservation, recreation and open space, and housing. Coastal communities are also required to prepare a coastal management element. Of greatest relevance to transportation planning at the local level are the following three elements of the comprehensive plan: traffic circulation, land use and capital improvements. The land use

element designates where specific types of land use will be located and the standards to which it will be built. Because different land uses have different impacts on the transportation system, the traffic circulation element needs to be closely coordinated with the land use plan so that adequate transportation capacity is available for the proposed land uses. The capital improvements element details capital expenditures necessary to implement the plan, including the transportation expenditures necessary to support the future land uses in the plan. These three elements are coordinated in the transportation concurrency system, which is a part of the traffic circulation element. The transportation concurrency system outlines how needed transportation facilities, including roads, sidewalks, bicycle trails and transit services will be provided and how they will be funded.

The purpose of the comprehensive plan is to establish a framework for the efficient and orderly development of the community. The plan establishes a set of goals objectives and policies for which Land Development Regulations are prepared and then used to evaluate development projects as they are proposed. Most projects are reviewed by the local government under the provisions of the Comprehensive Plan and the Land Development Regulations that are written to provide more detail on how to implement the Comprehensive Plan. The one special category of projects are Developments of Regional Impact, which are projects that are of a scale that they have impacts beyond a single county. These projects must be consistent with the local government comprehensive plan and its land development regulations AND they must undergo a review by the applicable Regional Planning Council. The state legislation governing Development of Regional Impact is describe first, followed by the rules required in the local comprehensive plan.

Chapter 380 – Developments of Regional Impact (DRI)

Development of regional impact (DRI) is any development which "because of its character, magnitude, or location, would have a substantial effect upon the health, safety, or welfare of citizens or more than one county. New developments must undergo a DRI review in where the development is assessed on the extent of its effects on the natural and built environment. That would include all traffic facilities, energy consumption by the new people in the area, and the size of the development and if would it encourage other new developments along side.

Future Land Use Element

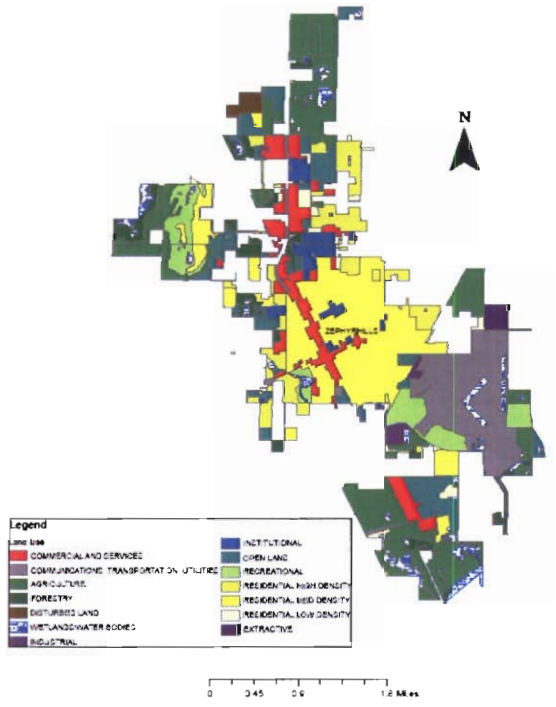
A future land use plan element of a comprehensive plan must designate

- Proposed future lands use allocation of residential uses, commercial uses, industry, agriculture, conservation, recreation/open space, etc…
- These future land uses must be defined and have standards that control the densities of the population and the built environment.
- There should also be maps of the current and future land use with in the land use element for visual reference.
- The proposed distribution of future land use distributions should be backed by the goals, polices, and objectives as well as extensive data.
- The data should include analysis of the projected growth in the area and the required land to accommodate it, the character of undeveloped land, the potential of redevelopment of existing land and uses, and encouragement of economic diversity and vitality through land use patterns.

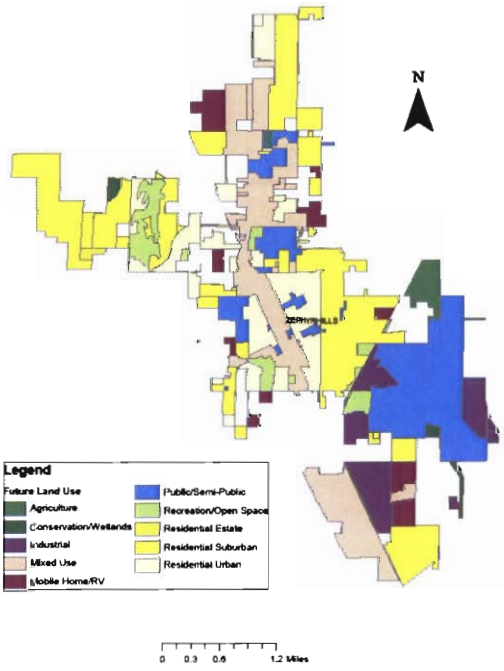
- All these issues must be represented through the map as well as boundaries of the special area under the agency's jurisdiction (e.g., the urban service area, redevelopment districts and historic district).
- Also of great importance with in this element is the designation of land use for public schools; which must include information of proximity to residential development and the development must meet the projected need for the school.

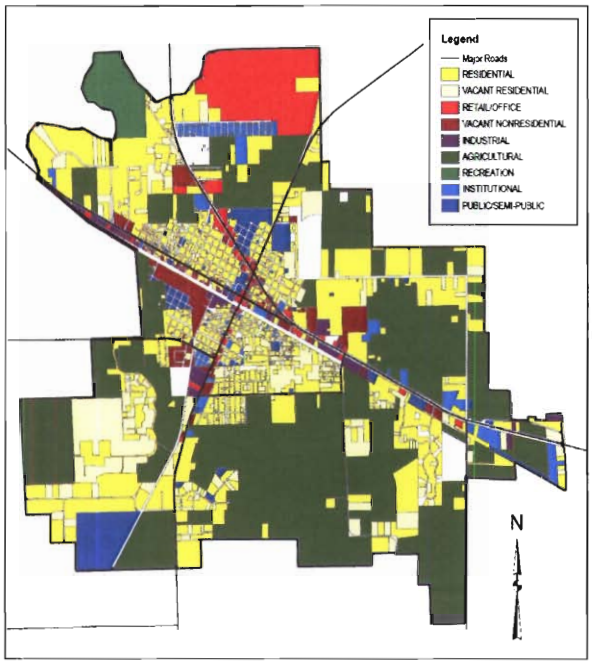
Below are present and future land use maps for the city of Zephyrhills and the city of High Springs as an example of a land use element map.

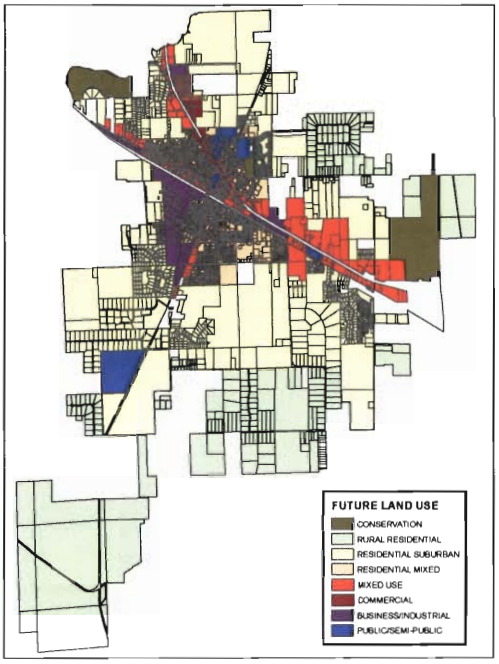
City of Zephyrhills Land Use



City of Zephyrhills Future Land Use







Traffic Circulation Element

The traffic circulation element

- provides a detailed description of the transportation system network with in the area.
- This includes the classification, location, and geometric features of the existing and proposed major roadways and bicycle, pedestrian, transit, park and ride and other local transportation hubs and corridors.
- All alternatives modes of transportation in the area will also be documented. This includes the location, availability, level of service, accessibility, and interconnectedness of the following modes of travel: public transportation, bicycle travel, pedestrian travel, airports, seaports, rail, mass transit, parking, and all inter- and multi-modal facilities.

The transportation circulation element must also relate all these facilities to one another and other regional connections while coordinating them with the future land use element.

Capital Improvements Element

The capital improvements element provides a list of capital projects to be built by the community in order to implement the comprehensive plan. The capital improvements element includes;

- The timing of building capital improvements
- The funding sources, including grants, public sources and private donations from the local, regional and state.

Rule 9J-5, Florida Administrative Code – Minimum Criteria for Review of Local Government Comprehensive Plans and Plan Amendments, Evaluation and Appraisal Reports, Land Development Regulations and Determinations of Compliance

Rule 9J-5 establishes minimum criteria for the preparation, review, and determination of compliance of comprehensive plans and plan amendments pursuant to Chapter 163 of the Florida Statutes. This chapter establishes criteria implementing the legislative mandate that local comprehensive plans be consistent with the appropriate strategic regional policy plan and the State Comprehensive Plan, and recognizes the major role that local government will play, in accordance with that mandate, in accomplishing the goals and policies of the appropriate comprehensive regional policy plan and the State Comprehensive Plan.

Transportation Concurrency & Concurrency Management

Concurrency management is a policy to ensure that when a new development is completed, the adjacent area has the public facilities and services needed to support the new development. The term "concurrency" comes from the state law that says public facilites and services need to be available "concurrent" with the impact of development. Transportation concurrency is one of seven elements that should have a concurrency element. The other facilities and services include: parks, conservation, water and waste water...

Local governments must adopt a concurrency management element into their comprehensive plans and land development codes. The concurrency management system should include the following components: (1) a list of all transportation faciliites needed to support the future land use, including roadways, sidewalks, bicycle lanes, transit service, and other transportation facilities; (2) a level of service standard for all facilities in the plan. Only new development orders and permits are issued to those developers whose projects will either allow the transportation facility meet the established level of service standards contained in the plan. If a proposed project would cause the transportation facility to exceed the level of service standard, the developer must mitigate the impacts of the development based upon the options contained in the transportation concurrency management system of the comprehensive plan. Transportation concurrency exception areas, transportation concurrency management areas, and multimodal transportation districts can be used as a part of the comprehensive plan to mitigate the impacts of the development for which the concurrency standards can not be met.

If the community has existing facilities that are currently in a deficit a government establish a long-term transportation concurrency management system. In planning a long-term concurrency management system, the local government establishes an area for which roadways can not meet the requirements for project-level concurrency review and develops a list of transportation projects that would address the deficiency in transportation facilities and prioritizes them to be corrected within a 10-year period. If the backlog is extensive, the local government can apply for a five-year extension for the long-term concurrency management system. Upon approval of the extension, the local government would have a total of 15 years to eliminate the deficiency. The long-term concurrency management system can be an effective means of addressing a backlog of transportation projects. However, the local government must carefullly plan the use of this option. An important part of the long-term concurrency management system is that it must be financially feasible. To

accomplish this, the capital improvments elements of the comprehensive plan must include the list of facilities on the backlog, the expected developments, and a plan to fund those projects over a 10 years (or 15-years if an extension of the 10-year requirement is received).

Proportionate Share Mitigation

Proportionate share planning is a method for calculating the mitigation costs of impacts from a development of regional impact (DRI). As similar related concept is proportionate fair-share, which applies to other projects for which transportation concurrency can not be met. This is a required method by where the local government can assess the developer's fair share cost so that the development can proceed even if it does not meet the concurrency standards. The funds collected by the local government can then be used with public funds to make improvements to the area to satisfy the concurrency standards. The proportionate fair-share method was put into place in 2005 when the Florida Legislature passed the SB 360 to provide a method for mitigating the impacts of developments on transportation facilities. With hundreds of new residents moving to Florida daily, the state's population is projected to continue to grow and local governments were continuing to have a backlog of inbuilt projects. The "pay-as-you-grow" system bases decisions about new development on the ability of Florida's communities to provide adequate infrastructure. Under the plan, comprehensive plans now require a budget and timeline to address the backlog of infrastructure along with the increased demands of new development. Additionally, the law discourages urban sprawl by providing regulatory incentives to develop within urban service boundaries and urban infill and redevelopment areas.
http://www.dot.state.fl.us/planning/gm/pfso/draft-102705.pdf

Financial Feasibility

Financial Feasibility is defined as the ability to have the funds present and available for a project so that it can begin to be built. The 2005 legislation requires that financial feasibility be an issue when dealing with proportionate share planning and concurrency. For capital improvements projects the funding for the first three (3) years must be already committed. For years 4 and 5, the funding can come from committed funds or "reasonably anticipated funds." Reasonably anticipated funds are those that are come from future public and private revenues or even proportionate share payments. It is all funding that is going to be taken in by the agency in the future. Thus, for the purpose of reviewing plan amendments that impact the road system, the financial feasibility test may consider proportionate share payments and other public and private revenues projected through a 10-year period. (Florida Statue 163)

Summary

In this chapter, the planning process and the actors in the process at the state and regional level are introduced and the requirement of the local government in establishing a comprehensive plan are summarized. The transportation planning process is designed to be completed using the 3C's of transportation planning: comprehensive, coordinated and comprehensiveness. The state develops a Long-Range State Transportation Plan. District DOT offices and MPOs establish priorities for transportation investment at a regional level by considering the needs of the state and the needs of the local governments within the region. The local government comprehensive plan is then prepared to establish the vision of the community and the resulting

land use pattern. The Land Development Regulations are established to implement the comprehensive plan. Within the comprehensive plan, the local government takes the land use plan and develops a transportation system to support the land use system and a capital improvements plan to fund and build those transportation facilities. The transportation concurrency management system brings all of these elements together by establishing level of service standards for transportation facilities that are then used to review development projects as they are proposed.

In the next chapter, challenges for small communities in completing comprehensive planning are discussed. In the next two chapters, the steps in developing a comprehensive plan are outline. Before leaving the overview of comprehensive planning, it is useful to understand the requirements for good comprehensive planning. A well-known author on the subject of comprehensive planning, William I. Goodman stated that the "key principle in the concept of the comprehensive plan is that it is an instrument to be used by those leaders in a community who establish the policies and make the decisions regarding physical development." Accordingly, Goodman suggests six basic requirements that the plan should fulfill: http://www.wcedc.org/CP/

1. The plan should be comprehensive.
2. The plan should be long-range.
3. The plan should be general.
4. The plan should focus on physical development.
5. The plan should relate physical design proposals to community goals and social and economic policies.
6. The plan should be first a policy instrument, and only second a technical instrument.

Goodman goes on to outline five basic requirements for creating a comprehensive plan:

1. There should be only one official comprehensive plan.
2. The plan should be formally adopted by the legislative body.
3. There should be a lengthy period of public debate prior to adoption.
4. The plan should be available and understandable to the public.
5. The plan should be formulated so as to capitalize on its educational potential.

The main principles of the State Comprehensive Plan, and the Regional Policy Plan and those who prepare it is to create policies for the local government agencies so that communities are designed to preserve or enhance the quality of life of their citizens.

CHAPTER TWO: TRANSPORTATION ISSUES FACING SMALL CITIES IN FLORIDA

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Chapter 1 outlined the planning process at the state, regional and local level. Local governments, irrespective of their size are required to develop their own plans that are consistent with the plans of adjacent jurisdictions, the regional and the state. The complexity of the planning process can create a significant challenge for small communities who have a small planning staff and fewer financial resources than larger communities. In this chapter, the challenges in transportation planning are explored for all communities. Then the issues that are distinct to small communities are discussed.

The 2025 Florida Transportation Plan identifies the following challenges in meeting Florida's transportation needs:[1]

> ***Capacity constraints.*** *Most urban and interregional highway corridors are expected to be heavily congested during peak periods by 2025, even after planned transportation improvements are made. More than 30 of the state's airports are projected to be operating at more than 80 percent of capacity, the point at which expanded capacity should be under construction.*
>
> ***Inadequate intermodal connectivity.*** *Florida's transportation system traditionally has been planned by mode, facility, or ownership. The weakest links often are the connections between modes, such as access from seaports, airports, and other passenger and freight terminals to highways, rail corridors, waterways, and other transportation hubs.*
>
> ***Continued safety concerns.*** *Although Florida's highway fatality rate has fallen in recent years, it has remained higher than the national average for more than 20 years. In 2004, a total of 3,257 people died on Florida's roads. Nearly one out of three of these deaths occurred in roadway intersections, and nearly one out of five were pedestrians or bicyclists.*
>
> ***Threats and emergencies.*** *Attention to improving the security of transportation facilities has increased since September 11, 2001. Recent federal and state legislation imposing significant security measures at airports, seaports, and other passenger and freight facilities nationwide have impacted the efficient movement of passengers and freight throughout the state and created additional financial pressures for transportation agencies. Hurricanes and other natural disasters have also highlighted the importance of effective emergency response and the vulnerability of the transportation system to major disruptions.*
>
> ***Balance between transportation and community livability.*** *The delicate balance between transportation and community livability is becoming more challenging as demand for people and freight mobility continues to rise and choices for locating new development and infrastructure become more constrained. In the past, transportation investments often have focused on the fast movement of vehicles without adequate consideration of community livability. At the same time, rising housing and land costs, as*

[1] 2025 Florida Transportation Plan

well as some zoning and land regulations adopted in urban areas, encourage sprawling development and longer commuting patterns, adding to the strain on the transportation system and deteriorating the quality of life for residents and visitors.

Rising costs of transportation. *Household, business, and government spending devoted to transportation is increasing rapidly. The increasing cost and instability in the supply of petroleum products is raising concern about the need to improve the fuel efficiency of vehicles, reduce the number of miles traveled by cars and trucks, and use alternatives to single occupant vehicles for personal transportation. The cost of maintaining and improving the transportation system is also increasing steadily due to rising prices for fuel and materials as well as growth in right-of-way costs.*

Insufficient funding. *Projected transportation funding from all sources - federal, state, local, and private – will not be sufficient to pay for all needed improvements. Because resources are limited, all transportation partners must work together to make strategic choices, explore new ways of financing transportation, and reduce the cost of providing and operating transportation facilities.*

Challenges Facing Small Cities in Florida

Small cities in Florida face many of these same challenges but, unlike larger cities and counties, they usually have fewer resources and less expertise to address these challenges. In particular, small cities have inadequate intermodal connectivity, a need to balance between transportation and community livability, rising costs of transportation and insufficient funding. In this section, these issues will be discussed with a focus on small cities.

Small cities are frequently located on the state highway systems that served traffic between cities and the movement of freight. The importance of some of these highways has been diminished as the interstate highway system, Florida's Turnpike and other limited access facilities have been built. As is discussed in Chapter 2, the state designated the Strategic Intermodal System as a intermodal system to connect between major hubs of economic activity, such as seaports, airports, and other passenger and freight terminals. The Florida Intrastate Highway System (FIHS) was designated in the early 1990s to provide for passenger and freight movement between cities and through major urban areas.

Small cities located near FIHS and other major state routes that support regional and intercity traffic movement face significant challenges in balancing the economic activity associated with the highway with community livability. The purpose of these roadways is to provide high-speed, high-capacity roadway capacity. However, some communities become over-reliant on these roadways for moving what is local traffic. Over-reliance on state highways leads to:[2]

a. inadequate local and collector roadways;
b. concentration of traffic in congested corridors; and,
c. unnecessary increases in daily vehicle miles of travel[3].

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[2] http://www.mtsmartgrowth.org/transportation_study/LandUse.pdf

[3] VMT or Vehicle Miles of Travel: A measure of the amount of vehicular travel (per capita, per household or within some geographical area). One vehicle traveling one mile = 1 VMT.

Some communities consider the state highway system as the ideal location for commercial development. However, locating strip commercial development along these corridors will often result in unintended consequences for the community. Firstly, the commercial development along the state highway may be in competition with the existing businesses in the downtown of the community. This may diminish the vitality of the city's downtown and begin a cycle of decline. Secondly, if access to the businesses is not carefully managed, the roadway will become congested serving the needs of these businesses rather than serving the purpose for which the roadway was developed – the movement of freight and passengers between cities and through regions of the state. If the state highway becomes too congested due to local traffic, the truck traffic may conflict with the safe movement of all members of the community. The State may desire to build a bypass of the city to maintain their goal of moving traffic throughout the state.

Local government have two choices in addressing traffic along major highways: (1) they can carefully manage the movement of local traffic along the corridor through a coordinated access management program; or (2) the community can risk the future vitality of the community by developing in such a manner that the regional and local traffic conflict. In the long run, a strategy that carefully manages capacity through access management will offer the option of balancing community livability with the needs for movement on the transportation system. A coordinated access management program includes proper spacing of driveway along the state highway and parallel local capacity that allows people to get from one destination to the other in the community without going on the state highway. In the absence of careful planning for access on the state highway, small cities risk the reducing safety in their community due to large number of trucks and high-speed traffic through the center of the city and the potential loss of a vital and healthy downtown business area.

Inadequate access management results in a system of continuous access roadways designed to facilitate corridor oriented development patterns everywhere, even in locations where this is not consistent with local land use planning. This leads to decreased safety for all users of the system because the corridor is only built to support the movement of vehicles and not all modes of transport. The widening of such roadways uses the limited budgets of small cities. Such continuous access roadways are self-defeating in terms of congestion relief and are disastrous for local land development patterns.

Considerations for Small City Transportation Planners

There are several important considerations when developing rural and small city transportation plans. These include:

Planning for the Multimodal System. Rural and small city planning needs to maintain a system-wide perspective at the local, regional and statewide levels. Many times when local and regional agencies perform planning, there is a natural tendency to focus on projects in the local area that address local concerns and technical needs. Many plans have a tendency to be project lists that focus on a single mode. Instead, plans should take a long term strategic perspective and reflect local, regional, statewide, and national

priorities for an interconnected multimodal transportation system. How a particular improvement fits into the local, regional and statewide system is a key planning question. A good rural plan will address this.

Coordination of Transportation Plans. Once a small city or rural community understands how their needs fit into the system-wide perspective, they need to coordinate their transportation plans with the plans created by different levels of government. Thus, for example, if the Florida Department of Transportation has plans to resurface a roadway, the small city may want to improve the sidewalk connections to that state roadway corridor. Because small cities and rural communities have few resources, it is critical for successful rural planning that all plans are coordinated. This means that, to the extent possible, policies and technical analysis should be consistent and comparable. This can be a challenge because small communities may not have the resources to complete comparable and equal technical analysis as the state.

Coordination with Land Use and Development Process. There is growing local interest in the coordination between transportation and land use planning. However, in most rural areas and small cities there is very little land use planning with which to coordinate. However, rural and small city planners should ensure that the community has a strong vision for the community. If they do, when other levels of government have plans that directly affect the community, the community leadership can determine the best ways to coordinate the state plans with the development review process and other land use decisions. For example, the community may be able to adjust the boundaries of the unincorporated area or coordinate their subdivision review in response to, or in coordination with, other levels of government to ensure that the community's vision can be achieved.

Ensuring Adequate Resources to Perform Transportation Planning. A common issue amongst many local and regional agencies performing rural and small city transportation planning is a lack of technical expertise to perform planning. These agencies often "borrow" staff from the state DOT or the Regional Planning Council (RPC). These agencies are not always clear about how much technical expertise is required to do the planning. Documents such as this one are helpful with the process; however the state DOT planning practitioners often provide specific guidelines and data for technical analysis such as forecasts, pavement condition analysis, traffic and accident statistics, and project evaluation criteria. Many other states also have handbooks for such purposes.

Developing a Financially Feasible Transportation Plan. The comprehensive planning process is used to establish goals, objectives and policies to meet the vision of the community. Once the plan is completed, the challenge is to develop an implementation plan that addresses the needs of the community within the constraints of the community to fund the project. In developing a financially feasible transportation plan, the community should consider its own priorities, the priorities of the county, regional and state agencies and the proposed new development in the community. Cities should also consider the variety of funding from the private and public sector and from taxes

and bonding. The funding needs to be matched with the prioritized projects to develop a financially transportation plan, which becomes part of the capital improvements plan.

CHAPTER THREE: LINKING LAND USE AND TRANSPORTATION

CHAPTER THREE: LINKING LAND USE AND TRANSPORTATION

Land use and transportation are two sides of the same coin.[1] Transportation affects land use and land use affects transportation. Decisions that affect one also affect the other. Consequently, it is important that transportation and land use planning decisions are complementary rather than contradictory.

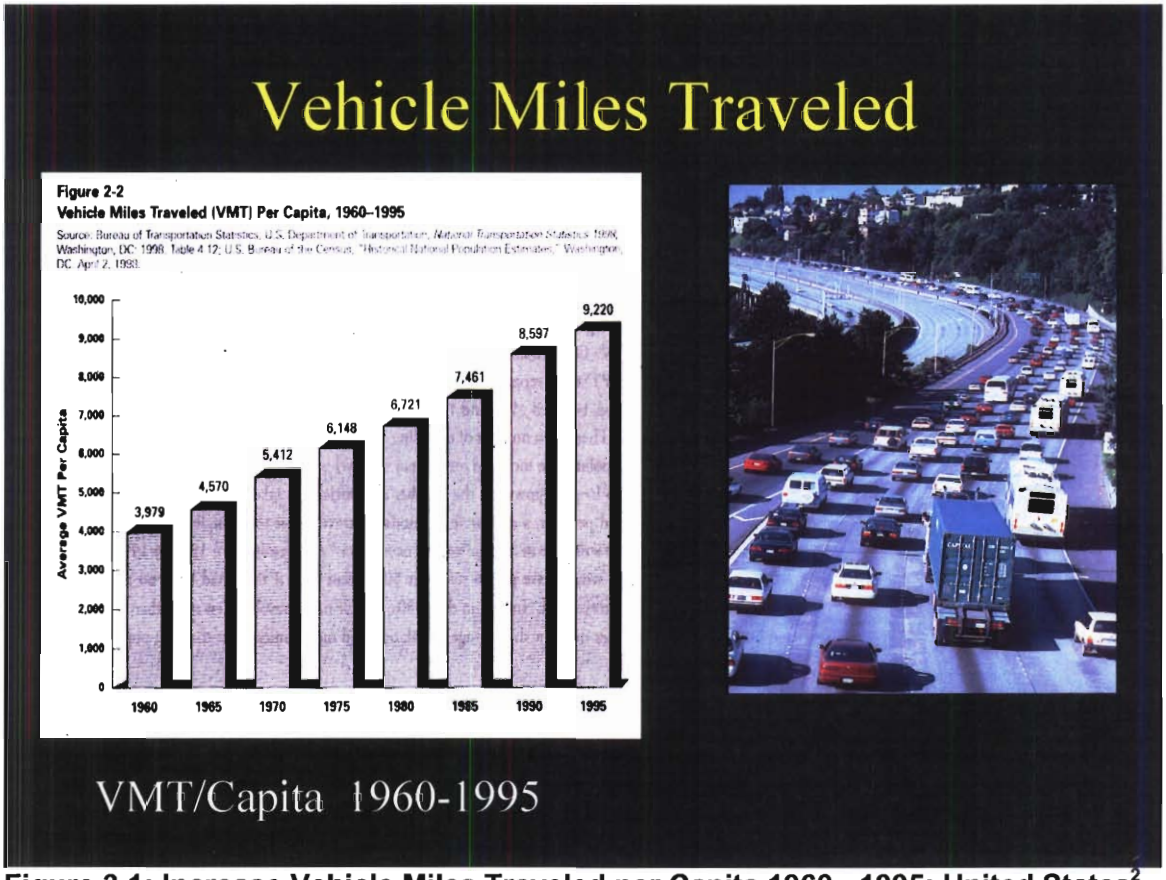

Figure 3.1: Increase Vehicle Miles Traveled per Capita 1960 - 1995: United States[2]

There can be little doubt that the dependence of Americans on the automobile is increasing. As illustrated by Figure 1, the vehicle miles traveled per capita in the United States tripled between 1960 and 1995. The average trip is almost ten miles in length. The demand for roadways is growing much faster than our population. We are driving further for all purposes and spending increasingly more time in congested conditions.

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[1] Land Use Impacts on Transport: How Land Use Factors Affect Travel Behaviors, Todd Litman, Victoria Transport Institute, April 3, 2007

[2] Graphic provided by Dan Burden, Glatting Jackson; Source: Bureau of Transportation Statistics, US Department of Transportation, *National Transportation Statistics, 1998*, Washington, D.C. 1998, Table 4-12: US Bureau of the Census, "Historical National Population Estimates," Washington, D.C., April 2, 1998

Table 3.1: U.S. Average Annual Person-Miles and Person-Trips

	Commute	Shopping	Recreation	Other	Total
Annual Miles	2,540 (18.1%)	1,965 (14.0%)	4,273 (30.5%)	5,238 (37.4%)	14,016 (100%)
Annual Trips	214 (14.8%)	284 (19.6%)	387 (26.7%)	565 (39.0%)	1,450 (100%)
Average Trip Length	11.9	6.9	11.0	9.3	9.7

Source: 2001 National Household Travel Survey cited by Litman, pg 6

Developing a Balanced Approach to Transportation Planning

Much of the disconnection between transportation and land use can be attributed to the prevailing paradigm that favors an engineering approach to the growing use of the automobile. The conventional approach illustrated by Figure 3.2 is based on the assumption that more traffic demands more roads and better traffic management (i.e. a system that primarily focuses on the movement of cars).

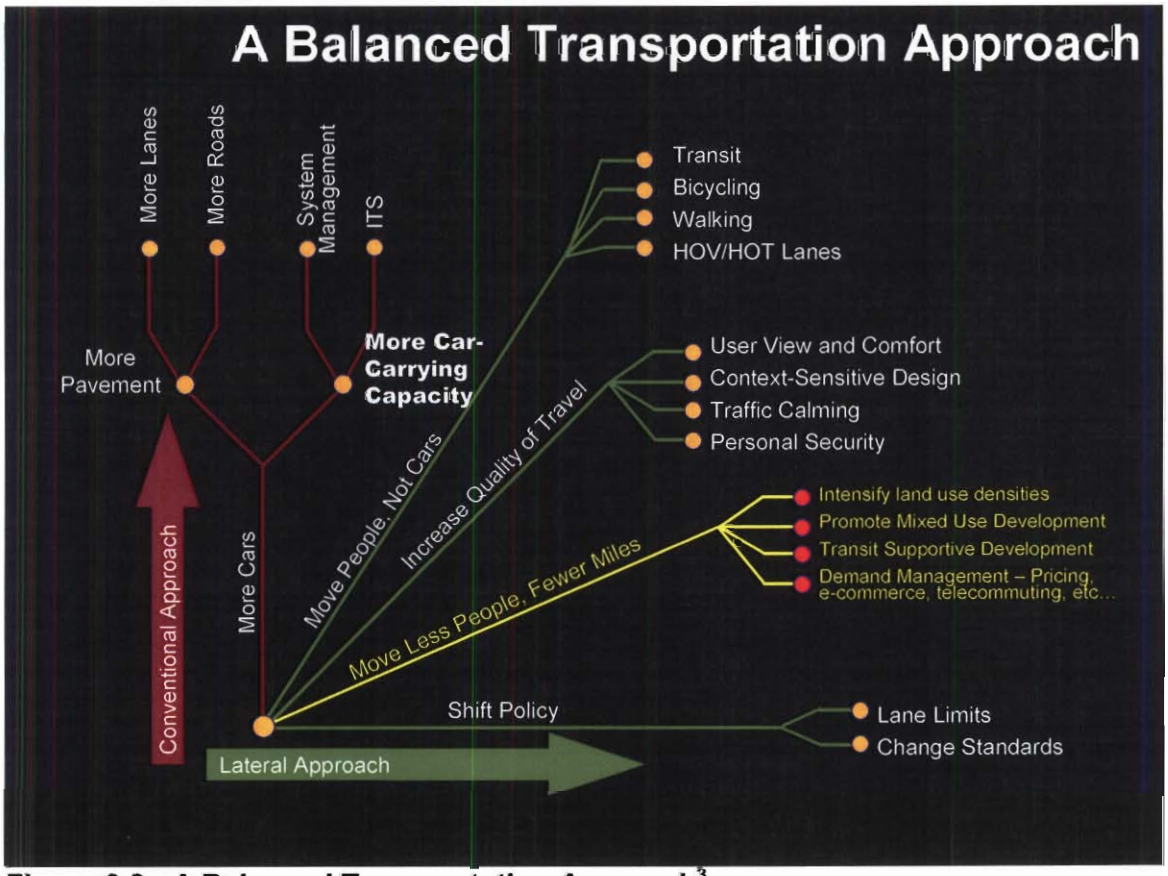

Figure 3.2: A Balanced Transportation Approach[3]

The "lateral" approach, also shown by Figure 3.2, focuses instead on the movement of people and emphasizes the balance between land use and the transportation infrastructure that supports it. This chapter explores various aspects of the connection

[3] Dan Burden, Glatting Jackson

between land use and transportation and provides a framework for community visioning to accomplish this coordination using a variety of the lateral approaches. In this chapter, the terms of this discussion are first introduced. Then the steps necessary to develop a community vision are described. Finally, methods to promote transportation choice are explained. The chapter ends by exploring how to link transportation demand with the comprehensive plan.

How Do Land Use Factors Influence Travel Patterns?

To ensure that transport planning decisions support land use planning objectives and land use planning decisions support transport planning objectives, an understanding of how specific land use patterns affect travel is needed. Table 3.2 provides the basic terms that define the land use transportation relationship.

Regional Accessibility / Centeredness

Regional Accessibility refers to an individual site's location relative to the regional activity centers and the number of jobs and public services available within a given travel time[4]

Centeredness refers to the portion of employment, commercial, entertainment, and other major activities concentrated in activity centers, such as downtowns and employment centers. Such centers reduce the amount of travel required between destinations and are more conducive to alternative modes.

Density refers to the number of people or jobs in an area. Density affects travel behavior through the following mechanisms:

- **Land Use Accessibility**. The number of potential destinations located within a geographic area tends to increase with population and employment density, reducing travel distances and the need for automobile travel.[5] For example, in low-density areas a school may serve several square miles, requiring most students to arrive by motor vehicle. In denser areas, schools may serve a much smaller geographic area, reducing average travel distances and allowing more students to walk and cycle. Similarly, average travel distances for errands, commuting and business-to-business transactions tend to be reduced as density increases.

- **Transportation Options**. Increased density tends to increase the number of travel options available in an area due to economies of scale in providing facilities such as sidewalks and services such as public transit, taxis and deliveries.

- **Reduced Automobile Accessibility**. Increased density tends to reduce traffic speeds, increase congestion and reduce parking supply, making driving less attractive compared with other modes.

[4] (Kuzmyak and Pratt, 2003; Ewing, 1995). Cited by Litman
[5] ("Accessibility," VTPI, 2005).

As a result, increased density tends to reduce per capita vehicle ownership and use, and increase use of alternative modes[6].

[6] (Jack Faucett and Sierra Research, 1999; Holtzclaw, et al., 2002; Ewing, Pendall and Chen, 2002; Kuzmyak and Pratt, 2003; TRL, 2004) cited in Litman

Table 3.2 Land Use Impacts on Travel

Factor	Definition	Travel Impacts
Regional Accessibility	Location of development relative to regional urban center.	Improved accessibility reduces per capita vehicle mileage. Residents of more central neighborhoods typically drive 10-30% fewer vehicle-miles than urban fringe residents.
Centeredness	Portion of commercial, employment and other activities in major activity centers.	Centeredness increases use of alternative commute modes. Typically 30-60% of commuters to major commercial centers use alternative modes, compared with 5-15% of commuters at dispersed locations.
Density	People or jobs per unit of land area (acre or hectare).	Increased density tends to reduce per capita vehicle travel. Each 10% increase in urban densities typically reduces per capita VMT by 1-3%.
Mix	Degree that related land uses (housing, commercial, institutional) are located close together.	Increased land use mix tends to reduce per capita vehicle travel, and increase use of alternative modes, particularly walking for errands. Neighborhoods with good land use mix typically have 5-15% lower vehicle-miles.
Network Connectivity	Degree that walkways and roads are connected to allow direct travel between destinations.	Improved roadway connectivity can reduce vehicle mileage, and improved walkway connectivity tends to increase walking and cycling.
Transit Quality/ Accessibility	Quality of transit service and degree to which destinations are transit accessible.	Improved service increases transit ridership and reduces automobile trips. Residents of transit oriented neighborhoods tend to own 10-30% fewer vehicles, drive 10-30% fewer miles, and use alternative modes 2-10 times more frequently than residents of automobile-oriented communities.
Roadway Design / Management	Scale, design and management of streets.	More multi-modal streets increase use of alternative modes. Traffic calming reduces vehicle travel and increases walking and cycling.
Walking / Cycling Conditions	Quantity, quality and security of sidewalks, crosswalks, paths, and bike lanes.	Improved walking and cycling conditions tends to increase nonmotorized travel and reduce automobile travel. Residents of more walkable communities typically walk 2-4 times as much and drive 5-15% less than if they lived in more automobile-dependent communities.
Site Design	The layout and design of buildings and parking facilities.	More multi-modal site design can reduce automobile trips, particularly if implemented with improved transit services.
Parking Supply / Management	Number of parking spaces per building unit or acre, and how parking is managed.	Reduced parking supply, increased parking pricing and implementation of other parking management strategies can significantly reduce vehicle ownership and mileage. Cost-recovery pricing (charging users directly for parking facilities) typically reduces automobile trips by 10-30%.
Mobility Management	Policies and programs that encourage more efficient travel patterns.	Mobility management can significantly reduce vehicle travel for affected trips. Vehicle travel reductions of 10-30% are common.

Source: Land Use Impacts on Transport: How Land Use Factors Affect Travel Behaviors, Todd Litman, Victoria Transport Institute, April 3, 2007

Land Use Mix

Land Use Mix refers to locating different types of land uses (residential, commercial, institutional, recreational, etc.) close together. This mix can occur at various scales, including mixing within a building (such as ground-floor retail, with offices and residential above), along a street, and within a neighborhood. It can also include mixing housing types and price ranges that accommodate different demographic and income classes.

Increased mix tends to reduce travel distances, and allows more trips to be made by walking and cycling. Improved mix can reduce commute distances, particularly if affordable housing is located in job-rich areas and employees who work in mixed-use commercial areas are more likely to commute by alternative modes[7]. Households located in highly accessible neighborhoods travel a median distance of 2.0 mi one-way for errands versus 5.0 mi for households in less accessible locations. [8] Certain land use combinations create *complete urban villages*, providing compact walkable neighborhood centers containing commonly used services and activities, such as stores, schools and parks.

Table 3.3 Housing Mix Impacts On Land Consumption (Litman, 2004b)

	Large Lot (1 acre)	Medium Lot (1/2 ac)	City Lot (100x100)	Small Lot (50x100)	Multi Family	Totals	Single Family
Home per Acre	**1**	**2**	**4.4**	**8.7**	**20**		
Sprawl							
Percent	**30%**	**25%**	**25%**	**10%**	**10%**	**100%**	**90%**
Number	**300,000**	**250,000**	**250,000**	**150,000**	**100,000**	**1,000,000**	
Total Land Use	**300,000**	**125,000**	**57,392**	**11,294**	**5,000**	**451,497**	
Standard							
Percent	**20%**	**20%**	**20%**	**20%**	**20%**	**100%**	**80%**
Number	**200,000**	**200,000**	**200,000**	**200,000**	**200,000**	**200,000**	
Total Land Use	**200,000**	**100,00**	**45,914**	**22,989**	**10,000**	**378,902**	
Smart Growth							
Percent	**10%**	**10%**	**20%**	**35%**	**25%**	**100%**	**75%**
Number	**100,000**	**100,000**	**200,000**	**350,000**	**250,000**	**1,000,000**	
Total Land Use	**100,000**	**50,000**	**45914**	**40,320**	**12,500**	**248,644**	

Even modest shifts can significantly reduce land consumption. The Smart Growth option only requires 15% of households to shift from single- to multi-family homes, yet land requirements are reduced by half compared with sprawl

Table 3.2 illustrate how relatively small increases in density and modest changes in land use mix can have dramatic effects on the amount of land consumed by development.

[7] (Modarres, 1993; Kuzmyak and Pratt, 2003), cited in Litman

[8] Krizek (2003a) cited in Litman

This comparison may be especially relevant for small communities struggling with issues of sprawl and density.

Connectivity

Connectivity refers to the degree to which a transportation network is connected, and therefore the directness of travel between destinations.[9] A hierarchical road network with many dead-end streets that connect to a few major arterials provides less accessibility than a well-connected network, as illustrated in Figure 3.3. Increased connectivity reduces vehicle travel by reducing travel distances between destinations and by improving walking and cycling access, particularly where paths provide shortcuts so walking and cycling are more direct than driving. Better local connectivity, especially when it is accompanied by a land use mix, can reduce the level of traffic on major arterials because multiple paths are available for a variety of trips reducing the concentration of traffic on major arterials.

Figure 3.3 **Comparing Hierarchical and Connected Road Systems** (Illustration from Kulash, Anglin and Marks, 1990)

Figure showing Hierarchial v Connected Littman pg 16

The conventional hierarchical road system, illustrated on the left, has many dead-end streets and requires travel on arterials for most trips. A connected road system, illustrated on the right, allows more direct travel between destinations and makes nonmotorized travel more feasible.

Transit accessibility refers to the quality of transit serving a particular location and the ease with which people can access that service, usually by walking but also by bicycle or automobile. *Transit-Oriented Development* (TOD) refers to residential and commercial areas designed to maximize transit access and usually involves creating compact, mixed-use, walkable urban villages. Households living in transit oriented neighborhoods

[9] Connectivity," VTPI, 2005 cited in Litman

tend to own fewer cars, and residents and employees in such areas are more likely to commute by alternative modes[10] .

[10] Cambridge Systematics, 1994 cited in Litman

Roadway Design refers to factors such as block size, road cross-section (the number, widths and management of traffic lanes, parking lanes, traffic islands, and sidewalks), traffic calming features, sidewalk condition, street furniture (utility poles, benches, garbage cans, etc.), landscaping, and the number and size of driveways. Roadway designs that reduce motor vehicle traffic speeds, improve connectivity, favor alternative modes, and improve walking and cycling conditions tend to reduce automobile traffic and encourage use of alternative modes, depending on specific conditions. Roadway design that improves walking conditions and aesthetics support urban redevelopment, and therefore smart growth land use patterns.

Walking and Cycling Conditions are affected by the quantity and quality of sidewalks, crosswalks and paths, path system connectivity, the security and attractiveness of pedestrian facilities, and support features such as bike racks and changing facilities. Improved walking and cycling conditions tend to increase nonmotorized travel, increase transit travel, and reduce automobile travel.[11]

Site Design and Building Orientation Some research indicates that people walk more and drive less in areas with traditional pedestrian-oriented commercial districts where building entrances connect directly to the sidewalk than in areas with automobile-oriented commercial strips where buildings are set back and separated by large parking lots, and where sites have poor pedestrian connections.[12] Variations in site design and building orientation can account for changes of 10% or more in VMT per employee or household.[13]

Parking Management refers to the supply, price and regulation of parking facilities.[14] How parking is managed can significantly affect travel behavior. [15] As parking becomes more abundant and cheaper, automobile ownership and use increase, because it increases the convenience and reduces the cost of driving, and by dispersing destinations reduces the convenience of walking and public transit travel. Parking supply and pricing have a significant impact on commute mode split.[16]

Parking management reduces the amount of land devoted to parking facilities and increases parking prices, which tends to reduce vehicle travel and increase use of alternative modes. [17] Most parking is automatically included with building space and provided free to motorists. As households reduce their vehicle ownership they tend to drive fewer miles.

Mobility Management (also called *Transportation Demand Management*) includes various policies and programs that increase transport system efficiency by reducing motor vehicle travel and encouraging use of alternative modes. It is often implemented as an alternative to road and parking facility capacity expansion. Mobility management affects land use indirectly, by reducing the need to increase road and parking facility

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[11] "Nonmotorized Transport Planning," VTPI, 2005 cited in Littman
[12] Moudon, 1996; Kuzmyak and Pratt cited in Litman
[13] PBQD, 1994; Kuzmyak and Pratt, 2003 cited in Litman
[14] "Parking Management," VTPI, 2006 cited in Littman
[15] Litman, 2006)
[16] Morrall and Bolger, 1996; Shoup, 1997; Mildner, Strathman and Bianco, 1997 cited in Litman
[17] "Parking Management," VTPI, 2005) cited in Litman

capacity, providing incentives to businesses and consumers to favor more accessible, clustered, development with improved transport choices.

Impact Summary

What are the effects of land use factors on travel behavior, and the ability of land use planning to achieve transportation planning objectives? Studies indicate that feasible land use management strategies which affect local factors (density, mix, design, etc.) can reduce per capita vehicle travel 10-20%, while those that affect regional factors (location of development relative to urban areas) can reduce automobile travel by 20-40%.[18] The following are general conclusions that can be made about the effects of specific land use factors on travel behavior.

- Per capita automobile travel tends to decline with increasing population and employment density.

- Per capita automobile travel tends to decline with increased land use mix, such as when commercial and public services are located within or adjacent to residential areas.

- Per capita automobile travel tends to decline in areas with connected street networks, particularly if the nonmotorized and local transportation network are relatively well-connected.

- Per capita automobile travel tends to decline in areas with attractive and safe streets that accommodate pedestrian and bicycle travel, and where buildings are connected to sidewalks rather than set back behind parking lots.

- Larger and higher-density commercial centers tend to have lower rates of automobile commuting because they tend to support better travel choices (more transit, ridesharing, better pedestrian facilities, etc.) and amenities such as cafes and shops.

- Per capita automobile travel tends to decline with the presence of a strong, competitive transit system, particularly when integrated with supportive land use.

- Land use management can provide various benefits to society in addition to helping to achieve transportation objectives.

Research indicates that density by itself has a relatively modest effect on travel. This is good news in terms of the feasibility of using innovative land use techniques to achieve land use planning objectives, since there is often local resistance to increased density. It means that land use management strategies can emphasize other factors such as improving land use mix and walkability, and thus reduce per capita vehicle travel and increase nonmotorized travel for a given level of density. Strategies such as Smart Growth can therefore be applied in a variety of land use conditions, including urban, suburban, small towns and even rural areas. Box 1 provides a summary of the fourteen guiding principles for connecting land use and transportation in land use plans. This information summarizes principles that should be used in developing the community vision and the comprehensive plan.

[18] Ewing and Cervero, 2001(?)

Fourteen Guiding Principles for Connecting Land Use and Transportation in Land Use Plans[19]

Plan Presentation

Guiding principle 1: Plans should contain clear and readable land use maps, conveying usable information without the need to read accompanying text.

Key landmarks and activity nodes should be clear. Relevant mobility alternatives should be clearly specified (roads, transit routes, major bike/greenways).

Guiding principle 2: The time horizon of the plan determines the extent to which certain impacts, such as the land development impacts of planned transportation projects, are to be examined. As a rule of thumb, plans with more than a 10-year time horizon should account for the development impacts of transportation projects. A shorter time- frame is appropriate for the transportation impacts of development projects, since these impacts occur as the development is completed.

Information Base and Content

Guiding principle 3: The plan should have spatially specific information. Differences in the quality and availability of transportation services, transportation infrastructure, and in land uses should be clearly related to geographically identified areas. Policies and goals should relate to specific geographic areas. It is important to identify as specifically as possible where current conditions or recommended actions are located in space.

Guiding principle 4: Travel demand and the supply of transportation infrastructure should be discussed in the plan. A snapshot of current conditions is useful for identifying areas of need and areas where there is a surplus of capacity.

Guiding principle 5: Plans should include assessments of transportation policies, such as minimum parking requirements, parking supply, and parking cost. These policies lie at the intersection between land use and transportation planning, and as such are rarely included explicitly in either type of plan. An open discussion about parking demand (including cost) and the regulations governing parking will help in guiding decision-makers.

Guiding principle 6: The presentation of future land uses in a community should be accompanied by their differential impacts on travel demand and transportation infrastructure. Although the detail of these transportation

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[19] Connection between land use and transportation in land use plans NCDOT Research Project 2003-16, Final Report

impacts will be captured in the community's transportation plan, a need to communicate broad transportation impacts remains. Indicators such as approximate number of trips in the peak period, number of auto trips, number of walking trips, or mode shares are helpful in understanding these impacts. References to existing multimodal transportation plan should be provided.

Guiding principle 7: Plans should consider the cost and feasibility of the extension of transportation services (bus) and infrastructure (sidewalks and roads). When appropriate, such costs should be provided as part of the plan or references to capital improvement programs or transportation plans should be provided.

Guiding principle 8: Plans should examine the existing and proposed local, state, and federal transportation infrastructure investments. The plans should map and inventory the conditions and capacities of existing facilities and proposed changes in those systems. The State Transportation Improvement Program is a detailed source of information that can help localities identify and understand large transportation investments that may affect their locality.

Guiding principle 9: Plans should use various mobility and accessibility indicators. Indicators such as level of service, volume to capacity ratios, delay, commuting time, and daily traffic are expected. However, broader indicators of accessibility such as the % of population/jobs/retail within ¼ mile of transit, % of population/jobs/retail within a 20 minute walk/bike/drive, isochronal curves, or jobs/population ratios at various scales are recommended because they link land use and transportation. After all, people tend to travel to get to destinations.

Goals and policies

Guiding principle 10: The plan provides clearly articulated goals, including transportation goals achieved with land use policies and objectives, and land use goals achieved with transportation policies and objectives (see Kaiser et al, 1995). These goals may be mandated by state and federal policy which the local government is legally or politically bound to implement (such as VMT reductions). The plan may also include the community's judgments about how to meet or manage the demand for travel in the future. These judgments and values will determine infrastructure capacity needs.

Guiding principle 11: The transportation and land use goals should be reasonably achievable with the policies suggested in the plan. Otherwise, the policies are not efficacious and more suitable policies or revised goals are necessary.

Implementation

Guiding principle 12: The plan should facilitate meaningful ongoing public participation and incorporate ongoing monitoring and implementation evaluation procedures, using indicators.

Coordination and consistency

Guiding principle 13: The community should use a common, consistent, and persuasive set of assumptions in its integration of future land uses with transportation plans. Most importantly, estimates of the demand for land should be based on the same population and economic forecasts as the estimates used in the transportation plans. In that way, both land use and transportation planners will share similar assumptions about the size and shape of the future community.

Guiding principle 14: The plan should achieve internal consistency (between facts, goals, analyses, and policies), horizontal consistency (between the plan and plans of neighboring jurisdictions), vertical consistency (between the locality and state and federal plans and mandates), and consistency in implementation (between plan policies and implementation mechanisms such as land use regulations and building codes).

DEVELOPING A COMMUNITY VISION

Communities are increasingly using visioning to build consensus regarding their common future. Visioning is a useful and accepted step in the comprehensive planning process.

What is visioning?

Visioning is a process for defining the future that a community wants. Through public involvement, communities identify purpose, core values and vision of the future. Visioning :

- Emphasizes community assets rather then needs
- Assesses community options and opportunities on the basis of shared purposes and values
- Stresses early and continuous public involvement.

The vision serves to describe what the community should look like physically, socially and environmentally in 5, 10, 20 years and even beyond.

A visioning exercise can bring a community together as people identify shared values and purposes and articulate a shared vision. Visioning helps to create a sense of ownership in the community's future.

Who Participates?

- **Local government: elected officials, appointed officials, administrators, transportation, planners, police, others**
- **Organizations: art & culture, unions, churches, environmental, neighborhood associations, others**
- **Economic sectors: development and building industry, retail, tourism, manufacturing, services, agriculture, others**
- **Political views: conservative, liberal, moderate, pro growth, anti-growth, others**
- **Personal characteristics: age, ethnicity, income level, renters, homeowners, others**

What are the Results of Visioning?

The results of visioning will typically include:

- An overall community vision statement
- Thematic vision statements that can address all elements of the comprehensive plan such as transportation, land use, housing and natural resources
- Better communication within the community
- Context for consideration and adoption of goals, objectives and policies
- A sounding board during inventory, data and analysis stages
- Grounded discussions and decisions when devising criteria and resulting policies
- Ammunition when naysayers challenge the adoption of your community's comprehensive plan.

Setting Your Vision, Goals Objectives and Strategies

Tips:
Before you get started, read the book "Facilitating With Easel", by Ingrid Bens, M.Ed, Jossey-Bass, Inc., 2000., or some other book on how to run successful meetings. Try one to four new methods each meeting.

1 Vision Comes First

A Vision Tells us Which Way to Go

A vision is based on values and needs, not wants. Visions are very broad.

A vision is a direction most people seek

A vision is simple to under-

A vision is what we always fall back on when the going gets tough (and it will).

2 Goals

Goals Give us our bearings and compass setting

Set a goal for each meeting and stick with it

Set an overall goal of what you want to accomplish to fulfill your broad vision. This goal, or mission statement reads something like...

"State Street will double its economic, civic and retail life by 2008. Traffic will continue to flow at its present capacity"

3 Objectives

Objectives give us way points in our journey

You may want 4-8 objectives. Each one helps you accomplish your mission. Objectives are measured. An example objective:

"All methods of movement... bus, bike, walking, autos and deliveries will be balanced and addressed by 2008"

3 Strategies

Strategies Identify Steps

Each objective has 2-10 strategies. Each strategy is easily measured. An example strategy is:

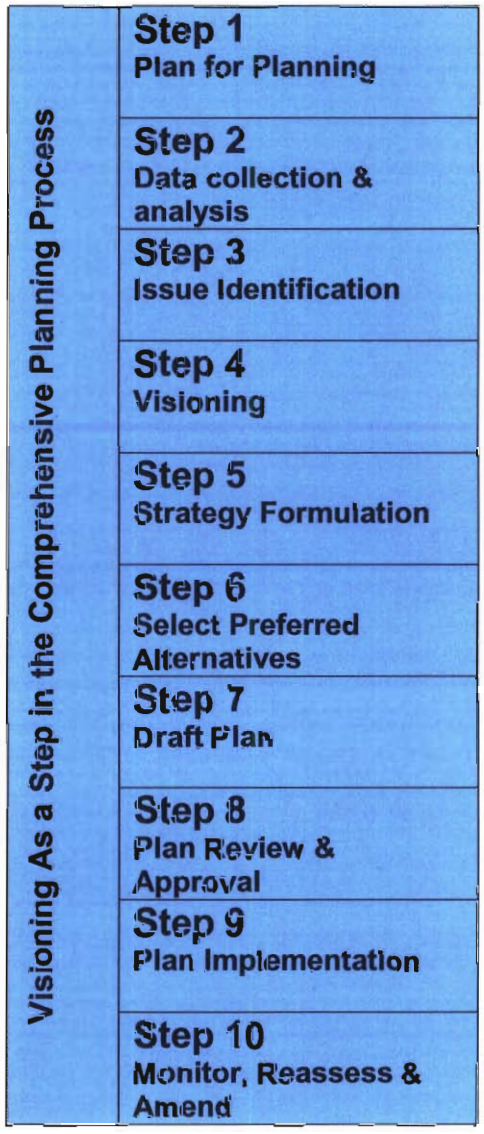
"Sidewalks will be completed on the eastern side of State and Andrews by Spring 2006. All other sidewalks will be completed by autumn 2008"

How Can Visioning Be Incorporated Into the Comprehensive Planning Process?

There are two basic approaches that can be used to bring visioning into the planning process. The community may develop a vision at the beginning of the planning process that serves as a foundation upon which to build and evaluate the rest of the process. Citizens feel they are in control and that their input is meaningful. This approach requires that planners, elected officials and others must give up control of the results and trust that citizens will develop a vision (and goals and objectives) that are appropriate for the community.

A second approach develops the vision after the issues have been identified and evaluated. In this model, elected officials and planners are maintaining a higher degree of control with the attendant risk that citizens will not trust the result and more effort will then be required to develop trust and ownership of the resulting plan.

Visioning efforts attempt to maximize the number participants. No one is excluded and everyone has an equal voice. Representation from all parts of the community is essential. In essence, visioning acts as "human glue"[20] to the planning process by involving a broad spectrum of people form the community.



[20] Anna Haines, *"Using Visioning in a Comprehensive Planning Process"*, University of Wisconsin Extension

The Transportation Charrette

The public design charrette has emerged as an alternative to the "design and present" convention. Charrettes use continual feedback loops as leverage for change. They should not be confused with extended planning meetings, visioning sessions, or design workshops that are often referred to as charrettes, but lack one or more of the key elements.

What Is A Charrette?

The word, "Charrette" means "little cart" in French, and it was used to describe the final, intense work effort expended by art and architecture students to meet project deadlines. At the Ecole des Beaux Arts in Paris during the 19th century, proctors circulated carts to collect final drawings while students frantically put finishing touches on their work.

In modern planning, "charrette" means a rigorous and inclusive process that produces the strategies and implementation documents for complex and difficult design and planning projects. It is cross disciplinary, collaborative, and values- and vision-driven.

The "charrette" is a "resource intensive process" requiring not only extensive preparation but also expert execution. Effective charrette facilitators must posses a varied set of skills, ranging from ability to finesse difficult public meetings, to managing talented, eclectic workshop or charrette design teams, to orchestrating report production.

Charrette Elements

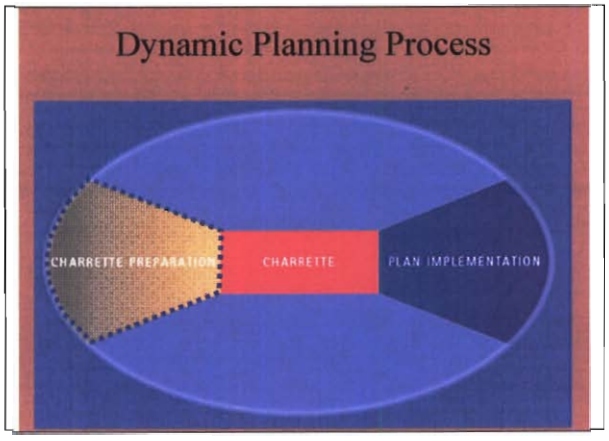
Cross disciplinary, full stakeholder involved
Strategies and implementation documents
Collaborative, collective, all-inclusive
Values, ideals and vision driven
Overcomes fear of change
Makes all stakeholders responsible for outcomes
Rigorous, highly engaging and inclusive
Develops "Informed Consent"

Transportation charrettes base their success on the following:

- Successful interviews with clients and key stakeholders before meeting with the public.
- Walking audits (known as walking workshops), where people see, sense and feel what is working and what is failing where they live.
- Assembling then presenting well focused design principles and practices to guide discussion and uncover key issues in public groups.
- Techniques for brainstorming and prioritizing community problems, issues and needs.

- Management of design tables—groups working around tables and coming up with solutions that work for the entire community,
- Design table presentations and next steps.

Supportive community change requires collaboration and a built shared stakeholder outcome. Consensus is not enough. It is essential for maximum project support to reach **"informed consent." Informed Consent** is defined as reaching a point where the great majority of people have received training, instruction and working insight to know the most important issues and tools. Once they have reached this point they are likely to grant their consent to a set of solutions that best fits the needs of everybody, with no one left out.

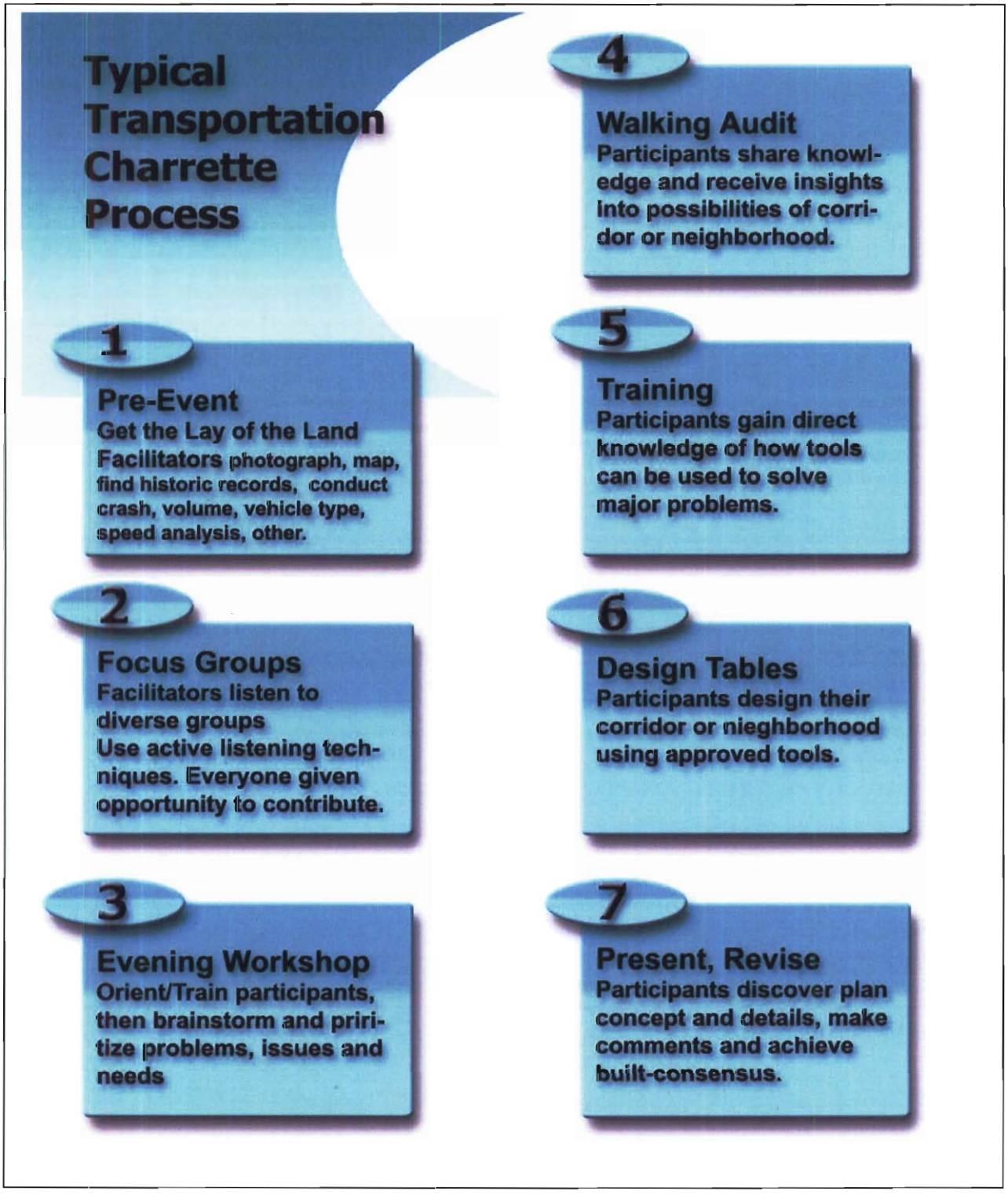


In most cases people who go through this Charrette driven informed consent building process support sets of solutions which may not be in their own personal best interest, but because they have worked through the learning process they grant their consent to the most practical and authentic set of solutions that still works for them.

Consent building process provides appropriate training and orientation, delivers a variety of activities, energizing sessions, and crystallizes concepts, confirming what leaders feel or know. The informed consent process confirms that the hard work of building better place has the requisite community involvement and sense of "ownership."

Leaders who observe or take part in this process know that when those tough times to take action come, charrette participants will return to more gently spar with and convince those who didn't participate in the design process that this is the best possible set of community building outcomes.

In this process skilled facilitators plant new and appropriate ideas, concepts and tools sensitive to context. Effective facilitators bring forth, shape and help frame discussions in purposeful and meaningful ways; making clear the shared values, interests, knowledge and passions of each and all stakeholders.


Typical Transportation Charrette Process
1
Pre-Event
Get the Lay of the Land
Facilitators photograph, map, find historic records, conduct crash, volume, vehicle type, speed analysis, other.
2
Focus Groups
Facilitators listen to diverse groups
Use active listening techniques. Everyone given opportunity to contribute.
3
Evening Workshop
Orient/Train participants, then brainstorm and priritize problems, issues and needs
4
Walking Audit
Participants share knowledge and receive insights into possibilities of corridor or neighborhood.
5
Training
Participants gain direct knowledge of how tools can be used to solve major problems.
6
Design Tables
Participants design their corridor or nieghborhood using approved tools.
7
Present, Revise
Participants discover plan concept and details, make comments and achieve built-consensus.

PROMOTING TRANSPORTATION CHOICE BY INNOVATIVE DESIGN

Future land use plans and zoning codes within many small cities only provide for rural and suburban style commercial and residential development, even within the downtown area. Future land use plans and zoning codes should be amended to include mixed-use developments which combine commercial and residential uses in one development, thus creating walkable communities which are less reliant on the automobile. A short list of land-use and building components which promote sustainable transportation options include[21]:

- Mix of commercial and residential uses within a ¼ mile of each other;
- Building heights of at least 2 stories with roadway width to building height ratios of 3:1 or less;
- Mixed-income housing units;
- Commercial Development focused around downtown or neighborhood cores;
- Daily needs (residence, office, retail, recreation, civic) within ¼ mile walking distance, and less frequent needs within 3-mile bicycle/transit range;
- Residential density of at least 7 dwelling units per acre and commercial intensity of at least 1.00 FAR (floor area ratio)
- Modest front yard setbacks with front porches and building entrances facing the street
- Buildings, lighting, and parking scaled for people rather than cars
- Car-oriented uses designed to be scaled for, and compatible with, neighborhoods

Basic Criteria for Sustainable Transportation

A sustainable transportation system should be supported by community design features that provide an adequate level of mobility and accessibility within downtowns, activity centers and traditional neighborhoods. Community design elements needed for establishing a sustainable transportation system include:

- Provision of a complementary mix of land uses, including residential, educational, recreational, and cultural uses

- Provision of an interconnected network of streets designed to encourage walking and bicycling use with traffic calming where desirable

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[21] City of Gainesville. Planning Division. *Transportation Mobility Element.* 25 Jan. 2001. 10 June 2007 http://www.cityofgainesville.org/comdev/common/docs/compplan/transmobility02.pdf .

- Provision of appropriate densities and intensities of land uses within walking distance of transit stops

- Provision of daily activities within walking distance of residences; public infrastructure that is safe, comfortable, and attractive for pedestrians; adjoining buildings open to the street; and parking facilities structured to avoid conflict with pedestrian, transit, automobile, and truck travel.

- Provision of transit service within the designated area, or a definitive commitment to the provision of transit

Complementary Mix of Land Uses

A complementary mix of land uses requires that a transportation district:

- Be of sufficient size to support various uses and transportation alternatives
- Contain a variety of land uses, including both employment and residential
- Include land uses promoting pedestrian, bicycle and transit use

Source: Dan Burden, WalkableCommunities.org

The area should contain an appropriate mix of land uses that promote balanced transportation. The Urban Land Institute defines mixed-use developments through the following standards:[22]

- Three or more significant land uses, such as retail, office, residential, hotel/motel, entertainment, cultural, recreational, that are mutually supporting;

- Physical and functional integration of project components, including connected and continuous pedestrian and bicycle facilities.

An important component in the success of a balanced transportation district is the presence of residential uses within the overall land use mix. This mix provides amenities that attract pedestrians, bicyclists and transit users. The *significant* land uses suitable for balanced transportation include office, regional retail, recreation, educational, cultural, institutional, hospital, and high/medium density residential. *Supporting* land uses include commercial uses such as hotels, theaters, restaurants, health clubs, day care, convenience retail, specialty retail, or light industrial and manufacturing. See Table X below for a list of peak and off-peak land uses that promote walking and transit usage.

[22] The Urban Land Institute ,*Mixed Use Development Handbook,* Dean Schwanke, 1987

Table 3.4 Land Uses Promoting Transit and Pedestrian Usage in Mixed-Use Areas

Land Use	Peak	Off-Peak
High Density Residential	x	x
Commercial / Office	x	
Destination Retail		x
Convenience Retail	x	x
Entertainment		x
Institutional	x	x
Day Care	x	
School	x	
Grocery Stores	x	x
Restaurants	x	x

Source: Adapted from *Planning for Transit Friendly Land Use*, *NJTransit, 1994*, and *Pedestrian and Transit Friendly Design, FDOT, 1996*

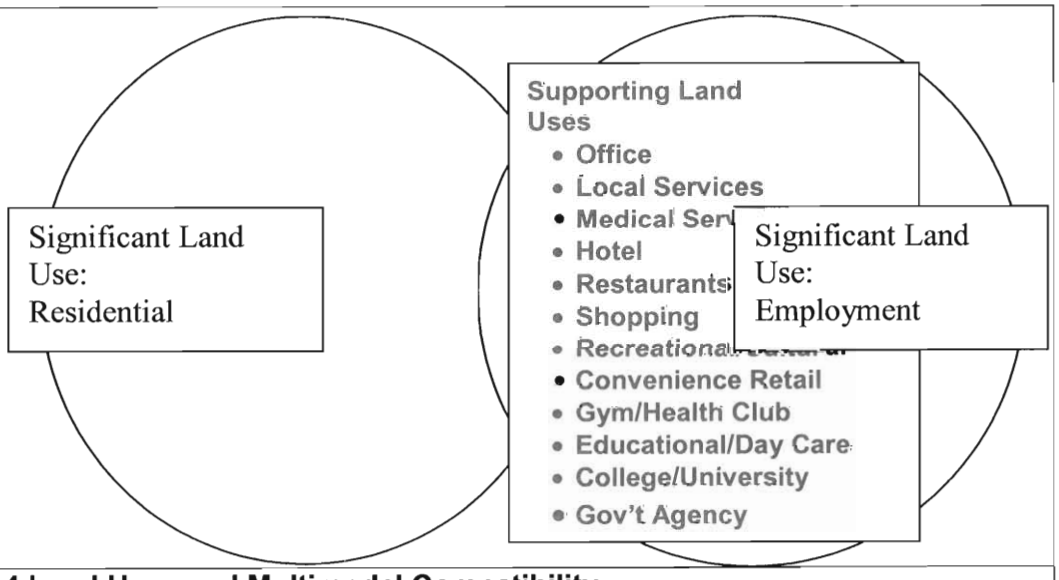


Figure 3.4 Land Uses and Multimodal Compatibility

See pg 23 Multimodal Handbook MMTDAQS Handbook

In addition to an appropriate mix of compatible land uses, the urban form, or organization and pattern of land uses should promote transit, bicycle and pedestrian travel. This design is critical in sustaining multimodal usage and achieving the full potential of the district. The activity resulting from a constant level of transit, pedestrian and bicycling activity promotes a safe, pleasurable experience for the traveler.

> "The inclusion of varied uses within an otherwise residential environment appears to be a necessary precondition for pedestrian street activity. A blend of non-residential and residential uses places trip attractions within walking distance of people's homes. People are much more likely to walk when they have some place specific and nearby to go.
>
> Other pedestrian-friendly qualities ascribed to mixed-use development include: architectural variety and visual interest; street security; and a greater sense of community when residents have places outside home and work to casually interact.
>
> Two kinds of accessibility between land uses are important. Proximity of activities to one's place of residence – so called residential accessibility affects the length, mode and the frequency of home-based trips. A second type of accessibility is destination accessibility – the proximity of activities to one another. Destination accessibility affects the travelers' ability to link trips efficiently into tours or, better still, complete more than one activity at a single stop. In either case, activity centers should be placed no more than ¼ mile from housing if walking is to be a serious mode of travel. "
>
> *-Pedestrian and Transit Friendly Design, FDOT, 1996*

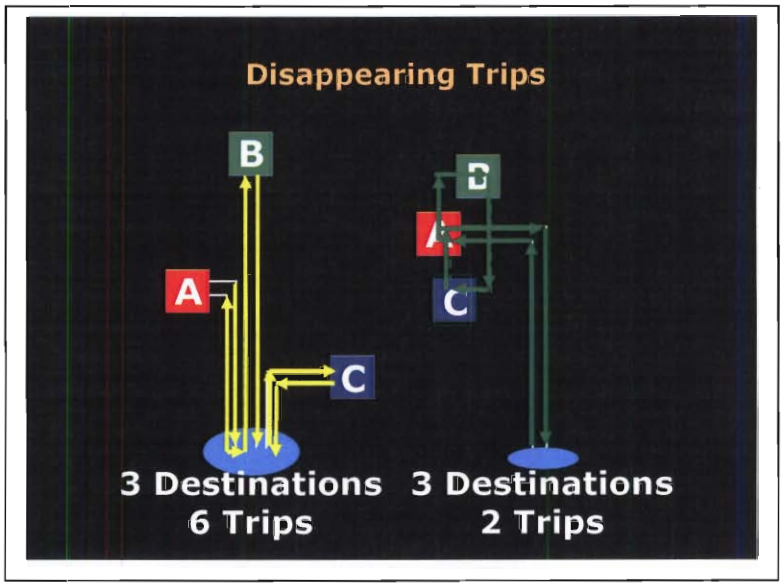


Table 3.4 summarizes the land uses that promote pedestrian and transit usage by time of day. Off-peak usage is important in promoting the needed level of activity to create a safe and vital pedestrian environment.

A complementary mix of land uses is critical to encouraging and sustaining pedestrian, bike and transit use. In conjunction with this mix of land uses, modal choices must provide convenient and efficient transportation service, allowing the user to remain within a comfort zone of activity, travel time, perception of safety, and pleasantness of the trip.

The land uses necessary for multimodal interaction are employment and residential. The residential and employment need to be supported by other land uses which are contributing factors to multimodal interaction. Figure 3.4 illustrates the necessary and supporting land uses that are compatible with and support multimodal usage in a district. As shown in the diagram, the supporting uses can also function as employment centers.

Table 3.5 Recommended Maximum Separations of Land Uses Based on Trip

Trip Purpose	Maximum Trip Length Walking Mode	Maximum Trip Length Walking Mode
Home-based Shopping	0.25 -.05 miles	5-10 minutes
Home-based Social / Recreational	0.5 – 1.0 miles	10 – 20 minutes
Home Based work	1.0 – 1.25 miles	20 -25 minutes

Adapted from *Pedestrian and Transit Friendly Design, FDOT, 1996.*

The maximum walk trip lengths for home-based work and social/recreational purposes are more flexible than those shown for shopping. These trip lengths are applicable to the typical urban area and are not indicative of special areas, such as high tourist areas, which may demonstrate acceptance of much longer trips. This information is useful in providing guidance for designing new developments that are potential multimodal districts, as well as for assessing the potential success of districts located in existing developments.

Appropriate Density and Intensity of Land Uses

The appropriate density, intensity and organization of land uses are as important as the mix of land uses in maximizing the multimodal potential of any area. The proper coordination of these land use elements with the modes of transportation ensures the success of balanced transportation districts. Land uses within a district should be appropriately distributed to help define viable activity centers and community cores and to support bicycle, pedestrian and transit use.

Land use density is a critical element of a balanced transportation district. The densities necessary for sustaining a balanced transportation should provide the opportunity for vital and active pedestrian and bicycle usage at a minimum and be sufficient to support bus transit along major corridors where bus transit is available. The desirable levels of residential densities and commercial intensities for an area to support the designation as a balanced transportation district are summarized in Table 3.6. In determining these densities, areas that are not available for development, such as parks and open space, should be excluded from the analysis. The assessment should also recognize and define future development possibilities that could increase the area's multimodal potential.

Table 3.6. Desirable Densities and Intensities for Balanced Transportation Districts

Residential Land Use (units per acre)	**Commercial Land Use** (employees per acre)	**Multimodal Potential and Transportation Compatibility**
1-3	**1-39**	Poor
4-6	**40-59**	Marginal multimodal potential, but possibilities for success exist.
7-14	**60-99**	Good multimodal potential. Densities support bus transit service
15+	**100+**	High multimodal potential. Densities support light-rail and other high capacity transit service

Source: Planning for Transit Friendly Land Use, NJ Transit, 1994

Organization of Land Uses Promoting a Central Core

Providing a central core of community services is a characteristic of the major land use typically needed for balanced transportation districts. A strong central core within a community or urban center is the ideal land use organization for providing the vitality and sustainability of land uses and pedestrian activity necessary for a multimodal use. Figure 3.5 provides an illustration of the principles of transportation and land use location around the central core.

Figure 3.5 Organization of Land Uses That Promote a Central Core **(See pg 26 Multimodal Handbook)**

The intensity of land uses should provide denser development within the primary service area for this central core, which should include transit service. The primary service area bound by a radius of ¼ mile should include a mixture of land uses including commercial, residential and retail.

Between ¼ and ½ mile, which is considered the practical limit for walking access, densities may decline but mixed use including residential, retail and community facilities

is encouraged. Beyond the ½ mile walking boundary, lower densities are permitted. This pattern of land use intensity promotes a logical organization and a compatible mix of land uses that promotes a balanced transportation system.

While this land use organizational structure is ideal, there are other development patterns that can support a balanced transportation system. This pattern is evidenced in the Gainesville Case Study, which had a land use organizational structure that was not concentric. The key element is a density of development providing primary services, whether the activity core is located centrally, or in some other organizational form.

Organization of Land Uses Along Corridors

Along the major corridors, land uses should be distributed so that the densities and intensities promote transit usage. Higher density land uses, such as commercial offices, multifamily residential, and institutions should be located within walking distances to activity centers along the major route. These activity centers are best located at key crossings of perpendicular routes, which are generally minor arterials or collectors, or transit service routes. The densities along the perpendicular facilities to the major route should decrease as distance from the major route increases. This strategy will enhance access and promote transit usage. These concepts are illustrated in Figure 4.

Figure 3.7 Recommended Intensities of Land Uses Along Corridors: Major Arterial Boundary See Multi Modal Hand Book pg 28

Figure 3.6. Recommended Intensities of Land Uses Along Corridors See Multi modal Handbook pg 27

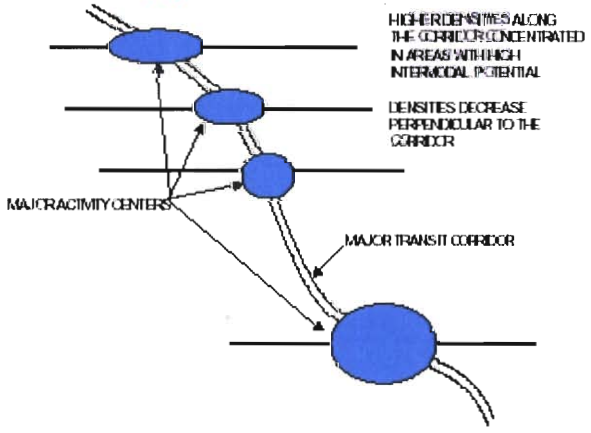


Figure 3.7 Recommended Intensities of Land Uses Along Corridors: Major Arterial Boundary See Multi Modal Hand Book pg 28

Network Connectivity

An interconnected network designed to meet the needs of the transportation user, and to encourage and facilitate walking, bicycling and transit usage, is essential for a balanced transportation system. This transportation network must provide a convenient, connected transportation system, connectivity between modes and to regional intermodal facilities, as well as minimum desirable levels of service for bicyclists, pedestrians and transit riders.

Network connectivity requires::

- Adequate levels of service for bicyclists, pedestrians and transit
- Appropriate numbers of connections within the street network
- Connected pedestrian, bicycle and transit network
- Convenient modal connections
- Convenient connections to regional transportation

Design

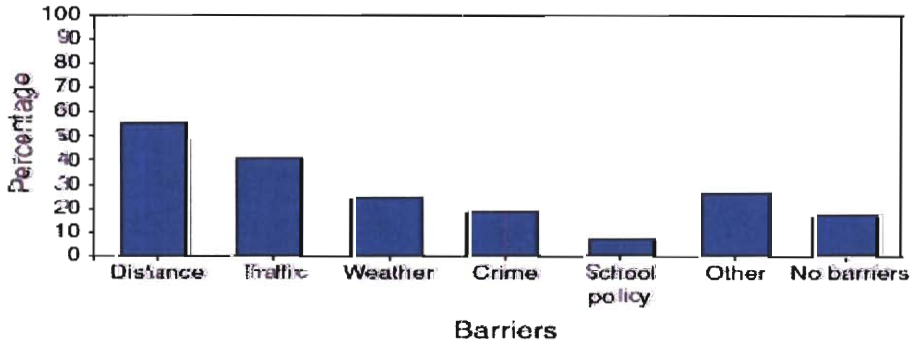
The design and development of a multimodal transportation district should incorporate those elements both providing for, and encouraging the use of, alternative transportation modes. Almost every trip begins and ends with walking, regardless of the transportation mode chosen for the trip. The design of the area should provide a pleasant environment conducive to the continuation of a trip utilizing some form of transportation other than the automobile. Design features that promote transit/pedestrian/bicycle activity include adequate pedestrian/bicycle connections with transit stations and stops, which facilitate, encourage and support transit use.

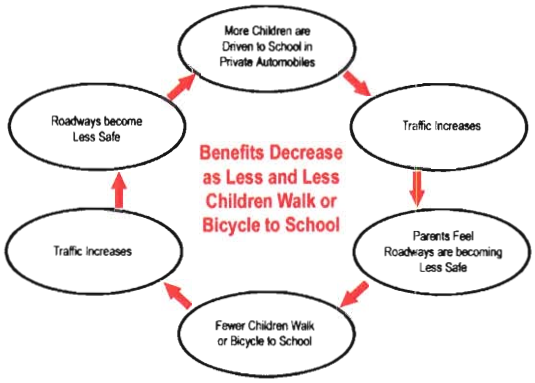
While adequate parking is needed, care must be taken not to provide an excess of parking. An abundance of convenient and cheap parking encourages, rather than discourages, the use of the private automobile instead of other transportation modes. It is also important that urban design and aesthetics be considered in the provision of parking. A "sea of asphalt" parking lot is not conducive to a pleasant walking environment, nor does it visually enhance the streetscape. The ideal location for adequate parking is on the edge or outside of an activity center. Another important feature contributing to the quality of the pedestrian environment is block length. Shorter blocks provide more stopping points for automobiles, allowing for easier pedestrian crossings. The shorter block design also allows for numerous route options, providing more overall connectivity. Consideration should also be given to the provision of truck access to businesses for freight deliveries.

Consideration of Schools

Schools can play a key role in developing a balanced transportation system. Daycare/Preschool facilities and K-12 schools are land uses with high potentialf for pedestrian, bicycle and transit modes. Because of the special safety needs associated with younger walkers, bicyclists and bus riders, the planning and design of facilities should receive special attention. With recent concern about childhood obesity, the creation of communities in which children can walk to school is even more important. Figure 3-X shows the barriers to children walking and bicycling to school. The two most frequently reported barriers are distance and traffic. Both of these factors can become less important through careful coordination of land use and transportation. The distance children walk to school can be reduced by locating residences close to schools. The negative cycle that produces lots of traffic

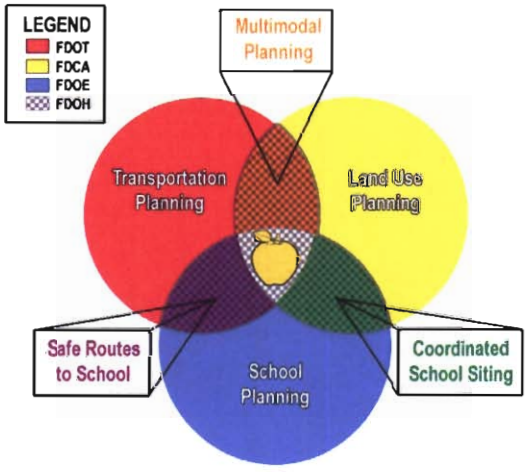
Figure 3: Barriers to children walking and biking to school
Source: United States Health Style Survey, 1999





near schools is show in the figure shown here. The more children are driven to school, the less safe it is for children to walk because of too much traffic. The high level fo traffic near schools can be reduce through careful coordination of residences and schools and programs to encourage children to walk to school On such program is the *Safe Routes to School Program.* The FDOT is required by federal legislation to administer this program. This program could provide special funding for transportation and safety improvements for students in and around schools. Improvements can include sidewalks, paths, and bicycle/pedestrian/transit connections, as well as appropriate traffic safety projects that help in difficult street crossings and improvements in drop off areas to reduce conflicts. The *Safe Routes to School Program* is augmented by local *SafeRoutes to School Programs* that are implemented locally through specific schools or school districts. For additional information, on the *Safe Routes to School* program, visit their website at: http://www.dot.state.fl.us/safety/SRTS_files/SRTS.htm and http://www.saferoutestoschools.org/resources.html.

One other aspect of school siting for small communities to consider is the connection between land use, transportation and school planning. As shown on this diagram, coordination of transportation, land planning, education, and health agencies is necessary to achieve the goal of children walking and bicycling to school. Local governments are required under school concurrency to coordinate with the county school district. Other opportunities exist to coordinate school program with the county health department to ensure that children can walk to school where distances are not a factor.



Generally, the parents are required to provide transportation for their children if they live within two miles of the school; children who live over two miles from the school are bused to school. The greater the number of children walking and bicycling to school, the

less traffic that other children will encounter near the school and the greater the safety for all children.

Special consideration of pedestrian and bicycle LOS in the school zone is recommended for activity centers with a LOS B or better for pedestrian and bicycle modes along major access routes to schools.

All approved MPO Long Range Transportation Plans (LRTP) must include provisions for safe school access, and include development of sidewalk inventory and list of projects coordinated with school board recommendations. Also in the LRTP, travel mode for school trips will target a mode share of less than 30% motor vehicle.

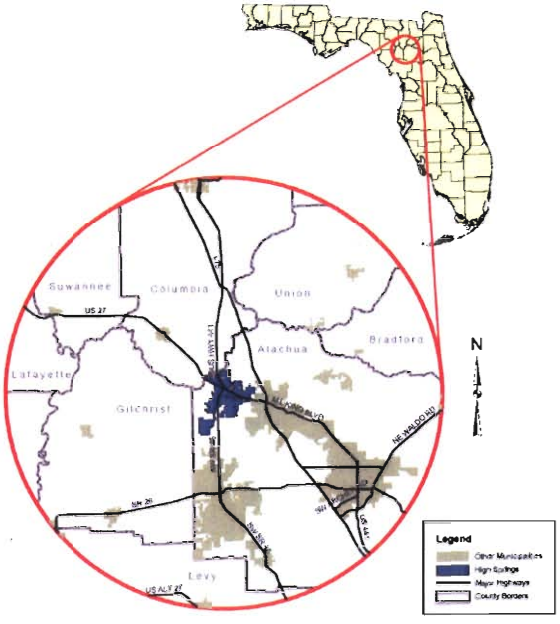
Speed limits for school routes should be reduced to 25mph, and 15 mph in school zones. High emphasis crosswalks for pedestrian crossings should be encouraged with raised speed tables, overhead signs, and flashing lights. Within school zones, an emphasis should be placed on crosswalks and other forms of traffic calming.

The school siting process should include better coordination in the preliminary stages of site planning. Schools should be encouraged to incorporate a strategy to incorporate safe walking and bicycling to school and traffic safety education into every school improvement plan.

LINKING TRANSPORTATION DEMAND WITH THE COMPREHENSIVE PLAN

Planning with the Regional Transportation System in Mind

Transportation planning begins with an understanding of the transportation system that serves the region. Each community is connected to the region by this system and is highly influenced by its design and where the community is situated within this larger transportation infrastructure.



Transportation planning at the local level is also significantly affected by regional travel patterns. Residents often rely upon this system to reach their place of employment, obtain retail goods and a variety of other activities that require travel outside the community. Travel generated by other communities use these regional facilities as well adding to the travel demands that each individual community must address. In this section, the role of the local government in this overall system is explored. As has already been described in Chapter 1, the state, regional agencies make decisions that affect the transportation planning at the local level. The role of each of these agencies is summarized below.

State, Regional and County Agencies

Local municipal governments, especially small ones, are often impacted significantly by the transportation policies of state, regional and county agencies. An understanding of the plans, policies and programs is an essential starting point for the development of a balanced transportation system.

The Florida Department of Transportation (FDOT) operates under the authority of Chapter 334-339, FS, and Chapter 341, FS. FDOT and is responsible for coordinating the planning of all modes of transportation on land, sea, and air, and for constructing and maintaining the state highway system. For operational purposes, the FDOT is organized into seven districts.

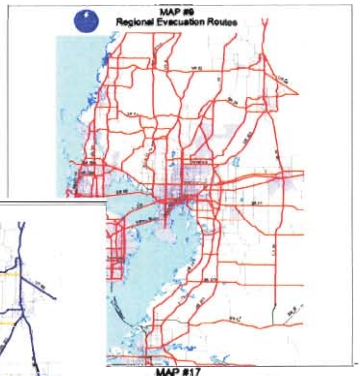
The primary documents of importance to transportation planning at the local level include:

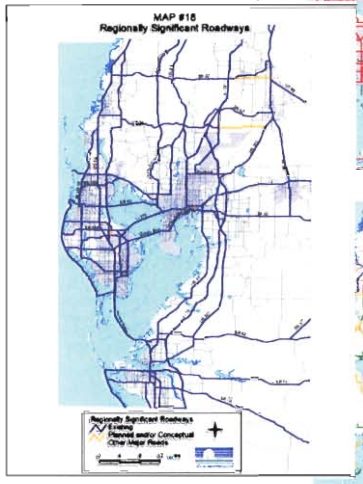
- **2025 Florida Transportation Plan**
  http://www.dot.state.fl.us/planning/2025ftp/default.htm

- **The Strategic Intermodal System (SIS)**
  http://www.dot.state.fl.us/planning/sis/default.htm

- The Florida Intrastate Highway System
  http://www.dot.state.fl.us/planning/systems/fihs/default.htm

Regional Planning Councils (RPC) engage in strategic regional planning, mediates conflicts between local governments, review and comment on some development orders issued by local governments. The Strategic Regional Plan maintained by each RPC contains a transportation element.



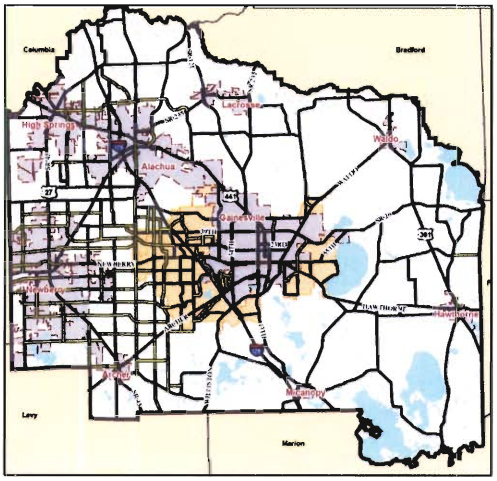


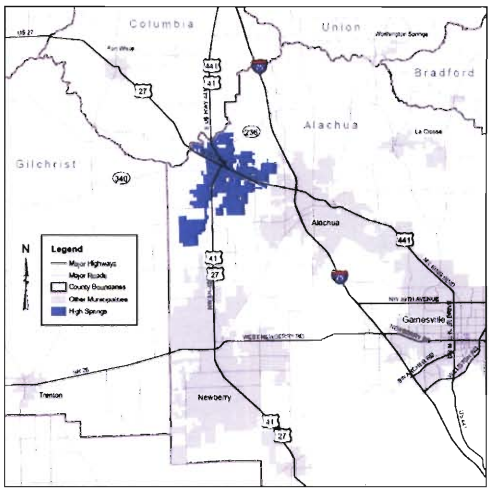
RPCs may also participate in a Transportation Regional Incentive Program (TRIP). Such programs involve regionally significant roadways and projects that originate from partnerships in designated regional transportation areas

Metropolitan Planning Organizations (MPOs). Urban cities and counties in Florida join together under interlocal agreements to coordinate transportation planning and investment. In those areas of the state where they exist[23], MPOs are typically responsible for the development of Long Range Transportation Plans (LRTPs) and capital improvement plans.

County Transportation Systems. County road systems, especially for small cities in rural or suburban areas, often comprise a significant component to the roadway network serving the community. Consequently, county roads will often be included within the transportation inventory developed for transportation planning and may well comprise a substantial proportion of the roadway capacity serving a community.

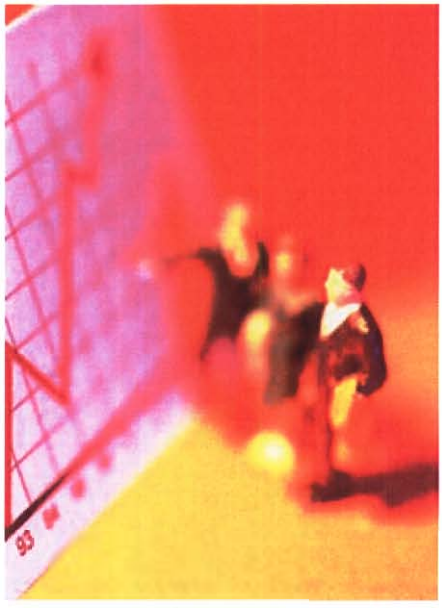
[23] http://www.mpoac.org/documents/mpo_areas_map.pdf





Projecting Travel Demand

An estimate of travel demand and a projection of the travel demand associated with the community's growth and development pattern provides the analytical foundation for the transportation plan.



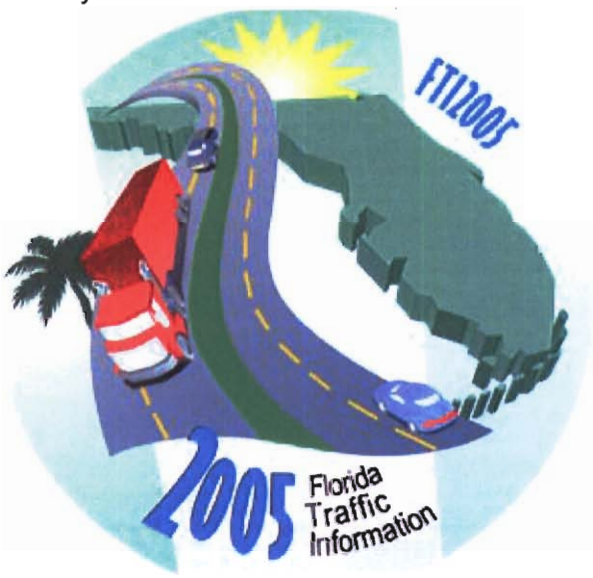
Travel demand projections involve two components:

- Estimate and projection of travel demand on regional roadways within the community but generated outside of the community (external travel); and

- Estimates and projections of travel demand with origins, destinations or both within the boundaries of the community (Internal trips).

External travel demand is generally beyond the control of local government but its impact on traffic conditions and city's capacity to accommodate travel may be substantially affected. Many small cities in Florida have historically existed because of their location on a state highway. As traffic demand increases on these state facilities, their capacity to serve the travel demands of the state highway and function as well as "main street" may be severely compromised. Not only may the volume of traffic become an issue but the type and speed of the through traffic may be incompatible.

The FDOT provides data and tools to assist local governments in estimating and projecting the travel demand on major roadways.



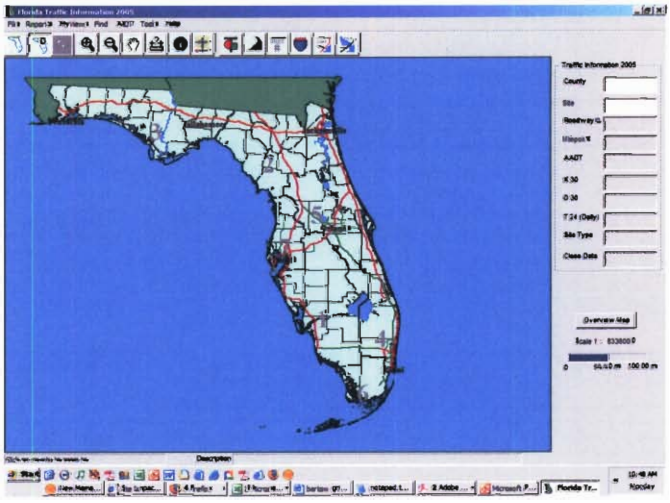
The following steps are recommended:

- Identify major roads and key segments;
- Obtain historical volumes (at least the last five years) from FDOT (available on website) and other sources such as MPOS or county government;
- Perform a traffic trend analysis that projects traffic volume for at least 20 years

In developing the projections, be sure to account for major transportation changes and major development changes that alter capacity or attract new trips.

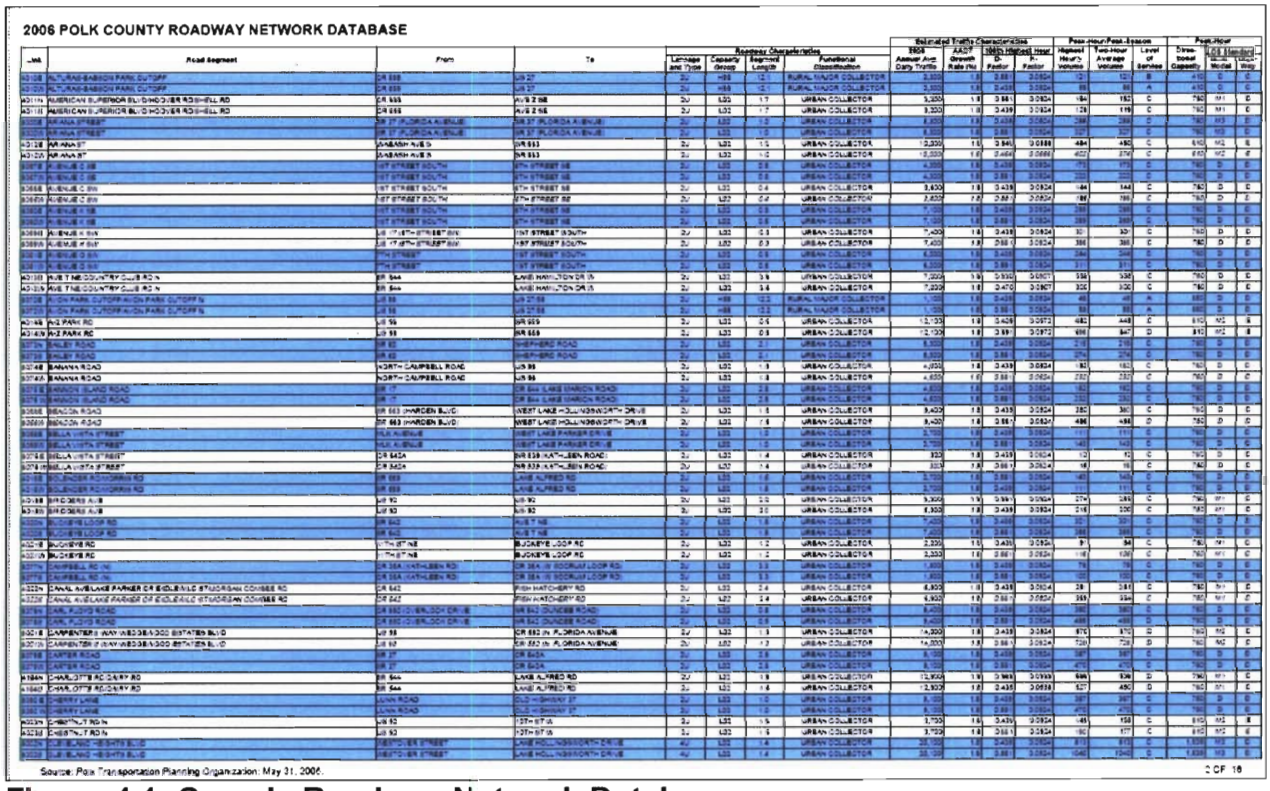
It is recommended that traffic projections include three types of trend:

- Linear growth
- Geometric growth
- Declining growth



Inventorying the Transportation System

The State, Metropolitan Planning Organization, and possibly the local County government, should have an inventory of the transportation system that may be useful. Transportation geographic data that should be collected includes roadway, railway, transit, and airport data. Most roadway files from the Florida Geographic Data Library (FGDL)[24] contain information on the roadway classification, the number of lanes, whether the road is divided or undivided, the segment length, and traffic data such as AADT, k and d factors, and level of service, if available. A sample data table is shown in Figure 4.1.



2006 POLK COUNTY ROADWAY NETWORK DATABASE

Link	Road Segment	From	To	Roadway Characteristics: Lanes and Type	Roadway Characteristics: Capacity Group	Roadway Characteristics: Segment Length	Roadway Characteristics: Functional Classification	Estimated Traffic Characteristics: 2005 Annual Ave Daily Traffic	Estimated Traffic Characteristics: AADT Growth Rate (%)	Estimated Traffic Characteristics: 100th Highest Hour D Factor	Estimated Traffic Characteristics: 100th Highest Hour K Factor	Peak-Hour/Peak-Direction: Highest Hour's Volume	Peak-Hour/Peak-Direction: Two-Hour Average Volume	Peak-Hour/Peak-Direction: Level of Service	Peak-Hour: Directional Capacity	Peak-Hour: LOS Standard - Median	Peak-Hour: LOS Standard - Width
A0108	ALTURAS-BABSON PARK CUTOFF	CR 555	US 27	2U	H88	12.1	RURAL MAJOR COLLECTOR	3,300	1.0	0.09	0.092+	92	157	B	410	C	C
A0109	ALTURAS-BABSON PARK CUTOFF	CR 555	US 27	2U	H88	12.1	RURAL MAJOR COLLECTOR	3,300	1.0	0.09	0.092+	88	88	A	410	C	C
A0111	AMERICAN SUPERIOR BLVD/HOOVER RD/BELL RD	CR 555	AVE 2 NE	2U	L02	1.7	URBAN COLLECTOR	3,200	1.0	0.09	0.092+	184	192	C	760	M1	D
A0111	AMERICAN SUPERIOR BLVD/HOOVER RD/BELL RD	CR 555	AVE 2 NE	2U	L02	1.7	URBAN COLLECTOR	3,200	1.0	0.09	0.092+	128	119	C	760	M1	D
A0118	ARANA STREET	CR 37 (FLORIDA AVENUE)	CR 37 (FLORIDA AVENUE)	2U	L02	1.0	URBAN COLLECTOR	2,300	1.0	0.09	0.092+	208	208	D	760	M3	E
A0118	ARANA STREET	CR 37 (FLORIDA AVENUE)	CR 37 (FLORIDA AVENUE)	2U	L02	1.0	URBAN COLLECTOR	2,300	1.0	0.09	0.092+	107	107	C	760	M3	E
A0120	ARANA ST	SABASH AVE S	SR 653	2U	L02	1.5	URBAN COLLECTOR	12,200	1.0	0.94	0.098	484	460	C	840	M2	E
A0120	ARANA ST	SABASH AVE S	SR 653	2U	L02	1.5	URBAN COLLECTOR	12,200	1.0	0.094	0.098	422	374	C	840	M2	E
A0158	AVENUE C NE	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.8	URBAN COLLECTOR	4,200	1.0	0.09	0.092+	172	172	C	760	D	E
A0159	AVENUE C NE	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.8	URBAN COLLECTOR	4,200	1.0	0.09	0.092+	220	220	C	760	D	E
A0658	AVENUE C SW	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.4	URBAN COLLECTOR	3,400	1.0	0.09	0.092+	144	144	C	760	D	E
A0659	AVENUE C SW	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.4	URBAN COLLECTOR	3,400	1.0	0.09	0.092+	180	180	C	760	D	E
A0658	AVENUE K NE	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.8	URBAN COLLECTOR	7,100	1.0	0.09	0.092+	288	288	C	760	D	E
A0659	AVENUE K NE	1ST STREET SOUTH	5TH STREET NE	2U	L02	0.8	URBAN COLLECTOR	7,100	1.0	0.09	0.092+	301	301	C	760	D	E
A0660	AVENUE K SW	US 17/ST STREET SW	1ST STREET SOUTH	2U	L02	0.8	URBAN COLLECTOR	7,400	1.0	0.09	0.092+	301	301	C	760	D	E
A0660	AVENUE K SW	US 17/ST STREET SW	1ST STREET SOUTH	2U	L02	0.8	URBAN COLLECTOR	7,400	1.0	0.09	0.092+	308	308	C	760	D	E
A0658	AVENUE O NW	7TH STREET	1ST STREET SOUTH	2U	L02	0.8	URBAN COLLECTOR	6,200	1.0	0.09	0.092+	244	244	C	760	D	E
A0659	AVENUE O NW	7TH STREET	1ST STREET SOUTH	2U	L02	0.8	URBAN COLLECTOR	6,200	1.0	0.09	0.092+	31	31	C	760	D	E
A0160	AVE T/HEDGOUNTRY CLUB RD N	SR 544	LAKE HAMILTON DR N	2U	L02	3.6	URBAN COLLECTOR	7,200	1.0	0.093	0.097	336	336	C	760	D	E
A0160	AVE T/HEDGOUNTRY CLUB RD N	SR 544	LAKE HAMILTON DR N	2U	L02	3.6	URBAN COLLECTOR	7,200	1.0	0.09	0.097	300	300	C	760	D	E
A0125	ALON PARK CUTOFF/ALON PARK CUTOFF N	US 98	US 27 SB	2U	H88	12.2	RURAL MAJOR COLLECTOR	1,100	1.0	0.09	0.092+	48	48	A	880	C	D
A0125	ALON PARK CUTOFF/ALON PARK CUTOFF N	US 98	US 27 SB	2U	H88	12.2	RURAL MAJOR COLLECTOR	1,100	1.0	0.09	0.092+	88	88	A	880	C	D
A0148	AV 2 PARK RD	US 98	SR 659	2U	L02	0.5	URBAN COLLECTOR	12,100	1.0	0.09	0.097	482	448	C	840	M2	E
A0148	AV 2 PARK RD	US 98	SR 659	2U	L02	0.5	URBAN COLLECTOR	12,100	1.0	0.09	0.097	498	847	D	840	M2	E
02126	BAILEY ROAD	US 92	SHEPHERD ROAD	2U	L02	2.1	URBAN COLLECTOR	8,100	1.0	0.09	0.092+	216	216	C	760	D	E
02126	BAILEY ROAD	SR 60	SHEPHERD ROAD	2U	L02	2.1	URBAN COLLECTOR	8,100	1.0	0.09	0.092+	274	274	C	760	D	E
02148	BANANA ROAD	NORTH CAMPBELL ROAD	US 98	2U	L02	1.5	URBAN COLLECTOR	4,200	1.0	0.09	0.092+	160	160	C	760	D	E
02148	BANANA ROAD	NORTH CAMPBELL ROAD	US 98	2U	L02	1.5	URBAN COLLECTOR	4,600	1.0	0.09	0.092+	232	232	C	760	D	E
02516	BANNON ISLAND ROAD	SR 17	CR 544 LAKE MARION ROAD	2U	L02	2.5	URBAN COLLECTOR	4,800	1.0	0.09	0.092+	182	182	C	760	D	E
02516	BANNON ISLAND ROAD	SR 17	CR 544 LAKE MARION ROAD	2U	L02	2.5	URBAN COLLECTOR	4,800	1.0	0.09	0.092+	252	252	C	760	D	E
02656	BEACON ROAD	SR 563 (HARDEN BLVD)	WEST LAKE HOLLINGSWORTH DRIVE	2U	L02	1.6	URBAN COLLECTOR	3,400	1.0	0.09	0.092+	280	360	C	760	D	E
02656	BEACON ROAD	SR 563 (HARDEN BLVD)	WEST LAKE HOLLINGSWORTH DRIVE	2U	L02	1.6	URBAN COLLECTOR	3,400	1.0	0.09	0.092+	496	496	D	760	D	E
02656	BELLA VISTA STREET	OLA AVENUE	WEST LAKE PARKER DRIVE	2U	L02	1.0	URBAN COLLECTOR	2,700	1.0	0.09	0.092+	111	111	C	760	D	E
02656	BELLA VISTA STREET	OLA AVENUE	WEST LAKE PARKER DRIVE	2U	L02	1.0	URBAN COLLECTOR	2,700	1.0	0.09	0.092+	142	142	C	760	D	E
02748	BELLA VISTA STREET	SR 542A	SR 539 (KATHLEEN ROAD)	2U	L02	1.4	URBAN COLLECTOR	800	1.0	0.09	0.092+	101	101	C	760	D	E
02748	BELLA VISTA STREET	SR 542A	SR 539 (KATHLEEN ROAD)	2U	L02	1.4	URBAN COLLECTOR	800	1.0	0.09	0.092+	18	18	C	760	D	E
02168	BOLENDER ROAD/BRIS RD	SR 655	LAKE ALFRED RD	2U	L02	1.8	URBAN COLLECTOR	3,100	1.0	0.09	0.092+	140	140	C	760	D	E
02169	BOLENDER ROAD/BRIS RD	SR 655	LAKE ALFRED RD	2U	L02	1.8	URBAN COLLECTOR	3,100	1.0	0.09	0.092+	111	111	C	760	D	E
A0138	BRIDGES AVE	US 92	US 92	2U	L02	2.0	URBAN COLLECTOR	9,300	1.0	0.09	0.092+	274	282	C	760	M1	E
A0139	BRIDGES AVE	US 92	US 92	2U	L02	2.0	URBAN COLLECTOR	8,900	1.0	0.09	0.092+	218	206	C	760	M1	E
02886	BRIDGES LOOP RD	SR 542	AVE T NE	2U	L02	1.5	URBAN COLLECTOR	7,400	1.0	0.09	0.092+	321	321	D	760	D	E
02887	BRIDGES LOOP RD	SR 542	AVE T NE	2U	L02	1.5	URBAN COLLECTOR	7,400	1.0	0.09	0.092+	388	388	D	760	D	E
A0218	BUCKEYE RD	17TH ST NE	BUCKEYE LOOP RD	2U	L02	1.2	URBAN COLLECTOR	2,300	1.0	0.09	0.092+	91	84	C	760	M1	D
A0219	BUCKEYE RD	17TH ST NE	BUCKEYE LOOP RD	2U	L02	1.2	URBAN COLLECTOR	3,200	1.0	0.09	0.092+	116	120	C	760	M1	D
02774	CAMPBELL RD (N)	CR 35A (N KISSIMMEE)	CR 35A (N KISSIMMEE-OKEECHOBEE RD)	2U	L02	3.3	URBAN COLLECTOR	1,800	1.0	0.09	0.092+	79	79	C	760	D	E
02774	CAMPBELL RD (N)	CR 35A (N KISSIMMEE)	CR 35A (N KISSIMMEE-OKEECHOBEE RD)	2U	L02	3.3	URBAN COLLECTOR	1,800	1.0	0.09	0.092+	100	100	C	760	D	E
A0224	CANAL AVE/LAKE PARKER DR EIDELWILD STUDORIAN CONWEE RD	CR 542	FISH HATCHERY RD	2U	L02	2.4	URBAN COLLECTOR	6,900	1.0	0.09	0.092+	28	381	C	760	M1	E
A0224	CANAL AVE/LAKE PARKER DR EIDELWILD STUDORIAN CONWEE RD	CR 542	FISH HATCHERY RD	2U	L02	2.4	URBAN COLLECTOR	6,900	1.0	0.09	0.092+	359	334	C	760	M1	E
02185	CARL RUDD ROAD	CR 580 (DUNDEE ROAD)	CR 542 (DUNDEE ROAD)	2U	L02	2.6	URBAN COLLECTOR	5,400	1.0	0.09	0.092+	360	360	C	760	D	E
02185	CARL RUDD ROAD	CR 580 (DUNDEE ROAD)	CR 542 (DUNDEE ROAD)	2U	L02	2.6	URBAN COLLECTOR	5,400	1.0	0.09	0.092+	480	480	D	760	D	E
A0218	CARPENTERS WAY/WEBB/SCOTTS BLVD	US 98	CR 580 (N FLORIDA AVENUE)	2U	L02	1.5	URBAN COLLECTOR	14,200	1.0	0.09	0.092+	870	870	D	760	M2	E
A0218	CARPENTERS WAY/WEBB/SCOTTS BLVD	US 98	CR 580 (N FLORIDA AVENUE)	2U	L02	1.5	URBAN COLLECTOR	14,200	1.0	0.09	0.092+	726	726	D	760	M2	E
02768	CARTER ROAD	SR 37	CR 542A	2U	L02	2.8	URBAN COLLECTOR	5,100	1.0	0.09	0.092+	387	387	D	760	D	E
02769	CARTER ROAD	SR 37	CR 542A	2U	L02	2.8	URBAN COLLECTOR	5,100	1.0	0.09	0.092+	476	476	D	760	D	E
A1844	CHARLOTTE RD/DAIRY RD	SR 544	LAKE ALFRED RD	2U	L02	1.9	URBAN COLLECTOR	12,900	1.0	0.093	0.0993	696	936	D	760	M1	E
A1845	CHARLOTTE RD/DAIRY RD	SR 544	LAKE ALFRED RD	2U	L02	1.9	URBAN COLLECTOR	12,900	1.0	0.09	0.0938	527	480	D	760	M1	E
02816	CHERRY LANE	LINN ROAD	OLD HIGHWAY 37	2U	L02	1.0	URBAN COLLECTOR	5,100	1.0	0.09	0.092+	387	387	D	760	D	E
02817	CHERRY LANE	LINN ROAD	OLD HIGHWAY 37	2U	L02	1.0	URBAN COLLECTOR	5,100	1.0	0.09	0.092+	476	476	D	760	D	E
A0234	CHRISTIAN RD N	US 92	12TH ST W	2U	L02	1.5	URBAN COLLECTOR	3,700	1.0	0.09	0.092+	148	158	C	840	M2	E
A0234	CHRISTIAN RD N	US 92	12TH ST W	2U	L02	1.5	URBAN COLLECTOR	3,700	1.0	0.09	0.092+	180	177	C	840	M2	E
02824	CLUBLAND HEIGHTS BLVD	WESTSIDE STREET	LAKE HOLLINGSWORTH DRIVE	4U	L02	1.4	URBAN COLLECTOR	28,100	1.0	0.09	0.092+	870	870	C	1,830	M3	E
02825	CLUBLAND HEIGHTS BLVD	WESTSIDE STREET	LAKE HOLLINGSWORTH DRIVE	4U	L02	1.4	URBAN COLLECTOR	28,100	1.0	0.09	0.092+	1040	1040	D	1,830	M3	E

Source: Polk Transportation Planning Organization: May 31, 2006.

2 OF 18

Figure 4.1: Sample Roadway Network Database

[24] See http://www.fgdl.org/ for information on the data available in the Florida Geographic Data Library.

Understanding Traffic Engineering

The Planning Analysis Hour Factor, or K Factor, is the ratio of the traffic volume in the study hour to the annual average daily traffic (AADT). There are numerous potential study hours and K factors depending upon the applications. Frequently used K factors include the 30th highest volume hour of the year (K30), 100th highest volume hour of the year (K100), highest hourly volume to daily volume (Kp/d), 5-6 p.m. weekday volume to AADT (K5-6pm), average p.m. weekday peak volume to AADT (Kpm), average a.m. peak weekday volume to AADT (Kam), and noon weekday volume to AADT (Knoon). In general, K factors are used for peak hour traffic analyses, but analyses can also be based on low volume conditions, such as the analysis of truck travel in early morning hours. Roadway, traffic and control conditions vary considerably during the day, potentially affecting capacity values and service volume thresholds. A few of the most commonly used K factors are briefly discussed below.

The PHF or Peak Hour Factor is the hourly volume divided by the peak 15-minute rate of flow within the peak hour.

PHF = hourly volume ÷ (4 * peak 15-minute volume)

Assessing Connectivity

Street connectivity can be defined as the quantity and quality of connection in the street network. The purpose of the street network is to connect origins with destinations. The design of this network determines how direct or indirect the connections are, while also determining the number of options at one's disposal in getting from one place to another. Traditional neighborhood design typically consists of a rectilinear grid system which provides relatively direct connections and multiple routes, and thus has high connectivity. On the other hand, post World War II, suburban subdivision developments typically consist of curvilinear street networks dominated by cul-de-sacs and often provide relatively few connections and indirect routes and thus have low connectivity[i]. Connectivity is important because as peoples' choices on routes become more and more limited and focused on only a few different routes, and their routes become less and less direct, travel times greatly increase and the modes of transportation are limited to the automobile.

There are several different methods to assess connectivity within a developed area. The two most popular and most easily calculated for a city of limited resources are the Polygon and the Link-Node Method. The Polygon Method is a general index of connectivity which requires the least calculation of all methods. This method, which can be used for automobile, pedestrian, or bicycle routes, uses the standard of 50 polygons per square mile as the benchmark for good connectivity. Below this value, areas are considered to have inadequate connectivity, while areas above this value are considered to have good connectivity. The main factors that this method takes into account are the presence of a grid pattern and the block length, or distance between intersections. Some limitations for the Polygon Method are that it is only applicable in fully developed tracts of land, and that it doesn't factor in choke points. So, for example, you could have a tightly spaced grid-patterned subdivision with only one entrance and exit point between the subdivision and the collector road, and the rating of connectivity using the Polygon Method would be nearly the same as if there were multiple connections between the subdivision and the rest of the community.

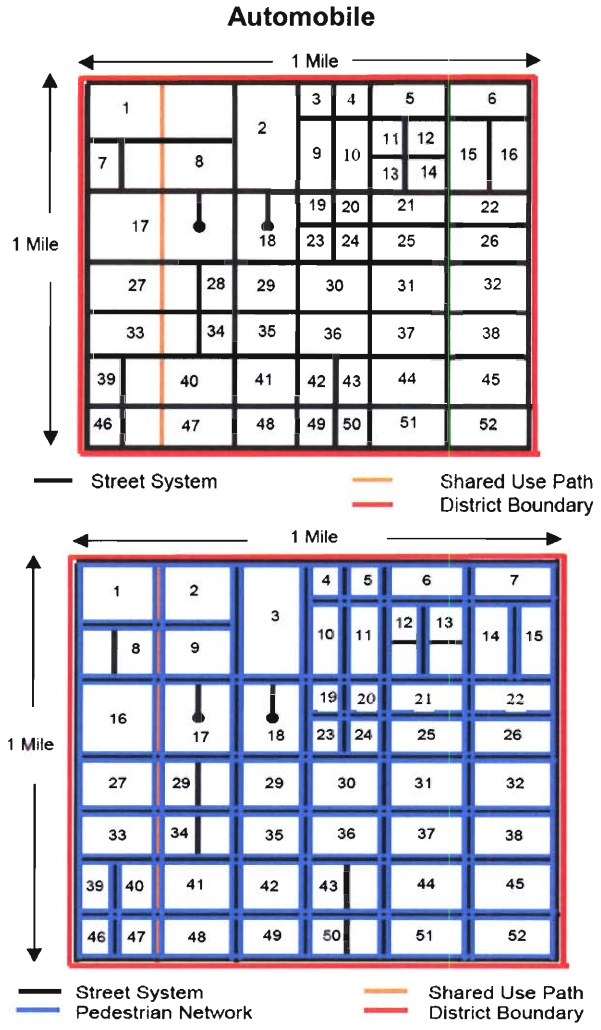


Figure 4.2: Polygon Method for Commuting the Connectivity Index for Automobiles and Pedestrians[ii]

The Link-Node Ratio is another measure of connectivity that uses links, or roadway segment between two endpoints, and nodes, which include intersections and cul-de-sacs, to determine the level of connectivity for a given area. The ratio is computed by summing the total number of links and dividing this by the total number of nodes, with the higher number indicating a higher level of connectivity. Links are defined as all roadway segments between two points, and nodes are defined as intersections and cul-de-sacs or roadway ends. Figure 4.3 illustrates the three methods for computing the connectivity index based on the Link-Node Method. When using the method on the far right in Figure 4.3 in which nodes are not included along arterials, Ewing[iii] and Burden[iv] suggest that a link-node ratio of 1.4, about halfway between extremes, is a good target for network planning purposes.

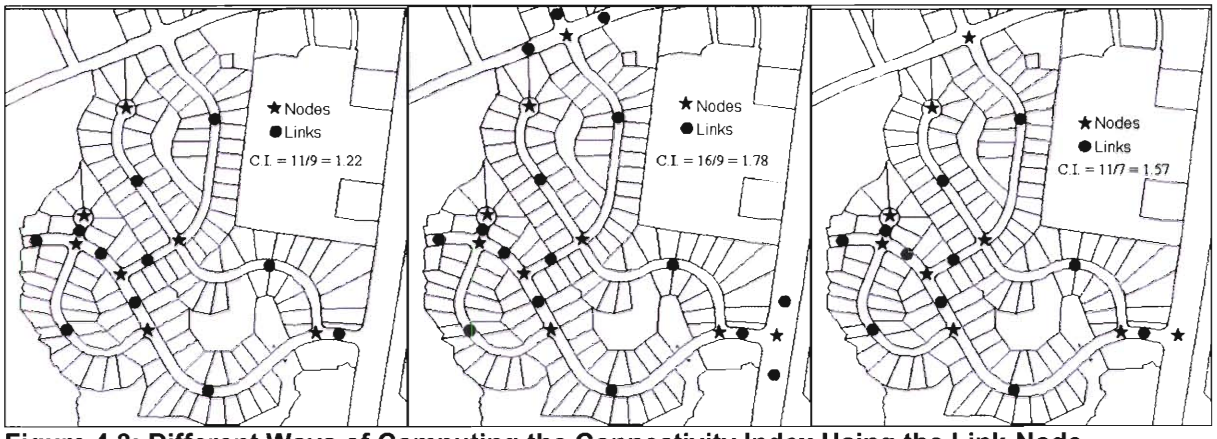
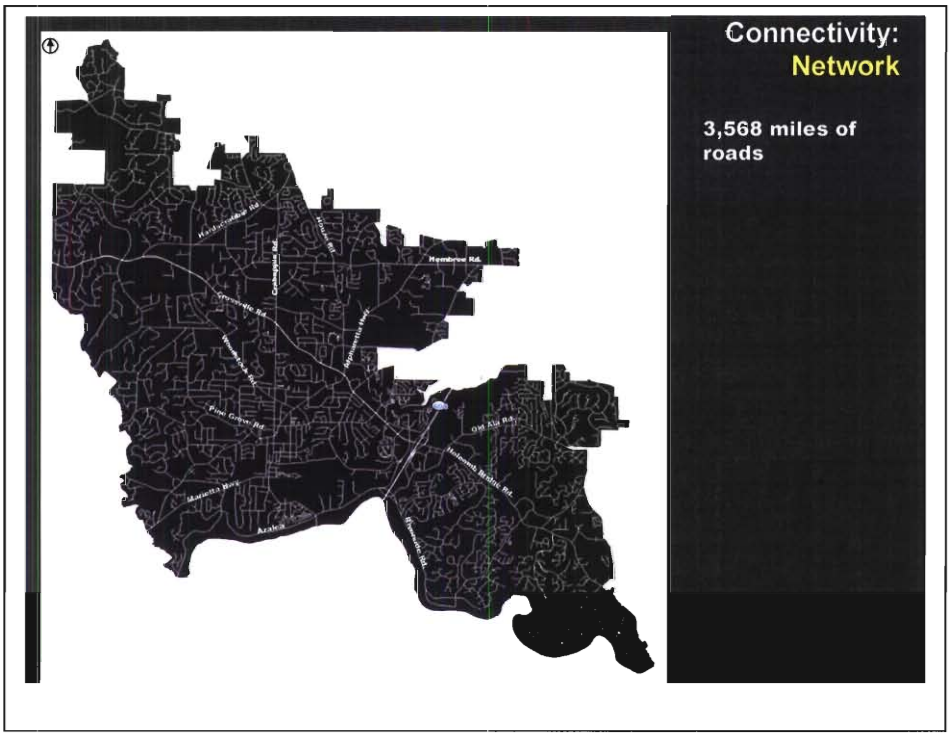
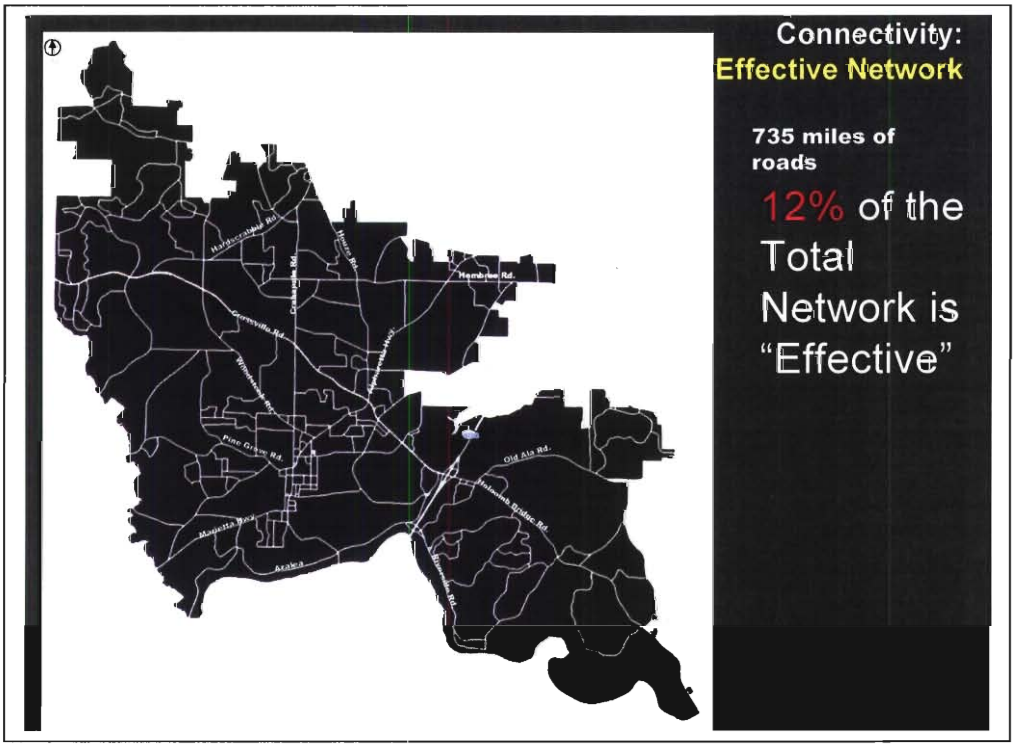
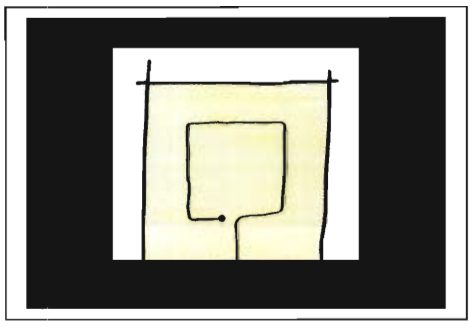


Figure 4.3: Different Ways of Computing the Connectivity Index Using the Link-Node Method[v]

Since the Link-Node method does not take into account block length though, this measure might not be effective unless used in conjunction with a measure of connectivity which factors in block length, such as the Polygon Method. In addition, the Link-Node Ratio is less intuitive, and therefore may be less attractive as a policy tool[vi].


Connectivity:
Network
3,568 miles of roads
Hembree Rd.
Old Alia Rd.
Pine Grove Rd.
Azalea


Connectivity:
Effective Network
735 miles of roads
12% of the Total Network is "Effective"
Hembree Rd.
Old Alia Rd.
Pine Grove Rd.
Azalea



CHAPTER FOUR: DESIGNING THE TRANSPORTATION SYSTEM

CHAPTER FOUR: DESIGNING THE TRANSPORTATION SYSTEM

Planning with the Regional Transportation System in Mind

Regional planning is a critical first step for linking transportation and land use policy. Local governments must work together to plan a sustainable future for their entire region. Otherwise land use and transportation planning in one city is wasted if it is not connected to a functionally effective regional transportation network. A good regional transportation plan should focus new development around existing infrastructure while seeking to limit automobile dependence and preserve open space

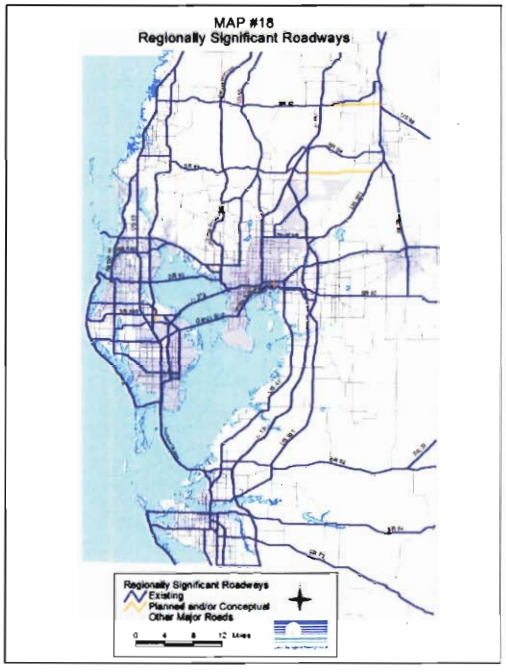


Figure 4.1: Regional Transportation System[1]

Designing an Effective Transportation Network

An effective transportation network is essential to building a sustainable transportation system. This network disperses traffic over a large number of streets while avoiding the congestion which created by a system of one entrance one exit subdivisions abutting on a single roadway. Figure 4.1 shows a comparison of the traditional development pattern on bottom, versus the auto-dependent, conventional development pattern on top.

The first step to designing an effective transportation network is to examine the current network in place and to determine the strengths and weaknesses. In the previous chapter several different methods for measuring connectivity and levels of service were described. Future efforts should focus on improving those areas which fall below connectivity and network density requirements, as well as providing transportation networks to accommodate future growth.

[1] Source: Tampa Bay Regional Planning Council

Proper Pattern of Roadways

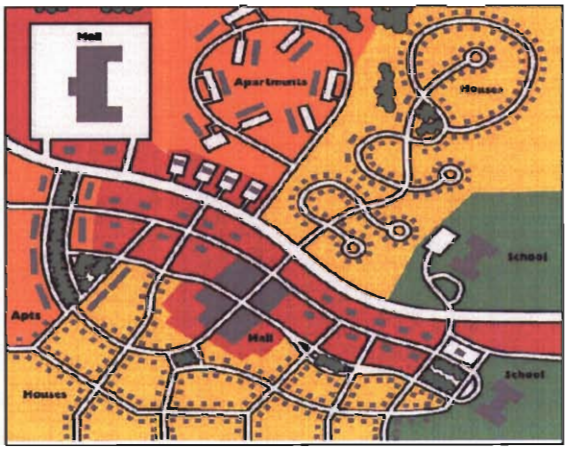


Figure 4.1: Traditional vs. Conventional Development Pattern

The street pattern should promote efficient and continuous circulation that maximizes travel options and provides the greatest accessibility for pedestrians and bicyclists. Networks that have meandering, serpentine streets with numerous termini or cul-de-sacs limit opportunities for bike and pedestrian usage. A properly organized street network promotes continuous systems for pedestrians, bicyclists, transit and automobiles. Street systems should support pedestrian usage by providing continuous sidewalks, shade tree canopies or covered walkways, and traffic buffers and separations wherever possible. While arterial roadways should provide greater mobility to automobiles and transit, amenities should also be provided to promote pedestrian and bicycle usage, including protection at major roadway crossings. Freeways and other major highways promote and support automobile and truck mobility, but safe environments should be provided for bicyclists and pedestrians wherever possible and allowable. Safety and ease of crossing major automobile and truck routes for pedestrians and bicyclists should be a priority. The street pattern should also provide good access to a community focal point or urban core that provides basic services such as a government center or town square. The basic concept of the hierarchy and proper pattern of roadways is shown with photos illustrating these basic concepts in Figure 4.3.

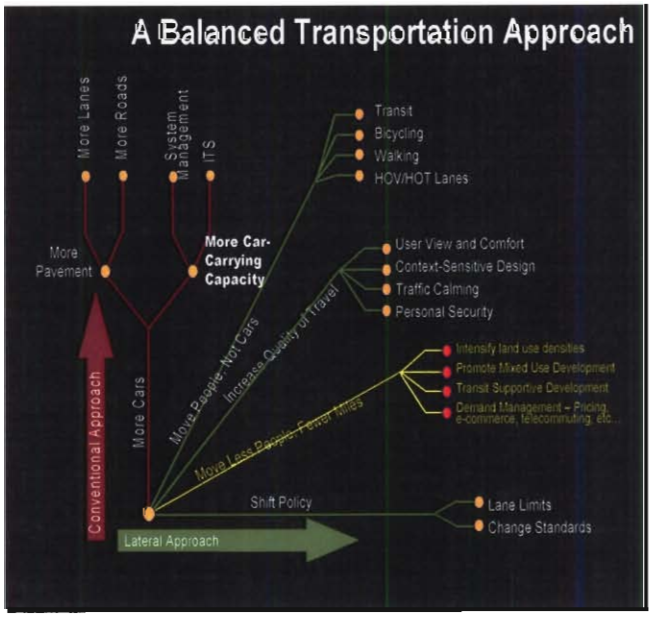


Figure 4.2: Balanced Transportation Approach

A conventional suburban-style street layout has a system of streets with feeder, collector and arterial streets. This system has very poor street connectivity, as all traffic is funneled onto the arterial street. As a result, only one possible (and often longer) route exists for most trips, creating congestion on the arterial street and making it impractical to walk anywhere. In contrast, traditional street layout has a high degree of street connectivity. Many more possible and more direct routes are available for any given trip, and traffic is spread out over the entire street network, reducing congestion. If shopping is centrally located within a traditional neighborhood, it becomes possible for shoppers to walk to the store. A centrally located school not only makes it possible for kids to walk to school, but also makes school athletic and playground equipment easily reached by the members of the neighborhood in the evening and on the weekends.[2]

[2] Source: *Concepts Sketchbook: Street Connectivity,* Oregon Department of Land Conservation and Development, 2001

Network Density

How much roadway capacity is required to meet a desired level of service? For comprehensive planning purposes, this question can best be answered by determining the network density necessary to provide the vehicle lane miles needed to accommodate the vehicle miles generated by the intensity of land use planned for the community.

The model illustrated by Tables 4.1 and Figure 4.4 illustrates that communities that increase density will require fewer new roads than lower density communities to accommodate the same amount of growth

Table 4.1 Road Network Density Model [3]

Local Road Network Density – 0.2897*Population Density (persons per Sq Mile) $^{0.4639}$				
Population per household assumed to be 2.5				
Gross Density (du/ac)	Gross Density (du/ sq mi)	Population Density (persons / sq mi)	Centerline Miles per sq mi	Centerline Miles Per sq mi
0.50	320	800	6.44	20.12
1.00	640	1,600	8.88	13,87
2.00	1,280	3,200	12.25	9.57
3.00	1,920	4,800	14.78	7.70
4.00	2,560	6,400	16.89	6.60
5.00	3,200	8,000	18.73	5.85
6.00	3,840	9,600	20.39	5.31

Gross Development Density is derived by dividing the total number of residential units by the total amount of developed land (including all land used for residential purposes)

This simple sketch tool can be used to assess the adequacy of an existing roadway network or to determine the network density required the land use pattern envisioned by the future land use plan. When combined with a buildout audit of the future land use, it may provide an essential statistic supporting a Master Thoroughfare Plan.

[3] Center for Urban Policy research, Rutgers University, *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan, September 2000*

Photos courtesy of Walkable Communities, Inc.

Figure 4.3 Street Patterns Promoting Pedestrian and Transit Activity

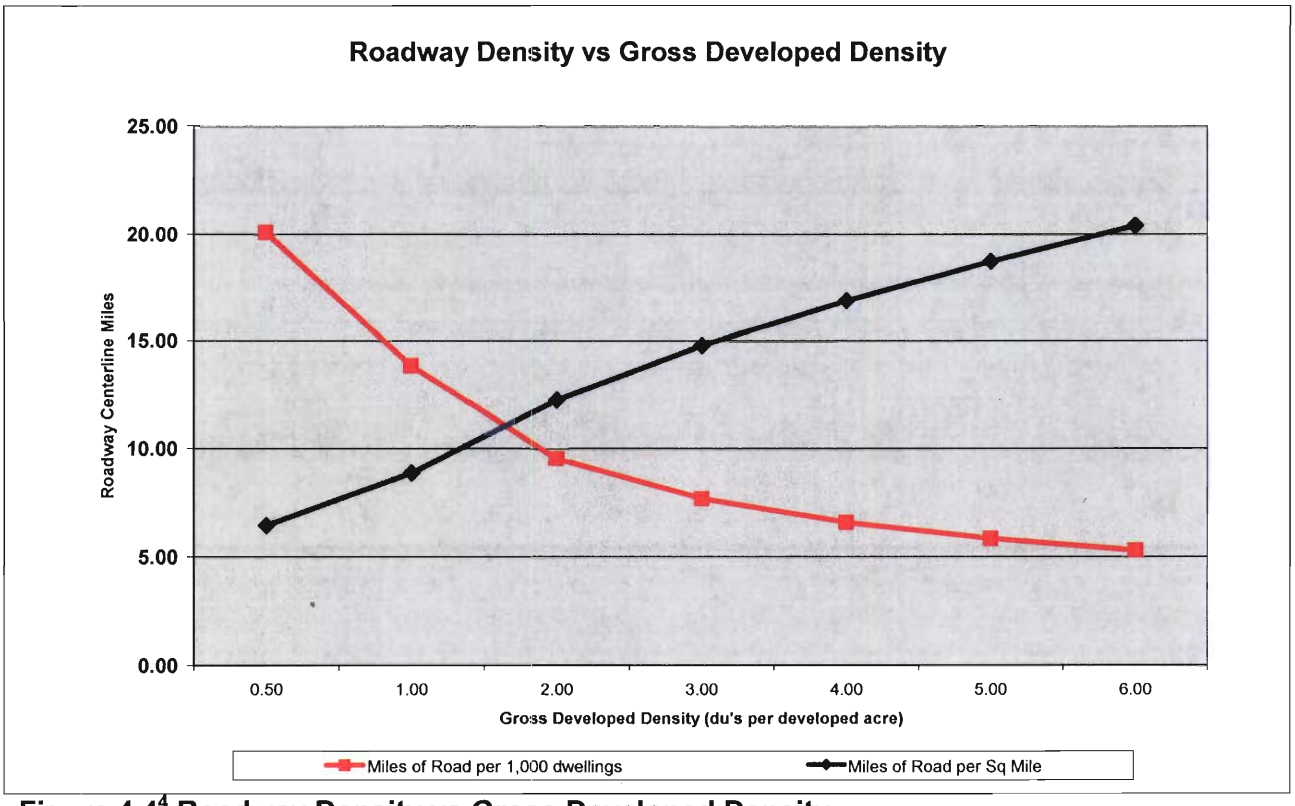


Figure 4.4[4] Roadway Density vs Gross Developed Density

[4] Center for Urban Policy research, Rutgers University, *The Costs and Benefits of Alternative Growth Patterns: The Impact Assessment of the New Jersey State Plan, September 2000*

Spacing Criteria

The spacing criteria developed using the Capacity Index Method detailed in Chapter 4 will produce general spacing criteria guidelines for the current roadway network as well as accounting for future growth. This spacing value sets a general precedence for spacing within the study area, but care should be given to reduce this spacing as specific densities increase near town and neighborhood centers and to increase this spacing in more suburban or rural locations within the area. Care should also be given to avoiding conflicts with natural resource features, as well conflicts with land owners by focusing new roadway construction on property edges where at all possible.

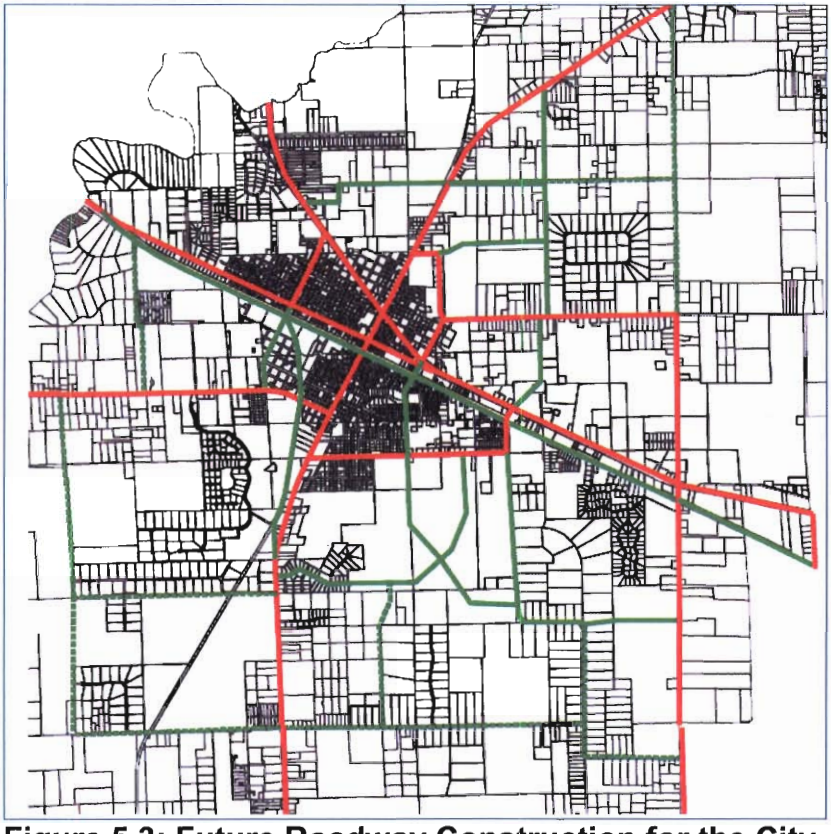


Figure 5.3: Future Roadway Construction for the City of High Springs

Connectivity

An interconnected transportation network designed to meet the needs of the transportation user, as well as to encourage and facilitate walking, bicycling and transit usage, is essential objective. This transportation network must provide a convenient, connected transportation system within the district, connectivity between modes and to regional facilities, as well as desirable levels of service for automobiles, bicyclists, pedestrians and transit riders.

The concept of good connectivity is synonymous with a good transportation network. The traditional pattern of development lends itself to the highest connectivity and produces the most efficient and sustainable transportation network. Figure 5.4 illustrates that while the amount of roadway which needs to be constructed is actually the same in both types of roadway system, the connected network approach provides a greater capacity.

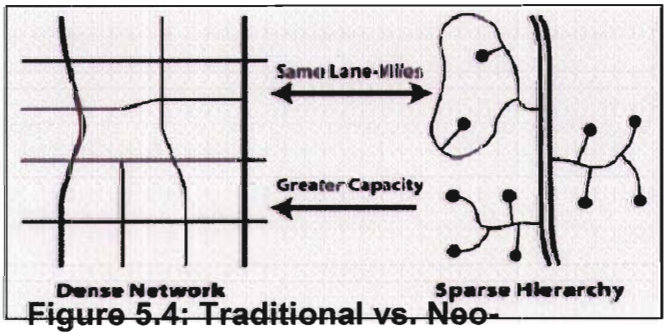


Figure 5.4: Traditional vs. Neo-Traditional Street Network

A first step to creating an effective, connected network is to evaluate the current network using the methods listed in Chapter 4 for calculating the Connectivity Index: the Link-Node Method and the Polygon Method. These methods should be used to identify areas which require added connectivity, and plans should be developed, if at all possible, to fill in existing gaps in the network.

Several cities, including Orlando in Florida, have developed standards for new subdivision development based on this connectivity index. Some other issues to consider when attempting to increase street connectivity have been outlined in the report "Planning for Street Connectivity: Getting from Here to There" produced by the American Planning Association. These include:

- Increasing connectivity between residential areas and arterials
- Planning for future connections through stub-out requirements
- Decreasing minimum street widths
- Promoting the use of traffic calming devices
- Restricting the use or length of cul-de-sacs
- Prohibiting gated communities
- Promoting pedestrian and bicycle connectivity
- Allowing for flexibility through performance standards and incentives
- Giving appropriate considerations to topography, floodplains, and dense drainage networks and to other factors that might limit connections
- Establishing processes for the granting of variances and exceptions

A connectivity index for each of the modes should be applied to measure how well the street pattern is organized. There are several methodologies available to measure the connectivity of the modal networks. These connectivity indices include the accepted link-node methodology, as well as some that are currently being researched and under development. After the application of these various methodologies within case studies, the polygon methodology, which is currently being tested and updated by the. This polygon methodology was chosen for the simplicity of application. In applying this connectivity methodology, the modal network is identified. Once the network has been identified, the number of polygons contained within that network is counted. Based on an evaluation of communities exhibiting excellent connectivity, a minimum of 50 polygons per square mile is considered to be an acceptable level of connectivity for a proposed district (See Figures 10-13).

Level of Service Standards

In addition to convenient connections within the network and between modes, the network must also provide a desirable minimum level of service for bicycles, pedestrians, and transit. Level of service is a term that is commonly used in the analysis of highway systems. This term has been used interchangeably with quality of service and performance measurement. According to the *Transit Capacity and Quality of Service Manual* (Transportation Research Board, 1999), the terms are defined as:

- *Level of Service (LOS)* - the system of six designated ranges of values for a particular aspect of service, graded from "A" (best) to "F" (worst) based on a user's perception.
- *Quality of Service* - the overall measures or perceived performance of service from the user's point of view.
- *Performance Measure/Measures of Effectiveness* - a quantitative or qualitative factor used to evaluate a particular aspect of service. Performance measures, or measures of effectiveness, are defined based on an understanding of the user's perceptions of the quality of service. Analytical techniques can be used to estimate these performance measures, or they can be measured directly in the field. The results of the analysis or measurement produce quantifiable results that can be stratified into ranges from 'A' (best) to 'F' (worst).

When evaluating multimodal transportation districts, the LOS for pedestrians, bicyclists and transit are the critical components in the assessment. The comfort and safety of those using modes of travel other than the automobile and the access provided to these alternative modes must be addressed and supported in the successful multimodal environment. The task may be complex, because some design elements supporting high pedestrian LOS, such as on-street parking, can adversely affect the LOS of other modes. This can be an important element, particularly if a proposed district contains a route designated as part of the Florida Intrastate Highway System (FIHS). In the case of FIHS routes, the minimum LOS standard is established by the FDOT. For other streets and highways, the LOS requirements are identified in the local government comprehensive plan (LGCP). Table 7 includes recommended modal LOS standards for

multimodal transportation districts and correlates the standards with the two basic scenarios of transit oriented development and bicycle and pedestrian oriented development.

Level of Service Techniques for Pedestrians, Bicyclists, and Automobiles

The Florida Department of Transportation is currently leading the nation in the development of quality of service, level of service and performance measures for multimodal transportation. The following is a summary of the basic methodologies that are currently in the FDOT Multimodal Quality/Level of Service Handbook. These techniques are consistent with national practices documented in the 2000 edition of the *Highway Capacity Manual* and the *Transit Capacity and Quality of Service Manual* when appropriate.

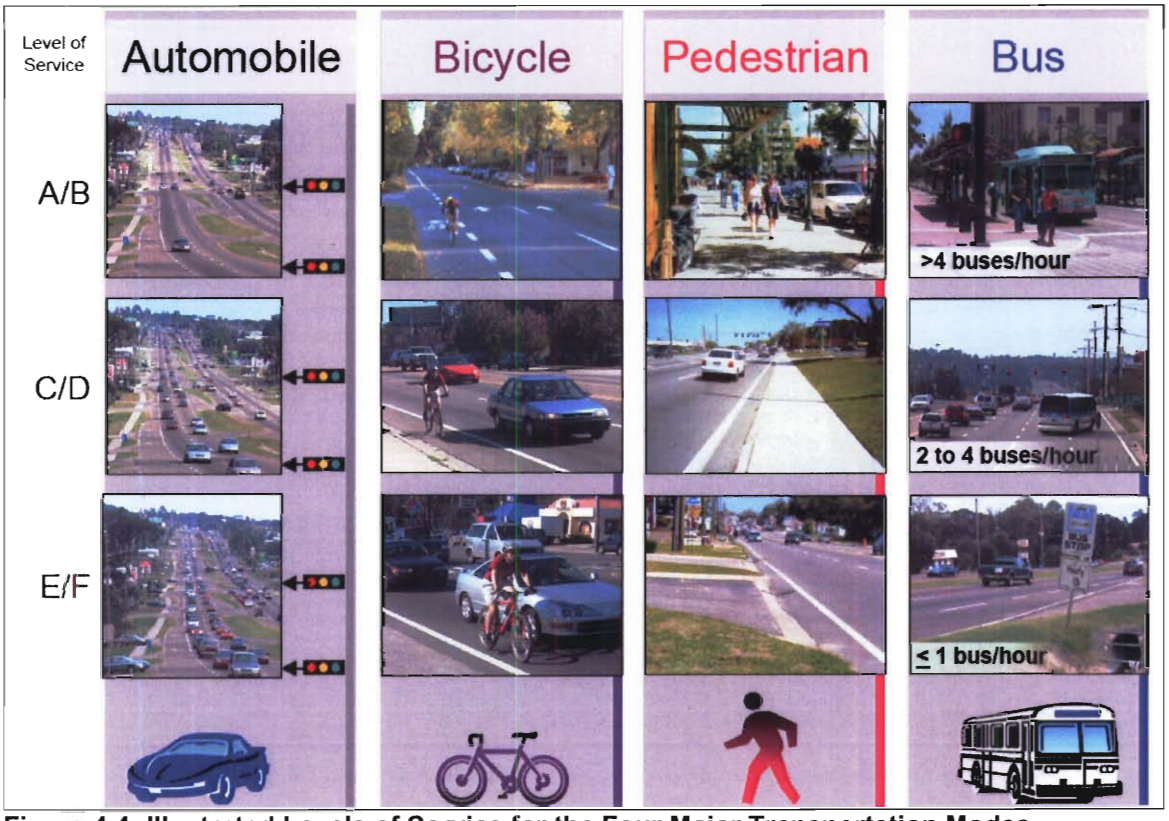


Figure 4.4: Illustrated Levels of Service for the Four Major Transportation Modes

Automobile Level of Service for Florida Instrastate Highway System (FIHS)

Facilities included on the FIHS have the primary responsibility of moving statewide and regional traffic in the most efficient and effective manner. The goal for these facilities differs significantly from the goals of an MMTD and therefore should be excluded from the designated district area if at all possible. However, if the potential district boundaries are such that an FIHS facility must be included, the minimum level of service standard is established by the Florida Department of Transportation. Special attention should be given on all facilities to ensure good, safe access for pedestrians and cyclists to any transit stops, as well as frequent and safe crossings. The recommended number of crossings providing the needed connectivity is a minimum of two crossings per mile The safe access and crossings for non-automobile modes where needed on these types of facilities ensures the candidate multimodal transportation district meets the overall goal of promoting non-automobile modes of transportation, as well as providing for the needs of those using motorized transportation. Detailed descriptions of the software, techniques, and tools available for computing level of service for various modes and facilities can be found in FDOT's *2002 Quality/Level of Service Handbook*.

Pedestrian Level of Service

The Florida Department of Transportation recently adopted a method for determining the quality level of service for pedestrians along facilities. The Pedestrian LOS Model measures the performance of a roadway with respect to pedestrians' primary perception of safety and comfort. The factors that are considered in the model include:

Lateral separation elements between the pedestrian and motor vehicle traffic,such as:

- Presence of sidewalk
- Buffers between sidewalk and motor vehicle travel lanes, such as grass strips
- Presence of protective barriers, such as trees or swales within the buffer area, or on-street parking
- Width of outside travel lanes and bicycle lanes
- Motor vehicle traffic volume
- Motor vehicle speed

Each of these factors is weighted within the model by relative importance. This weighting has been validated by a statistically significant sample. A numerical score is computed and then converted to a level of service letter grade based on the numerical scale. The equation for determining Pedestrian Level of Service (PedLOS) can be found in FDOT's 2002 *Quality/Level of Service Handbook*.

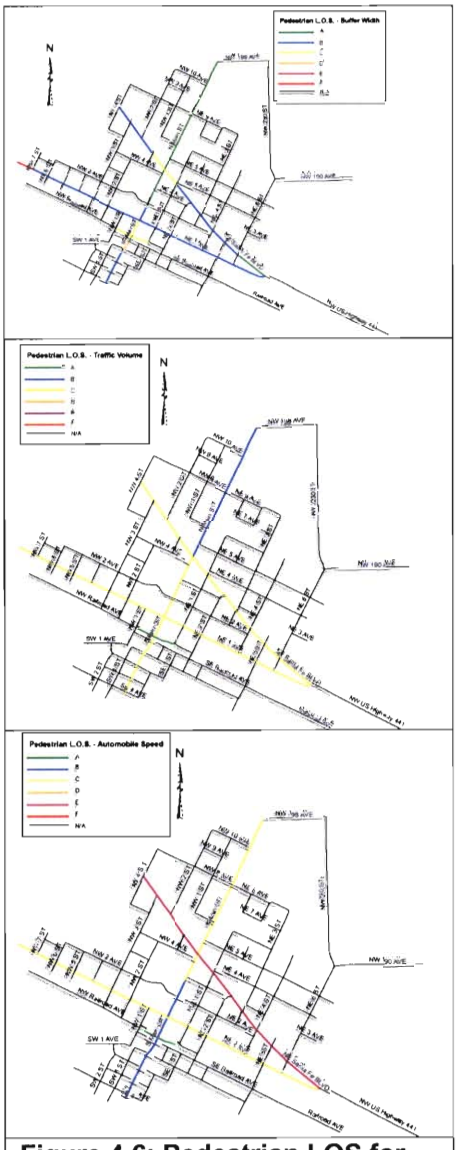


Figure 4.6: Pedestrian LOS for High Springs

Table 4.2: Pedestrian Level of Service Standards

Grade	Average Buffer Width	Traffic Volume (veh/day)	Automobile Speed (miles/hour)
A	≥ 10* ft	≤ 2,000	≤ 25
B	6 - 9.9* ft.	2,001 - 6,000	30
C	4 - 5.9 ft.	6,001 - 12,000	35
D	2 - 3.9 ft.	12,001 - 15,000	40
E	1 - 1.9 ft.	15,001 - 20,000	45
F	< 1 ft.	> 20,000	≥ 50

* Sidewalks must be present on both sides of the roadway

Bicycle Level of Service

The Florida Department of Transportation recently adopted a method for determining the quality/level of service for bicyclists. This model measures the performance of a roadway with respect to bicyclists' perception of quality, which appears to be based primarily on safety and comfort. Bicycle level of service along a roadway segment depends on a numeric score that considers the effect of a number of factors on the bicycle mode of travel. These factors include:

- Total width of pavement
- Traffic volume in the outside lane
- Motor vehicle speed
- Percentage and number of trucks
- Pavement surface condition
- Availability of a designated bike lane or paved shoulder

Each of these factors is weighted within the model by relative importance. This weighting has been validated by a statistically significant sample. A numerical score is computed and then converted to a level of service letter grade based on the numerical scale. The equation for determining Bicycle Level of Service (BikeLOS) can be found in FDOT's 2002 *Quality/Level of Service Handbook.*

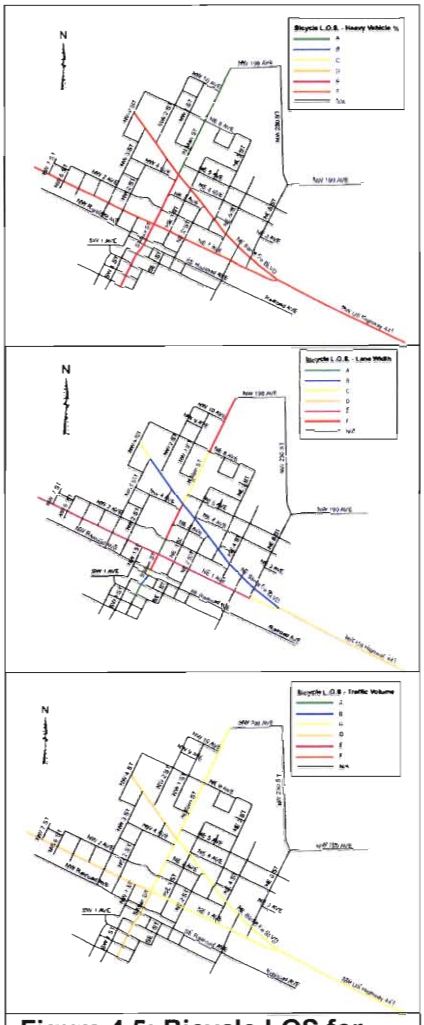


Figure 4.5: Bicycle LOS for High Springs

Table 4.1: Bicycle Level of Service Standards

Grade	Total Width of Outside Lane and Bike Lane	Traffic Volume (veh/day)	Percentage of Heavy Vehicles
A	≥ 17* ft	≤ 2,000	0%
B	15 - 16.9* ft.	2,001 - 5,000	0.01% - 0.5%
C	13 - 14.9 ft.	5,001 - 9,000	0.51% - 1%
D	12 - 12.9 ft.	9,001 - 15,000	1.01% - 2.5%
E	10.1 - 11.9 ft.	15,001 - 25,000	2.51% - 5%
F	≤ 10 ft.	> 25,000	> 5%

* Must include striped bike lane

Transit Levels of Service

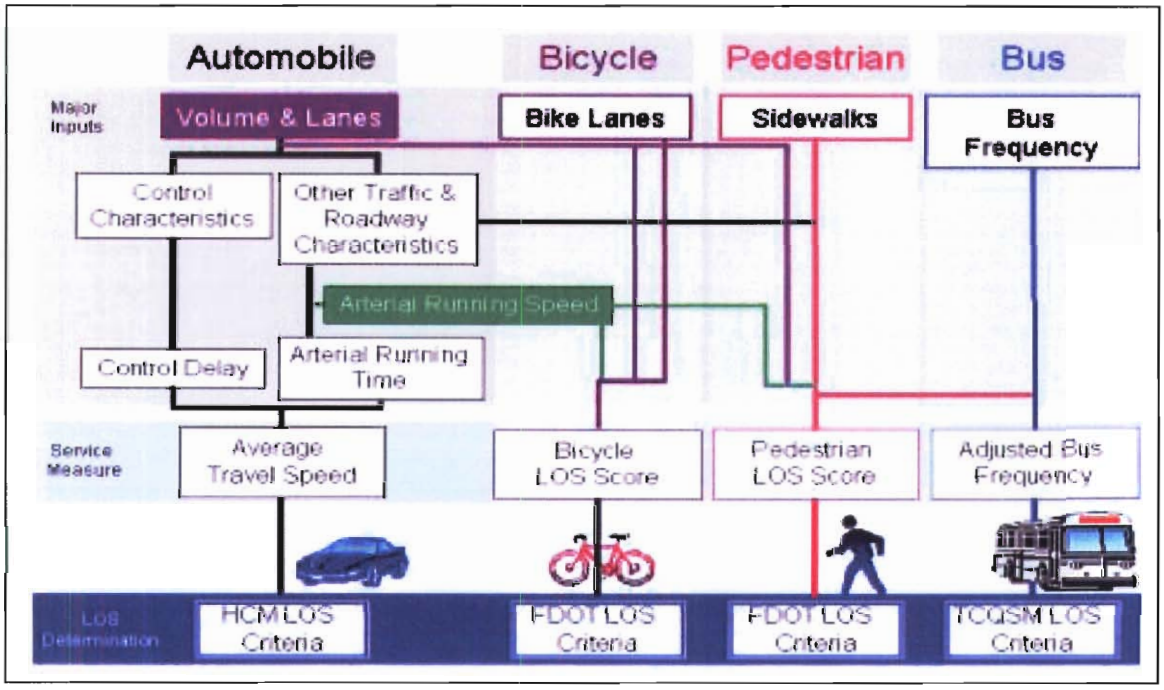
Public transportation in many small cities is either limited or non-existent due to a lack of density and funding. Public transportation in small cities is generally limited to regional or local bus routes. Commuter rail lines have been proposed in central Florida which would possibly pass through several small towns, but this level of service analysis is geared more towards intra-city bus routes. The Q/LOS Handbook defines level of service for transit routes generally as depending on headway. Headway is defined as the distance between transit vehicles. LOS grades, based on headway, are shown in Table 4.3. The Handbook lists several other adjustment factors which can alter level of service grade which are not necessary for analysis by a small city. Some general trends from these adjustment factors which may be used as guiding principles for assessing the transit system include:

- Level of service increases as the hours of service per day increases (LOS D for 12-13 hours per day of bus service)
- Sidewalk continuity is an important transit LOS factor and sidewalk networks should be present around transit stops to allow for riders to easily reach the station
- The ease with which pedestrians can cross the street mid-block increases transit LOS

Table 4.3: Transit Level of Service

Grade	Headway	Explanation
A	< 10 min	Passengers don't need schedules
B	10 to 14 min	Frequent service, passengers consult schedules
C	15 to 20 min	Maximum desirable time to wait if transit vehicle is missed
D	21 to 30 min	Service unattractive to choice riders
E	31 to 60 min	Service available during hours
F	> 60 min	Service unattractive to all riders

The diagram on the following page shows the factors considered in the calculation of the Quality/Level of Service for each of the four major modes of transportation.


Automobile
Bicycle
Pedestrian
Bus
Major Inputs
Volume & Lanes
Bike Lanes
Sidewalks
Bus Frequency
Control Characteristics
Other Traffic & Roadway Characteristics
Arterial Running Speed
Control Delay
Arterial Running Time
Service Measure
Average Travel Speed
Bicycle LOS Score
Pedestrian LOS Score
Adjusted Bus Frequency
LOS Determination
HCM LOS Criteria
FDOT LOS Criteria
FDOT LOS Criteria
TCQSM LOS Criteria

Capacity Index

The Capacity Index, which was explained in Chapter 3, is an alternative method that can be used to determine current Level of Service for the roadway network within a given study area, and to determine the amount of roadways needed in the future to attain a pre-determined LOS. This is a good tool for estimated capital improvement costs and it can also be used to reserve right-of-ways for future road projects. Figure 5.5 illustrates a comparison between the area-wide network LOS for the city of Zephyrhills for the current situation (on the right), and buildout (on the left).

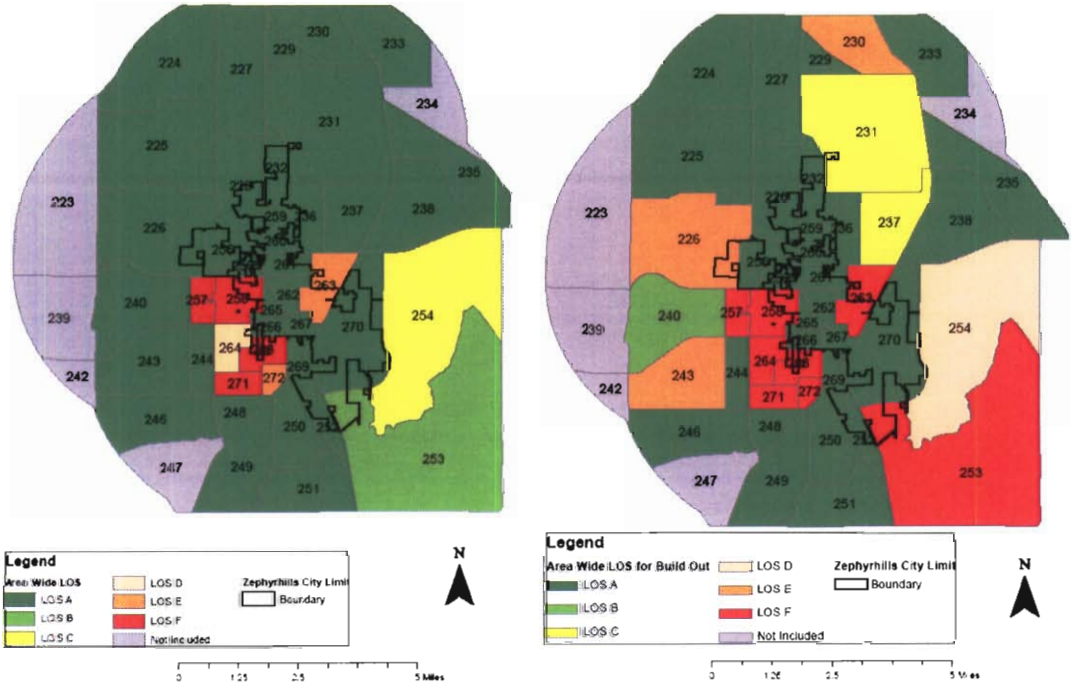


Figure 5.5: Capacity Index Analysis (Current and Buildout) for Zephyrhills

Context Sensitive Solutions: Roadway Design

Roadways can be designed in a variety of ways and one size does not fit all. It is important to understand the context in which the road is building built, and what resulting land uses are desirable on either side of the roadway. A suburban residential collector road is different from a main street.

Corridor Design

In recent years, the Federal Highway Administration and the Florida Department of Transportation have decided is rethinking their approach to highway design. This change in design approach considers the characteristics of the roadway itself, but also the way in which the roadway relates to the surrounding land uses and the greater community. This new way of thinking, termed "context sensitive design", is one which fits better with a community's character and respect for natural resources. These designs enlist citizen involvement at the early stages of planning and designing a roadway in a way that stresses equally the components of safety, mobility, and the preservation of aesthetic, scenic, historic, and other community values.

Alachua County, Florida, has adopted a corridor design manual which specifies graphically and numerically what these new context sensitive corridors would look and feel like. Some of the designs that may be applicable to within small cities in Florida include the Collector Street, with a design speed of 30-35 miles per hour, the Main Street, with a design speed of 25-30 miles per hour, and the Neighborhood Street, with a design speed of 20-25 miles per hour. These three designs are illustrated in Figures 5.6-5.8.

The Road Widening Paradox

It seems intuitive that widening lanes would create more capacity along roadways, but it has been concluded in recent years that this is not often the case. The explanation lies in the conditions of latent demand, induced traffic, and induced development which occur upon the addition of travel lanes. Induced traffic involves (1) drivers who formerly used alternative routes during rush hour switching to the widened roadway, (2) drivers who formerly traveled just before or after rush hour who begin traveling during rush hour, and (3) commuters who used to take transit during rush hour switching to driving, since driving a car has become faster[1]. Induced development refers to development which occurs as a direct result of additional roadway capacity – when roads are widened development patterns shift to focus around the roadway with the new capacity (usually towards the edge of town where land is the cheapest) until the vehicle volumes increase and again reach capacity. Lastly, latent demand refers to the theory that the constant on driving is not cost, but rather congestion, and therefore as traffic decreases, the number of trips that one takes increases[1]. These theories basically point to a gridlock equilibrium as the end result of most roadway widenings. A study by the University of California of 30 urban counties in California found that every 1 percent increase in lane miles generated a 0.9 percent increase in motor vehicle traffic within five years, negating the congestion-easing effect of wider streets. A Federal Highway Administration study in Milwaukee found that 11-22 percent of the city's increased automobile traffic was a result of induced traffic alone[1]. The road widening paradox also plays out is reverse as cities such as Portland, San Francisco, and New York have found that removing entire freeways has lead to the disappearance of automotive trips and has served to rejuvenate the surrounding areas.

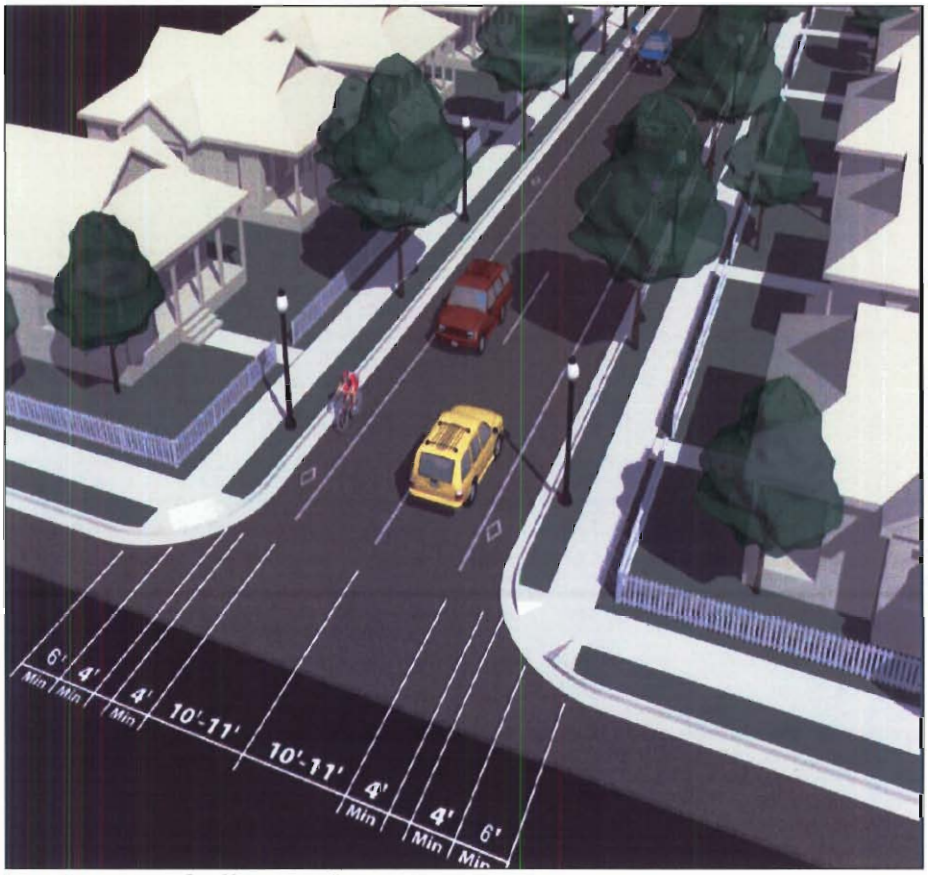


Figure 5.6: Collector Street

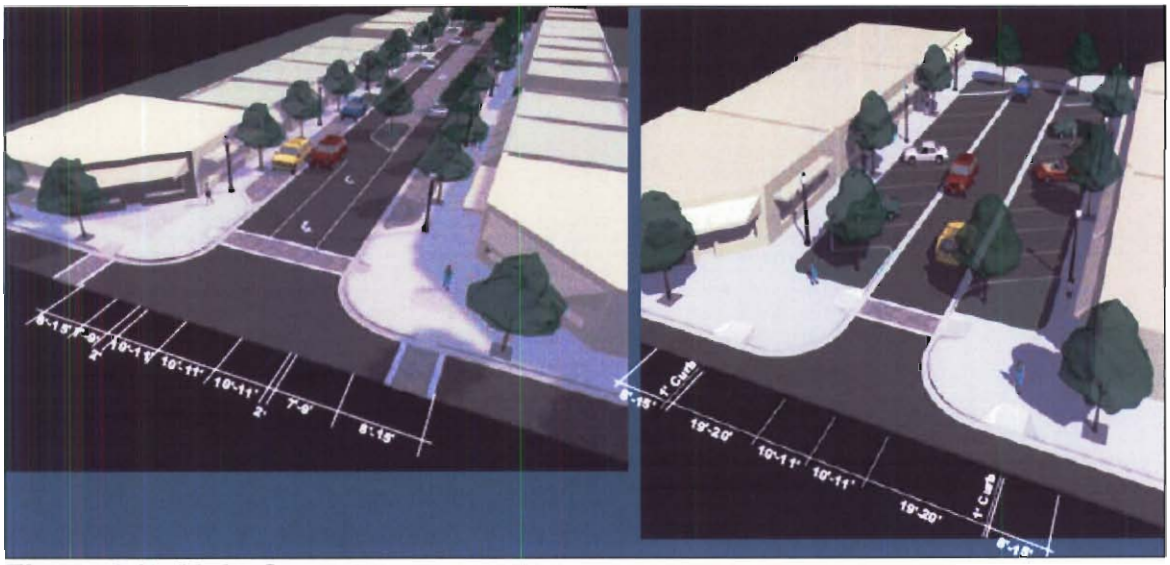


Figure 5.7: Main Street

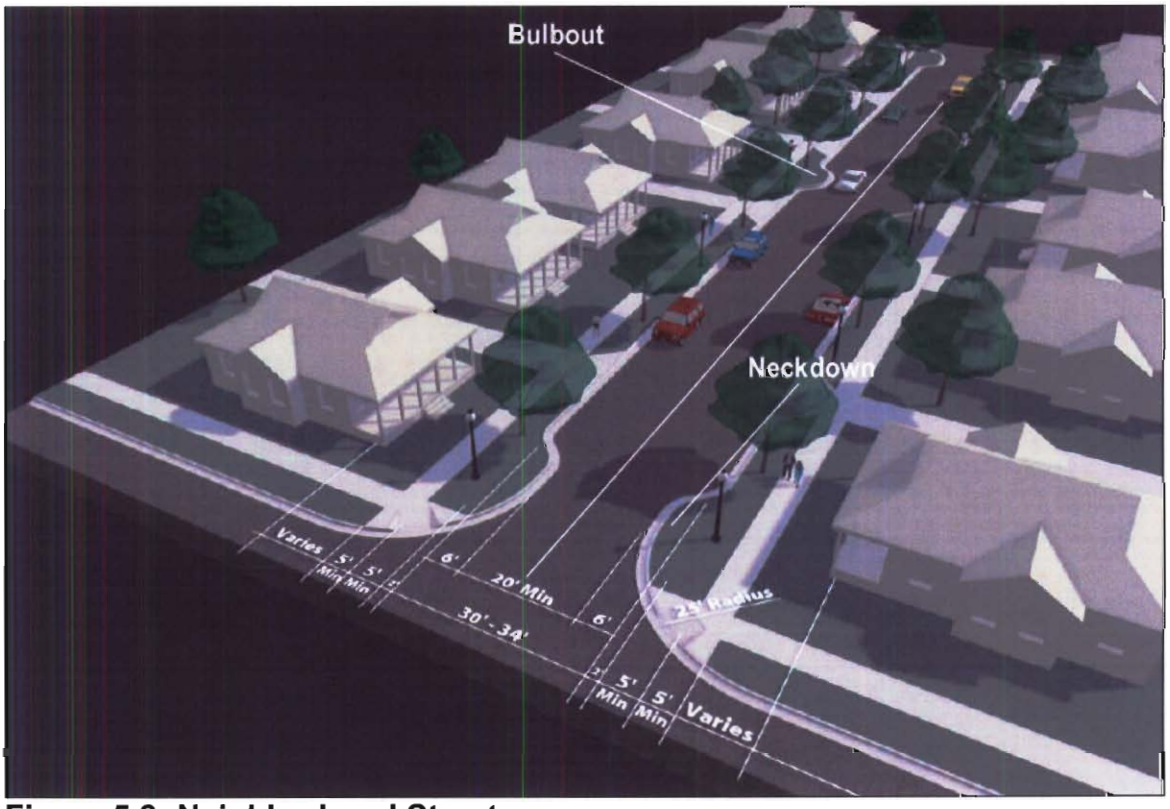


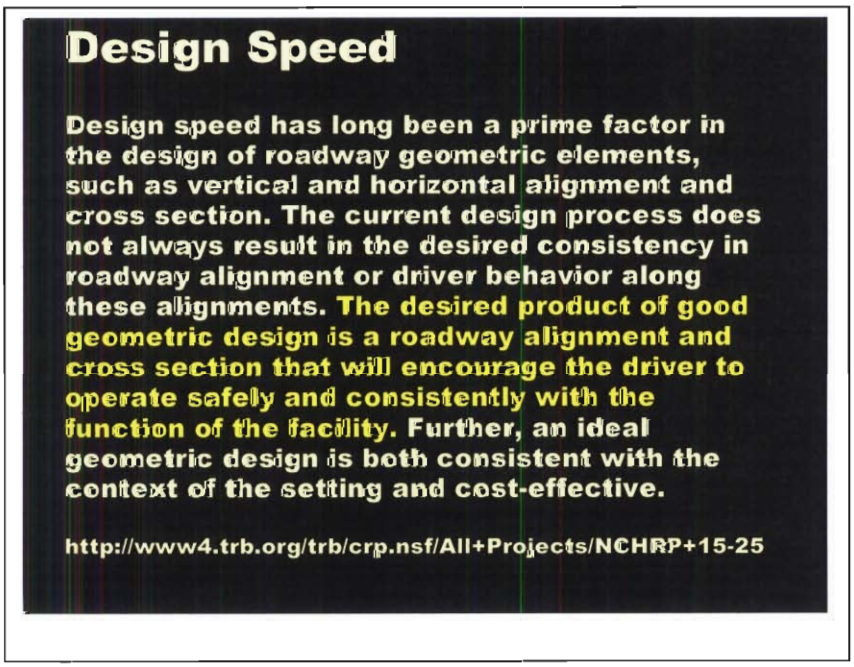
Figure 5.8: Neighborhood Street

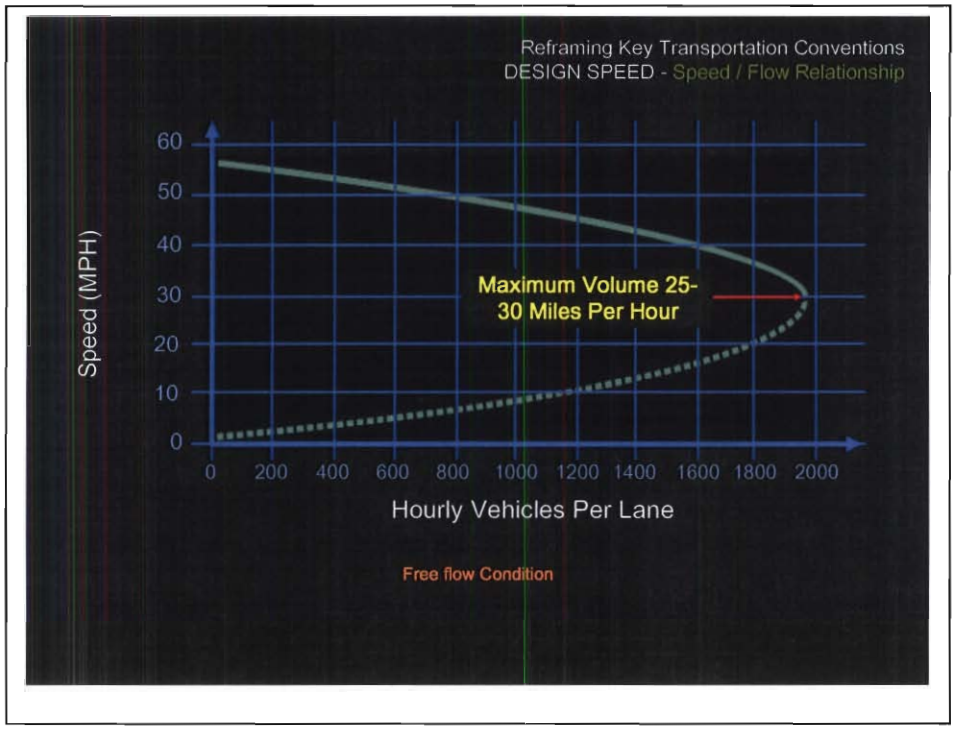
Design Speed and Roadway Capacity

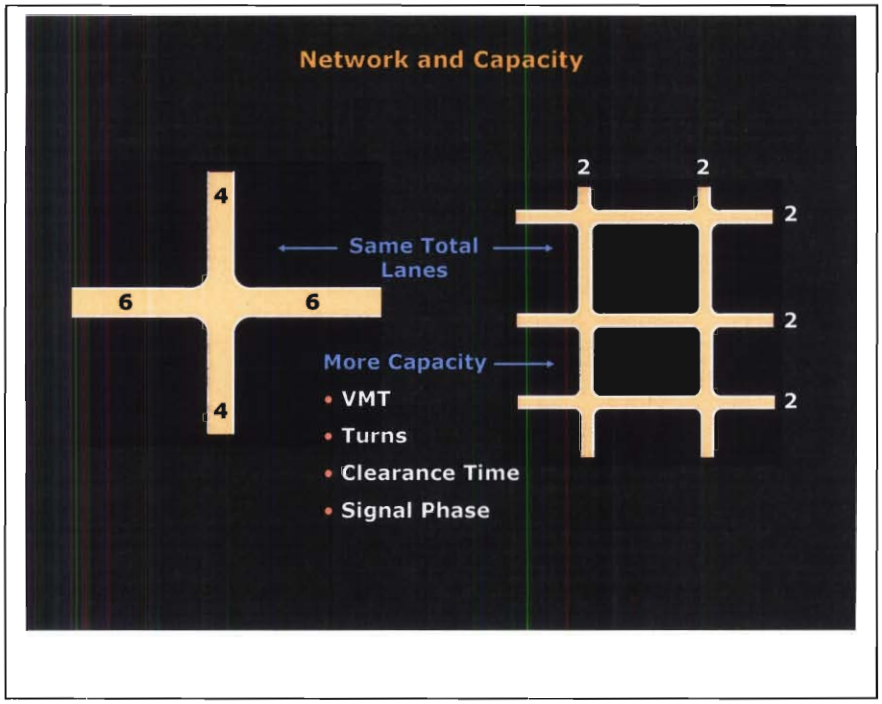
Design speed and capacity have a direct correlation on roadway segments between intersections. Some believe that as vehicle speeds increase, that capacity also must increase because should be moving through the area. This is not true however. The maximum capacity for a roadway with closely spaced intersections is actually reached at about 30 miles per hour due to the increased separation between cars as vehicle speeds increase in order to ensure a safe stopping distance. Design speed however, has long been the main factor in the geometric design characteristics of a roadway which include both horizontal and vertical alignments, as well as the cross-section. A study conducted through a grant from the transportation research board offered this conclusion:

> "The current design process does not always result in the desired consistency in roadway alignment or driver behavior along these alignments. The desired product of good geometric design is a roadway alignment and cross section that will encourage the driver to operate safely and consistently with the function of the facility. Further, an ideal geometric design is both consistent with the context of the setting and cost-effective[5]."

This approach suggests that the most effective way to design roadways is not through speed, but rather through context. Contrary to popular belief this reduction in design speed will not significantly reduce capacity, and in most cases it will increase it. This context sensitive design will also increase safety for both motorists and pedestrians, but it will also improve aesthetics and allow for different types of land use than merely the gated subdivision or the commercial strip-mall.




Reframing Key Transportation Conventions
DESIGN SPEED - Speed / Flow Relationship
Speed (MPH)
60
50
40
30
20
10
0
Maximum Volume 25-
30 Miles Per Hour
0
200
400
600
800
1000
1200
1400
1600
1800
2000
Hourly Vehicles Per Lane
Free flow Condition


Network and Capacity
4
6
6
4
Same Total
Lanes
2
2
2
2
2
More Capacity
• VMT
• Turns
• Clearance Time
• Signal Phase

Traffic Calming

Roadways over-designed for speed which has decreased the safety of not only other motorists, but also pedestrians and bicyclists. To decrease speeds, old roadways can be retrofitted with traffic calming devices and these designs can be incorporated into future roads. Illustration of some of the common forms of traffic control devices are shown in Figure 5.9.

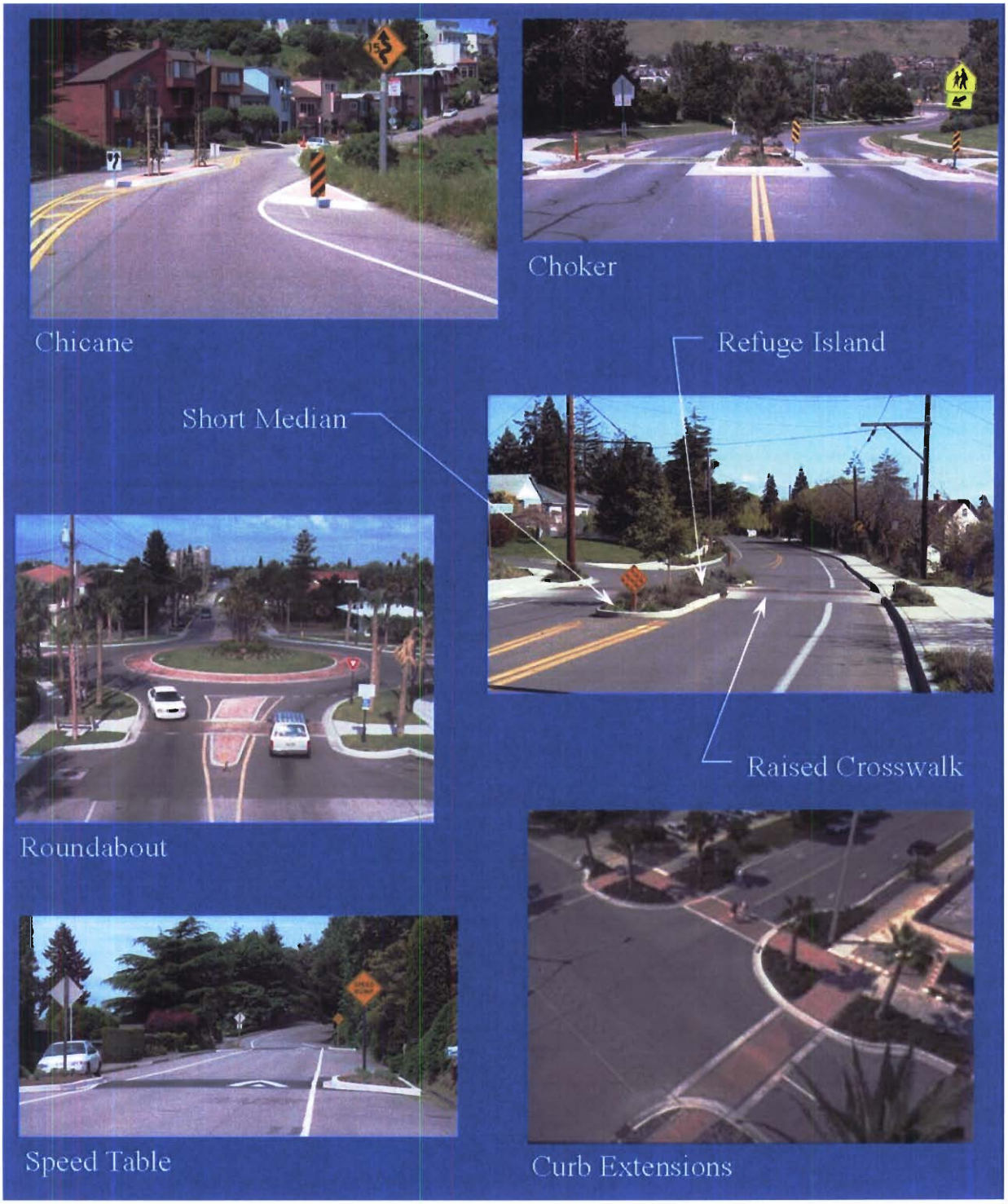
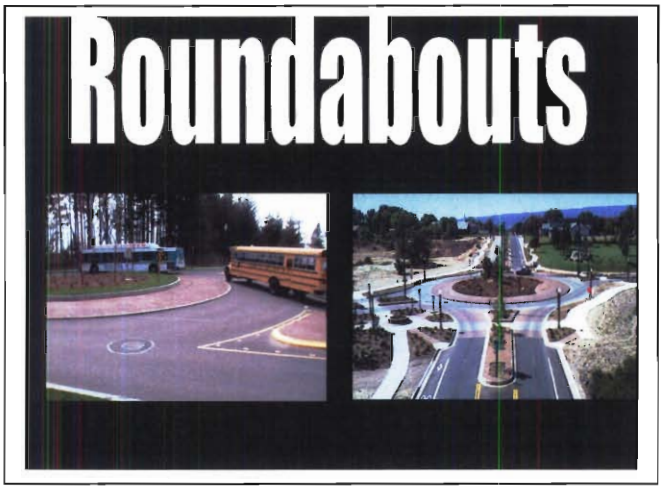
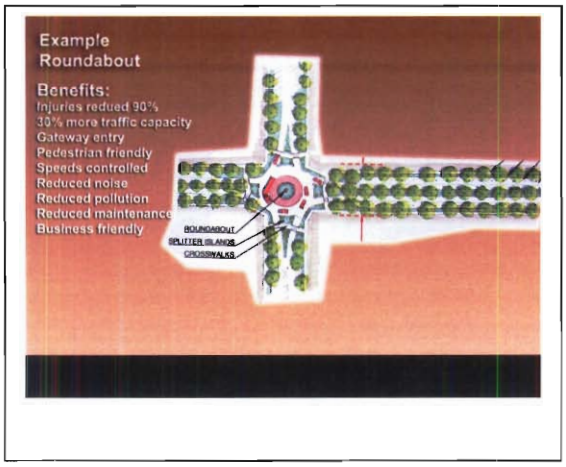


Figure 5.9: Collage of Traffic Control Devices


Roundabouts


Example
Roundabout
Benefits:
Injuries redued 90%
30% more traffic capacity
Gateway entry
Pedestrian friendly
Speeds controlled
Reduced noise
Reduced pollution
Reduced maintenance
Business friendly
ROUNDABOUT
SPLITTER ISLANDS
CROSSWALKS

Pedestrian Facilities

Although individuals have different propensities to walk, most people will walk a distance of a quarter mile (1,320 feet) or 5 minutes from their residence to a destination before opting to drive or ride a bike rather than walk. This dimension is a constant in the way people have settled for centuries and has been widely adopted as a standard for walkability in urban design. A major factor in the walkability of a community is not only whether it is possible or comfortable to walk through a neighborhood (sidewalks and shade trees), but also whether there are any destinations within one's neighborhood that are worth walking to. Destinations within a five minute walk that are instrumental in achieving a high quality of life include schools, parks, and grocery stores. Figure 5.10 shows an example of walking circles around grocery stores within High Springs.

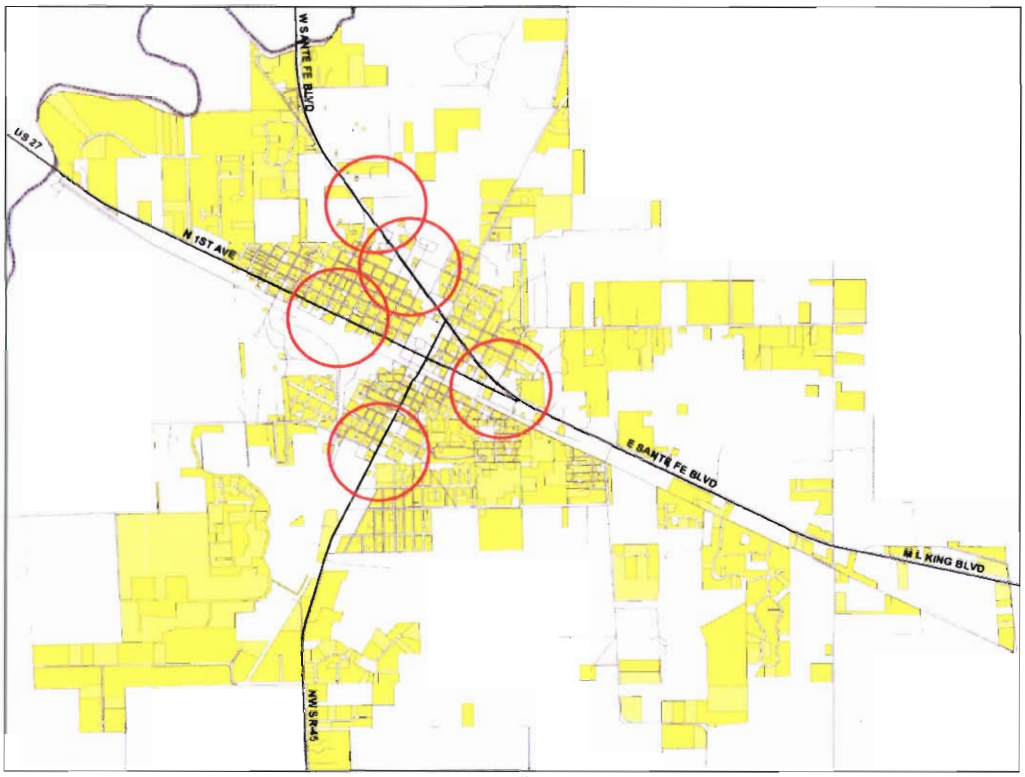


Figure 5.10: Five Minute Walking Circles around Grocery Stores in High Springs, FL

Keeping both origins and destinations in mind, pedestrian sidewalks and paths should be prioritized where schools, parks, grocery stores, and the central business district connect with residences. The three major pedestrian level of service criteria outlined in chapter 4 can give a quick estimate about the current state of segments within the pedestrian network, and also will provide input on the best possible segments for placement of future paths. Some general design criteria for pedestrian facilities include:

- Emphasize continuity over quantity – attempt to link all paths within the network in order to reduce gaps which can lead to pedestrian and vehicle conflicts
- Give priority to the placement of pedestrian ways which connect to destinations
- Do not allow gated communities which restrict pedestrian movement
- Require that subdivisions provide pedestrian ingress and ingress at multiple points and in multiple directions if possible
- Require that sidewalks have a minimum width of 5 feet in low-density residential neighborhoods, 8 feet within the central business district, and 10 feet along shared-use paths
- Provide a landscaped buffer between the sidewalk and the roadway
- Provide street trees and at a 20 ft. spacing where possible and provide pedestrian scale lighting within heavily walked sections of town

For further consideration, the FDOT created some guidelines for the maximum separation of land uses based on trip purpose. These guidelines are shown in Table 5.1.

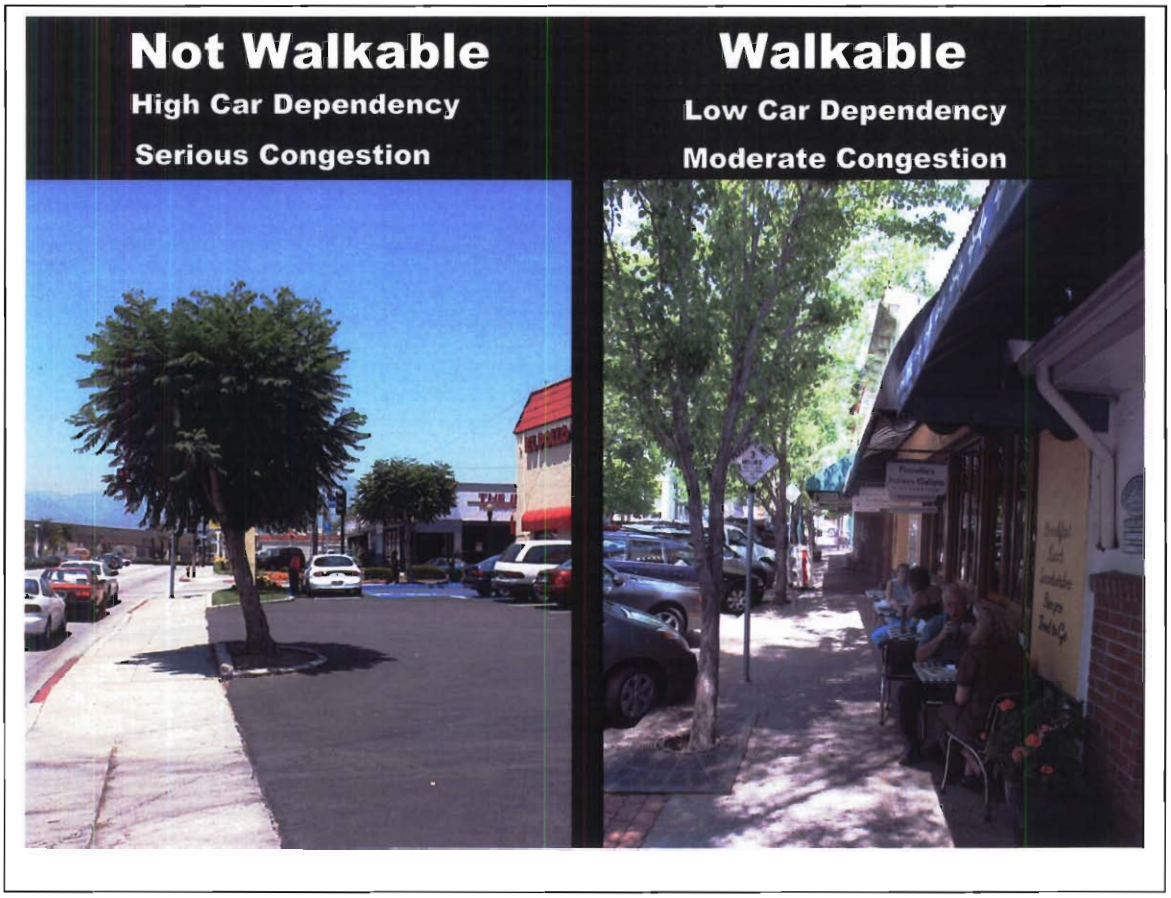


Table 5.1: Maximum Separations of Land Uses Based on Trip Purpose

Trip Purpose	Maximum Trip Length Walking Mode	Maximum Trip Length Walking Mode
Home-Based Shopping	0.25 - 0.5 miles	5 - 10 minutes
Home-Based-Social/Recreational	0.5 – 1.0 miles	10 - 20 minutes
Home-Based Work	1.0 – 1.25 miles	20 - 25 minutes

Adapted from *Pedestrian and Transit Friendly Design*, *FDOT, 1996.*

Pedestrian Measures

• **Directness** – does the network provide the shortest possible route?
• **Continuity** – is the network free from gaps and barriers?
• **Street Crossings** – can the pedestrian safely cross streets?
• **Visual Interest and Amenities** – is the environment attractive and comfortable?
• **Security** – is the environment secure and well lighted with good line of sight to see

Pedestrian Measures
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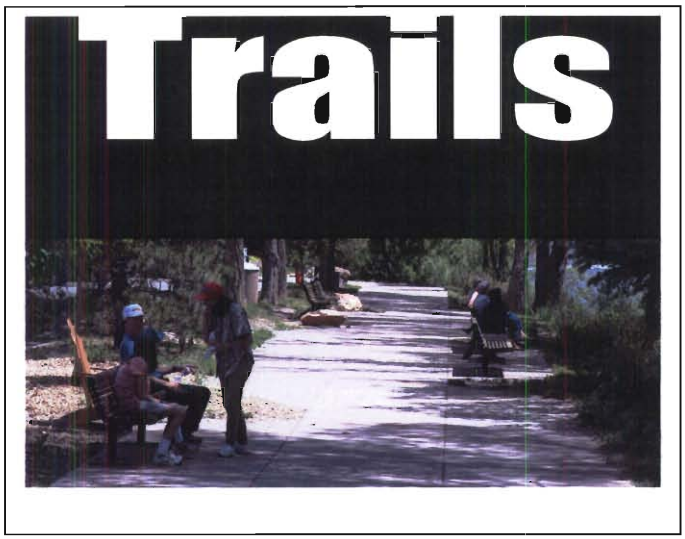
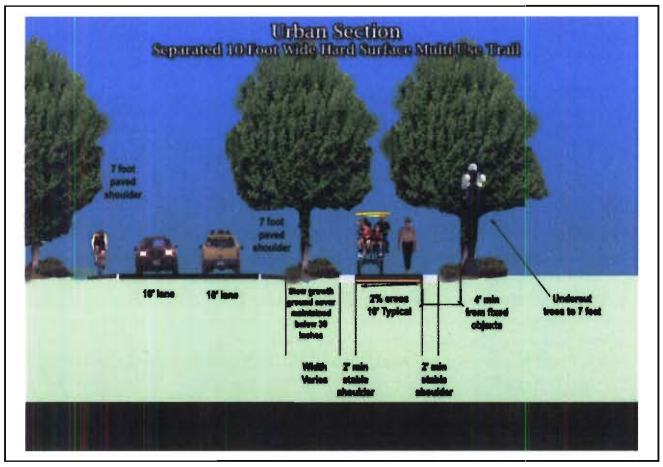
• **Security** – is the environment secure and well lighted with good line of sight to see the pedestrian?

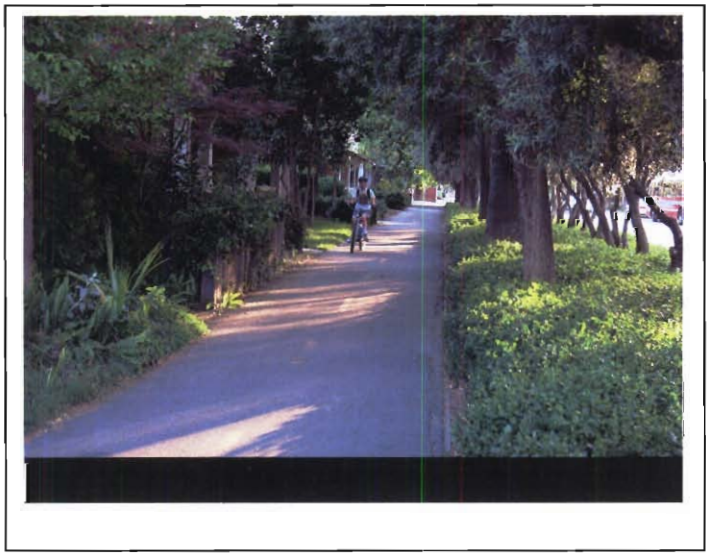

Trails

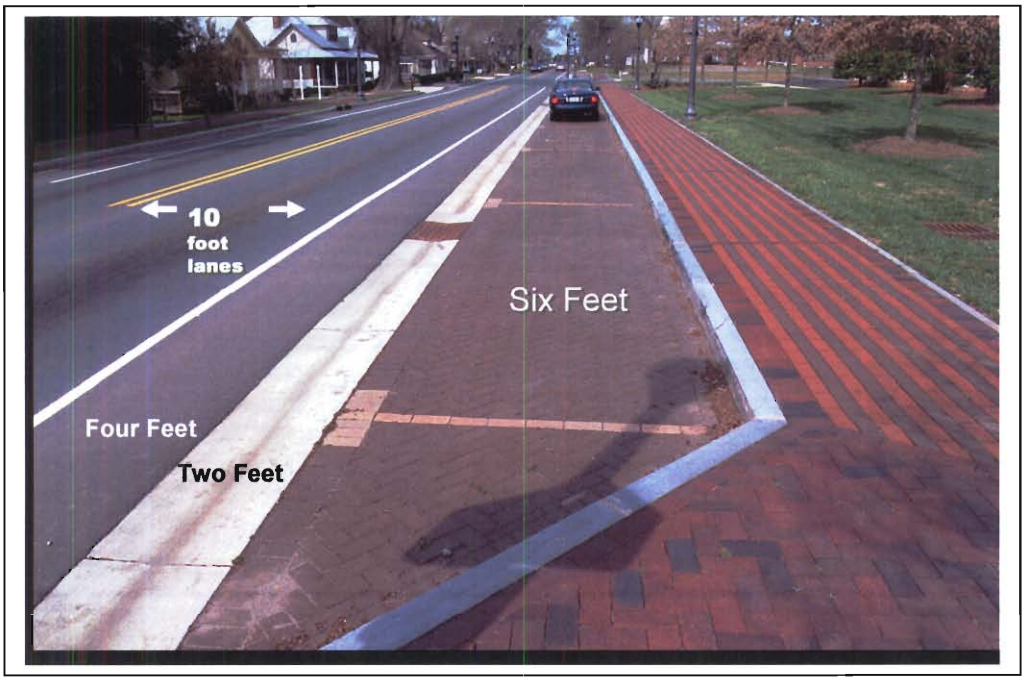

Urban Section
Separated 10-Foot Wide Hard Surface Multi-Use Trail
7 foot paved shoulder
7 foot paved shoulder
10' lane
10' lane
Width Varies
2' min stable shoulder
2% cross 10' Typical
2' min stable shoulder
4' min from fixed objects
Undercut trees to 7 feet

Bicycle Facilities

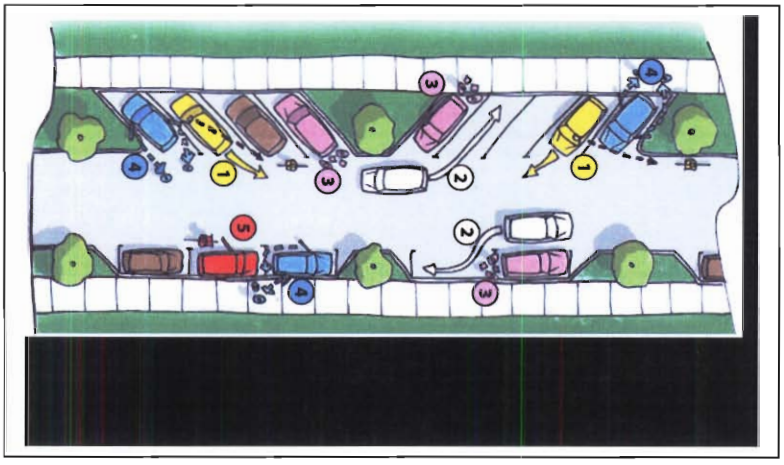
Similarly to the quarter mile walking circle used for pedestrians, it is standard practice to use a half-mile biking circle between residential areas and major destinations. These circles are not the only main criteria to be used for considering bicycle routes, because many avid cyclists will bike much greater distances, and thus trail networks can cover great distances, and a network of statewide and regional trails is being developed. Local bicycle trails, as well as the large network of trails, are oftentimes used solely for recreation, and not as a means to get from point A to point B. On roads with low speeds and volumes, bicyclists can often ride with traffic, and have no need for separate facilities. Given these facts, bicycle trails and paths are designed very differently than pedestrian sidewalks. Some general guidelines regarding the development of a network of bike paths within a city include:

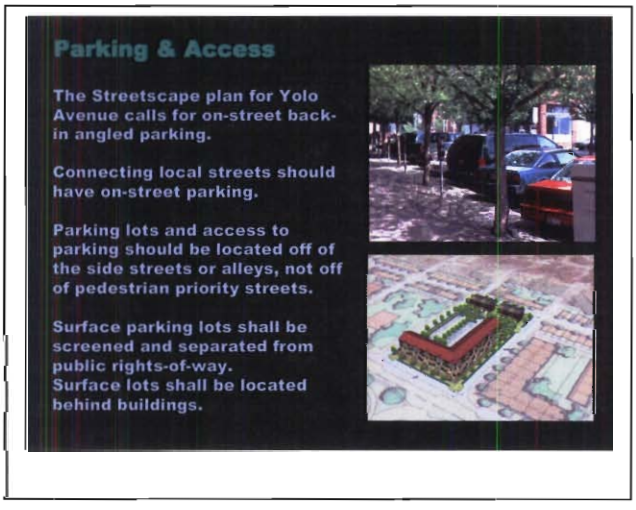
- Allowing bicycles to travel with traffic where speeds are at or below 25 miles/hour
- Placing shared road markers along major routes where bicycles and cars share the road
- Providing a separate lane for bicyclists on the shoulder in urbanized areas where speeds range between 25 - 45 miles/hour
- Bicycle lanes should be between 5 and 6 feet in width from the center of the stripe to the edge of pavement
- Shared use paths should be included in areas of high travel speeds and percentages of heavy vehicle traffic where curb cuts are limited
- The overall effectiveness of any bike system within a city is dependent on the continuity of the network, gaps within the network should be avoided if at all possible and should be the top priorities within multi-modal transportation capital improvements schedule
- Bicycle routes should be designed to avoid truck and bicyclist conflict when at all possible; if each mode must travel along the same route, an additional stripped buffer over several feet should be placed between the outside travel lane and the bicycle path




10
foot
lanes
Six Feet
Four Feet
Two Feet

Parking Management





CHAPTER FIVE: COMPREHENSIVE PLANNING AND IMPLEMENTATION STRATEGIES

CHAPTER FIVE: COMPREHENSIVE PLANNING AND IMPLEMENTATION STRATEGIES

In Florida, the local government comprehensive plan (LGCP) is the essential tool for implementing all goals, objectives and polices related to growth management and community building. The comprehensive plan provides both a mechanism for coordination with state and regional agencies and a foundation for the regulations and investment strategies required for implementation.

Meeting the planning responsibilities of local government as described in Chapter 1, linking use and transportation as described in Chapter 3 and the designing of a functional transportation system as described in Chapter 4, must be first enunciated in the form and goals, objectives and policies expressed in the comprehensive plan.

Although the focus of this guide is transportation and its primary emphasis is placed on the Traffic Circulation Element, the principles that it expresses are very unlikely to be achieved without supportive policies in the Future Land Use Element and implementing policies in the Capital Improvements and Intergovernmental Coordination Elements.

No transportation plan will succeed without the dollars to build the system. In Florida, high priority is placed on "financial feasibility" and concurrency.

And finally the regulatory framework for implementing the transportation plan must be established. Design, access management, corridor preservation, connectivity standards are central to the regulatory framework.

DEVELOPING THE COMPREHENSIVE PLAN ELEMENTS

The transportation plan will typically be reflected in three elements of the comprehensive plan:

- Transportation (Traffic Circulation) Element
- Future Land Use Element
- Capital Improvements Element
-

Transportation Element

The Transportation (Traffic Circulation) Element creates the foundation and framework for building your community's transportation net work and linking that network with your land use patterns. This element will not only establish the broad goals but also authorize the various concepts and techniques that make up the plan.

The components described in the following sections are recommended if the principles outline din Chapters 3 and 4 of this Guide are to be achieved.

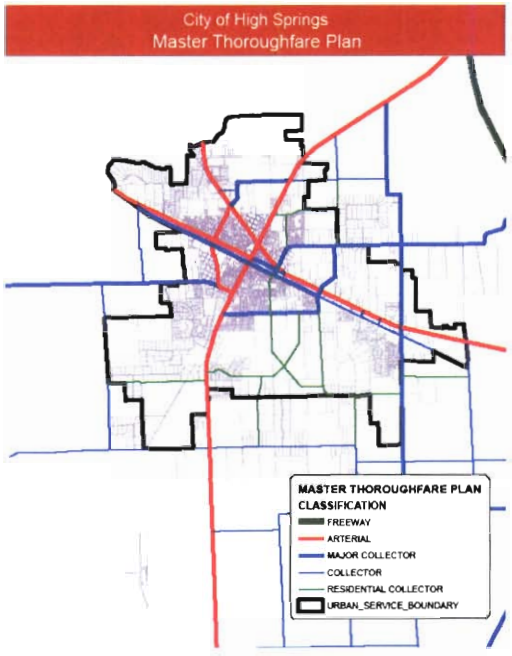
Establish the Broad Goals

Be clear about what the plan is intended to achieve. Typical goals may be:

- Improving traffic safety;
- Decrease travel time;
- Reducing congestion;
- Improve the livability of the community

Master Thoroughfare Plan

The Master Thoroughfare Plan is not required for compliance with state requirements. This tool is highly recommended nonetheless as an essential component an effective transportation strategy. Its purpose is to define the transportation network necessary to support the land uses envisioned in the Future land use plan. It may be viewed as a "buildout" plan and generally represents a forty or fifty year horizon.



The Master Thoroughfare Plan provides the foundation for corridor preservation and as a blueprint for incrementally building the transportation network over time.

The Master Thoroughfare Plan should typically be established as an objective within the Transportation Element. Supporting policies would:

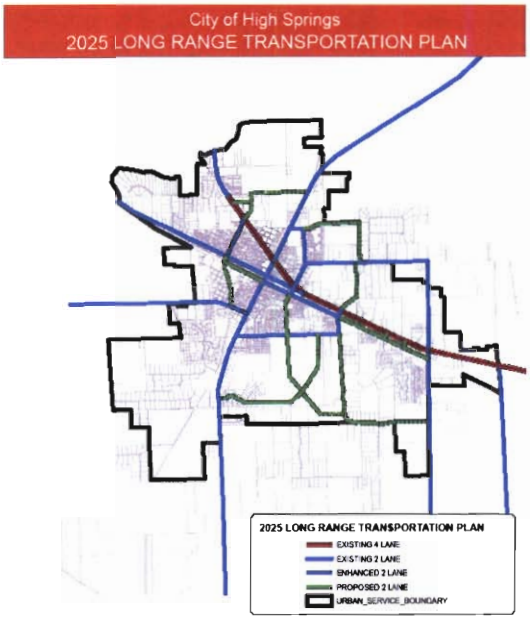
- Adopt the Master Thoroughfare Plan Map by reference;
- Define the roadway classification system to be used;
- Establish corridor standards such as planned roadway configuration and right-of-way width;
- Define the relationship of the Master Thoroughfare map with other plan elements such as an "urban service area"; and
- Authorize the adoption of a "corridor preservation ordinance.

Long Range Transportation Plan

The **LRTP** is a required element of the Transportation Plan and typically reflects the 20 year planning horizon of the comprehensive plan. The LRTP is the "cost affordable" plan and shows those transportation improvements that are programmed or planned during the planning period.

LRTP's are typically coordinated with regional transportation plans developed by metropolitan planning organizations, regional planning councils and FDOT.

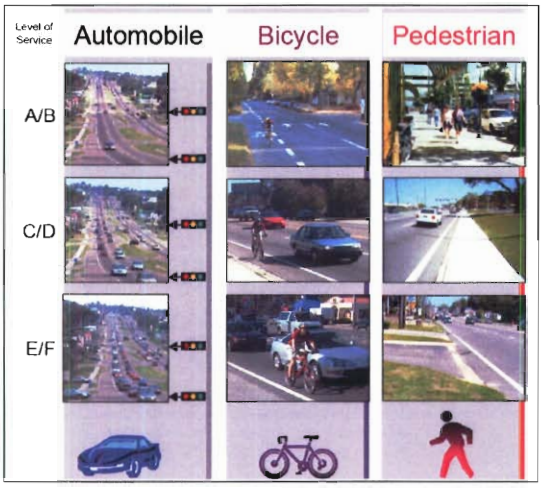
The **LRTP** should by established as an objective within the Transportation Element. Supporting policies should adopt the Long Range Transportation Map by reference, and define the roadway classifications that apply to the LRTP. Information and data regarding the various segments of the transportation system may also in adopted as policy or by reference.



Level of Service Standards

Level of Service standards (LOSS) should be established in the Transportation Element as an objective. Supporting policies should define the LOSS for each type of roadway.

The addition of pedestrian, bicycle and , where appropriate, transit LOS standards should included consistent with the principles and techniques described in Chapters 3 & 4 of this Guide. Pedestrian and bicycle LOS standards may be applied generally or may be applied only in designated areas. If this approach is used, the policies should clearly define the geographic areas where these standards apply.

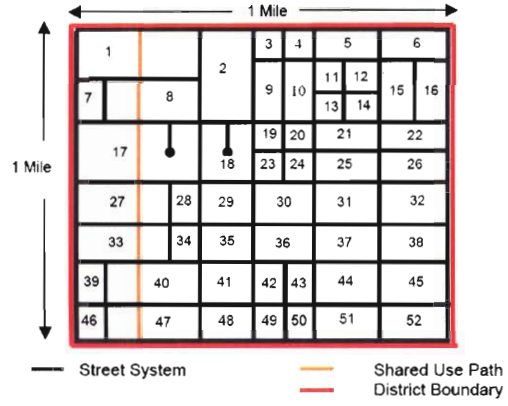


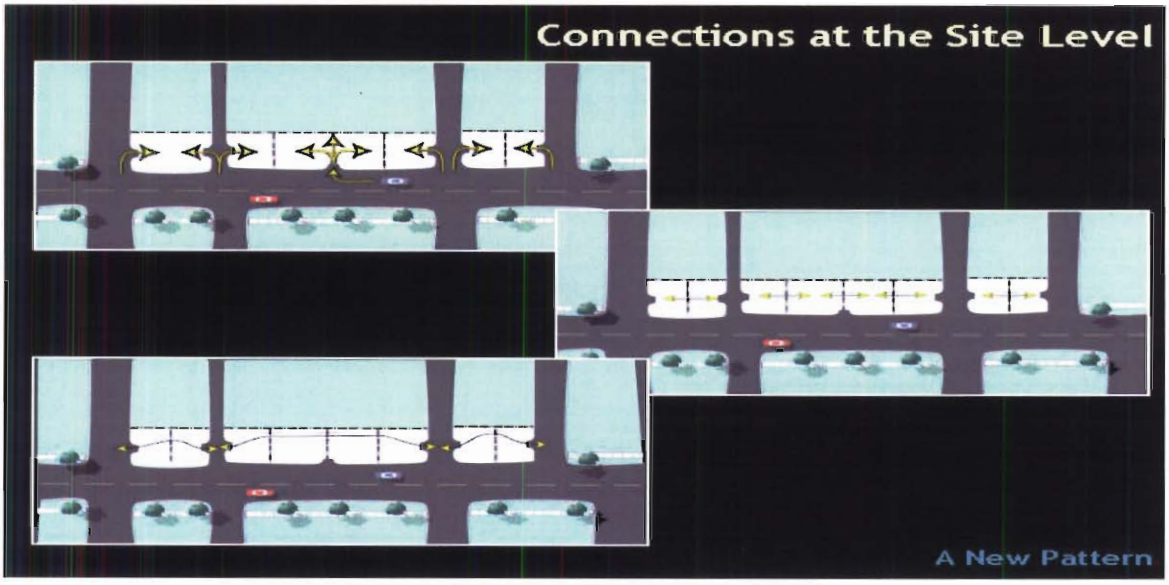
Connectivity

The development of an interconnected network is an essential component of a balanced transportation system.

Connectivity should be established as an objective within the Transportation Element. Supporting policies should articulate the connectivity standards that will apply (such as spacing criteria) and how connectivity is to be determined.

Pedestrian and bicycle should not be overlooked especially if walkability is given high priority.





Access Management

The effective management of access to the transportation system serves to preserve capacity and to promote efficient use of the transportation network. Requirements and standards for access management should be established as an objective within the Transportation Element

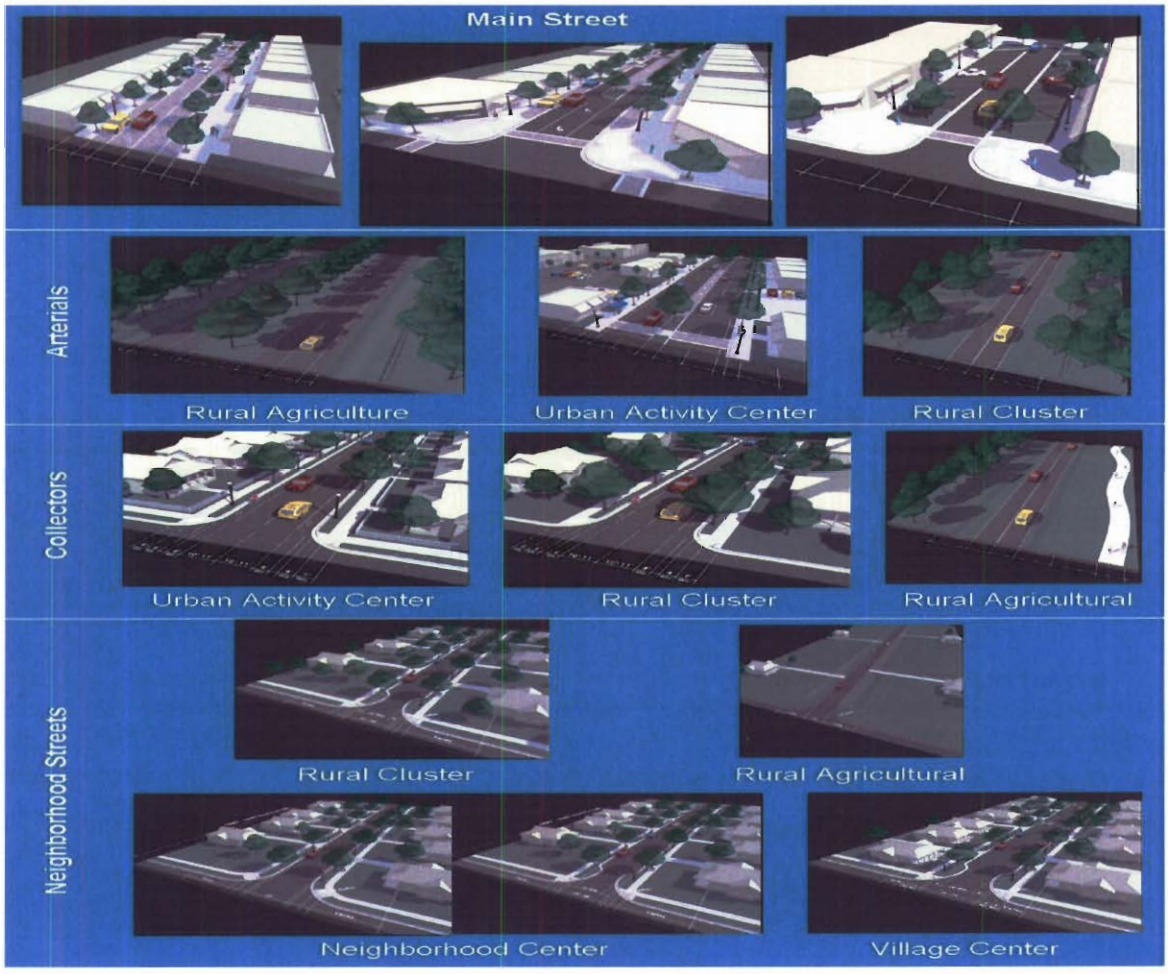
Supporting policies should establish standards for (1) access management on public rights of way (the location of median openings and street spacing), (2) property access for homes and businesses, and (3) cross-access for adjoining properties.

Community Character & Context-Sensitive Design

The design of roadways, parking facilities and other transportation elements strongly influences livability. The introduction of "context-sensitive" design can dramatically alter the land use – transportation interface for the betterment of the community. The concept of design as an element of livability should be introduced into the Transportation Element as a **goal**.

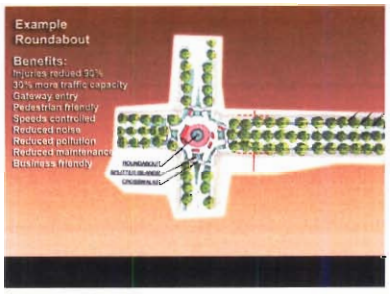
Context Sensitive Design means that the character and function of the land use adjoining a roadway should be as important as traffic characteristics in its design. This concept should be established as an objective in the Transportation Element. Supporting policies should establish design and streetscape standards to be applied in various settings.

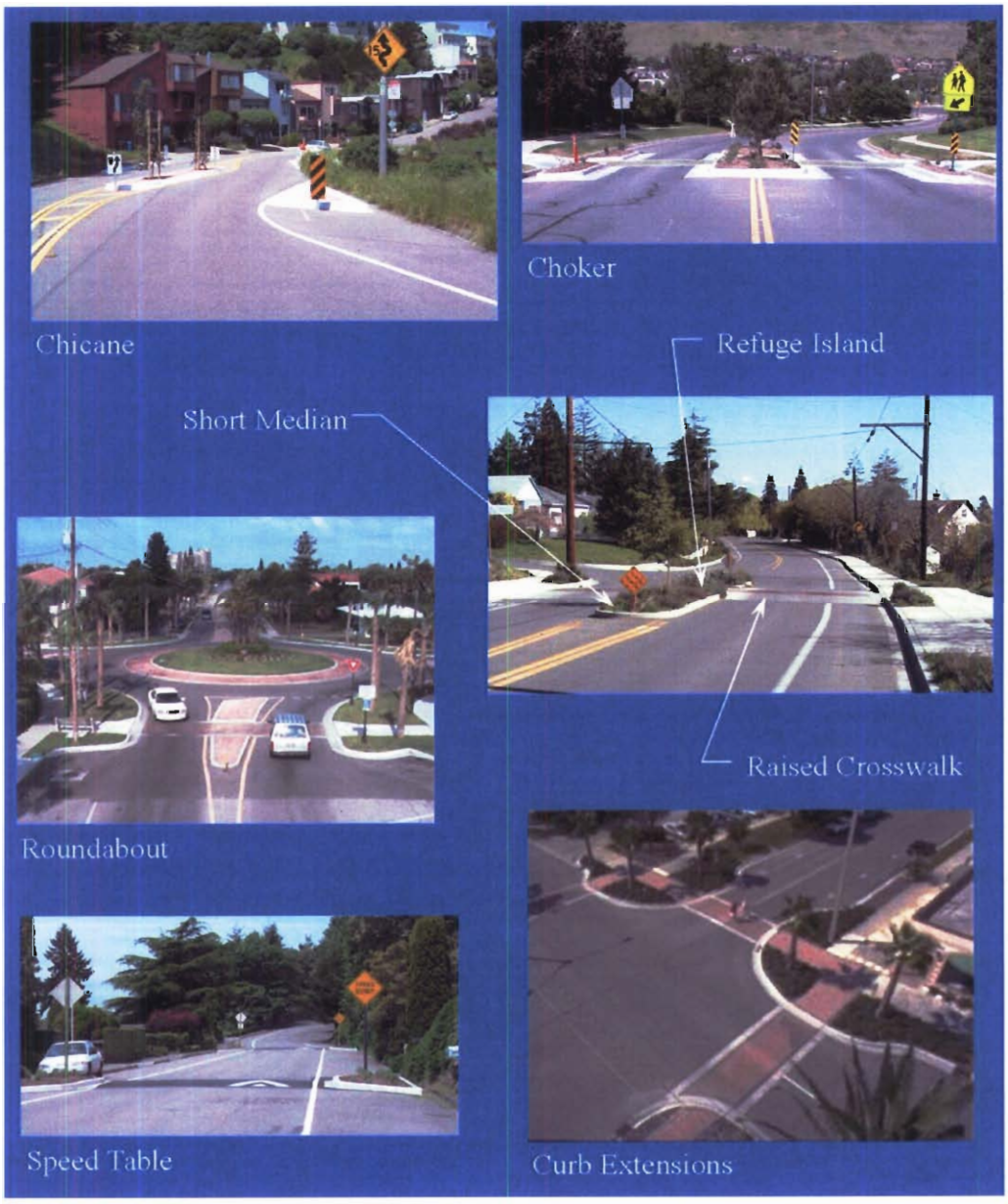
The design element of the plan can perhaps best be addressed by the use of graphics. Either integrated into the plan it self or adopted by reference. For example, the High Springs plan (pilot study) adopts the Alachua County Corridor Design Manual. The policies should clearly state where and how the design standards are to be applied.



Traffic Calming

Traffic calming measures are widely used but most often as a means of taming traffic where too many cars are moving too fast. The techniques are also powerful design tools that can make all roads more livable, pleasant and functional. The introduction of traffic calming as an objective in the Transportation Element can expand and even mandate traffic calming as a "context sensitive" design technique.




Chicane
Choker
Refuge Island
Short Median
Raised Crosswalk
Roundabout
Speed Table
Curb Extensions

Parking Management

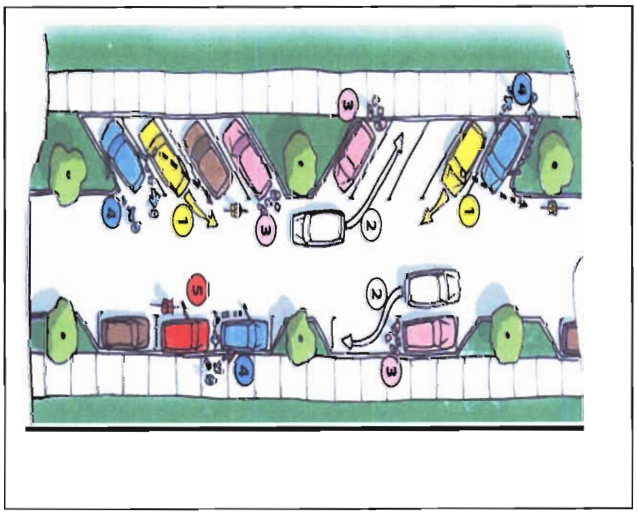
Parking requirements, location and the design of parking facilities should be addressed as an n objective of the Transportation Element especially for application in downtowns, villages centers and other areas where walkability is a priority.

The supporting policies may that:

- Minimum off-street parking standards shall be prescribed by the Land Development Code;
- Facilitate cross access;
- Allow a parking bonus for properties which share both cross access and a common entrance drive.
- Shared parking is encouraged;
- Parking areas between the buildings they serve and the public street is discouraged;
- Landscaping shall be used to breakup large expanses of parking;
- Pedestrian access from the parking space to the building shall be required;
- Pervious pavements are encouraged;
- The Land Development Code may include provisions for the treatment of infrequently used spaces with pervious materials.
- Provide a parking credit for the preservation of large trees

Parking in the downtown core especially benefit from parking management policies such as:

- Maximum parking allowances for downtown activities;
- No off-street parking requirements for Main Street businesses and other appropriate activities and locations;
- The enhancement of common parking facilities to satisfy parking demand; and
- The implementation of innovative parking techniques such as "back-in angle" parking

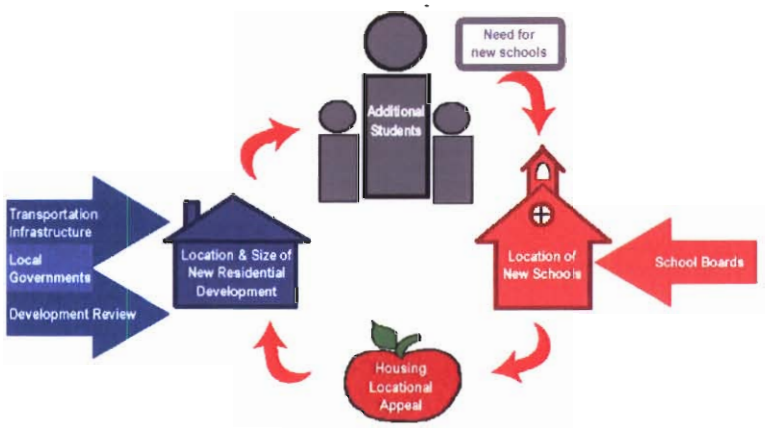


Safe Routes to School

Don't forget about schools. There is probably no greater opportunity to enhance livability through transportation than offered by the "walk to school."

Include the "safe routes" to school concept as an objective in the Transportation Element. Supporting policies should address:

- Emphasis of pedestrian and bicycle safety within walking distance of schools;
- Emphasis on safety and the removal of impediments to walking for roads near schools;



- Traffic calming and other design techniques in the vicinity of schools; and
- The consideration of safety and walkability in school siting decisions

Future Land Use Element

The innovative land use concepts that support a balanced approach to transportation planning are primarily contained in the Future Land Use Element. Those components that are especially important are described in this section.

Urban Form

The Future Land Use Element by definition defines the community's urban form. Desirably, the various urban form alternatives have been evaluated and a preferred alternative has been selected and endorsed through a visioning process. Typically, a least three urban form alternatives can be considered:[1]

Compact Urban Form – creates a high quality walking, bicycling, and transit-supportive environment with a focus on reinvestment in the traditional core area. This form reflects a greater mix of land uses and increased density of development. Proposed transportation projects would include reducing the number of travel lanes on certain roads to create a more pedestrian environment, enhancing bus service, developing on-land off-road trails, and constructing a dedicated lane for transit vehicles.

Town/Village Center Concept – focuses on the region's transportation system on connecting a limited number of intensively developed, mixed use centers of activity located throughout the County and on maintaining the character of existing towns and neighborhood villages. Small cities may themselves fit the criteria of a town or village

[1] Integrating Land Use and Transportation *by Whit Blanton*

Radial Development Pattern – creates a transportation system serving mixed use centers located along major linear corridors linking outlying neighborhoods.

Urban Service Areas

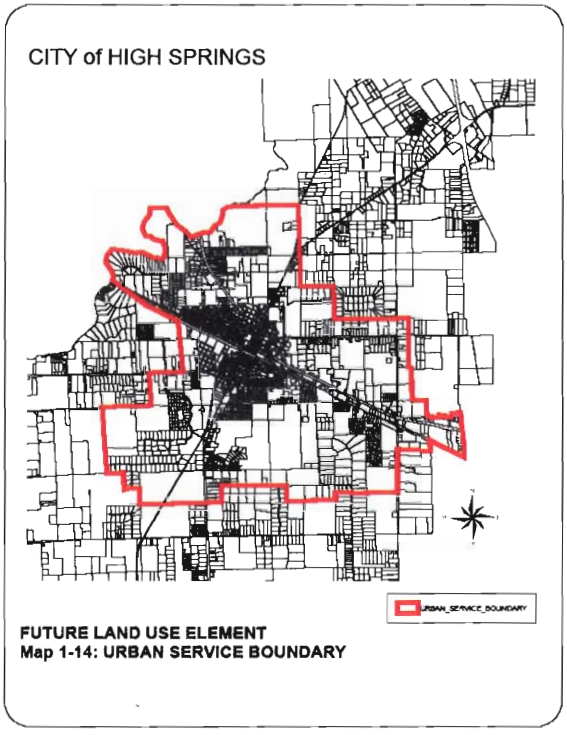
The new optional visioning and urban service area provisions could also significantly impact the development process. As an incentive for local governments, the legislation provides that plan amendments located within the urban service area shall be exempt from DCA review and processed as small scale amendments and that development within the urban service area shall be exempt from development of regional impact ("DRI") review. Existing comprehensive plans with previously established urban service areas can also qualify for the incentives, provided that DCA determines in writing that the existing service area meets the statutory requirements.

DCA's determination is not subject to any form of administrative challenge. This provision may provide an opportunity to expedite larger scale developments without undergoing plan amendment and DRI review in some jurisdictions. However, the local government must limit the potential land use allocations within the urban service area to the projected need for only a 10-year period, which may significantly constrain intensive infill and redevelopment opportunities within some jurisdictions. Local governments must also enter into binding agreements with the Department of Transportation ("FDOT") and adjacent jurisdictions to define how mitigation of state and regional roadways will be addressed.

Visioning and Urban Service Boundaries

This provision of Chapter 163;

- Provides incentives, including exemption from DCA review of comprehensive plan future land use map ("FLUM") amendments and DRI exemption, if a local government complies with optional visioning provisions, including the adoption of urban service boundaries;
- DRI exemption provided the local government has entered into a binding agreement with adjacent jurisdictions and FDOT regarding mitigation of impacts on state and regional transportation facilities, and has adopted a proportionate share methodology.
- Allows local governments to submit data and analysis to DCA to determine if an existing urban service area would qualify and DCA's determination is not subject to administrative challenge



FUTURE LAND USE ELEMENT
Map 1-14: URBAN SERVICE BOUNDARY

- Amendments submitted to implement results of visioning are exempt from twice per year limitation on plan amendments

- Optional visioning meetings and public hearings must include discussions related to topics such as open space, natural resources, affordable housing, mixed use, growth projections and urban boundaries

- Urban service boundaries be based on growth and infrastructure needs projected for a 10-year planning period, must be supported by a financially feasible 10-year capital improvements schedule, but cannot exceed the amount of land required for projected growth over the 10 year planning period.

Mixed Use

The mixed-use categories combine retail, service and other commercial uses with office and/or residential use in the same building or on the same site. Mixed-use areas can create vibrant pedestrian-oriented urban environments by bringing complementary activities and public amenities together in one location at various scales. Mixed-use areas create higher density, pedestrian-friendly environments where the variety of uses enables people to live, work, play, and shop in one place. The proximity of diverse uses and pedestrian orientation of these areas make it possible to reduce vehicular trips.

To support new land use policies aimed at promoting more compact, sustainable development patterns— reducing auto trips, increasing connectivity, encouraging walking and the use of transit, and expanding the supply of higher density, affordable housing near employment and activity centers—the Future Land Use Map should set aside significant amounts of land to a variety of mixed use forms throughout the City.

Community Mixed Use can be applied to large tracts of undeveloped land which may be appropriate for creatively planned communities, where a mix of residential types and densities are complemented by supporting retail, small to medium-scale office development, and integrated open spaces. Compatibility among these various uses can be maintained through design standards that address the locations, character of, and relationships between uses, while affording greater development flexibility than provided by standard zoning district classifications. Instead of specifying a range of allowable residential densities, the residential mixed-use designation encourages a balanced mixture of residential types as the predominant use in this category, at densities consistent with those provided for each housing type in the base residential categories described previously. Examples of development that can be accommodated by this category include traditional neighborhoods and planned development communities.

Neighborhood Mixed Use applies to smaller areas of mixed non-residential use within existing and new neighborhoods. Neighborhood mixed use areas often abut key roadway corridors and function as gateways into the neighborhoods they serve. These compact—and often "walk-to"—centers provide limited retail goods and services to a local customer base, while having minimal impact on the surrounding residential uses. They accommodate mixed-use development as well as mixed use buildings with neighborhood-serving retail, service, and other uses on the ground floor, and offices or residential units above the nonresidential space.. Uses in these areas might

include a corner store, small grocery store, coffee shops, hair salons, dry cleaners and other personal services, as well as small professional offices. Neighborhood commercial areas may also include churches, schools, and small parks. In new neighborhoods, in particular, the exact size, location, and design of these areas would be subject to a more specific approval process, to ensure an appropriate integration into the neighborhood context.

Employment Mixed Use applies to undeveloped land located at strategic locations which may designated for well planned, larger scale employment and business activities, as well as supporting uses such as retail, services, and hotels. Primary uses include offices, flex offices, and technology research and development, as well as environmentally friendly manufacturing. These uses should be encouraged to develop in a campus-like "corporate park" setting with generous, linked open space to maximize value and promote visual quality and compatibility with the surrounding area. The category also accommodates moderate intensity uses such as office, office research, and office warehouse uses. These areas often act as a transition between more intensely developed commercial uses and residential neighborhoods. For this reason, standards should be developed to ensure that development of these activities is compatible with the character of the surrounding area. Industrial uses already exist or are anticipated to continue for the foreseeable future are a part of this designation. Such uses include light industrial uses such as manufacturing, assembly, wholesaling and distribution activities. Care should be taken to protect adjacent uses from adverse impacts potentially associated with these uses (truck traffic, outside storage, etc.), such as using buffering, performance-based development standards, and avoidance of noxious uses.

Capital Improvements Element

The Capital Improvements Element (CIE) defines how your community plans to pay for the transportation improvements. The CIE has both a long term component reflected in the "cost affordable" Long Range Transportation Plan (typically a 20 year horizon) and the much shorter term "capital improvements program" (typically six years). Florida statutes require that the CIE be updated annually and that any planned transportation improvements on which concurrency approvals are based must be "financially feasible".

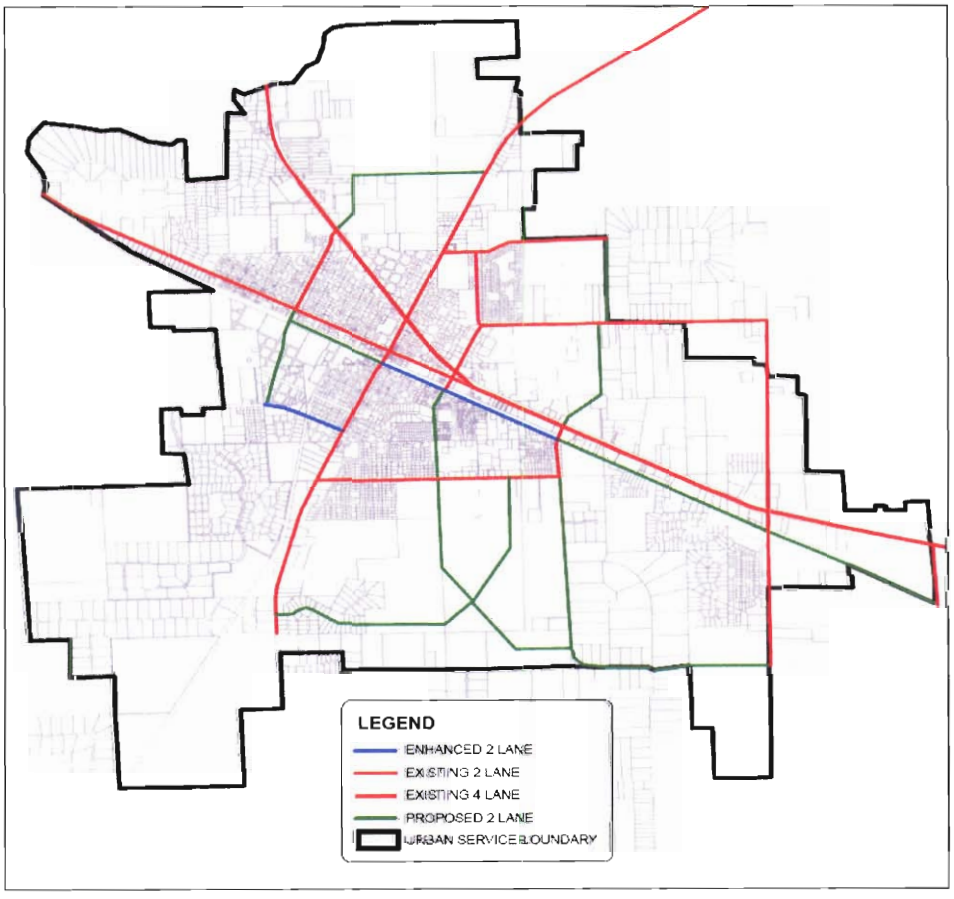
In short, the CIE contains a list of transportation projects that your city plans to build. The CIE should contain objectives or policies addressing the following topics:

- the preparation of an annual list of roadway improvements along with estimated cost and funding source;
- a system for the setting of priorities for transportation investment;
- a requirement that new development bear the full cost of internal transportation improvements and a proportionate share of off-site improvements; and
- the appropriateness of impact fees to defray the transportation cost attributed to new development

The Department of Community Affairs has produced "A Guide to the Annual Update of the Capital Improvements Element" This Guide can be found on the FDCA website

Ten Year Transportation Capital Improvements

Project	Dimension	Cost	Source
222nd St – Palm Ave to Connector A	1.71 mi	$2.0 mil	City / Developer Contribution
Connector A	.69 mi	$0.7 mil	Developer
Tillman Blvd	2.1 mi	$2.0 mil	Developer
6th St – Palm Ave to 222nd St	1.6 mi	$1.5 mil	Developer
6th St – 1st Ave to Palm Ave	0.7 mi	$1.0 mil	City
222nd St – US 441 to 190th Ave	0.7 mi	$0.7 mil	Developer
222nd St – 190th Ave to 198th Ave	0.6 mi	$0.6 mil	Developer
198th Ave – 222nd St to NE 6th Blvd	0.7 mi	$0.7 mil	Developer
Connector B	1.2 mi	$1.2 mil	Developer
9th St – Poe Springs Rd to 1st Ave (US 27)	0.7 mi	$0.8 mil	City / Developer Contribution
Railroad Ave – 9th St to 222nd St	1.7 mi	$1.0 mil	City
Railroad Ave – 222nd St to CR 202	1.4 mi	$1.6 mil	City / Developer Contribution
Railroad Avenue – CR 202 to Alachua City Limits	1.0 mi	$1.2 mil	City / Developer Contribution



IMPLEMENTATION TOOLS

Corridor Preservation Ordinances

Corridor preservation provides numerous benefits to communities, taxpayers, and the public at large.

- Preserving right-of-way for planned transportation facilities promotes orderly and predictable development. As communities grow and metropolitan areas expand, land must be set aside for the transportation infrastructure needed to support development and to maintain a desired level of transportation service. The decisions each community makes regarding the location and design of this transportation network will have a lasting impact on growth patterns, community design, and modal alternatives. For these reasons, effective corridor preservation is critical to accomplishing a wide range of community planning objectives.

- Corridor preservation minimizes damage to homes, businesses, and the corresponding costs of acquiring right-of-way when improvements are made. Right-of-way costs often represent the single largest expenditure for transportation improvement, particularly in growing urbanized areas where transportation improvement needs are the greatest.

- Corridor preservation reduces adverse social, economic, and environmental impacts on people and communities. The social and economic costs of relocation can be high for some communities, particularly low-income, ethnic, or elderly populations and small businesses that cater to a local population. In addition, where viable transportation corridors are foreclosed by development, roadways may need to be relocated into more environmentally sensitive areas, thereby increasing adverse impacts on the environment.

- The private sector benefits from greater clarification of public intentions regarding the location, timing of roadway improvements, and the desired level of access control. This reduces the risk associated with the timing and phasing of development projects. Advanced notice of public corridor preservation intentions also enables developers to plan projects and site-related improvements in a manner that is more compatible with the planned transportation functions of the corridor.

Legal and political concerns have caused many agencies to take a conservative approach to right-of-way preservation that focuses on widely accepted or less controversial methods. The most accepted technique is fee simple purchase of land for transportation right-of-way. Most local agencies also employ basic policy tools, such as building setbacks from road rights-of way, and many have subdivision regulations that provide for dedication of local subdivision roads. Local agencies also attempt to obtain voluntary donations or dedications of right-of way for planned improvements on a case-by-case basis during the land development process.

However, a variety of other tools are available to preserve right-of-way and mitigate hardship on property owners. These include density credits, regulatory controls, options to purchase, interim use agreements, land banking, and purchase of development rights.

What is lacking in most communities is a systematic program for preserving right-of-way and managing access that uses the full range of governmental powers and tools to their maximum advantage.

Below is an overview of changes in Florida transportation and growth management law that provide the foundation for a more systematic, proactive approach to corridor preservation that is grounded in local comprehensive plans and codes.

.Florida's Corridor Management Legislation. In 1995, the Florida legislature amended state transportation planning law (Chapter 337, F.S.), and the "Growth Management Act" (Chapter 163, F.S.), to greatly expand the local role in right-of-way preservation.

The policy shift was designed to encourage closer coordination between the FDOT and local governments on preserving right-of-way for planned facilities.
It was also a logical outgrowth of the *Palm Beach County v. Wright* opinion supporting corridor management efforts in the context of local comprehensive planning and growth management programs.

The intent of the amendments was to coordinate transportation and land use planning through local comprehensive plans for a variety of legitimate public purposes. As noted in the amendments:

> "Transportation corridor management means the coordination of the planning of designated future transportation corridors with land-use planning within and adjacent to the corridor to promote orderly growth, to meet the concurrency requirements of this chapter, and to maintain the integrity of the corridor for transportation purposes." §163.3164, F.S.

Rather than designating corridors for preservation in the Florida Transportation Plan, the amendments called for designation of state highway corridors in local comprehensive plans. The amendments also replaced the term "corridor protection" with "corridor management" to reflect the desired emphasis on providing for compatible development along designated corridors, as opposed to strictly limiting development.

Local governments were authorized to adopt transportation corridor management ordinances to manage development in an along designated corridors. The new statute called for transportation corridor management ordinances to include the following:

- Criteria to manage land uses within and adjacent to the corridor;
- The types of restrictions on residential and nonresidential construction within the corridor;
- Uses that are permitted within the designated corridor;
- A public notification process for notifying affected property owners of the corridor designation; and
- An intergovernmental coordination process that provides for the coordinated management of transportation corridors with the plans of adjacent jurisdictions.

Local governments were directed to notify the FDOT before approving any rezoning, building permit, subdivision change, or other permitting activity that would substantially impair the future viability of the corridor for transportation purposes. The intent of this provision was to provide FDOT an opportunity to determine whether to purchase the affected property or initiate eminent domain proceedings. Early monitoring of corridor development activity would also provide FDOT an opportunity to identify problems and negotiate acceptable alternatives.

Corridor Preservation In The Comprehensive Plan

In determining the validity of local regulatory actions, courts review whether the action is consistent with and based upon a local comprehensive plan. Therefore, it is essential that local corridor management programs have a strong foundation in the comprehensive plan. The *Palm Beach County* case clarified that corridor preservation under Florida law begins with the designation of transportation corridors in the state-mandated local comprehensive plan, and is supported by goals, objectives and policies that are adopted in accordance with Chapter 163 and Rule 9J-5, FAC.

Corridor management programs should also be tied to valid public purposes as indicated in Florida law (§163.3164, F.S.), which are "to promote orderly growth, to meet the concurrency requirements of this chapter, and to maintain the integrity of the corridor for transportation purposes." Programs or regulations with an unclear purpose or that are aimed primarily at reducing right-of-way acquisition costs have been deemed unconstitutional.

Transportation corridors are designated for preservation in the transportation element of the local comprehensive plan. The plan should identify transportation projects expected to be completed in the planning horizon, particularly those projects that are part of the MPO cost feasible plan, the state transportation improvement program, and the local capital improvements program.
Some communities also take longer-term approach and designate future transportation corridors that are not "financially constrained," including corridors in the MPO "needs" plan and other collector or arterial roadways deemed locally important to the efficiency of the transportation network.

Right-of-way needs for each planned transportation facility will need to be determined, based upon typical (or corridor specific) cross-sections, and then mapped. This map effectively designates a corridor for preservation and should be part of the comprehensive plan or a thoroughfare plan that is referenced in the comprehensive plan. Goals, objectives and policies for corridor preservation and access management should be included in the transportation element of the comprehensive plan to establish the strategic and policy intent of the community.

Access Management Standards

Access management is similar to corridor preservation. The difference is that it deals primarily with existing facilities, although it can also be applied to planned facilities. Access management is important in the preservation of capacity on existing transportation facilities. It is primarily accomplished by controlling adjacent land use, and the property access/local street connections.

Access Management is the careful planning and systematic control of the location, design, spacing, and placement of driveways, median openings, interchanges, and street connections and traffic signals. The goal of access management is to reduce traffic conflicts caused by increased traffic congestions and delays, increase public safety, and provide access to land development to preserve the efficiency of the transportation system. .

Access management is important for a number of reasons. Without good access management, increased traffic congestion, delays, and vehicle collisions result. Additionally, pedestrians and cyclists are at a greater risk as more cut-through traffic results in residential areas. Limiting access management often leads to a decrease in roadway efficiency and an increase in overburdened roadways. This in turn leads to greater fuel consumption, commuting time, frustrated motorists, and traffic delays.

Concurrency Management

What is Concurrency?[2] Concurrency is the growth management concept intended to ensure that the necessary public facilities are available concurrent with the impacts of development. To carry out transportation concurrency, local governments must define what constitutes an adequate level of service (LOS) and measure whether the infrastructure and service needs of a new development exceed existing capacity and/or new capacity created by any scheduled improvements in the Capital Improvements Element (CIE) of the local government comprehensive plan. Concurrency entered into Florida law in 1985, through F.S. 163.3180.

What happens if there is not enough capacity on the road? If adequate capacity is not available, the local government cannot permit development unless certain conditions apply as provided for in statute, such as exceptions for developments having only minor impacts, or concurrency exception areas to encourage infill and redevelopments.

Each local government is required to adopt by ordinance a method for assessing proportionate fair-share mitigation options if adequate capacity is not available. If the developer chooses the proportionate fair-share option, they may be allowed to proceed with development.

What is a concurrency management system used for? Local governments use Concurrency Management Systems (CMS) to monitor and maintain LOS as a result of the various impacts from approved developments. In addition, a CMS can also be used as a planning tool to estimate transportation facility needs and to update capital improvement plans. Each CMS can

[2] Working with Transportation Concurrency management Systems, FDOT Volume 1, September 2006

be slightly different, but usually consists of a spreadsheet and supporting documentation, including the procedures for maintaining the system and the requirements for applicants to submit traffic impact analyses. The basic requirement of each CMS is that it quantifies existing traffic volumes and capacities and the approved development trips for each roadway link in the local government's jurisdiction. Once each development is constructed, these trips would be added to the link volumes of the spreadsheet following the update of traffic counts as part of the normal maintenance of the CMS.

Local governments can also use the Concurrency Management System as a tool to develop the local government's Capital Improvement Plan (CIP), which identifies capacity projects necessary to achieve and maintain adequate levels of service as outlined in their comprehensive plan. As impacts from new developments are logged into the CMS, existing and future year deficiencies can be identified and addressed in the local government's CIP. For example, the local government can coordinate with FDOT to ensure that LOS standards on key corridors are maintained. This can be accomplished by looking at needs in the local government jurisdiction and determining if the deficiencies are addressed in the FDOT Work Program (WP) or a Metropolitan Planning Organization (MPO) long-range transportation plan (LRTP). If the corridor deficiency is not in the FDOT WP, it may be possible to move the project up on the list of LRTP projects so that it will be addressed sooner.

What are the general concurrency requirements for local governments? For the purpose of the issuance of development orders and development permits, local governments must adopt level of service (LOS) standards for roads and transit service located within the area for which such local government has authority to issue development orders and development permits.

Each local government is required to adopt, as a component of the comprehensive plan, objectives, policies and standards for the establishment of a concurrency management system. The concurrency management system must include:

- A requirement that the local government shall maintain the adopted LOS standards for roads and transit, if applicable.
- A requirement that the local government CIE sets forth a financially feasible plan which demonstrates that the adopted LOS standards will be achieved and maintained.
- A system for monitoring and ensuring adherence to the adopted LOS standards, the schedule of capital improvements, and the availability of transportation capacity.
- Guidelines for interpreting and applying LOS standards to applications for development orders and development permits and determining when the test for concurrency must be met. The latest point in the application process for the determination of concurrency is prior to the approval of an application for a development order or permit which contains a specific plan for development, including the densities and intensities of development.
- A requirement that the local government shall adopt land development regulations which specify and implement provisions of the concurrency management system and, as a minimum, provide a program that ensures that development orders and development permits are issued in a manner that will not result in a reduction in the levels of service below the adopted LOS standards for the affected facility.